Operating Instructions

VEGABAR 67

4 ... 20 mA/HART - climate compensated
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Supplementary documentation

Information:
Supplementary documents appropriate to the ordered version come with the delivery. You can find them listed in chapter "Product description".

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1 About this document

1.1 Function
This operating instructions manual provides all the information you need for mounting, connection and setup as well as important instructions for maintenance and fault rectification. 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 operating instructions manual is directed to trained qualified personnel. The contents of this manual should be made available to these personnel and put into practice by them.

1.3 Symbolism used

Information, tip, note
This symbol indicates helpful additional information.

Caution: If this warning is ignored, faults or malfunctions can result.
Warning: If this warning is ignored, injury to persons and/or serious damage to the instrument can result.
Danger: If this warning is ignored, serious injury to persons and/or destruction of the instrument can result.

Ex applications
This symbol indicates special instructions for Ex applications.

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

Action
This arrow indicates a single action.

Sequence
Numbers set in front indicate successive steps in a procedure.
2 For your safety

2.1 Authorised personnel

All operations described in this operating instructions manual must be carried out only by trained specialist personnel authorised by the plant operator.

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

2.2 Appropriate use

VEGABAR 67 is a suspension pressure transmitter for level and gauge measurement.

You can find detailed information on the application range 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.

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 the manufacturer. Arbitrary conversions or modifications are explicitly forbidden.

2.3 Warning about misuse

Inappropriate or incorrect use of the instrument can give rise to application-specific hazards, e.g. vessel overfill or damage to system components through incorrect mounting or adjustment.

2.4 General safety instructions

This is a high-tech instrument requiring the strict observance of standard regulations and guidelines. The user must take note of the safety instructions in this operating instructions manual, the country-specific installation standards as well as all prevailing safety regulations and accident prevention rules.

The instrument must only be operated in a technically flawless and reliable condition. The operator is responsible for trouble-free operation of the instrument.

During the entire duration of use, the user is obliged to determine the compliance of the necessary occupational safety measures with the current valid rules and regulations and also take note of new regulations.
2.5 Safety label on the instrument

The safety approval markings and safety tips on the device must be observed.

2.6 CE conformity

This device fulfills the legal requirements of the applicable EC guidelines. By attaching the CE mark, VEGA provides a confirmation of successful testing. You can find the CE conformity declaration in the download area of www.vega.com.

2.7 Measuring range - permissible process pressure

Due to the application, a measuring cell with a measuring range higher than the permissible pressure range of the process pressure may have been integrated. The permissible process pressure is stated with "Process pressure" on the type label, see chapter 3.1 "Configuration". For safety reasons, this range must not be exceeded.

2.8 Fulfillment of NAMUR recommendations

The device fulfills the requirements of the applicable NAMUR recommendations.

2.9 Safety instructions for Ex areas

Please note the Ex-specific safety information for installation and operation in Ex areas. These safety instructions are part of the operating instructions manual and come with the Ex-approved instruments.

2.10 Environmental instructions

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.

Please help us fulfill this obligation by observing the environmental instructions in this manual:

- Chapter "Packaging, transport and storage"
- Chapter "Disposal"
3 Product description

3.1 Structure

Scope of delivery

The scope of delivery encompasses:

- VEGABAR 67 pressure transmitter with suspension cable
- Straining clamp (optionally available with screwed fitting)
- External electronics
- or VEGABAR 67 pressure transmitter with connection tube
- Documentation
  - this operating instructions manual
  - Test certificate for pressure transmitters
  - Safety Manual 31637 "VEGABAR series 50 and 60 - 4 ... 20 mA/HART" (optional)
  - Operating instructions manual 27835 "Indicating and adjustment module PLICSCOM" (optional)
  - Supplementary instructions manual 31708 "Heating for indicating and adjustment module" (optional)
  - Supplementary instructions manual "Plug connector for continuously measuring sensors" (optional)
  - Ex-specific "Safety instructions" (with Ex versions)
  - if necessary, further certificates

Type label

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

- Instrument type
- Article number instrument
- Technical data: Measuring range, process pressure, process temperature, signal output, voltage supply, protection, protection class
- Order number
- Article numbers, documentation
- Serial number

With the serial number, you can access the delivery data of the instrument via www.vega.com, "VEGA Tools" and "serial number search". In addition to the type label outside, you can also find the serial number on the inside of the instrument.

Constituent parts

The VEGABAR 67 consists of the components:

- Transmitter
- Suspension cable or connection tube (optionally available with lock fitting)
- External housing with electronics, optionally available with plug connector

The components are available in different versions.
Fig. 1: Example of a VEGABAR 67 with suspension cable (left) and connection tube (right)

1 Housing with integrated electronics
2 Suspension cable
3 Connection tube
4 Threaded fitting
5 Transmitter
6 Protective cap
The type label contains the most important data for identification and use of the instrument:

Fig. 2: Structure of the type label (example)
1 Instrument type
2 Product code
3 Approvals
4 Electronics
5 Protection rating
6 Measuring range
7 Process and ambient temperature, process pressure
8 Material, wetted parts
9 Hardware and software version
10 Order number
11 Serial number of the instrument
12 ID numbers, instrument documentation

With the serial number, you can access the delivery data of the instrument via www.vega.com, "VEGA Tools" and "serial number search". In addition to the type label outside, you can also find the serial number on the inside of the instrument.

3.2 Mode

Application area
The VEGABAR 67 is a suspension pressure transmitter for level measurement in vessels under difficult conditions (cold media, warm humid environment). Measured products can be all media against which the wetted materials of are resistant.

Functional principle
The METEC® measuring cell is the measuring unit. It consists of the ceramic-capacitive CERTEC® absolute pressure measuring cell and a special, temperature-compensating isolating system.
The hydrostatic pressure of the medium or the process pressure causes a capacitance change in the measuring cell via the metal process diaphragm and the isolating liquid. This change is converted into an electrical signal, compared with an integrated reference pressure measurement and outputted as measured value via the output signal.

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

**Voltage supply**

Two-wire electronics 4 ... 20 mA/HART for power supply and measured value transmission over the same cable.

The supply voltage range can differ depending on the instrument version.

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

The optional background lighting of the indicating and adjustment module is powered by the sensor. A certain level of operating voltage is required for this. You can find the exact voltage specifications in chapter "Technical data".

The optional heating requires its own operating voltage. You can find details in the supplementary instructions manual "Heating for indicating and adjustment module".

This function is generally not available for approved instruments.

### 3.3 Operation

The instrument can be adjusted with the following adjustment media:

- with indicating and adjustment module
- with the suitable VEGA DTM in conjunction with an adjustment software according to the FDT/DTM standard, e.g. PACTware and PC
- with manufacturer-specific adjustment programs AMS™ or PDM
- With a HART handheld

### 3.4 Packaging, transport and storage

**Packaging**

The device was protected by packaging during transport. Its capacity to handle normal loads during transport is assured by a test according to DIN EN 24180.

The packaging of standard instruments 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 under 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 "Supplement - Technical data - Ambient conditions"
- Relative humidity 20 … 85 %

3.5 Accessories and replacement parts

Indicating and adjustment module

The indicating and adjustment module PLICSCOM is used for measured value indication, adjustment and diagnosis. It can be inserted into the sensor and removed at any time.

You can find further information in the operating instructions "Indicating and adjustment module PLICSCOM" (Document-ID 27835).

Interface adapter

The interface adapter VEGACONNECT 4 enables the connection of communication-capable instruments to the USB interface of a PC. For parameter adjustment of these instruments, an adjustment software such as PACTware with VEGA-DTM is required.

You can find further information in the operating instructions "Interface adapter VEGACONNECT" (Document-ID 32628).

External indicating and adjustment unit

VEGADIS 61 is suitable for external measured value indication and adjustment of plics® sensors. It is connected to the sensor with an up to 25 m long, four-wire, screened standard cable.

You can find further information in the operating instructions "VEGADIS 61" (Document-ID 27720).

Flanges

Flanges are available in different versions according to the following standards: DIN 2501, EN 1092-1, ANSI B 16.5, JIS B 2210-1984, GOST 12821-80.
You will find additional information in the supplementary instructions manual "Flanges according to DIN-EN-ASME-JIS" (Document-ID 31088).

### Measuring instrument holder

The measuring instrument holder is used for wall/tube mounting of VEGABAR series 50 pressure transmitters and VEGAWELL 52 suspension pressure transmitters. Supplied reducers enable the adaptation to different instrument diameters. The material used is 316L.

### Protective cap

The protective cover protects the sensor housing against soiling and intense heat from solar radiation.

You will find additional information in the supplementary instructions manual "Protective cover" (Document-ID 34296).

### Electronics module

The electronics module is a replacement part for pressure transmitter VEGABAR. One version is available for each type of signal output.

You find further information in the operating instructions "Electronics module VEGABAR series 50 and 60 " (Document-ID 30175).
4 Mounting

4.1 General instructions

Suitability for the process conditions

Make sure that all parts of the instrument exposed to the process, in particular the sensor element, process seal and process fitting, are suitable for the existing process conditions. These include above all the process pressure, process temperature as well as the chemical properties of the medium.

You can find the specifications in chapter "Technical data" or on the type label.

Diaphragm protection

To protect the diaphragm, the process fitting is covered by a protective cap.

Remove the protective cap just before installation so that the diaphragm will not get damaged. It is recommended to keep the cap and use it again later for storage or transport.

Mounting position

Select an installation position you can easily reach for mounting and connecting as well as later retrofitting of an indicating and adjustment module. The housing can be rotated by 330° without the use of any tools. You can also install the indicating and adjustment module in four different positions (each displaced by 90°).

Moisture

Use the recommended cables (see chapter "Connecting to power supply") and tighten the cable gland.

You can give your instrument additional protection against moisture penetration by leading the connection cable downward in front of the cable entry. Rain and condensation water can thus drain off. This applies mainly to outdoor mounting as well as installation in areas where high humidity is expected (e.g. through cleaning processes) or on cooled or heated vessels.

Fig. 3: Measures against moisture penetration
**Ventilation and pressure compensation**

The ventilation of the electronics housing as well as the atmospheric pressure compensation for the measuring cell are realised via a filter element in the area of the cable gland.

![Filter element diagram](image)

*Fig. 4: Position of the filter element*

1. Filter element
2. Blind stopper

**Caution:**
Due to the filter effect, the pressure compensation is time delayed. When opening/closing the housing cover quickly, the measured value can change for a period of approx. 5 s by up to 15 mbar.

**Information:**
Make sure that the filter element is always free of buildup during operation. A high-pressure cleaner may not be used for cleaning.

With instrument versions in protection IP 66/IP 68, 1 bar, the ventilation is realised via the capillaries in the permanently connected cable. The filter element is replaced by a blind stopper.

### 4.2 Mounting preparations

For the suspension cable version note the following points when selecting the mounting position:

- Sideways movements of the transmitter can cause measurement errors
  
  → Therefore, mount VEGABAR 67 in a calm area or in a suitable protective tube

- The suspension cable has a capillary for atmospheric pressure compensation
Therefore lead the cable end into a dry space or directly to the external electronics.

The external electronics is provided with terminals and a filter element for pressure compensation. Keep in mind for all versions:

- The protective cover prevents mechanical damage to the measuring cell. It should only be removed when the sensor is deployed in extremely polluted water.

**Fig. 5:** Mounting example: Version with connection tube in an open vessel

**Fig. 6:** Mounting example: Version with suspension cable in a pump shaft
4.3 Mounting steps with straining clamp

Fig. 7: Straining clamp
1 Suspension cable
2 Suspension opening
3 Clamping jaws

Mount VEGABAR 67 with straining clamp as follows:

1 Hang the straining clamp on a suitable wall hook
2 Lower VEGABAR 67 to the requested height
3 Slide the clamping jaws upward and push the suspension cable between them
4 Hold the suspension cable, push the clamping jaws downward and fix them with a light blow

Removal is carried out in reverse order.
4.4 Mounting steps with screwed connection

Mount VEGABAR 67 with screwed connection as follows:

1. Weld the welded socket into the vessel top
2. Lower VEGABAR 67 to the requested height by means on the welded socket G1½ A or 1½ NPT on the vessel side
3. Insert the suspension cable from below into the open screwed connection
4. Slide the seal cone and the cone sleeve over the suspension cable, fasten manually with the seal screw
5. Screw the screwed connection into the socket, fasten with SW 30 and then fasten seal screw with SW 19

How to correct the height:

1. Loosen seal screw with SW 19
2. Slide seal cone and cone sleeve to the requested position on the cable
3. Fasten the seal screw

Removal is carried out in reverse order.
4.5 Mounting steps with lock fitting

Mount VEGABAR 67 with lock fitting as follows:

1. Weld the welded socket G1½ A or 1½ NPT to the vessel top.
2. Lower VEGABAR 67 through the welded socket.
3. Turn the lock fitting on the lower hexagon into the welded socket. Use a resistant seal. Spanner width SW 41, torque max. 80 Nm.
4. Adjust the connection tube of VEGABAR 67 to the requested height and hold it.
5. Turn the upper hexagon into the lower hexagon. Spanner width SW 41, torque max. 80 Nm. VEGABAR 67 is now temporarily hold by the washer disc.
6. Tighten fixing screws (2) and (5) with an Allen wrench size 2.5. Torque max. 7 Nm.

The fixing screws press lightly into the connection tube and fasten VEGABAR 67 in this position.
4.6 Mounting steps with housing and thread

**Mount into the vessel**
Mount VEGABAR 67 with housing and thread in the following way:

1. Weld the welded socket G1½ A or 1½ NPT to the vessel top
2. Insert the transmitter with connection tube or suspension cable into the opening
3. Turn the thread with seal into the socket and tighten with SW 46

**Warning:**
The housing must not be used to screw the instrument in! Applying tightening force can damage internal parts of the housing.

**Mounting into the basin**
Mount VEGABAR 67 with housing and thread in the following way:

1. Fasten the mounting bracket at the suitable height on the basin wall

**Information:**
We recommend articles from the line of VEGA accessories:
- Mounting bracket of stainless steel, article no. 2.21615
- Counter nut of PP, article no. 2.10371

2. Insert the transmitter with connection tube or suspension cable into the opening of the mounting bracket and counter nut
3. Fasten counter nut with SW 46 on the thread

Removal is carried out in reverse order.

1) Seal the 1½ NPT thread with teflon, hemp or a similar resistant material.
4.7 Mounting steps, external housing

Wall mounting

1. Mark the holes according to the following drilling template
2. Depending on the mounting surface, fasten the wall mounting plate with 4 screws

Fig. 11: Drilling template - wall mounting plate

Tip:
Mount the wall mounting plate so that the cable entry of the socket housing points downward. The socket housing can be displaced by 180° to the wall mounting plate.

Warning:
The four screws of the socket housing must only be hand screwed. A torque > 5 Nm (3.688 lbf ft) can damage the wall mounting plate.
5 Connecting to power supply

5.1 Preparing the connection

Safety instructions

Always keep in mind the following safety instructions:

- Connect only in the complete absence of line voltage
- If overvoltage surges are expected, overvoltage arresters should be installed

Tip:

We recommend using VEGA overvoltage arresters B63-48 and USB 62-36G.X.

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

Voltage supply

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

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

Provide a reliable separation between the supply circuit and the mains circuits according to DIN VDE 0106 part 101. The VEGA power supply units VEGATRENN 149A Ex, VEGASTAB 690 as well as all VEGAMETs and VEGASCANs meet this requirement.

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

- Output voltage of the power supply unit can be lower under nominal load (with a sensor current of 20.5 mA or 22 mA in case of fault message)
- Influence of additional instruments in the circuit (see load values in chapter "Technical data")

Connection cable

The instrument is connected with standard two-wire cable without screen. If electromagnetic interference is expected which is above the test values of EN 61326 for industrial areas, screened cable should be used.

Use cable with round cross-section. A cable outer diameter of 5 … 9 mm (0.2 … 0.35 in) ensures the seal effect of the cable gland. If you are using cable with a different diameter or cross-section, exchange the seal or use a suitable cable gland.

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

Cable gland ½ NPT

On the instrument with cable entry ½ NPT and plastic housing there is a metallic ½" threaded insert moulded into the plastic housing.
**Caution:**
No grease should be used when screwing the NPT cable gland or steel tube into the threaded insert. Standard grease can contain additives that corrode the connection between threaded insert and housing. This would influence the stability of the connection and the tightness of the housing.

**Cable screening and grounding**
If screened cable is necessary, connect the cable screen on both ends to ground potential. In the sensor, the screen must be connected directly to the internal ground terminal. The ground terminal on the outside of the housing must be connected to the potential equalisation (low impedance).

If potential equalisation currents are expected, the connection on the processing side must be made via a ceramic capacitor (e.g. 1 nF, 1500 V). The low frequency potential equalisation currents are thus suppressed, but the protective effect against high frequency interference signals remains.

**Warning:**
Within galvanic plants as well as vessels with cathodic corrosion protection there are considerable potential differences. Considerably equalisation currents can be caused via the cable screen when the screen is earthed on both ends. To avoid this, the cable screen must only connected to ground potential on one side of the switching cabinet in such applications. The cable screen must **not** be connected to the internal ground terminal in the sensor and the outer ground terminal on the housing **not** to the potential equalisation!

**Information:**
The metal parts of the instrument (antenna, transmitter, concentric tube, etc.) are conductive connected with the inner and outer ground terminal on the housing. This connection exists either directly metallic or with instruments with external electronics via the screen of the special connection cable. You can find specifications to the potential connections within the instrument in chapter "Technical data".

Take note of the corresponding installation regulations for Ex applications. In particular, make sure that no potential equalisation currents flow over the cable screen. In case of grounding on both sides this can be achieved by the use of a capacitor or a separate potential equalisation.

### 5.2 Connection procedure

**Single/Double chamber housing**
Proceed as follows:

1. Unscrew the housing cover
2 If an indicating and adjustment module is installed, remove it by turning it slightly to the left.
3 Loosen compression nut of the cable entry
4 Remove approx. 10 cm of the cable mantle, strip approx. 1 cm insulation from the individual wires
5 Insert the cable into the sensor through the cable entry
6 Lift the opening levers of the terminals with a screwdriver (see following illustration)
7 Insert the wire ends into the open terminals according to the wiring plan
8 Press down the opening levers of the terminals, you will hear the terminal spring closing
9 Check the hold of the wires in the terminals by lightly pulling on them
10 Connect the screen to the internal ground terminal, connect the outer ground terminal to potential equalisation
11 Tighten the compression nut of the cable entry. The seal ring must completely encircle the cable
12 Screw the housing cover on
The electrical connection is finished.

Fig. 12: Connection steps 6 and 7

IP 68 version with external housing

Proceed as follows:
1 Loosen the four screws on the housing base with an Allen key size
4
2  Remove the housing socket from the mounting plate

![Diagram of the external housing components]

Fig. 13: Components of the external housing
1  Screws
2  Wall mounting plate
3  Cable gland

3  Loop the connection cable through the cable entry on the housing base

**Information:**
The cable gland can be mounted in three positions each displaced by 90°. Simply exchange the cable gland against the blind plug in the suitable thread opening.

4  Connect the wire ends as described under "Single/Double chamber housing" according to the numbering

5  Connect the screen to the internal ground terminal, connect the outer ground terminal above on the housing to potential equalisation

6  Tighten the compression nut of the cable entry. The seal ring must completely encircle the cable

7  Attach the mounting plate again and tighten the screws

The electrical connection of the sensor to the external housing is hence ready.

---

2) The connection cable is already preconfectioned. If necessary, shorten it to the requested length, cut the breather capillaries clean. Remove approx. 5 cm of the cable mantle, strip approx. 1 cm insulation from the ends of the individual wires. After shortening the cable, fasten the type plate with support back onto the cable.
5.3 Wiring plan, single chamber housing

The following illustrations apply to the non-Ex as well as to the Ex-ia version.

**Electronics and connection compartment**

![Electronics and connection compartment](image)

*Fig. 14: Electronics and connection compartment, single chamber housing*

1. Plug connector for VEGACONNECT (I²C interface)
2. Spring-loaded terminals for connection of the external indication VEGADIS 61
3. Ground terminal for connection of the cable screen
4. Spring-loaded terminals for voltage supply

**Wiring plan**

![Wiring plan](image)

*Fig. 15: Wiring plan, single chamber housing*

1. Voltage supply/Signal output
5.4 Wiring plan, double chamber housing

The following illustration apply to non-Ex as well as Ex ia versions. The Exd version is described in the next subchapter.

Electronics compartment

Fig. 16: Electronics compartment, double chamber housing
1 Plug connector for VEGACONNECT (I²C interface)
2 Internal connection cable to the connection compartment
3 Terminals for VEGADIS 61
Connection compartment

1. Plug connector for VEGACONNECT (I²C interface)
2. Ground terminal for connection of the cable screen
3. Spring-loaded terminals for voltage supply

Wiring plan

1. Voltage supply/Signal output
5.5 Wiring plan with double chamber housing Ex d

Electronics compartment

![Electronics compartment diagram](image)

Fig. 19: Electronics compartment, double chamber housing
1 Plug connector for VEGACONNECT (I²C interface)
2 Internal connection cable to the connection compartment
3 Terminals for VEGADIS 61

Connection compartment

![Connection compartment diagram](image)

Fig. 20: Connection compartment with double chamber housing Ex d
1 Spring-loaded terminals for power supply and cable screen
2 Ground terminal for connection of the cable screen
Wiring plan

Fig. 21: Wiring plan with double chamber housing Ex d
1 Voltage supply/Signal output

5.6 Wiring plan - version IP 66/IP 68, 1 bar

Wire assignment connection cable

Fig. 22: Wire assignment connection cable
1 brown (+) and blue (-) to power supply or to the processing system
2 Shielding
5.7 Wiring plan, external housing with version IP 68

Overview

Fig. 23: VEGABAR 67 in IP 68 version 25 bar, non-Ex and axial cable outlet, external housing
Electronics and connection compartment for power supply

Fig. 24: Electronics and connection compartment

1 Plug connector for VEGACONNECT (I²C interface)
2 Spring-loaded terminals for connection of the external indication VEGADIS 61
3 Cable gland to the process component
4 Ground terminal for connection of the cable screen
5 Spring-loaded terminals for voltage supply
5 Connecting to power supply

Terminal compartment, housing socket

![Diagram of sensor connection](image)

**Fig. 25: Connection of the sensor in the housing socket**

1. Brown
2. Blue
3. Yellow
4. White
5. Shielding
6. Breather capillaries

Wiring plan external electronics

![Diagram of external electronics wiring](image)

**Fig. 26: Wiring plan external electronics**

1. Voltage supply

5.8 Switch on phase

**Switch on phase**

After connecting VEGABAR 67 to power supply or after a voltage recurrence, the instrument carries out a self-check for approx. 30 seconds:
• Internal check of the electronics
• Indication of the instrument type, the firmware as well as the sensor TAGs (sensor designation)
• Output signal jumps briefly (approx. 10 seconds) to the set fault current

Then the corresponding current is outputted to the cable (the value corresponds to the actual level as well as the settings already carried out, e.g. factory setting).
6 Set up with the indicating and adjustment module PLICSCOM

6.1 Short description

The indicating and adjustment module is used for measured value display, adjustment and diagnosis. It can be mounted in the following housing versions and instruments:

- All continuously measuring sensors in single as well as double chamber housing (optionally in the electronics or connection compartment)
- External indicating and adjustment unit

Note:
You can find detailed information on the adjustment in the operating instructions manual "Indicating and adjustment module".

6.2 Insert indicating and adjustment module

The indicating and adjustment module can be inserted into the sensor and removed again at any time. It is not necessary to interrupt the power supply.

Proceed as follows:

1. Unscrew the housing cover
2. Place the indicating and adjustment module in the desired position on the electronics (you can choose any one of four different positions - each displaced by 90°)
3. Press the indicating and adjustment module onto the electronics and turn it to the right until it snaps in.
4. Screw housing cover with inspection window tightly back on

Removal is carried out in reverse order.

The indicating and adjustment module is powered by the sensor, an additional connection is not necessary.
Fig. 27: Insert indicating and adjustment module

**Note:**
If you intend to retrofit the instrument with an indicating and adjustment module for continuous measured value indication, a higher cover with an inspection glass is required.
6.3 Adjustment system

**Key functions**

- **[OK]** key:
  - Move to the menu overview
  - Confirm selected menu
  - Edit parameter
  - Save value
- **[->]** key to select:
  - Menu change
  - Select list entry
  - Select editing position
- **[+]** key:
  - Change value of the parameter
- **[ESC]** key:
  - Interrupt input
  - Jump to the next higher menu

**Adjustment system**

The sensor is adjusted via the four keys of the indicating and adjustment module. The LC display indicates the individual menu items. The functions of the individual keys are shown in the above illustration. Approx. 10 minutes after the last pressing of a key, an automatic reset to measured value indication is triggered. Any values not confirmed with **[OK]** will not be saved.
6.4 Setup steps

**Address setting HART-Multidrop**

In HART-Multidrop mode (several sensors on one input) the address must be set before continuing with the parameter adjustment. You will find a detailed description in the operating instructions manual "Indicating and adjustment module" or in the online help of PACTware or DTM.

**Level or process pressure measurement**

VEGABAR 67 can be used for level as well as for process pressure measurement. Default setting is level measurement. The mode can be changed in the adjustment menu.

Depending on the application only the respective subchapter "Level or process pressure measurement" is of importance. There, you find the individual adjustment steps.

**Parameter adjustment "Level measurement"**

Set up VEGABAR 67 in the following sequence:

1. Selecting adjustment unit/density unit
2. Carry out a position correction
3. Carry out min. adjustment
4. Carry out max. adjustment

In the menu item "Adjustment unit" you select the physical unit in which the adjustment should be carried out, e.g. mbar, bar, psi...

The position correction compensates the influence of the mounting position or static pressure on the measurement. It does not influence the adjustment values.

**Information:**

The steps 1, 3 and 4 are not necessary for instruments which are already preset according to customer specifications!

You can find the data on the type label on the instrument or in the menu items of the min./max. adjustment.

The indicating and adjustment module enables the adjustment without filling or pressure. Thanks to this, you can carry out your settings already in the factory without the instrument having to be installed.

The actual measured value is also displayed in the menu items for min./max. adjustment.
Select unit

In this menu item you select the adjustment unit as well as the unit for the temperature indication in the display.

To select the adjustment unit (in the example switching over from bar to mbar), proceed as follows:

1. Push the [OK] button in the measured value display, the menu overview is displayed.

2. Confirm the menu "Basic adjustment" with [OK], the menu item "Unit" will be displayed.

3. Activate the selection with [OK] and select "Units of measurement" with [-].

4. Activate the selection with [OK] and select the requested unit with [-] (in the example mbar).

5. Confirm with [OK] and move to position correction with [-].

The adjustment unit is thus switched over from bar to mbar.

Information:

When switching over to adjustment in a height unit (in the example from bar to m), the density also has to be entered.

Proceed as follows:

1. Push the [OK] button in the measured value display, the menu overview is displayed.

2. Confirm the menu "Basic adjustment" with [OK], the menu item "Units of measurement" will be displayed.

3. Activate the selection with [OK] and select the requested unit with [-] (in the example m).

4. Confirm with [OK], the submenu "Density unit" appears.

---

3) Selection options: mbar, bar, psi, Pa, kPa, MPa, inHg, mmHg, inH2O, mmH2O.
5 Select the requested unit, e.g. kg/dm³ with [-] and confirm with [OK], the submenu "Density" appears.

6 Enter the requested density value with [-] and [+], confirm with [OK] and move to position correction with [-].

The adjustment unit is thus switched over from bar to m.

Proceed as follows to select the temperature unit:

- Activate the selection with [OK] and select "Temperature unit" with [-].
- Activate the selection with [OK] and select the requested unit with [-] (e.g. °F).
- Confirm with [OK].

The temperature unit is hence switched over from °C to °F.

### Carry out a position correction

Proceed as follows:

1 Activate in the menu item "Position correction" the selection with [OK].

2 Select with [-], e.g. to accept actual measured value.

3 Confirm with [OK] and move to min.(zero) adjustment with [-].

### Carry out min. adjustment

Proceed as follows:

1 Edit the % value in the menu item "Min. adjustment" with [OK].

4) Selection options: °C, °F.
2 Set the requested percentage value with [+ ] and [-> ].
3 Edit the requested mbar value with [OK].
4 Set the requested mbar value with [+ ] and [-> ].
5 Confirm with [+ ] and move to max. adjustment with [-> ].
The min. adjustment is finished.

Information:
For an adjustment with filling, simply enter the actual measured value indicated at the bottom of the display.

If the adjustment ranges are exceeded, the message "Outside parameter limits" appears. The editing procedure can be aborted with [ESC] or the displayed limit value can be accepted with [OK].

Proceed as follows:
1 Edit the % value in the menu item "Max. adjustment" with [OK].

Information:
The displayed pressure for 100 % corresponds to the nominal measuring range of the sensor (in the above example 1 bar = 1000 mbar).

2 Set the requested percentage value with [-> ] and [OK].
3 Edit the requested mbar value with [OK].
4 Set the requested mbar value with [+ ] and [-> ].
5 Confirm with [OK] and move to the menu overview with [ESC].
The max. adjustment is finished.

Information:
For an adjustment with filling, simply enter the actual measured value indicated at the bottom of the display.

If the adjustment ranges are exceeded, the message "Outside parameter limits" appears. The editing procedure can be aborted with [ESC] or the displayed limit value can be accepted with [OK].

Process pressure measurement
Set up VEGABAR 67 in the following sequence:
1 Select application "Process pressure measurement"
2 Select the unit of measurement
3 Carry out a position correction
4 Carrying out zero adjustment
5 Carrying out span adjustment

In the menu item "Adjustment unit" you select the physical unit in which the adjustment should be carried out, e.g. mbar, bar, psi...

The position correction compensates the influence of the mounting position or static pressure on the measurement. It does not influence the adjustment values.

In the menu items "zero" and "span" you determine the span of the sensor, the span corresponds to the end value.

**Information:**
The steps 1, 3 and 4 are not necessary for instruments which are already preset according to customer specifications!

You can find the data on the type label on the instrument or in the menu items of the zero/span adjustment.

The indicating and adjustment module enables the adjustment without filling or pressure. Thanks to this, you can carry out your settings already in the factory without the instrument having to be installed.

The actual measured value is displayed in addition to the menu items for zero/span adjustment.

---

**Select application "Process pressure measurement"**

VEGABAR 67 is preset to application "Level measurement". Proceed as follows when switching over to application "Process pressure measurement":

1 Push the [OK] button in the measured value display, the menu overview is displayed.
2 Select the menu "Service" with [->] and confirm with [OK].
3 Select the menu item "Application" with [->] and edit with [OK].

**Warning:**
Note the warning: "Output can change".

4 Select with [->] "OK" and confirm with [OK].
5 Select "Process pressure" from the list and confirm with [OK].

**Select unit**

In this menu item you select the adjustment unit as well as the unit for the temperature indication in the display.
To select the adjustment unit (in the example switching over from bar to mbar), proceed as follows:5)

1. Push the [OK] button in the measured value display, the menu overview is displayed.

2. Confirm the menu "Basic adjustment" with [OK], the menu item "Unit" will be displayed.

3. Activate the selection with [OK] and select "Units of measurement" with [->].

4. Activate the selection with [OK] and select the requested unit with [->] (in the example mbar).

5. Confirm with [OK] and move to position correction with [->].

The adjustment unit is thus switched over from bar to mbar.

Proceed as follows to select the temperature unit:6)

→ Activate the selection with [OK] and select "Temperature unit" with [->].

→ Activate the selection with [OK] and select the requested unit with [->] (e.g. °F).

→ Confirm with [OK].

The temperature unit is hence switched over from °C to °F.

**Carry out a position correction**

Proceed as follows:

1. Activate in the menu item "Position correction" the selection with [OK].

2. Select with [->], e.g. to accept actual measured value.

5) Selection options: mbar, bar, psi, Pa, kPa, MPa, inHg, mmHg, inH₂O, mmH₂O.

6) Selection options: °C, °F.
Proceed as follows:
1. Edit the mbar value in the menu item "zero" with [OK].

100.0 %

$0000.0 \text{ mbar}$

2. Set the requested mbar value with [+] and [-].
3. Confirm with [+] and move to span adjustment with [-].

The zero adjustment is finished.

Information:
The zero adjustment shifts the value of the span adjustment. The span, i.e. the difference between these values, however, remains unchanged.

Information:
For an adjustment with pressure, simply enter the actual measured value indicated at the bottom of the display.

If the adjustment ranges are exceeded, the message "Outside parameter limits" appears. The editing procedure can be aborted with [ESC] or the displayed limit value can be accepted with [OK].

Proceed as follows:
1. Edit the mbar value in the menu item "span" with [OK].

100.0 %

$1000.0 \text{ mbar}$

2. Set the requested mbar value with [->] and [OK].
3. Confirm with [OK] and move to the menu overview with [ESC].

The displayed pressure for 100 % corresponds to the nominal measuring range of the sensor (in the above example 1 bar = 1000 mbar).
The span adjustment is finished.

Information:
For an adjustment with pressure, simply enter the actual measured value indicated at the bottom of the display.

If the adjustment ranges are exceeded, the message "Outside parameter limits" appears. The editing procedure can be aborted with [ESC] or the displayed limit value can be accepted with [OK].

Linearisation curve
A linearization is necessary for all vessels in which the vessel volume does not increase linearly with the level - e.g. in a horizontal cylindrical or spherical tank - and the indication or output of the volume is required. Corresponding linearization curves are preprogrammed for these vessels. They represent the correlation between the level percentage and vessel volume. By activating the appropriate curve, the volume percentage of the vessel is displayed correctly. If the volume should not be displayed in percent but e.g. in l or kg, a scaling can be also set in the menu item "Display".

![Linearisation curve]

Enter the requested parameters via the appropriate keys, save your settings and jump to the next menu item with the [->] key.

Caution:
Note the following if the VEGABAR 67 with corresponding approval is used as part of an overfill protection system according to WHG:

If a linearisation curve is selected, the measuring signal is no longer compulsorily linear proportional to the level. This must be taken into consideration by the user, particularly when adjusting the switching point on the level switch.

Copy sensor data
This function enables reading out parameter adjustment data as well as writing parameter adjustment data into the sensor via the indicating and adjustment module. A description of the function is available in the operating instructions manual "Indicating and adjustment module".

The following data are read out or written with this function:

- Measured value presentation
- Adjustment
- Damping
- Linearisation curve
- Sensor-TAG
- Displayed value
• Display unit
• Scaling
• Current output
• Unit of measurement
• Language

The following safety-relevant data are not read out or written:
• SIL
• HART mode
• PIN
• Application

Reset

Basic adjustment
If the "Reset" (sensor-specific basic adjustment) is carried out, the sensor resets the values of the following menu items to the reset values (see chart):

<table>
<thead>
<tr>
<th>Menu section</th>
<th>Function</th>
<th>Reset value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic settings</td>
<td>Zero/Min. adjustment</td>
<td>Measuring range begin</td>
</tr>
<tr>
<td></td>
<td>Span/Max. adjustment</td>
<td>Measuring range end</td>
</tr>
<tr>
<td></td>
<td>Density</td>
<td>1 kg/l</td>
</tr>
<tr>
<td></td>
<td>Density unit</td>
<td>kg/l</td>
</tr>
<tr>
<td></td>
<td>Damping</td>
<td>1 s</td>
</tr>
<tr>
<td></td>
<td>Linearisation</td>
<td>Linear</td>
</tr>
<tr>
<td></td>
<td>Sensor-TAG</td>
<td>Sensor</td>
</tr>
<tr>
<td>Display</td>
<td>Displayed value 1</td>
<td>bar</td>
</tr>
<tr>
<td></td>
<td>Displayed value 2</td>
<td>%</td>
</tr>
<tr>
<td></td>
<td>Display unit</td>
<td>Volume/l</td>
</tr>
<tr>
<td></td>
<td>Scaling</td>
<td>0.00 to 100.0</td>
</tr>
<tr>
<td></td>
<td>Decimal point indication</td>
<td>8888.8</td>
</tr>
<tr>
<td>Service</td>
<td>Current output - characteristics</td>
<td>4 ... 20 mA</td>
</tr>
<tr>
<td></td>
<td>Current output - failure</td>
<td>&lt; 3.6 mA</td>
</tr>
<tr>
<td></td>
<td>Current output - min. current</td>
<td>3.8 mA</td>
</tr>
<tr>
<td></td>
<td>Current output - max. current</td>
<td>20.5 mA</td>
</tr>
</tbody>
</table>

The values of the following menu items are not reset with "Reset:

7) With instruments with signal output 4 ... 20 mA/HART
### Menu section

<table>
<thead>
<tr>
<th>Function</th>
<th>Reset value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic settings</td>
<td></td>
</tr>
<tr>
<td>Unit of measurement</td>
<td>No reset</td>
</tr>
<tr>
<td>Temperature unit</td>
<td>No reset</td>
</tr>
<tr>
<td>Position correction</td>
<td>No reset</td>
</tr>
<tr>
<td>Display</td>
<td></td>
</tr>
<tr>
<td>Lighting</td>
<td>No reset</td>
</tr>
<tr>
<td>Service</td>
<td></td>
</tr>
<tr>
<td>SIL</td>
<td>No reset</td>
</tr>
<tr>
<td>Language</td>
<td>No reset</td>
</tr>
<tr>
<td>HART mode(^8)</td>
<td>No reset</td>
</tr>
<tr>
<td>Application</td>
<td>No reset</td>
</tr>
</tbody>
</table>

#### Factory setting
Like basic adjustment, in addition, special parameters are reset to default values.\(^9\)

#### Peak value
The min. and max. temperature or pressure values are each reset to the actual value.

#### Optional settings
Additional adjustment and diagnosis options such as e.g. scaling, simulation or trend curve presentation are shown in the following menu schematic. You will find a detailed description of these menu items in the operating instructions manual "Indicating and adjustment module".

---

\(^8\) With instruments with signal output 4 … 20 mA/HART

\(^9\) Special parameters are parameters which are set customer-specifically on the service level with the adjustment software PACTware.
6.5 Menu schematic

**Information:**
Depending on the version and application, the highlighted menu windows may not always be available.

**Basic adjustment**
- Unit
  - Unit of measurement: bar ▼
  - Temperature unit: °C ▼
- Position correction
  - Offset: 0.2 mbar
  - 0000 mbar
- Min. adjustment
  - 000.0 %
  - 0.0 mbar
- Max. adjustment
  - 100.00 %
  - 100.00 mbar
- Damping
  - 1 s
- Linearisation curve
  - Linear ▼
- Sensor-TAG
  - Sensor

**Display**
- Displayed value
  - Pressure ▼
  - Scaled
- Display unit
  - Volume ▼
- Scaling
  - 0 % = 0.0
  - 100 % = 100.0
- Lighting
  - Switched off ▼
Diagnostics

3
Basic adjustment
Display
Diagnostics
Service
Info

3.1
Peak value
p-min.: -5.8 mbar
p-max.: 167.5 mbar
T-min.: -12.5 °C
T-max.: +85.5 °C

3.2
Sensor status
OK

3.3.1
Trend curve
Start trend curve?

Service

4
Basic adjustment
Display
Diagnostics
Service
Info

4.1
Current output
Output mode: 4-20 mA ▼
Fail-mode: < 3.6 mA ▼
Min. current: 3.8 mA ▼
max. current: 20.5 mA ▼

4.2
Simulation
Start simulation ▼

4.3
Reset
Select reset ▼

4.4
Language
Deutsch ▼

4.5
SIL
Deactivated! ▼

4.6
HART mode
Standard
Address 0

4.7
Copy sensor data
Copy sensor data?

4.8
PIN
Enable?

4.9
Application
Level ▼

Info

5
Basic adjustment
Display
Diagnostics
Service
Info

5.1
Instrument type

5.2
Calibration date
Software version

5.3
Last change using PC

5.4
Sensor characteristics
Display now?

Service

4.1
Current output
Output mode: 4-20 mA ▼
Fail-mode: < 3.6 mA ▼
Min. current: 3.8 mA ▼
max. current: 20.5 mA ▼

4.2
Simulation
Start simulation ▼

4.3
Reset
Select reset ▼

4.4
Language
Deutsch ▼

4.5
SIL
Deactivated! ▼

4.6
HART mode
Standard
Address 0

4.7
Copy sensor data
Copy sensor data?

4.8
PIN
Enable?

4.9
Application
Level ▼

Info

5
Basic adjustment
Display
Diagnostics
Service
Info

5.1
Instrument type

5.2
Calibration date
Software version

5.3
Last change using PC

5.4
Sensor characteristics
Display now?
6.6 Saving the parameter adjustment data

It is recommended noting the adjusted data, e.g. in this operating instructions manual and archive them afterwards. They are hence available for multiple use or service purposes.

If VEGABAR 67 is equipped with an indicating and adjustment module, the most important data can be read out of the sensor into the indicating and adjustment module. The procedure is described in the operating instructions manual "Indicating and adjustment module" in the menu item "Copy sensor data". The data remain there permanently even if the sensor power supply fails.

If it is necessary to exchange the sensor, the indicating and adjustment module is inserted into the replacement instrument and the data are written into the sensor under the menu item "Copy sensor data".
7 Set up with PACTware and other adjustment programs

7.1 Connect the PC via VEGACONNECT

VEGACONNECT directly on the sensor

Fig. 29: Connection of the PC via VEGACONNECT directly to the sensor
1 USB cable to the PC
2 VEGACONNECT
3 Sensor

VEGACONNECT externally

Fig. 30: Connection via VEGACONNECT externally
1 I²C bus (com.) interface on the sensor
2 I²C connection cable of VEGACONNECT
3 VEGACONNECT
4 USB cable to the PC
Necessary components:

- VEGABAR 67
- PC with PACTware and suitable VEGA DTM
- VEGACONNECT
- Power supply unit or processing system

**VEGACONNECT via HART**

![Diagram of VEGACONNECT via HART](image)

Fig. 31: Connecting the PC via HART to the signal cable

1. VEGABAR 67
2. HART resistance 250 Ω (optional depending on processing)
3. Connection cable with 2 mm pins and terminals
4. Processing system/PLC/Voltage supply

Necessary components:

- VEGABAR 67
- PC with PACTware and suitable VEGA DTM
- VEGACONNECT
- HART resistance approx. 250 Ω
- Power supply unit or processing system

**Note:**

With power supply units with integrated HART resistance (internal resistance approx. 250 Ω), an additional external resistance is not necessary. This applies, e.g., to the VEGA instruments VEGATRENN 149A, VEGADIS 371, VEGAMET 381. Common Ex separators are also usually equipped with a sufficient current limitation resistance. In such cases, VEGACONNECT 4 can be connected parallel to the 4 ... 20 mA cable.

### 7.2 Parameter adjustment with PACTware

Further setup steps are described in the operating instructions manual "DTM Collection/PACTware" attached to each CD and which can also be downloaded from our homepage. A detailed description is available in the online help of PACTware and the VEGA DTMs.
Note:
Keep in mind that for setup of VEGABAR 67, DTM-Collection in the actual version must be used.

All currently available VEGA DTMs are included as a DTM Collection on a CD. They can be purchased for a token fee from the responsible VEGA agency. In addition, the actual PACTware version is also available on this CD.

In addition, this DTM Collection incl. the basic version of PACTware can be downloaded free of charge from the Internet. Move via www.vega.com and "Downloads" to "Software".

7.3 Parameter adjustment with AMS™ and PDM

For VEGA sensors, instrument descriptions for the adjustment programs AMS™ and PDM are available as DD or EDD. The instrument descriptions are already implemented in the current versions of AMS™ and PDM.

For older versions of AMS™ and PDM, a free-of-charge download is available via Internet. Move via www.vega.com and "Downloads" to "Software".

7.4 Saving the parameter adjustment data

It is recommended to document or save the parameter adjustment data. That way they are available for multiple use or service purposes.

The VEGA DTM Collection and PACTware in the licensed, professional version provide suitable tools for systematic project documentation and storage.
8 Maintenance and fault rectification

8.1 Maintenance

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

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

If necessary, clean the diaphragm. Make sure that the materials are resistant to the cleaning process, see resistance list under "Services" on "www.vega.com". The wide variety of applications of isolating diaphragms makes special cleaning instructions necessary for each application. Please ask the VEGA agency serving you.

Caution:

Never clean the separating diaphragm mechanical, for example with tools when using instruments with isolating diaphragms! This can damage the diaphragm and filling oil can penetrate.

8.2 Remove interferences

Failure reasons

VEGABAR 67 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 to be taken are to check the output signals as well as to evaluate the error messages via the indicating and adjustment module. The procedure is described below. Further comprehensive diagnostics can be carried out on a PC with the software PACTware and the suitable DTM. In many cases, the causes can be determined and the faults rectified this way.

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 available to you 7 days a week round-the-clock. Since we offer this service world-wide, the support is only available in the English language. The service is free of charge, only the standard telephone costs will be charged.
Checking the 4 ... 20 mA signal

Connect a handheld multimeter in the suitable measuring range according to the wiring plan.

- 4 ... 20 mA signal not stable
  - Level fluctuations
  - Set the integration time via the indicating and adjustment module or PACTware
  - No atmospheric pressure compensation
  - Check the pressure compensation in the housing and clean the filter element, if necessary

- 4 ... 20 mA signal missing
  - Connection to voltage supply wrong
  - Check connection according to chapter "Connection steps" and if necessary, correct according to chapter "Wiring plan"
  - No power supply
  - Check cables for breaks; repair if necessary
  - Operating voltage too low or load resistance too high
  - Check, adapt if necessary

- Current signal greater than 22 mA or less than 3.6 mA
  - Electronics module or measuring cell defective
  - Exchange the instrument or send it in for repair

In Ex applications, the regulations for the wiring of intrinsically safe circuits must be observed.

Error messages via the indicating and adjustment module

- E013
  - No measured value available
  - Exchange the instrument or send it in for repair

- E017
  - Adjustment span too small
  - Repeat with modified values

- E036
  - No operable sensor software
  - Carry out a software update or send instrument for repair

- E041
  - Hardware error
  - Exchange the instrument or send it in for repair

10) Fault message can also appear if the pressure is higher than the nominal range.
8.3 Calculation of total deviation (similar to DIN 16086)

**Total deviation**

The total deviation $F_{\text{total}}$ according to DIN 16086 is the sum of basic accuracy $F_{\text{perf}}$ and longterm stability $F_{\text{stab}}$. $F_{\text{total}}$ is also called maximum practical deviation or utility error.

$$F_{\text{total}} = F_{\text{perf}} + F_{\text{stab}}$$

$$F_{\text{perf}} = \sqrt{(F_T)^2 + (F_{Kl})^2}$$

With the analogue signal output there is also the error of the current output $F_a$.

$$F_{\text{perf}} = \sqrt{(F_T)^2 + (F_{Kl})^2 + (F_a)^2}$$

With:

- $F_{\text{total}}$: Total deviation
- $F_{\text{perf}}$: Basic accuracy
- $F_{\text{stab}}$: Long-term drift
- $F_T$: Temperature coefficient (influence of medium or ambient temperature)
- $F_{Kl}$: Deviation
- $F_a$: Error current output

**Example**

Level measurement 1.5 mWs

Ambient temperature 40 °C, product temperature 10 °C

VEGABAR 67 with measuring range 0.2 bar

Calculation of the set Turn Down:

$$TD = 200 \text{ mbar}/147 \text{ mbar}, TD = 1.4$$

**Basic accuracy digital output signal in percent:**

$$F_{\text{perf}} = \sqrt{(F_T)^2 + (F_{Kl})^2}$$

$$F_T = (0.15 + 0.4 \times TD) \ %$$

$$F_{Kl}= 1 \ %$$

$$F_{\text{perf}} = \sqrt{(0.15 \ % + 0.4 \ % \times 1.4)^2 + (1 \ %)^2}$$

$$F_{\text{perf}} = 1.23 \ %$$

**Total deviation digital output signal in percent:**

$$F_{\text{total}} = F_{\text{perf}} + F_{\text{stab}}$$

$$F_{\text{stab}} = 0.1 \ %/year \times 1.4$$

$$F_{\text{stab}} = 0.14 \ %$$

$$F_{\text{total}} = 1.23 \ % + 0.14 \ % = 1.37 \ %$$

**Total deviation digital output signal absolute:**

$$F_{\text{total}} = 1.37 \ % \times 147 \text{ mbar}/100 \ % = 2.01 \text{ mbar} = 20.53 \text{ mm}$$
Basic accuracy analogue output signal in percent:
\[ F_{\text{perf}} = \sqrt{\left( F_T \right)^2 + \left( F_{Kl} \right)^2 + \left( F_a \right)^2} \]

\[ F_T = (0.15 + 0.4 \times \text{TD}) \% \]

\[ F_{Kl} = 1 \% \]

\[ F_a = 0.15 \% \]

\[ F_{\text{perf}} = \sqrt{((0.15 \% + 0.4 \% \times 1.4)^2 + (1 \%)^2 + (0.15 \%)^2)} \]

\[ F_{\text{perf}} = 1.24 \% \]

Total deviation analogue output signal in percent:
\[ F_{\text{total}} = F_{\text{perf}} + F_{\text{stab}} \]

\[ F_{\text{stab}} = 0.1 \%/\text{year} \times 1.4 \]

\[ F_{\text{stab}} = 0.14 \% \]

\[ F_{\text{total}} = 1.24 \% + 0.14 \% = 1.38 \% \]

Total deviation analogue output signal absolute:
\[ F_{\text{total}} = 0.87 \% \times 147 \text{ bar/100 \%} = 2.03 \text{ mbar} = 20.68 \text{ mm} \]

8.4 Exchanging the electronics module

In case of a defect, the electronics module can be exchanged by the user against an identical type. If no electronics module is available on side, the module can be ordered from the agency serving you.

Ordering and exchange are possible with or without sensor serial number. The electronics module with serial number includes order-specific data such as factory setting, seal material etc. These are not included in the electronics module without serial number.

The serial number is stated on the type label of VEGABAR 67 or on the delivery note.

8.5 Software update

The software version of VEGABAR 67 can be determined as follows:

- on the type label of the electronics
- via the indicating and adjustment module
- via PACTware

You can view all software histories on our website www.vega.com. Make use of this advantage and get registered for update information via e-mail.

The following components are required to update the sensor software:

- Sensor
- Voltage supply
- VEGACONNECT
- PC with PACTware
- Current sensor software as file
8.6 Instrument repair

If a repair is necessary, please proceed as follows:

You can download a return form (23 KB) from our Internet homepage www.vega.com under: "Downloads - Forms and certificates - Repair form".

By doing this you help us carry out the repair quickly and without having to call back for needed information.

- Print and fill out one form per instrument
- Clean the instrument and pack it damage-proof
- Attach the completed form and, if need be, also a safety data sheet outside on the packaging
- Please ask the agency serving you for the address of your return shipment. You can find the respective agency on our website www.vega.com under: "Company - VEGA worldwide"
9 Dismounting

9.1 Dismounting steps

Warning:
Before dismounting, be aware of dangerous process conditions such as e.g. pressure in the vessel, high temperatures, corrosive or toxic products etc.

Take note of chapters "Mounting" and "Connecting to power supply" and carry out the listed steps in reverse order.

9.2 Disposal

The instrument consists of materials which can be recycled by specialised recycling companies. We use recyclable materials and have designed the electronics to be easily separable.

WEEE directive 2002/96/EG
This instrument is not subject to the WEEE directive 2002/96/EG and the respective national laws. Pass the instrument directly on to a specialised recycling company and do not use the municipal collecting points. These may be used only for privately used products according to the WEEE directive.

Correct disposal avoids negative effects on humans and the environment and ensures recycling of useful raw materials.

Materials: see chapter "Technical data"

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

10.1 Technical data

**General data**

<table>
<thead>
<tr>
<th>Measured variable</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring principle</td>
<td>ceramic-capacitive, temperature-compensated isolated system</td>
</tr>
<tr>
<td>Communication interface</td>
<td>I²C bus</td>
</tr>
</tbody>
</table>

**Materials and weights**

Material 316L corresponds to 1.4404 or 1.4435

Materials, wetted parts

- Transmitter 316L
- Diaphragm Hastelloy C276
- Suspension cable FEP
- Connection tube 316L
- Process fitting 316L
- Seal process fitting thread G1½ A, threaded connection, lock fitting Klingersil C-4400
- Seal, suspension cable FEP
- Protective cap PFA

Materials, non-wetted parts

- Isolating liquid Essomarcal (med. white oil, FDA-approved)
- Straining clamp 1.4301
- Threaded fitting 316L
- Lock fitting 316L
- Housing Plastic PBT (polyester), Alu die-casting powder-coated, 316L
- External housing plastic PBT (Polyester)
- Socket, wall mounting plate external housing plastic PBT (Polyester)
- Seal between housing socket and wall mounting plate TPE (fixed connected)
- Seal between housing and housing cover NBR (stainless steel housing), silicone (Alu/plastic housing)
- Inspection window in housing cover for PLICSCOM Polycarbonate (UL-746-C listed)
- Ground terminal 316Ti/316L
- Ohmic contact Between ground terminal, process fitting and transmitter
- Connection cable between IP 68 housing and external electronics PUR, FEP, PE
- Type plate support with IP 68 version on cable PE hard

Weight approx.
- Basic weight 0.7 kg (1.543 lbs)
- Suspension cable 0.1 kg/m (0.07 lbs/ft)
- Connection tube 1.5 kg/m (1 lbs/ft)
- Straining clamp 0.2 kg (0.441 lbs)
- Threaded fitting 0.4 kg (0.882 lbs)

Lengths
- Connection tube 0.25 … 6 m (0.82 … 19.69 ft)

<table>
<thead>
<tr>
<th><strong>Output variable</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Output signal</td>
<td>4 … 20 mA/HART</td>
</tr>
<tr>
<td>HART output values</td>
<td></td>
</tr>
<tr>
<td>- HART value (Primary Value)</td>
<td>Process pressure</td>
</tr>
<tr>
<td>- HART value (Secondary Value)</td>
<td>Temperature&lt;sup&gt;11&lt;/sup&gt;)</td>
</tr>
<tr>
<td>Signal resolution</td>
<td>1.6 µA</td>
</tr>
<tr>
<td>Failure signal current output (adjustable)</td>
<td>mA-value unchanged 20.5 mA, 22 mA, &lt; 3.6 mA</td>
</tr>
<tr>
<td>Max. output current</td>
<td>22 mA</td>
</tr>
<tr>
<td>Load</td>
<td>see load diagram under Power supply</td>
</tr>
<tr>
<td>Fulfilled NAMUR recommendations</td>
<td>NE 43</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Dynamic behaviour output</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Run-up time approx.</td>
<td>10 s</td>
</tr>
</tbody>
</table>

<sup>11</sup> The value does not correspond to the process temperature with each instrument and process fitting.
Fig. 32: 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

Dead time \( \leq 150 \text{ ms} \)
Rise time \( \leq 100 \text{ ms} \) (10 ... 90 %)
Step response time \( \leq 250 \text{ ms} \) (ti: 0 s, 10 ... 90 %)
Damping (63 % of the input variable) \( 0 \ldots 999 \text{ s, adjustable} \)

**Additional output parameter - temperature**

Processing is made via output signal HART multidrop, Profibus PA and Foundation Fieldbus

- **Range**:\(-50 \ldots +150 \degree \text{C} (-58 \ldots +302 \degree \text{F})\)
- **Resolution**: \(1 \degree \text{C} (1.8 \degree \text{F})\)
- **Accuracy**
  - in the range of \(0 \ldots +100 \degree \text{C} \) (\(+32 \ldots +212 \degree \text{F}\)) \(\pm 3 \text{ K}\)
  - in the range of \(-50 \ldots 0 \degree \text{C} (-58 \ldots +32 \degree \text{F})\) and \(+100 \ldots +150 \degree \text{C} (+212 \ldots +302 \degree \text{F})\) \(\text{typ. } \pm 4 \text{ K}\)

**Input variable**

**Adjustment**

Adjustment range of the min./max. adjustment relating to the nominal measuring range:
- **Percentage value**: \(-10 \ldots 110 \%\)
- **Pressure value**: \(-20 \ldots 120 \%\)

Adjustment range of the zero/span adjustment relating to the nominal measuring range:
- **zero**: \(-20 \ldots +95 \%\)
- **span**: \(-120 \ldots +120 \% \text{ }^{12}\)

\(^{12}\) Values less than \(-1 \text{ bar}\) cannot be set.
- Difference between zero and span \( \text{max. 120 \% of the nominal range} \)

Recommended max. turn down \( 10 : 1 \)

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

The specifications are only an overview and refer to the measuring cell. Limitations due to the material and process fitting version are possible. The specifications on the type label apply.

<table>
<thead>
<tr>
<th>Nominal range</th>
<th>Overload capacity, max. pressure</th>
<th>Overload capacity, min. pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gauge pressure</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 ... +0.2 bar/0 ... +20 kPa</td>
<td>+20 bar/+2000 kPa</td>
<td>-15 psig</td>
</tr>
<tr>
<td>0 ... +0.4 bar/0 ... +40 kPa</td>
<td>+30 bar/+3000 kPa</td>
<td>-15 psig</td>
</tr>
<tr>
<td>0 ... +1 bar/0 ... +100 kPa</td>
<td>+35 bar/+3500 kPa</td>
<td>-1 bar/-100 kPa</td>
</tr>
<tr>
<td>0 ... +2.5 bar/0 ... +250 kPa</td>
<td>+50 bar/+5000 kPa</td>
<td>-1 bar/-100 kPa</td>
</tr>
<tr>
<td>0 ... +5 bar/0 ... +500 kPa</td>
<td>+65 bar/+6500 kPa</td>
<td>-1 bar/-100 kPa</td>
</tr>
<tr>
<td>0 ... +10 bar/0 ... +1000 kPa</td>
<td>+90 bar/+9000 kPa</td>
<td>-1 bar/-100 kPa</td>
</tr>
<tr>
<td>0 ... +25 bar/0 ... +2500 kPa</td>
<td>130 bar/13 MPa</td>
<td>-1 bar/-100 kPa</td>
</tr>
</tbody>
</table>

**Nominal measuring ranges and overload capability in psig**

The specifications are only an overview and refer to the measuring cell. Limitations due to the material and process fitting version are possible. The specifications on the type label apply.

<table>
<thead>
<tr>
<th>Nominal range</th>
<th>Overload capacity, max. pressure</th>
<th>Overload capacity, min. pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gauge pressure</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 ... +3 psig</td>
<td>+290 psig</td>
<td>-15 psig</td>
</tr>
<tr>
<td>0 ... +6 psig</td>
<td>+430 psig</td>
<td>-15 psig</td>
</tr>
<tr>
<td>0 ... +15 psig</td>
<td>+500 psig</td>
<td>-15 psig</td>
</tr>
<tr>
<td>0 ... +35 psig</td>
<td>+700 psig</td>
<td>-15 psig</td>
</tr>
<tr>
<td>0 ... +70 psig</td>
<td>+950 psig</td>
<td>-15 psig</td>
</tr>
<tr>
<td>0 ... +150 psig</td>
<td>+1300 psig</td>
<td>-15 psig</td>
</tr>
<tr>
<td>0 ... +350 psig</td>
<td>+1900 psig</td>
<td>-15 psig</td>
</tr>
<tr>
<td>0 ... +900 psig</td>
<td>+2900 psig</td>
<td>-15 psig</td>
</tr>
</tbody>
</table>

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

Reference conditions according to DIN EN 61298-1
- Temperature \( 18 \ldots 30 \, ^\circ\text{C} \) (64 \ldots 86 \, ^\circ\text{F})
- Relative humidity \( 45 \ldots 75 \, \% \)
- Air pressure \( 860 \ldots 1060 \, \text{mbar/86} \ldots 106 \, \text{kPa} \) (12.5 \ldots 15.4 \, \text{psi})

Determination of characteristics limit point adjustment according to DIN 16086

Characteristic curve Linear

Reference installation position upright, diaphragm points downward

Influence of the installation position \( < 5 \, \text{mbar/0.5 kPa} \) (0.07 psig)
Deviation determined according to the limit point method according to IEC 60770\(^{13}\)

Applies to the **digital** signal output (HART, Profinet PA, Foundation Fieldbus) as well as to **analogue** current output 4…20 mA and refers to the set span. Turn down (TD) is the ratio nominal measuring range/set span.

Deviation

- Turn down 1 : 1 up to 5 : 1  < 0.1 %
- Turn down  > 5 : 1  < 0.02 % x TD

Influence of the product or ambient temperature

**Average temperature coefficient of the zero signal and the output span**

Applies to the **digital** signal output (HART, Profinet PA, Foundation Fieldbus) as well as to **analogue** current output 4…20 mA and refers to the set span. Turn down (TD) is the ratio nominal measuring range/set span.

<table>
<thead>
<tr>
<th>Nominal measuring range in bar/kPa</th>
<th>Nominal measuring range in psig</th>
<th>Average temperature coefficient of the zero signal and the output span, in the compensated temperature range 0...+100 °C (+32 ... +212 °F), reference temperature 20 °C (68 °F)</th>
<th>Average temperature coefficient of the zero signal and the output span, outside the compensated temperature range</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 ... 0.2 bar/0 ... 20 kPa</td>
<td>0 ... 3 psi</td>
<td>(&lt;0.15 + 0.4 x TD)%</td>
<td>(&lt;0.15 + 0.6 x TD)%</td>
</tr>
<tr>
<td>0 ... 0.4 bar/0 ... 40 kPa</td>
<td>0 ... 6 psig</td>
<td>(&lt;0.15 + 0.4 x TD)%</td>
<td>(&lt;0.15 + 0.6 x TD)%</td>
</tr>
<tr>
<td>0 ... 1 bar/0 ... 100 kPa</td>
<td>0 ... 15 psig</td>
<td>(&lt;0.1 + 0.2 x TD)%</td>
<td>(&lt;0.1 + 0.3 x TD)%</td>
</tr>
<tr>
<td>0 ... 2.5 bar/0 ... 250 kPa</td>
<td>0 ... 35 psig</td>
<td>(&lt;0.1 + 0.2 x TD)%</td>
<td>(&lt;0.1 + 0.3 x TD)%</td>
</tr>
<tr>
<td>0 ... 5 bar/0 ... 500 kPa</td>
<td></td>
<td>(&lt;0.05 + 0.1 x TD)%</td>
<td>(&lt;0.1 + 0.15 x TD)%</td>
</tr>
<tr>
<td>0 ... 10 bar/0 ... 1000 kPa</td>
<td>0 ... 150 psig</td>
<td>(&lt;0.05 + 0.1 x TD)%</td>
<td>(&lt;0.1 + 0.15 x TD)%</td>
</tr>
<tr>
<td>0 ... 25 bar/0 ... 2500 kPa</td>
<td>0 ... 350 psig</td>
<td>(&lt;0.05 + 0.1 x TD)%</td>
<td>(&lt;0.1 + 0.15 x TD)%</td>
</tr>
</tbody>
</table>

**Thermal change of the current output**

Applies also to the **analogue** 4…20 mA current output and refers to the set span.

Thermal change, current output < 0.05 %/10 K, max. < 0.15 %, each with -40 ... +80 °C (-40 ... +176 °F)

---

\(^{13}\) Incl. non-linearity, hysteresis and non-repeatability.
**Fig. 33: Thermal change, current output**

### Long-term stability (similar to DIN 16086, DINV 19259-1 and IEC 60770-1)

Applies to digital HART interface as well as to analogue current output 4 ... 20 mA under reference conditions. Specifications refer to the set span. Turn down (TD) is the relation nominal measuring range/set span.

Long-term drift of the zero signal:
- For one year $< 0.05 \% \times TD$
- For five years $< 0.1 \% \times TD$
- For ten years $< 0.2 \% \times TD$

### Ambient conditions

Ambient, storage and transport temperature
- Version with connection tube $-40 \ldots +80 \, ^\circ\text{C} (-40 \ldots +176 \, ^\circ\text{F})$
- Version with suspension cable FEP, PUR $-20 \ldots +80 \, ^\circ\text{C} (-4 \ldots +176 \, ^\circ\text{F})$
- Version with suspension cable PE $-20 \ldots +60 \, ^\circ\text{C} (-4 \ldots +140 \, ^\circ\text{F})$

### Process conditions

The specifications to the pressure stage and the product temperature are used as an overview. The specifications of the type label are applicable.

Process pressure
- with measuring ranges 0.1 bar (1.45 psig) max. 15 bar (217.6 psig) or max. 20 bar (290 psig)$^{14}$
  or 0.2 bar (2.9 psig)
- with meas. ranges from 0.4 bar (5.8 psig) max. 25 bar (363 psig)$^{15}$

Pressure stage, process fitting
- Threaded fitting 316L PN 3, PVDF PN 5$^{16}$

---

$^{14}$ Limited by the overpressure resistance of the measuring cell.
$^{15}$ Limitation by the pressure-tightness of the cable connection.
$^{16}$ Limited by the overpressure resistance of the measuring cell.
Thread 316L PN 25, PVDF unpressurized

Lock fitting Unpressurized

Product temperature

- Suspension cable -12 ... +100 °C (+10 ... +212 °F)
- Connection tube -12 ... +100 °C (+10 ... +212 °F)

Vibration resistance mechanical vibrations with 4 g and 5 ... 100 Hz

With version with connection tube, vibration resistance 1 g. With lengths > 0.5 m (1.64 ft) the tube must be supported in addition.

Shock resistance Acceleration 100 g/6 ms

Electromechanical data - version IP 66/IP 67

Cable entry/plug

- Single chamber housing
  - 1 x cable gland M20 x 1.5 (cable: ø 5 ... 9 mm),
  - 1 x blind stopper M20 x 1.5
  - 1 x closing cap ½ NPT, 1 x blind plug ½ NPT
  - 1 x plug (depending on the version), 1 x blind stopper M20 x 1.5

- Double chamber housing
  - 1 x cable entry M20 x 1.5 (cable: ø 5 ... 9 mm),
  - 1 x blind stopper M20 x 1.5; plug M12 x 1 for the external indicating and adjustment unit (optional)
  - 1 x closing cap ½ NPT, 1 x blind stopper ½ NPT, plug M12 x 1 for the external indicating and adjustment unit (optional)
  - 1 x plug (depending on the version), 1 x blind stopper M20 x 1.5; plug M12 x 1 for the external indicating and adjustment unit (optional)
  - 2 x blind stoppers M20 x 1.5; plug M12 x 1 for the external indicating and adjustment unit (optional)

Spring-loaded terminals for wire cross-section < 2.5 mm² (AWG 14)

17) Tested according to the guidelines of German Lloyd, GL directive 2.
18) Tested according to EN 60068-2-27.
19) Depending on the version M12 x 1, according to ISO 4400, Harting, 7/8" FF.
### Electromechanical data - version IP 66/IP 68 (1 bar)

**Cable entry**
- Single chamber housing
  - 1 x IP 68 cable gland M20 x 1.5; 1 x blind stopper M20 x 1.5
  - or:
    - 1 x closing cap ½ NPT, 1 x blind plug ½ NPT

**Connection cable**
- Structure
  - four wires, one suspension cable, one breather capillary, screen braiding, metal foil, mantle
- Wire cross-section
  - 0.5 mm² (AWG 20)
- Wire resistance
  - < 0.036 Ω/m (0.011 Ω/ft)
- Tensile strength
  - > 1200 N (270 pounds force)
- Standard length
  - 5 m (16.4 ft)
- Max. length
  - 1000 m (3281 ft)
- Min. bending radius at 25 °C/77 °F
  - 25 mm (0.985 in)
- Diameter approx.
  - 8 mm (0.315 in)
- Colour - Non-Ex version
  - Black
- Colour - Ex-version
  - Blue

### Electromechanical data - version IP 68

**Cable entry/plug**
- External housing
  - 1 x cable gland M20 x 1.5 (cable: ø 5 ... 9 mm), 1 x blind stopper M20 x 1.5
  - or:
    - 1 x closing cap ½ NPT, 1 x blind plug ½ NPT
  - or:
    - 1 x plug (depending on the version), 1 x blind stopper M20 x 1.5

**Spring-loaded terminals for wire cross-section up to**
- 2.5 mm² (AWG 14)

**Connection cable between IP 68 instrument and external housing:**
- Structure
  - four wires, one suspension cable, one breather capillary, screen braiding, metal foil, mantle
- Wire cross-section
  - 0.5 mm² (AWG 20)
- Wire resistance
  - < 0.036 Ω/m (0.011 Ω/ft)
- Standard length
  - 5 m (16.4 ft)
- Max. length non-Ex
  - 250 m (820.21 ft)
- Max. length Ex
  - 180 m (591.55 ft)
- Min. bending radius at 25 °C/77 °F
  - 25 mm (0.985 in)
- Diameter
  - approx. 8 mm (0.315 in)

---

20) Depending on the version M12 x 1, according to ISO 4400, Harting, 7/8" FF.
– Cable extraction force\textsuperscript{21)} $\geq 650$ N (146.1 lbf)
– Colour - standard PE Black
– Colour - standard PUR Blue
– Colour - Ex-version Blue

### Indicating and adjustment module

| Voltage supply and data transmission | through the sensor |
| Indication | LC display in dot matrix |
| Adjustment elements | 4 keys |

### Protection rating

| – unassembled | IP 20 |
| – mounted into the sensor without cover | IP 40 |

### Materials

| – Housing | ABS |
| – Inspection window | Polyester foil |

### Voltage supply

#### Operating voltage

| – Non-Ex instrument | 12 ... 36 V DC |
| – EEx-ia instrument | 12 ... 30 V DC |
| – Exd instrument | 18 ... 36 V DC |

#### Operating voltage with lighted indicating and adjustment module

| – Non-Ex instrument | 20 ... 36 V DC |
| – EEx-ia instrument | 20 ... 30 V DC |
| – EEx-d-ia instrument | 20 ... 36 V DC |

### Permissible residual ripple

| – < 100 Hz | $U_{ss} < 1$ V |
| – 100 Hz ... 10 kHz | $U_{ss} < 10$ mV |

Load see diagram

\(\textsuperscript{21)}\) With this extraction force, the suspension cable can be extracted out of the transmitter.
**Fig. 34: Voltage diagram**

1. HART load
2. Voltage limit EEx-ia instrument
3. Voltage limit non-Ex/Ex-d instrument
4. Operating voltage

---

**Electrical protective measures**

Protection rating
- Transmitter: IP 68 (25 bar)
- Housing, standard: IP 66/IP 67
- Aluminium and stainless housing (optionally available): IP 68 (1 bar)
- External housing: IP 65

Overvoltage category: III

Protection class: II

---

**Functional safety (SIL)**

Functional safety is already activated on instruments with SIL qualification ex factory. On instruments without SIL qualification ex factory, the functional safety must be activated by the user via the indicating and adjustment module or via PACTware for applications according to SIL.

Functional safety according to IEC 61508-4
- Single channel architecture (1oo1D) up to SIL2
- Double channel diversitary redundant architecture (1oo2D) up to SIL3

You can find detailed information in the supplied Safety Manual of the instrument series or under "www.vega.com", "Downloads", "Approvals".

---

22) Instruments with gauge pressure measuring ranges cannot detect the ambient pressure when submerged, e.g. in water. This can lead to falsification of the measured value.

23) Only with instruments with absolute pressure ranges.
Approvals

Instruments with approvals can have different technical data depending on the version.

That’s why the associated approval documents have to be noted with these instruments. They are part of the delivery or can be downloaded under www.vega.com via "VEGA Tools" and "serial number search" as well as via "Downloads" and "Approvals".
10.2 Dimensions

The following dimensional drawings represent only an extract of the possible versions. Detailed dimensional drawings can be downloaded on www.vega.com under "Downloads" and "Drawings".

Plastic housing

![Dimensions Diagram]

1  Single chamber version
2  Double chamber version

Aluminium housing

![Dimensions Diagram]

1  Single chamber version
2  Double chamber version
Aluminium housing in protection rating IP 66/IP 68, 1 bar

1 Single chamber version
2 Double chamber version

Stainless steel housing

1 Single chamber version, electropolished
2 Single chamber version, precision casting
2 Double chamber version, precision casting
Stainless steel housing in protection rating IP 66/IP 68, 1 bar

1 Single chamber version, electropolished
2 Single chamber version, precision casting
2 Double chamber version, precision casting

IP 68 version with external housing

Fig. 40: IP 68 version with external housing
1 Lateral cable outlet
2 Axial cable outlet
**Fig. 41: VEGABAR 67 - standard fittings**

1. Straining clamp
2. Threaded fitting
3. Thread G1½ A
4. Thread 1½ NPT
5. Lock fitting
VEGABAR 67 - flange connection

Fig. 42: VEGABAR 67 - flange connection
1. Flanges according to DIN 2501
2. Flanges according to ANSI B16.5
Fig. 43: VEGABAR 67 - hygienic fittings

1 Clamp 2" PN16 (ø64 mm) DIN 32676, ISO 2852/316L
2 Bolting DN 50
10.3 Industrial property rights

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

Only in U.S.A.: Further information see patent label at the sensor housing.

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进一步信息请参见网站<http://www.vega.com>。

10.4 Trademark

All the brands as well as trade and company names used are property of their lawful proprietor/originator.
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Zero adjustment 43
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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