# Operating Instructions

**Pressure sensor with ceramic measuring cell**

## VEGABAR 38

Two-wire: 4 … 20 mA

Document ID: 57088

# Contents


**1 About this document ... 4**
- 1.1 Function ... 4
- 1.2 Target group ... 4
- 1.3 Symbols used ... 4

**2 For your safety ... 5**
- 2.1 Authorised personnel ... 5
- 2.2 Intended use ... 5
- 2.3 Warning about incorrect use ... 5
- 2.4 General safety instructions ... 5
- 2.5 Installation and operation in the USA and Canada ... 5

**3 Product description ... 7**
- 3.1 Configuration ... 7
- 3.2 Principle of operation ... 9
- 3.3 Adjustment ... 11
- 3.4 Packaging, transport and storage ... 12
- 3.5 Accessories ... 13

**4 Mounting ... 14**
- 4.1 General instructions ... 14
- 4.2 Process pressure measurement ... 16
- 4.3 Level measurement ... 18

**5 Connecting to power supply ... 19**
- 5.1 Preparing the connection ... 19
- 5.2 Connection procedure ... 19
- 5.3 Wiring plan - Two-wire 4 … 20 mA ... 22
- 5.4 Switch-on phase ... 23

**6 Access protection ... 24**
- 6.1 Bluetooth radio interface ... 24
- 6.2 Protection of the parameterization ... 24
- 6.3 Storing the codes in myVEGA ... 25

**7 Set up with the integrated display and adjustment unit ... 26**
- 7.1 Adjustment system ... 26
- 7.2 Measured value and menu item display ... 27
- 7.3 Parameter adjustment ... 28

**8 Setup with smartphone/tablet (Bluetooth) ... 35**
- 8.1 Preparations ... 35
- 8.2 Connecting ... 35
- 8.3 Sensor parameter adjustment ... 36

**9 Setup with PC/notebook (Bluetooth) ... 37**
- 9.1 Preparations ... 37
- 9.2 Connecting ... 37
- 9.3 Parameter adjustment ... 38

**10 Menu overview ... 39**
- 10.1 Display and adjustment unit (on site) ... 39
- 10.2 VEGA Tools app and DTM (Bluetooth) ... 40

**11 Diagnostics and servicing ... 43**


57088-EN-251113

11.1 Maintenance ... 43
11.2 Rectify faults ... 43
11.3 Diagnosis, fault messages ... 44
11.4 Status messages according to NE 107 ... 44
11.5 Software update ... 46
11.6 How to proceed if a repair is necessary ... 47

**12 Dismount ... 48**
12.1 Dismounting steps ... 48
12.2 Disposal ... 48

**13 Certificates and approvals ... 49**
13.1 Radio licenses ... 49
13.2 Approvals for Ex areas ... 49
13.3 Approvals as overfill protection ... 49
13.4 Food and pharmaceutical certificates ... 49
13.5 Conformity ... 49
13.6 NAMUR recommendations ... 49
13.7 Environment management system ... 50

**14 Supplement ... 51**
14.1 Technical data ... 51
14.2 Dimensions ... 59
14.3 Industrial property rights ... 64
14.4 Licensing information for open source software ... 64
14.5 Trademark ... 64

57088-EN-251113

Editing status: 2025-11-13

# 1 About this document

## 1.1 Function

This instruction provides all the information you need for mounting, connection and setup as well as important instructions for maintenance, fault rectification, safety and the exchange of parts. Please read this information before putting the instrument into operation and keep this manual accessible in the immediate vicinity of the device.

## 1.2 Target group

This instruction manual is directed to trained personnel. The contents of this manual must be made available to the qualified personnel and implemented.

## 1.3 Symbols used

**Document ID**
This symbol on the front page of this instruction refers to the Document ID. By entering the Document ID on www.vega.com you will reach the document download.

**Information, note, tip:** This symbol indicates helpful additional information and tips for successful work.

**Note:** This symbol indicates notes to prevent failures, malfunctions, damage to devices or plants.

**Caution:** Non-observance of the information marked with this symbol may result in personal injury.

**Warning:** Non-observance of the information marked with this symbol may result in serious or fatal personal injury.

**Danger:** Non-observance of the information marked with this symbol results in serious or fatal personal injury.

**Ex applications**
This symbol indicates special instructions for Ex applications.

- **List**
  The dot set in front indicates a list with no implied sequence.

1. **Sequence of actions**
   Numbers set in front indicate successive steps in a procedure.

**Disposal**
This symbol indicates special instructions for disposal.

57088-EN-251113

# 2 For your safety

## 2.1 Authorised personnel

All operations described in this documentation must be carried out only by trained and authorized personnel.

During work on and with the device, the required personal protective equipment must always be worn.

## 2.2 Intended use

The VEGABAR 38 is a pressure transmitter for process pressure and hydrostatic level measurement.

You can find detailed information about the area of application in chapter "*Product description*".

Operational reliability is ensured only if the instrument is properly used according to the specifications in the operating instructions manual as well as possible supplementary instructions.

## 2.3 Warning about incorrect use

Inappropriate or incorrect use of this product can give rise to application-specific hazards, e.g. vessel overfill through incorrect mounting or adjustment. Damage to property and persons or environmental contamination can result. Also, the protective characteristics of the instrument can be impaired.

## 2.4 General safety instructions

This is a state-of-the-art instrument complying with all prevailing regulations and directives. The instrument must only be operated in a technically flawless and reliable condition. The operating company is responsible for the trouble-free operation of the instrument. When measuring aggressive or corrosive media that can cause a dangerous situation if the instrument malfunctions, the operating company has to implement suitable measures to make sure the instrument is functioning properly.

The safety instructions in this operating instructions manual, the national installation standards as well as the valid safety regulations and accident prevention rules must be observed.

For safety and warranty reasons, any invasive work on the device beyond that described in the operating instructions manual may be carried out only by personnel authorised by us. Arbitrary conversions or modifications are explicitly forbidden. For safety reasons, only the accessory specified by us must be used.

To avoid any danger, the safety approval markings and safety tips on the device must also be observed.

## 2.5 Installation and operation in the USA and Canada

This information is only valid for USA and Canada. Hence the following text is only available in the English language.

Installations in the US shall comply with the relevant requirements of the National Electrical Code (NEC - NFPA 70) (USA).

Installations in Canada shall comply with the relevant requirements of the Canadian Electrical Code (CEC Part I) (Canada).

# 3 Product description

## 3.1 Configuration

**Scope of delivery**

The scope of delivery encompasses:

- VEGABAR 38 pressure transmitter
- Information sheet "*Documents and software*" with:
  - Instrument serial number
  - QR code with link for direct scanning
- Information sheet "*PINs and Codes*" (with Bluetooth versions) with:
  - Bluetooth access code
- Information sheet "*Access protection*" (with Bluetooth versions) with:
  - Bluetooth access code
  - Emergency Bluetooth unlock code
  - Emergency device code

The further scope of delivery encompasses:

- Documentation
  - Quick setup guide VEGABAR 38
  - Ex-specific "*Safety instructions*" (with Ex versions)
  - Radio approvals (versions with Bluetooth)
  - If necessary, further certificates

**Information:**
Optional instrument features are also described in this instructions. The respective scope of delivery results from the order specification.

## Constituent parts

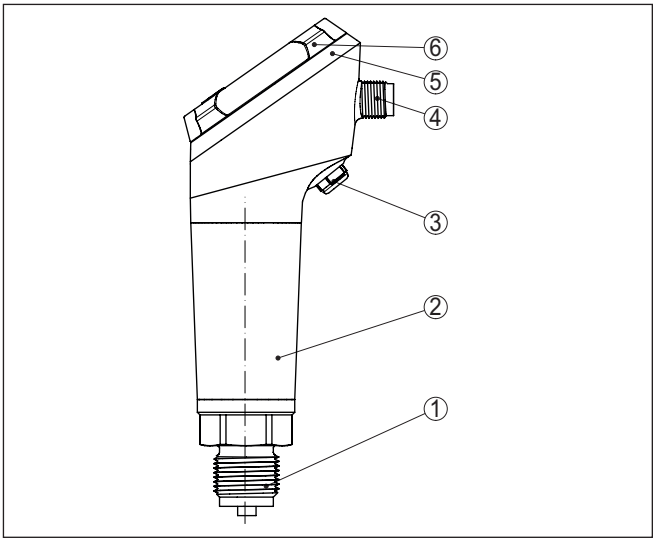



*Fig. 1: Components of VEGABAR 38*

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

## Type label

The type label contains the most important data for identification and use of the instrument:

- Instrument type
- Information about approvals
- Configuration information
- Technical data
- Serial number of the instrument
- QR code for device identification
- Numerical code for Bluetooth access (optional)
- Manufacturer information

## Documents and software

To find order data, documents or software related to your device, you have the following options:

- Move to "www.vega.com" and enter in the search field the serial number of your instrument.
- Scan the QR code on the type label.
- Open the VEGA Tools app and enter the serial number under "***Documentation***".

## 3.2 Principle of operation

**Application area**

VEGABAR 38 is suitable for applications in virtually all industries. It is used for the measurement of the following pressure types.

- Gauge pressure
- Absolute pressure
- Vacuum

**Measured products**

Measured products are gases, vapours and liquids.

Depending on the process fitting and measurement setup, measured products can be also viscous or contain abrasive substances.

**Measured variables**

The VEGABAR 38 is suitable for the measurement of the following process variables:

- Process pressure
- Level

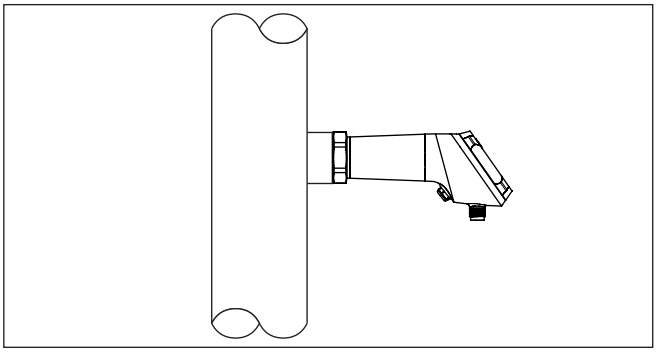


*Fig. 2: Process pressure measurement VEGABAR 38*

**Measuring system pressure**

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.

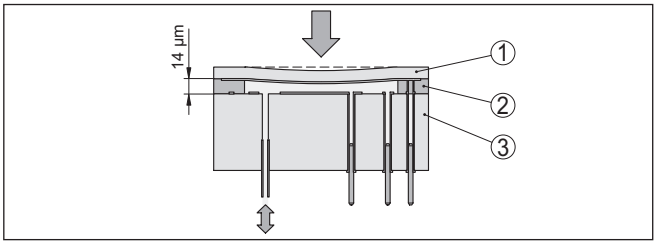



*Fig. 3: Configuration of the Mini-CERTEC® measuring cell*

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

**Measuring system temperature**

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

**Pressure types**

**Relative pressure**: the measuring cell is open to the atmosphere. The ambient pressure is detected in the measuring cell and compensated. It thus has no influence on the measured value.

**Absolute pressure**: the measuring cell contains vacuum and is encapsulated. The ambient pressure is not compensated and does hence influence the measured value.

**Recessed installation**

The recessed installation is particularly suitable for applications with gases, vapours and clear liquids. The measuring cell seals are positioned laterally as well as in front.

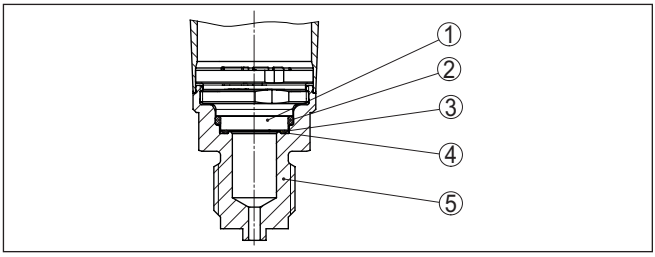



*Fig. 4: Recessed installation of the measuring cell (example: thread G½ (EN 837), manometer connection)*

*1 Measuring cell*
*2 Lateral measuring cell seal*
*3 Front measuring cell seal*
*4 Diaphragm*
*5 Process fitting*

**Front flush installation**

The front-flush installation is particularly suitable for applications with viscous or abrasive media and for buildup.

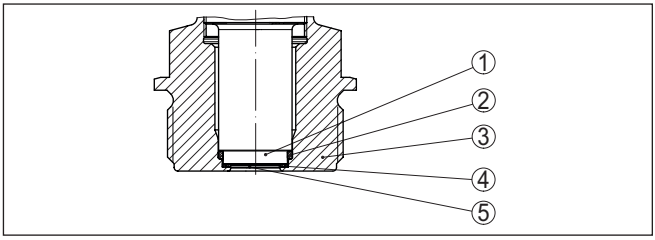



*Fig. 5: Front-flush installation of the measuring cell (example: thread G1½)*

*1 Measuring cell*
*2 Lateral measuring cell seal*
*3 Process fitting*
*4 Front measuring cell seal*
*5 Diaphragm*

57088-EN-251113

**Front-flush installation in hygienic fitting**

The front-flush, hygienic installation of the measuring cell is particularly suitable for food applications. The front seal is installed gap-free.

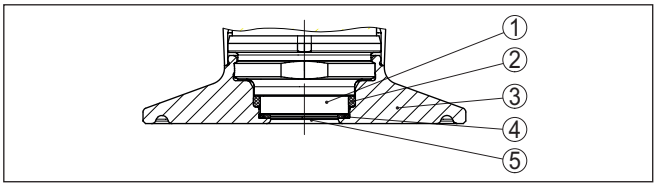



*Fig. 6: Hygienic installation of the measuring cell (example: Clamp 2")*

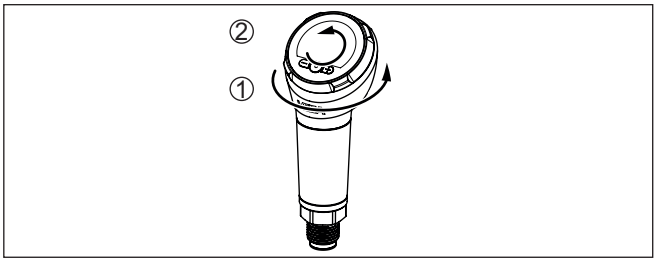
*1 Measuring cell*
*2 Lateral measuring cell seal*
*3 Process fitting*
*4 Front measuring cell seal*
*5 Diaphragm*

## 3.3 Adjustment

**Local adjustment**

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

For convenient reading and operation in any installation position of the device, the housing and display and adjustment unit can be rotated without tools.




*1 Rotating the housing by 330°*
*2 Rotating the display and adjustment unit by 270°*

**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)

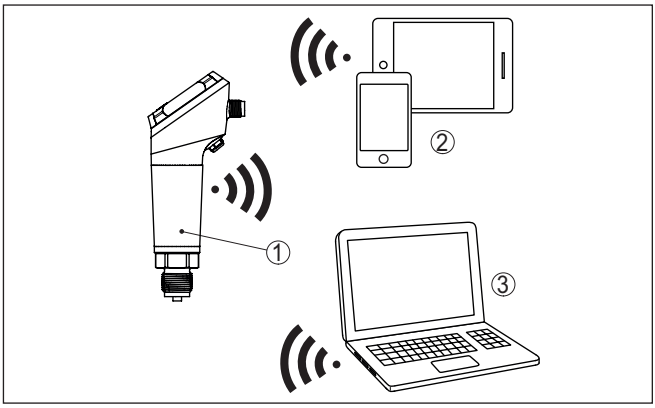



*Fig. 7: Wireless connection to standard operating devices with integrated Bluetooth LE*

*1 Sensor*
*2 Smartphone/Tablet*
*3 PC/Notebook*

## 3.4 Packaging, transport and storage

**Packaging**

Your instrument was protected by packaging during transport. Its capacity to handle normal loads during transport is assured by a test based on ISO 4180.

The packaging consists of environment-friendly, recyclable cardboard. For special versions, PE foam or PE foil is also used. Dispose of the packaging material via specialised recycling companies.

**Transport**

Transport must be carried out in due consideration of the notes on the transport packaging. Nonobservance of these instructions can cause damage to the device.

**Transport inspection**

The delivery must be checked for completeness and possible transit damage immediately at receipt. Ascertained transit damage or concealed defects must be appropriately dealt with.

**Storage**

Up to the time of installation, the packages must be left closed and stored according to the orientation and storage markings on the outside.

Unless otherwise indicated, the packages must be stored only under the following conditions:

- Not in the open
- Dry and dust free
- Not exposed to corrosive media
- Protected against solar radiation
- Avoiding mechanical shock and vibration

**Storage and transport temperature**

- Storage and transport temperature see chapter "*Technical data - Ambient conditions*"

- Relative moisture 20 … 85 %

## 3.5 Accessories

The instructions for the listed accessories can be found in the download area on our homepage.

**Welded socket, threaded and hygienic adapter**

Welded sockets are used to connect the devices to the process.

Threaded and hygienic adapters enable simple adaptation of devices with standard threaded fittings to process-side hygiene connections.

**Mounting accessories**

The suitable mounting accessories for VEGABAR 38 includes siphons, blocking valves and measuring instrument holders.

# 4 Mounting

## 4.1 General instructions

**Ambient conditions**

The instrument is suitable for standard and extended ambient conditions acc. to DIN/EN/BS EN/IEC/ANSI/ISA/UL/CSA 61010-1. It can be used indoors as well as outdoors.

**Process conditions**

**Note:**
For safety reasons, the instrument must only be operated within the permissible process conditions. You can find detailed information on the process conditions in chapter "*Technical data*" of the operating instructions or on the type label.

Hence make sure before mounting that all parts of the instrument exposed to the process are suitable for the existing process conditions.

These are mainly:

- Active measuring component
- Process fitting
- Process seal

Process conditions in particular are:

- Process pressure
- Process temperature
- Chemical properties of the medium
- Abrasion and mechanical influences

**Permissible process pressure (MWP) - Device**

The permissible process pressure range is specified by "MWP" (Maximum Working Pressure) on the type label, see chapter "*Structure*". The MWP takes the element of the measuring cell and processing fitting combination with the weakest pressure into consideration and may applied permanently. The specification refers to a reference temperature of +20 °C (+68 °F). It also applies when a measuring cell with a higher measuring range than the permissible pressure range of the process fitting is installed order-related.

In addition, a temperature derating of the process fitting, e. g. with flanges, can limit the permissible process pressure range according to the respective standard.

**Note:**
In order to prevent damage to the device, a test pressure may only exceed the specified MWP briefly by 1.5 times at reference temperature. The pressure stage of the process fitting as well as the overload resistance of the measuring cell are taken into consideration here (see chapter "*Technical Data*").

**Protection against moisture**

Protect your instrument against moisture ingress through the following measures:

- Use a suitable connection cable (see chapter "*Connecting to power supply*")
- Tighten the cable gland or plug connector

- When mounting horizontally, rotate the housing so that the cable gland or plug connector point downward
- Lead the connection cable downward in front of the cable entry or plug connector

This applies mainly to outdoor installations, in areas where high humidity is expected (e.g. through cleaning processes) and on cooled or heated vessels.

Make sure that the degree of contamination specified in chapter "*Technical data*" meets the existing ambient conditions.

**Ventilation and pressure compensation**

Ventilation and pressure compensation for VEGABAR 38 are provided by an air-permeable, moisture-blocking filter element.

**Note:**
In case of horizontal mounting, turn the housing so that the filter element points downward after the instrument is installed. This provides better protection against buildup.

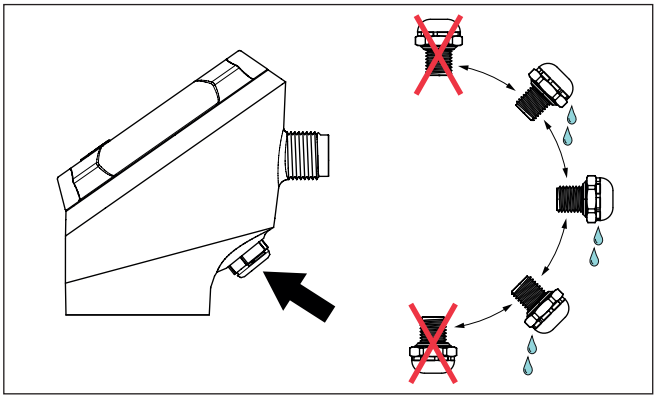


*Fig. 8: Orientation of the filter element*

**Note:**
If possible, position the housing so that moisture can drain off the filter element.

For effective ventilation, the filter element must always be free of buildup.

**Screwing in**

Devices with threaded fitting are screwed into the process fitting with a suitable wrench via the hexagon.

See chapter "*Dimensions*" for wrench size.

**Warning:**
The housing or the electrical connection may not be used for screwing in! Depending on the device version, tightening can cause damage, e. g. to the rotation mechanism of the housing.

**Permissible process pressure (MWP) - Mounting accessory**

The permissible process pressure range is stated on the type label. The instrument should only be operated with these pressures if the mounting accessory used also fulfils these values. This should be ensured by suitable flanges, welded sockets, tension rings with Clamp connections, sealings, etc.

**Temperature limits**

Higher process temperatures often mean also higher ambient temperatures. Make sure that the upper temperature limits stated in chapter "*Technical data*" for the environment of the electronics housing and connection cable are not exceeded.

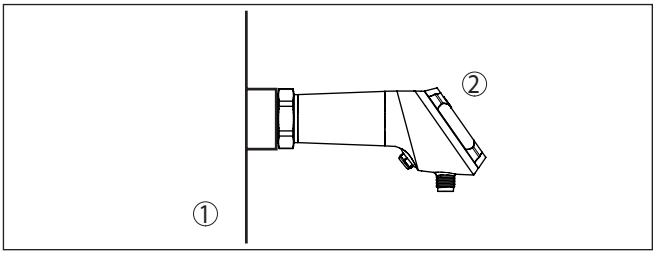



*Fig. 9: Temperature ranges*

*1 Process temperature*
*2 Ambient temperature*

## 4.2 Process pressure measurement

**In gases**

Keep the following in mind when setting up the measuring system:

- Mount the instrument above the measuring point

Possible condensation can then drain off into the process line.

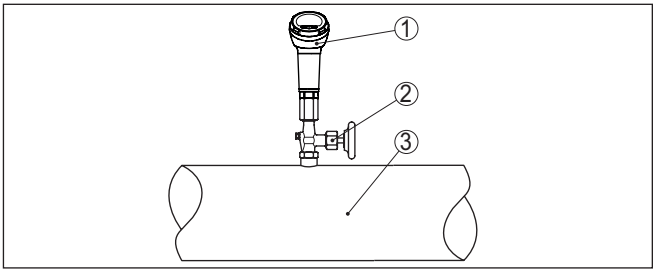



*Fig. 10: Measurement setup for process pressure measurement of gases in pipelines*

*1 VEGABAR 38*
*2 Shut-off valve*
*3 Pipeline*

**In vapours**

Keep the following in mind when setting up the measuring system:

- Connect via a siphon

57088-EN-251113

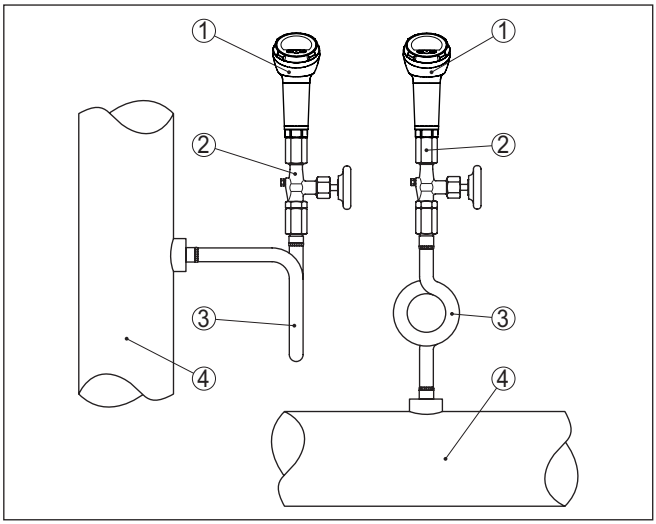



*Fig. 11: Measurement setup for process pressure measurement of gases in pipelines*

*1 VEGABAR 38*
*2 Shut-off valve*
*3 Siphon in U or circular form*
*4 Pipeline*

A protective accumulation of water is formed through condensation in the pipe bends. Even in applications with hot steam, a medium temperature < 100 °C on the transmitter is ensured.

**In liquids**

Keep the following in mind when setting up the measuring system:

- Mount the instrument below the measuring point

The effective pressure line is always filled with liquid and gas bubbles can bubble up to the process line.

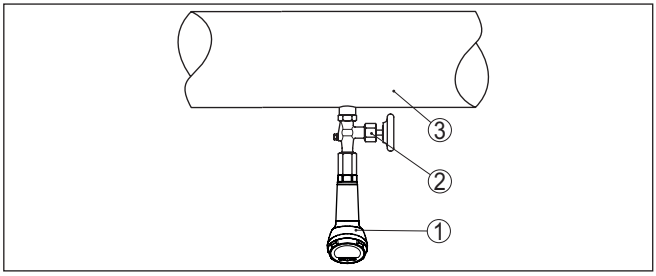



*Fig. 12: Measurement setup for process pressure measurement of liquids in pipelines*

*1 VEGABAR 38*
*2 Shut-off valve*
*3 Pipeline*

## 4.3 Level measurement

**Measurement setup**

Keep the following in mind when setting up the measuring system:

- Mount the instrument below the min. level
- Do not mount the instrument close to the filling stream or emptying area
- Mount the instrument so that it is protected against pressure shocks from the stirrer

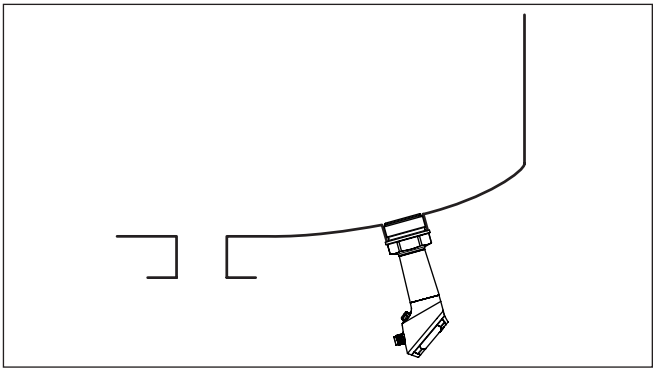


*Fig. 13: Measurement setup for level measurement*

# 5 Connecting to power supply

## 5.1 Preparing the connection

**Safety instructions**

Always keep in mind the following safety instructions:

- Carry out electrical connection by trained, qualified personnel authorised by the plant operator
- If overvoltage surges are expected, overvoltage arresters should be installed

**Warning:**
Only connect or disconnect in de-energized state.

**Voltage supply**

The data for power supply are specified in chapter "*Technical data*".

**Note:**
Power the instrument via an energy-limited circuit (power max. 100 W) acc. to IEC 61010-1, e.g.:

- Class 2 power supply unit (acc. to UL1310)
- SELV power supply unit (safety extra-low voltage) with suitable internal or external limitation of the output current
- PELV power supply unit (protective low voltage) with suitable internal or external limitation of the output current

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*")

**Connection cable**

Use cable with round cross section. Depending on the plug connection, you have to select the outer diameter of the cable respectively so that the seal effect of the cable gland is ensured.

Depending on the connection method or signal output, the device is connected with standard two, three or four-wire cable without shielding.

## 5.2 Connection procedure

**M12 x 1 plug**

This plug connection requires a complete confectioned cable with counter plug.

**Plug according to ISO 4400**

Proceed as follows:

1. Loosen the screw on the rear of the plug connector
2. Remove the plug connector and seal from VEGABAR 38
3. Remove the plug insert from the plug housing

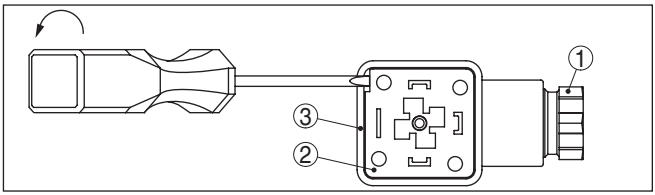



*Fig. 14: Loosen the plug insert*

*1 Cable gland*
*2 Plug insert*
*3 Plug housing*

4. Remove approx. 5 cm of the cable mantle, strip approx. 1 cm insulation from the individual wires
5. Lead the cable through the cable gland into the plug housing
6. Connect the wire ends to the screw terminals according to the wiring plan

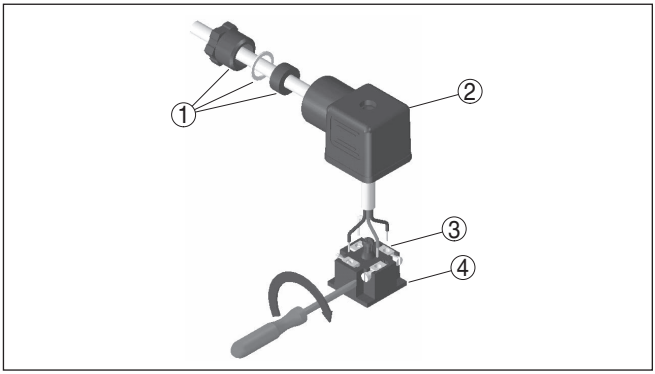



*Fig. 15: Connection to the screw terminals*

*1 Cable gland*
*2 Plug housing*
*3 Plug insert*
*4 Plug seal*

7. Snap the plug insert into the plug housing and insert the sensor seal
8. Plug the plug insert with seal to VEGABAR 38 and tighten the screw

The electrical connection is finished.

**ISO 4400 plug with hinged cover**

Proceed as follows:

1. Loosen the screw in the cover of the plug connector
2. Open the cover and remove it
3. Press the plug insert downwards
4. Loosen the screws of the strain relief and cable entry

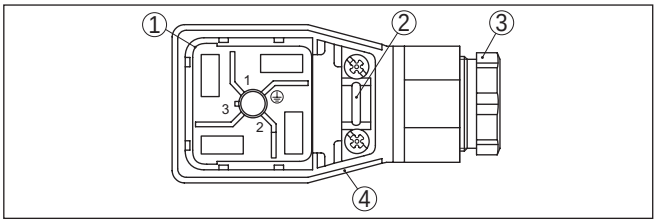



*Fig. 16: Loosen the plug insert*

*1 Plug insert*
*2 Strain relief*
*3 Cable gland*
*4 Plug housing*

5. Remove approx. 5 cm of the cable mantle, strip approx. 1 cm insulation from the individual wires
6. Lead the cable through the cable gland into the plug housing
7. Connect the wire ends to the screw terminals according to the wiring plan

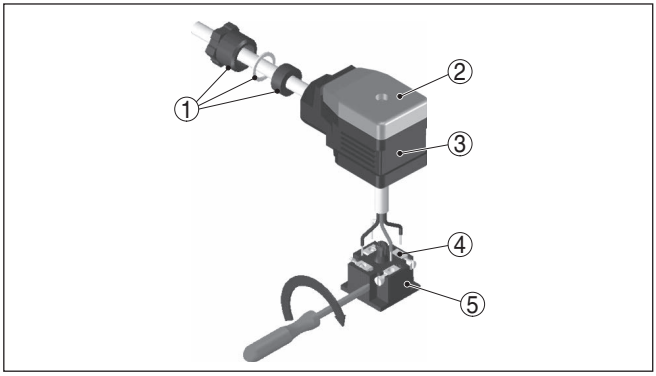



*Fig. 17: Connection to the screw terminals*

*1 Cable gland*
*2 Cover*
*3 Plug housing*
*4 Plug insert*
*5 Plug seal*

8. Snap the plug insert into the plug housing and insert the sensor seal

**Information:**
Note the correct arrangement, see illustration

9. Tighten the screws on the strain relief and cable entry
10. Hook in the cover and push onto the plug connection, tighten cover screw
11. Plug the plug insert with seal to VEGABAR 38 and tighten the screw

The electrical connection is finished.

**Plug according to ISO 4400 with IDC method of termination**

For this plug version you can use standard cable with round wire cross-section. The inner conductors do not have to be stripped. The plug connects the conductors automatically when screwing in. Cable diameter 5.5 … 8 mm, protection IP67.

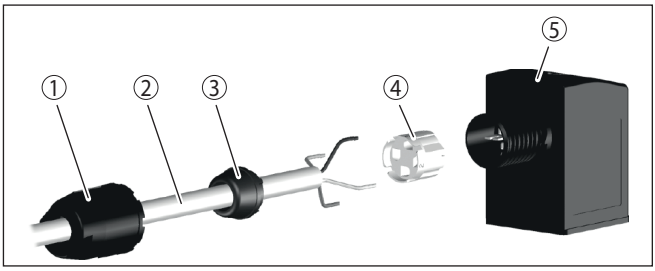



*Fig. 18: Connection, valve plug ISO 4400 with IDC crimping technology*

*1 Compression nut*
*2 Cable*
*3 Seal ring*
*4 Terminal insert*
*5 Plug housing*

## 5.3 Wiring plan - Two-wire 4 … 20 mA

**Plug according to ISO 4400**

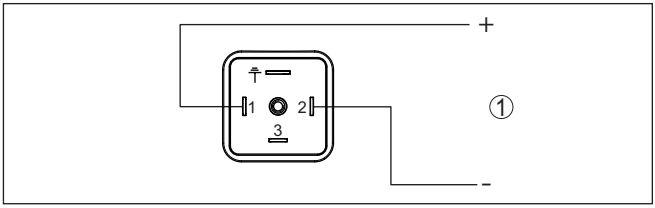



*Fig. 19: Wiring plan - two-wire 4 … 20 mA - plug according to ISO 4400*

*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 |

**M12 x 1 plug**

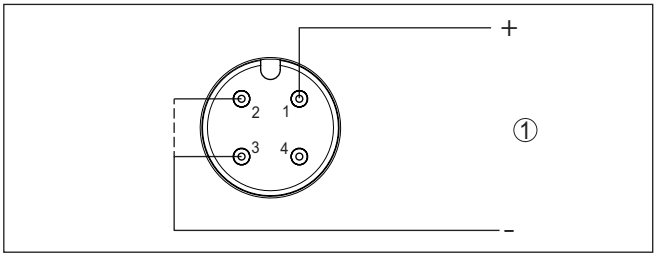



*Fig. 20: Wiring plan - two-wire 4 … 20 mA - M12 x 1 plug*

*1 Voltage supply and signal output*

| Contact, plug connector | Function/Polarity |
|---|---|
| 1 | Voltage supply, signal output/+ |
| 2 | Voltage supply, signal output/- |
| 3 | Voltage supply, signal output/-[1)] |
| 4 | Free |

## 5.4 Switch-on phase

After switching on, the device first carries out a self-check:

- Internal check of the electronics
- The output signal jumps to the set fault current

The current measured value is then output on the signal cable.

[1)] Internal bridge between contact 2 and 3

# 6 Access protection

## 6.1 Bluetooth radio interface

Devices with a Bluetooth radio interface are protected against unwanted access from outside. This means that only authorized persons can receive measured and status values and change device settings via this interface.

**Bluetooth access code**

A Bluetooth access code is required to establish Bluetooth communication via the adjustment tool (smartphone/tablet/notebook). This code must be entered once when Bluetooth communication is established for the first time in the adjustment tool. It is then stored in the adjustment tool and does not have to be entered again.

The Bluetooth access code is individual for each device. It is printed on the device housing with Bluetooth. In addition, it is supplied with the device in the information sheet "*PINs and Codes*" In addition, the Bluetooth access code can be read out via the display and adjustment unit, depending on the device version.

The Bluetooth access code can be changed by the user after the first connection is established. If the Bluetooth access code is entered incorrectly, the new entry is only possible after a waiting period has elapsed. The waiting time increases with each further incorrect entry.

**Emergency Bluetooth unlock code**

The emergency Bluetooth access code enables Bluetooth communication to be established in the event that the Bluetooth access code is no longer known. It can't be changed. The emergency Bluetooth access code can be found in information sheet "*Access protection*". If this document is lost, the emergency Bluetooth access code can be retrieved from your personal contact person after legitimation. The storage and transmission of Bluetooth access codes is always encrypted (SHA 256 algorithm).

## 6.2 Protection of the parameterization

The settings (parameters) of the device can be protected against unwanted changes. The parameter protection is deactivated on delivery, all settings can be made.

**Device code**

To protect the parameterization, the device can be locked by the user with the aid of a freely selectable device code. The settings (parameters) can then only be read out, but not changed. The device code is also stored in the adjustment tool. However, unlike the Bluetooth access code, it must be re-entered for each unlock. When using the adjustment app or DTM, the stored device code is then suggested to the user for unlocking.

**Emergency device code**

The emergency device code allows unlocking the device in case the device code is no longer known. It can't be changed. The emergency device code can also be found on the supplied information sheet "*Access protection*". If this document is lost, the emergency device code can be retrieved from your personal contact person after legitimation.

57088-EN-251113

The storage and transmission of the device codes is always encrypted (SHA 256 algorithm).

## 6.3 Storing the codes in myVEGA

If the user has a "*myVEGA*" account, then the Bluetooth access code as well as the device code are additionally stored in his account under "*PINs and Codes*". This greatly simplifies the use of additional adjustment tools, as all Bluetooth access and device codes are automatically synchronized when connected to the "*myVEGA*" account

# 7 Set up with the integrated display and adjustment unit

## 7.1 Adjustment system

**Function**

The instrument is operated via the three keys of the integrated display and adjustment unit. The respective menu items are shown on the LC display. You can find the function of the individual keys in the below overview.

Certain settings are only possible to a limited extent or not possible with the integrated display and adjustment unit. For these settings, we recommend using the adjustment app or PACTware with corresponding DTM.

**Display and adjustment elements**

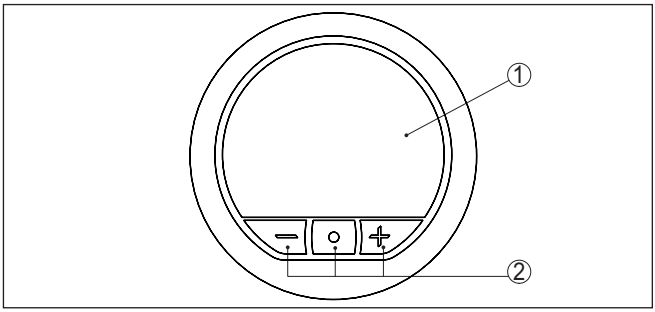



*Fig. 21: Integrated display and adjustment unit*

*1 LC display*
*2 Adjustment keys*

**Key functions**

| Key | Function |
|---|---|
| **[•]** | Entry to the menu level<br>Jump to selected menu item<br>Edit parameter<br>Select editing position<br>Save value |
| **[+]** | Switching between the individual measured value windows<br>Navigation in the menu items, forwards<br>Change parameter values upwards |
| **[-]** | Switching between the individual measured value windows<br>Navigation in the menu items, backwards<br>Change parameter values downwards |
| **[+]** and **[-]** simultaneously | Jump to next higher menu<br>Interrupt input |

**Time functions**

When the **[+]** and **[-]** keys are pressed quickly, the edited value, or the cursor, changes one value or position at a time. If the key is pressed longer than 1 s, the value or position changes continuously.

Simultaneous pressing of the **[+]** and **[-]** keys causes a return to the measured value indication.

Approx. 60 minutes after the last pressing of a key, an automatic reset to measured value indication is triggered. Any values not confirmed with **[•]** will not be saved.

## 7.2 Measured value and menu item display

**Measured value indication**

Measured value images are displayed according to the following presentation:

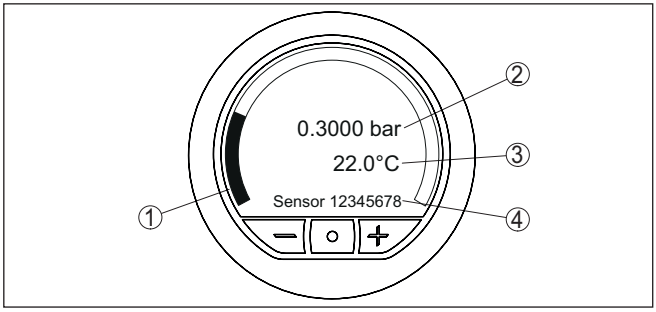



*Fig. 22: Indication of measured value with additional displays*

*1 Measured value as bargraph*
*2 Measured value as digital value with unit*
*3 Measuring cell temperature*
*4 Sensor-TAG*

**Menu item display**

The menu items are displayed according to the following diagram:

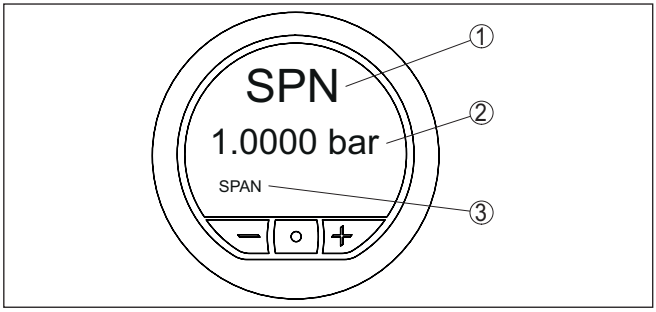



*Fig. 23: Display menu item*

*1 Menu item code acc. to VDMA 24574-1*
*2 Actual parameter value*
*3 Menu item name*

## 7.3 Parameter adjustment

### 7.3.1 Main menu

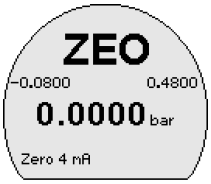
**Selection language**

With the first setup, the instrument offers you a selection of the menu languages. The selection you are making here can be changed any time under "*Extended functions*", "*Menu language*".

**Zero**

The menu item Zero (initial value) defines the pressure value at the output current 4 mA.

**Information:**
The zero adjustment has no influence on the value of the span adjustment.




Menu item code:

- ZEO

Parameter:

- Pressure value

**Span**

The menu item Span (final value) defines the pressure value at the output current 20 mA.

Menu item code:

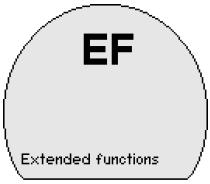
- SPN

Parameter:

- Pressure value

**Extended functions, diagnosis**

These menu items allow access to the menu areas "*Extended functions*" or "*Diagnosis*".



Menu item code:

- EF
- DIA

### 7.3.2 Extended functions

**Reaction when malfunction occurs**

In this menu item you define the behaviour of the current output in the event of failures.

Menu item code:

- FER

Parameter:

- ≤ 3.6 mA
- ≥ 21 mA

**Damping**

To damp process-dependent measured value fluctuations, set an integration time in this menu item.

Due to the set damping, the 4 … 20 mA output as well as the switching output react in case of a sudden increased of the measured variable with a time-delayed slope curve.

Menu item code:

- DAM

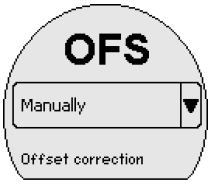
Parameter:

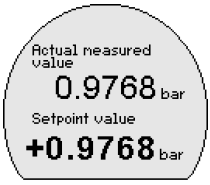
- Time value

**Offset correction**

The installation position of the device can shift the measured value minimally (offset). The offset correction compensates this measured value shift. The measured value that should currently be displayed is entered (manual offset correction). With relative pressure transmitters, an automatic offset to 0.0000 bar can alternatively be carried out.

**Note:**
With automatic offset correction, the current measured value must not be influenced by product coverage or static pressure.



The position correction can be repeated as often as necessary. However, if the sum of the corrective values exceeds 100 % of the nominal measuring range, then no position correction is possible.

Menu item code:

- OFS

Parameter:

- Pressure value

**Accept value**

In this menu item ( live adjustment ) you can accept the current measured value as the value for the 4 mA adjustment (LRV) or the 20 mA adjustment (URV).[2)]

Menu item code:

- LRV
- URV

Parameter:

- Pressure value

**Display lighting**

In this menu item you switch the backlight for the display off or on.

Menu item code:

- DIS

Parameter

- On
- Off

**Note:**
When the backlight is on, the 360° status display is deactivated or vice versa.

**Pressure unit**

In this menu item the adjustment unit of the device is defined. The selection made determines the displayed unit in the menu items "*Zero/ Span*" and "*Offset correction*" as well as "*Accept value*".

[2)] LRV: Lower Range Value, URV: Upper Range Value

Menu item code:

- UNI

The following units are available: mbar, bar, psi, Pa, kPa, MPa, inHg, mmHg, $mmH_2O$, $inH_2O$

**Unit temperature**

In this menu item the temperature unit of the device is defined. The selection made determines the unit for the measuring cell temperature shown on the display.

Menu item code:

- TMP

Parameter:

- °C
- °F

**Menu language**

This menu item enables the setting of the requested national language for the display.

Menu item code:

German, English, French, Spanish, Portuguese, Italian, Dutch, Russian, Chinese, Turkish

**Bluetooth access code**

In this menu item, you can change the factory-preset Bluetooth access code to your personal Bluetooth access code.

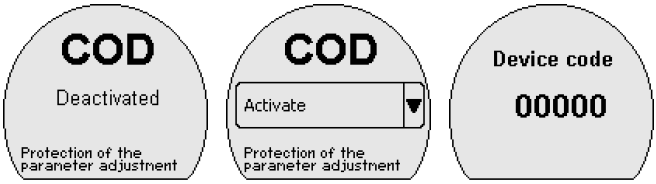
**Note:**
The individual preset Bluetooth access code of the device can be found on the supplied information sheet "*PINs and Codes*". If this is changed by the user and is no longer available, access is only possible via the emergency Bluetooth unlock code on the information sheet "*Emergency unlock codes*" also supplied.

Menu item code:

- BT

**Protection of the parameterization**

In this menu item you safeguard the sensor parameters by entering a 6-digit device code against unauthorized or unintentional modifications.




With protected parameter adjustment, the individual menu items can be selected and displayed, however the parameters can no longer be modified.

The sensor operation can also be enabled in any menu item by entering the device code. The parameter adjustment remains open until you return to the measured value display. This takes place automatically after 60 min.

Menu item code:

- COD

Parameter:

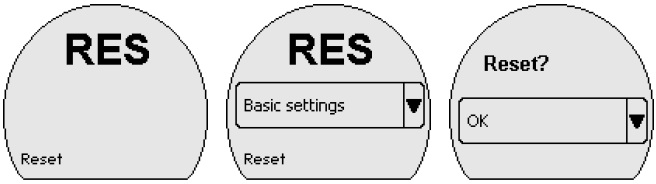
- Numerical value

**Note:**
The factory set device code is "*000000*". If this is changed by the user and is no longer available, access is only possible via the emergency device unlock code on the information sheet "*Emergency unlock codes*" also supplied.

**Note:**
With protected parameter adjustment, adjustment via the VEGA Tools app as well as PACTware/DTM and other systems is also blocked.

**Reset**

During a reset, parameter settings made by the user are reset to the values of the basic setting or the delivery status (see chapter "*Menu overview*").[3)]




Menu item code:

- RES

Parameter:

- Basic settings

[3)] Language and Bluetooth access code are not reset.

- Delivery status[4)]

**Basic settings:** Resets the parameter settings to the default values of the respective device. The order-related settings are not transferred to the current parameters after this reset.

**Delivery status:** Resets the parameter settings to the delivery status.

**Information:**
The current status of the access protection, the Bluetooth access code and the device code are not reset.

### 7.3.3 Diagnostics

**Status**

In this menu item, the device status is displayed.

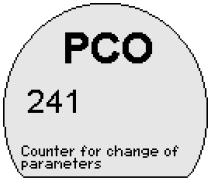
Menu item code:

- STA

In the event of an error, the error code, e.g. F017, and an error description, e.g. "*Adjustment span too small*" are displayed.

**Parameter modification counter**

This menu item displays the number of parameter changes made.




Menu item code:

- PCO

**Peak indicator**

In this menu item, the min. and max. values for pressure, measuring cell temperature and electronics temperature are displayed.

[4)] Parameter delivery status only available with a parameter adjustment that deviates from the basic settings, e.g. customer-specific adjustment

Menu item code:

- LO
- HI

**Information:**
To reset the peak indicator, the VEGA Tools app or PACTware/DTM is required.

**Sensor information**

This menu item displays the hardware and software status as well as the serial number of the device.

Menu item code:

- INF

Parameter:

- HW
- SW
- SN

**Extended functions - Simulation**

In this menu item you simulate switching states of the transistor outputs or current values of the 4 … 20 mA output. This allows the signal path to be tested, e.g. via downstream display instruments or the input card of the control system. The simulation values are: Pressure, current, switching status.

Menu item code:

- SIM

Parameter:

- Numerical value
- Open
- Closed

**Note:**
Without manual deactivation, the sensor terminates the simulation automatically after 60 minutes.

# 8 Setup with smartphone/tablet (Bluetooth)

## 8.1 Preparations

**System requirements**

Make sure that your smartphone/tablet meets the following system requirements:

- Operating system: iOS 13 or newer
- Operating system: Android 5.1 or newer
- Bluetooth 4.0 LE or newer

Download the VEGA Tools app from the "*Apple App Store*", "*Google Play Store*" or "*Baidu Store*" to your smartphone or tablet.

## 8.2 Connecting

**Connecting**

Start the adjustment app and select the function "*Setup*". The smartphone/tablet searches automatically for Bluetooth-capable instruments in the area.

The message "*Connecting …*" is displayed.

The devices found are listed and the search is automatically continued.

Select the requested instrument in the device list.

As soon as the Bluetooth connection to a device is established, the LED display of the device in question flashes blue 4 times.

**Authenticate**

When establishing the connection for the first time, the operating tool and the sensor must authenticate each other. After the first correct authentication, each subsequent connection is made without a new authentication query.

**Enter Bluetooth access code**

For authentication, enter the 6-digit Bluetooth access code in the next menu window. You can find the code on the outside of the device housing and on the information sheet "*Pins and Codes*" in the device packaging.

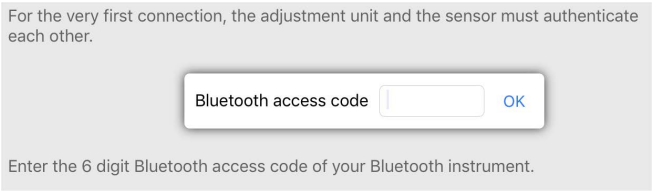



*Fig. 24: Enter Bluetooth access code*

**Note:**
If an incorrect code is entered, the code can only be entered again after a delay time. This time gets longer after each incorrect entry.

The message "*Waiting for authentication*" is displayed on the smartphone/tablet.

**Connected**

After connection, the sensor adjustment menu is displayed on the respective adjustment tool.

If the Bluetooth connection is interrupted, e.g. due to a too large distance between the two devices, this is displayed on the adjustment tool. The message disappears when the connection is restored.

**Change device code**

Parameter adjustment of the device is only possible if the parameter protection is deactivated. When delivered, parameter protection is deactivated by default and can be activated at any time.

It is recommended to enter a personal 6-digit device code. To do this, go to menu "*Extended functions*", "*Access protection*", menu item "*Protection of the parameter adjustment*".

## 8.3 Sensor parameter adjustment

**Enter parameters**

The sensor adjustment menu is divided into two areas, which are arranged next to each other or one below the other, depending on the adjustment tool.

- Navigation section
- Menu item display

The selected menu item can be recognized by the colour change.

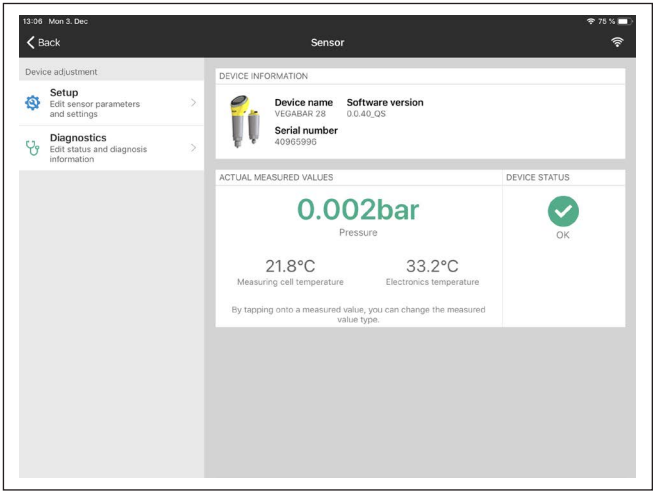



*Fig. 25: Example of an app view - Setup measured values*

# 9 Setup with PC/notebook (Bluetooth)

## 9.1 Preparations

**System requirements**

Make sure that your PC/notebook meets the following system requirements:

- Operating system Windows 10 or newer
- DTM Collection 10/2020 or newer
- Bluetooth 4.0 LE or newer

**Activate Bluetooth connection**

Activate the Bluetooth connection via the project assistant.

**Note:**
Older systems do not always have an integrated Bluetooth LE. In these cases, a Bluetooth USB adapter is required. Activate the Bluetooth USB adapter using the Project Wizard.

After activating the integrated Bluetooth or the Bluetooth USB adapter, devices with Bluetooth are found and created in the project tree.

## 9.2 Connecting

**Connecting**

Select the requested device for the online parameter adjustment in the project tree.

As soon as the Bluetooth connection to a device is established, the LED display of the device in question flashes blue 4 times.

**Authenticate**

When establishing the connection for the first time, the operating tool and the device must authenticate each other. After the first correct authentication, each subsequent connection is made without a new authentication query.

**Enter Bluetooth access code**

For authentication, enter in the next menu window the 6-digit Bluetooth access code:

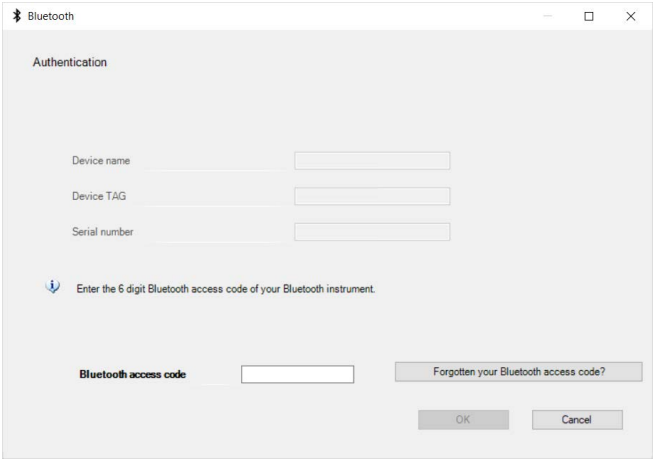



*Fig. 26: Enter Bluetooth access code*

You can find the code on the outside of the device housing and on the information sheet "*PINs and Codes*" in the device packaging.

**Note:**
If an incorrect code is entered, the code can only be entered again after a delay time. This time gets longer after each incorrect entry.

The message "*Waiting for authentication*" is displayed on the PC/notebook.

**Connected**

After connection, the device DTM appears.

If the connection is interrupted, e.g. due to a too large distance between device and adjustment tool, this is displayed on the adjustment tool. The message disappears when the connection is restored.

**Change device code**

Parameter adjustment of the device is only possible if the parameter protection is deactivated. When delivered, parameter protection is deactivated by default and can be activated at any time.

It is recommended to enter a personal 6-digit device code. To do this, go to menu "*Extended functions*", "*Access protection*", menu item "*Protection of the parameter adjustment*".

## 9.3 Parameter adjustment

**Prerequisites**

For parameter adjustment of the instrument via a Windows PC, the configuration software PACTware and a suitable instrument driver (DTM) according to FDT standard are required. The latest PACTware version as well as all available DTMs are compiled in a DTM Collection. The DTMs can also be integrated into other frame applications according to FDT standard.

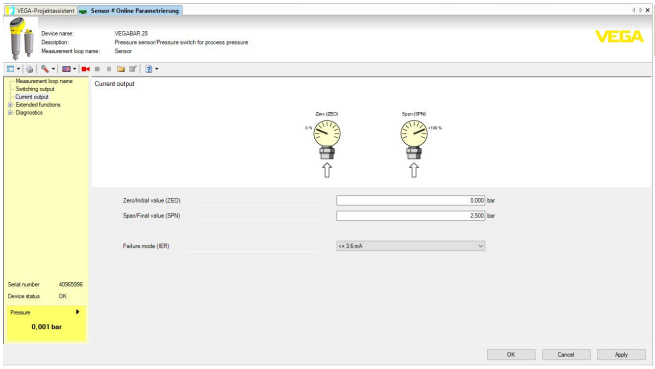



*Fig. 27: Example of a DTM view - Adjustment current output*

# 10 Menu overview

## 10.1 Display and adjustment unit (on site)

**Measured value indication**

| Menu item | Measured value window 1 | Measured value window 2 |
|---|---|---|
| Measured value indication | Pressure | Pressure, measuring cell temperature, sensor TAG |

**Main menu**

| Menu item | Code acc. to VDMA 24574-1 | Basic settings |
|---|---|---|
| Zero 4 mA | ZEO | Measuring range begin |
| Span 20 mA | SPN | Measuring range end |
| Extended functions | EF | - |
| Diagnostics | DIA | - |

**Extended functions**

| Menu item | Code acc. to VDMA 24574-1 | Basic settings |
|---|---|---|
| Damping | DAM | 1 s |
| Offset correction | OFS | - |
| Reaction when malfunctions occur | FER | ≤ 3.6 mA |
| Accept value 4 mA | LRV | - |
| Accept value 20 mA | URV | |
| Display lighting | DIS | On |
| Pressure unit | UNI | mbar |
| Unit temperature | TMP | °C |
| Menu language | LG | German |
| Bluetooth access code | BT | On |
| Protection of the parameterization | COD | Off |
| Reset | RES | - |

**Diagnostics**

| Menu item | Code acc. to VDMA 24574-1 | Delivery status |
|---|---|---|
| Status | STA | - |
| Parameter modification counter | PCO | - |
| Min. value peak indicator | LO | Last values |
| Max. value peak indicator | HI | |
| Sensor information | INF, HW, SW | - |

| Menu item | Code acc. to VDMA 24574-1 | Delivery status |
|---|---|---|
| Simulation | SIM | - |

## 10.2 VEGA Tools app and DTM (Bluetooth)

### Start image (app)

| Menu item | Device information | Actual measured values | Device status |
|---|---|---|---|
| Start image | Device name, serial number | Pressure, output current, measuring cell temperature, electronics temperature, sensor TAG | OK, error indication |

### Basic functions

| Menu item | Parameter (code acc. to VDMA 24574-1) | Editing section | Basic setting |
|---|---|---|---|
| Measurement loop name | Measurement loop name | 19 alphanumeric characters/ special characters | Sensor |
| Current output | Zero 4 mA (ZEO) | Measuring range begin … measuring range end | Measuring range begin |
| | Span 20 mA (SPN) | | Measuring range end |
| | Reaction in case of fault (FER) | ≤ 3.6 mA, ≥ 21 mA | ≤ 3.6 mA |
| 360° status indication (acc. to NAMUR NE 107) | Brightness (LED) | 0 %, 10 %, 20 % … 100 % | 100 % |
| | Signalling | Acc. to NAMUR NE 107 | Acc. to NAMUR NE 107 |
| 360° status display (free signalling) | Brightness (LED) | 0 %, 10 %, 20 % … 100 % | 100 % |
| | Signalling | Acc. to NAMUR NE 107, switching output, free signalling | Acc. to NAMUR NE 107 |
| | Fault | Red, yellow, green …, individual colour selection, no signalling | Red |
| | Flashing | Yes, no | No |
| | Operating status[5)] | Operating states 1, 2, 3, 4, 5 | 1 |
| | Upper limit | Measuring range begin minus 20 % … measuring range end plus 20 % | 0.000 bar |
| | Colour selection | Red, yellow, green …, individual colour selection, no signalling | Green |
| | Flashing | Yes, no | No |

**Note:**
With the 360° status indication switched on, the lighting of the display and adjustment unit is deactivated or vice versa.

[5)] Signalling of process pressure ranges by colour and flashing

### Extended functions

| Menu item | Parameter (code acc. to VDMA 24574-1) | Editing section | Basic setting |
|---|---|---|---|
| Damping | Integration time (DAM) | 0 … 9.0 s | 0 s |
| | Activate thermo-shock suppression | Yes, no | No |
| Offset correction | Offset correction (OFS) | Execute, automatic correction | 0.000 bar |
| Adjustment with medium | Apply min. pressure on the sensor | Accept 4 mA (LRV) | - |
| | Apply max. pressure on the sensor | Accept 20 mA (URV) | |
| Scaling | Scaling size (SCS) | Other, mass, volume, height, pressure, flow, temperature | Miscellaneou |
| | Scaling unit (SCU) | Dependent on SCS | User-defined |
| | Scaling format (SCF) | Number of decimal places | Automatically |
| | Minimum value (MIV) | - | - |
| | Maximum value (MAV) | - | - |
| Indication | Lighting (DIS)[6] | | On |
| | Menu language (LG) | | German |
| | Presentation | Measured value indication 1, measured value indication 2 | Measured value indication 1 |
| Units | Pressure unit (UNI) | mbar, bar, Pa, kPa, MPa, psi, mmH2O, mmHg, inH2O, inHg | bar |
| | Temperature (TMP) | °C, °F | °C |
| Access protection | Bluetooth access code | | Device-specific access code |
| | Protection of the parameterization | | Deactivated |
| Reset | Reset | | - |

### Diagnostics

| Menu item | Parameter | Indication |
|---|---|---|
| Status | Device status, parameter change counter | Actual values |
| Peak indicator | Process pressure, measuring cell temperature, electronics temperature | Actual values, min. values, max. values |
| Measured values | Measured values, output, additional measured values | Actual values pressure, current output, electronics temperature, measuring cell temperature |
| Measured value memory (DTM) | Trend curve | Last values |
| Simulation | Pressure, current output | Simulated values |

[6] When the display lighting is on, the 360° status display is deactivated or vice versa.

| Menu item | Parameter | Indication |
|---|---|---|
| Sensor information | | Device name, serial number, hardware version, software version, factory calibration date, Device Revision, measuring range begin, measuring range end |
| Sensor features (DTM) | Sensor characteristics | Features of the instrument version |

# 11 Diagnostics and servicing

## 11.1 Maintenance

**Maintenance**

If the device is used properly, no special maintenance is required in normal operation.

**Precaution measures against buildup**

In some applications, product buildup on the diaphragm can influence the measuring result. Depending on the sensor and application, take precautions to ensure that heavy buildup, and especially a hardening thereof, is avoided.

**Cleaning**

The cleaning helps that the type label and markings on the instrument are visible.

Take note of the following:

- Use only cleaning agents which do not corrode the housings, type label and seals
- Use only cleaning methods corresponding to the housing protection rating

## 11.2 Rectify faults

**Reaction when malfunction occurs**

The operator of the system is responsible for taking suitable measures to rectify faults.

**Causes of malfunction**

The device offers maximum reliability. Nevertheless, faults can occur during operation. These may be caused by the following, e.g.:

- Sensor
- Process
- Voltage supply
- Signal processing

**Fault rectification**

The first measures are:

- Evaluation of fault messages
- Checking the output signal
- Treatment of measurement errors

A smartphone/tablet with the adjustment app or a PC/notebook with the software PACTware and the suitable DTM offer you further comprehensive diagnostic possibilities. In many cases, the causes can be determined in this way and the faults eliminated.

**Reaction after fault rectification**

Depending on the reason for the fault and the measures taken, the steps described in chapter "*Setup*" must be carried out again or must be checked for plausibility and completeness.

**24 hour service hotline**

Should these measures not be successful, please call in urgent cases the VEGA service hotline under the phone no. **+49 1805 858550**.

The hotline is also available outside normal working hours, seven days a week around the clock.

Since we offer this service worldwide, the support is provided in English. The service itself is free of charge, the only costs involved are the normal call charges.

## 11.3 Diagnosis, fault messages

**4 … 20 mA signal**

Connect a multimeter in the suitable measuring range according to the wiring plan. The following table describes possible errors in the current signal and helps to eliminate them:

| Error | Cause | Rectification |
|---|---|---|
| 4 … 20 mA signal not stable | Fluctuating measured value | Set damping |
| 4 … 20 mA signal missing | Electrical connection faulty | Check connection, correct, if necessary |
| | Voltage supply missing | Check cables for breaks; repair if necessary |
| | Operating voltage too low, load resistance too high | Check, adapt if necessary |
| Current signal greater than 22 mA, less than 3.6 mA | Sensor electronics defective | Replace device or send in for repair depending on device version |

**LED illuminated ring**

The 360° status indication on the device (see chapter "*Configuration*") shows the following:

- Device status
- Operating status[7)]

This enables simple on-site diagnosis without tools, see the following table:

| Colour[8)] | Permanent light | Flashing |
|---|---|---|
| Green | voltage supply on, operation without failure | Message acc. to NE 107 "*Maintenance required*" available |
| Yellow | | - |
| Red | voltage supply on, operation with failure | Message acc. to to NE 107 "*Function check*", "*Out of specification*" or "*Simulation state*" is displayed |

## 11.4 Status messages according to NE 107

The instrument features self-monitoring and diagnostics according to NE 107 and VDI/VDE 2650. In addition to the status messages in the following tables there are more detailed error messages available under the menu item "*Diagnostics*" via the respective adjustment module.

**Status messages**

The status messages are divided into the following categories:

7) Signalling of process pressure ranges by colour and flashing, adjustable via VEGA Tools app or PACTware/DTM.
8) Delivery status; adjustable via VEGA Tools app or PACTware/DTM

- Failure
- Function check
- Out of specification
- Maintenance required

and explained by pictographs:

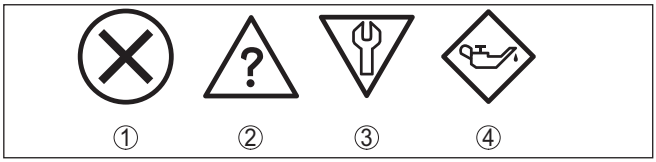



*Fig. 28: Pictographs of the status messages*

*1 Failure - red*
*2 Out of specification - yellow*
*3 Function check - orange*
*4 Maintenance required - blue*

**Malfunction (Failure):**
Due to a malfunction in the instrument, a fault signal is output.

This status message is always active. It cannot be deactivated by the user.

**Function check:**
The instrument is being worked on, the measured value is temporarily invalid (for example during simulation).

This status message is inactive by default.

**Out of specification:**
The measured value is unreliable because an instrument specification was exceeded (e.g. electronics temperature).

This status message is inactive by default.

**Maintenance required:**
Due to external influences, the instrument function is limited. The measurement is affected, but the measured value is still valid. Plan in maintenance for the instrument because a failure is expected in the near future (e.g. due to buildup).

This status message is inactive by default.

**Failure**

| Code<br>Text message | Cause | Rectification |
|---|---|---|
| F013<br>no measured value available | Hardware error in the area of the measuring cell | Send instrument for repair |
| F017<br>Adjustment span too small | Adjustment not within specification | Change adjustment |
| F036<br>no operable sensor software | Failed or interrupted software update | Repeat software update |

| Code<br>Text message | Cause | Rectification |
|---|---|---|
| F080<br>General software error | General software error | Restart |
| F110<br>Switching points too close together | Selected switching points too close together | Increase the distance between the switching points |
| F111<br>Switching points interchanged | Switching point 1 is smaller than switching point 2 | Select switching point 1 to greater than switching point 2 |
| F260<br>Error in the calibration | Checksum error in the calibration values | Send instrument for repair |
| F261<br>Error in the instrument settings | Checksum error in the configuration values | Carry out a reset |

**Function check**

| Code<br>Text message | Cause | Rectification |
|---|---|---|
| C700<br>Simulation active | A simulation is active | Finish simulation<br>Wait for the automatic end after 60 mins. |

**Out of specification**

| Code<br>Text message | Cause | Rectification |
|---|---|---|
| S600<br>Impermissible electronics temperature | Temperature of the electronics in the non-specified range | Check ambient temperature<br>Insulate electronics |
| S604<br>Switching output overloaded | Overload or short circuit at output 1 or 2 | Electrical connection, check load resistance |

**Maintenance**

| Code<br>Text message | Cause | Rectification |
|---|---|---|
| M504<br>Error at a device interface | Interference of the internal communication to Bluetooth | Restart<br>Send instrument for repair |
| M510<br>No communication with the main controller | Fault in internal communication with the display | Restart<br>Send instrument for repair |

## 11.5 Software update

The device software is updated via Bluetooth.

The following components are required:

- Instrument
- Voltage supply
- PC/notebook with PACTware/DTM and Bluetooth USB adapter
- Current instrument software as file

You can find the current instrument software as well as detailed information on the procedure in the download area of our homepage: www.vega.com.

**Caution:**
Instruments with approvals can be bound to certain software versions. Therefore make sure that the approval is still effective after a software update is carried out.

You can find detailed information in the download area at www.vega.com.

## 11.6 How to proceed if a repair is necessary

On our homepage you will find detailed information on how to proceed in the event of a repair.

So that we can carry out the repair quickly and without queries, generate a instrument return form there with the data of your device.

The following is required:

- The serial number of the instrument
- A short description of the fault
- Details of the medium, if applicable

Print the generated instrument return form.

Clean the instrument and pack it damage-proof.

Send the printed instrument return form and possibly a safety data sheet together with the device.

You will find the address for the return on the generated instrument return form.

# 12 Dismount

## 12.1 Dismounting steps

To remove the device, carry out the steps in chapters "*Mounting*" and "*Connecting to power suplly*" in reverse.

**Warning:**
When dismounting, pay attention to the process conditions in vessels or pipelines. There is a risk of injury, e.g. due to high pressures or temperatures as well as aggressive or toxic media. Avoid this by taking appropriate protective measures.

## 12.2 Disposal

Pass the instrument on to a specialised recycling company and do not use the municipal collecting points.

Remove any batteries in advance, if they can be removed from the device, and dispose of them separately.

If personal data is stored on the old device to be disposed of, delete it before disposal.

If you have no way to dispose of the old instrument properly, please contact us concerning return and disposal.

# 13 Certificates and approvals

## 13.1 Radio licenses

**Bluetooth**
The Bluetooth radio module in the device has been tested and approved according to the current edition of the applicable country-specific norms or standards.

The confirmations as well as regulations for use can be found in the document "*Radio licenses*" supplied or on our homepage.

## 13.2 Approvals for Ex areas

Approved versions for use in hazardous areas are available or in preparation for the device or the device series.

You can find the relevant documents on our homepage.

## 13.3 Approvals as overfill protection

Approved versions for use as part of an overfill protection system are available or in preparation for the device or the device series.

The corresponding approvals can be found on our homepage.

## 13.4 Food and pharmaceutical certificates

Versions for use in the food and pharmaceutical industries are available or in preparation for the device or the device series.

The corresponding certificates can be found on our homepage.

## 13.5 Conformity

The device complies with the legal requirements of the applicable country-specific directives or technical regulations. We confirm conformity with the corresponding labelling.

The corresponding conformity declarations can be found on our homepage.

Due to the design of its process fittings, the device does not subject of EU pressure device directive if it is operated at process pressures ≤ 200 bar (good engineering practice).

## 13.6 NAMUR recommendations

NAMUR is the automation technology user association in the process industry in Germany. The published NAMUR recommendations are accepted as the standard in field instrumentation.

The device fulfils the requirements of the following NAMUR recommendations:

- NE 21 – Electromagnetic compatibility of equipment
- NE 43 – Signal level for fault information from measuring transducers
- NE 53 – Compatibility of field devices and display/adjustment components

- NE 107 – Self-monitoring and diagnosis of field devices

For further information see www.namur.de.

## 13.7 Environment management system

Protection of the environment is one of our most important duties. That is why we have introduced an environment management system with the goal of continuously improving company environmental protection. The environment management system is certified according to DIN EN ISO 14001.

Help us to meet these requirements and observe the environmental instructions in the chapters "*Packaging, transport and storage*", "*Disposal*" of this instructions manual.

# 14 Supplement

## 14.1 Technical data

**Note for approved instruments**

The technical data in the respective safety instructions which are included in delivery are valid for approved instruments (e.g. with Ex approval). These data can differ from the data listed herein, for example regarding the process conditions or the voltage supply.

All approval documents can be downloaded from our homepage.

**Materials and weights**

**Materials, wetted parts**

| | |
|---|---|
| Process fitting | 316L, PVDF, Duplex steel (1.4462), PEEK |
| Diaphragm | Sapphire-ceramic® (> 99.9 % $Al_2O_3$ ceramic) |
| Measuring cell seal | FKM (VP2/A), EPDM (A+P 70.10-02/70.503-00), FFKM (Perlast G74S) |
| Seal for process fitting (in the scope of delivery) | |
| – Thread G½ (EN 837), thread G½ inside G¼ (ISO 228-1), thread G½ inside 11.4 mm (ISO 228-1), thread M20 x 1.5 (EN 837), thread G1½ (DIN 3852-A) | Klingersil C-4400 |
| – Further thread versions | Depending on the configuration |

**Materials for applications in foodstuffs**

| | |
|---|---|
| Surface quality, hygienic fittings, typ. | |
| – Process fitting | $R_a$ < 0.76 µm |
| – Ceramic diaphragm | $R_a$ < 0.38 µm |

**Materials, non-wetted parts**

| | |
|---|---|
| Electronics housing | 316L und PBT/PC |
| Illuminated ring | PC |
| M12 x 1 plug connector | |
| – Contact support | PBT/PC |
| – Contacts | CuZn, nickel layer and 0.8 µm gold-plated |
| Weight | approx. 0.25 kg (0.55 lbs) |

**Torques**

| | |
|---|---|
| Max. torque for process fitting (examples) | |
| – Thread G½, inside G¼ (ISO 228-1), PVDF | 5 Nm (3.688 lbf ft) |
| – Clamp | 5/10 Nm (3.688/7.376 lbf ft) |
| – Thread ½ NPT inside 6 mm, G1 (DIN 3852-E) PEEK, G1½ (DIN 3852-A-B) PEEK | 10 Nm (7.376 lbf ft) |
| – Varivent | 20 Nm (14.75 lbf ft) |

| | |
|---|---|
| – Thread G½ (ISO 228-1), G¾ (DIN 3852-E), M30 x 1.5, Ingold, NPT connections | 30 Nm (22.13 lbf ft) |
| – SMS, collar socket DIN 11851, DIN 11864-1, Form A | 40 Nm (29.50 lbf ft) |
| – Thread G½ (EN 837), G½ (DIN 3852-A), G1 (ISO 228-1), G1½ (DIN 3852-A) | 50 Nm (36.88 lbf ft) |
| – Thread G1 with conus | 100 Nm (73.76 lbf ft) |

## Input variable

The specifications are only an overview and refer to the measuring cell. Limitations due to the material and version of the process fitting as well as the selected pressure type are possible. The specifications on the nameplate apply.[9)]

### Nominal measuring ranges and overload capability in bar/kPa

| Nominal range | Overload capability | |
|---|---|---|
| | maximum pressure | minimum pressure |
| Gauge pressure | | |
| 0 … +0.1 bar/0 … +10 kPa | +15 bar/+1500 kPa | -0.2 bar/-20 kPa |
| 0 … +0.4 bar/0 … +40 kPa | +30 bar/+3000 kPa | -0.8 bar/-80 kPa |
| 0 … +1 bar/0 … +100 kPa | +35 bar/+3500 kPa | -1 bar/-100 kPa |
| 0 … +2.5 bar/0 … +250 kPa | +50 bar/+5000 kPa | -1 bar/-100 kPa |
| 0 … +5 bar/0 … +500 kPa | +65 bar/+6500 kPa | -1 bar/-100 kPa |
| 0 … +10 bar/0 … +1000 kPa | +90 bar/+9000 kPa | -1 bar/-100 kPa |
| 0 … +25 bar/0 … +2500 kPa | +130 bar/+13000 kPa | -1 bar/-100 kPa |
| 0 … +60 bar/0 … +6000 kPa | +200 bar/+20000 kPa | -1 bar/-100 kPa |
| -0.05 … +0.05 bar/-5 … +5 kPa | +15 bar/+1500 kPa | -0.2 bar/-20 kPa |
| -0.2 … +0.2 bar/-20 … +20 kPa | +20 bar/+2000 kPa | -0.4 bar/-40 kPa |
| -0.5 … +0.5 bar/-50 … +50 kPa | +35 bar/+3500 kPa | -1 bar/-100 kPa |
| -1 … 0 bar/-100 … 0 kPa | +35 bar/+3500 kPa | -1 bar/-100 kPa |
| -1 … +1.5 bar/-100 … +150 kPa | +40 bar/+4000 kPa | -1 bar/-100 kPa |
| -1 … +5 bar/-100 … +500 kPa | +65 bar/+6500 kPa | -1 bar/-100 kPa |
| Absolute pressure | | |
| 0 … 0.1 bar/0 … 10 kPa | 15 bar/1500 kPa | 0 bar abs. |
| 0 … 1 bar/0 … 100 kPa | 35 bar/3500 kPa | 0 bar abs. |
| 0 … 2.5 bar/0 … 250 kPa | 50 bar/5000 kPa | 0 bar abs. |
| 0 … +5 bar/0 … +500 kPa | 65 bar/+6500 kPa | 0 bar abs. |
| 0 … 10 bar/0 … 1000 kPa | 90 bar/9000 kPa | 0 bar abs. |
| 0 … 25 bar/0 … 2500 kPa | +130 bar/+13000 kPa | 0 bar abs. |

9) Data on overload capability apply for reference temperature.

| Nominal range | Overload capability | |
|---|---|---|
| | maximum pressure | minimum pressure |
| 0 … 60 bar/0 … 6000 kPa | +200 bar/+20000 kPa | 0 bar abs. |

### Nominal measuring ranges and overload capacity in psi

| Nominal range | Overload capacity, max. pressure | |
|---|---|---|
| | maximum pressure | minimum pressure |
| Gauge pressure | | |
| 0 … +1.5 psig | +225 psig | -3 psig |
| 0 … +5 psig | +435 psig | -12 psig |
| 0 … +15 psig | +525 psig | -14.51 psig |
| 0 … +30 psig | +725 psig | -14.51 psig |
| 0 … +75 psig | +950 psig | -14.51 psig |
| 0 … +150 psig | +1300 psig | -14.51 psig |
| 0 … +300 psig | +1900 psig | -14.51 psig |
| 0 … +900 psig | +2900 psig | -14.51 psig |
| -0.7 … +0.7 psig | +225 psig | -3 psig |
| -3 … +3 psig | +290 psi | -6 psig |
| -7 … +7 psig | +525 psig | -14.51 psig |
| -14.5 … 0 psig | +525 psig | -14.51 psig |
| -14.5 … +20 psig | +580 psig | -14.51 psig |
| -14.5 … +72.5 psig | +950 psig | -14.51 psig |
| Absolute pressure | | |
| 0 … 15 psi | 525 psi | 0 psi |
| 0 … 30 psi | 600 psi | 0 psi |
| 0 … +75 psi | 975 psi | 0 psi |
| 0 … 150 psi | 1350 psi | 0 psi |
| 0 … 300 psi | 1500 psi | 0 psi |
| 0 … 900 psi | +2900 psi | 0 psi |

## Adjustment ranges

Specifications refer to the nominal measuring range, pressure values lower than -1 bar cannot be set

Zero/Span adjustment:

| | |
|---|---|
| – Zero | -20 … +95 % |
| – Span | -120 … +120 % |
| Maximum permissible Turn Down | Unlimited (recommended 20 : 1) |

| Switching-on phase active current output | |
|---|---|
| Start-up time with operating voltage $U_B$ | ≤ 2 s |
| Starting current for run-up time | ≤ 3.6 mA |

| Output variable - two-wire 4 … 20 mA | |
|---|---|
| Output signal | 4 … 20 mA - passive |
| Connection technology | Two-wire |
| Range of the output signal | 3.8 … 20.5 mA |
| Signal resolution | 5 µA |
| Fault signal, current output (adjustable) | ≤ 3.6 mA, ≥ 21 mA, last measured value |
| Max. output current | 21.5 mA |
| Load | See load resistance under Power supply |
| Transferred measured value | Pressure |

**Dynamic behaviour output**

Dynamic characteristics - Current output

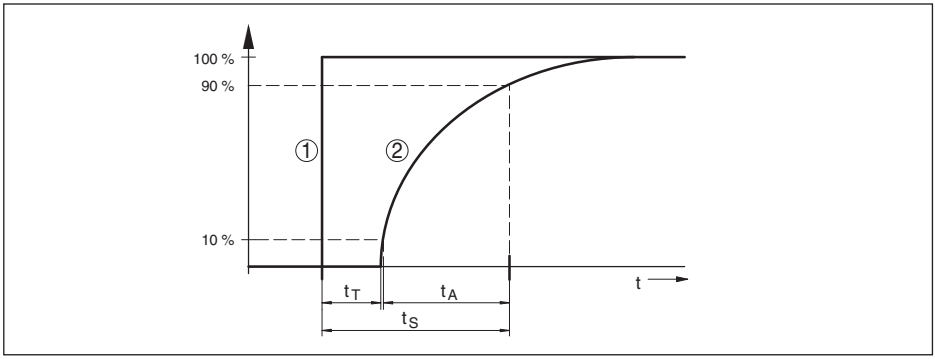



*Fig. 29: Behaviour the current output in case of sudden change of the process variable. $t_T$: dead time; $t_A$: rise time; $t_S$: jump response time*

*1 Process variable*
*2 Output signal*

| Size | Time |
|---|---|
| Dead time | ≤ 2 ms |
| Rise time (10 … 90 %) | ≤ 4 ms |
| Step response time (ti: 0 s, 10 … 90 %) | ≤ 6 ms |

Damping (63 % of the input variable) 0 … 9 s, adjustable

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

Reference conditions according to DIN EN 61298-1

- Temperature +15 … +25 °C (+59 … +77 °F)
- Relative humidity 45 … 75 %

| | |
|---|---|
| – Air pressure | 860 … 1060 mbar/86 … 106 kPa (12.5 … 15.4 psig) |
| Determination of characteristics | Limit point adjustment according to IEC 61298-2 |
| Characteristic curve | Linear |
| Reference installation position | upright, diaphragm points downward |
| Influence of the installation position | < 0.2 mbar/20 Pa (0.003 psig) |
| Max. measurement deviation with electromagnetic interference | < ± 80 µA |

## Deviation (according to IEC 60770)

Applies to the 4 … 20 mA current output and refers to the adjusted span. Turn down (TD) is the relation nominal measuring range/adjusted span.

| Accuracy class | Non-linearity, hysteresis and repeatability with TD 1 : 1 up to 5 : 1 | Non-linearity, hysteresis and repeatability at TD > 5 : 1 |
|---|---|---|
| 0.3 % | < 0.3 % | < 0.06 % x TD |

## Influence of the medium or ambient temperature

Average temperature coefficient of the zero signal

| | |
|---|---|
| – In the compensated temperature range[10)] | < 0.15 %/10 K |
| – Outside the compensated temperature range typ. | 0.3 %/10 K |

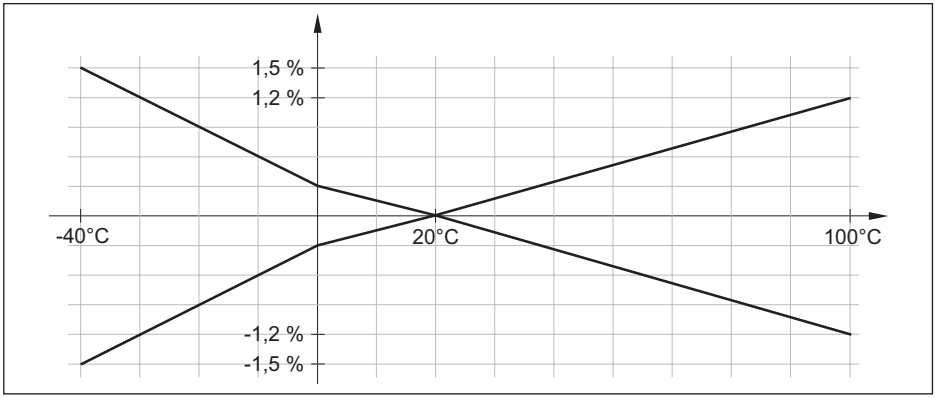



*Fig. 30: Temperature error with TD 1 : 1*

### Additional factor through Turn Down

The additional factor FTD through Turn down is calculated according to the following formula:

$F_{TD} = 0.5 \times TD + 0.5$

In the table, example values for typical Turn downs are listed.

[10)] 0 … +100 °C (+32 … +212 °F)

| Turn Down | TD : 1 | TD 2.5 : 1 | TD 5 : 1 | TD 10 : 1 | TD 20 : 1 |
|---|---|---|---|---|---|
| Factor FTD | 1 | 1.75 | 3 | 5.5 | 10.5 |

## Long-term stability (according to DIN 16086)

Specifications refer to the set span. Turn down (TD) is the ratio: nominal measuring range/set span.

| Time period | Long-term drift zero signal and output span |
|---|---|
| One year | < 0.1 % x TD |
| Five years | < 0.2 % x TD |
| Ten years | < 0.4 % x TD |

## Ambient conditions

| | |
|---|---|
| Ambient temperature device | -40 … +70 °C (-40 … +158 °F) |
| Ambient temperature display | -25 … +70 °C (-13 … +158 °F) |
| Storage and transport temperature | -40 … +70 °C (-40 … +158 °F) |

## Mechanical environmental conditions

| | |
|---|---|
| Vibrations (oscillations) | Class 4M8 acc. to IEC 60721-3-4 (5 g, 4 … 200 Hz) |
| Impacts (mechanical shock) | Class 6M4 acc. to IEC 60721-3-6 (50 g; 2.3 ms) |
| Impact resistance | |
| – Plug according to ISO 4400 | IK07 acc. to IEC 62262 |
| – M12 x 1 plug | IK06 acc. to IEC 62262 |

## Process conditions

### Process temperature

| Measuring cell seal | | Process temperature with process fitting | | |
|---|---|---|---|---|
| | | 316L, Duplex steel | PVDF | PEEK[11] |
| FKM | VP2/A | -20 … +130 °C (-4 … +266 °F) | -20 … +80 °C (-4 … +176 °F)[12] | -20 … +100 °C (-4 … +212 °F) |
| EPDM | A+P 70.10-02/70.503-00 | -40 … +130 °C (-40 … +266 °F) | | |
| FFKM | Perlast G74S | -15 … +130 °C (+5 … +266 °F) | | |

### Temperature derating

[11] Applied for OL approval
[12] Process pressures > 5 bar: 20 … +60 °C (-4 … +140 °F)

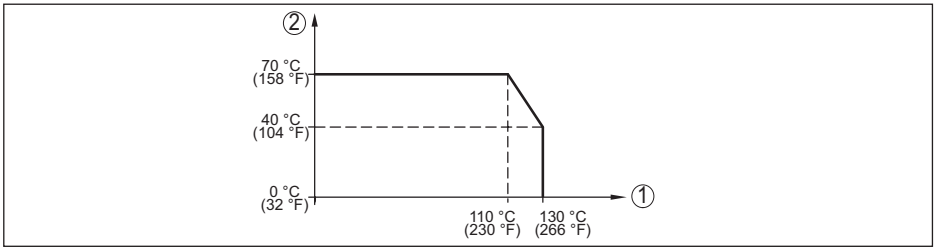



*Fig. 31: Temperature derating VEGABAR 38*

*1 Process temperature*
*2 Ambient temperature*

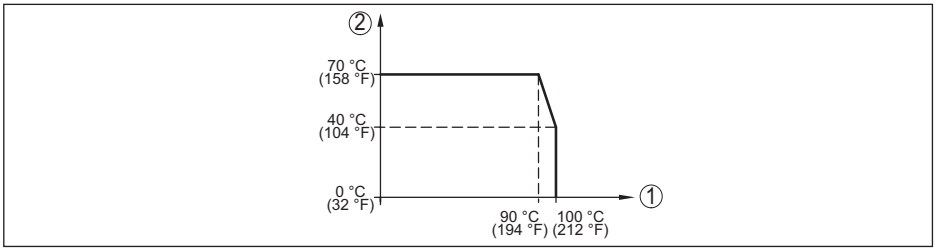



*Fig. 32: Temperature derating VEGABAR 38, with activated Bluetooth communication*

*1 Process temperature*
*2 Ambient temperature*

**SIP process temperature**[13)]

Device configuration suitable for vapour, i.e. measuring cell seal EPDM or FFKM (Perlast G74S), previous CIP cleaning up to max. +80 °C (+176 °F):[14)]

SIP process temperature with vapour stratification up to

| | |
|---|---|
| – 15 minutes | +150 °C (+302 °F) |
| – 30 minutes | +140 °C (+284 °F) |
| – 1 hour | +135 °C (+275 °F) |

**Process pressure**

| | |
|---|---|
| Permissible process pressure | see specification "*MWP*" on the type label[15)] |

**Indication**

| | |
|---|---|
| Measured value and menu display | |
| – Graphic-capable LC display, with lighting | digital and quasianalogue indication |
| – Max. indicating range | -9999 … 9999 |
| Status indication | LED illuminated ring (green-yellow-red) |

[13)] SIP = Sterilization in place
[14)] CIP = Cleaning in place
[15)] MWP: Maximum Working Pressure

| Adjustment | |
|---|---|
| Adjustment elements | 3 x keys for menu adjustment |
| PC/Notebook | PACTware/DTM |
| Smartphone/Tablet | Adjustment app |

| Measuring cell temperature | |
|---|---|
| Range | -40 … +130 °C (-40 … +266 °F) |
| Resolution | < 0.2 K |
| Deviation | ±3 K |
| Output of the temperature values via[16] | Display and adjustment unit, Bluetooth, IO-Link |

| Bluetooth interface | |
|---|---|
| Bluetooth standard | Bluetooth 5.0 |
| Frequency | 2.402 … 2.480 GHz |
| Max. emitted power | +2.2 dBm |
| Max. number of participants | 1 |
| Effective range | typically 25 m (82 ft)[17] |

| Electromechanical data | |
|---|---|
| Angled plug connector | |
| – Version | 4-pin according to ISO 4400 |
| – Cable gland | M16 x 1.5 (for cable diameter 4.5 … 10 mm) |
| – Screw terminals for cable cross-section up to | 1.5 $mm^2$ (AWG 15) |
| Angle plug connector with flap lid | |
| – Version | 4-pin according to ISO 4400 |
| – Cable gland | PG 11 (for cable diameter 4.5 … 11 mm) |
| – Screw terminals for cable cross-section | up to 1.5 $mm^2$ (AWG 15) |
| Round plug connector | 4-pole with M12 x 1 screw connection |

| Voltage supply | |
|---|---|
| Operating voltage $U_B$ | 12 … 35 V DC |
| Operating voltage $U_B$[18] | 15 … 35 V DC |
| Reverse voltage protection | Integrated |
| Permissible residual ripple | |
| – for $U_N$ 12 V DC (12 V < $U_B$ < 18 V) | ≤ 0.7 $V_{eff}$ (16 … 400 Hz) |
| – for $U_N$ 24 V DC (18 V < $U_B$ < 35 V) | ≤ 1.0 $V_{eff}$ (16 … 400 Hz) |

[16] Depending on the instrument version
[17] Depending on the local conditions
[18] Illuminated display and adjustment unit or activated 360° status display

Load resistor

| | |
|---|---|
| – Calculation | $(U_B - U_{min})/0.022$ A |
| – Example - $U_B$ = 24 V DC | (24 V - 12 V)/0.022 A = 545 Ω |

**Electrical protective measures**

| | |
|---|---|
| Potential separation | Electronics potential free up to 500 V AC |
| Protection rating | |

| Connection technology | Protection according to EN 60529/IEC 529 | Protection according to NEMA/ UL 50E |
|---|---|---|
| M12 x 1 plug | IP66/IP67 | Type 6P |
| Plug according to ISO 4400 | IP65 | Type 4X |
| ISO 4400 plug with hinged cover | | |
| Plug according to ISO 4400 with IDC method of termination | | |

| | |
|---|---|
| Altitude above sea level | 5000 m (16404 ft) |
| Protection class | III |
| Pollution degree | 4 |

## 14.2 Dimensions

### Connection technology

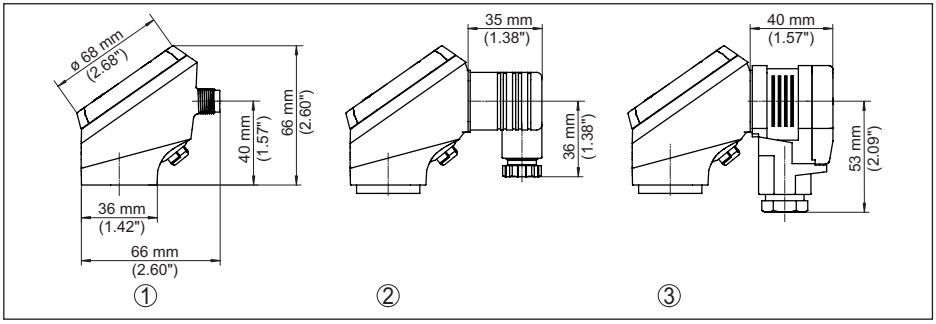



*Fig. 33: Connection technology VEGABAR 38*

*1 M12 x 1 plug connector*
*2 Plug connector according to ISO 4400*
*3 Plug connector according to ISO 4400 with hinged cover*

## VEGABAR 38, threaded fitting not front-flush

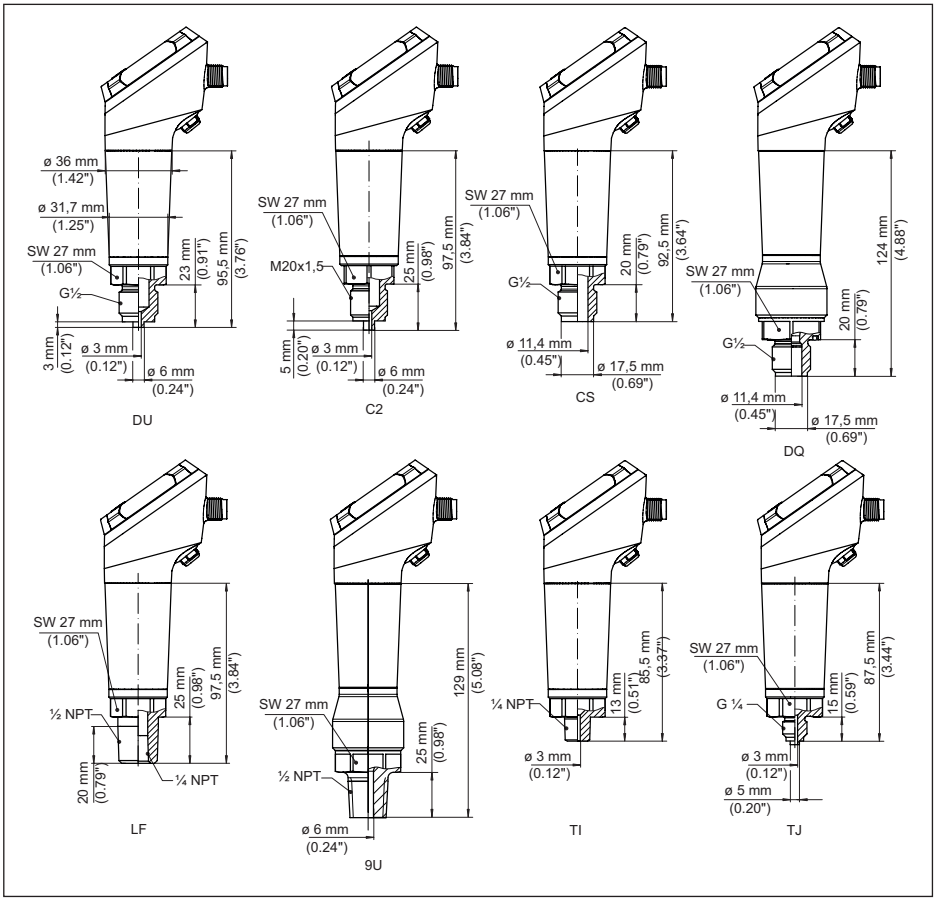



*Fig. 34: VEGABAR 38, threaded fitting not front-flush*

*DU Thread G½ (EN 837), manometer connection*
*C2 Thread M20 x 1.5 (EN 837), manometer connection*
*CS Thread G½, inside G¼ A (ISO 228-1), Duplex steel (1.4462)*
*LF Thread ½ NPT, inside ¼ NPT (ASME B1.20.1)*
*TI Thread ¼ NPT (ASME B1.20.1)*
*TJ Thread G¼ (ISO 228-1)*

## VEGABAR 38, threaded fitting front-flush

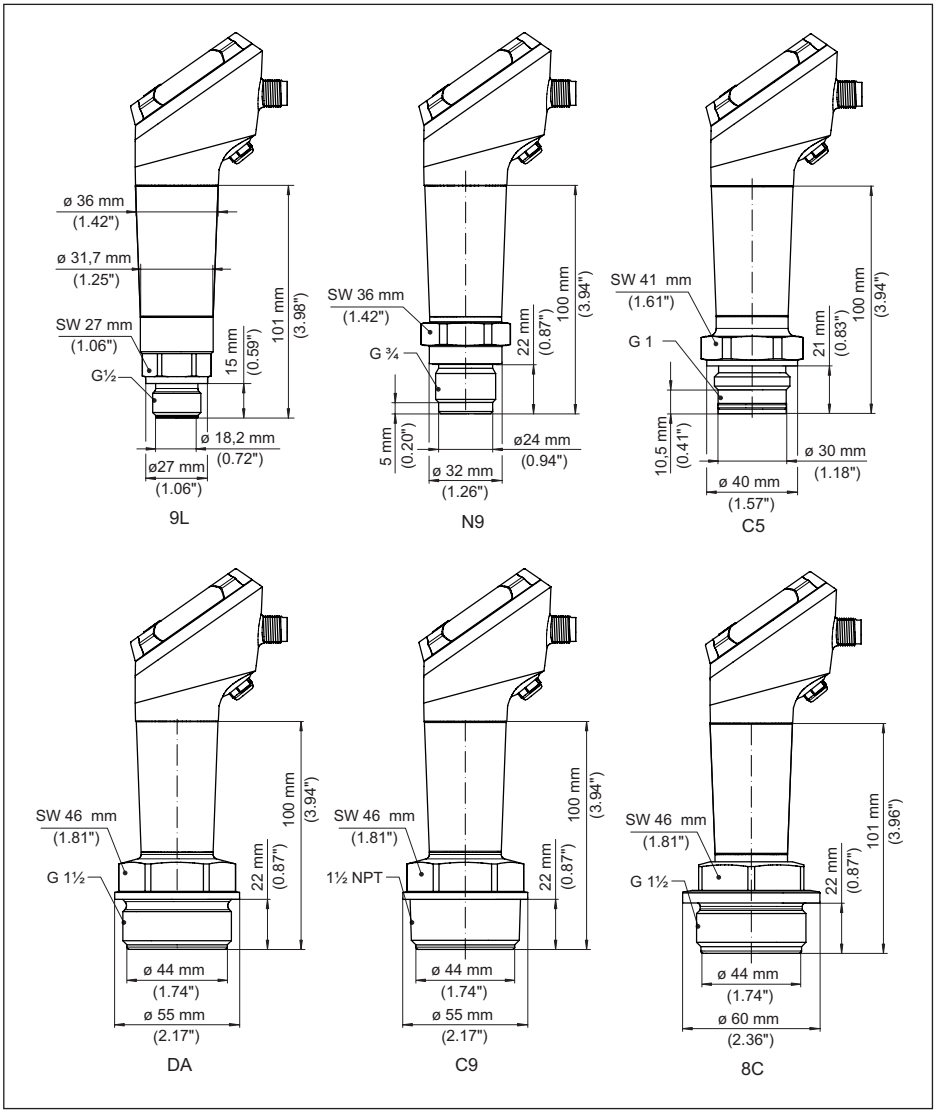



*Fig. 35: VEGABAR 38, threaded fitting front-flush*

*9L Thread G½ (DIN 3852-A)*
*N9 Thread G¾ (DIN 3852-E)*
*C5 Thread G1 (ISO 228-1)*
*DA Thread G1½ (DIN 3852-A)*
*C9 Thread 1½ NPT (ASME B1.20.1)*
*8C Thread G1½ (DIN 3852-E), PEEK*

**VEGABAR 38, threaded fitting front-flush with cone/extension**

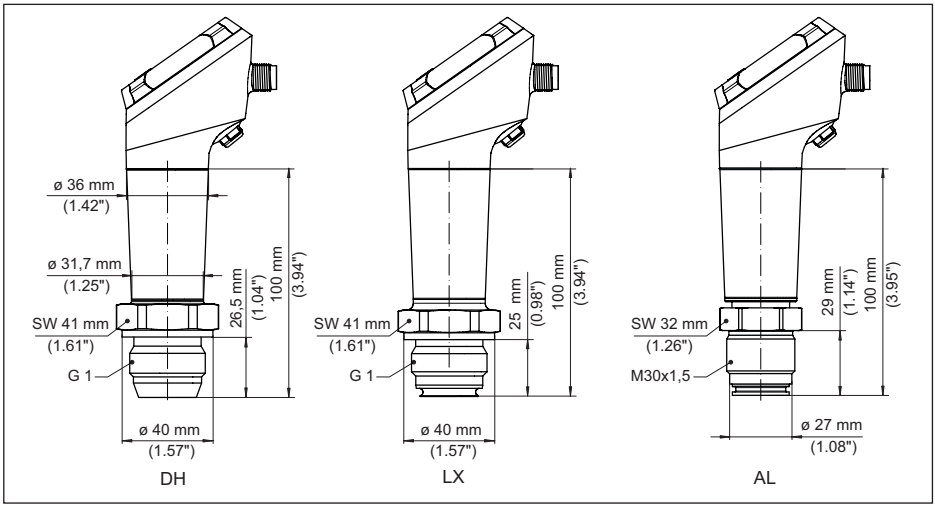



*Fig. 36: VEGABAR 38, cone/extension fitting*

*DH Thread G1 (ISO 228-1), cone 40°*
*LX Thread G1 (ISO 228-1), hygienic design*
*AL Thread M30 x 1.5 (DIN 13)*

## VEGABAR 38, hygienic fitting

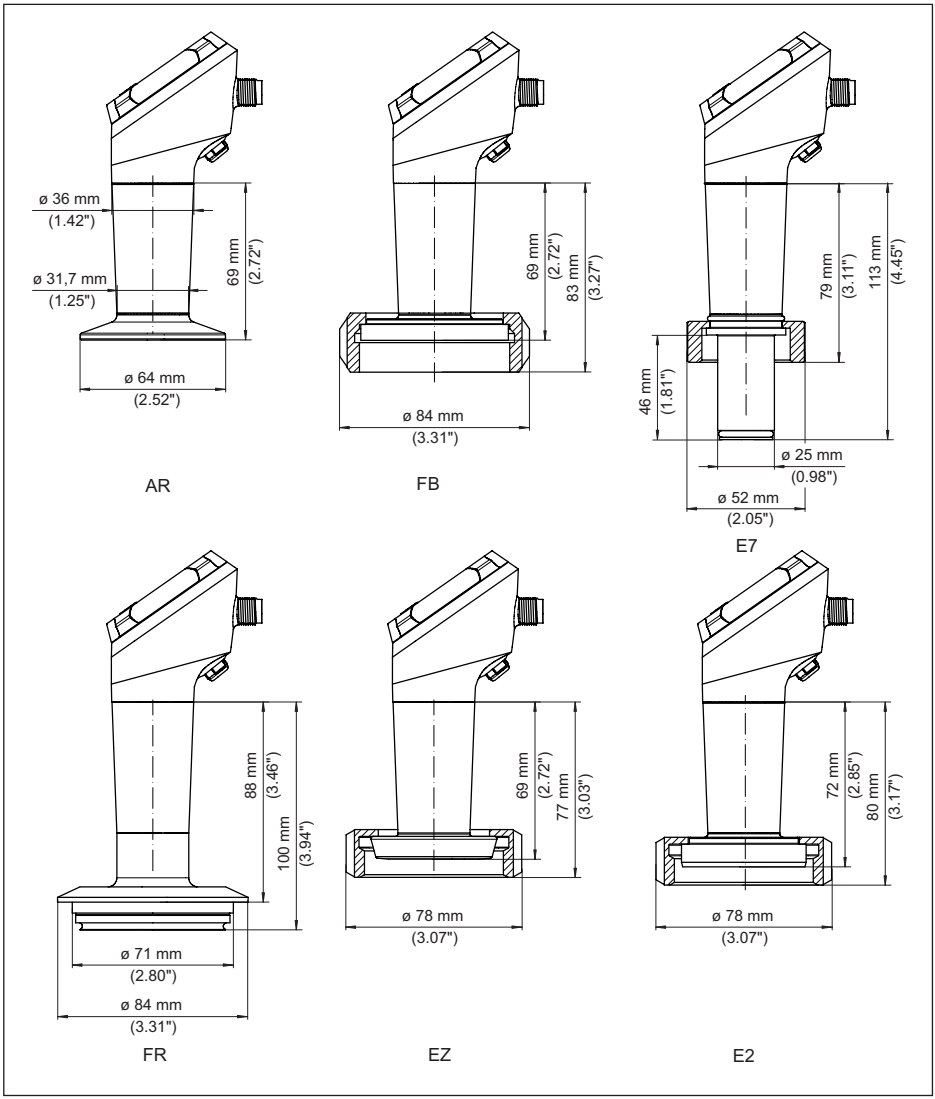



*Fig. 37: VEGABAR 38, hygienic fitting*

*AR Clamp 2" PN 40 ø 64 mm (DIN 32676, ISO 2852)*
*FB SMS DN 51 PN 6*
*E7 Ingold connection PN 10*
*FR Varivent N50-40 PN 25*
*EZ Collar socket DN 40 PN 40 (DIN 11851)*
*E2 Collar socket DN 40 PN 40 (DIN 11864-1, Form A)*

## 14.3 Industrial property rights

VEGA product lines are global protected by industrial property rights. Further information see www.vega.com.

VEGA Produktfamilien sind weltweit geschützt durch gewerbliche Schutzrechte.

Nähere Informationen unter www.vega.com.

Les lignes de produits VEGA sont globalement protégées par des droits de propriété intellectuelle. Pour plus d'informations, on pourra se référer au site www.vega.com.

VEGA lineas de productos están protegidas por los derechos en el campo de la propiedad industrial. Para mayor información revise la pagina web www.vega.com.

Линии продукции фирмы ВЕГА защищаются по всему миру правами на интеллектуальную собственность. Дальнейшую информацию смотрите на сайте www.vega.com.

VEGA系列产品在全球享有知识产权保护。

进一步信息请参见网站<www.vega.com。

## 14.4 Licensing information for open source software

Open source software components are also used in this device. A documentation of these components with the respective license type, the associated license texts, copyright notes and disclaimers can be found on our homepage.

## 14.5 Trademark

All the brands as well as trade and company names used are property of their lawful proprietor/ originator.

Printing date:

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.
Subject to change without prior notice

© VEGA Grieshaber KG, Schiltach/Germany 2025

57088-EN-251113

VEGA Grieshaber KG
Am Hohenstein 113
77761 Schiltach
Germany

Phone +49 7836 50-0
E-mail: info.de@vega.com
www.vega.com