



Product information

Process pressure

Pressure sensors

VEGABAR 18, 19

VEGABAR 28, 29

VEGABAR 38, 39



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Take note of safety instructions for Ex applications



Please note the Ex specific safety information which you can find on our homepage www.vega.com/downloads under "Approvals" and which comes with every instrument. In hazardous areas you should take note of the corresponding 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 Measuring principle

1.1 Measuring cell technology

VEGABAR 18, 28, 38

The sensor element is the Mini-CERTEC® measuring cell with robust ceramic diaphragm. The process pressure deflects the ceramic diaphragm and causes a capacitance change in the measuring cell. This capacitance change is converted into an electrical signal and outputted as measured value via the output signal.

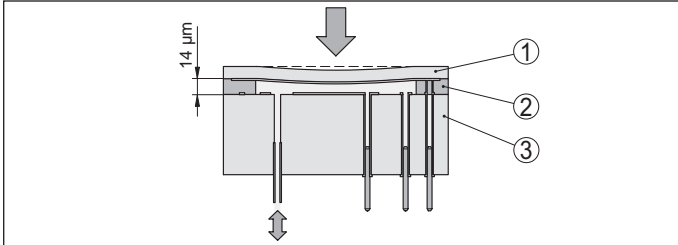


Fig. 1: Configuration of the Mini-CERTEC® measuring cell

- 1 Process diaphragm
- 2 Glass joint
- 3 Base element

A temperature sensor in the electronics of the Mini-CERTEC® measuring cell measures the current process temperature. The temperature value is output via Bluetooth or the display.

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The process pressure acts on the sensor element via the metallic process diaphragm. The process pressure causes a resistance change which is converted into a corresponding output signal and output as measured value.

Measuring ranges up to 100 bar: piezoresistive sensor element with internal transmission liquid is used.

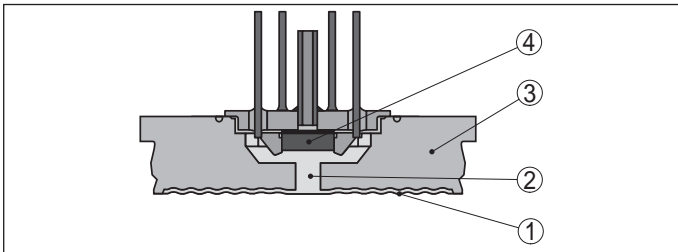


Fig. 2: Configuration of the measuring system with piezoresistive sensor element

- 1 Diaphragm
- 2 Isolating liquid
- 3 Base element
- 4 Sensor element

For measuring ranges above 250 bar, a strain gauge (DMS) sensor element (dry system) is used.

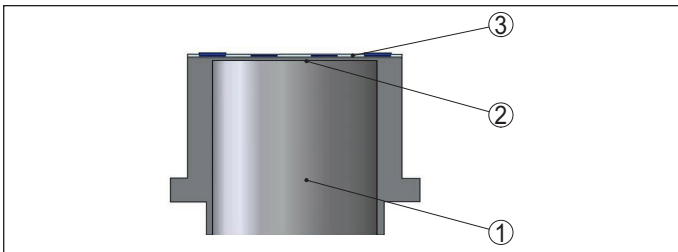


Fig. 3: Configuration of the measuring system with strain gauge (DMS) sensor element

- 1 Pressure cylinder
- 2 Process diaphragm
- 3 Sensor element

2 Type overview

VEGABAR 18



VEGABAR 19



VEGABAR 28



| | | | |
|-------------------------------------|---|--|---|
| Measuring cell | Mini-CERTEC® | Piezoresistive/DMS | Mini-CERTEC® |
| Diaphragm | Ceramic | Metal | Ceramic |
| Media | gases, vapours and liquids, also with abrasive substances | Gases, vapours and liquids, also aggressive products | gases, vapours and liquids, also with abrasive substances |
| Process fitting | Thread from G½, ½ NPT | Thread from G½, ½ NPT | Thread from G¼, ¼ NPT Hygienic fittings from DN 25 |
| Material Process fitting | 316L | 316L | 316L |
| Material Diaphragm | Al ₂ O ₃ ceramic | 316L | Al ₂ O ₃ ceramic |
| Measuring cell seal | FKM | - | FKM, EPDM, FFKM |
| Isolating liquid | Dry measuring system | Synthetic oil | Dry measuring system |
| Measuring range | 0 ... +25 bar/0 ... +2500 kPa (0 ... +362.6 psig) | -1 ... +100 bar/-100 ... +10 MPa (-14.5 ... +1450 psig) | -1 ... +60 bar/-100 ... +6000 kPa (-14.5 ... +870.2 psig) (-14.5 ... +14500 psig) |
| Smallest measuring range | 0.1 bar/10 kPa (1.45 psig) | 0.4 bar/40 kPa (5.802 psig) | 0.1 bar/10 kPa (1.45 psig) |
| Process temperature | -40 ... +100 °C (-40 ... +212 °F) | -40 ... +100 °C (-40 ... +212 °F) | -40 ... +130 °C (-40 ... +266 °F), +150 °C (+302 °F) with brief vapour stratification |
| Deviation | < 0.5 % | < 0.5 % | < 0.3 % |
| Signal output | ● 4 ... 20 mA | ● 4 ... 20 mA | ● 4 ... 20 mA ● Transistor ● IO-Link |
| Communication interface | - | - | Bluetooth |
| Indication | - | - | Coloured LED illuminated ring as operating status indication |
| Adjustment | - | - | Via app on smartphone or tablet via Bluetooth |
| Approvals ¹⁾ | - | - | ● c-UL-us, EAC, RCM ● ATEX/IEC ● EAC/SEPRO ● NEPSI/CCOE/IIIS/KOSHA ● INMETRO/IA |

¹⁾ Available or applied for

VEGABAR 29



VEGABAR 38



VEGABAR 39



| | | | |
|-------------------------------------|---|---|---|
| Measuring cell | Piezoresistive/DMS | Mini-CERTEC® | Piezoresistive/DMS |
| Diaphragm | Metal | Ceramic | Metal |
| Media | Gases, vapours and liquids, also aggressive products | gases, vapours and liquids, also with abrasive substances | Gases, vapours and liquids, also aggressive products |
| Process fitting | Thread from G¼, ¼ NPT Hygienic fittings from DN 25 | Thread from G¼, ¼ NPT Hygienic fittings from DN 25 | Thread from G¼, ¼ NPT Hygienic fittings from DN 25 |
| Material Process fitting | 316L | 316L | 316L |
| Material Diaphragm | 316L | Al ₂ O ₃ ceramic | 316L |
| Measuring cell seal | - | FKM, EPDM, FFKM | - |
| Isolating liquid | Synthetic oil | Dry measuring system | Synthetic oil |
| Measuring range | -1 ... +1000 bar/-100 kPa... +100 MPa (-14.5 ... +1450 psig) | -1 ... +60 bar/-100 ... +6000 kPa (-14.5 ... +870.2 psig) | -1 ... +1000 bar/-100 kPa... +100 MPa (-14.5 ... +1450 psig) |
| Smallest measuring range | 0.4 bar/40 kPa (5.802 psig) | 0.1 bar/10 kPa (1.45 psig) | 0.4 bar/40 kPa (5.802 psig) |
| Process temperature | -40 ... +130 °C (-40 ... +266 °F), +150 °C (+302 °F) with brief vapour stratification | -40 ... +130 °C (-40 ... +266 °F), +150 °C (+302 °F) with brief vapour stratification | -40 ... +130 °C (-40 ... +266 °F), +150 °C (+302 °F) with brief vapour stratification |
| Deviation | < 0.3 % | < 0.3 % | < 0.3 % |
| Signal output | <ul style="list-style-type: none"> ● 4 ... 20 mA ● Transistor ● IO-Link | <ul style="list-style-type: none"> ● 4 ... 20 mA ● Transistor ● IO-Link | <ul style="list-style-type: none"> ● 4 ... 20 mA ● Transistor ● IO-Link |
| Communication interface | Bluetooth | Bluetooth | Bluetooth |
| Indication | Coloured 360° switching status indication | Integrated display and adjustment unit Coloured 360° switching status indication | Integrated display and adjustment unit Coloured 360° switching status indication |
| Adjustment | Via app on smartphone or tablet via Bluetooth | Via app on smartphone or tablet via Bluetooth | Via app on smartphone or tablet via Bluetooth |
| Approvals ²⁾ | <ul style="list-style-type: none"> ● c-UL-us, EAC, RCM ● ATEX/IEC ● EAC/SEPRO ● NEPSI/CCOE/TIIS/KOSHA ● INMETRO/IA | <ul style="list-style-type: none"> ● c-UL-us, EAC, RCM ● ATEX/IEC ● EAC/SEPRO ● NEPSI/CCOE/TIIS/KOSHA ● INMETRO/IA | <ul style="list-style-type: none"> ● c-UL-us, EAC, RCM ● ATEX/IEC ● EAC/SEPRO ● NEPSI/CCOE/TIIS/KOSHA ● INMETRO/IA |

²⁾ Available or applied for

3 Instrument selection

Application area

With VEGABAR process pressure transmitters of series 10, 20, 30, pressures and levels of liquids, gases and vapours are detected. They are also developed for use in chemically aggressive liquids as well as in hazardous or hygienic areas.

Measured variables

The VEGABAR is suitable for the measurement of the following process variables:

- Process pressure
- Level

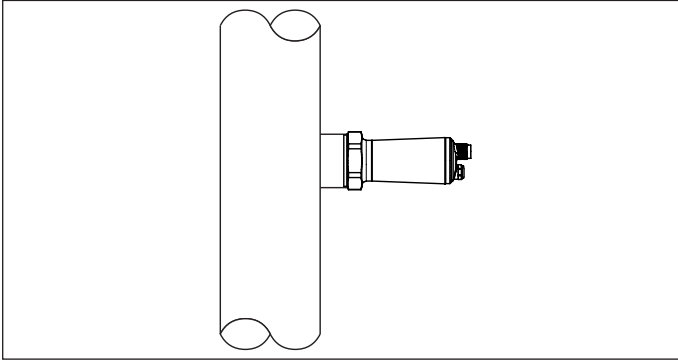


Fig. 4: Process pressure measurement

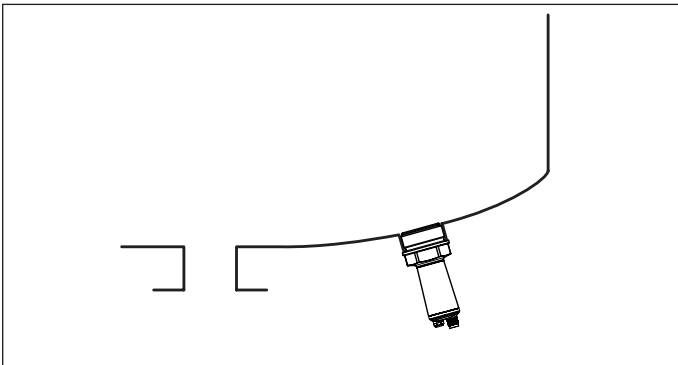


Fig. 5: Level measurement

Device overview

VEGABAR 18

The VEGABAR 18 pressure transmitter with ceramic measuring cell can be used universally for measurement of gases, vapours and liquids.

The device is an economical solution for a variety of applications in all industrial sectors.

VEGABAR 19

The VEGABAR 19 pressure transmitter with metallic measuring cell can be used universally for measurement of gases, vapours and liquids.

The device is an economical solution for a variety of applications in all industrial sectors.

VEGABAR 28

The VEGABAR 28 pressure transmitter with ceramic measuring cell can be used universally for measurement of gases, vapours and liquids.

The optional universal connection for hygienic adapters reduces the installation effort and economic stockkeeping.

VEGABAR 29

The VEGABAR 29 pressure transmitter with metallic measuring cell can be used universally for measurement of gases, vapours and liquids.

The optional universal connection for hygienic adapters reduces the

installation effort and economic stockkeeping.

VEGABAR 38

The VEGABAR 38 pressure transmitter with ceramic measuring cell can be used universally for measurement of gases, vapours and liquids.

The optional universal connection for hygienic adapters reduces the installation effort and economic stockkeeping.

The sensor has a display with on-site adjustment as well as a coloured 360° switching status indication.

VEGABAR 39

The VEGABAR 39 pressure transmitter with metallic measuring cell can be used universally for measurement of gases, vapours and liquids.

The optional universal connection for hygienic adapters reduces the installation effort and economic stockkeeping.

The sensor has a display with on-site adjustment as well as a coloured 360° switching status indication.

Configuration and housing protection classes

The pressure transmitters of series VEGABAR 10, 20, 30 are available in different materials, housing protection classes and connection techniques. The following illustrations show typical examples.

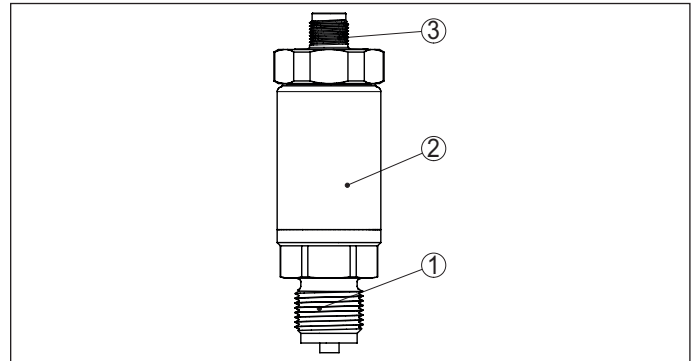


Fig. 6: VEGABAR 18 with plug connector acc. to ISO 4400 in protection rating IP65

- 1 Process fitting
- 2 Electronics housing
- 3 Plug connector

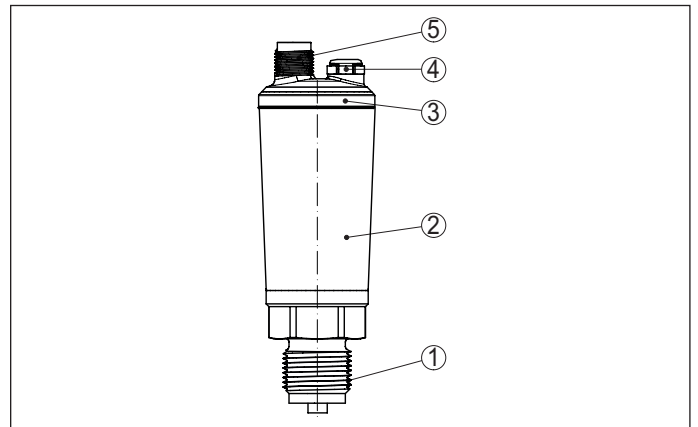


Fig. 7: VEGABAR 28 with M12 x 1 plug connector in protection rating IP66/IP67

- 1 Process fitting
- 2 Electronics housing
- 3 LED illuminated ring
- 4 Ventilation/pressure compensation
- 5 Plug connector

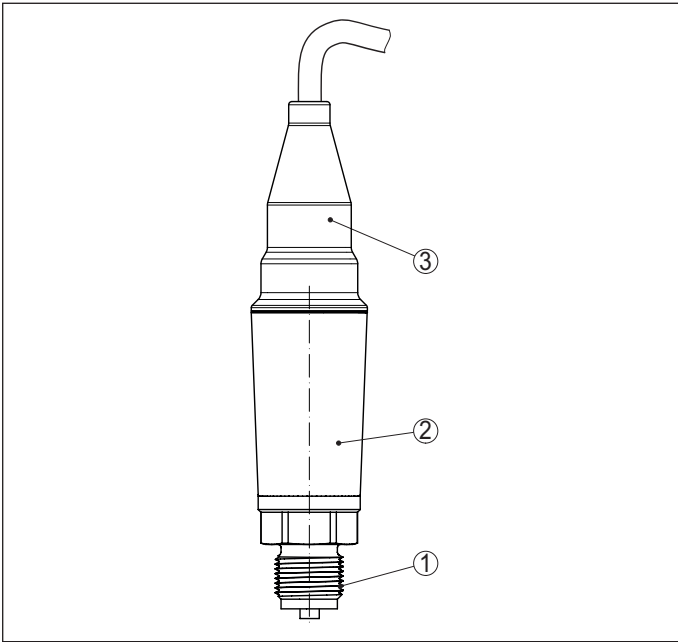


Fig. 8: VEGABAR 29 with direct cable outlet in protection rating IP66/IP68 (0.5 bar)/IP69

- 1 Process fitting
- 2 Electronics housing
- 3 Cable outlet

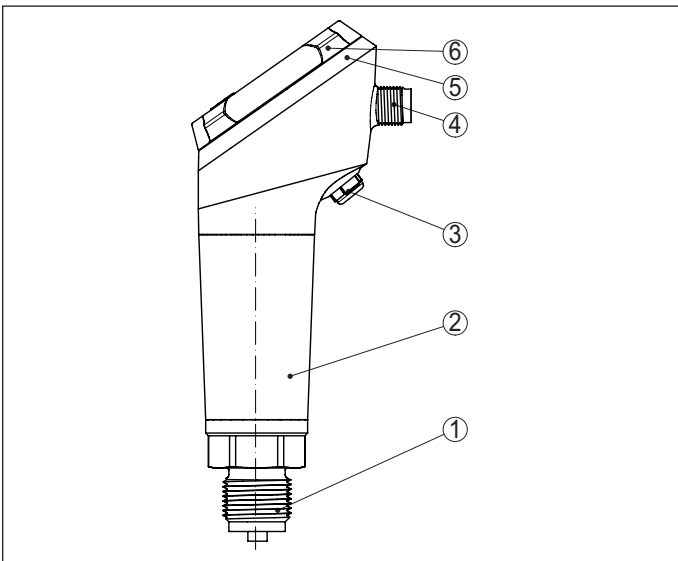


Fig. 9: VEGABAR 38 with M12 x 1 plug connector in protection rating IP66/IP67

- 1 Process fitting
- 2 Electronics housing
- 3 Ventilation/pressure compensation
- 4 Plug connector
- 5 LED illuminated ring
- 6 Display/adjustment unit

4 Selection criteria

| | | VEGABAR 18 | VEGABAR 19 | VEGABAR 28 | VEGABAR 29 | VEGABAR 38 | VEGABAR 39 |
|---------------------------|--------------------------------------|------------|------------|------------|------------|------------|------------|
| Wear through process | Aggressive products | - | ● | - | ● | - | ● |
| | Abrasive products | ● | - | ● | - | ● | - |
| Process temperature up to | +100 °C (+212 °F) | ● | ● | ● | ● | ● | ● |
| | +130 °C (+266 °F) | - | - | ● | ● | ● | ● |
| Measuring system | Dry | ● | - | ● | ● | ● | ● |
| | Oil-filled | - | ● | - | ● | - | ● |
| Version process fittings | Not front-flush | ● | ● | ● | ● | ● | ● |
| | Front-flush | - | - | ● | ● | ● | ● |
| | Hygienic | - | - | ● | ● | ● | ● |
| Largest measuring range | 60 bar (6 MPa) | ● | ● | ● | ● | ● | ● |
| | 100 bar (10 MPa) | - | ● | - | ● | - | ● |
| | 1000 bar (100 MPa) | - | - | - | ● | - | ● |
| Smallest measuring range | 0.1 bar (10 kPa) | ● | - | ● | - | ● | ● |
| | 0.4 bar (40 kPa) | - | ● | - | ● | - | ● |
| Vacuum applications | up to 1 mbar _{abs} (100 Pa) | ● | - | ● | - | ● | - |
| | up to 2 mbar _{abs} (200 Pa) | - | ● | - | ● | - | ● |
| Industries | Chemical | - | - | ● | ● | ● | ● |
| | Foodstuffs | - | - | ● | ● | ● | ● |
| | Paper | ● | ● | ● | ● | ● | ● |
| | Pharmaceutical | - | - | ● | ● | ● | ● |
| | Environment and recycling industry | ● | ● | ● | ● | ● | ● |
| | Water, waste water | ● | ● | ● | ● | ● | ● |

5 Mounting

Installation position

The instruments function in any installation position. But the installation position can influence the measurement, depending on the measuring system. This can be compensated by a position correction.

Mounting examples and measurement setups

The following illustrations show mounting examples and measurement setups.

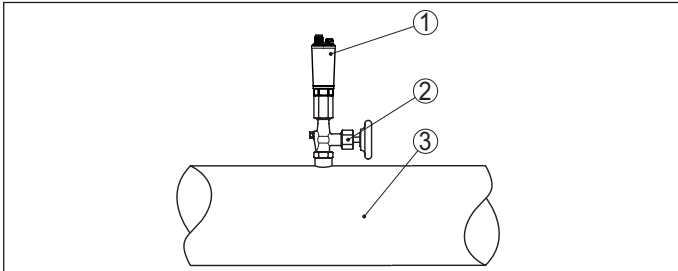


Fig. 10: Process pressure measurement of gases in pipelines

- 1 VEGABAR
- 2 Blocking valve
- 3 Pipeline

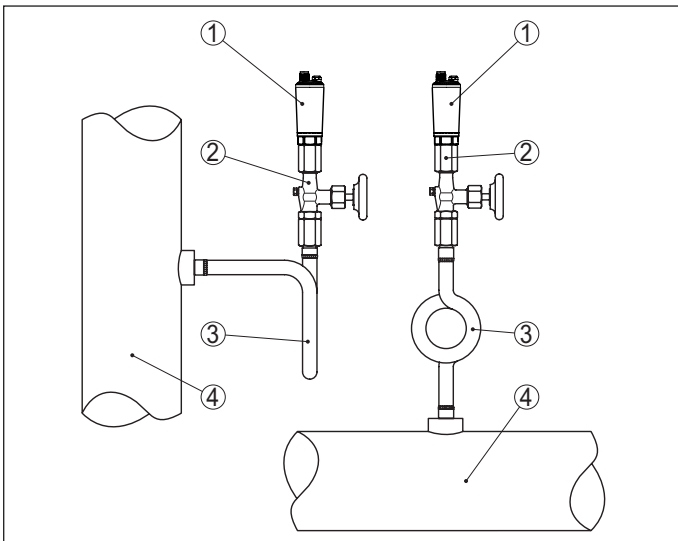


Fig. 11: Process pressure measurement of vapours in pipelines

- 1 VEGABAR
- 2 Blocking valve
- 3 Siphon in U or circular form
- 4 Pipeline

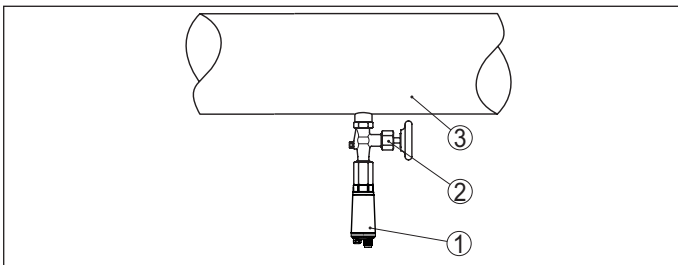


Fig. 12: Process pressure measurement of liquids in pipelines

- 1 VEGABAR
- 2 Blocking valve
- 3 Pipeline

6 Electronics - Two-wire 4 ... 20 mA

Voltage supply

Power the instrument via an energy-limited circuit (power max. 100 W) acc. to IEC 61010-1.

Specifications of the voltage supply:

- Operating voltage
 - 12 ... 35 V DC
- Permissible residual ripple
 - for U_N 12 V DC ($12\text{ V} < U_B < 18\text{ V}$): $\leq 0,7 V_{\text{eff}}$ (16 ... 400 Hz)
 - for U_N 24 V DC ($18\text{ V} < U_B < 35\text{ V}$): $\leq 1,0 V_{\text{eff}}$ (16 ... 400 Hz)

Keep in mind the following additional factors that influence the operating voltage:

- Lower output voltage of the power supply unit under nominal load (e.g. with a sensor current of 20.5 mA or 22 mA in case of fault signal)
- Influence of additional instruments in the circuit (see load values in chapter " *Technical data*" of the operating instructions of the respective instrument)

Connection cable

The instrument is connected with standard two-wire cable without shielding.

Connection via M12 x 1 plug

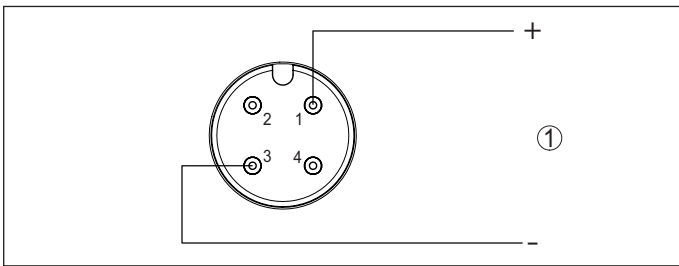


Fig. 13: Wiring plan - two-wire 4 ... 20 mA - M12 x 1 plug

1 Voltage supply and signal output

| Contact, plug connector | Function/Polarity |
|-------------------------|---------------------------------|
| 1 | Voltage supply, signal output/± |
| 2 | Free |
| 3 | Voltage supply, signal output/± |
| 4 | Free |

Connection via plug according to ISO 4400

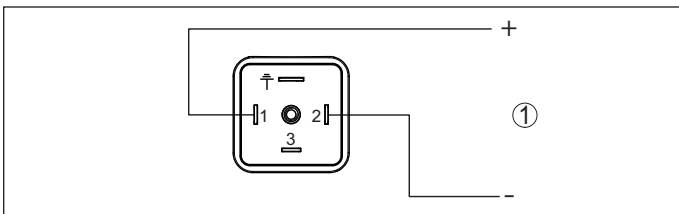



Fig. 14: Wiring plan - two-wire 4 ... 20 mA - plug according to ISO 4400

1 Voltage supply and signal output

| Contact, plug connector | Function/Polarity |
|---|---|
| 1 | Voltage supply, signal output/± |
| 2 | Voltage supply, signal output/± |
| 3 | Free |
|  | Electrically connected with metal housing |

Connection via direct cable outlet

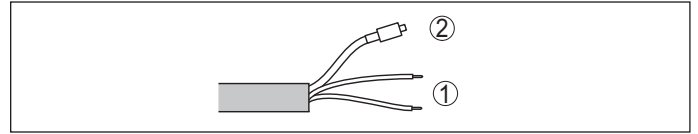


Fig. 15: Wiring plan - Two-wire 4 ... 20 mA - direct cable outlet

1 Voltage supply, signal output
2 Ventilation

| Wire colour | Function/Polarity |
|-------------|---------------------------------|
| Brown | Voltage supply, signal output/± |
| Blue | Voltage supply, signal output/± |

7 Electronics - Three-wire with IO-Link (2 x transistor or 4 ... 20 mA plus 1 x transistor)

Voltage supply

Power the instrument via an energy-limited circuit (power max. 100 W) acc. to IEC 61010-1.

Specifications of the voltage supply:

- Operating voltage
 - 12 ... 35 V DC
- Permissible residual ripple
 - for U_N 12 V DC ($12\text{ V} < U_B < 18\text{ V}$): $\leq 0,7 V_{\text{eff}}$ (16 ... 400 Hz)
 - for U_N 24 V DC ($18\text{ V} < U_B < 35\text{ V}$): $\leq 1,0 V_{\text{eff}}$ (16 ... 400 Hz)

Keep in mind the following additional factors that influence the operating voltage:

- Lower output voltage of the power supply unit under nominal load (e.g. with a sensor current of 20.5 mA or 22 mA in case of fault signal)
- Influence of additional instruments in the circuit (see load values in chapter " *Technical data*" of the operating instructions of the respective instrument)

Connection cable

The instrument is connected with standard four-wire cable without shielding.

Connection via M12 x 1 plug

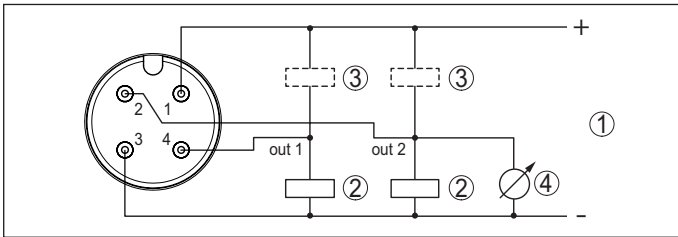


Fig. 16: Wiring plan - Three-wire with IO-Link (2 x transistor or 4 ... 20 mA plus 1 x transistor)

- 1 Voltage supply
- 2 PNP switching
- 3 NPN switching
- 4 Current output

| Contact, plug connector | Function/Polarity |
|-------------------------|---------------------------------------|
| 1 | Voltage supply/Plus |
| 2 | Transistor output 2 or current output |
| 3 | Voltage supply/Minus |
| 4 | Transistor output 1 or IO-Link port |

Connection via direct cable outlet

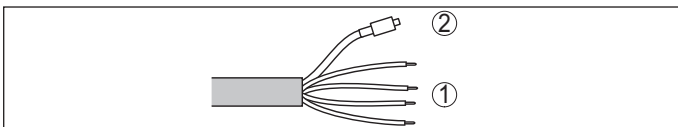


Fig. 17: Wiring plan - Three-wire with IO-Link (2 x transistor or 4 ... 20 mA plus 1 x transistor)

- 1 Cores
- 2 Capillary line with filter attachment

| Wire colour | Function/Polarity |
|-------------|---------------------------------------|
| Brown | Voltage supply/Plus |
| White | Transistor output 2 or current output |
| Blue | Voltage supply/Minus |
| Black | Transistor output 1 or IO-Link port |

8 Electronics - Three-wire 1 x transistor or 4 ... 20 mA

Voltage supply

Power the instrument via an energy-limited circuit (power max. 100 W) acc. to IEC 61010-1.

Specifications of the voltage supply:

- Operating voltage
 - 12 ... 35 V DC
- Permissible residual ripple
 - for U_N 12 V DC ($12\text{ V} < U_B < 18\text{ V}$): $\leq 0,7 V_{\text{eff}}$ (16 ... 400 Hz)
 - for U_N 24 V DC ($18\text{ V} < U_B < 35\text{ V}$): $\leq 1,0 V_{\text{eff}}$ (16 ... 400 Hz)

Keep in mind the following additional factors that influence the operating voltage:

- Lower output voltage of the power supply unit under nominal load (e.g. with a sensor current of 20.5 mA or 22 mA in case of fault signal)
- Influence of additional instruments in the circuit (see load values in chapter " *Technical data* " of the operating instructions of the respective instrument)

Connection cable

The instrument is connected with standard three-wire cable without shielding.

Connection via plug according to ISO 4400

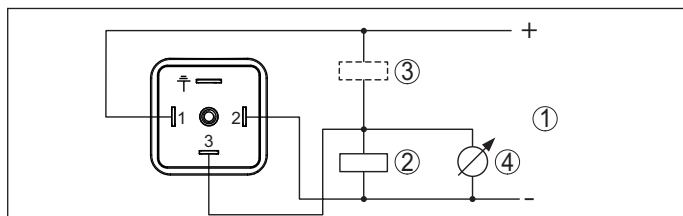


Fig. 18: Wiring plan - Three-wire (1 x transistor or 4 ... 20 mA)

- 1 Voltage supply
- 2 PNP switching
- 3 NPN switching
- 4 Current output

| Contact, plug connector | Function/Polarity |
|-------------------------|---------------------------------------|
| 1 | Voltage supply/Plus |
| 2 | Voltage supply/Minus |
| 3 | Transistor or current output |
| | Galvanically connected to the housing |

Connection via direct cable outlet

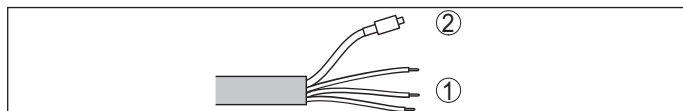


Fig. 19: Wiring plan - Three-wire (1 x transistor or 4 ... 20 mA)

- 1 Cores
- 2 Capillary line with filter attachment

| Wire colour | Function/Polarity |
|-------------|------------------------------|
| Brown | Voltage supply/Plus |
| White | Transistor or current output |
| Blue | Voltage supply/Minus |

9 Adjustment

9.1 Wireless adjustment

Devices with integrated Bluetooth module can be adjusted wirelessly via standard adjustment tools:

- Smartphone/tablet (iOS or Android operating system)
- PC/notebook (Windows operating system)

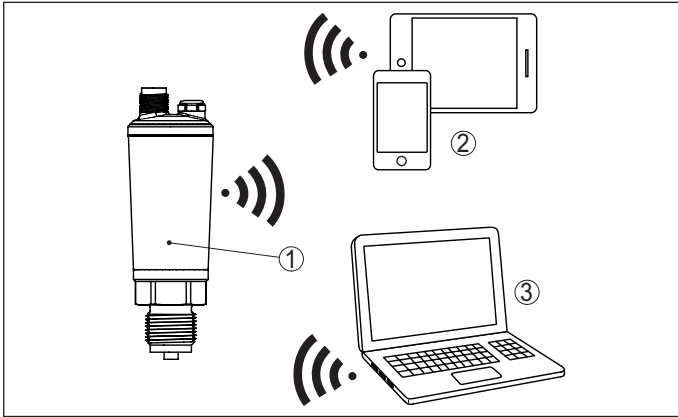


Fig. 20: Wireless connection to standard operating devices with integrated Bluetooth LE

- 1 Sensor
- 2 Smartphone/Tablet
- 3 Bluetooth USB adapter

9.2 Local adjustment

The integrated display and adjustment unit is used for on-site adjustment of VEGABAR 38 and 39.

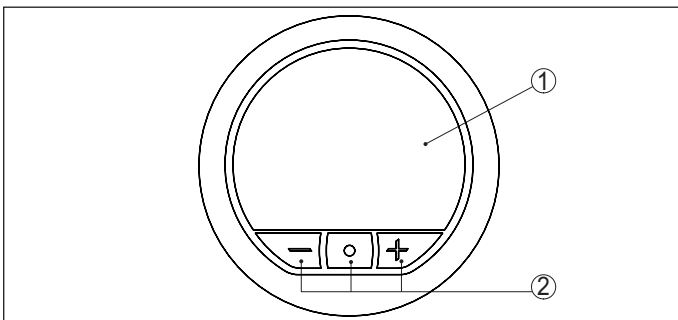


Fig. 21: Integrated display and adjustment unit

- 1 LC display
- 2 Adjustment keys

10 Dimensions

VEGABAR 18

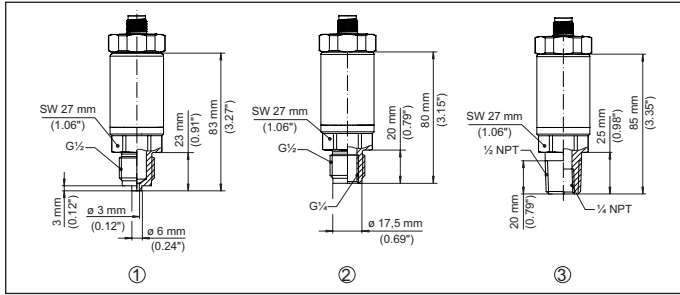


Fig. 22: Dimensions VEGABAR 18

- 1 Thread G $\frac{1}{2}$ (EN 837), manometer connection
- 2 Thread G $\frac{1}{2}$, inside G $\frac{1}{4}$ (ISO 228-1)
- 3 Thread $\frac{1}{2}$ NPT, inside $\frac{1}{4}$ NPT (ASME B1.20.1)

VEGABAR 19

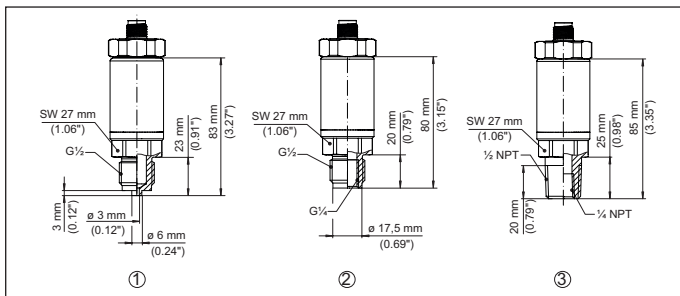


Fig. 23: Dimensions VEGABAR 19

- 1 Thread G $\frac{1}{2}$ (EN 837), manometer connection
- 2 Thread G $\frac{1}{2}$, inside G $\frac{1}{4}$ (ISO 228-1)
- 3 Thread $\frac{1}{2}$ NPT, inside $\frac{1}{4}$ NPT (ASME B1.20.1)

VEGABAR 28

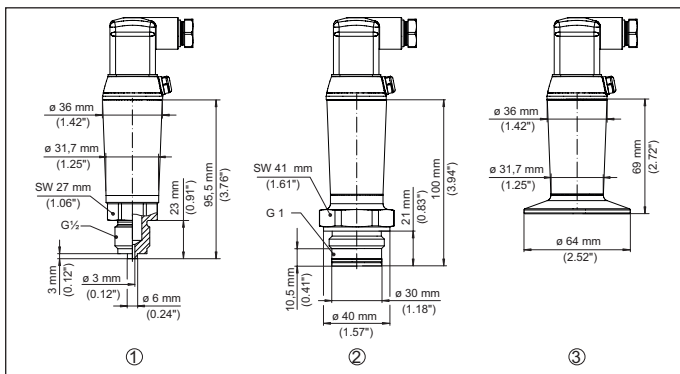


Fig. 24: Dimensions VEGABAR 28

- 1 Thread G $\frac{1}{2}$ (EN 837), manometer connection
- 2 Thread G1 (ISO 228-1)
- 3 Clamp 2" PN 40, \varnothing 64 mm (DIN 32676, ISO 2852)

VEGABAR 29

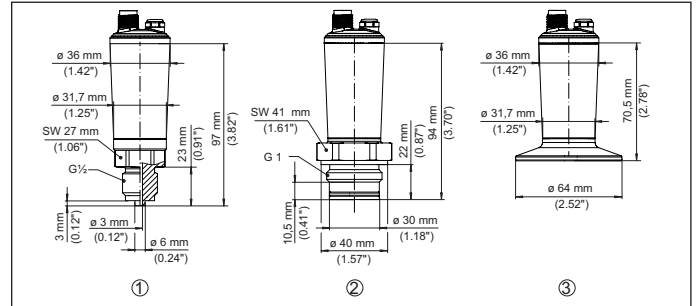


Fig. 25: Dimensions VEGABAR 29

- 1 Thread G $\frac{1}{2}$ (EN 837), manometer connection
- 2 Thread G1 (ISO 228-1)
- 3 Clamp 2" PN 40, \varnothing 64 mm (DIN 32676, ISO 2852)

VEGABAR 38

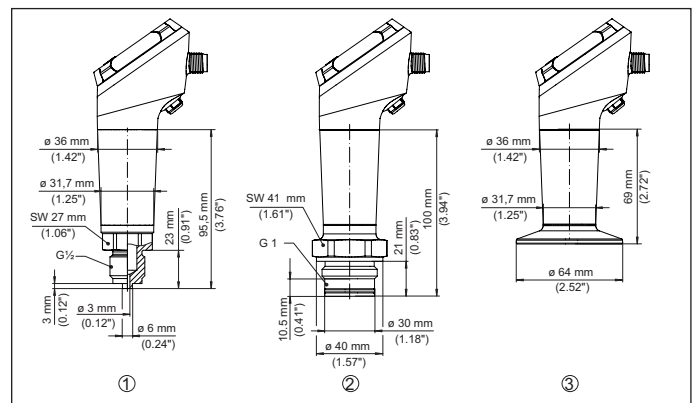


Fig. 26: Dimensions VEGABAR 38

- 1 Thread G $\frac{1}{2}$ (EN 837), manometer connection
- 2 Thread G1 (ISO 228-1)
- 3 Clamp 2" PN 40, \varnothing 64 mm (DIN 32676, ISO 2852)

VEGABAR 39

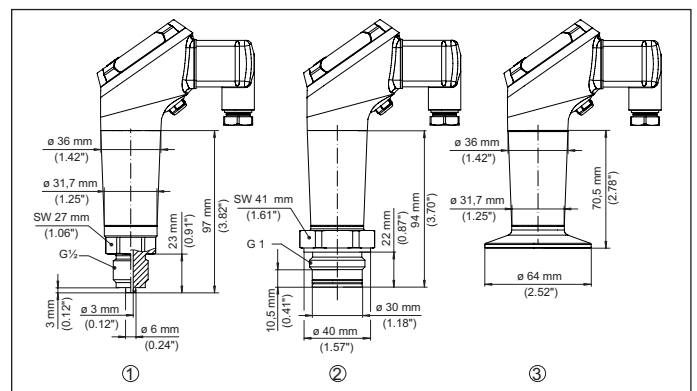


Fig. 27: Dimensions VEGABAR 39

- DU Thread G $\frac{1}{2}$ (EN 837), manometer connection
- C5 Thread G1 (ISO 228-1)
- AR Clamp 2" PN 40, \varnothing 64 mm (DIN 32676, ISO 2852)

The listed drawings represent only an excerpt of the available process fittings. You can find more drawings at www.vega.com/downloads under "Drawings".



All statements concerning scope of delivery, application, practical use and operating conditions of the sensors and processing systems correspond to the information available at the time of printing.
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