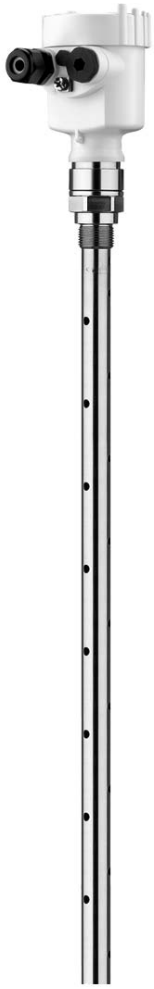
Interface measurement
in liquids

Guided microwave

# VEGAFLEX 67

## Product Information

VEGA

# Contents



**Take note of safety instructions for Ex applications**

With Ex applications, please note the Ex-specific safety information on our homepage www.vega.com\services\downloads and in the documentation that comes with every instrument. In hazardous areas you should take note of the appropriate regulations, conformity and type approval certificates of the sensors and power supply units. The sensors must only be operated on intrinsically safe circuits. The permissible electrical values are stated in the certificate.

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# 1 Description of the measuring principle

**Measuring principle**

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

A microprocessor identifies these level echoes, which are subsequently measured by the ECHOFOX software, evaluated and converted into level information.

Thanks to the simple measuring principle, time-consuming adjustment with medium is no longer necessary. The instruments are pre-set to the ordered probe length. Because their rods or cables can be shortened, the sensors can be adapted individually to the local requirements.

**Wide application range**

With meas. ranges up to 32 m (105 ft) the sensors are also suitable for tall vessels. Temperatures up to 150 °C and pressures from vacuum up to 40 bar cover a wide range of applications.

**Interface measurement**

VEGAFLEX 67 is particularly suitable for interface measurement of liquids. The mechanical configuration as well as the electronics were optimised for this application.

Due to its guide tube, the coax version is not influenced by vessel installations and measures reliably products with low DK value. Therefore this instrument version is preferred.

Several different probes are available

- Cable measuring probes - for applications in tall vessels up to 32 m
- Rod measuring probes - for applications in vessels up to 4 m
- Coax measuring probes - for applications in low viscosity liquids, with vessel installations, in vessels up to 6 m

**Prerequisites for interface measurement**

**Upper medium (L2)**

- The upper medium must not be conductive
- The dielectric value of the upper medium must be known (input necessary). Min. dielectric values: Rod version 1.7, coax version 1.4. You will find a list of the dielectric values on our homepage: 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
- The layer can be only measured when it has a thickness upwards of 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 value must be 10 higher than the dielectric value of the upper medium - preferably electrically conductive. Example: upper medium dielectric value 2, lower medium at least dielectric value 12

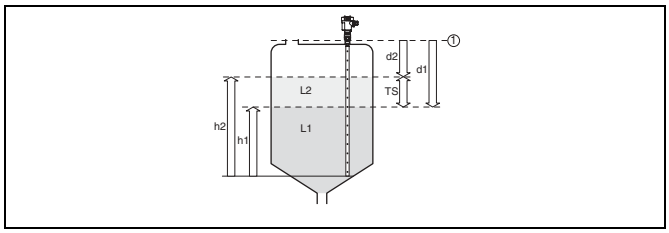


*Fig. 1: Interface measurement*

*1 Reference plane*
*d1 Distance to the interface (HART value 1 or Primary Value)*
*d2 Distance to the level (HART value 3 or Third Value)*
*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) transfers the height of the interface (h1) in percent. This is also the value that is adjusted.

The instrument is supplied with the sensor length and upper dead band (0 %/100 %) already adjusted.

The display of PLICSCOM and PACTware™ outputs the distance to the interface (d1) in m(d) and to the level (d2) in m(d) (m - distance).

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 evaluated with a VEGAMET 625 or any HART communication-based processing system such as e.g. interface modules. VEGAMET 625 can also generate the difference of the two values. This difference corresponds to the layer thickness of the upper medium.

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# 2 Type overview

| | VEGAFLEX 67 with rod measuring probe | VEGAFLEX 67 with cable measuring probe | VEGAFLEX 67 with coax measuring probe |
|---|---|---|---|
| |  |  |  |
| Application: | Liquids | Liquids | Liquids |
| Measuring range: | 0.15 … 4 m (0.5 … 13 ft) | 0.15 … 32 m (0.5 … 105 ft) | 0.05 … 6 m (0.5 … 20 ft) |
| Process fitting: | Thread, flange | Thread, flange | Thread, flange |
| Material: | 316L and PCTFE, Hastelloy C22 (2.4602) | 316L and PCTFE, 316 (1.4401) | 316L and PCTFE, Hastelloy C22 (2.4602) and PTFE (TFM 4105) |
| Process temperature: | -40 … +150 °C (-40 … +302 °F) | -40 … +150 °C (-40 … +302 °F) | -40 … +150 °C (-40 … +302 °F) |
| Process pressure: | -1 … 40 bar/-100 … 4000 kPa (-14.5 … 580 psi) | -1 … 40 bar/-100 … 4000 kPa (-14.5 … 580 psi) | -1 … 40 bar/-100 … 4000 kPa (-14.5 … 580 psi) |
| Signal output: | 4 … 20 mA/HART two-wire, four-wire, Profibus PA, Foundation Fieldbus | 4 … 20 mA/HART in two-wire, four-wire technology, Profibus PA, Foundation Fieldbus | 4 … 20 mA/HART in two-wire, four-wire technology, Profibus PA, Foundation Fieldbus |

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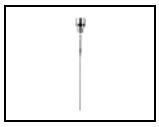
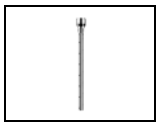
| | | | | |
|---|---|---|---|---|
| **Indicating and adjustment module** |  PLICSCOM | | | |
| **Housing** |  Plastic |  Stainless steel |  Aluminium |  Aluminium (double chamber) |
| **Electronics** |  4 … 20 mA/ HART two-wire |  4 … 20 mA/ HART four-wire |  Profibus PA |  Foundation Fieldbus |
| **Process fitting** |  Thread |  Flanges | | |
| **Sensors** |  Rod probe |  Cable probe |  Coax probe | |
| **Approvals** |  Gas explosion protection | | | |

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# 3 Mounting information

**Measuring range**
The reference plane for the measuring range of the sensors is the seal surface of the thread or flange.

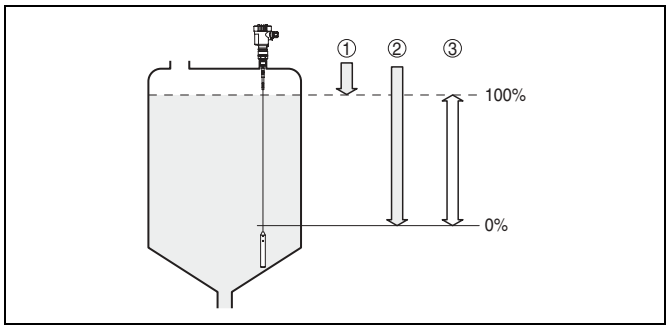


*Fig. 2: Measuring range (operating range) and max. measuring distance*

*1 full*
*2 empty (max. measuring distance)*
*3 Measuring range*

Make sure that a min. distance is maintained below the reference plane and if necessary at the probe end, where measurement is not possible (dead band). Keep in mind that the cable length cannot be used down to the end because measurement around the gravity weight is not possible. These min. distances (dead band areas) are specified in the "*Technical data*" in the "*Supplement*".

**Pressure/Vacuum**
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. The max. permissible pressure is stated in the "*Technical data*" or on the type label of the sensor.

**Installation position**
Mount VEGAFLEX so that the probe does not touch any installations or the vessel wall during operation. If necessary, fasten the probe end.

If such an installation location cannot be avoided, use a coax meas. probe - this type is not affected by such installation conditions.

When mounting the cable and rod versions of VEGAFLEX keep at least a distance of 300 mm to vessel installations or the vessel wall.

The rod probe must end approx. 3 cm above the vessel bottom, so that there is no contact with the vessel wall.

VEGAFLEX can be also mounted in standpipes or bypass tubes. Make sure that the probe does not touch the tube during operation. The tube must have an inner diameter between 25 and 300 mm.

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 vessel bottom. When using the cable version, remember that measurement down to the end of the probe not possible. The exact value of the min. distance (lower dead band) is stated in the "*Technical data*" in the "*Supplement*".

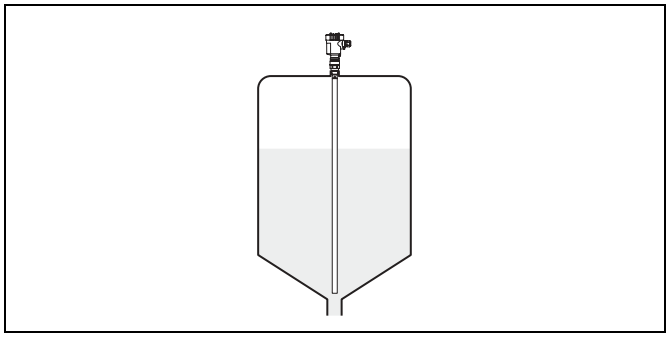

*Fig. 3: Vessel with conical bottom*

**Socket**
In general, sockets do not influence the measurement. Under extreme conditions, e.g. in liquids with low dielectric value (<2) and applications with high, wide sockets (e.g. >DN 100, h>200) the upper dead band is extended by the socket height. If both conditions apply, we recommended using the smallest possible socket.

Avoid using vessel sockets, i.e. mounting bosses. If possible, mount the sensor flush with the vessel top. If this is not possible, use short sockets with small diameter.

If a socket is absolutely necessary, then the use of a coax probe is recommended. Due to the coax guide tube, sockets do not influence measurement accuracy.

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

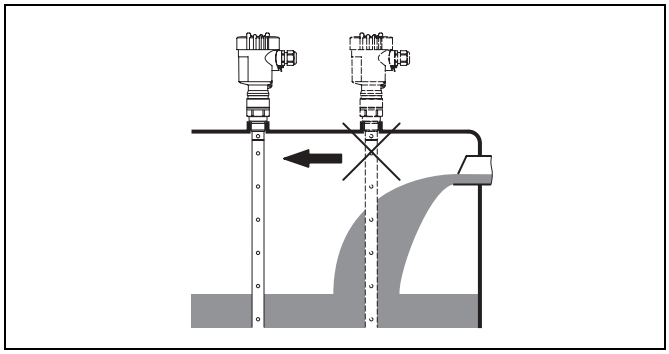

*Fig. 4: Lateral load*

**Fasten**
If the probe can touch the vessel wall during operation due to product movements or agitators etc., the probe should be strained.

There is a thread (M12) in the gravity weight, e.g. for a lug (article no. 2.27423).

Make sure that the probe cable is not extremely taut. Avoid tensile loads on the cable. Use a slightly pre-stressed tension spring to fasten the cable.

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Avoid indeterminable cable-vessel-connections, i.e. the connection must be either grounded or isolated reliably. Any deviation from this requirement will cause measurement errors.

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# 4 Electrical connection

## 4.1 General requirements

The supply voltage range can differ depending on the instrument version. The exact range is stated in the "*Technical data*".

Take note of country-specific installation standards (e.g. the VDE regulations in Germany) as well as prevailing safety regulations and accident prevention rules.

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

## 4.2 Voltage supply

**4 … 20 mA/HART two-wire**
Power supply and current signal are carried over the same two-wire connection cable. The requirements on the power supply are stated in the Technical data of this Product Information manual.

The VEGA power supply units VEGATRENN 149AEx, VEGASTAB 690, VEGADIS 371 as well as the VEGAMET signal conditioning instruments are suitable for power supply. When one of these instruments is used, a reliable separation of the supply circuit from the mains circuits acc. to DIN VDE 0106 part 101 and protection class II is ensured.

**4 … 20 mA/HART four-wire**
Power supply and current output are carried on two separate connection cables.

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

The 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 conductor terminal.

**Profibus PA**
Power is supplied by a Profibus DP/PA segment coupler or a VEGALOG 571 EP input card.

**Foundation Fieldbus**
Power supply via the H1 Fieldbus cable.

## 4.3 Connection cable

**General**
The sensors are connected with standard cable without screen. An outer cable diameter of 5 … 9 mm ensures the seal effect of the cable entry.

**4 … 20 mA/HART two-wire and four-wire**
If electromagnetic interference is expected which is above the test values of EN 61326 for industrial areas, screened cable should be used. In HART multidrop mode the use of screened cable is generally recommended.

**Profibus PA, Foundation Fieldbus**
The installation must be carried out acc. to the appropriate bus specification. VEGAFLEX is connected respectively with screened cable acc. to the bus specification. Make sure that the bus is terminated via appropriate terminating resistors.

For the power supply, an approved installation cable with PE conductor is also necessary.

In Ex applications, the corresponding installation regulations must be noted for the connection cable.

## 4.4 Connection of the cable screen and grounding

If screened cable is necessary, the cable screen must be connected on both ends to ground potential. If potential equalisation currents are expected, the connection on the evaluation side must be made via a ceramic capacitor (e.g. 1 nF, 1500 V).

**Profibus PA, Foundation Fieldbus**
In systems with potential separation, the cable screen is connected directly to ground potential on the power supply unit, in the connection box and directly on the sensor.

In systems without potential equalisation, connect the cable screen directly to ground potential only at the power supply unit and at the sensor - do not connect to ground potential in the connection box or T-distributor.

## 4.5 Wiring plans

**Single chamber housing**

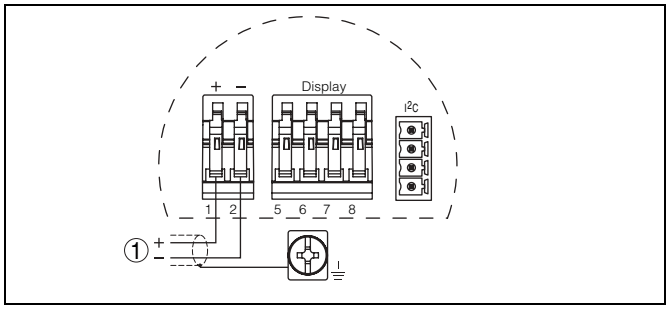


*Fig. 5: Connection HART two-wire, Profibus PA, Foundation Fieldbus*

*1 Power supply and signal output*

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### Double chamber housing - two-wire

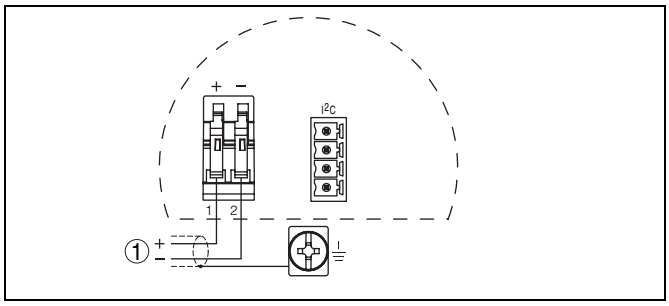


*Fig. 6: Connection HART two-wire, Profibus PA, Foundation Fieldbus*

*1 Power supply and signal output*

### Double chamber housing - 4 … 20 mA/HART four-wire

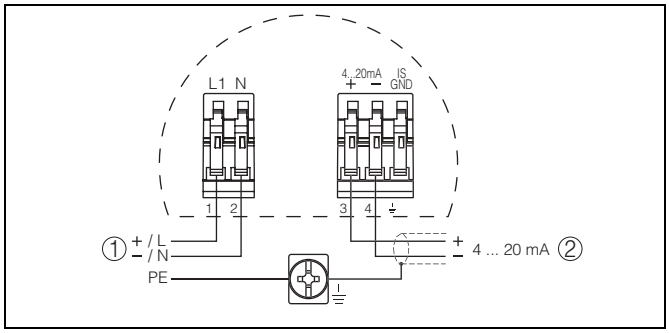


*Fig. 7: Connection 4 … 20 mA/HART four-wire*

*1 Voltage supply*
*2 Signal output*

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# 5 Adjustment

## 5.1 Overview

VEGAFLEX can be adjusted with the following adjustment media:
- the indicating and adjustment module PLICSCOM
- an adjustment software acc. to FDT/DTM standard, e.g. PACTware™ and PC

and, depending on the signal output, also with:
- a HART handheld (4 … 20 mA/HART)
- the adjustment program AMS (4 … 20 mA/HART and Foundation Fieldbus)
- the adjustment program PDM (Profibus PA)
- a configuration tool (Foundation Fieldbus)

The entered parameters are generally saved in VEGAFLEX, optionally also in PLICSCOM or in the adjustment program.

## 5.2 Compatibility acc. to NAMUR NE 53

VEGAFLEX meet NAMUR recommendation NE 53. VEGA instruments are generally upward and downward compatible:
- Sensor software for DTM VEGAFLEX HART, PA or FF
- DTM VEGAFLEX for adjustment software PACTware™
- adjustment module PLICSCOM for sensor software

The parameter adjustment of the basic sensor functions is independent of the software version. The range of available functions depends on the respective software version of the individual components.

## 5.3 Adjustment with the indicating and adjustment module PLICSCOM

**Setup and indication**

PLICSCOM is a pluggable indication and adjustment module for plics® sensors. It can be placed in four different positions on the instrument (each displaced by 90°). Indication and adjustment are made via four keys and a clear, graphic-capable dot matrix indication. The adjustment menu with language selection is clearly structured and enables easy setup. After setup, PLICSCOM serves as indicating instrument: through the screwed cover with glass insert, measured values can be read directly in the requested unit and presentation.

Depending on the hardware version of PLICSCOM or the respective sensor electronics, an integrated backlight can be switched on via the adjustment menu.[1)]

**PLICSCOM adjustment**

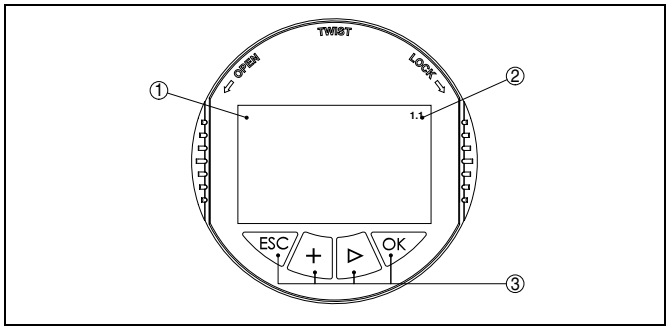


*Fig. 8: Indicating and adjustment elements*

*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
  - list entry
  - editing position
- ***[+]*** key:
  - modify value of a parameter
- ***[ESC]*** key:
  - interrupt input
  - jump to the next higher menu

## 5.4 Adjustment with PACTware™

**PACTware™/DTM**

Independent of the signal output 4 … 20 mA/HART, Profibus PA or Foundation Fieldbus, the VEGAFLEX sensors can be operated directly on the instrument via PACTware™. An instrument driver for the respective VEGAFLEX is necessary for the adjustment with PACTware™. All currently available VEGA DTMs are composed as DTM Collection with the current PACTware™ version on a CD. They are available for a protective fee from our respective VEGA agency. In addition, this DTM Collection incl. PACTware™ can be downloaded free-of-charge in the basic version via the Internet.

To use the entire range of functions of a DTM, incl. project documentation, a DTM licence is required for that particular instrument family. This licence can be bought from the VEGA agency serving you.

**Connecting the PC directly to the sensor**

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1) This function is for instruments with StEx, WHG or ship approval as well as country-specific approvals such as those acc. to FM or CSA, available at a later date.

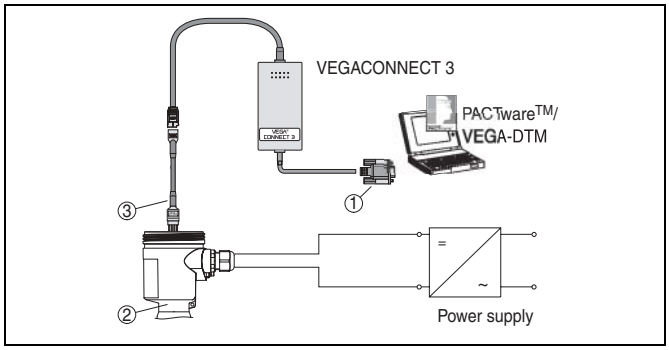


*Fig. 9: PC connected directly to the sensor*

*1 RS232 connection*
*2 VEGAFLEX*
*3 I²C adapter cable for VEGACONNECT 3*

To adjust with PACTware™, a VEGACONNECT 3 with I²C adapter cable (art. no. 2.27323) as well as a power supply unit necessary in addition to the PC and the suitable VEGA-DTM.

**Connecting the PC to the signal cable (4 … 20 mA/HART)**

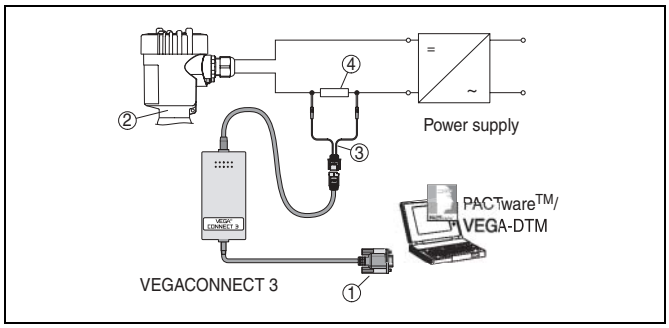


*Fig. 10: Connecting the PC to the signal cable*

*1 RS232 connection*
*2 VEGAFLEX*
*3 HART adapter cable for VEGACONNECT 3*
*4 HART resistance 250 Ohm*

To adjust with PACTware™, a VEGACONNECT 3 with HART adapter cable (art. no. 2.25397) as well as a power supply unit and a HART resistor with approx. 250 Ohm is required in addition to the PC and the suitable VEGA DTM.

**Note:**
With power supply units with integrated HART resistance (internal resistance approx. 250 Ohm), an additional external resistance is not necessary. This applies, e.g. to the VEGA instruments VEGATRENN 149A, VEGADIS 371, VEGAMET 381. Also standard Ex separators are most of the time equipped with a sufficiently high current limitation resistor. In such cases, VEGACONNECT 3 can be connected in parallel to the 4 … 20 mA cable.

**Connecting the PC to the signal cable (4 … 20 mA/HART four-wire)**

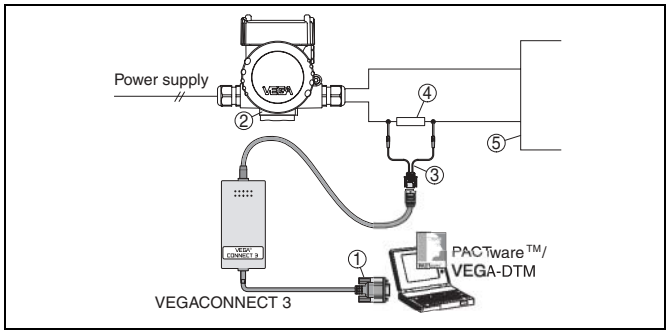


*Fig. 11: Connecting the PC to the signal cable*

*1 RS232 connection*
*2 VEGAFLEX*
*3 HART adapter cable for VEGACONNECT 3*
*4 HART resistance 250 Ohm*
*5 4 … 20 mA processing*

To adjust with PACTware™, a VEGACONNECT 3 with HART adapter cable (art. no. 2.25397) and a HART resistor with approx. 250 Ohm is required in addition to the PC and the suitable VEGA DTM.

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# 6 Technical data

## General data

Materials, wetted parts

| | |
|---|---|
| – Process fitting - cable version | 316L and PTFE (TFM 4105) |
| – Process fitting - rod version | 316L and PCTFE, Hastelloy C22 (2.4602) and PCTFE |
| – Process fitting - coax version | 316L and PCTFE, Hastelloy C22 (2.4602) and PCTFE |
| – Cable (ø 4 mm/0.16 in) | 316 |
| – Rod (ø 6 mm/0.24 in) | 316L, Hastelloy C22 (2.4602) |
| – Coax tube (ø 21.3 mm/0.84 in) | 316L, Hastelloy C22 (2.4602) |

**Seal material**

Seal

| | |
|---|---|
| – Cable and rod version | Viton, Kalrez 6375, EPDM, Viton FEP-coated (instruments with thread: Klingersil C-4400) |
| – Coax version | Kalrez 6375 |

**Materials, non-wetted parts**

Materials, non-wetted parts

| | |
|---|---|
| – Housing | plastic PBT (Polyester), Alu-die casting powder-coated, 316L |
| – Seal between housing and housing cover | NBR (stainless steel housing), silicone (Alu/plastic housing) |
| – Inspection window in housing cover for PLICSCOM (optional) | Polycarbonate |
| – Ground terminal | 316Ti/316L |

**Weights**

Weights

| | |
|---|---|
| – Plastic housing | 760 g (27 oz) |
| – Aluminium housing | 1170 g (41 oz) |
| – Aluminium double chamber housing | 1470 g (52 oz) |
| – Stainless steel housing | 1530 g (54 oz) |
| – Cable (ø 4 mm/0.16 in) | approx. 80 g/m (0.86 oz/ft) |
| – Rod (ø 6 mm/0.24 in) | approx. 220 g/m (2.4 oz/ft) |
| – Tube (ø 21.3 mm/0.84 in) | approx. 1000 g/m (10.8 oz/ft) |
| – gravity weight (only with cable version) | approx. 325 g (11.5 oz) |

**Lengths**

Lengths (L)

| | |
|---|---|
| – Cable (ø 4 mm/0.16 in) | 1 … 32 m (3.3 … 105 ft) |
| – Rod (ø 6 mm/0.24 in) | 0.3 … 4 m (1 … 13 ft) |
| – Tube (ø 21.3 mm/0.84 in) | 0.3 … 6 m (1 … 20 ft) |

**Lateral load**

Lateral load

| | |
|---|---|
| – Rod (ø 6 mm/0.24 in) | 4 Nm (3 lbf ft) |
| – Tube (ø 21.3 mm/0.84 in) | 60 Nm (44 lbf ft) |

**Max. tensile load**

Max. tensile load

| | |
|---|---|
| – (cable-ø 4 mm/0.16 in) | 5 KN |

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## Output variable

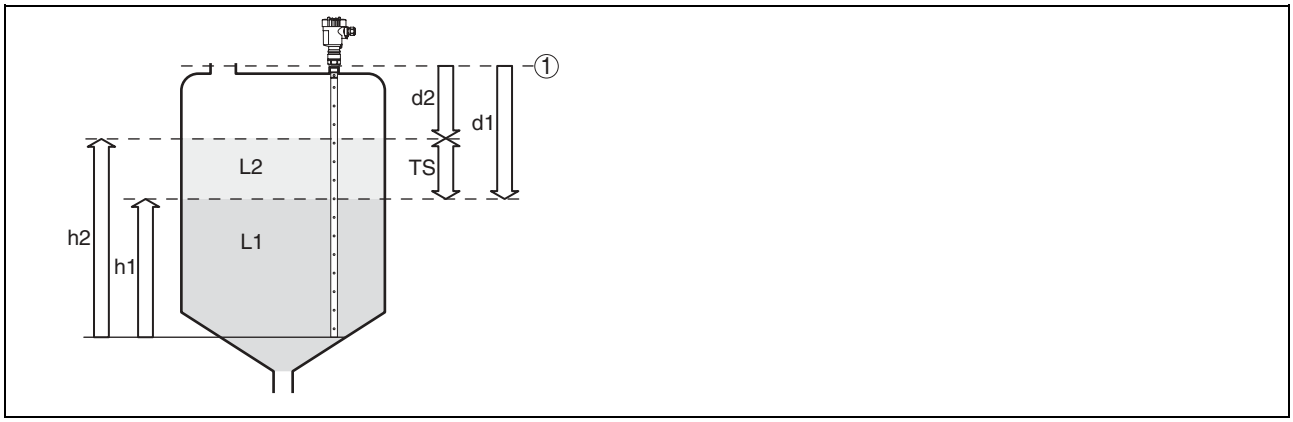


*Fig. 12: Interface measurement*

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

**4 … 20 mA/HART**

| | |
|---|---|
| Output signal | 4 … 20 mA/HART |
| HART specification | |
| – d1 | Distance to the interface (HART value 1 or Primary Value) |
| – d2 | Distance to the level (HART value 3 or Third Value) |
| Resolution | 1.6 µA |
| Fault signal | current output unchanged, 20.5 mA, 22 mA, <3.6 mA (adjustable) |
| Current limitation | 22 mA |
| Load | |
| – four-wire sensor | max. 500 Ohm[2)] |
| – two-wire sensor | see load diagram under Power supply |
| Integration time | 0 … 999 s, adjustable |
| Fulfilled NAMUR recommendation | NE 43 |

**Profibus PA**

| | |
|---|---|
| Output signal | digital output signal, format acc. to IEEE-754 |
| – Sensor address | 126 (default setting) |
| HART specification | |
| – d1 | Distance to the interface (HART value 1 or Primary Value) |
| – d2 | Distance to the level (HART value 3 or Third Value) |
| Current value | constantly 10 mA; ±0.5 mA |
| Integration time | 0 … 999 s, adjustable |

**Foundation Fieldbus**

| | |
|---|---|
| Output | |
| – Signal | digital output signal, Foundation Fieldbus protocol |
| – Physical layer | acc. to IEC 61158-2 |
| HART specification | |
| – d1 | Distance to the interface (HART value 1 or Primary Value) |
| – d2 | Distance to the level (HART value 3 or Third Value) |

[2)] With inductive load, ohmic share at least 25 Ohm/mH.

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| | |
|---|---|
| Channel Numbers | |
| – Channel 1 | Primary value |
| – Channel 2 | Secondary value 1 |
| – Channel 3 | Secondary Value 2 |
| – Channel 4 | Temperature Value[3] |
| Current value | 10 mA; ±0.5 mA |

## Input variable

| | |
|---|---|
| Parameter | Interface measurement of liquids |
| Min. dielectric figure (lower medium) | by 10 higher than Er of the upper medium |
| Min. measured layer thickness (upper medium) | >100 mm (>3.9 in) |
| Min. dielectric figure (upper medium) - coax version | Er >1.4 |
| Dead zone - coax version (ø 21.3 mm/0.84 in) | |
| – top | 30 mm (1.2 in) |
| – bottom | 0 mm |

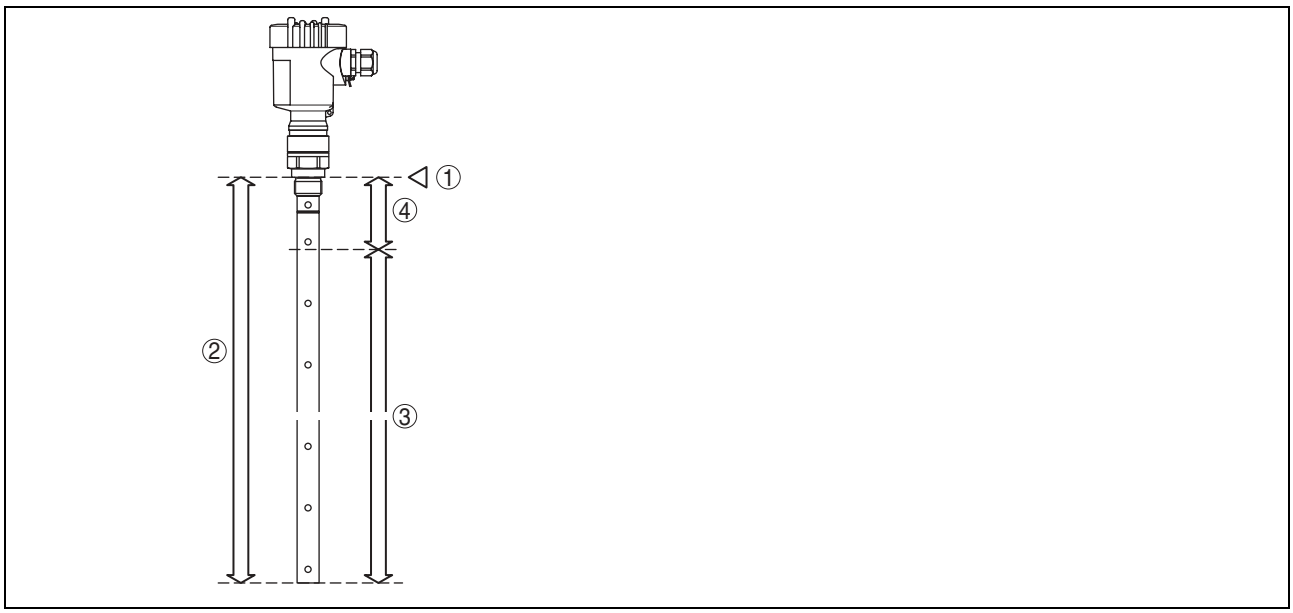


*Fig. 13: Measuring ranges of the VEGAFLEX - coax version*

*1 Reference plane*
*2 Probe length*
*3 Measuring range*
*4 Upper dead band*

| | |
|---|---|
| Min. dielectric figure (upper medium) - rod, cable version | Er >1.6 |
| Dead zone - rod version (ø 6 mm/0.24 in) | |
| – top | 80 mm (3.1 in) |
| – bottom | 0 mm |
| Dead zone - cable version (ø 4 mm/0.16 in) | |
| – top | 80 mm (3.1 in) |
| – bottom | 250 mm (9.8 in) (gravity weight + 100 mm) |

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[3] Only with sensors with integrated temperature measurement.

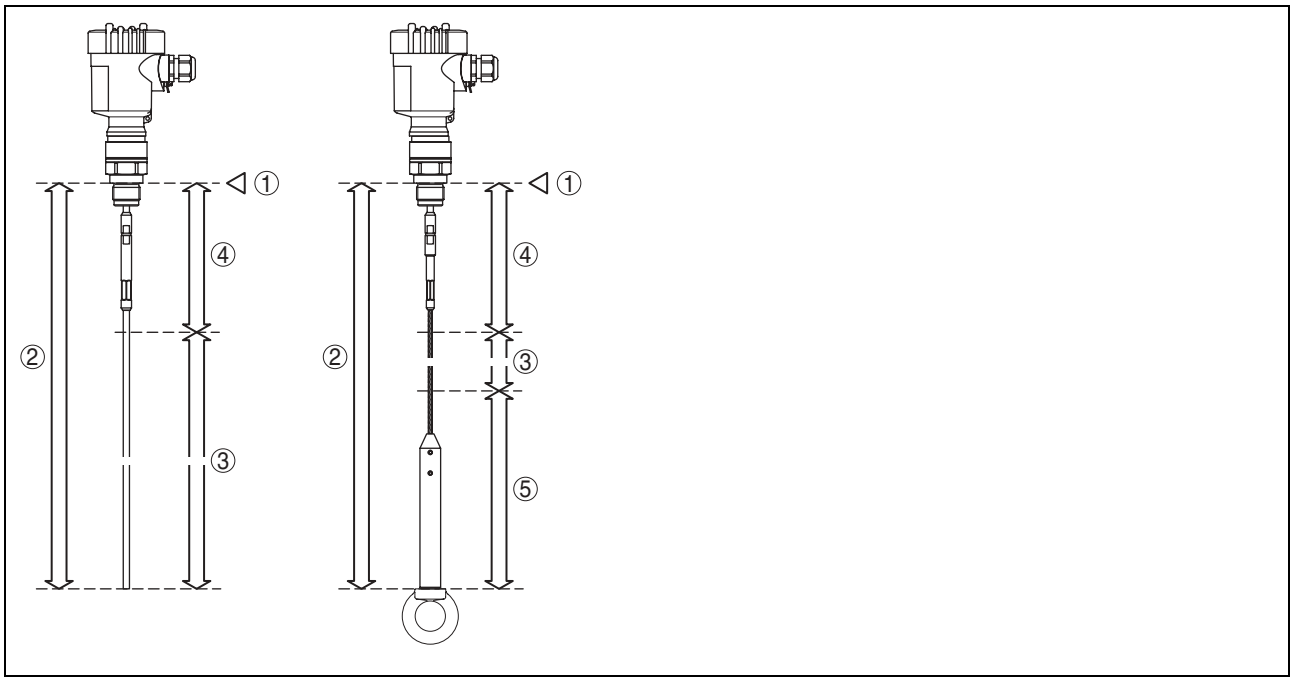


*Fig. 14: Measuring ranges of the VEGAFLEX - rod and cable version*

*1 Reference plane*
*2 Probe length*
*3 Measuring range*
*4 Upper dead band*
*5 Lower dead band (only with cable versions)*

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

| | |
|---|---|
| Reference conditions acc. to DIN EN 61298-1 | |
| – Temperature | +18 … +30 °C (+64 … +86 °F) |
| – Relative humidity | 45 … 75 % |
| – Atmospheric pressure | 860 … 1060 mbar/86 … 106 kPa (12.5 … 15.4 psi) |

## Characteristic curve deviation and measurement characteristics

| | |
|---|---|
| Reference installation conditions | |
| – Flanges | DN 100 |
| – min. distance to installations | 500 mm (20 in) |
| Reference reflector | Metal plate ø 1 m (40 in) |
| Temperature drift (current output) | 0.06 %/10 K relating to the max. measuring range |
| Accuracy | see diagrams |

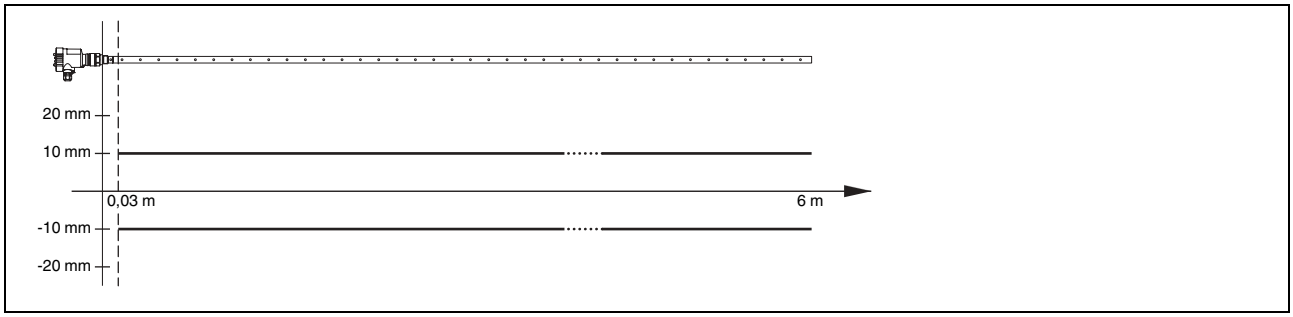


*Fig. 15: Accuracy VEGAFLEX - coax version*

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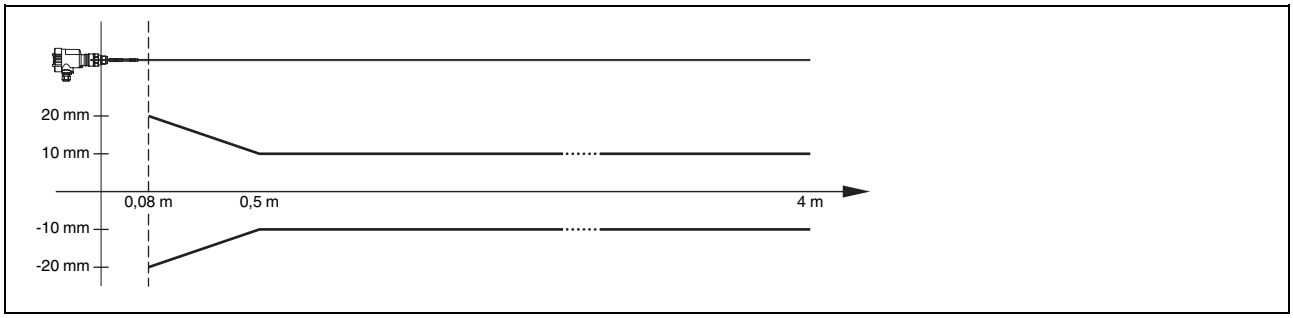


*Fig. 16: Accuracy VEGAFLEX - rod version*


*Fig. 17: Accuracy VEGAFLEX - cable version*

## Ambient conditions

Ambient, storage and transport temperature

| | |
|---|---|
| – without indicating and adjustment module | -40 … +80 °C (-40 … +176 °F) |
| – with indicating and adjustment module | -20 … +70 °C (-4 … +158 °F) |
| – Version IP 66/IP 68 1 bar with connection cable PE | -20 … +60 °C (-4 … +140 °F) |

## Process conditions

**VEGAFLEX 67**

| | |
|---|---|
| Process pressure | -1 … 40 bar/-100 … 4000 kPa (-14.5 … 580 psi) depending on the process fitting |

Process temperature (thread or flange temperature)

| | |
|---|---|
| – Viton | -30 … +150 °C (-22 … +302 °F) |
| – Viton, FEP coated | -40 … +150 °C (-40 … +302 °F) |
| – EPDM | -40 … +150 °C (-40 … +302 °F) |
| – Kalrez 6375 | -20 … +150 °C (-4 … +302 °F) |

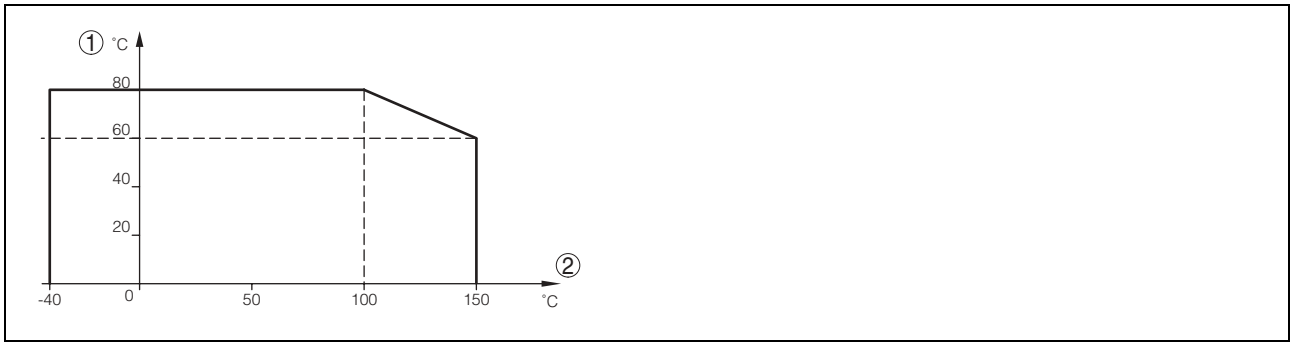


*Fig. 18: VEGAFLEX 67 - ambient temperature - product temperature*

*1 Ambient temperature*

*2 Product temperature (depending on the seal material)*

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## Electromechanical data - version IP 66/IP 67 and IP 66/IP 68; 0.2 bar

| | |
|---|---|
| Cable entry/plug [4] | |
| – Single chamber housing | • 1x cable entry M20x1.5 (cable-ø 5 … 9 mm), 1x blind stopper M20x1.5<br>or:<br>• 1x closing cap ½ NPT, 1x blind plug ½ NPT<br>or:<br>• 1x plug (depending on the version), 1x blind plug M20x1.5 |
| – Double chamber housing | • 1x cable entry M20x1.5 (cable-ø 5 … 9 mm), 1x blind stopper M20x1.5; plug M12x1 for VEGADIS 61 (optional)<br>or:<br>• 1x closing cap ½ NPT, 1x blind stopper ½ NPT, plug M12x1 for VEGADIS 61 (optional)<br>or:<br>• 1x plug (depending on the version), 1x blind stopper M20x1.5; plug M12x1 for VEGADIS 61 (optional) |
| Spring-loaded terminals | for wire cross sections up to 2.5 mm² |

## Indicating and adjustment module

| | |
|---|---|
| Power supply and data transmission | through sensor via gold-plated sliding contacts ($I^2C$ bus) |
| Display | LC display in full dot matrix |
| Adjustment elements | 4 keys |
| Protection | |
| – unassembled | IP 20 |
| – mounted into the sensor without cover | IP 40 |
| Materials | |
| – Housing | ABS |
| – Inspection window | Polyester foil |

## Power supply VEGAFLEX - two-wire instrument

**4 … 20 mA/HART**

| | |
|---|---|
| Voltage supply | |
| – non-Ex instrument | 14 … 36 V DC |
| – EEx ia instrument | 14 … 30 V DC |
| – EExd 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 |

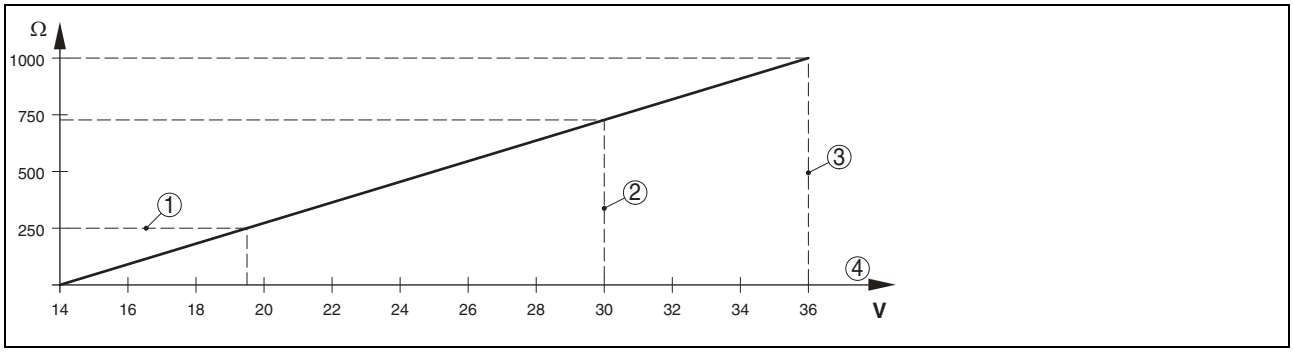


*Fig. 19: Voltage diagram*

*1 HART load*
*2 Voltage limit EEx ia instrument*
*3 Voltage limit non-Ex/Exd instrument*
*4 Voltage supply*

[4] Depending on the version M12x1, acc. to DIN 43650, Harting, Amphenol-Tuchel, 7/8" FF; note plug protection.

**Profibus PA**

| | |
|---|---|
| Voltage supply | |
| – non-Ex instrument | 9 … 32 V DC |
| – EEx ia instrument | 9 … 24 V DC |
| Power supply by/max. number of sensors | |
| – DP/PA segment coupler | max. 32 (max. 10 with Ex) |
| – VEGALOG 571 EP card | max. 15 (max. 10 with Ex) |

**Foundation Fieldbus**

| | |
|---|---|
| Voltage supply | |
| – non-Ex instrument | 9 … 32 V DC |
| – EEx ia instrument | 9 … 24 V DC |
| Power supply by/max. number of sensors | |
| – H1 Fieldbus cable/Voltage supply | max. 32 (max. 10 with Ex) |

## Power supply VEGAFLEX - Four-wire instrument 4 … 20 mA

**Four-wire instruments**

| | |
|---|---|
| Voltage supply | |
| – Non-Ex and EExd instrument | 20 … 72 V DC, 20 … 253 V AC, 50/60 Hz |
| Power consumption | max. 4 VA; 2.1 W |

## Electrical protective measures

| | |
|---|---|
| Protection | |
| – Plastic housing | IP 66/IP 67 |
| – Double chamber Alu-housing, four-wire instruments | IP 66/IP 67 |
| – Alu and stainless steel housing, two-wire instruments | IP 66/IP 68 (0.2 bar)[5] |
| – Alu and stainless steel housing optional, two-wire instruments | IP 66/IP 68 (1 bar) |
| Overvoltage category | III |
| Protection class | |
| – two-wire, Profibus PA, Foundation Fieldbus | II |
| – four-wire | I |

## Approvals[6]

ATEX II 1G, 1/2G, 2G EEx ia IIC T6
ATEX II 1/2G, 2G EExd ia IIC T6
Ship approvals
WHG

## CE conformity

EMVG (89/336/EWG), Emission EN 61326: 1997 (class B),
Susceptibility EN 61326: 1997/A1: 1998
LVD (73/23/EWG), EN 61010-1: 2001
NAMUR recommendation NE 21

[5] Requirement to maintain the protection is the suitable cable.
[6] Deviating data in Ex applications: see separate safety instructions.

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# 7 Dimensions

### Housing

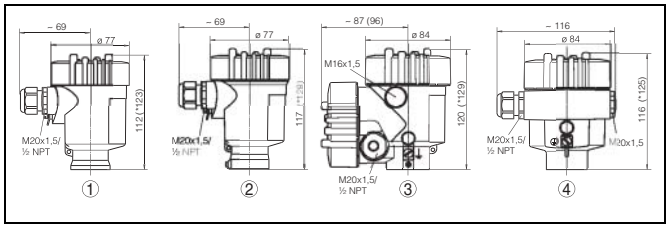


*Fig. 20: Housing versions*

*1 Plastic housing (* dimension with integrated PLICSCOM)*
*2 Stainless steel housing (* dimension with integrated PLICSCOM)*
*3 Aluminium double chamber housing (* dimension with integrated PLICSCOM)*
*4 Aluminium housing (* dimension with integrated PLICSCOM)*

### VEGAFLEX - rod and cable version

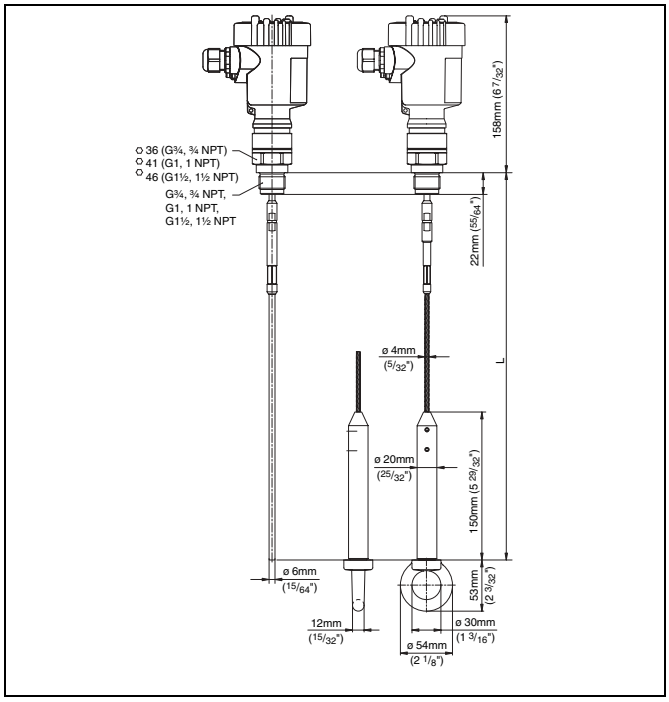


*Fig. 21: VEGAFLEX - cable and rod version with thread*

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

### VEGAFLEX - coax version

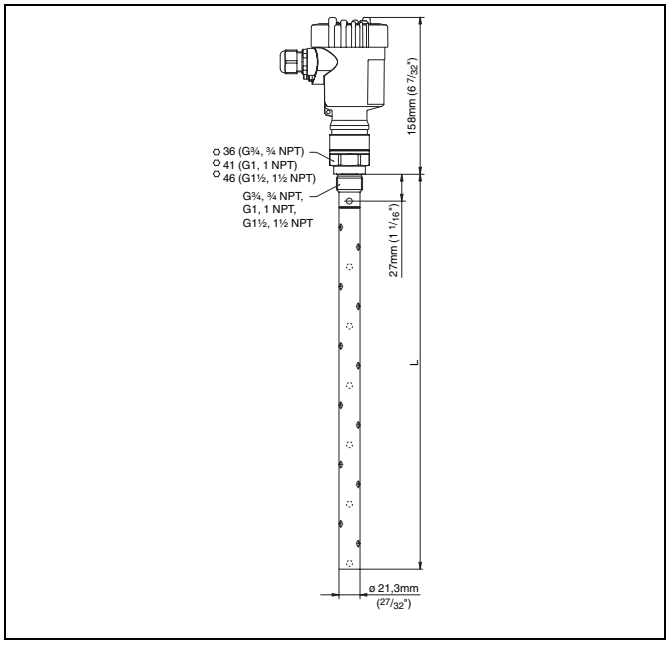


*Fig. 22: VEGAFLEX - coax version with thread*

*L = Sensor length, see "Technical data"*
*x = 20 mm, 120° displaced*

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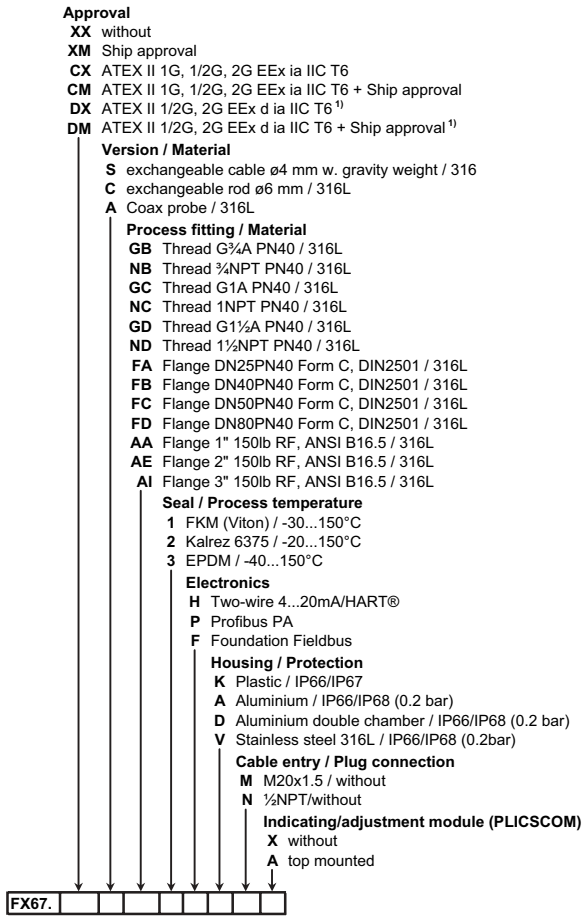
# 8 Product code

### VEGAFLEX 67




1) Only in conjunction with Housing / Protection "D"

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