



# Product information

## Process pressure

### Pressure sensors

VEGABAR 18, 19

VEGABAR 28, 29

VEGABAR 38, 39



Document ID: 55579

# VEGA

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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](http://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.

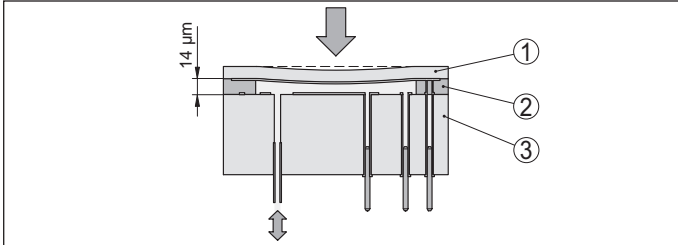


Fig. 1: Configuration of the Mini-CERTEC® measuring cell

- 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.

### VEGABAR 19, 29, 39

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.

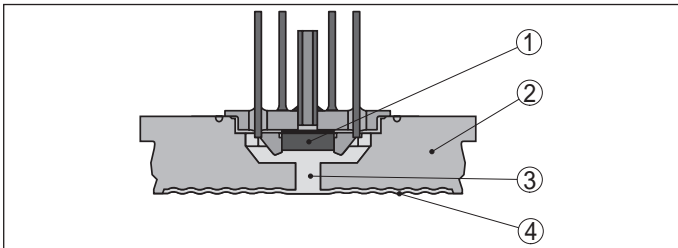


Fig. 2: Configuration of the measuring system with piezoresistive sensor element

- 1 Sensor element
- 2 Base element
- 3 Isolating liquid
- 4 Process diaphragm

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

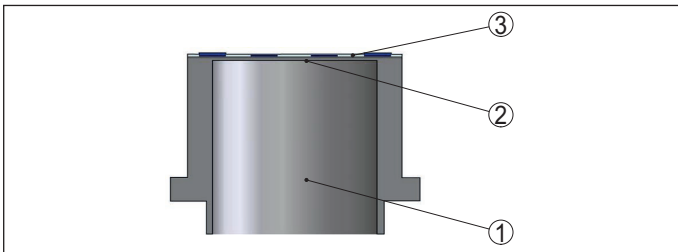


Fig. 3: Configuration of the measuring system with strain gauge (DMS) sensor element

- 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	316L	316L	316L
Process fitting			
Material	Al <sub>2</sub> O <sub>3</sub> ceramic	316L	Al <sub>2</sub> O <sub>3</sub> ceramic
Diaphragm			
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 <sup>1)</sup>	-	-	● c-UL-us, EAC, RCM ● ATEX/IEC ● EAC/SEPRO ● NEPSI/CCOE/TIIS/KOSHA ● INMETRO/IA

<sup>1)</sup> 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 <sub>2</sub> O <sub>3</sub> 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) (-14.5 ... +14500 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"> <li>4 ... 20 mA</li> <li>Transistor</li> <li>IO-Link</li> </ul>	<ul style="list-style-type: none"> <li>4 ... 20 mA</li> <li>Transistor</li> <li>IO-Link</li> </ul>	<ul style="list-style-type: none"> <li>4 ... 20 mA</li> <li>Transistor</li> <li>IO-Link</li> </ul>
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 <sup>2)</sup>	<ul style="list-style-type: none"> <li>c-UL-us, EAC, RCM</li> <li>ATEX/IEC</li> <li>EAC/SEPRO</li> <li>NEPSI/CCOE/TIIS/KOSHA</li> <li>INMETRO/IA</li> </ul>	<ul style="list-style-type: none"> <li>c-UL-us, EAC, RCM</li> <li>ATEX/IEC</li> <li>EAC/SEPRO</li> <li>NEPSI/CCOE/TIIS/KOSHA</li> <li>INMETRO/IA</li> </ul>	<ul style="list-style-type: none"> <li>c-UL-us, EAC, RCM</li> <li>ATEX/IEC</li> <li>EAC/SEPRO</li> <li>NEPSI/CCOE/TIIS/KOSHA</li> <li>INMETRO/IA</li> </ul>

<sup>2)</sup> 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

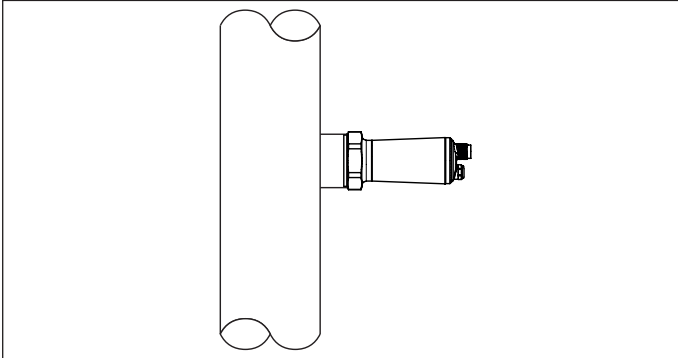


Fig. 4: Process pressure measurement

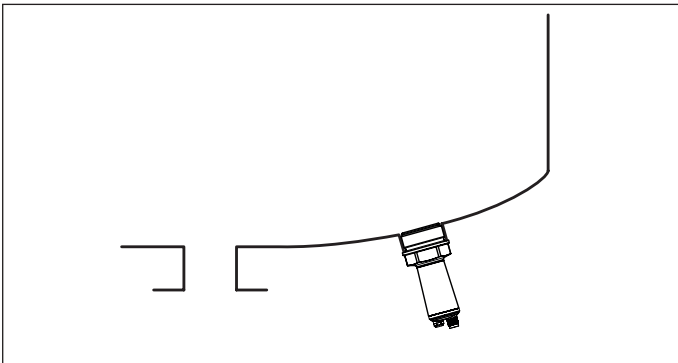


Fig. 5: Level measurement

#### 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.

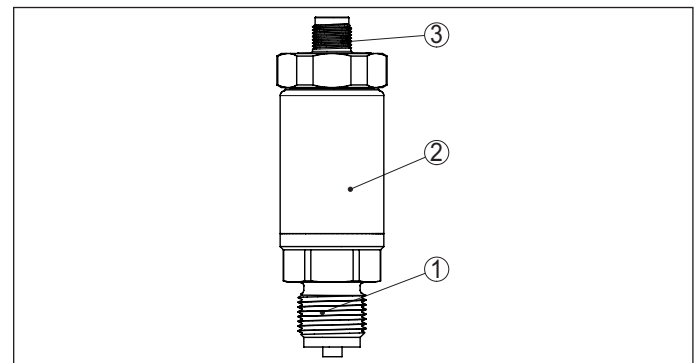


Fig. 6: VEGABAR 18 with plug connector acc. to ISO 4400 in protection rating IP65

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

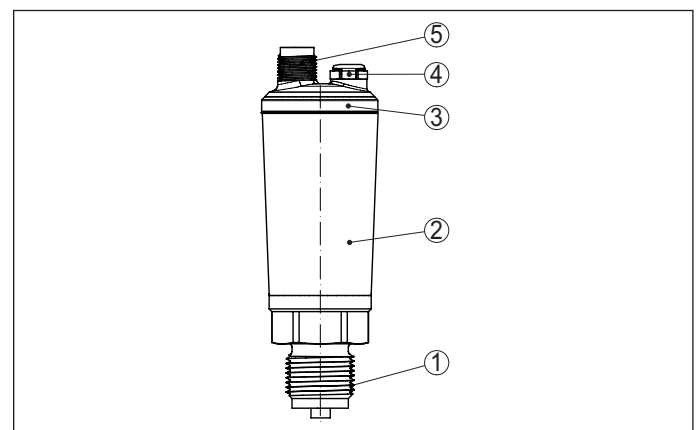


Fig. 7: VEGABAR 28 with M12 x 1 plug connector in protection rating IP66/IP67

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

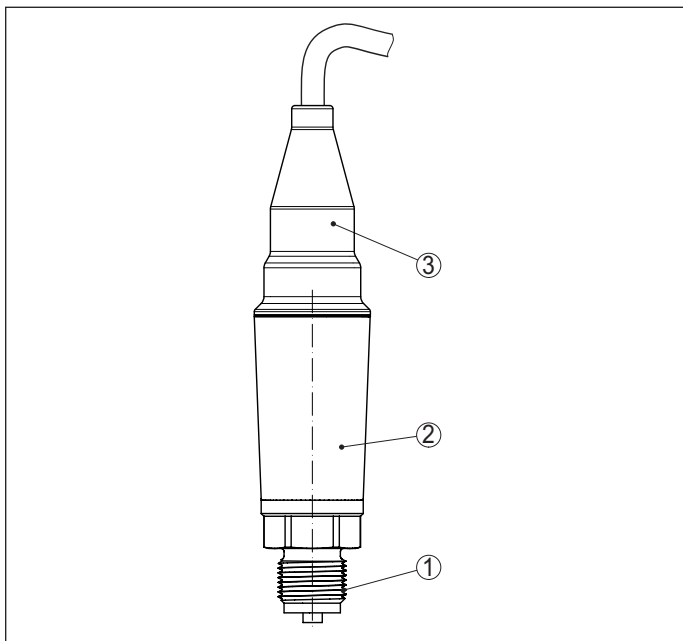


Fig. 8: VEGABAR 29 with direct cable outlet in protection rating IP66/IP68 (0.5 bar)/IP69

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

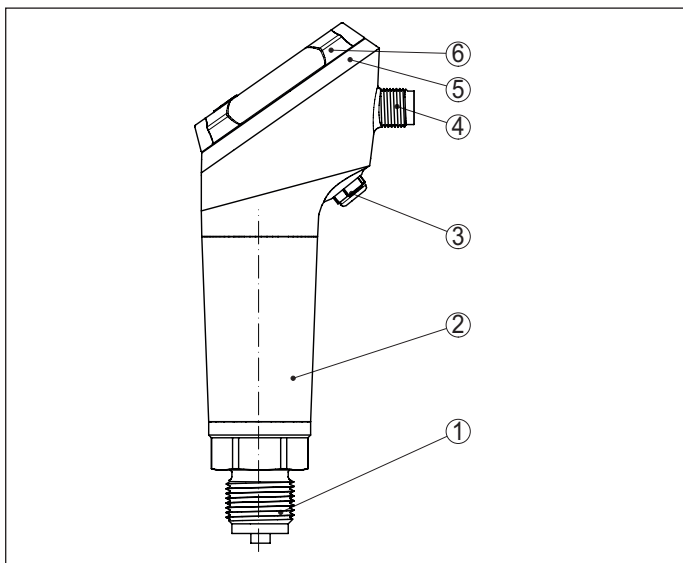


Fig. 9: VEGABAR 38 with M12 x 1 plug connector in protection rating IP66/IP67

- 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 <sub>abs</sub> (100 Pa)	●	–	●	–	●	–
	up to 2 mbar <sub>abs</sub> (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.

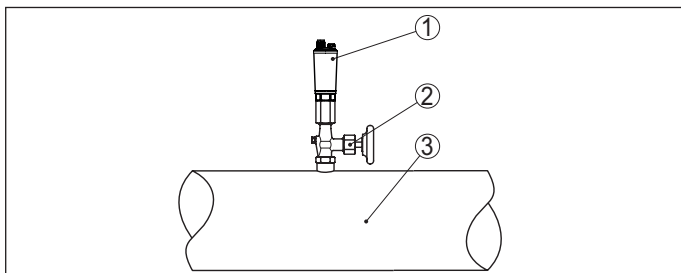


Fig. 10: Process pressure measurement of gases in pipelines

- 1 VEGABAR
- 2 Blocking valve
- 3 Pipeline

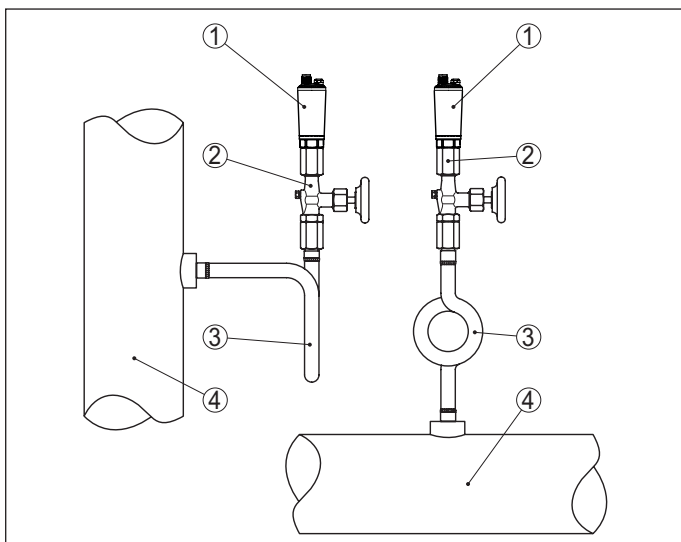


Fig. 11: Process pressure measurement of vapours in pipelines

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

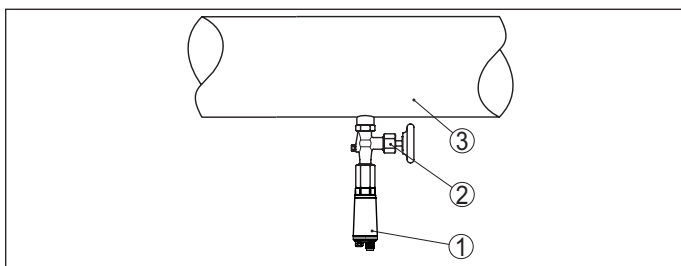


Fig. 12: Process pressure measurement of liquids in pipelines

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

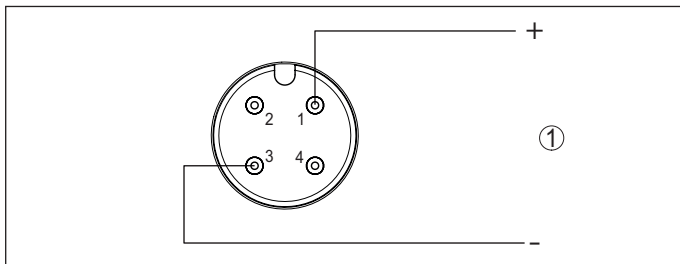


Fig. 13: Wiring plan - two-wire 4 ... 20 mA - M12 x 1 plug

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

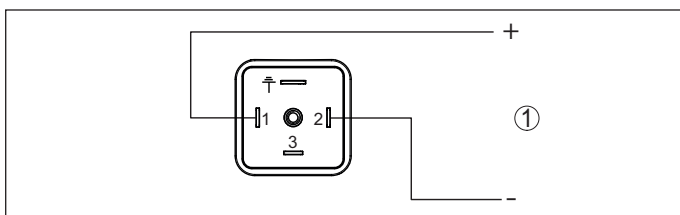



Fig. 14: Wiring plan - two-wire 4 ... 20 mA - plug according to ISO 4400

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

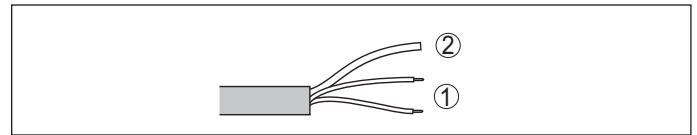


Fig. 15: Wiring plan - Two-wire 4 ... 20 mA - direct cable outlet

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

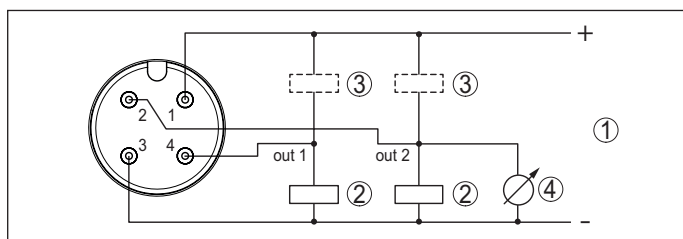


Fig. 16: Wiring plan - Three-wire with IO-Link (2 x transistor or 4 ... 20 mA plus 1 x transistor)

- 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

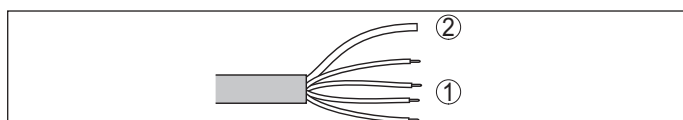


Fig. 17: Wiring plan - Three-wire with IO-Link (2 x transistor or 4 ... 20 mA plus 1 x transistor)

- 1 Cores
- 2 Ventilation

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

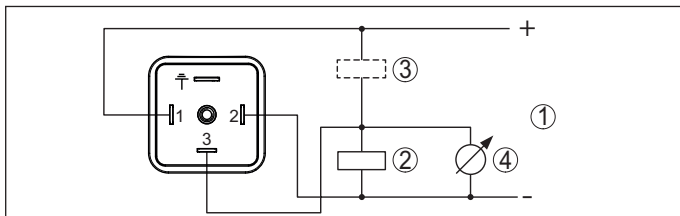



Fig. 18: Wiring plan - Three-wire 1 x transistor or 4 ... 20 mA

- 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

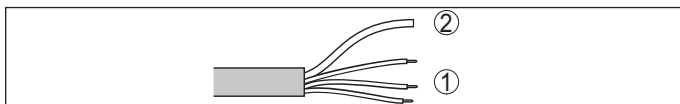


Fig. 19: Wiring plan - Three-wire 1 x transistor or 4 ... 20 mA

- 1 Cores
- 2 Ventilation

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)

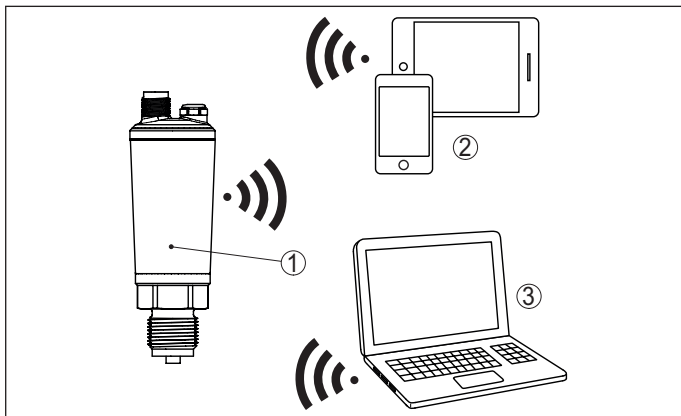


Fig. 20: Wireless connection to standard operating devices with integrated Bluetooth LE

- 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.

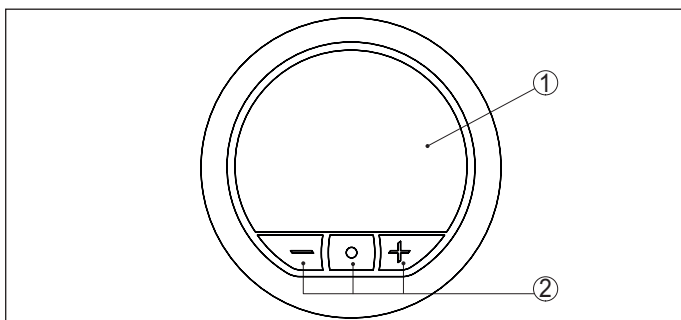


Fig. 21: Integrated display and adjustment unit

- 1 LC display
- 2 Adjustment keys

## 10 Dimensions

### VEGABAR 18

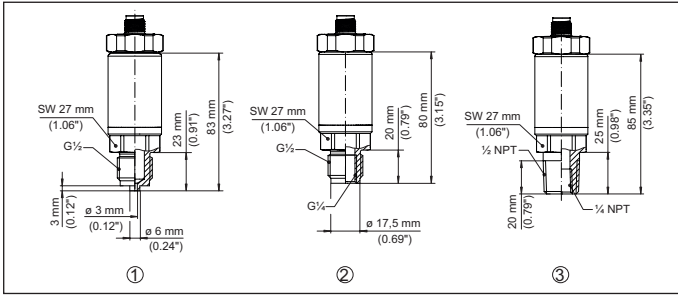


Fig. 22: Dimensions VEGABAR 18

- 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 29

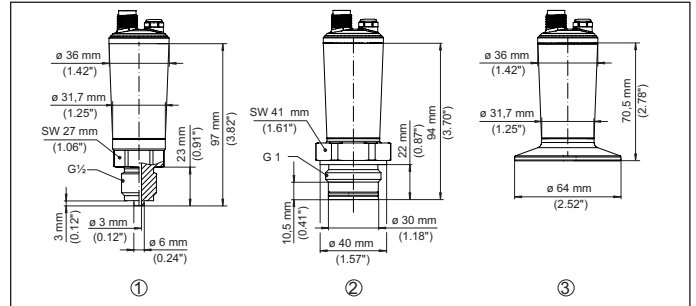


Fig. 25: Dimensions VEGABAR 29

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

### VEGABAR 19

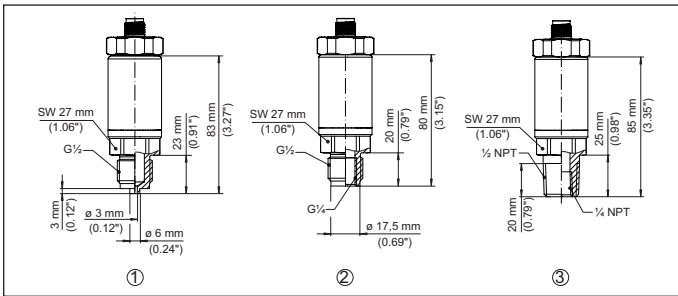


Fig. 23: Dimensions VEGABAR 19

- 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 38

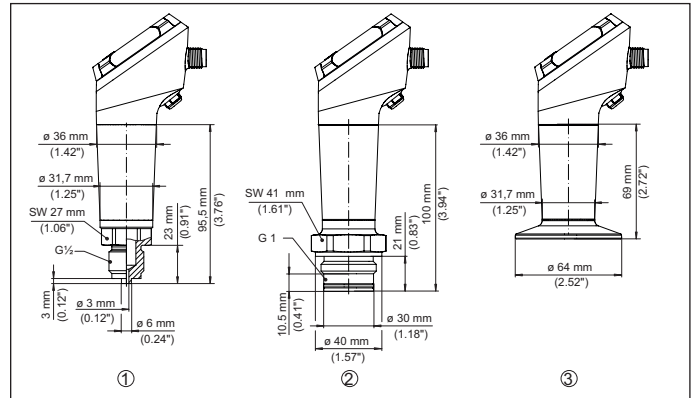


Fig. 26: Dimensions VEGABAR 38

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

### VEGABAR 28

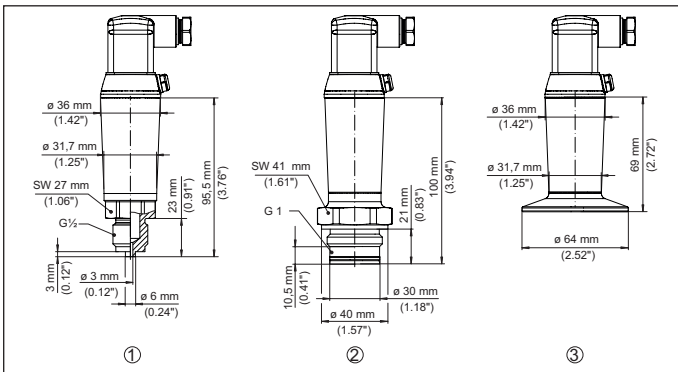


Fig. 24: Dimensions VEGABAR 28

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

### VEGABAR 39

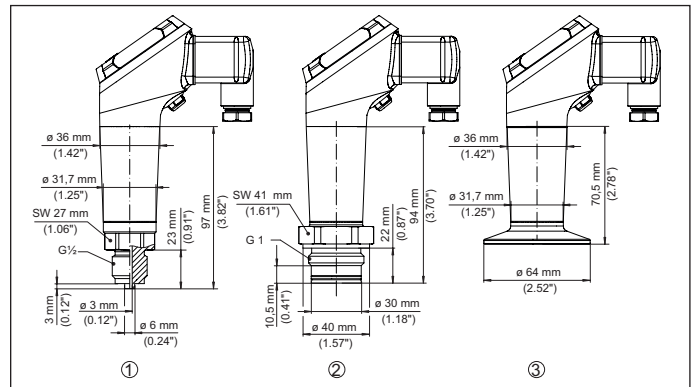


Fig. 27: Dimensions VEGABAR 39

- DU Thread G $\frac{1}{2}$  (EN 837), manometer connection
- C5 Thread G1 (ISO 228-1)
- AR Clamp 2" PN 40, ø 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](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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