



## Product information

### Process pressure

#### Pressure transmitter

VEGABAR 81

VEGABAR 82

VEGABAR 83



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**VEGA**

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### Take note of safety instructions for Ex applications



Please note the Ex specific safety information that you can find at [www.vega.com](http://www.vega.com) and that comes with each 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 Measuring principle

### 1.1 Basic function

The pressure of the measured medium acts on the pressure measuring cell, converting this pressure into an electronic signal. The ceramic-capacitive CERTEC® and MINI-CERTEC® as well as the metallic METEC®, piezo and strain gauge measuring cells are used.

### 1.2 Measuring cell technology

#### VEGABAR 81

VEGABAR 81 is equipped with a chemical seal. It consists of a process diaphragm as well as a transmission liquid.

The process pressure acts on the sensor element via the chemical seal. Depending on the measuring range, the sensor element is piezoresistive or a strain gauge system.

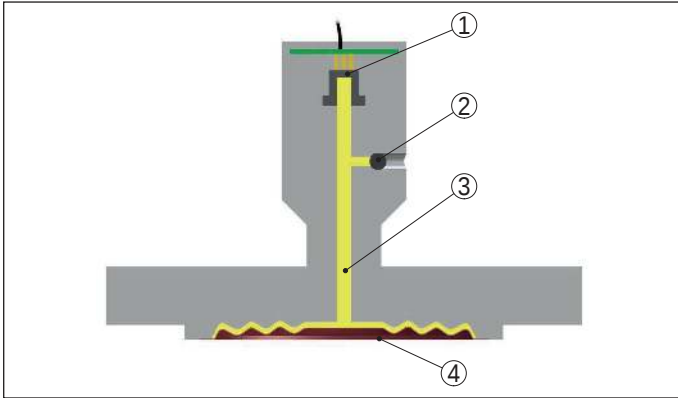


Fig. 1: Configuration of a chemical seal system

- 1 Sensor element
- 2 Sealed screw
- 3 Transmission liquid
- 4 Stainless steel diaphragm

#### VEGABAR 82

The sensor element is the ceramic CERTEC® measuring cell with front-flush, abrasion-resistant ceramic diaphragm.

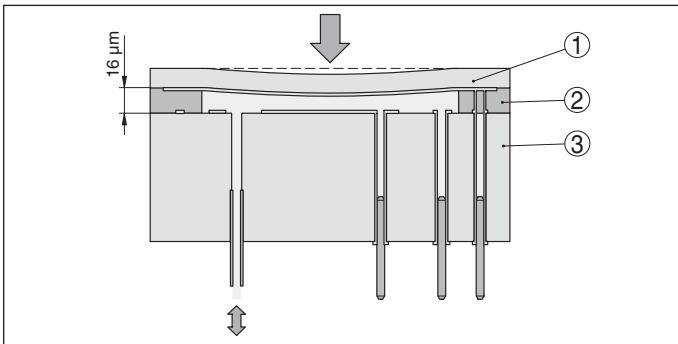


Fig. 2: Configuration of the CERTEC® measuring cell in VEGABAR 82

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

The CERTEC® measuring cell is also equipped with a temperature sensor. The temperature value can be displayed via the display and adjustment module or processed via the signal output.

#### VEGABAR 83

Measuring ranges up to 40 bar: piezoresistive sensor element with internal transmission liquid is used.

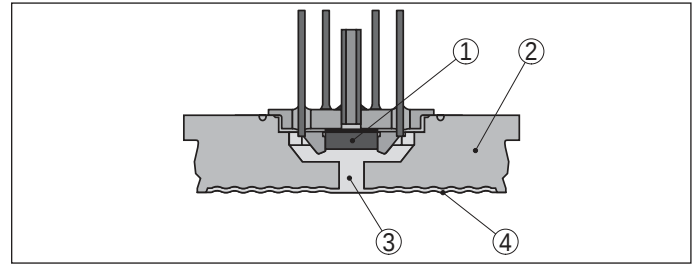


Fig. 3: Configuration of the piezoresistive measuring cell in VEGABAR 83

- 1 Sensor element
- 2 Base element
- 3 Silicone oil filling
- 4 Process diaphragm

For measuring ranges above 100 bar, a strain gauge (DMS) sensor element (dry system) is used.

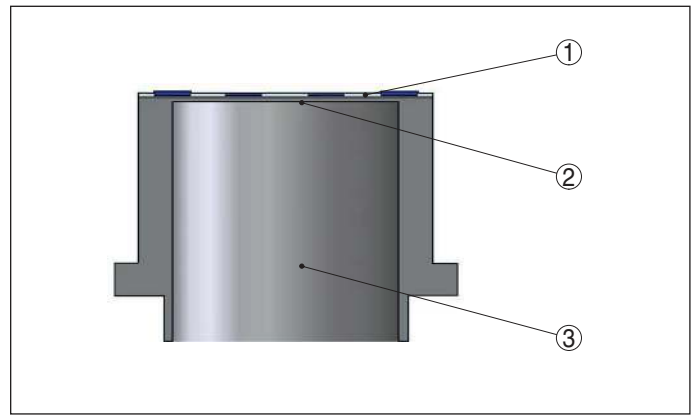


Fig. 4: Configuration of the strain gauge measuring cell in VEGABAR 83

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

With small measuring ranges or higher temperatures, the METEC® measuring cell is used. It consists of the ceramic-capacitive CERTEC® measuring cell and a special, temperature-compensated chemical seal system.

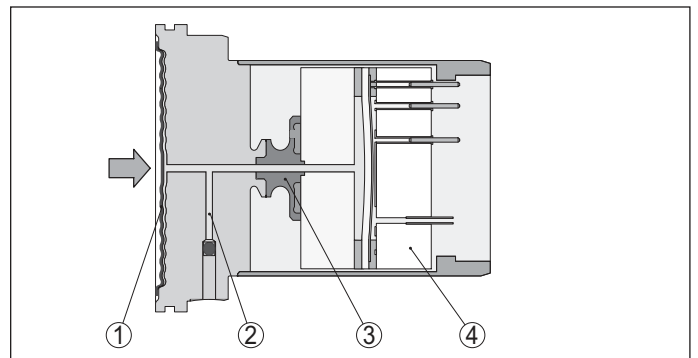


Fig. 5: Configuration of the METEC® measuring cell in VEGABAR 83

- 1 Process diaphragm
- 2 Isolating liquid
- 3 FeNi adapter
- 4 CERTEC® measuring cell

## 2 Type overview

VEGABAR 81



VEGABAR 82



VEGABAR 83



|                                 |                                                                                                                                                                                   |                                                                                                                                                                                   |                                                                                                                                                                                   |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Measuring cell</b>           | Piezoresistive/DMS                                                                                                                                                                | CERTEC®                                                                                                                                                                           | Piezoresistive/strain gauge, METEC®                                                                                                                                               |
| <b>Diaphragm</b>                | Metal                                                                                                                                                                             | Ceramic                                                                                                                                                                           | Metal                                                                                                                                                                             |
| <b>Media</b>                    | gases, vapours and liquids, also aggressive ones, at high temperatures                                                                                                            | gases, vapours and liquids, also with abrasive substances                                                                                                                         | gas, vapours and liquids, also viscous                                                                                                                                            |
| <b>Process fitting</b>          | Thread from G½ or ½ NPT<br>Flanges from DN 20<br>Boltings, tube isolating diaphragm each from DN 25                                                                               | Thread from G1 or ½ NPT<br>Flanges from DN 25<br>Extension fittings from 1"                                                                                                       | Thread from G1 or ½ NPT<br>Flanges from DN 20<br>Boltings, tube isolating diaphragm each from DN 25                                                                               |
| <b>Material</b>                 | 316L                                                                                                                                                                              | 316L, PVDF, Alloy C22 (2.4602), Alloy C276 (2.4819)                                                                                                                               | 316L                                                                                                                                                                              |
| <b>Process fitting</b>          |                                                                                                                                                                                   |                                                                                                                                                                                   |                                                                                                                                                                                   |
| <b>Diaphragm material</b>       | 316L, Alloy C276 (2.4819), Tantalum, gold on 316L                                                                                                                                 | Al <sub>2</sub> O <sub>3</sub> ceramic                                                                                                                                            | 316Ti, Elgiloy (2.4711), Alloy C276 (2.4819), gold-coated, gold/rhodium-coated                                                                                                    |
| <b>Measuring cell seal</b>      | -                                                                                                                                                                                 | FKM, EPDM, FFKM                                                                                                                                                                   | -                                                                                                                                                                                 |
| <b>Isolating liquid</b>         | Silicone oil, high temperature oil, halocarbon oil, medical white oil                                                                                                             | Dry measuring system                                                                                                                                                              | Silicone oil, Halocarbon oil<br>Medical white oil                                                                                                                                 |
| <b>Measuring range</b>          | -1 ... +1000 bar/-100 ... +100 MPa<br>(-14.5 ... +14500 psig)                                                                                                                     | -1 ... +100 bar/-100 ... +10 MPa<br>(-14.5 ... +1450 psig)                                                                                                                        | -1 ... +1000 bar/-100 ... +100 MPa<br>(-14.5 ... +14500 psig)                                                                                                                     |
| <b>Smallest measuring range</b> | 0.4 bar/40 kPa (5.802 psig)                                                                                                                                                       | 0.025 bar/2.5 kPa (1.45 psig)                                                                                                                                                     | 0.1 bar/10 kPa (1.45 psig)                                                                                                                                                        |
| <b>Process temperature</b>      | -90 ... +400 °C (-130 ... +752 °F)                                                                                                                                                | -40 ... +150 °C (-40 ... +302 °F)                                                                                                                                                 | -40 ... +200 °C (-40 ... +392 °F)                                                                                                                                                 |
| <b>Smallest deviation</b>       | < 0.2 %                                                                                                                                                                           | < 0.05 %                                                                                                                                                                          | < 0.075 %                                                                                                                                                                         |
| <b>Signal output</b>            | <ul style="list-style-type: none"> <li>● 4 ... 20 mA</li> <li>● 4 ... 20 mA/HART</li> <li>● Profibus PA</li> <li>● Foundation Fieldbus</li> <li>● Modbus</li> </ul>               | <ul style="list-style-type: none"> <li>● 4 ... 20 mA</li> <li>● 4 ... 20 mA/HART</li> <li>● Profibus PA</li> <li>● Foundation Fieldbus</li> <li>● Modbus</li> </ul>               | <ul style="list-style-type: none"> <li>● 4 ... 20 mA</li> <li>● 4 ... 20 mA/HART</li> <li>● Profibus PA</li> <li>● Foundation Fieldbus</li> <li>● Modbus</li> </ul>               |
| <b>Interface</b>                | Digital interface for Slave sensor                                                                                                                                                | Digital interface for Slave sensor                                                                                                                                                | Digital interface for Slave sensor                                                                                                                                                |
| <b>Indication/Adjustment</b>    | <ul style="list-style-type: none"> <li>● PLICSCOM</li> <li>● PACTware</li> <li>● VEGADIS 81</li> <li>● VEGADIS 62</li> </ul>                                                      | <ul style="list-style-type: none"> <li>● PLICSCOM</li> <li>● PACTware</li> <li>● VEGADIS 81</li> <li>● VEGADIS 62</li> </ul>                                                      | <ul style="list-style-type: none"> <li>● PLICSCOM</li> <li>● PACTware</li> <li>● VEGADIS 81</li> <li>● VEGADIS 62</li> </ul>                                                      |
| <b>Approvals</b>                | <ul style="list-style-type: none"> <li>● SIL</li> <li>● Shipbuilding</li> <li>● ATEX</li> <li>● Overfill protection</li> <li>● FM</li> <li>● CSA</li> <li>● EAC (GOST)</li> </ul> | <ul style="list-style-type: none"> <li>● SIL</li> <li>● Shipbuilding</li> <li>● ATEX</li> <li>● Overfill protection</li> <li>● FM</li> <li>● CSA</li> <li>● EAC (GOST)</li> </ul> | <ul style="list-style-type: none"> <li>● SIL</li> <li>● Shipbuilding</li> <li>● ATEX</li> <li>● Overfill protection</li> <li>● FM</li> <li>● CSA</li> <li>● EAC (GOST)</li> </ul> |

### 3 Instrument selection

#### Application area

With VEGABAR process pressure transmitters, 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.

All VEGABAR sensors can be upgraded to an electronic differential pressure system.

#### VEGABAR 81

VEGABAR 81 is a pressure transmitter with chemical seal for pressure and level measurement. The process-adapted chemical seal systems of VEGABAR 81 ensure reliable measurement even in highly corrosive and hot media.

#### VEGABAR 82

The VEGABAR 82 pressure transmitter can be used universally for measurement of gases, vapours and liquids. Even materials like sand are no problem for the abrasion-resistant ceramic measuring cell. VEGABAR 82 is an economical solution for a multitude of applications in all areas of industry.

#### VEGABAR 83

VEGABAR 83 is a pressure transmitter for pressure measurement of gases, vapours and liquids in all industries. VEGABAR 83 offers special advantages for applications with high pressures.

#### Configuration and housing protection classes

Pressure transmitters VEGABAR 81, 82 and 83 are available in different materials and housing protection classes. The following illustrations show typical examples.

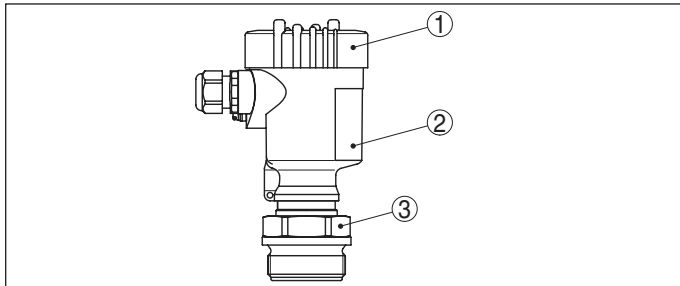


Fig. 9: Example of a VEGABAR 82 with plastic housing with protection rating IP 66/IP 67

- 1 Housing lid with integrated display and adjustment module (optional)
- 2 Housing with electronics
- 3 Process fitting with measuring cell

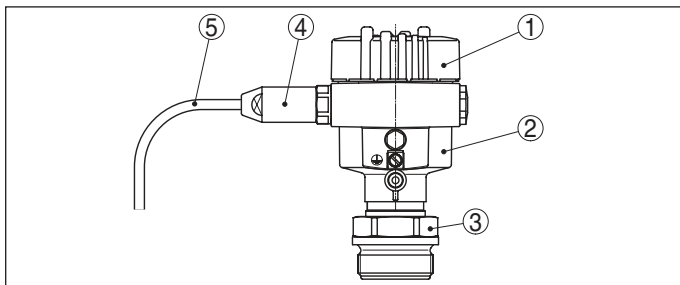


Fig. 10: Example of a VEGABAR 82 with aluminium housing in protection class IP 66/IP 68, 1 bar

- 1 Housing lid with integrated display and adjustment module (optional)
- 2 Housing with electronics
- 3 Process fitting with measuring cell
- 4 Cable gland
- 5 Connection cable

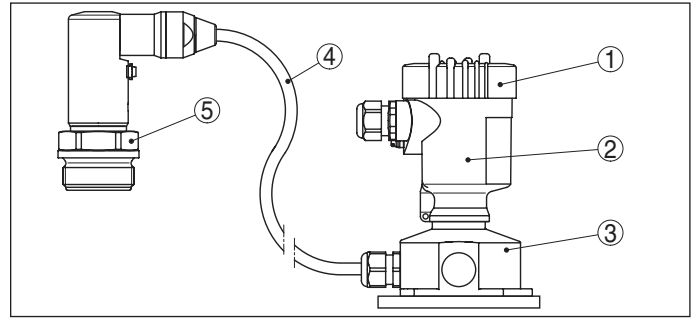


Fig. 11: Example of a VEGABAR 82 with protection rating IP 68 and external electronics

- 1 Housing lid with integrated display and adjustment module (optional)
- 2 Housing with electronics
- 3 Housing base
- 4 Connection cable
- 5 Process assembly

#### Measured variables

The pressure transmitters VEGABAR 81, 82 and 83 are suitable for measurement of the following process variables:

- Process pressure
- Level

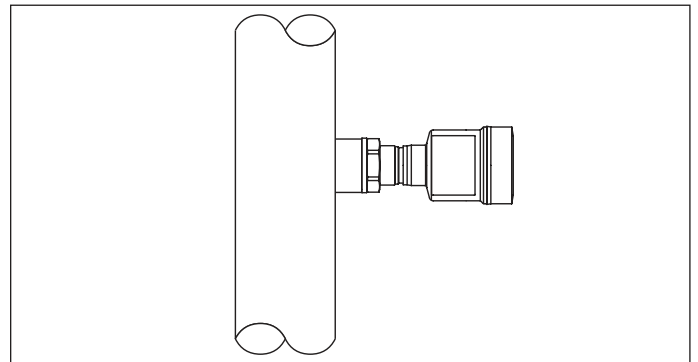


Fig. 12: Process pressure measurement

In conjunction with a Slave sensor for electronic differential pressure measurement, the instruments are also suitable for the measurement of the following process variables:

- Level, pressurized
- Differential pressure
- Flow
- Density
- Interface

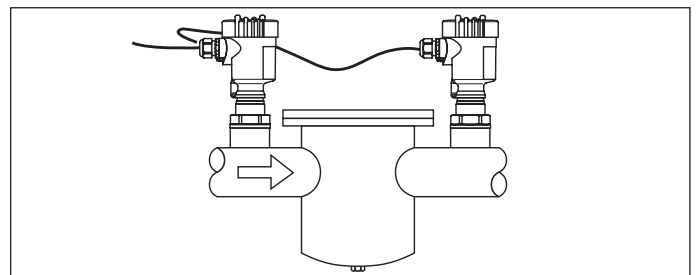


Fig. 13: Electronic differential pressure measurement through Master/Slave combination

#### 4 Selection criteria

|                                                |                                    | VEGABAR 81 | VEGABAR 82 | VEGABAR 83 |
|------------------------------------------------|------------------------------------|------------|------------|------------|
| Wear through process                           | Aggressive products                | ●          | –          | ●          |
|                                                | Abrasive products                  | –          | ●          | –          |
| Process temperature up to                      | +150 °C (+302 °F)                  | ●          | ●          | ●          |
|                                                | +200 °C (+302 °F)                  | ●          | ●          | ●          |
|                                                | +400 °C (+752 °F)                  | ●          | –          | –          |
| Measuring system                               | Dry                                | –          | ●          | ●          |
|                                                | Oil-filled                         | ●          | –          | ●          |
| Version process fittings                       | Front-flush                        | ●          | ●          | ●          |
|                                                | Hygienic                           | ●          | ●          | ●          |
| Largest measuring range                        | 100 bar (10 MPa)                   | ●          | ●          | ●          |
|                                                | 400 bar (40 MPa)                   | ●          | –          | ●          |
|                                                | 1000 bar (100 MPa)                 | ●          | –          | ●          |
| Smallest measuring range                       | 25 mbar (2.5 kPa)                  | –          | ●          | –          |
|                                                | 100 mbar (10 kPa)                  | –          | ●          | ●          |
|                                                | 400 mbar (40 kPa)                  | ●          | ●          | ●          |
| Vacuum applications up to                      | 1 mbar <sub>abs</sub> (100 Pa)     | –          | ●          | –          |
| Suitability for industry-specific applications | Aggregates and mining industry     | –          | ●          | ●          |
|                                                | Chemical                           | ●          | ●          | –          |
|                                                | Power generation                   | ●          | ●          | –          |
|                                                | Foodstuffs                         | ●          | ●          | ●          |
|                                                | Metal production                   | –          | ●          | ●          |
|                                                | Offshore                           | ●          | ●          | –          |
|                                                | Paper                              | ●          | ●          | ●          |
|                                                | Petrochemical                      | ●          | ●          | –          |
|                                                | Pharmaceutical                     | ●          | ●          | –          |
|                                                | Shipbuilding                       | –          | ●          | ●          |
|                                                | Environment and recycling industry | –          | ●          | –          |
|                                                | Water, waste water                 | –          | ●          | –          |
|                                                | Cement industry                    | –          | ●          | ●          |

## 5 Housing overview

|                          |                                                                                   |                                                                                   |
|--------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| <b>Plastic PBT</b>       |  |  |
| <b>Protection rating</b> | IP 66/IP 67                                                                       | IP 66/IP 67                                                                       |
| <b>Version</b>           | Single chamber                                                                    | Double chamber                                                                    |
| <b>Application area</b>  | Industrial environment                                                            | Industrial environment                                                            |

|                          |                                                                                   |                                                                                   |
|--------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| <b>Aluminium</b>         |  |  |
| <b>Protection rating</b> | IP 66/IP 67, IP 66/IP 68 (1 bar)                                                  | IP 66/IP 67, IP 66/IP 68 (1 bar)                                                  |
| <b>Version</b>           | Single chamber                                                                    | Double chamber                                                                    |
| <b>Application area</b>  | Industrial environment with increased mechanical stress                           | Industrial environment with increased mechanical stress                           |

|                             |                                                                                   |                                                                                   |                                                                                     |
|-----------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>Stainless steel 316L</b> |  |  |  |
| <b>Protection rating</b>    | IP 66/IP 67<br>IP 69K                                                             | IP 66/IP 67<br>IP 66/IP 68 (1 bar)                                                |                                                                                     |
| <b>Version</b>              | Single chamber, electropolished                                                   | Single chamber, precision casting                                                 | Double chamber, precision casting                                                   |
| <b>Application area</b>     | Aggressive environment, food processing, pharmaceutical                           | Aggressive environment, extreme mechanical stress                                 |                                                                                     |

|                          |                                                                                     |                                                                                     |
|--------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>Separate version</b>  |  |  |
| <b>Material</b>          | Stainless steel 316L                                                                | plastic PBT<br>Stainless steel 316L                                                 |
| <b>Protection rating</b> | IP 68 (25 bar)                                                                      | IP 65<br>IP 66/IP 67                                                                |
| <b>Function</b>          | Transmitter                                                                         | External electronics                                                                |
| <b>Application area</b>  | Extremely moist environment                                                         | Industrial environment                                                              |

## 6 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.

It is useful to select an installation position you can easily reach for mounting and connecting as well as later retrofitting of an display and adjustment module. For this purpose, the housing can be rotated by 330° without the use of any tools. You can also install the indicating and adjustment module in four different positions (each displaced by 90°).

### Mounting examples and measurement setups

The following illustrations show mounting examples and measurement setups.

#### Process pressure measurement

The VEGABAR measures the pressure in a pipeline.

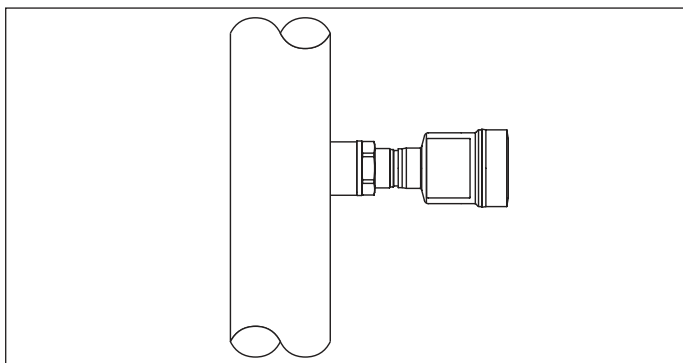


Fig. 23: Process pressure measurement on a pipeline with VEGABAR

#### Level measurement

The VEGABAR measures the level in a vessel.

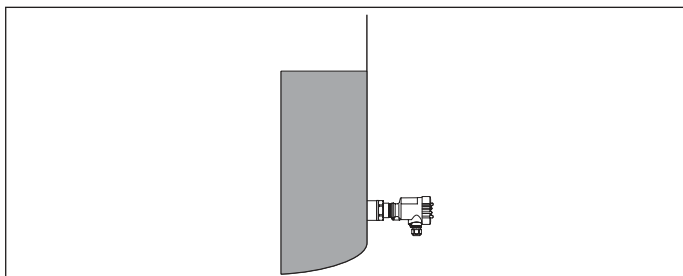


Fig. 24: Level measurement in a vessel with VEGABAR

## 7 Electronics - 4 ... 20 mA - two-wire

### Configuration of the electronics

The plug-in electronics is mounted in the electronics compartment of the instrument and can be exchanged by the user when servicing is required. The electronics is completely encapsulated to protect against vibration and moisture.

The terminals for voltage supply as well as the contact pins with I<sup>2</sup>C interface for parameter adjustment are located on the upper side of the electronics. In the double-chamber housing, the terminals are located in the separate terminal compartment.

### Voltage supply

Power supply and current signal are carried on the same two-wire cable. The operating voltage can differ depending on the instrument version.

You can find the data of the voltage supply in chapter "Technical data" in the operating instructions manual of the respective instrument.

Provide a reliable separation between the supply circuit and the mains circuits according to DIN EN 61140 VDE 0140-1.

Specifications of the voltage supply:

- Operating voltage
  - 9.6 ... 35 V DC
- Permissible residual ripple - Non-Ex, Ex-ia instrument
  - for  $U_N$  12 V DC:  $\leq 0.7 V_{eff}$  (16 ... 400 Hz)
  - for  $U_N$  24 V DC:  $\leq 1.0 V_{eff}$  (16 ... 400 Hz)
- Permissible residual ripple - Ex-d-ia instrument
  - for  $U_N$  24 V DC:  $\leq 1.0 V_{eff}$  (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)
- 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 screen. If electromagnetic interference is expected which is above the test values of EN 61326-1 for industrial areas, screened cable should be used.

In the product configurator of VEGABAR, different cable glands can be selected. They cover all cable diameters in the range of 4 ... 12 mm (0.16 ... 0.47 in).

### Cable screening and grounding

If screened cable is required, we recommend connecting the cable screen on both ends to ground potential. In the sensor, the screen should be connected directly to the internal ground terminal. The ground terminal on the outside of the housing must be connected to the ground potential (with low impedance).

### Connection

#### Single chamber housing

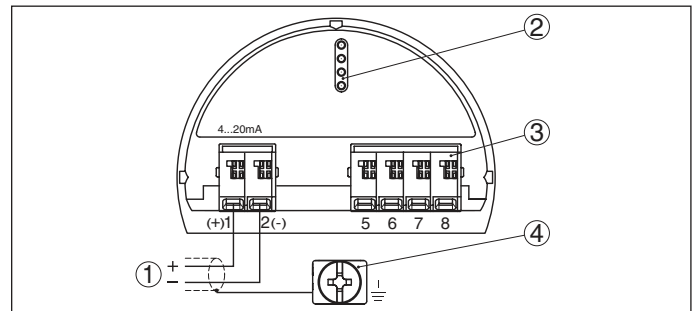


Fig. 25: Electronics and terminal compartment, single chamber housing

- 1 Voltage supply/Signal output
- 2 For display and adjustment module or interface adapter
- 3 For external display and adjustment unit
- 4 Ground terminal for connection of the cable screen

## 8 Electronics - 4 ... 20 mA/HART - two-wire

### Configuration of the electronics

The plug-in electronics is mounted in the electronics compartment of the instrument and can be exchanged by the user when servicing is required. The electronics is completely encapsulated to protect against vibration and moisture.

The terminals for voltage supply as well as the contact pins with I<sup>2</sup>C interface for parameter adjustment are located on the upper side of the electronics. In the double-chamber housing, the terminals are located in the separate terminal compartment.

### Voltage supply

Power supply and current signal are carried on the same two-wire cable. The operating voltage can differ depending on the instrument version.

You can find the data of the voltage supply in chapter "Technical data" in the operating instructions manual of the respective instrument.

Provide a reliable separation between the supply circuit and the mains circuits according to DIN EN 61140 VDE 0140-1.

Specifications of the voltage supply:

- Operating voltage
  - 9.6 ... 35 V DC
- Permissible residual ripple - Non-Ex, Ex-ia instrument
  - for  $U_N$  12 V DC:  $\leq 0.7 V_{eff}$  (16 ... 400 Hz)
  - for  $U_N$  24 V DC:  $\leq 1.0 V_{eff}$  (16 ... 400 Hz)
- Permissible residual ripple - Ex-d-ia instrument
  - for  $U_N$  24 V DC:  $\leq 1.0 V_{eff}$  (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)
- 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 screen. If electromagnetic interference is expected which is above the test values of EN 61326-1 for industrial areas, screened cable should be used.

We generally recommend the use of screened cable for HART multidrop mode.

### Cable screening and grounding

If screened cable is required, we recommend connecting the cable screen on both ends to ground potential. In the sensor, the screen should be connected directly to the internal ground terminal. The ground terminal on the outside of the housing must be connected to the ground potential (with low impedance).

### Connection

#### Single chamber housing

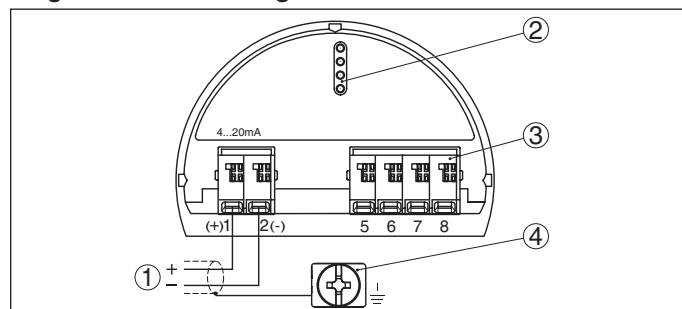


Fig. 26: Electronics and terminal compartment, single chamber housing

- 1 Voltage supply/Signal output
- 2 For display and adjustment module or interface adapter
- 3 For external display and adjustment unit
- 4 Ground terminal for connection of the cable screen

#### Double chamber housing

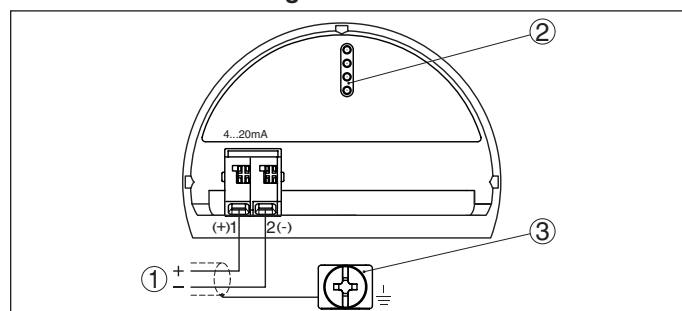


Fig. 27: Terminal compartment, double chamber housing

- 1 Voltage supply/Signal output
- 2 For display and adjustment module or interface adapter
- 3 Ground terminal for connection of the cable screen

## 9 Electronics - Profibus PA

### Configuration of the electronics

The plug-in electronics is mounted in the electronics compartment of the instrument and can be exchanged by the user when servicing is required. The electronics is completely encapsulated to protect against vibration and moisture.

The terminals for voltage supply as well as the plug with I<sup>2</sup>C interface for parameter adjustment are located on the upper side of the electronics. In the double-chamber housing, these connection elements are located in the separate terminal compartment.

### Voltage supply

The voltage supply is provided by a Profibus DP /PA segment coupler.

Specifications of the voltage supply:

- Operating voltage
  - 9 ... 32 V DC
- Max. number of sensors per DP/PA segment coupler
  - 32

### Connection cable

Connection is carried out with screened cable according to Profibus specification.

Make sure that the entire installation is carried out according to the Profibus specification. In particular, make sure that the bus is terminated with suitable terminating resistors.

### Cable screening and grounding

In systems with potential equalisation, connect the cable screen directly to ground potential at the power supply unit, in the connection box and at the sensor. The screen in the sensor must be connected directly to the internal ground terminal. The ground terminal outside on the housing must be connected to the potential equalisation (low impedance).

In systems without potential equalisation, connect the cable screen directly to ground potential on the power supply unit and the sensor. In the connection box or T-distributor, the screen of the short stub to the sensor may not be connected to ground potential or to another cable screen.

### Connection

#### Single chamber housing

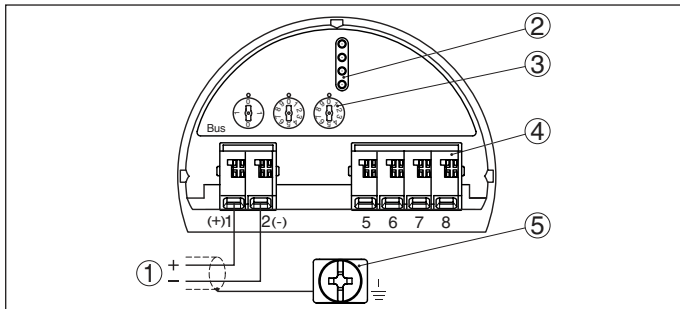


Fig. 28: Electronics and terminal compartment, single chamber housing

- 1 Voltage supply/Signal output
- 2 For display and adjustment module or interface adapter
- 3 Selection switch for bus address
- 4 For external display and adjustment unit
- 5 Ground terminal for connection of the cable screen

#### Double chamber housing

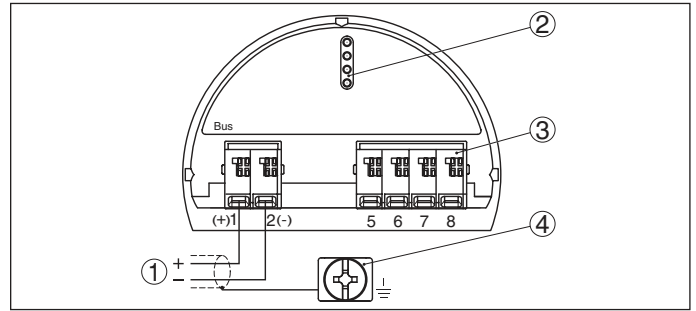


Fig. 29: Terminal compartment, double chamber housing

- 1 Voltage supply, signal output
- 2 For display and adjustment module or interface adapter
- 3 For external display and adjustment unit
- 4 Ground terminal for connection of the cable screen

## 10 Electronics - Foundation Fieldbus

### Configuration of the electronics

The plug-in electronics is mounted in the electronics compartment of the instrument and can be exchanged by the user when servicing is required. The electronics is completely encapsulated to protect against vibration and moisture.

The terminals for voltage supply as well as the plug with I<sup>2</sup>C interface for parameter adjustment are located on the upper side of the electronics. In the double-chamber housing, these connection elements are located in the separate terminal compartment.

### Voltage supply

Power supply via the H1 Fieldbus cable.

Specifications of the voltage supply:

- Operating voltage
  - 9 ... 32 V DC
- max. number of sensors
  - 32

### Connection cable

Connection is carried out with screened cable according to Fieldbus specification.

Make sure that the entire installation is carried out according to the Fieldbus specification. In particular, make sure that the bus is terminated with suitable terminating resistors.

### Cable screening and grounding

In systems with potential equalisation, connect the cable screen directly to ground potential at the power supply unit, in the connection box and at the sensor. The screen in the sensor must be connected directly to the internal ground terminal. The ground terminal outside on the housing must be connected to the potential equalisation (low impedance).

In systems without potential equalisation, connect the cable screen directly to ground potential on the power supply unit and the sensor. In the connection box or T-distributor, the screen of the short stub to the sensor may not be connected to ground potential or to another cable screen.

### Connection

#### Single chamber housing

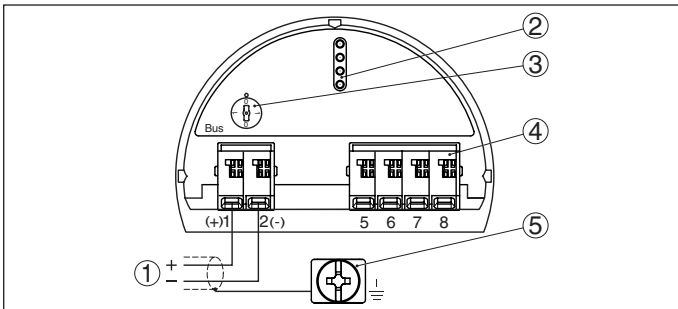


Fig. 30: Electronics and terminal compartment, single chamber housing

- 1 Voltage supply/Signal output
- 2 Contact pins for the display and adjustment module or interface adapter
- 3 Selection switch for bus address
- 4 For external display and adjustment unit
- 5 Ground terminal for connection of the cable screen

#### Double chamber housing

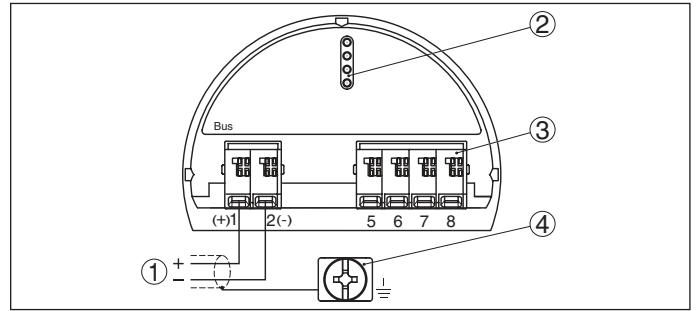


Fig. 31: Terminal compartment, double chamber housing

- 1 Voltage supply, signal output
- 2 For display and adjustment module or interface adapter
- 3 For external display and adjustment unit
- 4 Ground terminal for connection of the cable screen

## 11 Electronics - Modbus, Levelmaster protocol

### Configuration of the electronics

The plug-in electronics is mounted in the electronics compartment of the instrument and can be exchanged by the user when servicing is required. The electronics is completely encapsulated to protect against vibration and moisture.

The contact pins with I<sup>2</sup>C interface for parameter adjustment are located on the upper side of the electronics. The terminals for the power supply are located in the separate connection compartment.

### Voltage supply

Power supply via the Modbus host (RTU)

- Operating voltage
  - 8 ... 30 V DC
- max. number of sensors
  - 32

### Connection cable

Connection is carried out with screened cable according to Fieldbus specification.

For power supply, a separate two-wire cable is required.

In the product configurator of VEGABAR, different cable glands can be selected. They cover all cable diameters in the range of 4 ... 12 mm (0.16 ... 0.47 in).

Make sure that the entire installation is carried out according to the Fieldbus specification. In particular, make sure that the bus is terminated with suitable terminating resistors.

### Cable screening and grounding

In systems with potential equalisation, connect the cable screen directly to ground potential at the power supply unit, in the connection box and at the sensor. The screen in the sensor must be connected directly to the internal ground terminal. The ground terminal outside on the housing must be connected to the potential equalisation (low impedance).

In systems without potential equalisation, connect the cable screen directly to ground potential on the power supply unit and the sensor. In the connection box or T-distributor, the screen of the short stub to the sensor may not be connected to ground potential or to another cable screen.

### Connection

#### Double chamber housing

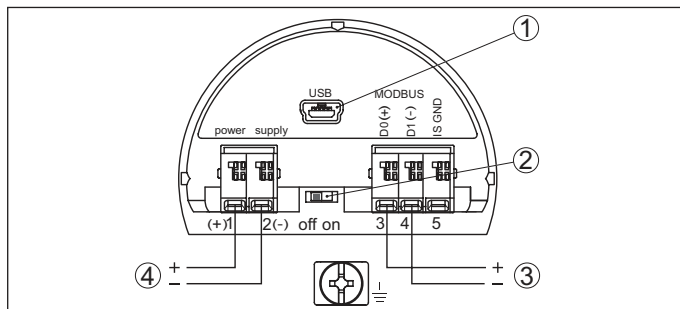


Fig. 32: Terminal compartment

- 1 USB interface
- 2 Slide switch for integrated termination resistor (120 Ω)
- 3 Voltage supply
- 4 Modbus signal

## 12 Operation

### 12.1 Adjustment on the measurement loop

#### Via the display and adjustment module through keys

The plug-in display and adjustment module is used for measured value indication, adjustment and diagnosis. It is equipped with an illuminated full dot matrix as well as four keys for adjustment.



Fig. 33: Display and adjustment module with single chamber housing

#### Via the display and adjustment module through magnetic pen

With the Bluetooth version of the display and adjustment module, the sensor can also be adjusted with the magnetic pen. This is done right through the closed lid (with inspection window) of the sensor housing.



Fig. 34: Display and adjustment module - with adjustment via magnetic pen

#### Via a PC with PACTware/DTM

The interface converter VEGACONNECT is required for connection of the PC. The converter is placed on the sensor instead of the display and adjustment module and connected to the USB interface of the PC.



Fig. 35: Connection of the PC via VEGACONNECT and USB

- 1 VEGACONNECT
- 2 Sensor
- 3 USB cable to the PC
- 4 PC with PACTware/DTM

PACTware is an adjustment software for configuration, parameter adjustment, documentation and diagnosis of field devices. The corresponding device drivers are called DTMs.

### 12.2 Operation in the measurement loop environment - wireless via Bluetooth

#### Via a smartphone/tablet

The display and adjustment module with integrated Bluetooth functionality allows wireless connection to smartphones/tablets with iOS or Android operating system. The adjustment is carried out via the VEGA Tools app from the Apple App Store or Google Play Store.

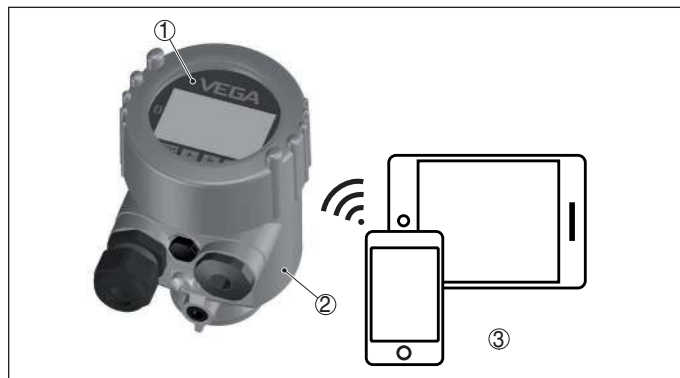


Fig. 36: Wireless connection to smartphones/tables

- 1 Display and adjustment module
- 2 Sensor
- 3 Smartphone/Tablet

#### Via a PC with PACTware/DTM

The wireless connection from the PC to the sensor is carried out via the Bluetooth USB adapter and a display and adjustment module with integrated Bluetooth function. The adjustment is carried out via the PC with PACTware/DTM.

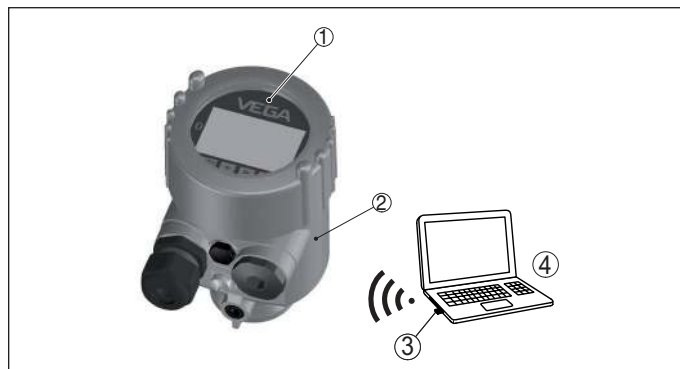


Fig. 37: Connection of the PC via Bluetooth adapter

- 1 Display and adjustment module
- 2 Sensor
- 3 Bluetooth USB adapter
- 4 PC with PACTware/DTM

### 12.3 Adjustment carried out at position remote from the measuring point - wired

#### Via external display and adjustment units

For this, the external display and adjustment units VEGADIS 81 and 82 are available. The adjustment is carried out via the keys of the built-in display and adjustment module.

The VEGADIS 81 is mounted at a distance of 50 m from the sensor and directly to the sensor electronics. VEGADIS 82 is looped directly into the signal cable at any point.

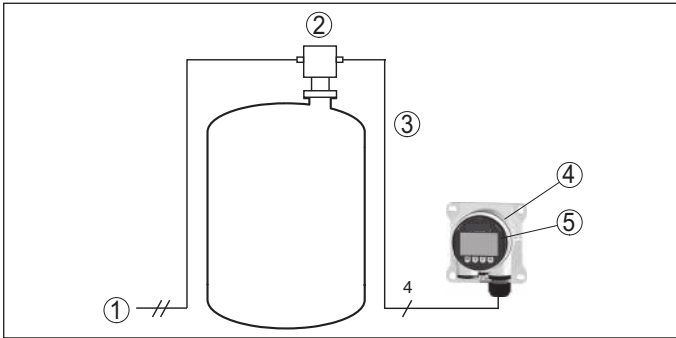


Fig. 38: Connection of VEGADIS 81 to the sensor

- 1 Voltage supply/Signal output sensor
- 2 Sensor
- 3 Connection cable sensor - external display and adjustment unit
- 4 External display and adjustment unit
- 5 Display and adjustment module

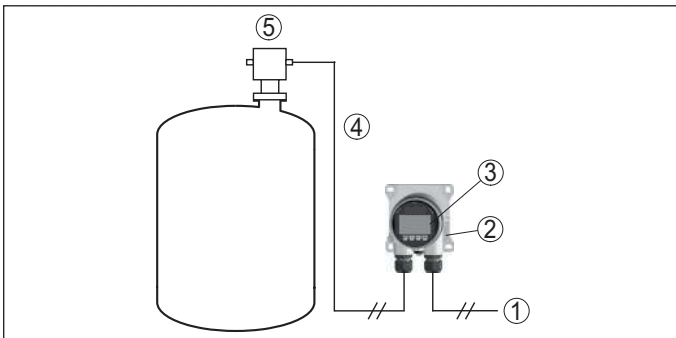


Fig. 39: Connection of VEGADIS 82 to the sensor

- 1 Voltage supply/Signal output sensor
- 2 External display and adjustment unit
- 3 Display and adjustment module
- 4 ... 20 mA/HART signal cable
- 5 Sensor

#### Via a PC with PACTware/DTM

The sensor adjustment is carried out via a PC with PACTware/DTM.

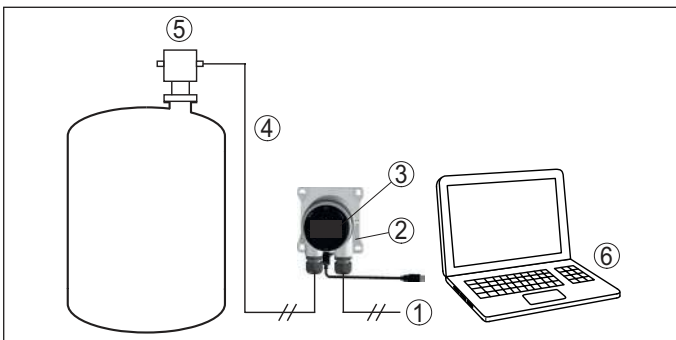


Fig. 40: Connection of VEGADIS 82 to the sensor, adjustment via PC with PACTware

- 1 Voltage supply/Signal output sensor
- 2 External display and adjustment unit
- 3 VEGACONNECT
- 4 ... 20 mA/HART signal cable
- 5 Sensor
- 6 PC with PACTware/DTM

### 12.4 Adjustment carried out at position remote from the measuring point - wireless through mobile network

As an option, the radio module PLICSMOBILE can be mounted into a plics® sensor with double chamber housing. It is used for transmission of measured values and for remote parameter adjustment of the sensor.

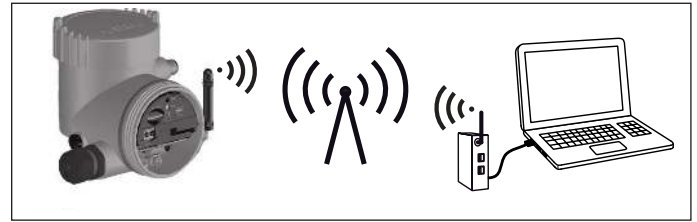


Fig. 41: Transmission of measured values and remote parameter adjustment of the sensor via mobile phone network.

### 12.5 Alternative adjustment programs

#### DD adjustment programs

Device descriptions as Enhanced Device Description (EDD) are available for DD adjustment programs such as, for example, AMS™ and PDM.

The files can be downloaded at [www.vega.com/downloads](http://www.vega.com/downloads) under "Software".

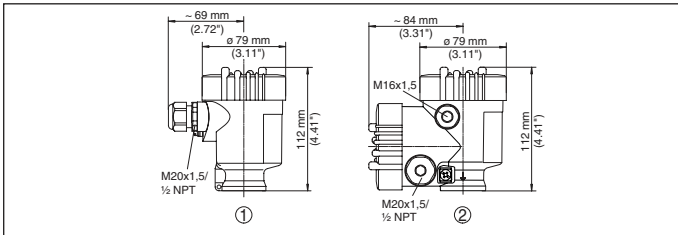
#### Field Communicator 375, 475

Device descriptions for the instrument are available as EDD for parameter adjustment with the Field Communicator 375 or 475.

For the integration of the EDD in the Field Communicator 375 or 475, the software "Easy Upgrade Utility" is required which is available from the manufacturer. This software is updated via the Internet and new EDDs are automatically taken over into the device catalogue of this software after they are released by the manufacturer. They can then be transferred to a Field Communicator.

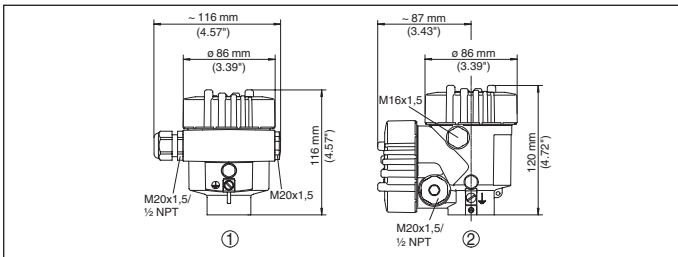
## 13 Dimensions

### Plastic housing



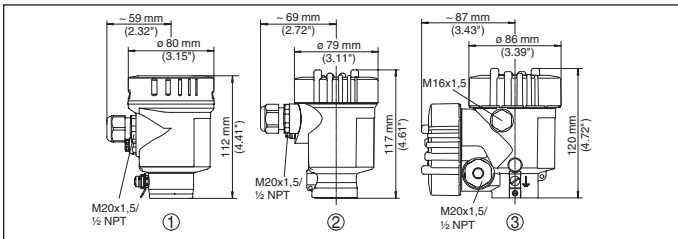
- 1 Single chamber housing
- 2 Double chamber housing

### Aluminium housing



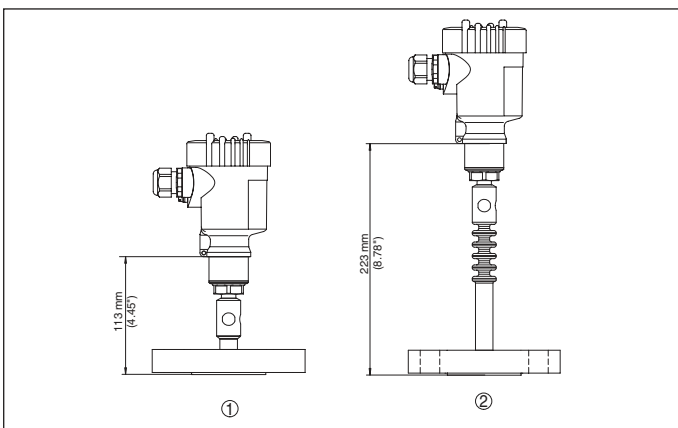
- 1 Single chamber housing
- 2 Double chamber housing

### Stainless steel housing



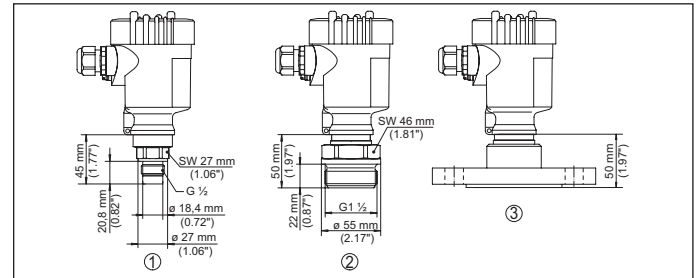
- 1 Single chamber housing, electropolished
- 2 Single chamber housing, precision casting
- 2 Double chamber housing, precision casting

### VEGABAR 81



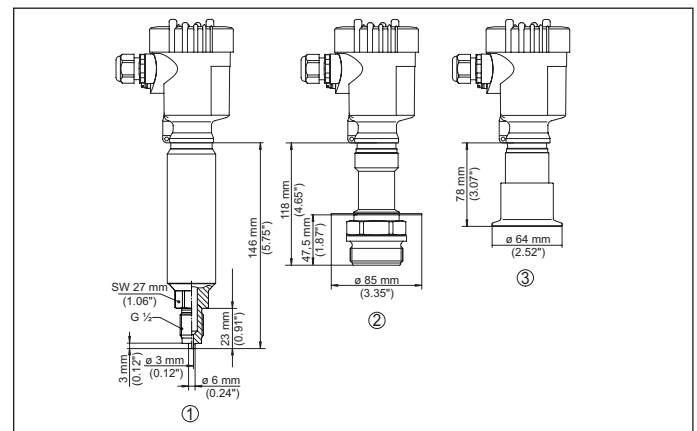
- 1 Flange version +150 °C
- 2 Flange version with cooling element +300 °C

### VEGABAR 82



- 1 Threaded version G 1/2, front-flush
- 2 Threaded version G 1 1/2
- 3 Flange version DN 50

### VEGABAR 83



- 1 Threaded version G 1/2, manometer connection EN 837
- 2 Threaded version front-flush with screening sheet (-12 ... +200 °C)
- 3 Clamp version 2"

The listed drawings represent only an excerpt of the available process fittings. You can find more drawings at [www.vega.com/downloads](http://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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