

## Operating Instructions

### VEGAFLEX 67

-40 ... +150 °C, PFA insulated

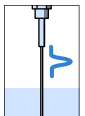
4 ... 20 mA/HART - four-wire



Document ID:  
32304



Guided Microwave



## Contents

|          |                                                                  |    |
|----------|------------------------------------------------------------------|----|
| <b>1</b> | <b>About this document</b>                                       |    |
| 1.1      | Function . . . . .                                               | 4  |
| 1.2      | Target group . . . . .                                           | 4  |
| 1.3      | Symbolism used . . . . .                                         | 4  |
| <b>2</b> | <b>For your safety</b>                                           |    |
| 2.1      | Authorised personnel . . . . .                                   | 5  |
| 2.2      | Appropriate use . . . . .                                        | 5  |
| 2.3      | Warning about misuse . . . . .                                   | 5  |
| 2.4      | General safety instructions . . . . .                            | 5  |
| 2.5      | Safety label on the instrument . . . . .                         | 6  |
| 2.6      | CE conformity . . . . .                                          | 6  |
| 2.7      | Fulfillment of NAMUR recommendations . . . . .                   | 6  |
| 2.8      | Safety instructions for Ex areas . . . . .                       | 6  |
| 2.9      | Environmental instructions . . . . .                             | 6  |
| <b>3</b> | <b>Product description</b>                                       |    |
| 3.1      | Structure . . . . .                                              | 7  |
| 3.2      | Principle of operation . . . . .                                 | 8  |
| 3.3      | Operation . . . . .                                              | 10 |
| 3.4      | Packaging, transport and storage . . . . .                       | 10 |
| <b>4</b> | <b>Mounting</b>                                                  |    |
| 4.1      | General instructions . . . . .                                   | 11 |
| 4.2      | Instructions for installation . . . . .                          | 12 |
| <b>5</b> | <b>Connecting to power supply</b>                                |    |
| 5.1      | Preparing the connection . . . . .                               | 15 |
| 5.2      | Connection procedure . . . . .                                   | 16 |
| 5.3      | Wiring plan, double chamber housing . . . . .                    | 17 |
| <b>6</b> | <b>Set up with the indicating and adjustment module PLICSCOM</b> |    |
| 6.1      | Short description . . . . .                                      | 20 |
| 6.2      | Insert indicating and adjustment module . . . . .                | 20 |
| 6.3      | Adjustment system . . . . .                                      | 22 |
| 6.4      | Setup steps . . . . .                                            | 23 |
| 6.5      | Menu schematic . . . . .                                         | 29 |
| 6.6      | Saving the parameter adjustment data . . . . .                   | 32 |
| <b>7</b> | <b>Set up with PACTware and other adjustment programs</b>        |    |
| 7.1      | Connect the PC . . . . .                                         | 33 |
| 7.2      | Parameter adjustment with PACTware . . . . .                     | 34 |
| 7.3      | Parameter adjustment with AMS™ and PDM . . . . .                 | 35 |
| 7.4      | Saving the parameter adjustment data . . . . .                   | 35 |
| <b>8</b> | <b>Maintenance and fault rectification</b>                       |    |
| 8.1      | Maintenance . . . . .                                            | 36 |

|           |                                             |    |
|-----------|---------------------------------------------|----|
| 8.2       | Remove interferences . . . . .              | 36 |
| 8.3       | Exchanging the electronics module . . . . . | 37 |
| 8.4       | Software update . . . . .                   | 38 |
| 8.5       | Instrument repair . . . . .                 | 39 |
| <b>9</b>  | <b>Dismounting</b>                          |    |
| 9.1       | Dismounting steps . . . . .                 | 40 |
| 9.2       | Disposal . . . . .                          | 40 |
| <b>10</b> | <b>Supplement</b>                           |    |
| 10.1      | Technical data . . . . .                    | 41 |
| 10.2      | Dimensions . . . . .                        | 50 |

## Supplementary documentation



### Information:

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

## Instructions manuals for accessories and replacement parts



### Tip:

To ensure reliable setup and operation of your VEGAFLEX 67, we offer accessories and replacement parts. The corresponding documentations are:

- 27720 - VEGADIS 61
- 30207 - Electronics module VEGAFLEX series 60
- 34296 - Protective cover
- 31088 - Flanges according to DIN-EN-ASME-JIS-GOST
- 30391 - Spacer

Editing status: 2012-03-19

# 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

VEGAFLEX 67 is a sensor for continuous interface measurement in liquids.

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](http://www.vega.com)".

## 2.7 Fulfillment of NAMUR recommendations

The device fulfills the requirements of the applicable NAMUR recommendations.

## 2.8 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.

## 2.9 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 fulfil 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:

- Level sensor VEGAFLEX 67
- Documentation
  - this operating instructions manual
  - Operating instructions manual 27835 "*Indicating and adjustment module PLICSCOM*" (optional)
  - Supplementary instructions manual "*Plug connector for continuously measuring sensors*" (optional)
  - Ex-specific "*Safety instructions*" (with Ex versions)
  - if necessary, further certificates

#### Constituent parts

The VEGAFLEX 67 consists of the components:

- Process fitting with probe
- Housing with electronics
- Housing cover, optionally available with indicating and adjustment module

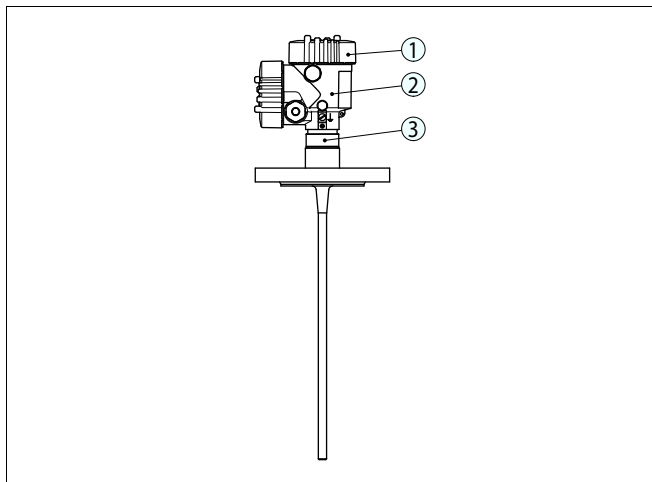


Fig. 1: VEGAFLEX 67 - rod version with double chamber housing

- 1 Housing cover with integrated indicating and adjustment module (optional)
- 2 Housing with electronics
- 3 Process fitting

#### Type label

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

- Article number
- Serial number

- Technical data
- Article numbers, documentation

With the serial number, you can access the delivery data of the instrument via [www.vega.com](http://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 Principle of operation

### Application range

VEGAFLEX 67 is a level sensor with rod or cable probe for continuous interface measurement.

It is designed for industrial use in all areas of process technology and can be used in liquids.

### Functional principle

High frequency microwave impulses are guided along a steel cable or rod. When reaching the product surface, a part of the microwave impulses is reflected. The other part passes the upper product and is reflected a second time by the interface. The running times to the two product layers are processed by the instrument.

### Prerequisites for interface measurement

#### Upper medium (L2)

- The upper medium must not be conductive
- The dielectric figure of the upper medium must be known (input required). Min. dielectric figure: rod version 1.7. You can find a list with the dielectric figures on our home page: [www.vega.com](http://www.vega.com)
- The composition of the upper medium must be stable, no varying products or mixtures
- The upper medium must be homogeneous, no stratifications within the medium
- Min. thickness of the upper medium 100 mm
- Clear separation from the lower medium, no emulsion phase, no mull layer
- If possible, no foam on the surface

#### Lower medium (L1)

- The dielectric figure must be 10 higher than the dielectric figure of the upper medium, preferably electrically conductive. Example: upper medium dielectric figure 2, lower medium at least dielectric figure 12

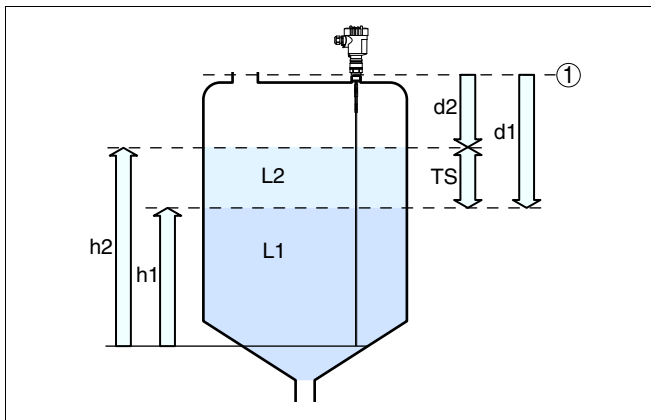


Fig. 2: Interface measurement

- 1 Reference plane
- d1 Distance to the interface (HART value 1)
- d2 Distance to the level (HART value 3)
- TS Thickness of the upper medium ( $d1 - d2$ )
- h1 Height - Interface
- h2 Height - Level
- L1 Lower medium
- L2 Upper medium

## Output signal

The interface is processed directly by the sensor.

The analogue output (4 ... 20 mA) transmits the height of the interface (h1) in percent. This is also the value that is adjusted.

The display of PLICSCOM and PACTware outputs the distance to the interface (d1) in m(d).

The HART protocol can transmit the distance to the interface - HART value 1 (d1) and the distance to the level (d2) - HART value 3.

The values can be processed e.g. with a HART interface module (HIM) or with a VEGAMET 625. VEGAMET 625 can also generate the difference out of the two values.

## Voltage supply

Four-wire electronics with separate power supply.

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

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

Measured value transmission is carried out via the 4 ... 20 mA/HART output separate from power supply.

The 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".

### 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

Your instrument 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 %

## 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*" and on the type label.

**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°).

**Welding work**

Before beginning the welding work, remove the electronics module from the sensor. By doing this, you avoid damage to the electronics through inductive coupling.

**Handling**

With threaded versions, the housing must not be used to screw in the instrument! Applying tightening forces on the housing can damage its internal parts.

Use the hexagon for screwing in.

**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.

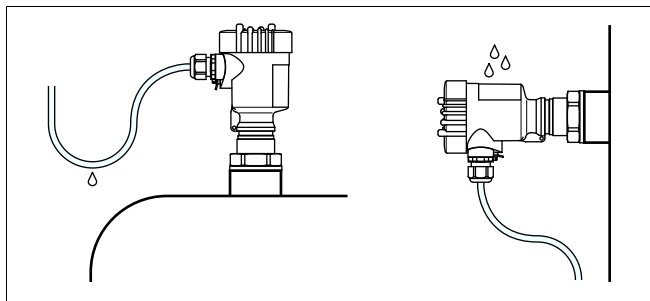


Fig. 3: Measures against moisture penetration

### Measuring range

The reference plane for the measuring range of the sensors is the sealing surface of the thread or flange.

Keep in mind that a min. distance must be maintained below the reference plane and possibly also at the end of the probe - measurement in these areas is not possible (dead band). Particularly the cable length cannot be used all the way to the end because measurement in the area of the gravity weight is not possible. These min. distances (dead bands) are listed in chapter "Technical data". Keep in mind for the adjustment that the default setting for the measuring range refers to water.

### Pressure

The process fitting must be sealed if there is gauge or low pressure in the vessel. Before use, check if the seal material is resistant against the measured product and the process temperature.

The max. permissible pressure is specified in chapter "Technical data" or on the type label of the sensor.

## 4.2 Instructions for installation

### Mounting position

When mounting the cable and rod versions of VEGAFLEX 67 keep at least a distance of 300 mm (11.81 in) to other vessel installations or to the vessel wall.

During operation, the probe must not touch any installations or the vessel wall. If necessary, fasten the probe end.

In vessels with conical bottom it can be advantageous to mount the sensor in the center of the vessel, as measurement is then possible down to the lowest point of the bottom. When using the cable version,

keep in mind that measurement down to the tip of the probe is not possible. The exact value of the min. distance (lower dead band) is stated in chapter "Technical data".

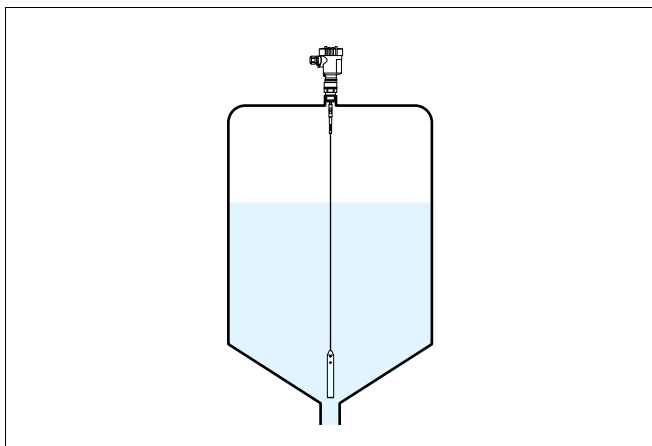


Fig. 4: Vessel with conical bottom

#### **Torque with PTFE plated flanges**

To compensate the normal bias voltage loss due to the seal materials, you have to use also disc springs in addition to the flange screws for fastening PTFE plated flanges.

The flange screws of VEGAFLEX 67 must always be tightened with a torque of approx. 60 Nm (44 lbf ft) so that the PTFE washer seals reliably.

#### **Inflowing medium**

Make sure that the probe is not subjected to strong lateral forces. Mount VEGAFLEX 67 at a position in the vessel where no disturbances, e.g. from filling openings, agitators, etc., can occur.

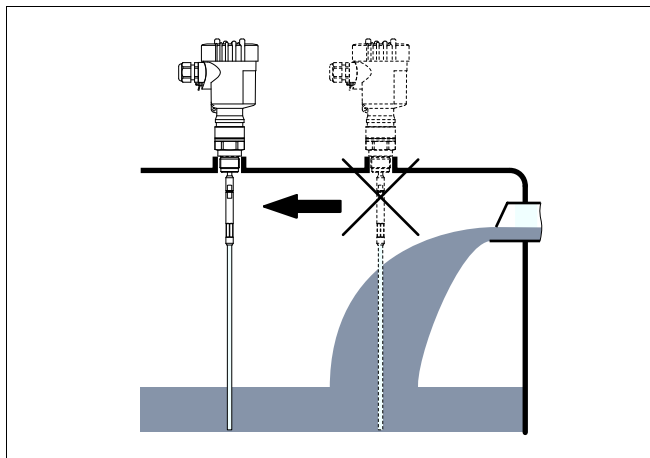


Fig. 5: Lateral load

Extreme vibration caused by the system, e.g. due to agitators or turbulence in the vessel from inflowing medium, can cause the coax probe of VEGAFLEX 67 to vibrate in resonance. With coax probes of more than 1 m (3.281 in) length, you must secure the probe by fastening a suitable insulated brace or guy directly above the end of the rod.

## Fixing

If there is a danger of the probe touching the vessel wall during operation due to product movements or agitators etc., the measuring probe should be securely fixed.

In the gravity weight there is a thread (M12), e.g. for a ring bolt (optional) - (article no. 2.27424).

Make sure that the probe cable is not completely taut. Avoid tensile loads on the cable.

Avoid undefined cable-vessel connections, i.e. the connection must be either grounded reliably or isolated reliably. Any deviation from this requirement can lead to measurement errors.

## 5 Connecting to power supply

### 5.1 Preparing the connection

#### Note 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 ÜSB 62-36G.X.

#### Take note of the safety instructions for Ex applications Voltage supply



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

Supply voltage and current output are carried on separate two-wire connection cables if reliable separation is required. The supply voltage range can differ depending on the instrument version.

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

The standard version can be operated with an earth-connected current output, the Exd version must be operated with a floating output.

This instrument is designed in protection class I. To maintain this protection class, it is absolutely necessary that the ground conductor be connected to the internal ground terminal. Take note of the general installation regulations.

Always connect the instrument to vessel ground (potential equalisation) or in case of plastic vessels to the next ground potential. For this purpose there is a ground terminal on the side of the instrument housing.

#### Connection cable

For power supply, an approved installation cable with PE conductor is required.

The 4 ... 20 mA current output 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.

#### 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 be 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 metallic parts of the instrument (transmitter, process fitting, etc.) are conductively connected with the inner and outer ground terminal on the housing. This connection exists either as a direct metallic contact or via the shielding of the special connection cable on instruments with external electronics. You can find specifications on the potential connections within the instrument in chapter "*Technical data*".

**Installation with  
Ex applications**

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.

With the Exd version, the minus side of the signal output is galvanically connected to ground via protective diodes. When connecting the instrument to a grounded PLC, equalising currents can flow in case of potential differences which can cause malfunctions. Make sure that there is sufficient potential equalisation from the system side or realise the connection via switching amplifier.

## 5.2 Connection procedure

Proceed as follows:

- 1 Unscrew the housing cover
- 2 Loosen compression nut of the cable entry
- 3 Remove approx. 10 cm (4 in) of the cable mantle (current output), strip approx. 1 cm (0.4 in) insulation from the ends of the individual wires
- 4 Insert the cable into the sensor through the cable entry
- 5 Lift the opening levers of the terminals with a screwdriver

- 6 Insert the wire ends into the open terminals according to the wiring plan
  - 7 Press down the opening levers of the terminals, you will hear the terminal spring closing
  - 8 Check the hold of the wires in the terminals by lightly pulling on them
  - 9 Connect the screen to the internal ground terminal, connect the outer ground terminal to potential equalisation
  - 10 Tighten the compression nut of the cable entry. The seal ring must completely encircle the cable
  - 11 Connect the lead cable for power supply in the same way according to the wiring plan, in addition connect the ground conductor to the inner ground terminal.
  - 12 Screw the housing cover back on
- The electrical connection is finished.

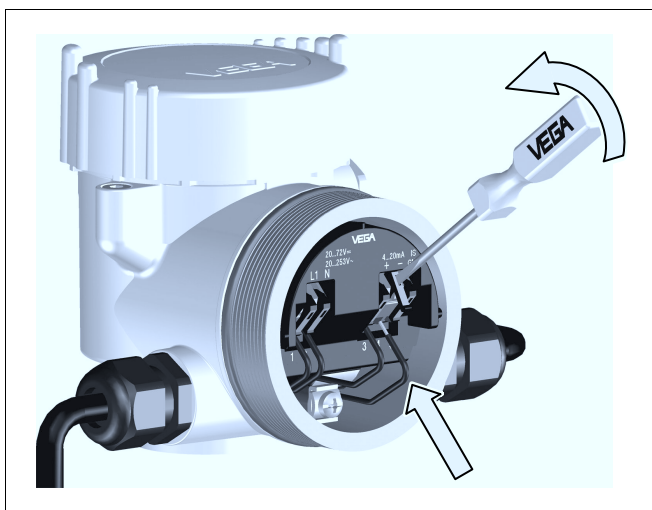


Fig. 6: Connection steps 5 and 6

### 5.3 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

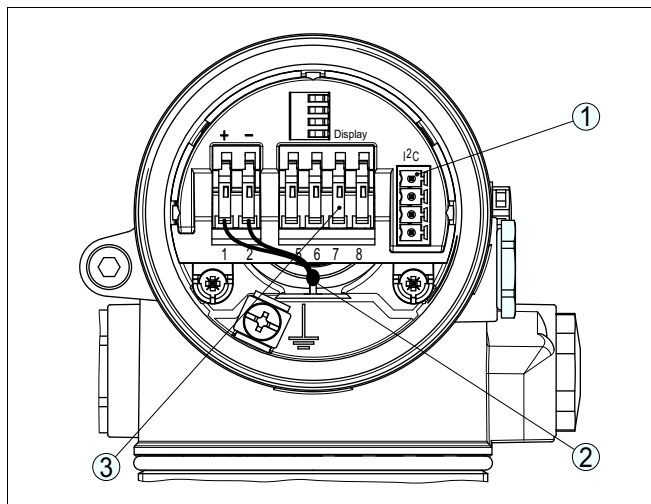


Fig. 7: Electronics compartment, double chamber housing

- 1 Plug connector for VEGACONNECT (I<sup>2</sup>C interface)
- 2 Internal connection cable to the connection compartment
- 3 Terminals for VEGADIS 61

## Connection compartment

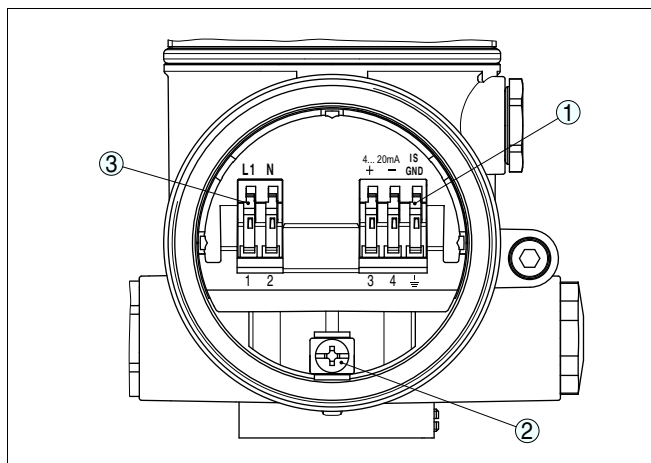


Fig. 8: Connection compartment double chamber housing

- 1 Spring-loaded terminals for signal output
- 2 Ground terminal for connection of the ground conductor and screen
- 3 Spring-loaded terminals for voltage supply

# Wiring plan

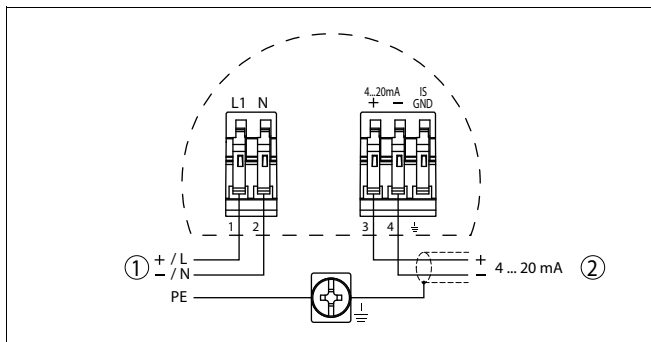


Fig. 9: Wiring plan, double chamber housing

- 1 Voltage supply
- 2 Signal output

## 6 Set up with the indicating and adjustment module PLICSCOM

### 6.1 Short description

#### Function/Configuration

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 sensors of the plics® instrument family, in the single as well as in the double chamber housing (optionally in the electronics or connection compartment)
- External indicating and adjustment unit VEGADIS 61

From a hardware version ...- 01 or higher of the indicating and adjustment module as well as of the corresponding sensor, an integrated backlight can be switched on via the adjustment menu. The hardware version is stated on the type label of the indicating and adjustment module or the sensor electronics.



#### 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

#### Mount/Dismount 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.

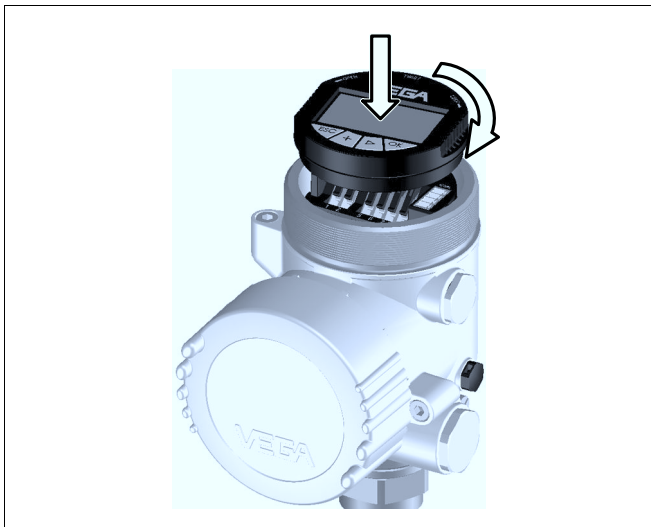


Fig. 10: Insert indicating and adjustment module



**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

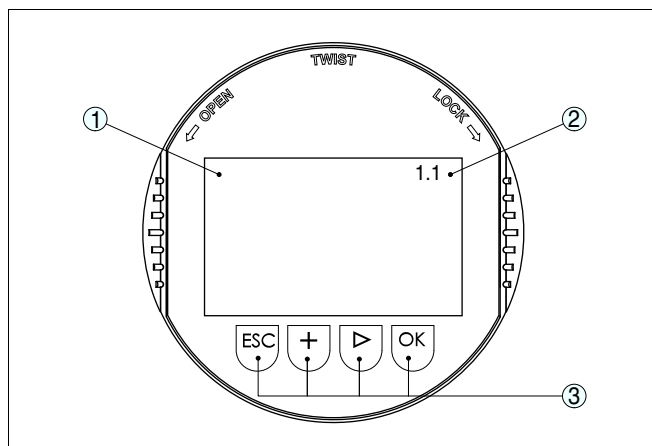


Fig. 11: Indicating and adjustment elements

- 1 LC display
- 2 Indication of the menu item number
- 3 Adjustment keys

#### 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
  - Return to higher-ranking 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

### Switch-on phase

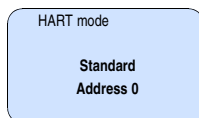
After connecting VEGAFLEX 67 to power supply or after a voltage recurrence, the instrument carries out a self-check for approx. 30 seconds:

- 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).

### 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.



### Parameter adjustment

As VEGAFLEX 67 is a distance measuring instrument, the distance from the sensor to the product surface is measured. To have the real product level displayed, an allocation of the measured distance to the percentage height must be made. To carry out this adjustment, the distance is entered with full and empty vessel. If these values are not known, an adjustment with the distance values, e.g. 10 % and 90 % is also possible. Starting point for these distance specifications is always the seal surface of the thread or flange. With these settings, the real level is calculated. Furthermore the operating range of the sensor is limited from maximum to the required range.

The real product level during this adjustment is not important, because the min./max. adjustment is always carried out without changing the product level. These settings can be made ahead of time without the instrument having to be installed.

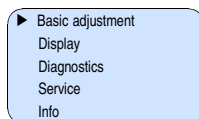
In the main menu item *"Basic adjustment"*, the individual submenu items should be selected one after the other and provided with the correct parameter values.

Start your parameter adjustment with the following menu items of the basic adjustment:

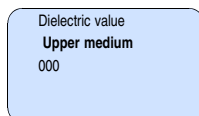
### Carry out min. adjustment

Proceed as follows:

- 1 Move from the measured value display to the main menu by pushing **[OK]**.

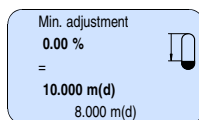


- 2 Select the menu item "Basic adjustment" with **[->]** and confirm with **[OK]**. Now the menu item "Dielectric value" is displayed.



- 3 Enter the dielectric figure (DK value) of the upper medium and confirm with **[OK]**.

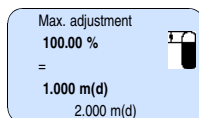
Save the settings with **[OK]** and move to "Min. adjustment" with **[->]**.



- 4 Prepare the % value for editing with **[OK]** and set the cursor to the requested position with **[->]**. Set the requested percentage value with **[+]** and save with **[OK]**. The cursor jumps now to the distance value.
- 5 Enter the suitable distance value in m for the empty vessel (e.g. distance from the sensor to the vessel bottom) corresponding to the percentage value.
- 6 Save the settings with **[OK]** and move to "Max. adjustment" with **[->]**.

### Carry out max. adjustment

Proceed as follows:

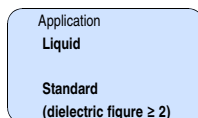


- 1 Prepare the % value for editing with **[OK]** and set the cursor to the requested position with **[->]**. Set the requested percentage value with **[+]** and save with **[OK]**. The cursor jumps now to the distance value.
- 2 Enter the appropriate distance value in m (corresponding to the percentage value) for the full vessel. Keep in mind that the max. level must lie below the dead band.

### 3 Save the settings with **[OK]**.

#### Application

Each product has different reflective properties. In addition, there are various interfering factors which have to be taken into account: agitated product surfaces and foam generation (with liquids); dust generation, material cones and echoes from the vessel wall (with solids). To adapt the sensor to these different conditions, you should first select in this menu item under "*Medium*" either "*Liquid*" or "*Solid*".



Depending on the dielectric figure (dielectric figure or  $\epsilon_r$ ), measured products can have a different reflective property. Therefore an additional selection possibility is available.

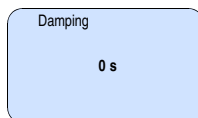
Under "*Sensitivity*" you can select "*Standard (dielectric figure ≥ 2)*" or "*Increased sensitivity (dielectric figure < 2)*".

Through this the sensor is optimally adapted to the product and measurement reliability, particularly in products with poor reflective properties, is considerably increased.

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

#### Damping

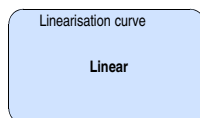
To suppress fluctuations in the measured value display, e. g. caused by an agitated product surface, a damping can be set. This time can be between 0 and 999 seconds. Keep in mind that the reaction time of the entire measurement will then be longer and the sensor will react to measured value changes with a delay. In general, a period of a few seconds is sufficient to smooth the measured value display.



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

#### Linearisation curve

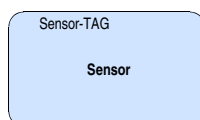
A linearisation is necessary for all vessels in which the vessel volume does not increase linearly with the level - e.g. in a horizontal cylindrical or spherical tank - and the indication or output of the volume is required. Corresponding linearisation curves are preprogrammed for these vessels. They 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*".



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

### Sensor-TAG

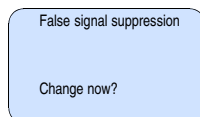
In this menu item you can enter an unambiguous designation for the sensor, e.g. the measurement loop name or the tank or product designation. In digital systems and in the documentation of larger plants, a singular designation should be entered for exact identification of individual measuring points.



With this menu item, the Basic adjustment is finished and you can now jump to the main menu with the **[ESC]** key.

### False signal suppression

High sockets or vessel installations, such as e. g. struts or agitators as well as buildup and weld joints on the vessel walls, cause interfering reflections which can impair the measurement. A false echo storage detects and marks these false echoes, so that they are no longer taken into account for the level measurement. A false echo memory should be created with low level so that all potential interfering reflections can be detected.



Proceed as follows:

- 1 Move from the measured value display to the main menu by pushing **[OK]**.
- 2 Select the menu item "Service" with **[>]** and confirm with **[OK]**. Now the menu item "False signal suppression" is displayed.
- 3 Confirm "False signal suppression - Change now" with **[OK]** and select in the below menu "Create new". Enter the actual distance from the sensor to the product surface. All false signals in this area are detected by the sensor and saved after confirming with **[OK]**.



#### Note:

Check the distance to the product surface, because if an incorrect (too large) value is entered, the existing level will be saved as false signal. The filling level would then no longer be detectable in this area.

## Copy sensor data

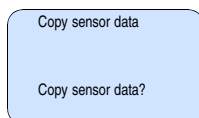
This function enables reading out parameter adjustment data as well as writing parameter adjustment data into the sensor via the indicating and adjustment module. A description of the function is available in the operating instructions manual "*Indicating and adjustment module*".

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

- Measured value presentation
- Adjustment
- Medium
- Vessel form
- Damping
- Linearisation curve
- Sensor-TAG
- Displayed value
- Display unit
- Scaling
- Current output
- Unit of measurement
- Language
- Sensitivity
- Dielectric figure

The following safety-relevant data are **not** read out or written:

- HART mode
- PIN
- SIL
- Sensor length/Sensor type
- False signal suppression



## Reset

### Basic adjustment

If the function "*Reset*" is carried out, the sensor resets the values of the following menu items to the reset values (see chart):<sup>1)</sup>

The following values will be reset:

| Function                           | Reset value                      |
|------------------------------------|----------------------------------|
| Max. adjustment                    | Distance, upper dead zone        |
| Min. adjustment - Rod/Coax version | Distance, supplied sensor length |
| Min. adjustment - Cable version    | Distance, lower dead zone        |
| Damping ti                         | 0 s                              |
| Linearisation                      | Linear                           |
| Sensor-TAG                         | Sensor                           |

<sup>1)</sup> Sensor-specific basic adjustment.

| Function                         | Reset value |
|----------------------------------|-------------|
| Display                          | Distance    |
| Current output - characteristics | 4 ... 20 mA |
| Current output - max. current    | 20 mA       |
| Current output - min. current    | 4 mA        |
| Current output - failure         | < 3.6 mA    |
| Application - rod/coax version   | Liquid      |
| Application - Cable version      | Bulk solid  |

The values of the following menu items are *not* reset to the reset values (see chart) with "**Reset**":

| Menu item | Reset value |
|-----------|-------------|
| Lighting  | No reset    |
| Language  | No reset    |
| SIL       | No reset    |
| HART mode | No reset    |

### Factory setting

Like basic adjustment, but in addition, special parameters are reset to default values.<sup>2)</sup>

### Peak value

The min. and max. values are reset to the actual value.

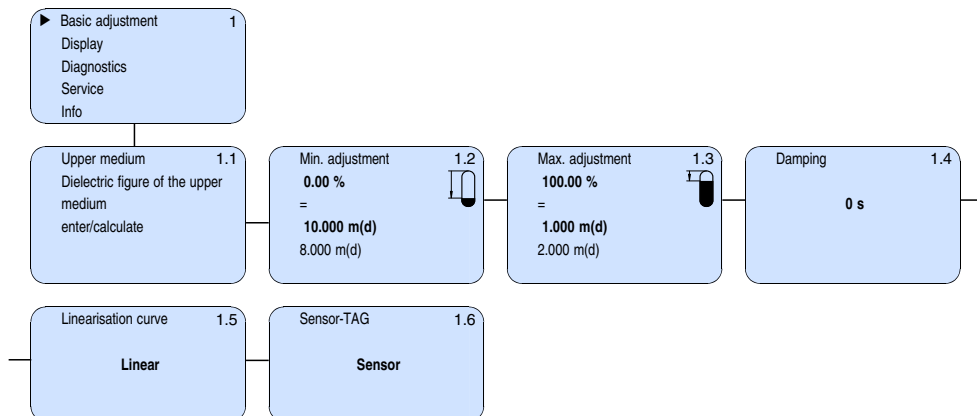
## Optional settings

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*".

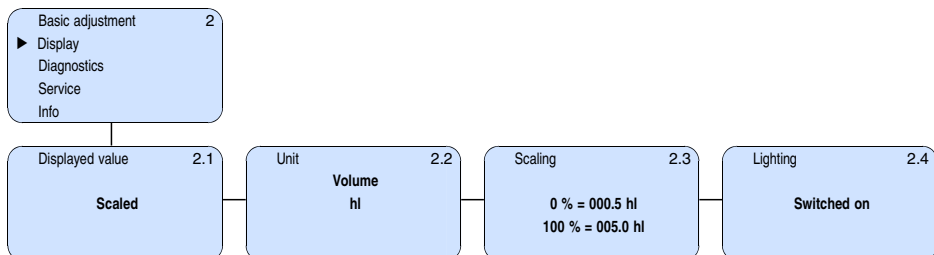
<sup>2)</sup> Special parameters are parameters which are set customer-specifically on the service level with the adjustment software PACTware.

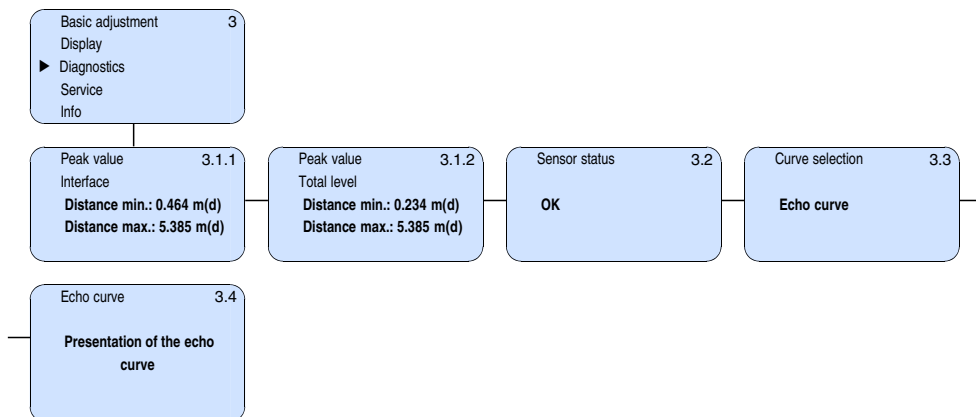
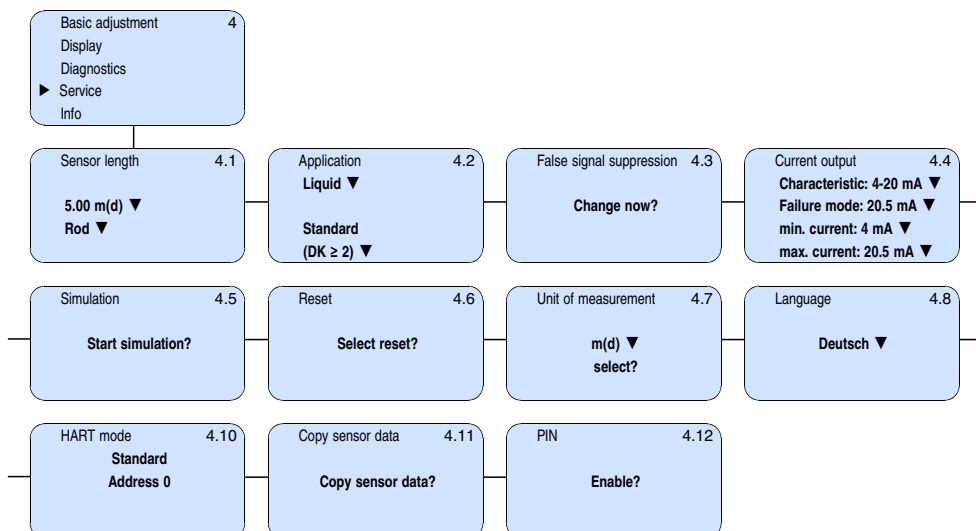
## 6.5 Menu schematic

### Basic adjustment

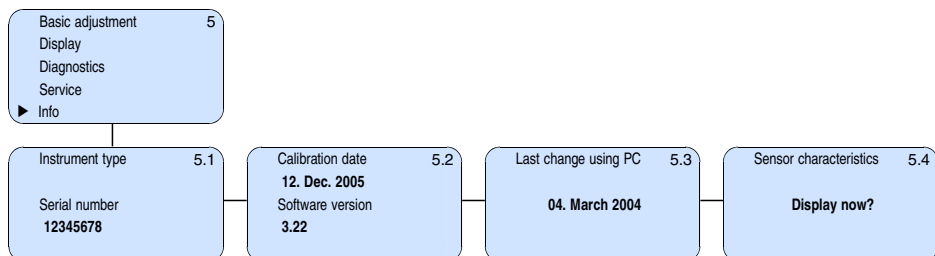


### Display



**Diagnostics****Service**

## Info



## 6.6 Saving the parameter adjustment data

We recommended noting the adjusted data, e.g. in this operating instructions manual, and archiving them afterwards. They are thus available for multiple use or service purposes.

If VEGAFLEX 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

**VEGACONNECT directly on the sensor**

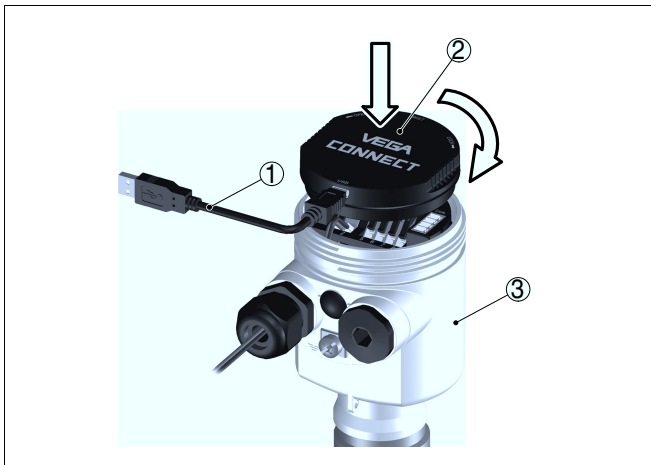


Fig. 12: Connection of the PC via VEGACONNECT directly to the sensor

- 1 USB cable to the PC
- 2 VEGACONNECT
- 3 Sensor

**VEGACONNECT externally**

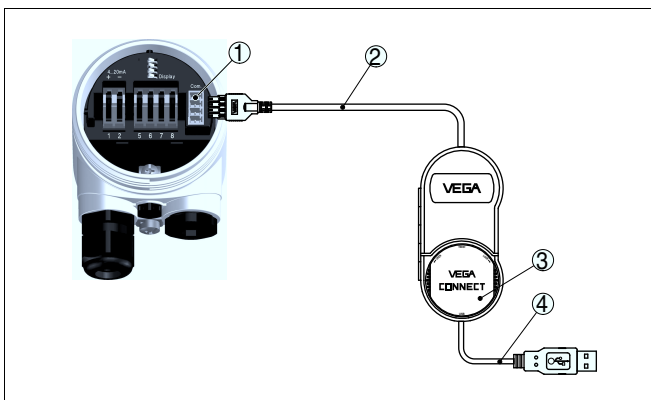


Fig. 13: Connection via VEGACONNECT externally

- 1 I²C bus (com.) interface on the sensor
- 2 I²C connection cable of VEGACONNECT
- 3 VEGACONNECT
- 4 USB cable to the PC

Necessary components:

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

## Connection via HART

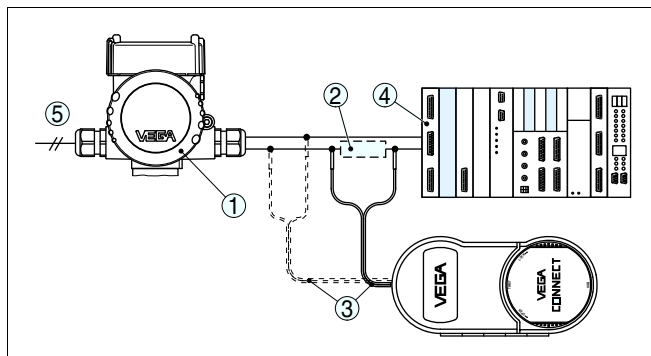


Fig. 14: Connecting the PC via HART to the signal cable

- 1 VEGAFLEX 67
- 2 HART resistance 250  $\Omega$  (optional depending on processing)
- 3 Connection cable with 2 mm pins and terminals
- 4 Processing system/PLC/Voltage supply

Necessary components:

- VEGAFLEX 67
- PC with PACTware and suitable VEGA DTM
- VEGACONNECT 4
- HART resistance approx. 250  $\Omega$
- Power supply unit or processing system



### Note:

With power supply units with integrated HART resistance (internal resistance approx. 250  $\Omega$ ), 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 VEGAFLEX 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](http://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](http://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.

### 8.2 Remove interferences

#### Reaction when malfunctions occur

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

#### Failure reasons

VEGAFLEX 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.

#### Check the 4 ... 20 mA signal

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

| Error                         | Cause                        | Rectification                                                                                                                           |
|-------------------------------|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| 4 ... 20 mA signal not stable | Level fluctuations           | Set damping via the indicating and adjustment module                                                                                    |
| 4 ... 20 mA signal missing    | Electrical connection faulty | Check connection according to chapter " <i>Connection steps</i> " and if necessary, correct according to chapter " <i>Wiring plan</i> " |
|                               | Voltage supply missing       | Check cables for breaks; repair if necessary                                                                                            |

| Error                                                 | Cause                                                 | Rectification                                    |
|-------------------------------------------------------|-------------------------------------------------------|--------------------------------------------------|
|                                                       | 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 in the sensor 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

The indicating and adjustment modules indicates faults via error codes and text messages. The following table describes the error codes with status according to NE 107 and gives information on the causes of failure and their removal:

| Status according to NE 107 | Error code | Text message                          | Cause/Rectification                                                                                                               |
|----------------------------|------------|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| Failure                    | E013       | no measured value available           | Sensor in boot phase                                                                                                              |
|                            |            | no measured value available           | Sensor does not find an echo, e.g. due to faulty installation or wrong parameter adjustment                                       |
|                            |            | no measured value available           | Wrong sensor length entered                                                                                                       |
|                            | E017       | Adjustment span too small             | Adjustment not within the specification. Carry out the adjustment again, increasing the distance between min. and max. adjustment |
|                            | E036       | No operable software                  | Failed or interrupted software update/Repeat software update                                                                      |
|                            | E042       | Hardware error, electronics defective | Exchange the instrument or send it in for repair                                                                                  |
|                            | E043       | Hardware error, electronics defective | Exchange the instrument or send it in for repair                                                                                  |

### Reaction after fault rectification

Depending on the reason for the fault and the measures taken, the steps described in chapter "Set up" may have to be carried out again.

## 8.3 Exchanging the electronics module

If the electronics module is defective, it can be replaced by the user.



In Ex applications only one instrument and one electronics module with respective Ex approval may be used.

If there is no electronics module available on site, one can be ordered from the VEGA agency serving you.

#### Sensor serial number

The new electronics module must be loaded with the settings of the sensor. These are the options:

- At the factory by VEGA
- Or on site by the user

In both cases, the sensor serial number is necessary. The serial numbers are stated on the type label of the instrument, inside the housing or on the delivery note.



#### Information:

When loading on site, first of all the order data must be downloaded from the Internet (see operating instructions manual "*Electronics module*").

#### Assignment

The electronics modules are adapted to the respective sensor and distinguish also in the signal output or power supply.

#### 4 ... 20 mA/HART four-wire

Electronics module FX-E.67V suitable for VEGAFLEX 67 - 4 ... 20 mA/HART four-wire:

- FX-E.67VX (X = without approvals)

## 8.4 Software update

The software version of VEGAFLEX 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](http://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

#### Load sensor software to PC

At "[www.vega.com/downloads](http://www.vega.com/downloads)" go to "Software". Select under "*plics sensors and instruments*", "*Firmware updates*" the respective instrument series and software version. Load the zip file via the right mouse key with "Save target as" e.g. on the desktop of your PC. Move with the right mouse key to the folder and select "Extract all". Save the extracted files, for example on the desktop.

### Prepare update

Connect the signal conditioning instrument to power supply and provide the connection from the PC to the instrument via the interface adapter. Start PACTware and go via the menu "Project" to the *VEGA project assistant*. Select "USB" and "Set instruments online". Activate the project assistant with "Start". The assistant establishes the connection automatically and opens the parameter adjustment window "Sensor # online parameter adjustment". Connect this parameter adjustment window before you carry out further steps.

### Load software into sensor

Select with the right mouse key the sensor in the project and go to "Additional function". Then click to "Software update". The window "Sensor # software update" opens. PACTware checks now the sensor data and displays the actual hardware and software version of the sensor. This takes approximately 60 s.

Push the button "Update software" and select the previously extracted hex file. Then the software update can be started. The additional files are installed automatically. Depending on the sensor, this procedure lasts up to 1 h. Then the message appears "Software update successfully executed".

## 8.5 Instrument repair

If a repair is necessary, please proceed as follows:

You can download a return form (23 KB) from our homepage at [www.vega.com](http://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](http://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

Material 316L corresponds to 1.4404 or 1.4435

#### Materials, wetted parts

|                                                                       |                                                                  |
|-----------------------------------------------------------------------|------------------------------------------------------------------|
| – Process fitting                                                     | PFA and TFM PTFE 1600                                            |
| – Rod: $\varnothing$ 10 mm (0.394 in)                                 | PFA and TFM PTFE 1600                                            |
| – Cable: $\varnothing$ 4 mm (0.157 in) with gravity weight (optional) | PFA and TFM PTFE 1600                                            |
| – Process seal                                                        | On site (instruments with thread: Klingersil C-4400 is attached) |

#### Materials, non-wetted parts

|                                                 |                                                                                 |
|-------------------------------------------------|---------------------------------------------------------------------------------|
| – inner conductor                               | 316L                                                                            |
| – Rod                                           | 316L                                                                            |
| – Cable                                         | 316L                                                                            |
| – Flange                                        | 316L                                                                            |
| – Gravity weight                                | 316L                                                                            |
| – Aluminium die-casting housing                 | Aluminium die-casting AlSi10Mg, powder-coated - basis: Polyester                |
| – Stainless steel housing - precision casting   | 316L                                                                            |
| – Seal between housing and housing cover        | NBR (stainless steel housing, investment casting), silicone (Aluminium housing) |
| – Inspection window in housing cover (optional) | Polycarbonate                                                                   |
| – Ground terminal                               | 316L                                                                            |

Torque of the flange screws (min.) 60 Nm (44.25 lbf ft)

Surface quality (rod, cable)  $R_a < 0.8 \mu\text{m}$

#### Process fittings

|                                                |                                                                                  |
|------------------------------------------------|----------------------------------------------------------------------------------|
| – Pipe thread, cylindrical (DIN 3852-A)        | G $\frac{3}{4}$ A, G1 A, G1 $\frac{1}{2}$ A                                      |
| – American pipe thread, conical (ASME B1.20.1) | $\frac{3}{4}$ NPT, 1 NPT, 1 $\frac{1}{2}$ NPT                                    |
| – Flanges                                      | DIN from DN 25, ANSI from 1"                                                     |
| – hygienic fittings                            | Bolting DN 40 PN 40, Bolting DN 50 PN 25, Tri-Clamp 2" PN 16, Tri-Clamp 3" PN 16 |

#### Weight

|                                                    |                                            |
|----------------------------------------------------|--------------------------------------------|
| – Instrument weight (depending on process fitting) | approx. 0.8 ... 8 kg (0.176 ... 17.64 lbs) |
| – Rod: $\varnothing$ 10 mm (0.394 in)              | approx. 620 g/m (6.7 oz/ft)                |
| – Cable: $\varnothing$ 4 mm (0.157 in)             | approx. 80 g/m (0.86 oz/ft)                |
| – Gravity weight                                   | 325 g (11.5 oz)                            |

## Insulation thickness

- Rod version 2 mm (0.08 in)
- Cable version 0.75 mm (0.03 in)  
On the gravity weight and beginning of the cable:  
2 mm (0.08 in)

## Probe length L (from seal surface), cannot be shortened

- Rod:  $\varnothing$  10 mm (0.394 in) up to 4 m (13.12 ft)
- Trimming accuracy - rod < 1 mm (0.039 in)
- Cable:  $\varnothing$  4 mm (0.157 in) up to 32 m (105 ft)
- Trimming accuracy - cable  $\pm 0.05$  %

Lateral load - rod:  $\varnothing$  10 mm (0.394 in) 4 Nm (3 lbf ft)Max. tensile load with cable:  $\varnothing$  4 mm (0.157 in) 2 kN (450 lbf)**Input variable**

|                                                               |                                                                                                                     |
|---------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| Measured variable                                             | Level of liquids                                                                                                    |
| Min. dielectric figure (lower medium)                         | by 10 higher than the $\epsilon_r$ of the upper medium                                                              |
| Min. layer thickness (upper medium)                           | > 100 mm (3.937 in)<br>The measured value deviates from the actual level until the min. layer thickness is reached. |
| Max. layer thickness (upper medium)                           |                                                                                                                     |
| – Dielectric figure (upper medium) 10                         | 6 m (19.69 ft)                                                                                                      |
| – Dielectric figure (upper medium) 5                          | 10 m (32.81 in)                                                                                                     |
| – Dielectric figure (upper medium) 2                          | 20 m (65.61 in)                                                                                                     |
| Min. dielectric figure (upper medium) with rod, cable version | $\epsilon_r > 1.6$                                                                                                  |

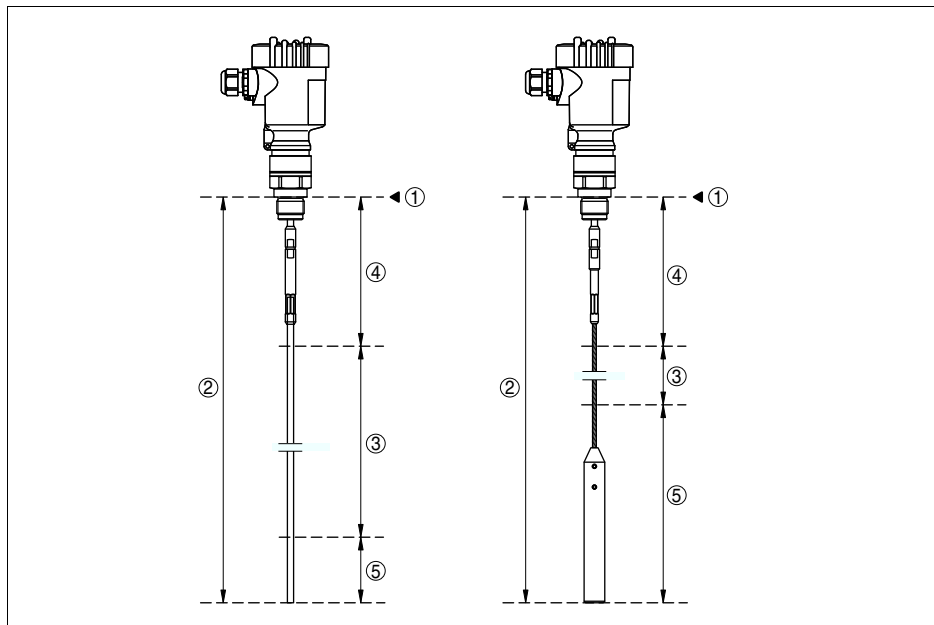


Fig. 15: Measuring ranges of the VEGAFLEX 67 - rod and cable version

- 1 Reference plane
- 2 Probe length
- 3 Measuring range (default setting refers to the measuring range in water)
- 4 Upper dead band (see diagrams under Accuracy - grey section)
- 5 Lower dead band (see diagrams under Accuracy - grey section)

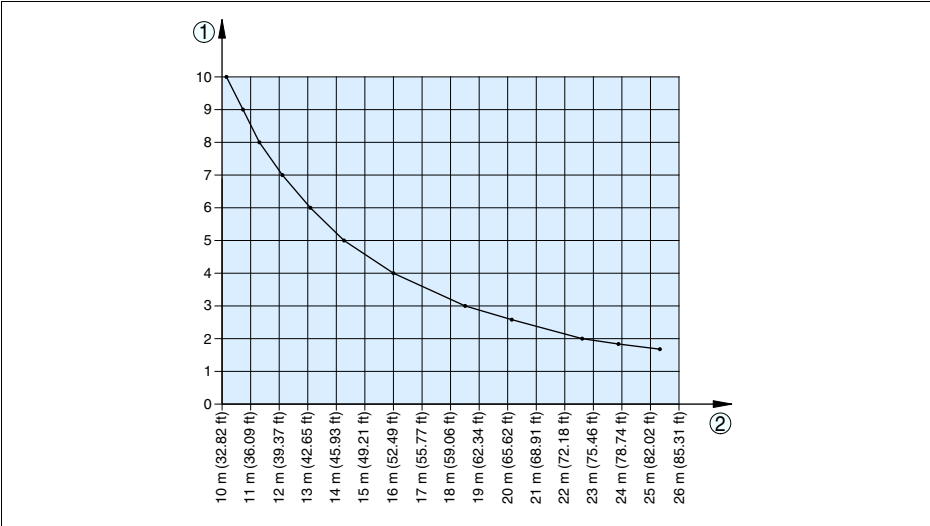


Fig. 16: Relation dielectric figure ( $\epsilon_r$ ) of the upper medium to the max. probe length

- 1 Dielectric figure ( $\epsilon_r$ ) of the upper medium
- 2 Max. probe length

Output variable

|                                            |                                               |
|--------------------------------------------|-----------------------------------------------|
| Output signal                              | 4 ... 20 mA/HART (active)                     |
| Cycle time                                 | min. 1 s (dependent on the parameter setting) |
| Signal resolution                          | 1.6 $\mu$ A                                   |
| Failure signal current output (adjustable) | mA-value unchanged 20.5 mA, 22 mA, < 3.6 mA   |
| Max. output current                        | 22 mA                                         |
| Load                                       | see load diagram under Power supply           |
| Damping (63 % of the input variable)       | 0 ... 999 s, adjustable                       |
| Fulfilled NAMUR recommendations            | NE 43                                         |
| HART output values                         |                                               |
| – HART value (Primary Value)               | Distance to the interface (d1)                |
| – HART value (Secondary Value)             | Height of the interface - scaled (h1)         |
| – HART value (3rd Value)                   | Distance to the level (d2)                    |
| – HART value (4th Value)                   | Height of the level - scaled (h2)             |

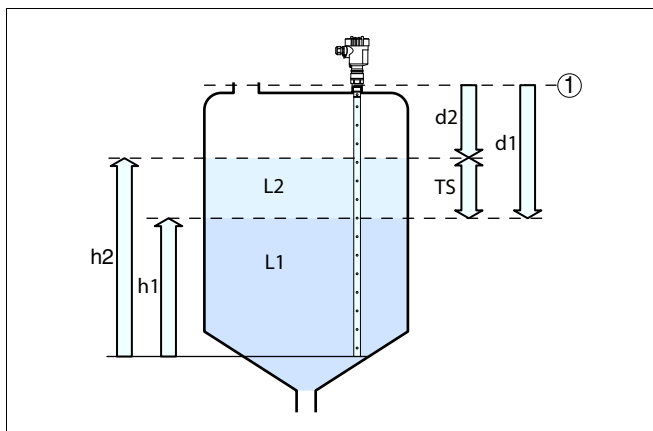


Fig. 17: Interface measurement (interface is between L1 and L2)

- 1 Reference plane
- d1 Distance to the interface (Primary Value)
- d2 Distance to the level (3rd Value)
- TS Thickness of the upper medium ( $d1 - d2$ )
- h1 Height - interface (Secondary Value)
- h2 Height - level (4th Value)
- L1 Lower medium
- L2 Upper medium

Resolution, digital

> 1 mm (0.039 in)

### Accuracy (according to DIN EN 60770-1)

Process reference conditions according to DIN EN 61298-1

- Temperature +18 ... +30 °C (+64 ... +86 °F)
- Relative humidity 45 ... 75 %
- Air pressure +860 ... +1060 mbar/+86 ... +106 kPa  
(+12.5 ... +15.4 psig)
- Emulsion phase < 2 mm (< 0.079 in)

Installation reference conditions

- Min. distance to installations > 500 mm (19.69 in)
- Vessel metallic,  $\varnothing$  1 m (3.281 ft), centric installation, process fitting flush with the vessel ceiling
- Medium Water/Oil (dielectric figure ~2.0)
- Installation Probe end does not touch the vessel bottom

Sensor parameter adjustment

Gating out of false signals carried out  
In bulk solids applications, implementing a false signal suppression is generally not recommended.  
The accuracy of bulk solid applications depends

## Deviation

considerably on the application. Hard and fast accuracy specifications are thus not available.

see diagrams

The accuracy values of the diagrams refer to the interface.

Depending on the installation conditions, there can be deviations which can be rectified with an adaptation of the adjustment or a change of the measured value offset in the DTM service mode.

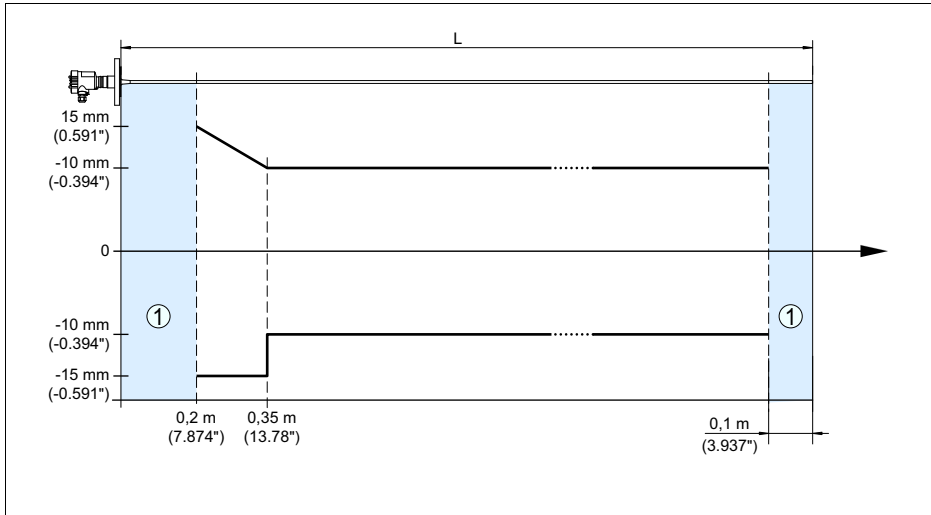


Fig. 18: Deviation VEGAFLEX 67 in rod version

- 1 Dead zone - no measurement possible in this area
- L Probe length

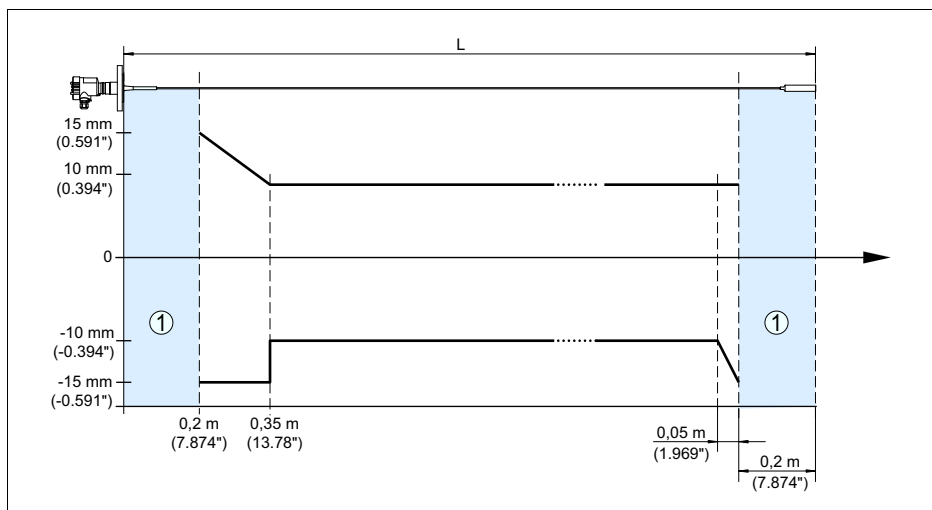


Fig. 19: Deviation VEGAFLEX 67 in cable version

1 Dead zone - no measurement possible in this area

L Probe length

## Influence of the ambient temperature to the sensor electronics

|                                    |                                                                |
|------------------------------------|----------------------------------------------------------------|
| Temperature drift                  | 0.03 %/10 K relating to the max. measuring range or max. 0.3 % |
| Temperature drift - Digital output | 3 mm/10 K relating to the max. measuring range or max. 10 mm   |

## Ambient conditions

|                                            |                                  |
|--------------------------------------------|----------------------------------|
| Ambient, storage and transport temperature | -40 ... +70 °C (-40 ... +158 °F) |
|--------------------------------------------|----------------------------------|

## Process conditions

|                                           |                                                                                                                    |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| Process pressure                          | -0.5 ... +16 bar/-50 ... +1600 kPa (-7.3 ... +232 psig), depending on the process fitting                          |
| - Flange version $\leq 2''/\text{DN } 50$ | -0.2 ... +16 bar/-20 ... +1600 kPa (-2.9 ... +232 psig), depending on the process fitting                          |
| - Flange version $> 2''/\text{DN } 50$    |                                                                                                                    |
| Process temperature (flange temperature)  | -40 ... +150 °C (-40 ... +302 °F)                                                                                  |
|                                           | The measurement error from the process conditions is in the specified pressure and temperature range of below 1 %. |

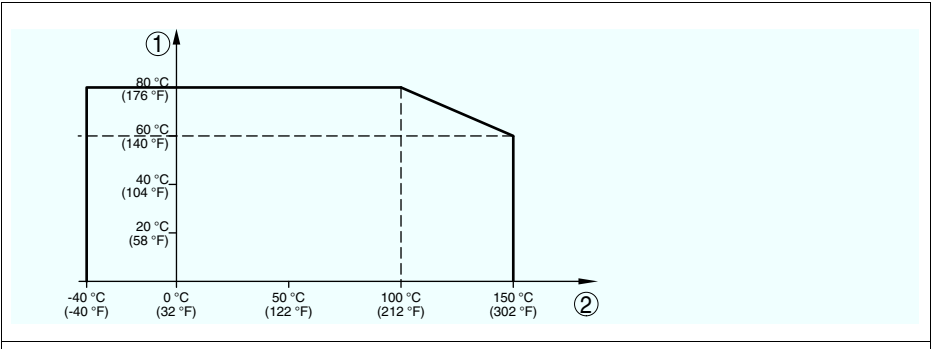


Fig. 20: Ambient temperature - Process temperature

- 1 Ambient temperature
- 2 Process temperature (depending on the seal material)

**Electromechanical data - version IP 66/IP 67**

**Cable entry**

- Double chamber housing
  - 1 x cable gland M20 x 1.5 (cable: ø 5 ... 9 mm), 1 x blind stopper M20 x 1.5; plug M12 x 1 for VEGADIS 61 (optional)
  - or:
  - 1 x closing cap ½ NPT, 1 x blind stopper ½ NPT, plug M12 x 1 for VEGADIS 61 (optional)
  - or:
  - 1 x plug (depending on the version), 1 x blind stopper M20 x 1.5; plug M12 x 1 for VEGADIS 61 (optional)

Spring-loaded terminals for wire cross-section < 2.5 mm<sup>2</sup> (AWG 14)

**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 and Ex-d instrument 20 ... 72 V DC, 20 ... 253 V AC, 50/60 Hz

Max. power consumption 4 VA; 2.1 W

---

**Electrical protective measures**

---

Protection rating IP 66/IP 67

Overvoltage category III

Protection class I

---

**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](http://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](http://www.vega.com) under "Downloads" and "Drawings".

### Housing

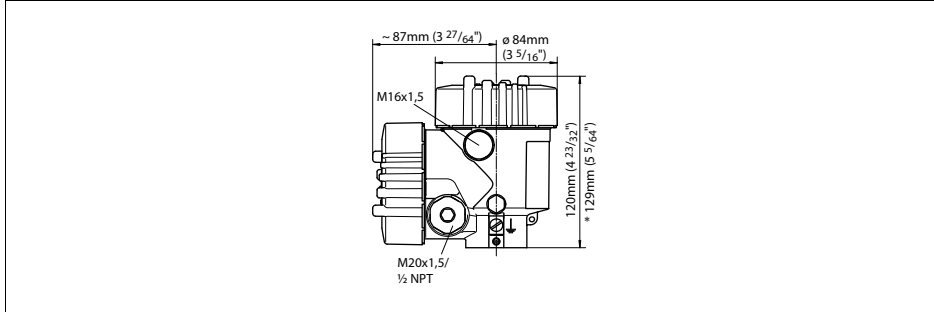


Fig. 21: Double chamber housing (with integrated indicating and adjustment module the housing is 9 mm/0.35 in higher)

# VEGAFLEX 67, flange version

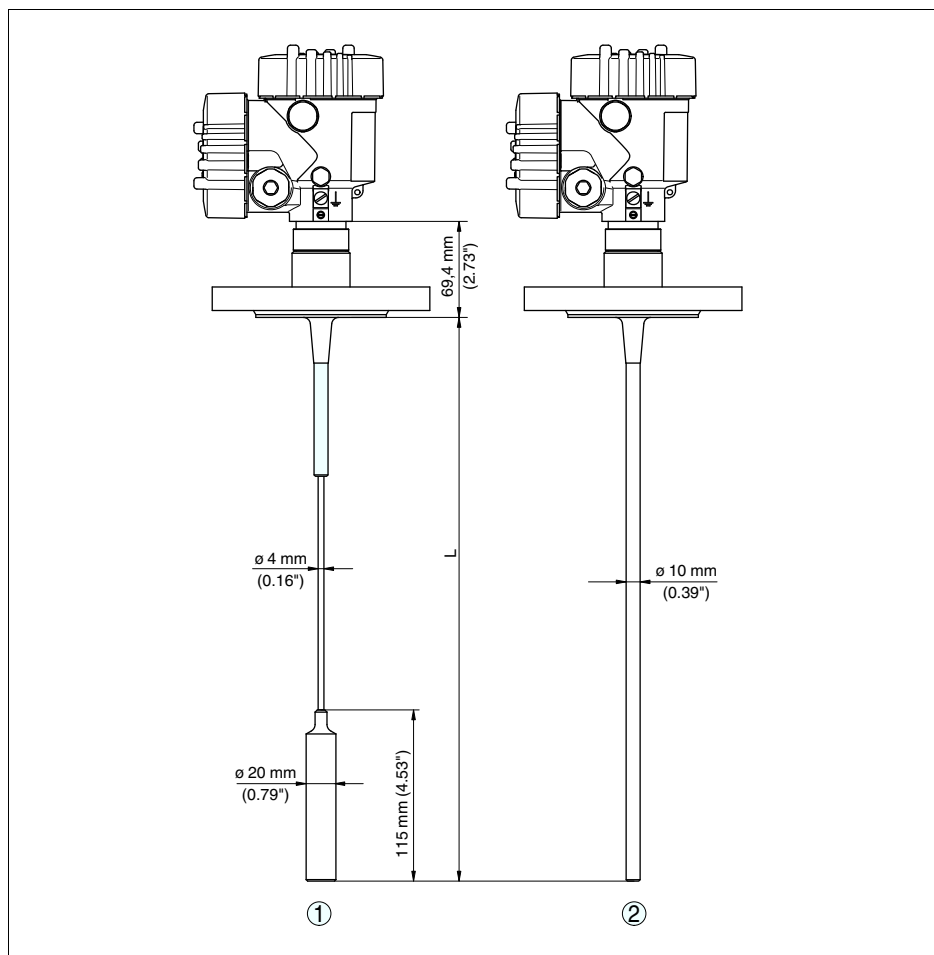


Fig. 22: VEGAFLEX 67, flange version

L Sensor length, see chapter "Technical data"

1 Cable version with flange connection

2 Rod version with flange connection

## VEGAFLEX 67, hygienic versions

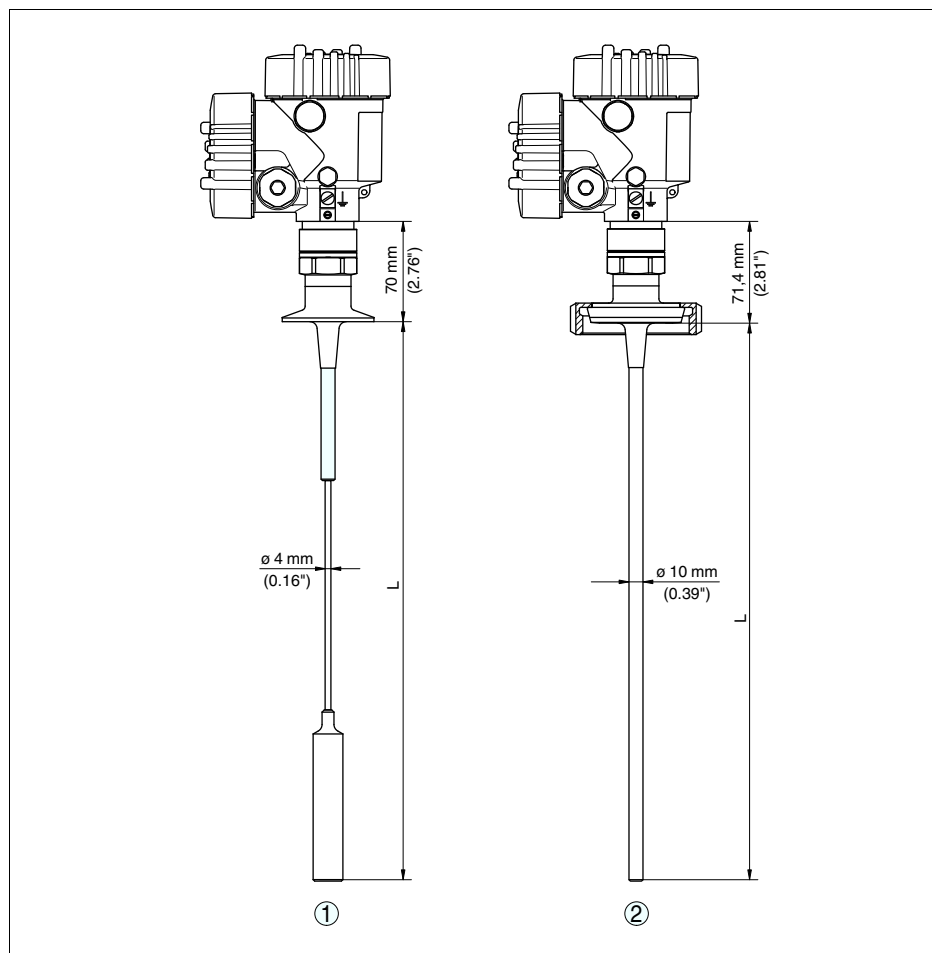


Fig. 23: VEGAFLEX 67, hygienic versions

*L* Sensor length, see chapter "Technical data"

1 Clamp

2 Bolting

### 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.

VEGA Produktfamilien sind weltweit geschützt durch gewerbliche Schutzrechte.

Nähere Informationen unter <http://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 <http://www.vega.com>.

VEGA líneas de productos están protegidas por los derechos en el campo de la propiedad industrial.

Para mayor información revise la pagina web <http://www.vega.com>.

Линии продукции фирмы ВЕГА защищаются по всему миру правами на интеллектуальную собственность.

Дальнейшую информацию смотрите на сайте <http://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<<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.







Printing date:

VEGA Grieshaber KG  
Am Hohenstein 113  
77761 Schiltach  
Germany  
Phone +49 7836 50-0  
Fax +49 7836 50-201  
E-mail: [info.de@vega.com](mailto:info.de@vega.com)  
**[www.vega.com](http://www.vega.com)**

For more VEGA product please visit: [www.ainstru.com](http://www.ainstru.com)

Mail: [Sales@ainstru.com](mailto:Sales@ainstru.com)



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.

© VEGA Grieshaber KG, Schiltach/Germany 2012