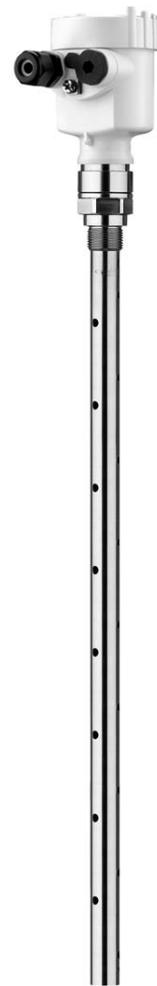


**Level measurement
in liquids**

Guided microwave

**VEGAFLEX 61
VEGAFLEX 63
VEGAFLEX 65
VEGAFLEX 66**



Product Information

VEGA

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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.

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 they reach the product surface, the microwave pulses are reflected and received by the processing electronics. The running time is processed by the instrument.

A microcomputer identifies this level echoes which are measured through the ECHOFOX software, are evaluated and converted into a level information.

Time-consuming adjustment with medium is not necessary. The instruments are preset to the ordered probe length. The shortenable cable and rod versions can be adapted individually to the local requirements.

Insensitive to steam

Even process conditions such as intense steam generation do not influence the accuracy of the measurement.

Unaffected by material fluctuations

Density fluctuations or changes of the dielectric constant do not influence the accuracy.

Buildup: no problem

Buildup or condensation on the probe or vessel wall do not influence the measuring result.

Wide application range

With measuring ranges up to 32 m (105 ft), the sensors are well suited for tall vessels. Temperatures up to 150 °C (302 °F) and pressures from vacuum to 40 bar (580 psi) cover a wide range of applications.

VEGAFLEX 66 is particularly suitable for the measurement of liquids with high process temperatures. Its mechanical configuration was specially optimised for such applications. With these high temperature versions, process temperatures from -200 to +400 °C (-328 ... +752 °F) and pressures up to 400 bar (5800 psi) are possible.

1.1 Application examples

Storage vessels



Fig. 1: Level measurement in a storage vessel with VEGAFLEX 61

The guided microwave principle is suitable for level measurement in storage vessels. The sensor can be set up without filling or adjustment with medium.

The coax version is especially suitable for low viscosity liquids with low dielectric value. This also applies when the requirements on the accuracy of the measurement are very high.

Cable and rod probes are available for different lengths and loads.

The measurement is independent of product characteristics such as density, temperature, overpressure, foam, dielectric value and buildup.

Different, as well as frequently changing products and mixtures can be measured.

Food processing or pharmaceutical vessels

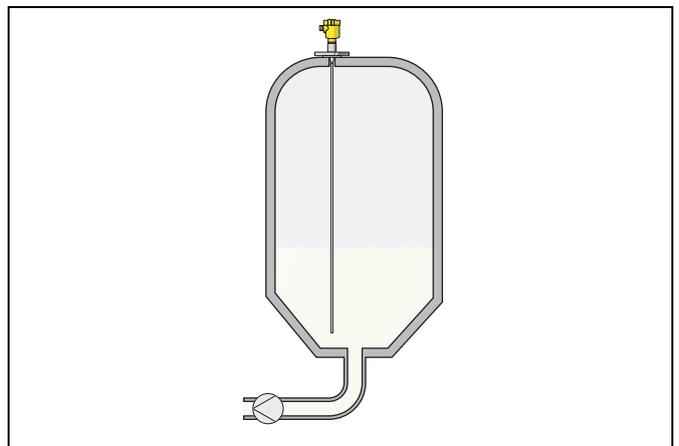


Fig. 2: Level measurement in a vessel with foodstuffs with VEGAFLEX 63

For level measurement in vessels in the food processing or pharmaceutical industry, the fully PFA-insulated VEGAFLEX 63 is the ideal solution. The sensor can be set up without filling or adjust-

ment. Fully insulated rod probes are available up to 4 m (13 ft), cable probes up to 32 m (105 ft) in length.

The wetted parts are made of the food safe plastics PFA and TFM-PTFE.

The measurement is unaffected by product characteristics such as density, temperature or overpressure. Even foam and buildup do not influence the measurement.

Different, as well as frequently changing products and mixtures can be measured.

Standpipe or bypass

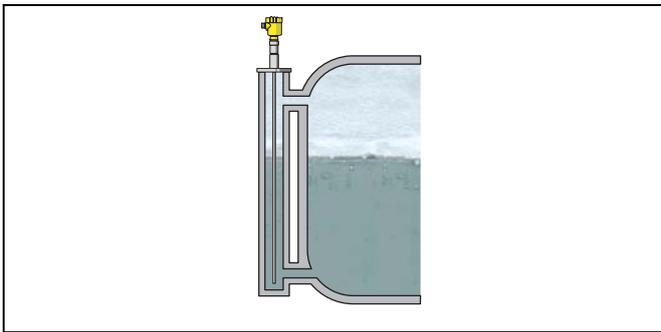


Fig. 3: Level measurement in a bypass tube

Standpipes or bypass tubes are often used in distillation columns, e.g. in the petrochemical industry. Also in this environment, measurement with guided microwaves has many advantages.

The configuration of the standpipe or bypass tube does not influence the measurement. Lateral tube connections, mixing holes, buildup or corrosion in the tube do not influence the measuring result.

Product temperatures up to 400 °C can be measured - up to 150 °C even with standard versions.

The sensor allows utilisation of nearly the entire height of the vessel and can measure with high accuracy up to approx. 30 mm beneath the process fitting.

VEGAFLEX sensors are also available with SIL2.

2 Type overview

VEGAFLEX 61 with cable measuring probe



VEGAFLEX 61 with rod measuring probe



Application:	Liquids	Liquids
Measuring range:	0.15 ... 32 m (0.5 ... 105 ft)	0.15 ... 4 m (0.5 ... 13 ft)
Process fitting:	Thread, flange	Thread, flange
Material:	316L and PCTFE, 316 (1.4401)	316L and PCTFE, Hastelloy C22 (2.4602)
Process temperature:	-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)
Signal output:	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

VEGAFLEX 63 with cable measuring probe



VEGAFLEX 63 with rod measuring probe



VEGAFLEX 65 with coax measuring probe



Application:	Liquids	Liquids	Liquids
Measuring range:	1 ... 32 m (3.3 ... 105 ft)	0.5 ... 4 m (1.6 ... 13 ft)	0.05 ... 6 m (0.16 ... 20 ft)
Process fitting:	Thread, flange, Tri-Clamp, bolting	Thread, flange, Tri-Clamp, bolting	Thread, flange
Material:	PTFE (TFM 1600)	PTFE (TFM 1600)	316L and PTFE (TFM 4105), 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 ... 16 bar/-100 ... 1600 kPa (-14.5 ... 232 psi)	-1 ... 16 bar/-100 ... 1600 kPa (-14.5 ... 232 psi)	-1 ... 40 bar/-100 ... 4000 kPa (-14.5 ... 580 psi)
Signal output:	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	4 ... 20 mA/HART in two-wire technology, Profibus PA, Foundation Fieldbus

250 °C/100 bar

VEGAFLEX 66 with cable measuring probe



VEGAFLEX 66 with rod measuring probe



VEGAFLEX 66 with coax measuring probe



Application:	Liquids	Liquids	Liquids
Measuring range:	1 ... 32 m (3.3 ... 105 ft)	0.5 ... 4 m (1.6 ... 13 ft)	0.3 ... 6 m (1 ... 20 ft)
Process fitting:	Thread, flange	Thread, flange	Thread, flange
Material:	316L and PEEK GF30, 316 (1.4401)	316L and PEEK GF30, Hastelloy C22 (2.4602)	316L and PEEK GF30, Hastelloy C22 (2.4602) and PTFE (TFM 4105)
Process temperature:	-20 ... +250 °C (-4 ... +482 °F)	-20 ... +250 °C (-4 ... +482 °F)	-20 ... +250 °C (-4 ... +482 °F)
Process pressure:	-1 ... 100 bar/-100 ... 10000 kPa (-14.5 ... 1450 psi)	-1 ... 100 bar/-100 ... 10000 kPa (-14.5 ... 1450 psi)	-1 ... 100 bar/-100 ... 10000 kPa (-14.5 ... 1450 psi)
Signal output:	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	4 ... 20 mA/HART in two-wire, four-wire technology, Profibus PA, Foundation Fieldbus

400 °C/400 bar

VEGAFLEX 66 with cable measuring probe



VEGAFLEX 66 with rod measuring probe



VEGAFLEX 66 with coax measuring probe



Application:	Liquids	Liquids	Liquids
Measuring range:	1 ... 32 m (3.3 ... 105 ft)	0.5 ... 6 m (1.6 ... 20 ft)	0.3 ... 6 m (1 ... 20 ft)
Process fitting:	Thread, flange	Thread, flange	Thread, flange
Material:	316L and PEEK GF30, 316 (1.4401)	316L and PEEK GF30, Hastelloy C22 (2.4602)	316L and PEEK GF30, Hastelloy C22 (2.4602) and PTFE (TFM 4105)
Process temperature:	-200 ... +400 °C (-328 ... +752 °F)	-200 ... +400 °C (-328 ... +752 °F)	-200 ... +400 °C (-328 ... +752 °F)
Process pressure:	-1 ... 400 bar/-100 ... 40000 kPa (-14.5 ... 5800 psi)	-1 ... 400 bar/-100 ... 40000 kPa (-14.5 ... 5800 psi)	-1 ... 400 bar/-100 ... 40000 kPa (-14.5 ... 5800 psi)
Signal output:	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	4 ... 20 mA/HART in two-wire, four-wire technology, Profibus PA, Foundation Fieldbus

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



Cable probe



Rod probe



Coax probe

Approvals



Gas explosion pro-
tection



Dust explosion pro-
tection



Ship approvals



SIL

3 Mounting information

Measuring range

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

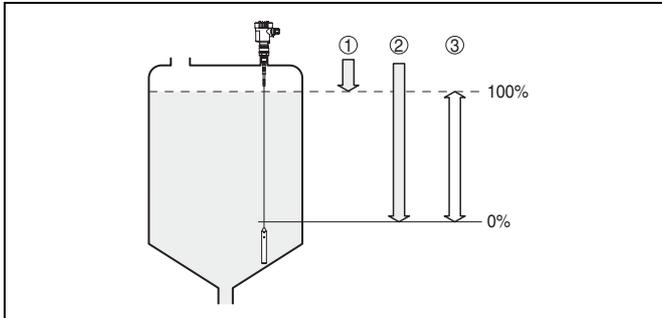


Fig. 4: Measuring range (operating range) and max. measuring distance

- 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 in such a way that the probe does not touch any installations or the vessel wall during operation. If necessary, fasten the probe end. If such an unsuitable installation location cannot be avoided, use a coax electrode - this sensor is not influenced by such installation conditions.

Mount the cable and rod versions of VEGAFLEX in such a way that the distance to vessel installations or the vessel wall is at least 300 mm (12 in).

VEGAFLEX can also be mounted in a standpipe or bypass tube with an inner diameter of 25 mm (1 in). Make sure that the probe does not touch the tube during operation. VEGAFLEX sensors are the ideal replacement for displacer systems because they have no moving parts. Furthermore VEGAFLEX is unaffected by density fluctuations and is easy to install.

If possible, mount the sensor flush with the vessel top. If this is not possible, use short sockets with small diameter.

In case of unfavourable mounting conditions such as e.g. very high ($h > 200$ mm/7.9 in) or very wide ($\varnothing > 200$ mm/7.9 in) sockets or a distance to the vessel wall or vessel installations of < 300 mm (11.8 in), we recommend carrying out an empty vessel profile for the area in question. Use the adjustment software PACTware™ with DTM. If such an installation location is necessary, use a coax probe. It is not influenced by unfavourable installation conditions.

Inflowing material

Make sure that the probe is not subjected to strong lateral forces. Mount VEGAFLEX at a position in the vessel where no interfering influence, such as e.g. by filling openings, stirrers, etc. can occur.

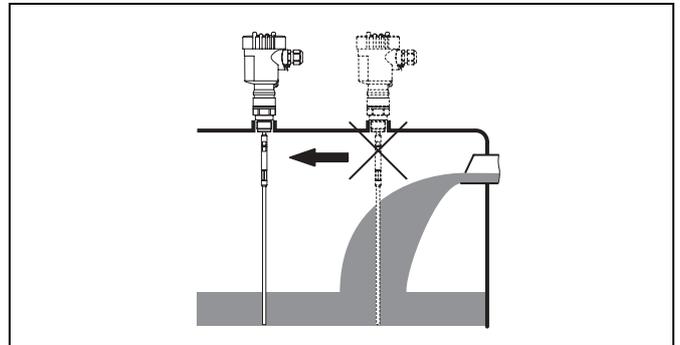


Fig. 5: Lateral load

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.

Avoid undetermined cable-vessel-connection, i.e. the connection must be either grounded reliably or isolated reliably. Any change of this requirement will cause measurement errors.

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, VEGAS-TAB 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

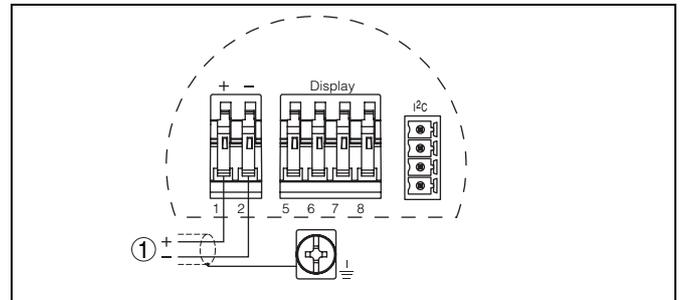


Fig. 6: Connection HART two-wire, Profibus PA, Foundation Fieldbus

1 Power supply and signal output

Double chamber housing - two-wire

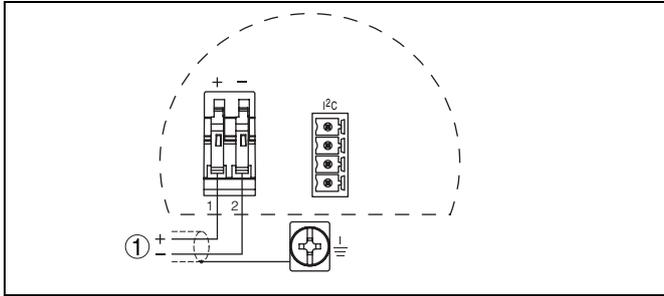


Fig. 7: Connection HART two-wire, Profibus PA, Foundation Fieldbus

- 1 Power supply and signal output

Version IP 66/IP 68, 1 bar

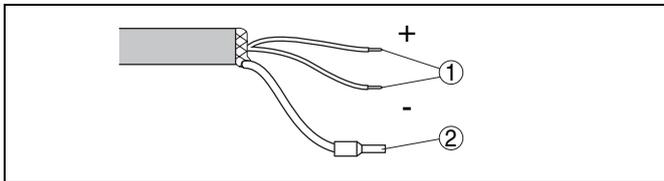


Fig. 8: Wire assignment, connection cable

- 1 br (+) and bl (-) for power supply or to the processing system
- 2 Screen

Double chamber housing - 4 ... 20 mA/HART four-wire

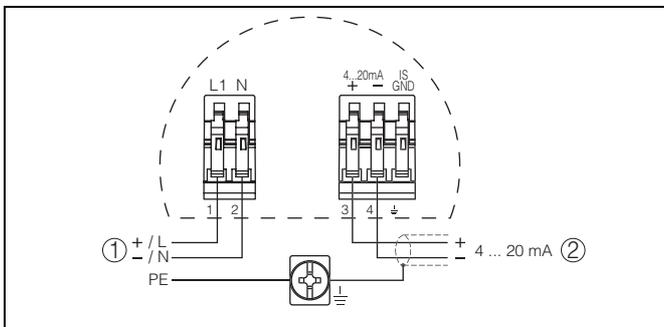


Fig. 9: Connection 4 ... 20 mA/HART four-wire

- 1 Voltage supply
- 2 Signal output

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

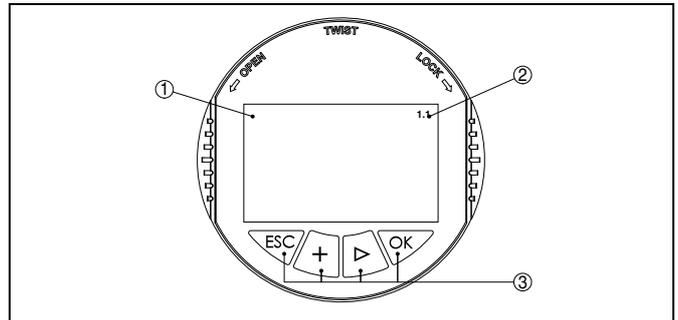


Fig. 10: Indicating and adjustment elements

- 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

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.

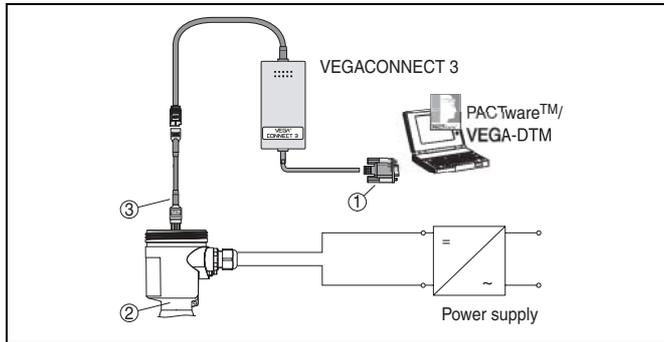


Fig. 11: PC connected directly to the sensor

- 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 is necessary in addition to the PC and the suitable VEGA-DTM.

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

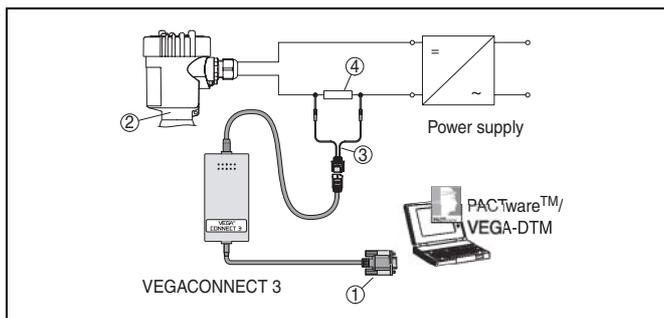


Fig. 12: Connecting the PC to the signal cable

- 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)

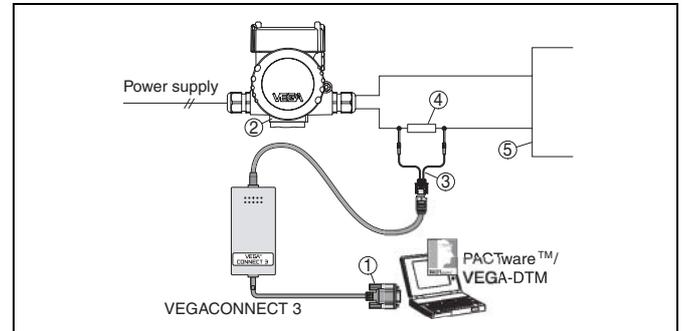


Fig. 13: Connecting the PC to the signal cable

- 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.

6 Technical data

General data

Material 316L corresponds to 1.4404 or 1.4435

VEGAFLEX 61

Materials, wetted parts

- Process fitting 316L and PCTFE, Hastelloy C22 (2.4602) and PCTFE
- Process seal Viton, Kalrez 6375 and EPDM (instruments with thread: Klingersil C-4400)
- inner conductor (up to the separation cable/rod) 1.4462
- Rod \varnothing 6 mm (0.24 in) 316L, Hastelloy C22 (2.4602)
- Cable \varnothing 4 mm (0.16 in) with gravity weight 316 (1.4401)

VEGAFLEX 63

Materials, wetted parts

- Process fitting PFA and PTFE (TFM 1600)
- Rod- \varnothing 10 mm (0.4 in) PFA and PTFE (TFM 1600)
- Cable- \varnothing 4 mm (0.16 in) with gravity weight PFA and PTFE (TFM 1600)

VEGAFLEX 65

Materials, wetted parts

- Process fitting 316L and PTFE (TFM) +25 % GF; Hastelloy C22 (2.4602) and PCTFE (TFM) +25 % GF
- Process seal Viton, Kalrez 6375 and EPDM (instruments with thread: Klingersil C-4400)
- Tube \varnothing 21.3 mm (0.84 in) 316L, Hastelloy C22 (2.4602)

VEGAFLEX 66

Materials, wetted parts - version -20 ... +250 °C (-4 ... +482 °F)

- Process fitting - coax version 316L, Hastelloy C22 (2.4602) and PEEK GF30
- Process fitting - rod version 316L, Hastelloy C22 (2.4602) and PEEK GF30
- Process fitting - cable version 316L and PEEK GF30
- Tube- \varnothing 21.3 mm (0.84 in) 316L, Hastelloy C22 (2.4602)
- Rod \varnothing 6 mm (0.24 in) 316L, Hastelloy C22 (2.4602)
- Cable \varnothing 4 mm (0.16 in) 316 (1.4401)
- Process seal Kalrez 6375

Materials, wetted parts - version -200 ... +400 °C (-328 ... +752 °F)

- Process fitting - coax version 316L, Hastelloy C22 (2.4602) and Aluminium oxide ceramic 99.7 % (Al₂O₃)
- Process fitting - rod version 316L, Hastelloy C22 (2.4602) and Aluminium oxide ceramic 99.7 % (Al₂O₃)
- Process fitting - cable version 316L, Hastelloy C22 (2.4602) and Aluminium oxide ceramic 99.7 % (Al₂O₃)
- Tube- \varnothing 43 mm (1.7 in) 316L
- Rod \varnothing 16 mm (0.63 in) 316L
- Cable \varnothing 6 mm (0.24 in) 316 (1.4401)
- Process seal graphite

Seal material

Seal

- Cable and rod version Viton, Kalrez 6375, EPDM, Viton FEP-coated
- 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 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)
– Rod-ø 10 mm (0.4 in)	approx. 350 g/m (approx. 3.8 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)
– Rod-ø 10 mm (0.4 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)
– Rod-ø 10 mm (0.4 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	
– VEGAFLEX 61, cable ø 4 mm (0.16 in)	5 KN (1124 lbf)
– VEGAFLEX 63, cable ø 4 mm (0.16 in)	2 KN (450 lbf)
– VEGAFLEX 66, cable ø 4 mm (0.16 in)	2.5 KN (562 lbf)

Output variable

4 ... 20 mA/HART

Output signal	4 ... 20 mA/HART
Resolution	1.6 µA
Fault signal	current output unchanged, 20.5 mA, 22 mA, <3.6 mA (adjustable)
Current limitation	22 mA
Load	
– Two-wire instrument - 4 ... 20 mA/HART	see load diagram under Power supply
– Four-wire instrument - 4 ... 20 mA/HART	max. 500 Ohm ²⁾
Integration time (63 % of the input variable)	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)
Current value	constantly 10 mA; ±0.5 mA
Integration time (63 % of the input variable)	0 ... 999 s, adjustable

Foundation Fieldbus

Output	
– Signal	digital output signal, Foundation Fieldbus protocol
– Physical layer	acc. to IEC 61158-2
Channel Numbers	
– Channel 1	Primary value
– Channel 2	Secondary value 1
– Channel 3	Secondary Value 2
Transmission rate	31.25 Kbit/s
Current value	10 mA; ±0.5 mA
Integration time (63 % of the input variable)	0 ... 999 s, adjustable

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

Input variable

Parameter	Level of liquids
Cable and rod version	
min. dielectric figure - rod, cable version	$\epsilon_r > 1.6$
Dead band - rod version (\varnothing 6 mm/0.24 in)	
– top	80 mm (3.1 in)
– bottom	0 mm
Dead band - cable version (\varnothing 4 mm/0.16 in)	
– top	150 mm (5.9 in)
– bottom	250 mm (9.8 in) (gravity weight + 100 mm)

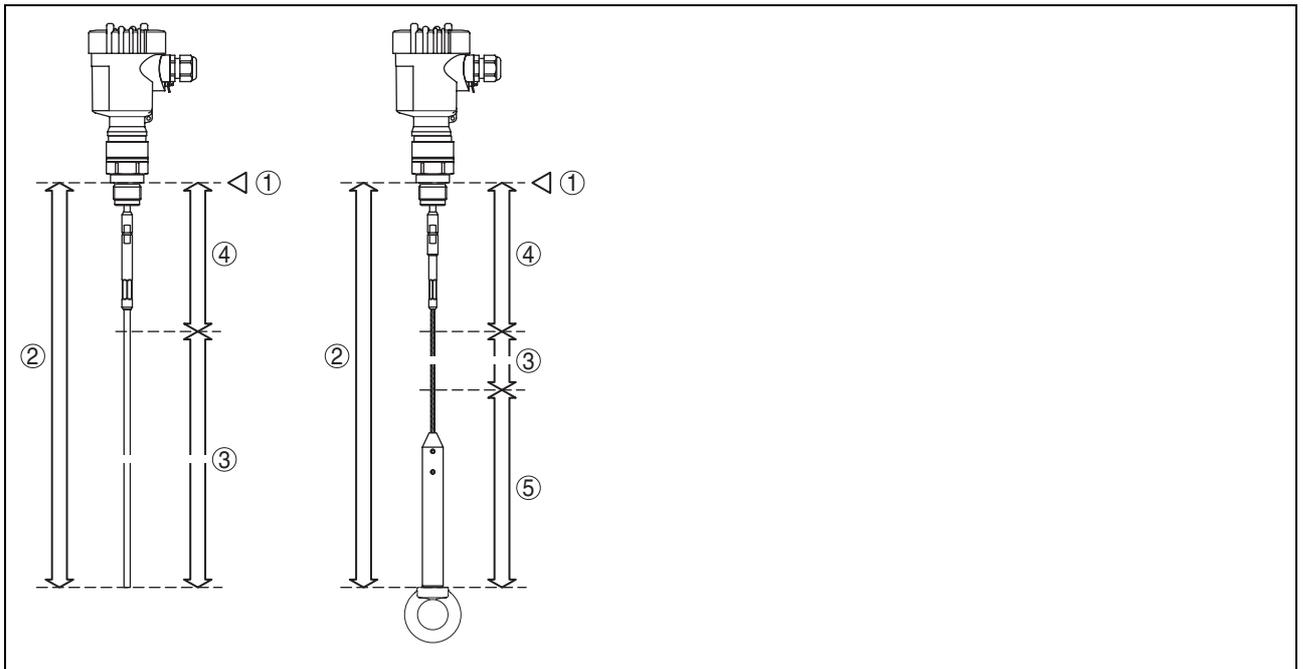


Fig. 14: Measuring ranges of VEGAFLEX - cable and rod version e.g. VEGAFLEX 61

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

Coax version

min. dielectric figure - coax version	$\epsilon_r > 1.4$
Dead band - coax version (\varnothing 21.3 mm/0.84 in)	
– top	30 mm (1.2 in)
– bottom	0 mm

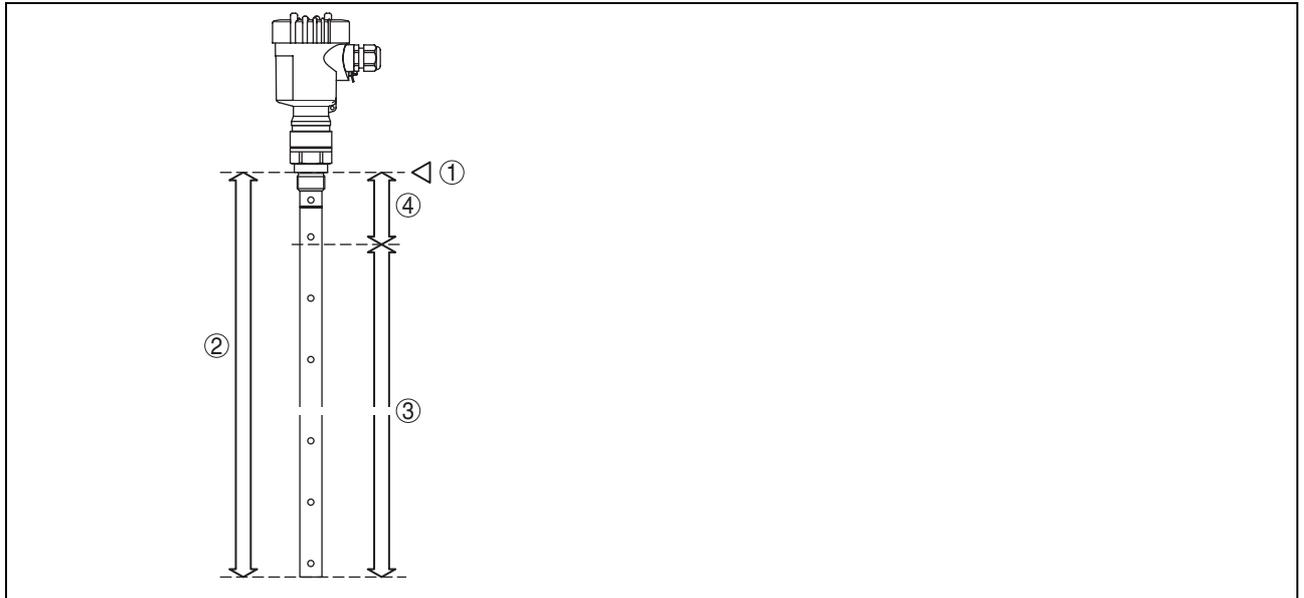


Fig. 15: Measuring ranges of VEGAFLEX - coax version e.g. VEGAFLEX 65

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

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 (not with coax version) 500 mm (20 in)
- Min. distance to metal vessel bottom 20 mm (0.8 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

- Cable version ±3 mm (±0.12 in)
- Rod version ±3 mm (±0.12 in)
- Coax version ±3 mm (±0.12 in)

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 61, 65

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)

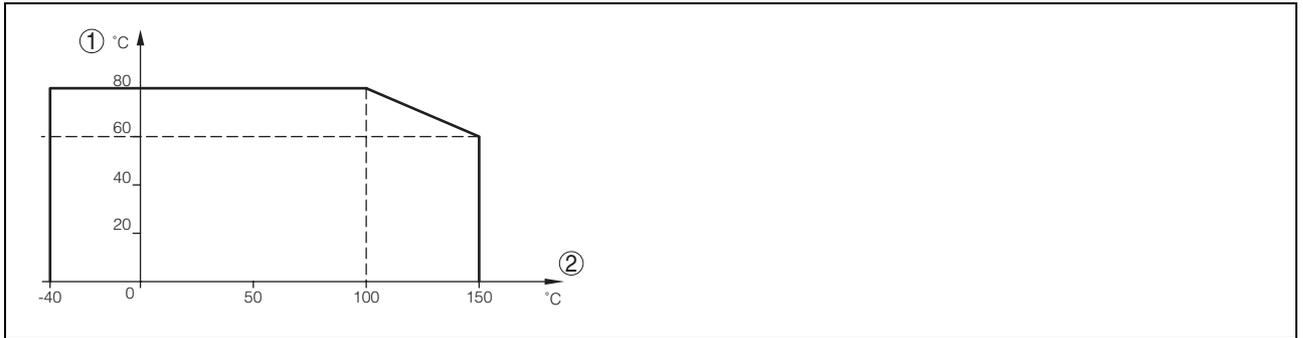


Fig. 16: VEGAFLEX 61, 65 - ambient temperature - product temperature

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

VEGAFLEX 63

Process pressure -1 ... 16 bar/-100 ... 1600 kPa (-14.5 ... 232 psi) depending on the process fitting

Process temperature (flange temperature) -40 ... +150 °C (-40 ... +302 °F)

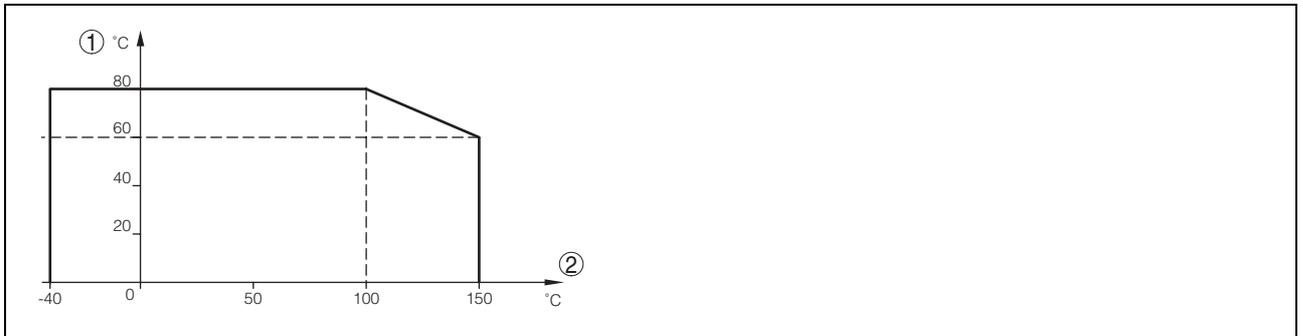


Fig. 17: VEGAFLEX 63 - ambient temperature - product temperature

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

VEGAFLEX 66

- Process pressure
- Standard version -1 ... 100 bar/-100 ... 10000 kPa (-14.5 ... 1450 psi) depending on the process fitting
- High temperature version -1 ... 400 bar/-100 ... 40000 kPa (-14.5 ... 5800 psi) depending on the process fitting

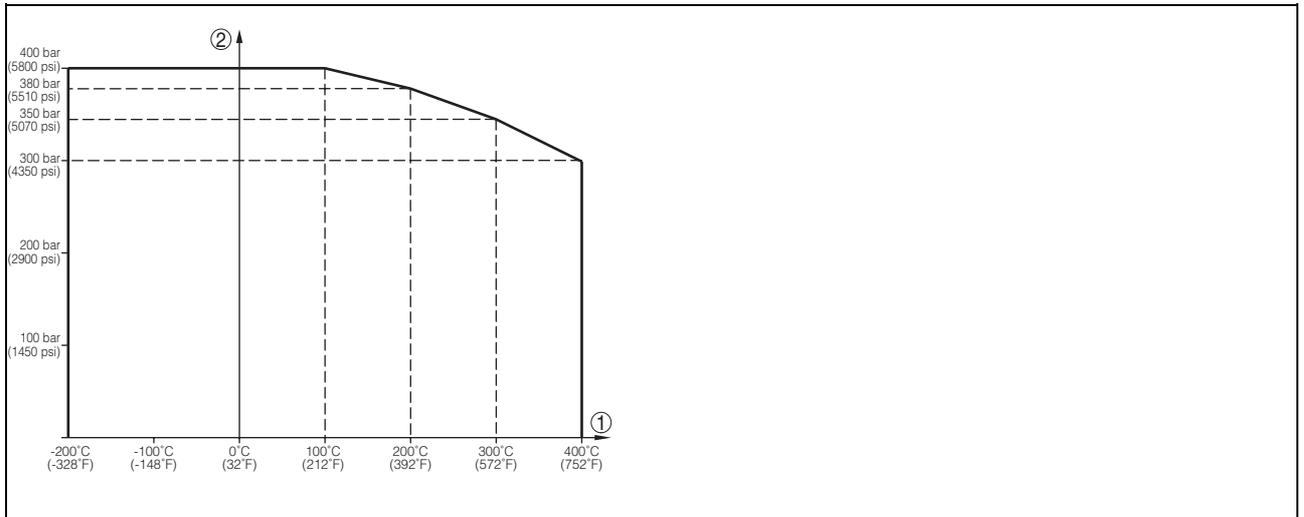


Fig. 18: High temperature version: Process pressure - product temperature

- 1 Product temperature
- 2 Process pressure

Process temperature

- Standard version (seal Kalrez 6375) -20 ... +250 °C (-4 ... +482 °F)
- High temperature version (seal graphite) -200 ... +400 °C (-328 ... +688 °F)

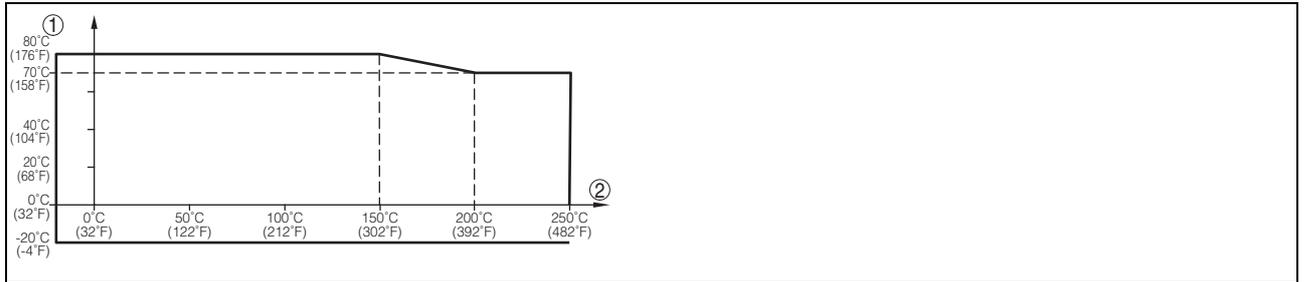


Fig. 19: Ambient temperature - product temperature (version -20 ... +250 °C/-4 ... +482 °F)

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

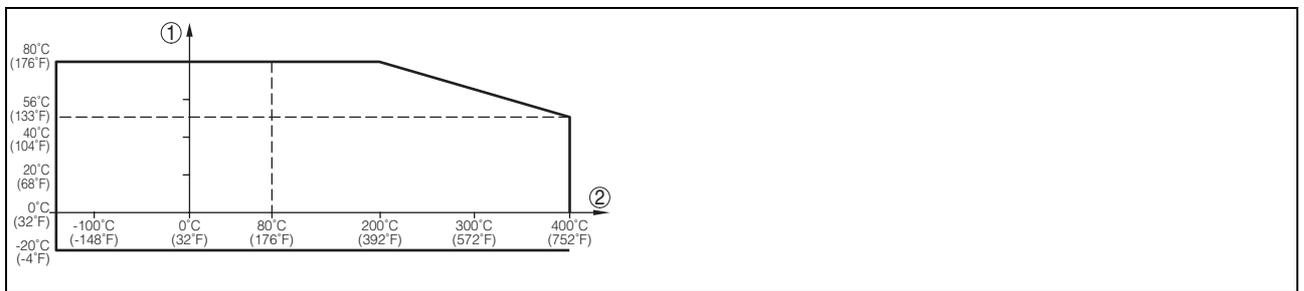


Fig. 20: Ambient temperature - product temperature (version -200 ... +400 °C/-328 ... +688 °F)

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

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) ⁴⁾
– 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

Approvals⁵⁾

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

Functional safety (SIL)

You will find detailed information in the Safety Manual of VEGAFLEX or under www.vega.com.
 Functional safety acc. to IEC 61508-4

– Single channel architecture (1oo1 D)	up to SIL2
– Double channel architecture (1oo2 D)	up to SIL3 (diversitary redundant)

⁴⁾ Requirement to maintain the protection is the suitable cable.

⁵⁾ Deviating data in Ex applications: see separate safety instructions.

Environmental instructions

VEGA environment management system⁶⁾

certified acc. to DIN EN ISO 14001

⁶⁾ You will find detailed information under www.vega.com.

7 Dimensions

Housing versions in protection IP 66/IP67 and IP 66/IP 68, 0.2 bar

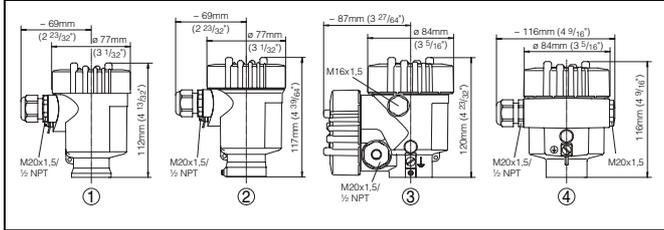


Fig. 22: Housing versions in protection IP 66/IP 67 and IP 66/IP 68, 0.2 bar (with integrated PLICSCOM the housing is 9 mm/0.35 in higher)

- 1 Plastic housing
- 2 Stainless steel housing
- 3 Aluminium double chamber housing
- 4 Aluminium housing

Housing in protection IP 66/IP 68, 1 bar

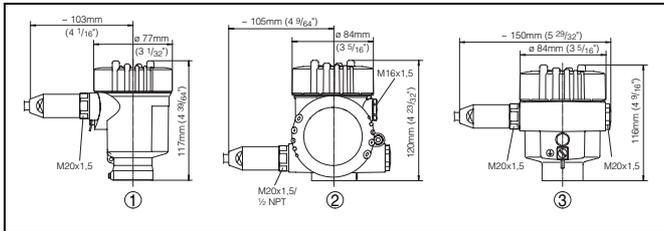


Fig. 23: Housing versions in protection IP 66/IP 68, 1 bar (with integrated PLICSCOM the housing is 9 mm/0.35 in higher)

- 1 Stainless steel housing
- 2 Aluminium double chamber housing
- 3 Aluminium housing

VEGAFLEX 61 - cable and rod version

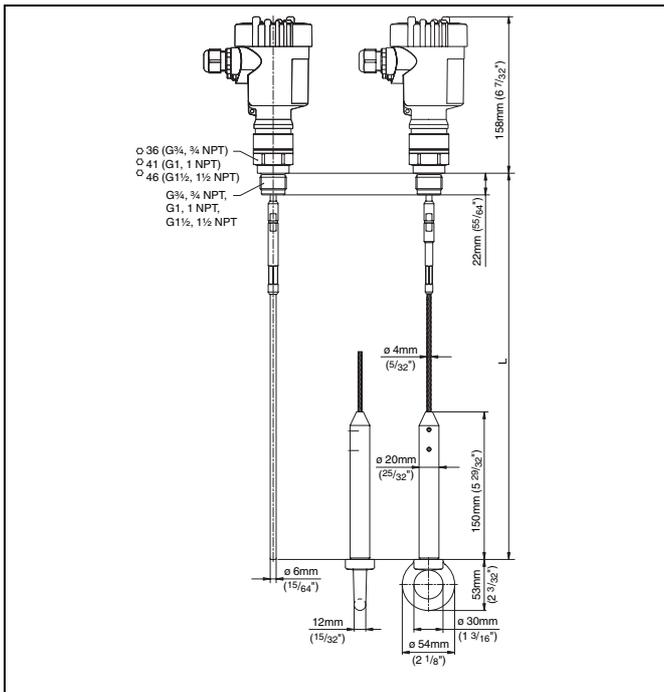


Fig. 24: VEGAFLEX 61 - cable and rod version with thread

L = Sensor length, see "Technical data"

VEGAFLEX 63 - cable and rod version

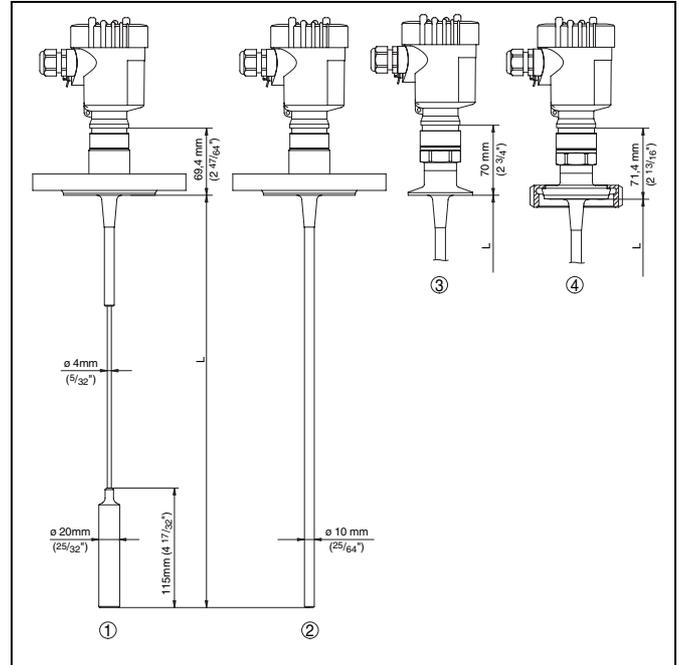


Fig. 25: VEGAFLEX 63 - flange version

- L = Sensor length, see "Technical data"
- 1 Cable version with flange connection
 - 2 Rod version with flange connection
 - 3 Tri-Clamp
 - 4 Bolting

VEGAFLEX 65 - coax version

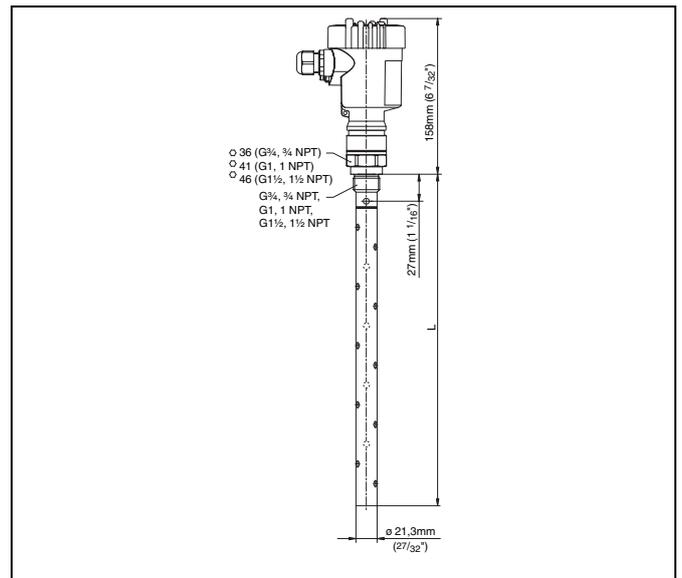


Fig. 26: VEGAFLEX 65 - coax version with thread

L = Sensor length, see "Technical data"

VEGAFLEX 66 (-20 ... +250 °C) - cable and rod version

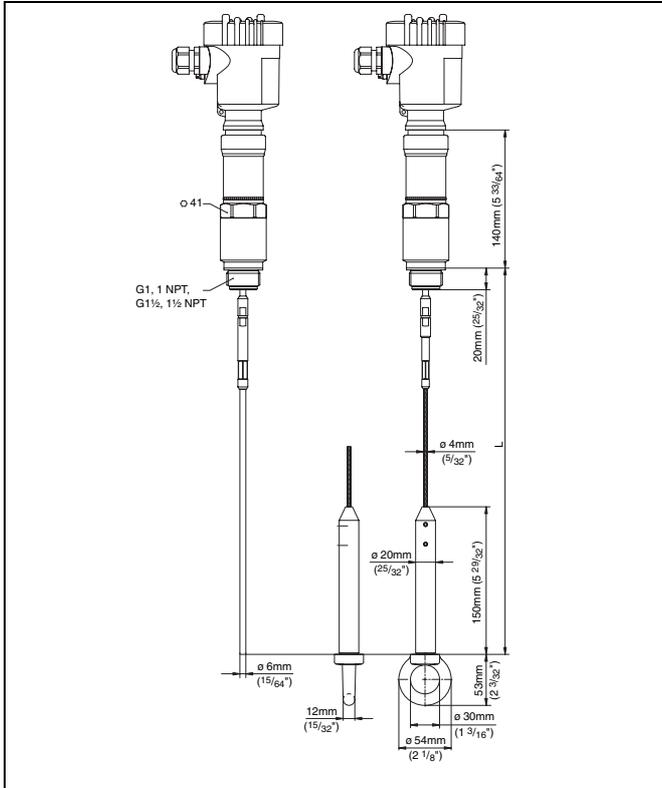


Fig. 27: VEGAFLEX 66 (-20 ... +250 °C) - cable and rod version with thread

L = Sensor length, see "Technical data"

VEGAFLEX 66 (-200 ... +400 °C) - cable and rod version

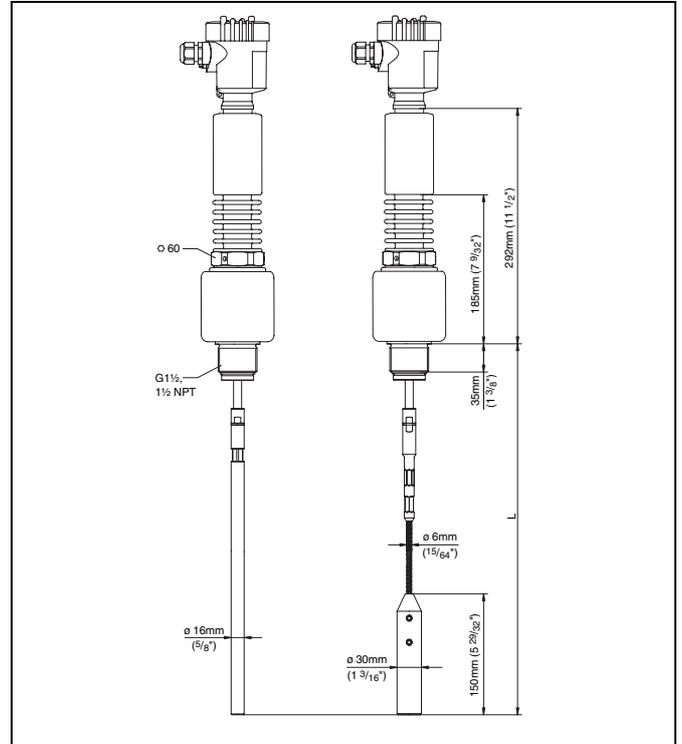


Fig. 29: VEGAFLEX 66 (-200° ... +400°C) - cable and rod version with thread

L = Sensor length, see "Technical data"

VEGAFLEX 66 (-20° ... +250°C) - coax version

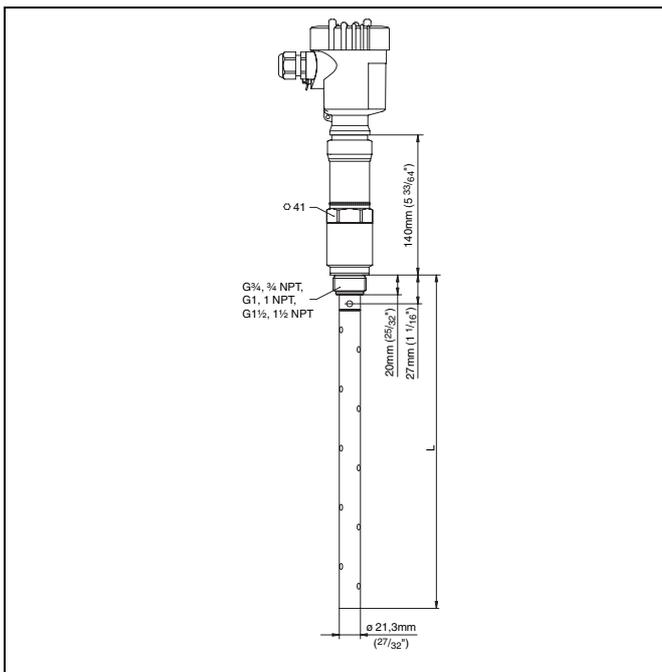


Fig. 28: VEGAFLEX 66 (-20° ... +250°C) - coax version with thread

L = Sensor length, see "Technical data"

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VEGAFLEX 66 (-200 ... +400°C) - coax version

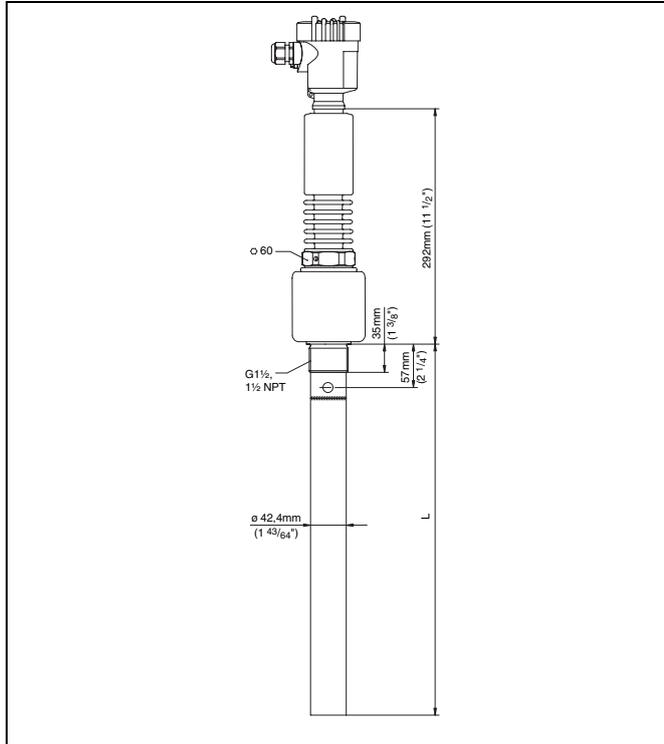


Fig. 30: VEGAFLEX 66 (-200 ... +400°C) - coax version with thread

L = Sensor length, see "Technical data"

8 Product code

VEGAFLEX 61

<p>Approval XX without XM Ship approval CX ATEX II 1G, 1/2G, 2G EEx ia IIC T6 CA ATEX II 1G, 1/2G, 2G EEx ia IIC T6 + WHG CM ATEX II 1G, 1/2G, 2G EEx ia IIC T6 + Ship approval DX ATEX II 1/2G, 2G EEx d ia IIC T6¹⁾ GX ATEX II 1/2 D, 2D IP6X T²⁾</p> <p>Version / Material A exchangeable cable ø4 mm with gravity weight / 316 C exchangeable rod ø6 mm / 316L</p> <p>Process connection / Material GB Thread G¾A PN40 / 316L NB Thread ¾NPT PN40 / 316L GC Thread G1A PN40 / 316L NC Thread 1NPT PN40 / 316L GD Thread G1½A PN40 / 316L ND Thread 1½NPT PN40 / 316L FA Flange DN25PN40 Form C, DIN2501 / 316L FB Flange DN40PN40 Form C, DIN2501 / 316L FC Flange DN50PN40 Form C, DIN2501 / 316L FD Flange DN80PN40 Form C, DIN2501 / 316L AA Flange 1" 150lb RF, ANSI B16.5 / 316L AE Flange 2" 150lb RF, ANSI B16.5 / 316L AI Flange 3" 150lb RF, ANSI B16.5 / 316L</p> <p>Seal / Process temperature 1 FKM (Viton) / -30...150°C 2 Kalrez 6375 / -20...150°C 3 EPDM / -40...150°C</p> <p>Electronics H Two-wire 4...20mA/HART® V Four wire 4...20mA/HART®¹⁾ P Profibus PA F Foundation Fieldbus</p> <p>Housing / Protection K Plastic / IP66/IP67 A Aluminium / IP66/IP68 (0.2 bar) D Aluminium double chamber / IP66/IP68 (0.2 bar) V Stainless steel 316L / IP66/IP68 (0.2bar)</p> <p>Cable entry / Plug connection M M20x1.5 / without N ½NPT/without</p> <p>Indicating/adjustment module (PLICSCOM) X without A top mounted</p>	<p>Approval XX without CX ATEX II 1G, 1/2G, 2G EEx ia IIC T6 CA ATEX II 1G, 1/2G, 2G EEx ia IIC T6 + WHG DX ATEX II 1/2G, 2G EEx d ia IIC T6¹⁾</p> <p>Version / Temperature E rod ø6 mm with PFA / -40...150°C</p> <p>Process connection / Material FC Flange DN50PN40, DIN2501 / PTFE-TFM 1600 FD Flange DN80PN40, DIN2501 / PTFE-TFM 1600 FE Flange DN100PN16, DIN2501 / PTFE-TFM 1600 KC Flange DN50PN40 EN1092-1 / PTFE-TFM 1600 KD Flange DN80PN40 EN1092-1 / PTFE-TFM 1600 KE Flange DN100PN16 EN1092-1 / PTFE-TFM 1600 AE Flange 2" 150lb RF, ANSI B16.5 / PTFE-TFM 1600 AI Flange 3" 150lb RF, ANSI B16.5 / PTFE-TFM 1600 AK Flange 4" 150lb RF, ANSI B16.5 / PTFE-TFM 1600 CA Tri-Clamp 2" PN16 / PTFE-TFM 1600 CE Tri-Clamp 3" PN16 / PTFE-TFM 1600 RA Bolting DN40PN40 DIN11851 / PTFE-TFM 1600 RB Bolting DN50PN25 DIN11851 / PTFE-TFM 1600</p> <p>Electronics H Two-wire 4...20mA/HART® V Four wire 4...20mA/HART®¹⁾ P Profibus PA F Foundation Fieldbus</p> <p>Housing / Protection K Plastic / IP66/IP67 A Aluminium / IP66/IP68 (0.2 bar) D Aluminium double chamber / IP66/IP68 (0.2 bar) V Stainless steel 316L / IP66/IP68 (0.2bar)</p> <p>Cable entry / Plug connection M M20x1.5 / without N ½NPT/without</p> <p>Indicating/adjustment module (PLICSCOM) X without A top mounted</p>
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FX61.

FX63.

¹⁾ Only in conjunction with Housing / Protection "D"
²⁾ Not in conjunction with Housing / Protection "K"

VEGAFLEX 63

<p>Approval XX without CX ATEX II 1G, 1/2G, 2G EEx ia IIC T6 CA ATEX II 1G, 1/2G, 2G EEx ia IIC T6 + WHG DX ATEX II 1/2G, 2G EEx d ia IIC T6¹⁾</p> <p>Version / Temperature E rod ø6 mm with PFA / -40...150°C</p> <p>Process connection / Material FC Flange DN50PN40, DIN2501 / PTFE-TFM 1600 FD Flange DN80PN40, DIN2501 / PTFE-TFM 1600 FE Flange DN100PN16, DIN2501 / PTFE-TFM 1600 KC Flange DN50PN40 EN1092-1 / PTFE-TFM 1600 KD Flange DN80PN40 EN1092-1 / PTFE-TFM 1600 KE Flange DN100PN16 EN1092-1 / PTFE-TFM 1600 AE Flange 2" 150lb RF, ANSI B16.5 / PTFE-TFM 1600 AI Flange 3" 150lb RF, ANSI B16.5 / PTFE-TFM 1600 AK Flange 4" 150lb RF, ANSI B16.5 / PTFE-TFM 1600 CA Tri-Clamp 2" PN16 / PTFE-TFM 1600 CE Tri-Clamp 3" PN16 / PTFE-TFM 1600 RA Bolting DN40PN40 DIN11851 / PTFE-TFM 1600 RB Bolting DN50PN25 DIN11851 / PTFE-TFM 1600</p> <p>Electronics H Two-wire 4...20mA/HART® V Four wire 4...20mA/HART®¹⁾ P Profibus PA F Foundation Fieldbus</p> <p>Housing / Protection K Plastic / IP66/IP67 A Aluminium / IP66/IP68 (0.2 bar) D Aluminium double chamber / IP66/IP68 (0.2 bar) V Stainless steel 316L / IP66/IP68 (0.2bar)</p> <p>Cable entry / Plug connection M M20x1.5 / without N ½NPT/without</p> <p>Indicating/adjustment module (PLICSCOM) X without A top mounted</p>	<p>Approval XX without CX ATEX II 1G, 1/2G, 2G EEx ia IIC T6 CA ATEX II 1G, 1/2G, 2G EEx ia IIC T6 + WHG DX ATEX II 1/2G, 2G EEx d ia IIC T6¹⁾</p> <p>Version / Temperature E rod ø6 mm with PFA / -40...150°C</p> <p>Process connection / Material FC Flange DN50PN40, DIN2501 / PTFE-TFM 1600 FD Flange DN80PN40, DIN2501 / PTFE-TFM 1600 FE Flange DN100PN16, DIN2501 / PTFE-TFM 1600 KC Flange DN50PN40 EN1092-1 / PTFE-TFM 1600 KD Flange DN80PN40 EN1092-1 / PTFE-TFM 1600 KE Flange DN100PN16 EN1092-1 / PTFE-TFM 1600 AE Flange 2" 150lb RF, ANSI B16.5 / PTFE-TFM 1600 AI Flange 3" 150lb RF, ANSI B16.5 / PTFE-TFM 1600 AK Flange 4" 150lb RF, ANSI B16.5 / PTFE-TFM 1600 CA Tri-Clamp 2" PN16 / PTFE-TFM 1600 CE Tri-Clamp 3" PN16 / PTFE-TFM 1600 RA Bolting DN40PN40 DIN11851 / PTFE-TFM 1600 RB Bolting DN50PN25 DIN11851 / PTFE-TFM 1600</p> <p>Electronics H Two-wire 4...20mA/HART® V Four wire 4...20mA/HART®¹⁾ P Profibus PA F Foundation Fieldbus</p> <p>Housing / Protection K Plastic / IP66/IP67 A Aluminium / IP66/IP68 (0.2 bar) D Aluminium double chamber / IP66/IP68 (0.2 bar) V Stainless steel 316L / IP66/IP68 (0.2bar)</p> <p>Cable entry / Plug connection M M20x1.5 / without N ½NPT/without</p> <p>Indicating/adjustment module (PLICSCOM) X without A top mounted</p>
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FX61.

FX63.

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



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