Operating Instructions

VEGAPULS 62

4 ... 20 mA/HART

Contents

28435-EN-060317

Supplementary operating instructions manuals

Information:
VEGAPULS 62 is available in different versions and is supplied specifically acc. to the order. Depending on the selected version, supplementary operating instructions manuals come with the shipment. The supplementary operating instructions are stated in paragraph "*Product description*".

Operating instructions manuals for accessories and replacement parts

Tip:
To ensure reliable setup and operation of your VEGAPULS 62, VEGA offers accessories and replacement parts. The corresponding documentations are:

- Operating instructions manual "*External indicating and adjustment unit VEGADIS 61*"
- Operating instructions manual "*Oscillator VEGAPULS series 60*"
- Supplementary instructions manual "*Antenna impedance cone VEGAPULS 62 and 68*"
- Supplementary instructions manual "*Flanges acc. to DIN-EN-ASME-JIS*"

28435-EN-060317

1 About this document

1.1 Function

This operating instructions manual has all the information you need for quick setup and safe operation. Please read this manual before you start setup.

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.

1 **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 operator. For safety and warranty reasons, any internal work on the instruments must be carried out only by personnel authorised by the manufacturer.

2.2 Appropriate use

VEGAPULS 62 is a sensor for continuous level measurement.

Detailed information on the application range of VEGAPULS 62 is available in chapter "*Product description*".

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

VEGAPULS 62 is a high-tech instrument requiring the strict observance of standard regulations and guidelines. The emitting frequencies of all radar sensors are in the C or K-band range (depending on the instrument version). The low transmitting power is far below the internationally permitted limit values, and when used correctly, no health-endangering effects are to be expected. The instrument can also be used without restriction on the side of metallic, closed vessels. The user must take note of the safety instructions in this operating instructions manual, the country-specific installation standards (e.g. the VDE regulations in Germany) as well as all prevailing safety regulations and accident prevention rules.

2.5 CE conformity

VEGAPULS 62 is in CE conformity with EMVG (89/336/EWG), R & TTE directive (1999/5/EC), fulfils NAMUR recommendation NE 21 and is in CE conformity with LVD (73/23/EWG).[1)]

Conformity has been judged acc. to the following standards:

[1)] R & TTE-Richtlinie (1999/5/EC): Not with version with increased sensitivity.

28435-EN-060317

- EMC: EN 61326: 2004
  - Emission: Class B
  - Susceptibility: Industrial areas
- R & TTE directive: I-ETS 300-440 Expert opinion No. 0043052-02/SEE, Notified Body No. 0499
- LVD: EN 61010-1: 2002

2.6 Compatibility acc. to NAMUR NE 53

VEGAPULS 62 meets NAMUR recommendation NE 53. VEGA instruments are generally upward and downward compatible:

- Sensor software for DTM VEGAPULS 62 HART, PA or FF
- DTM VEGAPULS 62 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.

The software version of VEGAPULS 62 can be determined as follows:

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

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

2.7 FCC/IC-Conformity (only for USA/Canada)

VEGAPULS with all antenna versions are FCC/IC approved

Unauthorized modifications could invalidate the FCC/IC approval. Modifications must be expressly agreed to by VEGA.

The VEGAPULS 62 complies with Part 15 and RSS-210 rules. Operation ist subject to the following conditions:

- This device may not cause harmful interference
- This device must accept any interference received, including interference that may cause undesired operation.

This device has been designed to operate with the antennas listed in the chapter "Dimensions" or without antenna and having a maximum gain of 33 dB. Antennas not included in this

list or having a gain greater than 33 dB are strictly prohibited for use with this device. The required antenna impedance is 50 Ohm.

2.8 Safety information 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 Manufacturer declaration

In conformity with DIN EN 60079-14/2004, para. 5.2.3, point c1, the VEGAPULS 62 radar sensor is suitable for use in zone 2.

The operator must use the instrument correctly and follow the specifications of the following documents:

- this operating instructions manual
- this manufacturer declaration (24626)
- the corresponding installation regulations

Max. increase of the surface temperature during operation: 27 K (individual components in the instrument)

With an ambient temperature of +70°C (+158°F) on the housing and a process temperature of +70°C (+158°F), the max. ambient temperature during operation is +97°C (+207°F).

Measures for maintaining explosion protection during operation:

- Operate the instrument in the range of the specified electrical limit values. Permissible supply voltage: see "*Technical data*"
- Mount and operate the instrument in such a way that no danger of ignition by electrostatic charges is to be expected. Antenna, process fitting and housing (as the case may be depending on instrument version) are made of electrically non-conductive plastic.
- Make sure that the seal is mounted correctly between lower part of the housing and cover. Screw the cover on tightly.
- Make sure there is no explosive atmosphere present if you want to operate the instrument with opened cover

- Make sure that the cable gland is tight and strain-relieved. The outer diameter of the connection cable must be adapted to the cable gland. Tighten the pressure screw of the cable gland carefully.
- Cover unused openings for cable glands tightly
- Mount the instrument in such a position that the sensor cannot touch the vessel wall or vessel installations. Keep the influence of product movements in the vessel in mind.
- The surface temperature of the housing must not exceed the ignition temperature of the surrounding explosive atmosphere

This instrument was assessed by a person fulfilling the requirements acc. to DIN EN 60079-14.

2.10 Environmental instructions

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

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

- Chapter "*Storage and transport*"
- Chapter "*Disposal*"

3 Product description

3.1 Configuration

Versions

The VEGAPULS 62 radar sensor is available in two electronics versions:

- Standard electronics type PS60**K**
- Electronics with increased sensitivity type PS60**S**

The respective version can be determined by means of the type label on the electronics.

The electronics version influences the CE conformity, the functional safety (SIL), the factory setting for the product selection and vessel, form, the accuracy, the voltage supply as well as the approvals of VEGAPULS 62. The differences are specified in this operating instructions manual in the respective paragraphs.

Scope of delivery

The scope of delivery encompasses:

- VEGAPULS 62 radar sensor
- documentation
  - this operating instructions manual
  - Supplementary instructions manual "*Safety Manual - Functional safety acc. to IEC 61508 (SIL)*"[2)]
  - Operating instructions manual "*Indicating and adjustment module PLICSCOM*" (optional)
  - Supplementary instructions manual "*Heating for 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

Components

VEGAPULS 62 consists of the following components:

- Horn or parabolic antenna
- process fitting (depending on the version flange or thread)
- optionally available with purging air connection, reflux valve
- Housing with electronics, optionally available with plug connector, optionally available with connection cable
- Housing cover, optionally available with indicating and adjustment module PLICSCOM

The components are available in different versions.

[2)] Not with electronics version with increased sensitivity

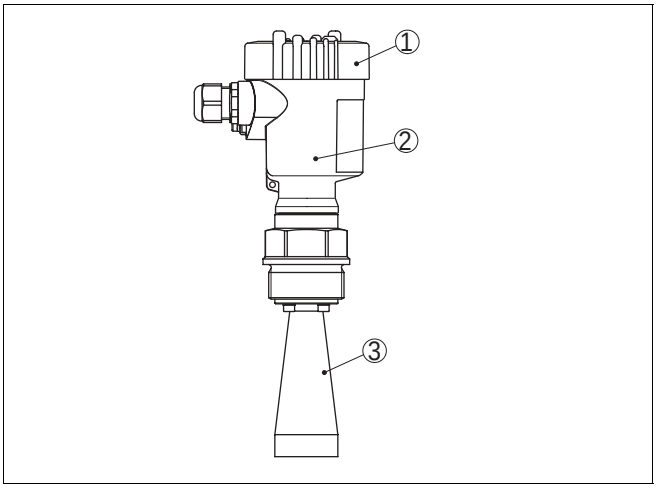


Fig. 1: VEGAPULS 62, threaded version with plastic housing
1 Housing cover with integrated PLICSCOM (optional)
2 Housing with electronics
3 Process fitting with horn antenna

3.2 Principle of operation

Area of application

VEGAPULS 62 is a radar sensor in K-band (emitting frequency approx. 26 GHz) for continuous level measurement.

A version of VEGAPULS 62 is available for the respective application.

The version with "**thread and horn antenna with ø 40 mm (1.6 in)**" is particularly suitable for small tanks and process vessels for measurement of virtually all products.

The version with "**flange and horn antenna with ø 48 … 95 mm (ø 1.9 … 3.7 in)**" is particularly suitable for storage tanks and process vessels, for measurement of solvents, hydrocarbons and fuels under most difficult process conditions.

The version with "**parabolic antenna**" is particularly suitable for precise measurement of products with small dielectric value.

Physical principle

The antenna of the radar sensor emits short radar pulses with a duration of approx. 1 ns. These pulses are reflected by the product and received by the antenna as echoes. The running time of the radar pulses from emission to reception is

proportional to the distance and hence to the level. The determined level is converted into an appropriate output signal and outputted as measured value.

Supply

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

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

The backlight of the indicating and adjustment module PLICSCOM is powered by the sensor. Prerequisite for this is a supply voltage at a certain level. The exact voltage specifications are stated in the "*Technical data*" in the "*Supplement*".

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.

The optional heating requires its own power supply. Details can be found in the supplementary instructions manual "*Heating for indicating and adjustment module PLICSCOM*".

This function is generally not available for approved instruments.

3.3 Adjustment

VEGAPULS 62 can be adjusted with four different adjustment media:

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

The entered parameters are generally saved in VEGAPULS 62, optionally also in PLICSCOM or in PACTware™.

3.4 Storage and transport

Packaging

Your instrument was protected by packaging during transport. Its capacity to handle normal loads during transport is assured by a test acc. 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.

Storage and transport temperature

- Storage and transport temperature see "*Supplement - Technical data - Ambient conditions*"
- Relative humidity 20 … 85 %

4 Mounting

4.1 General instructions

Installation 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°).

Screwing in

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

Moisture

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

You can give your VEGAPULS 62 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 mounting outdoors, in areas where moisture is expected (e.g. by cleaning processes) or on cooled or heated vessels.

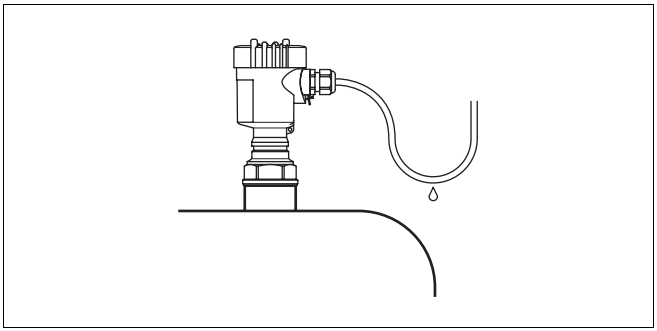


Fig. 2: Measures against moisture penetration

Measuring range

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

28435-EN-060317

Information:
If the medium reaches the antenna, buildup can be caused which can lead to faulty measurements later on.

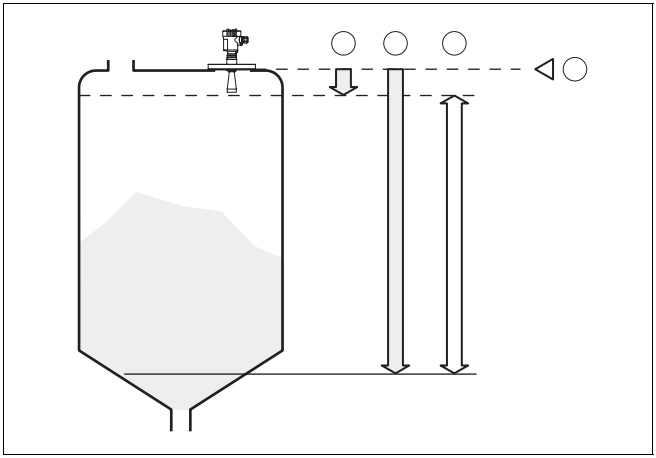


Fig. 3: Measuring range (operating range) and max. measuring distance
1 full
2 empty (max. measuring distance)
3 Measuring range

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 stated in the "*Technical data*" in the "*Supplement*" or on the type label of the sensor.

4.2 Mounting preparations - Horn antenna

Information:
This information applies only to special versions!

VEGAPULS 62 is also available in versions where the "**antenna has a bigger diameter**" than the process fitting (thread, flange). The antenna must therefore be disconnected from the process fitting before mounting. Proceed as follows:

1 Loosen the hexagon screws (3) on the antenna socket with an Allan key (size 3)
2 Remove the antenna (4)

3 Insert the antenna from below into the vessel socket and secure it against falling off

4 Retighten the antenna with hexagon screws to the antenna socket; torque max. 10 Nm (7.5 lbf ft)

Note:
VEGAPULS 62 with purging air connection or with antenna extension has a notch on the antenna socket. This notch must fit with the marking on the hexagon of the process fitting.[3)]

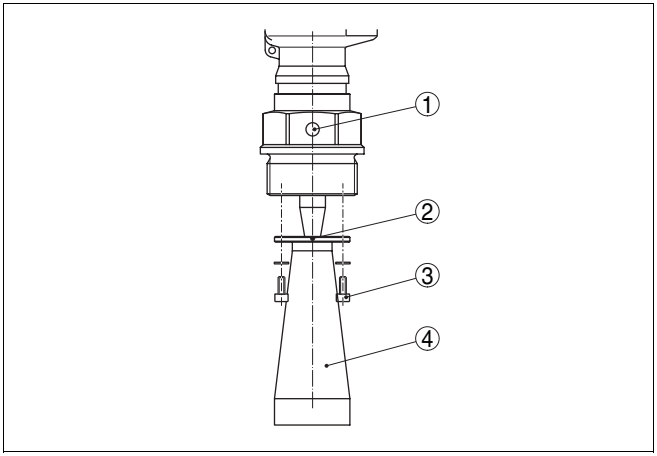


Fig. 4: Dismounting of the horn antenna
1 Marking
2 Notch
3 Hexagon screws on the antenna socket
4 Antenna

4.3 Mounting preparations - Parabolic antenna

Information:
This information applies only to special versions!

VEGAPULS 62 is also available in versions where the "**antenna has a bigger diameter**" than the process fitting (thread, flange). The antenna must therefore be disconnected from the flange before mounting. Proceed as follows:

1 Clamp VEGAPULS 62 with the flange, e.g. in a bench vice

[3)]
[3)] The marking indicates the orientation of the polarisation plane of the radar signal.

2 Hold the connection piece (3) with a wrench SW 22 on the flattenings
3 Unscrew the locknut (2) with SW 36 against the antenna
4 Unscrew the compression nut (1) with a wrench SW 41 against the antenna
5 Remove the parabolic antenna (4) axially
6 Mount sensor flange to the adapter flange and clamp it
7 Check if the O-ring is available on the adapter and if it is undamaged. If necessary, replace: FKM (Viton) article no. 2.28248; Kalrez 6375 article no. 2.27351
8 Remount the parabolic antenna (4)
9 Tighten compression nut (3) with SW 41, torque max. 50 Nm
10 Tighten locknut (2) with SW 36, torque max. 40 Nm.

Note:
Make sure when using VEGAPULS 62 with purging air connection that the holes in the antenna and in the process fitting match. This ensures sufficient air flow.[4)]

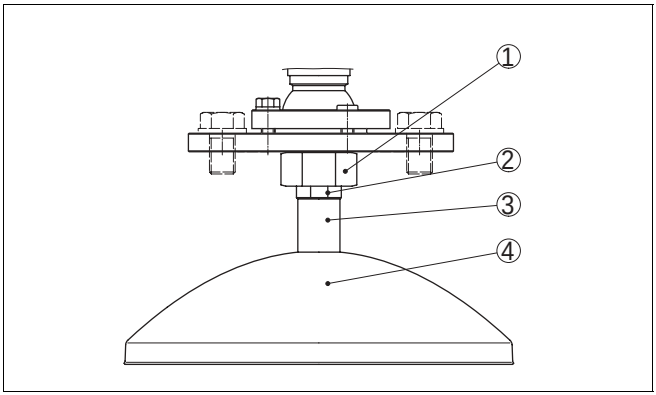


Fig. 5: Dismounting, parabolic antenna
1 Compression nut
2 Locknut
3 Connection piece
4 Parabolic antenna

4) 4) The air is lead through the holes to a feed system. Purging of the complete antenna is not planned.

4.4 Mounting information

Horn and parabolic antenna

The illustrations on the mounting instructions show a VEGAPULS 62 with horn antenna. The mounting instructions also apply to VEGAPULS 62 with parabolic antenna.

Installation position

When mounting VEGAPULS 62, keep a distance of at least 200 mm (7.9 in) to the vessel wall. If the sensor is installed in the center of concave or arched vessel tops, multiple echoes can arise. These can, however, be faded out by an appropriate adjustment (see "*Setup*").

If this distance cannot be maintained, a false echo storage should be carried out during setup. This applies particularly if buildup on the vessel wall is expected. In such case, we recommend repeating the false echo storage later on with existing buildup.

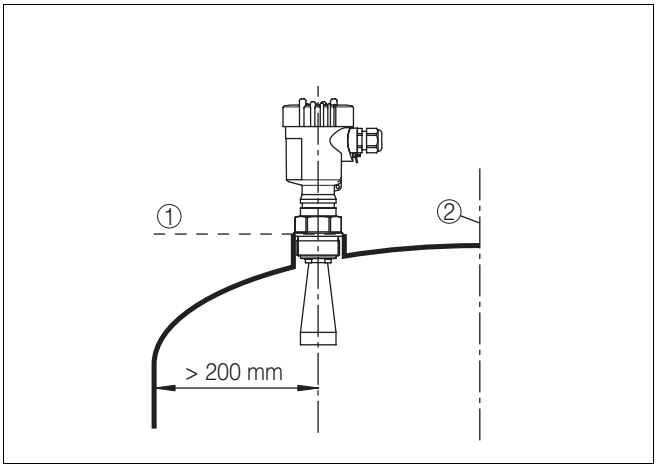


Fig. 6: Mounting on dished vessel tops
1 Reference plane
2 Vessel center or symmetry axis

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.

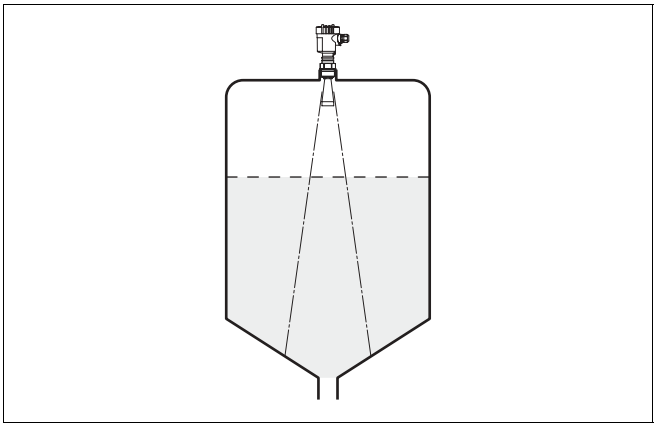


Fig. 7: Vessel with conical bottom

Inflowing material

Do not mount the instruments in or above the filling stream. Make sure that you detect the product surface and not the inflowing product.

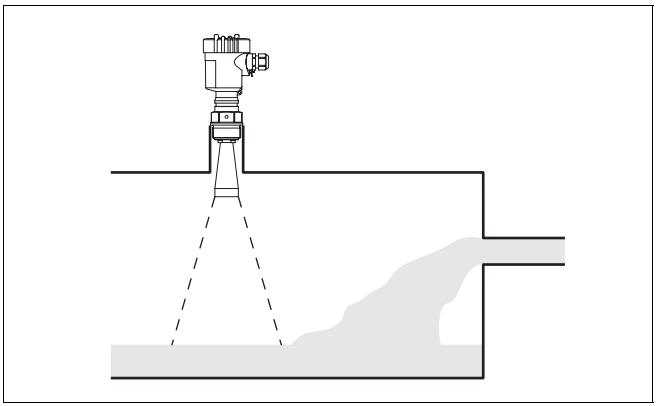


Fig. 8: Inflowing material

Socket

Socket pieces should be dimensioned such that the antenna end protrudes at least 10 mm (0.4 in) out of the socket.

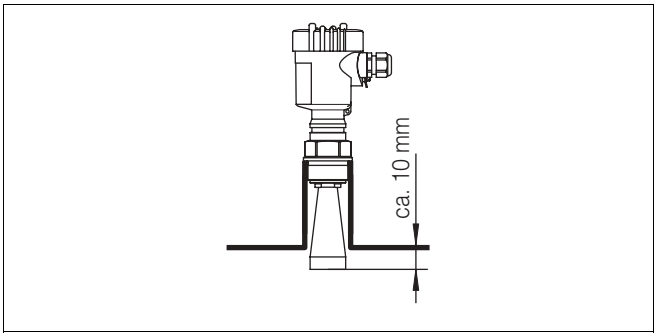
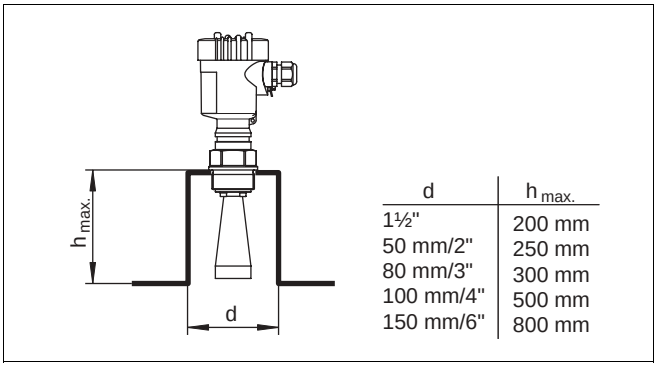


Fig. 9: Recommended socket mounting

If the reflective properties of the medium are good, you can mount VEGAPULS 62 on sockets higher than the antenna length. You will find recommended values for socket heights in the following illustration. The socket end should be smooth and burr-free, if possible also rounded. Then carry out a false echo storage.



d	h max.
1½"	200 mm
50 mm/2"	250 mm
80 mm/3"	300 mm
100 mm/4"	500 mm
150 mm/6"	800 mm

Fig. 10: Deviating socket dimensions

Sensor orientation

With liquids, align the sensor directly towards the product surface (as vertical as possible) to achieve optimum measurement.

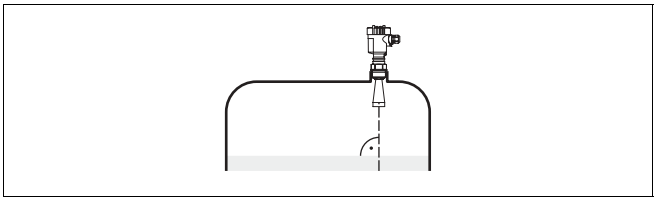


Fig. 11: Orientation in liquids

Vessel installations

The radar sensor should be installed at a location where no installations cross the microwave signals.

Vessel installations such as, for example, ladders, limit switches, heating spirals, struts, etc. can cause false echoes that get superimposed on the useful echo. Make sure when planning your measuring site that the radar sensor has a "clear view" to the measured product.

If there are existing vessel installations, a false echo storage should be carried out during setup.

If large vessel installations such as struts or supports cause false echoes, these can be attenuated through supplementary measures. Small, inclined sheet metal baffles above the installations scatter the radar signals and avoid a direct false echo reflection.

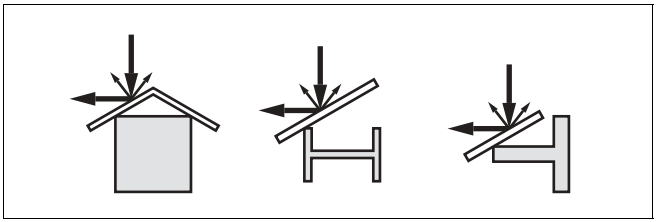


Fig. 12: Cover smooth profiles with deflectors

Agitators

If there are agitators in the vessel, a false echo storage should be carried out with the agitators in motion. This ensures that the interfering reflections from the agitators are saved with the blades in different positions.

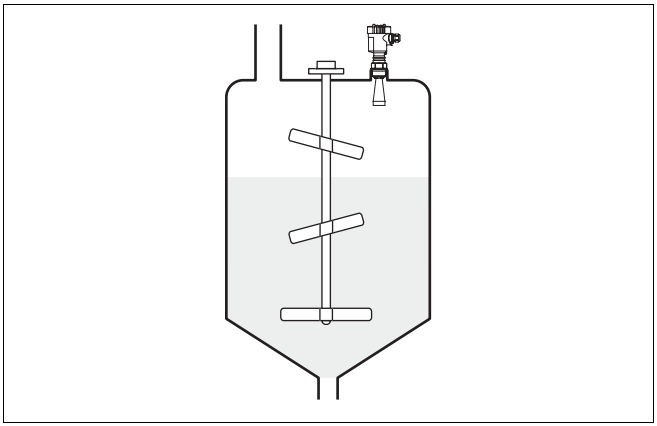


Fig. 13: Agitators

Foam generation

Through the action of filling, stirring and other processes in the vessel, dense foams which considerably damp the emitted signals may form on the product surface.

If foams lead to measurement errors, you should use the biggest possible radar antennas and low frequency radar sensors, e.g. VEGAPULS 65, 66 (C-band).

VEGAFLEX sensors with guided microwaves are not influenced by foam generation and are particularly suitable for such applications.

Measurement in the standpipe (surge or bypass tube)

By the use of a standpipe, influences of vessel installations and turbulence can be excluded. Under these requirements, the measurement of products with low dielectric values (from DK value 1.6) is possible.

Surge or bypass tubes must extend all the way down to the requested min. level, as measurement is only possible within the tube.

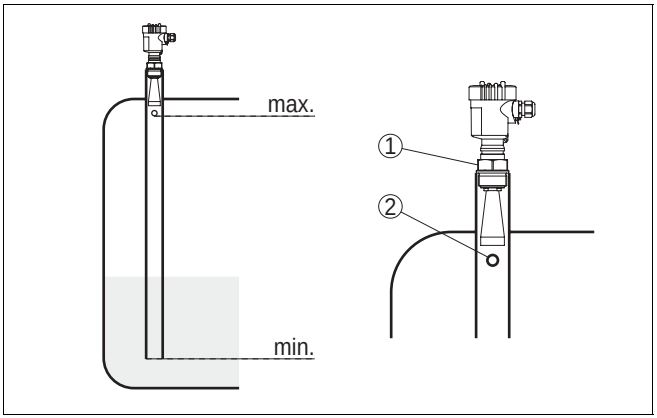


Fig. 14: Pipe antenna systems in a tank
1 Marking of the polarisation direction
2 Vent holde max. ø 5 mm (0.2 in)

If possible, the antenna diameter of the sensor should correspond to the inner diameter of the tube. With VEGAPULS 62 this is approx. 40 mm (1.6 in). The sensor can be used with tube diameters between 40 … 80 mm (1.6 … 3.2 in).

Make sure you provide the necessary upper vent hole in the surge pipe, which must by displaced by 90° to the polarisation marking on the sensor (see illustration: "*Pipe antenna system in a tank*").

As an alternative to the surge pipe in the vessel, a pipe system can be mounted outside of the vessel as a bypass tube. For setup, select the function "*Bypass tube*".

Align the sensor in such a way that the polarisation marking on the process fitting is displaced by 90° to the tube holes or the tube connection openings (see illustration: "*VEGAPULS in a bypass tube*").

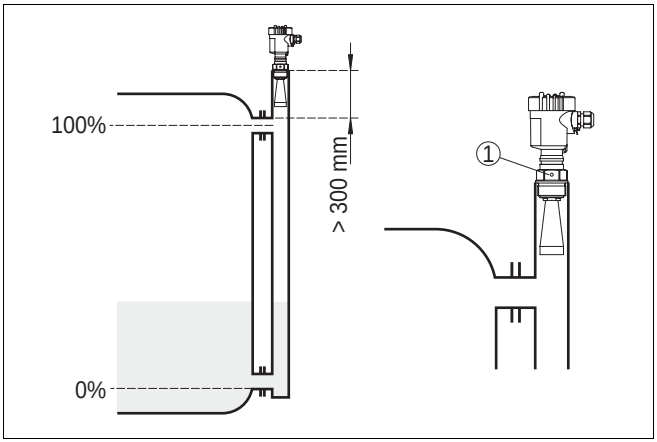


Fig. 15: VEGAPULS in a bypass tube
1 Marking of the polarisation direction

When mounting the sensor on a bypass tube, the distance of VEGAPULS 62 to the upper tube connection should be approx. 300 mm (12 in) or more. In case of extremely rough tube inner walls, you should use an inserted tube (tube within tube) or a radar sensor with tube antenna.

5 Connecting to power supply

5.1 Preparing the connection

Note safety instructions

Always observe the following safety instructions:

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

Tip:
We recommend using VEGA overvoltage arresters ÜS-F-LB-I and ÜSB 62-36G.X.

Take note of safety instructions for Ex applications

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

Select power supply

Power supply and current signal are transmitted via the same two-wire connection cable. The supply voltage range can differ depending on the instrument version. The exact range is stated in the "*Technical data*" in the "*Supplement*".

Provide a reliable separation between the supply circuit and the mains circuits acc. to DIN VDE 0106 part 101. The VEGA power supply units VEGATRENN 149AEx, VEGASTAB 690, VEGADIS 371 as well as all VEGAMETs meet this requirement.

Bear in mind the following factors regarding supply voltage:

- the reduction of the output voltage of the power supply unit under nominal load (with a sensor current of 20.5 mA or 22 mA in case of fault signal)
- The influence of additional instruments in the circuit (see load values in "*Technical data*").

Select connection cable

VEGAPULS 62 is connected with standard two-wire cable without screen. A outer cable diameter of 5 … 9 mm ensures the seal effect of the cable gland. If electromagnetic interference is expected which is above the test values of EN 61326 for industrial areas, screened cable should be used. For HART multidrop operation we recommend as standard practice the use of screened cable.

Cable gland ½ NPT

On VEGAPULS 62 with cable gland ½ NPT and plastic housing, a metal ½" threaded insert is moulded in the plastic housing.

Caution:
No grease should be used when screwing the NPT cable gland or steel tube into the threaded insert. Standard grease can contain additives affecting the connection between threaded insert and housing. This will influence the stability of the connection and the tightness of the housing.

Cable screening and grounding

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

If potential equalisation currents are expected, the connection on the evaluation side must be made via the 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.

Select connection cable for 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.

5.2 Connection procedure - Instrument housing

Proceed as follows:

1 Unscrew the housing cover
2 If an indicating and adjustment module is installed, remove it by turning it slightly to the left.
3 Loosen compression nut of the cable entry
4 Remove approx. 10 cm (4 in) of the cable mantle, strip approx. 1 cm (0.4 in) insulation from the ends of the individual wires
5 Insert the cable into the sensor through the cable entry
6 Lift the opening levers of the terminals with a screwdriver (see following illustration)
7 Insert the wire ends into the open terminals according to the wiring plan

28435-EN-060317

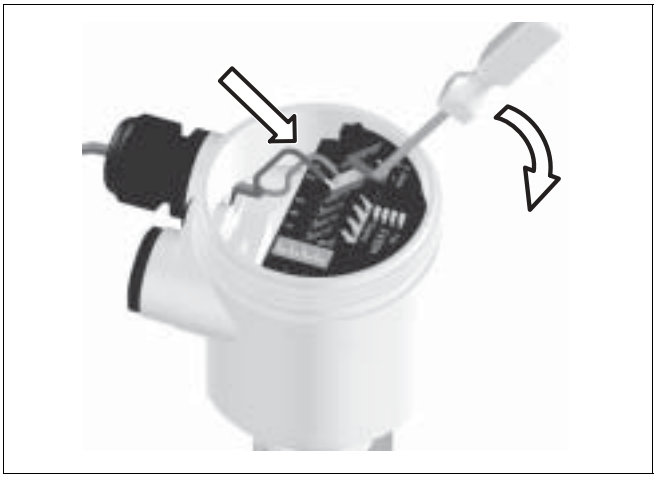


Fig. 16: Connection steps 6 and 7

8 Press the opening lever of the terminals downward, you will hear the terminal spring closing

9 Check the hold of the wires in the terminals by lightly pulling on them

10 Connect the screen to the internal ground terminal and the external ground terminal to potential equalisation

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

12 Screw the housing cover back on

The electrical connection is finished.

5.3 Wiring plans, single chamber housing

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

Housing overview

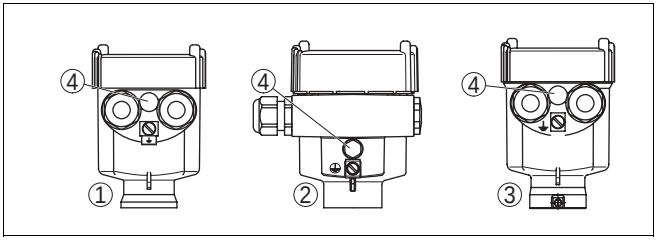


Fig. 17: Material versions, single chamber housing
1 Plastic
2 Aluminium
3 Stainless steel
4 Filter element for pressure compensation or blind stopper with version IP 66/ IP 68, 1 bar

Electronics and connection compartment

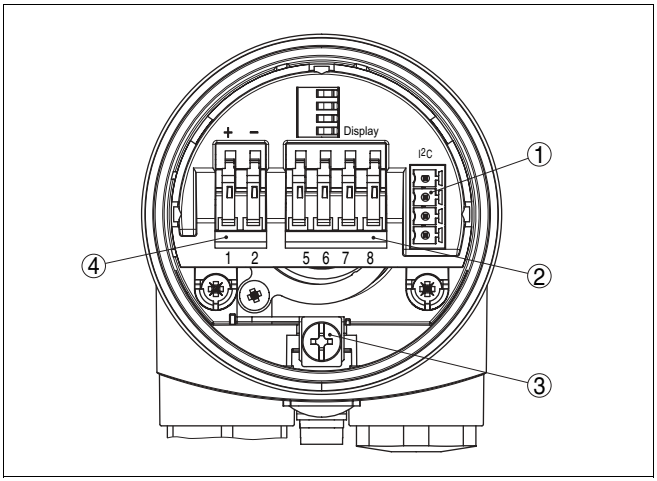


Fig. 18: Electronics and connection compartment, single chamber housing
1 Plug connector for VEGACONNECT (I^2C interface)
2 Spring-loaded terminals for connection of the external indication VEGADIS 61
3 Ground terminal for connection of the cable screen
4 Spring-loaded terminals for power supply

Wiring plan

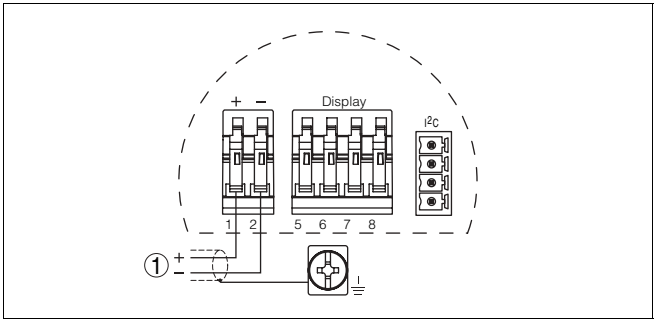


Fig. 19: Wiring plan, single chamber housing
1 Power supply/Signal output

5.4 Wiring plans, 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.

Housing overview

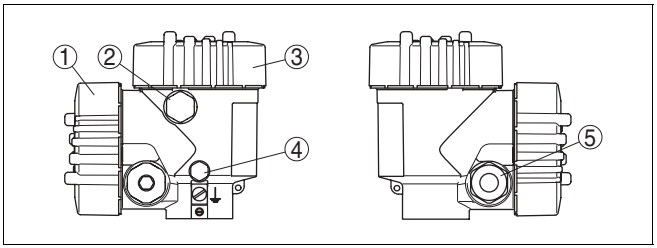


Fig. 20: Double chamber housing
1 Housing cover, connection compartment
2 Blind stopper or plug M12x1 for VEGADIS 61 (option)
3 Housing cover, electronics compartment
4 Filter element for pressure compensation or blind stopper with version IP 66/ IP 68, 1 bar[5)]
5 Cable entry or plug

[5)] [5)] Version IP 66/IP 68, 1 bar not with four-wire instruments.

Electronics compartment

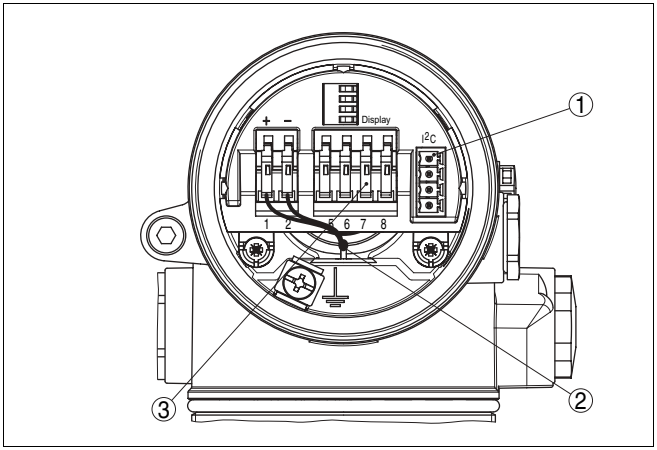


Fig. 21: Electronics compartment, double chamber housing
1 Plug connector for VEGACONNECT (I^2C interface)
2 Internal connection cable to the connection compartment
3 Terminals for VEGADIS 61

Connection compartment

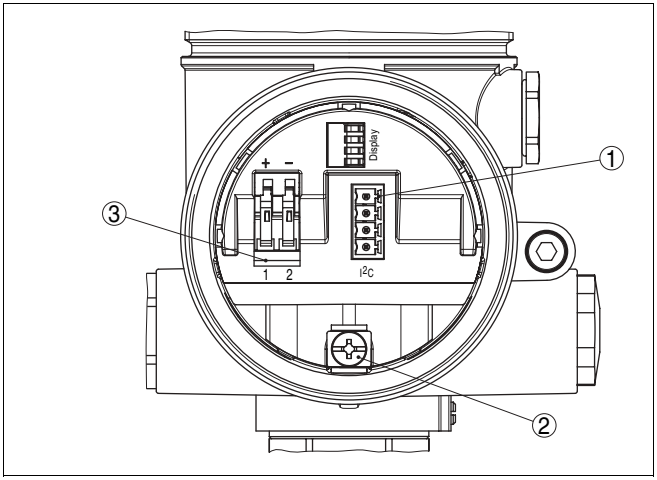


Fig. 22: Connection compartment, double chamber housing
1 Plug connector for VEGACONNECT (I^2C interface)
2 Ground terminal for connection of the cable screen
3 Spring-loaded terminals for power supply

Wiring plan

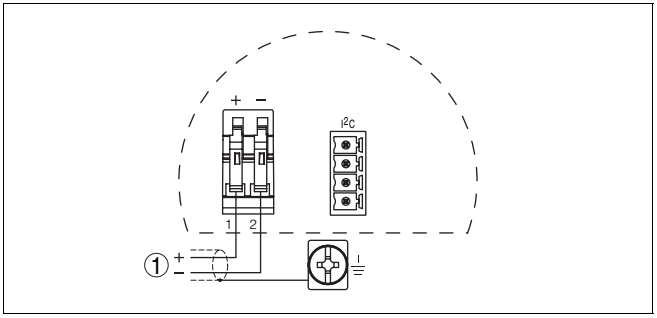


Fig. 23: Wiring plan, double chamber housing
1 Power supply/Signal output

5.5 Wiring plans, double chamber housing Exd

Housing overview

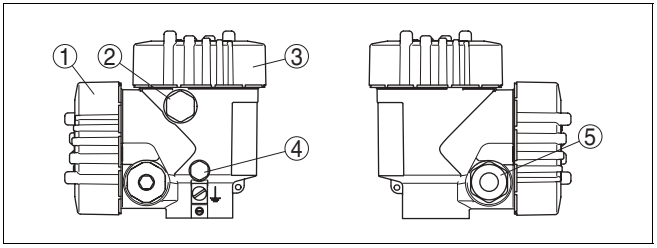


Fig. 24: Double chamber housing
1 Housing cover, connection compartment
2 Blind stopper or plug M12x1 for VEGADIS 61 (option)
3 Housing cover, electronics compartment
4 Filter element for pressure compensation or blind stopper with version IP 66/ IP 68, 1 bar[6)]
5 Cable entry or plug

6)
6) Version IP 66/IP 68, 1 bar not with four-wire instruments.

Electronics compartment

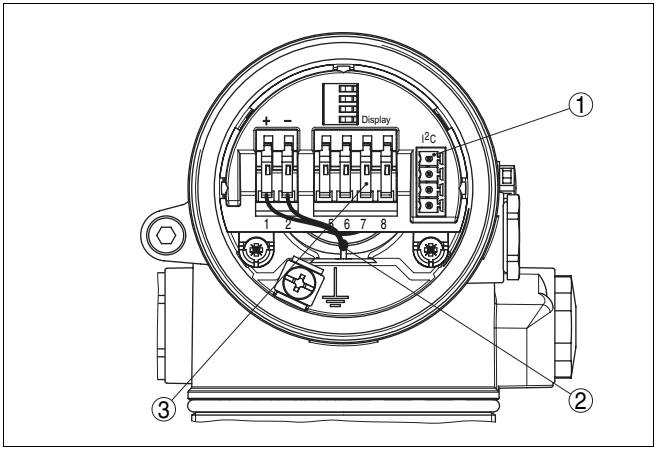


Fig. 25: Electronics compartment, double chamber housing
1 Plug connector for VEGACONNECT (I^2C interface)
2 Internal connection cable to the connection compartment
3 Terminals for VEGADIS 61

Connection compartment

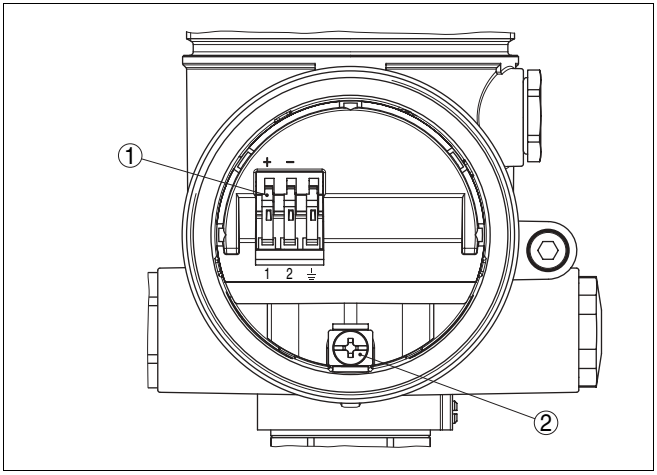


Fig. 26: Connection compartment, double chamber housing Exd
1 Spring-loaded terminals for power supply and cable screen
2 Ground terminal for connection of the cable screen

Wiring plan

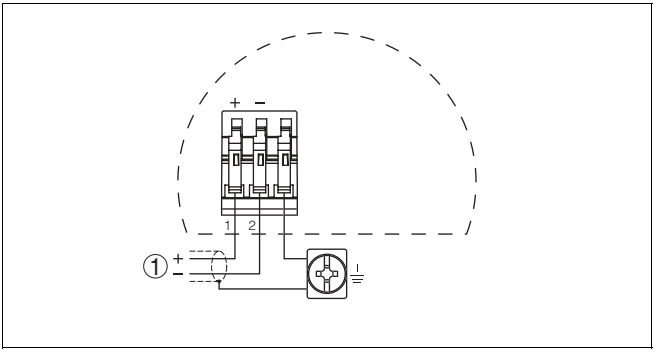


Fig. 27: Wiring plan, double chamber housing Exd
1 Power supply/Signal output

5.6 Wiring plans, version IP 66/IP 68, 1 bar

Wire assignment, connection cable

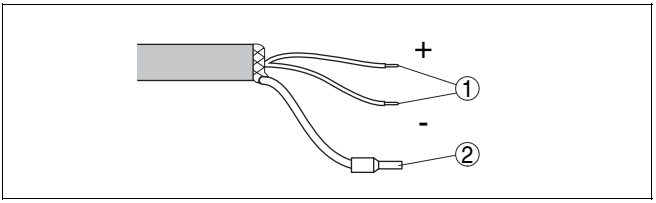


Fig. 28: Wire assignment, connection cable
1 br (+) and bl (-) for power supply or to the processing system
2 Screen

5.7 Switch-on phase

Switch-on phase

After VEGAPULS 62 is connected to power supply or after a voltage recurrence, the instrument carries out a self-test for approx. 30 seconds. The following steps are carried out:

- Internal check of the electronics
- Indication of the instrument type, the firmware version as well as the sensor TAGs (sensor name)
- Output signal jumps briefly (approx. 10 seconds) to the set fault current

Then the corresponding current is transmitted to the cable.[7)]

[7)] [7)] The value corresponds to the actual level as well as to the settings already carried out, e.g. default setting.

6 Setup with the indicating and adjustment module PLICSCOM

6.1 Short description

Function/Configuration

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

Information:
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.

Note:
You will find detailed information on the adjustment in the operating instructions manual of the indicating and adjustment module PLICSCOM.

6.2 Installing the indicating and adjustment module PLICSCOM

Insert/remove PLICSCOM

PLICSCOM can be inserted or removed at any time. It is not necessary to interrupt the power supply.

Proceed as follows:

1 Unscrew the housing cover

2 Place PLICSCOM in the desired position on the electronics (you can choose any one of four different positions - each displaced by 90°)

3 Press PLICSCOM lightly onto the electronics and turn it to the right until it snaps in.

28435-EN-060317

4 Screw housing cover with inspection window tightly back on

Removal is carried out in reverse order.

PLICSCOM is powered by the sensor, an additional connection is not necessary.

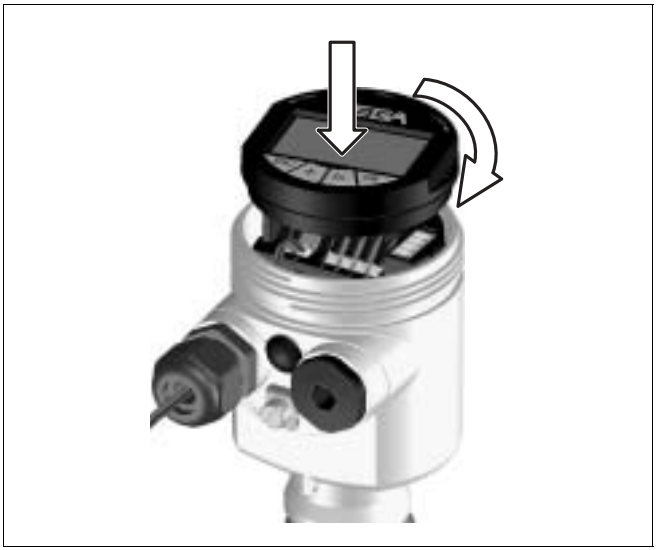


Fig. 29: Installation of PLICSCOM

Note:
If you intend to retrofit VEGAPULS 62 with a PLICSCOM for continuous measured value indication, a higher cover with an inspection glass is required.

6.3 Adjustment system

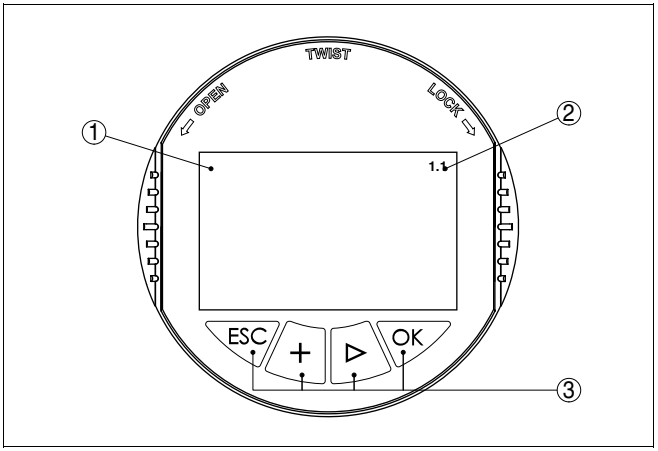


Fig. 30: Indicating and adjustment elements
1 LC display
2 Indication of the menu item number
3 Adjustment keys

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

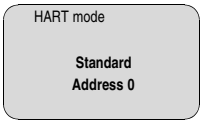
Adjustment system

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 procedure

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 of PLICSCOM or in the online help of PACTware™ or DTM.



Parameter adjustment

As VEGAPULS 62 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 this 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.

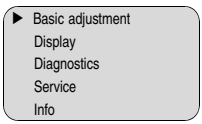
In the main menu item "*Basic adjustment*", the individual submenu items should be selected one after the other and provided with the correct parameter values.

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

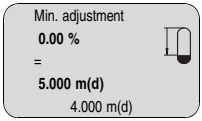
Carrying out min. adjustment

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 "*Min. adjustment*" is displayed.

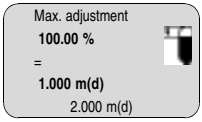


3 Prepare the % value for editing with ***[OK]*** and set the cursor to the requested position with ***[->]***. Set the requested percentage value with ***[+]*** and save with ***[OK]***. The cursor jumps now to the distance value.

4 Enter the appropriate distance value in m (corresponding to the percentage value) for the empty vessel (e.g. distance from the sensor to the vessel bottom).

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

Proceed as follows:

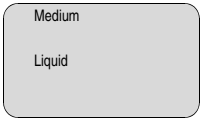


1 Prepare the % value for editing with ***[OK]*** and set the cursor to the requested position with ***[->]***. Set the requested percentage value with ***[+]*** and save with ***[OK]***. The cursor jumps now to the distance value.

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]*** and move to "Medium selection" with ***[->]***.

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 "*Liquid*" or "*Solid*".



According to the conductivity and the dielectric value of liquids, the reflection properties can differ considerably. Therefore additional options such as "*Solvent*", "*Chem. mixture*" and "*Water based*" are offered below the menu item Liquid.

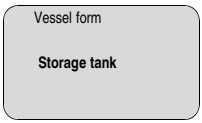
With solids, you can choose between "*Powder/Dust*", "*Granular/Pellets*" or "*Ballast/Pebbels*".

Through this additional selection, the sensor is adapted perfectly to the product and measurement reliability, particularly in products with bad reflective properties, is considerably increased.

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

Vessel form

Apart from the medium, the vessel shape can also influence the measurement. To adapt the sensor to the measuring conditions, this menu item offers different options depending on whether liquid or solid. With "*Liquid*" these are "*Storage tank*", "*Stilling tube*", "*Open vessel*" or "*Stirred vessel*", with "*Solid*", "*Silo*" or "*Bunker*".



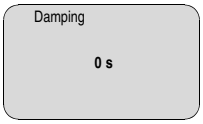
Information:
With VEGAPULS 62 with electronics version "*Increased safety*", "*Solid*" is preset as factory setting. However, the instrument should be used preferably in liquids. In such cases, the vessel form should be set to "*Storage tank*" during setup.

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

Damping

To suppress fluctuation in the measured value display, e.g. caused by a turbulent product surface, an integration time can be set. This time can be between 0 and 999 seconds. Please note that the reaction time of the entire measurement will be longer and the sensor will react to quick changes of the

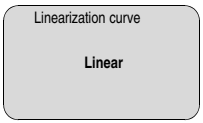
measured value with a corresponding delay. In general, a time of a few seconds is sufficient to smooth the measured value display.



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

Linearization curve

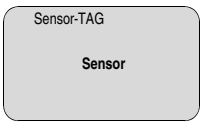
A linearization is necessary for all vessels in which the vessel volume does not increase linearly with the level - e.g. with a cylindrical or spherical tank - and the indication or output of the volume is required. Corresponding linearization curves are preprogrammed for these vessels. They represent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



Enter the requested parameter 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 sites.



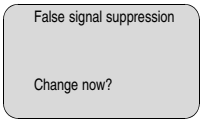
With this menu item, the Basic adjustment is finished and you can now jump to the main menu with the ***[ESC]*** key.

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 measure-

28435-EN-060317

ment. 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 empty vessel so that all potential interfering reflections will 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 to read out parameter adjustment data as well as write parameter adjustment data into the sensor via the indicating and adjustment module PLICSCOM. A description of the function is available in the operating instructions manual "*Indicating and adjustment module PLICSCOM*".

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

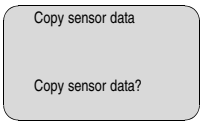
- Measured value presentation
- Adjustment
- Medium
- Standpipe inner diameter[8)]
- Vessel form
- Damping
- Linearization curve
- Sensor-TAG

[8)] With standpipe versions.

- Displayed value
- Display unit
- Scaling
- Current output
- Units of measurement
- Language

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

- HART mode
- PIN
- SIL



Basic adjustment

If the "*Reset*" is carried out, the sensor resets the values of the following functions to the reset vales (see chart):[9)]

Function	Reset value
Max. adjustment	0 m(d)
Min. adjustment	30 m(d) (VEGAPULS 61 … 65) 35 m(d) (VEGAPULS 66) 70 m(d) (VEGAPULS 68)
Medium	Liquid
Vessel form	not known
Damping	0 s
Linearization	Linear
Sensor-TAG	Sensor
Displayed value	Distance
Current output - characteristics	4 … 20 mA
Current output - max. current	20.0 mA
Current output - min. current	4 mA
Current output - failure	<3.6 mA
Units of measurement	m(d)

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

9) Sensor-specific basic adjustment.

Function	Reset value
Lighting	no reset
Language	no reset
SIL	no reset
HART mode	no reset

Factory setting
Like basic setting, in addition special parameters are reset to default values.[10)]

Peak values
The min. and max. distance values are reset to the current value.

Optional settings

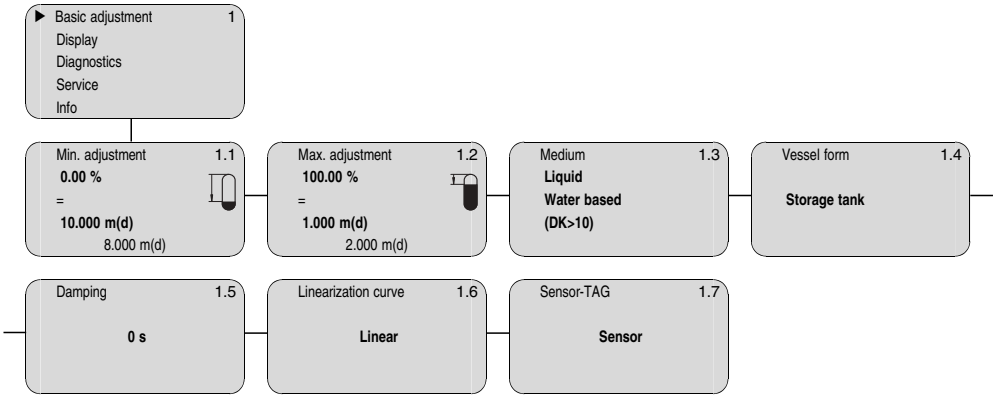
Additional adjustment and diagnosis options such as e.g. scaling, simulation or trend curve presentation are shown in the following menu schematic. You will find a detailed description of these menu items in the operating instructions manual of the indicating and adjustment module.

10) Special parameters are parameters which are set customer-specifically on the service level with the adjustment software PACTware™.

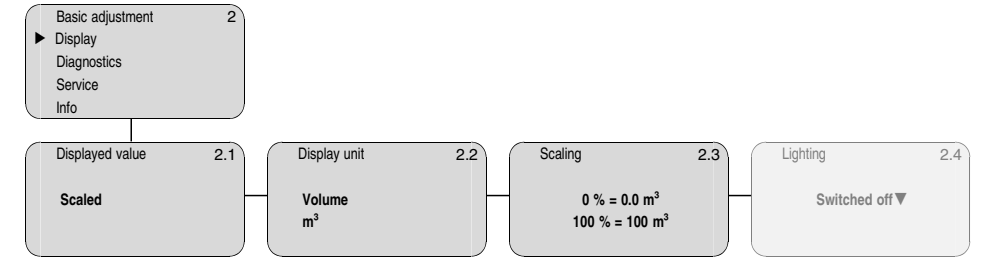
6.5 Menu schematic

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

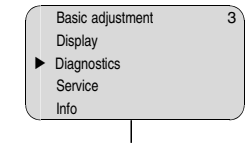
Basic adjustment

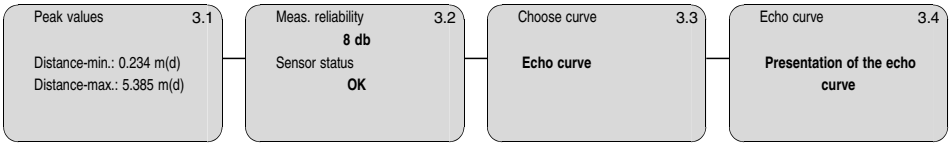


Display

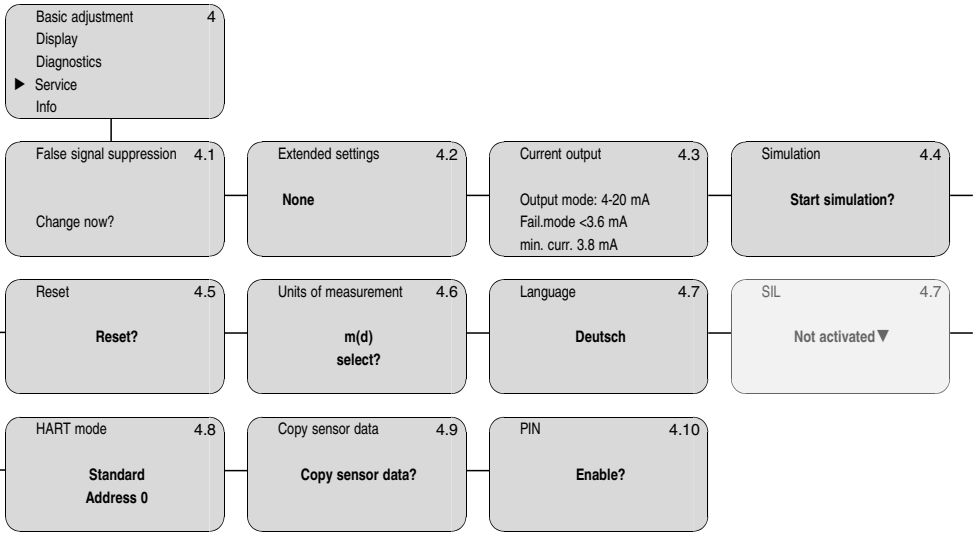


Diagnostics

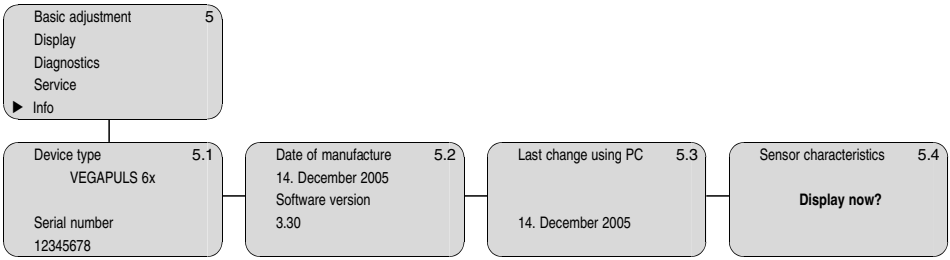




Service



Info



6.6 Saving the parameter adjustment data

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

If VEGAPULS 62 is equipped with an indicating and adjustment module PLICSCOM, the most important data can be read out of the sensor into PLICSCOM. The procedure is described in the operating instructions manual "*Indicating and adjustment module PLICSCOM*" 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 VEGAPULS 62, PLICSCOM is inserted into the replacement instrument and the data are written into the sensor under the menu item "*Copy sensor data*".

7 Setup with PACTware™ and other adjustment programs

7.1 Connecting the PC

Connecting the PC directly to the sensor

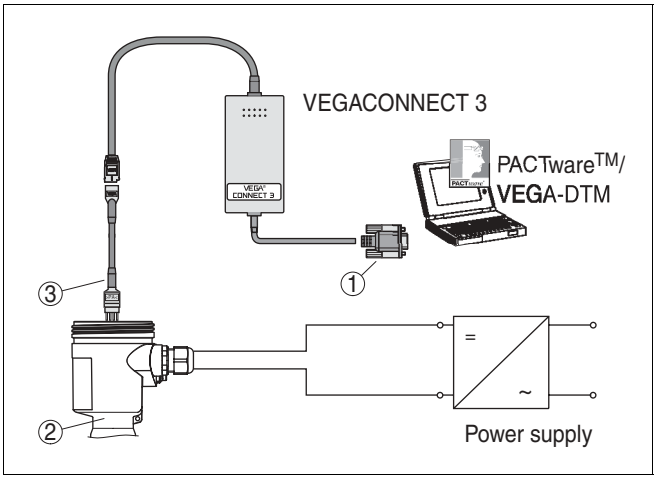


Fig. 31: PC connected directly to the sensor
1 RS232 connection
2 VEGAPULS 62
3 I²C adapter cable for VEGACONNECT 3

Necessary components:

- VEGAPULS 62
- PC with PACTware™ and suitable VEGA-DTM
- VEGACONNECT 3 with I²C adapter cable (article no. 2.27323)
- Power supply unit

Connecting the PC to the signal cable

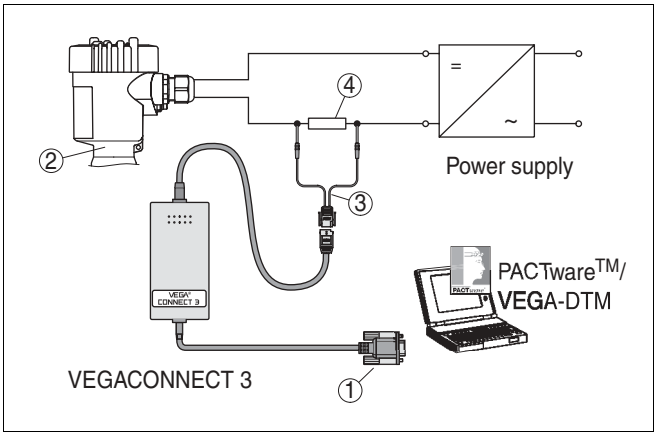


Fig. 32: Connecting the PC to the signal cable
1 RS232 connection
2 VEGAPULS 62
3 HART adapter cable for VEGACONNECT 3
4 HART resistance 250 Ohm

Necessary components:

- VEGAPULS 62
- PC with PACTware™ and suitable VEGA-DTM
- VEGACONNECT 3 with HART adapter cable (art. no. 2.25397)
- HART resistance approx. 250 Ohm
- Power supply unit

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.

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 VEGAPULS 62, DTM-Collection 06/2003 or a newer version must be used.

All currently available VEGA-DTMs are provided in the DTM Collection on CD and can be obtained from the responsible VEGA agency for a token fee. This CD includes also the up-to-date PACTware™ version. The basic version of this DTM Collection incl. PACTware™ is also available as a free-of-charge download from the Internet.

Go via www.vega.com and "*Downloads*" to the item "*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.

Go via www.vega.com and "*Downloads*" to the item "*Software*".

7.4 Saving the parameter adjustment data

It is recommended to document or save the parameter adjustment data. They are hence 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

When used as directed in normal operation, VEGAPULS 62 is completely maintenance-free.

8.2 Fault rectification

Causes of malfunction

VEGAPULS 62 offers maximum reliability. Nevertheless faults can occur during operation. These may be caused by the following, e.g.:

- Sensor
- Process
- 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 PLICSCOM. The procedure is described below. Further comprehensive diagnostics can be carried out on a laptop with the software PACTware™ and the suitable DTM. In many cases, the causes can be determined in this way and faults can be rectified.

24 hour service hotline

Should the following measures not be successful, please call in urgent cases the VEGA service hotline under the phone number **+49 1805 858550**.

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

Checking the 4 … 20 mA signal

Connect a hand-held multimeter with a suitable measuring range acc. to the wiring plan.

? 4 … 20 mA signal not stable

- level fluctuations

→ set integration time via PLICSCOM or PACTware™

? 4 … 20 mA signal missing

- incorrect connection to power supply

→ Check connection acc. to chapter "*Connection procedure*" and correct, if necessary, acc. to chapter "*Wiring plans*"

28435-EN-060317

- No voltage supply

→ check cables for line break, repair, if necessary

- supply voltage too low or load resistance too high

→ check and adapt, if necessary

? Current signal greater than 22 mA or less than 3.6 mA

- Electronics defective

→ Exchange instrument or return it for repair

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

Error message via PLICSCOM

? E013

- no measured value available

→ sensor in boot phase

→ sensor does not find an echo, e.g. because of faulty installation or incorrect parameter adjustment

? E017

- Adjustment span too small

→ Carry out a fresh adjustment and increase the distance between min. and max. adjustment

? E036

- No operable sensor software

→ Carry out software update or send instrument for repair

? E041, E042, E043

- Hardware error, electronics defective

→ Exchange instrument or return it for repair

8.3 Exchange of the electronics module

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

In Ex applications, only an instrument and an electronics module with appropriate 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 order data of the sensor must be downloaded into the new electronics module. This can be done:

- at the factory by VEGA personnel
- 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 or on the delivery note.

Information:
When loading on site, the order data must be downloaded from the Internet (see Operating Instructions manual of the oscillator).

Assignment

The oscillators are adapted to the respective sensor and differ in their signal output or in their power supply. You can find a suitable oscillator in the following overview.

4 … 20 mA/HART

Oscillator PS-E.60**K**H. is suitable for **K**-band VEGAPULS 61, 62, 63 - 4 … 20mA/HART:

- PS-E.60KH**X** (X = without approvals)
- PS-E.60KH**A** (A = approvals CA, DA, EA acc. to VEGA product list)
- PS-E.60KH**D** (D = approvals XM, CM, CK, CI, DM, DK, DI, EX, GX, UX, UF acc. to VEGA product list)
- PS-E.60KH**E** (E = approvals CX, DX acc. to VEGA product list)

4 … 20 mA/HART with increased sensitivity

Oscillator PS-E.60SH. is suitable for VEGAPULS 61, 62, 63 - 4 … 20 mA/HART:

- PS-E.60SH**X** (X = without approvals)
- PS-E.60SH**D** (D = approvals CK, GX acc. to VEGA product list)
- PS-E.60SH**E** (E = approvals CX, DX acc. to VEGA product list)

8.4 Instrument repair

If a repair is necessary, please proceed as follows:

You can download a return form (23 KB) from our homepage

28435-EN-060317

www.vega.com under: "*Services – 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 possibly also a safety data sheet to the instrument
- Please ask the agency serving you for the address of the return shipment

9 Dismounting

9.1 Dismounting procedure

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 the instructions in 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 electronic modules 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 (in Germany, e.g. ElektroG). 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 acc. to the WEEE directive.

Correct disposal avoids negative effects to persons and environment and ensures recycling of useful raw materials.

Materials: see "*Technical data*"

If you cannot dispose of the instrument properly, please contact us about disposal methods or return.

10 Supplement

10.1 Technical data

General data

316L corresponds to 1.4404 or 1.4435

Materials, non-wetted parts	
– Housing	plastic PBT (Polyester), Alu-die casting powder-coated, 316L
– Seal ring between housing and housing cover	NBR (stainless steel housing), silicone (Alu/plastic housing)
– Inspection window in housing cover for PLICSCOM	Polycarbonate (UL746-C listed)
– Ground terminal	316Ti/316L (1.4571/1.4435)
Materials, wetted parts	
– Process fitting	316L, Hastelloy C22, Hastelloy C22 plated, Monell Alloy
– Antenna	316L, Hastelloy C22, Monell Alloy
– Antenna cone	PTFE (TFM 1600 PTFE), PP
– seal, antenna system	FKM (Viton), Kalrez 2035, 6230 (FDA), 6375
Weight with horn antenna	
– Process fitting - Thread	2.0 … 2.8 kg (4.4 … 6.2 lbs), depending on thread size and housing
– Process fitting - Flange	4.2 … 15.4 kg (9.3 … 34 lbs), depending on flange size and housing
Weight with parabolic antenna	
– Process fitting - Thread	2.8 … 3.6 kg (6.2 … 13.7 lbs), depending on thread size and housing
– Process fitting - Flange	5.0 … 16.2 kg (11 … 35.7 lbs), depending on the flange size and housing

Output variable

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	see load diagram in Power supply
Integration time (63 % of the input variable)	0 … 999 s, adjustable
Fulfilled NAMUR recommendation	NE 43

Input variable

Parameter	distance between process fitting and product surface
Min. distance from antenna end	50 mm (2 in)

Recommended meas. range depending on the antenna diameter

– ø 40 mm (1.6 in)	up to 10 m (33 ft)
– ø 48 mm (1.9 in)	up to 15 m (50 ft)
– ø 75 mm (3 in), ø 95 mm (3.7 in), parabolic antenna	up to 30 m (98.4 ft)

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)

28435-EN-060317

Characteristic curve deviation and measurement characteristics[11)]

Average temperature coefficient of the zero signal (temperature error)	0.03 %/10 K
Resolution, general	max. 1 mm
Frequency	K-band (26 GHz technology)
Interval	approx. 1 s
Adjustment time[12)]	>1 s (dependent on the parameter adjustment)
Received average emitted power reaching an object directly in front of the antenna	
– Distance 1 m	108 nW per cm^2 ($108x10^{-9}$ W/cm^2)
– Distance 5 m	4.3 nW per cm^2 ($4.3x10^{-9}$ W/cm^2)
Beam angle with horn antenna, depending on the antenna diameter	
– ø 40 mm	22°
– ø 48 mm	18°
– ø 75 mm	10°
– ø 95 mm	8°
Accuracy	see diagram

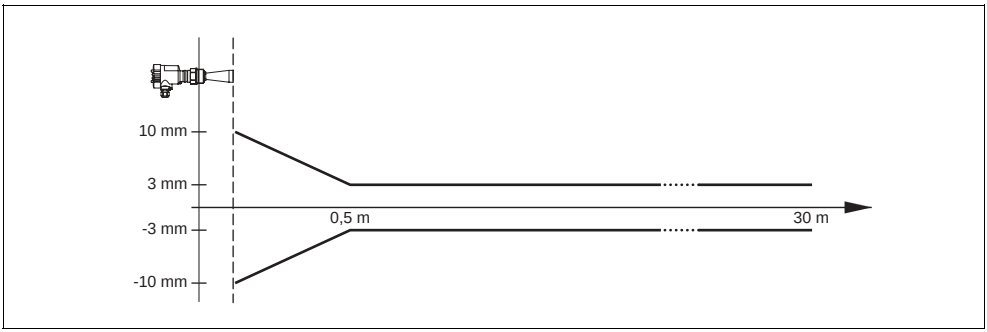


Fig. 33: Accuracy VEGAPULS 62 with horn antenna

11) Relating to the nominal range, incl. hysteresis and repeatability, determined acc. to the limit point method.

12) Time to output the correct level (with max. 10 % deviation) after a sudden level change.

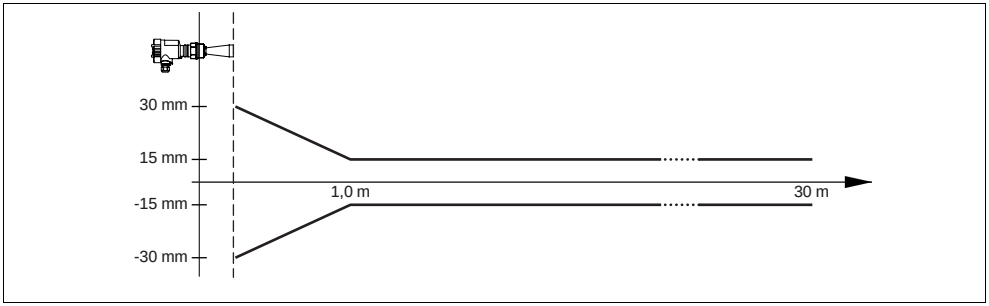


Fig. 34: Accuracy VEGAPULS 62 with horn antenna and increased sensitivity

Beam angle with parabolic antenna	4°
Accuracy with parabolic antenna	see diagram

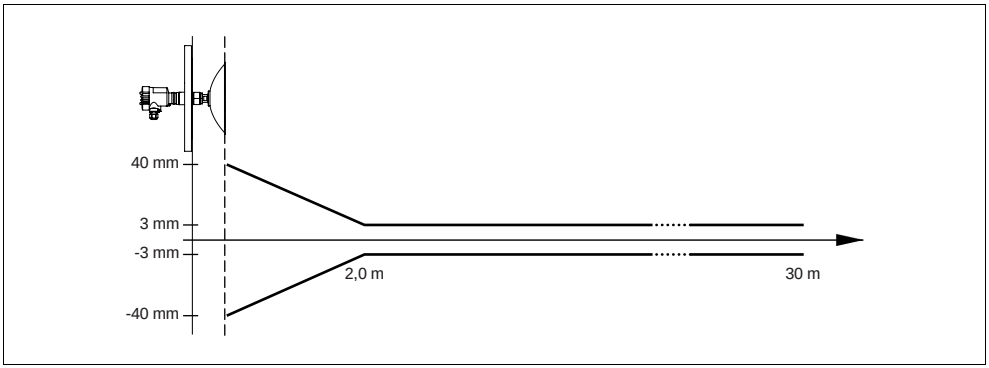


Fig. 35: Accuracy VEGAPULS 62 with parabolic antenna

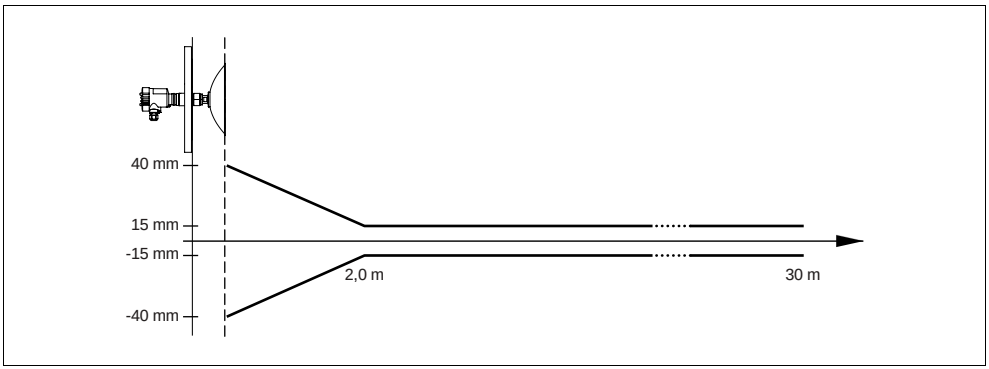


Fig. 36: Accuracy VEGAPULS 62 with parabolic antenna and increased sensitivity

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)

Process conditions

Process temperature (measured on the process fitting), depending on the seal of the antenna system

– FKM (Viton)	-40 … +130°C (-40 … +266°F)
– FKM (Viton) with impedance cone PP	-40 … +80°C (-40 … +176°F)
– FKM (Viton) with temperature adapter	-40 … +200°C (-40 … +392°F)
– Kalrez 2035, 6230 (FDA)	-15 … +130°C (+5 … +266°F)
– Kalrez 2035, 6230 (FDA) with temperature adapter	-15 … +200°C (+5 … +392°F)
– Kalrez 6375	-20 … +130°C (-4 … +266°F)
– Kalrez 6375 with impedance cone PP	-20 … +80°C (-4 … +176°F)
– Kalrez 6375 with temperature adapter	-20 … +200°C (-4 … +392°F)

Vessel pressure horn antenna	-1 … 40 bar/-100 … 4000 kPa (-14.5 … 580 psi)
Vessel pressure parabolic antenna	-1 … 6 bar/-100 … 6000 kPa (-14.5 … 87 psi)

Vessel pressure relating to DIN flange PN 16 (note nominal pressure stage of the flange and temperature derating!)

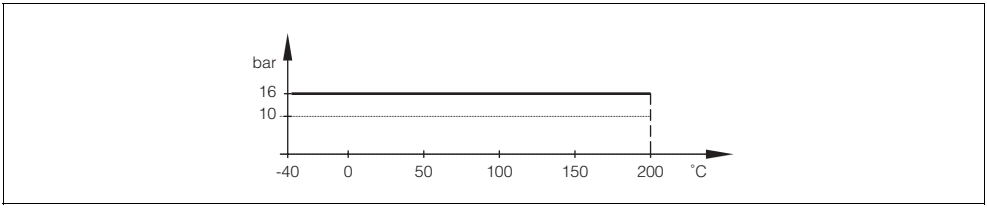


Fig. 37: DIN flange PN 16 temperature derating in bar/°C

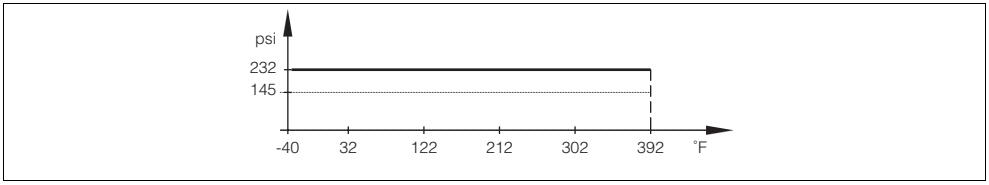


Fig. 38: DIN flange PN 16 temperature derating in psi/°F

Vessel pressure relating to DIN flange PN 40 (note nominal pressure stage of the flange and temperature derating!)

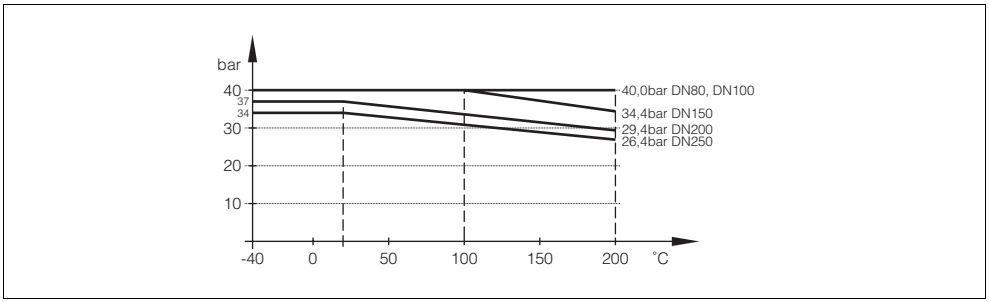


Fig. 39: DIN flange PN 40 temperature derating in bar/°C

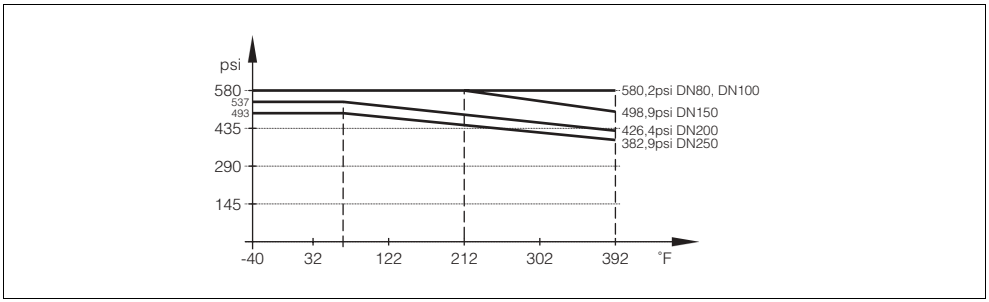


Fig. 40: DIN flange PN 40 temperature derating in psi/°F

Vessel pressure relating to DIN flange PN 64 (note nominal pressure stage of the flange and temperature derating!)

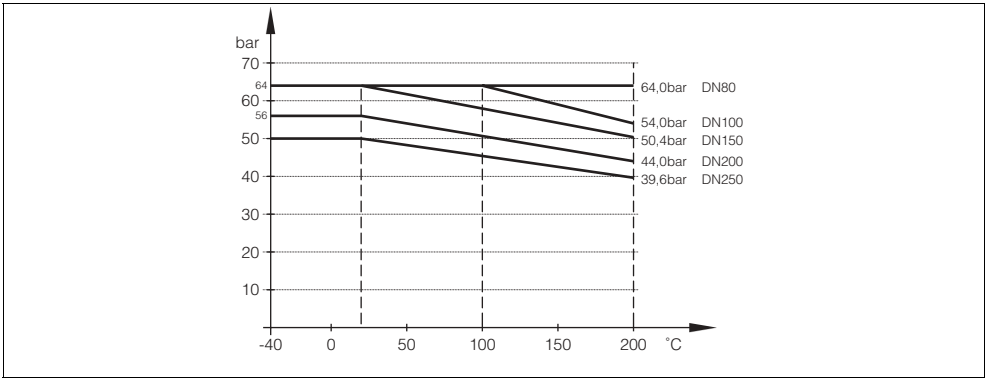


Fig. 41: DIN flange PN 64 temperature derating in bar/°C

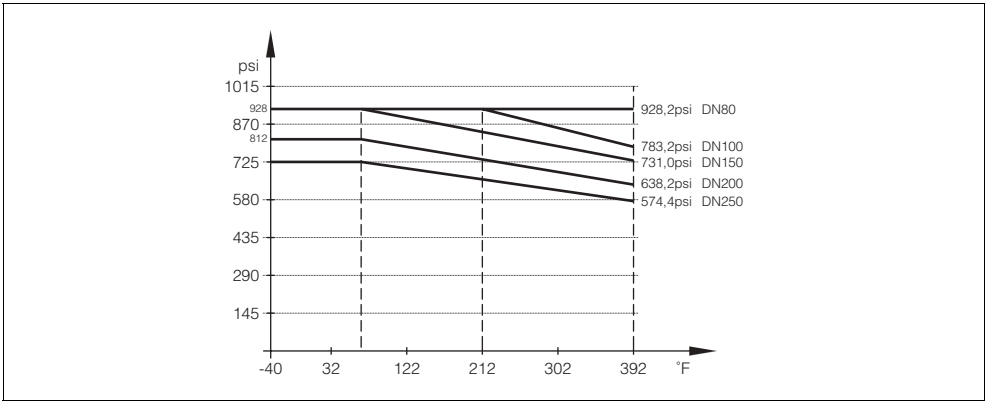


Fig. 42: DIN flange PN 64 temperature derating in psi/°F

Vessel pressure relating to ANSI flange 150 lbs (note nominal pressure stage of the flange and temperature derating!)

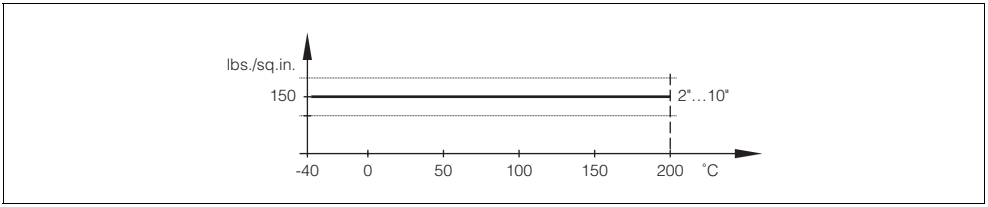


Fig. 43: ANSI flange 150 lbs temperature derating based on °C

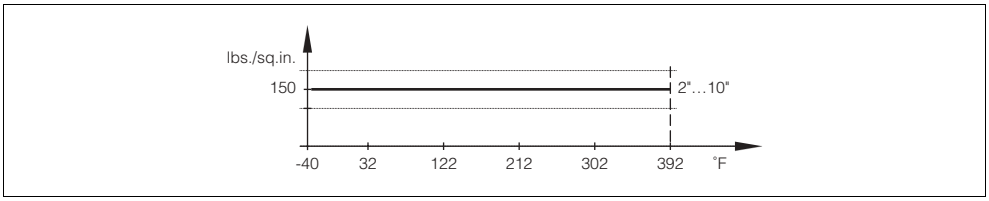


Fig. 44: ANSI flange 150 lbs temperature derating based on °F

Vessel pressure relating to ANSI flange 300 lbs (note nominal pressure stage of the flange and temperature derating!)

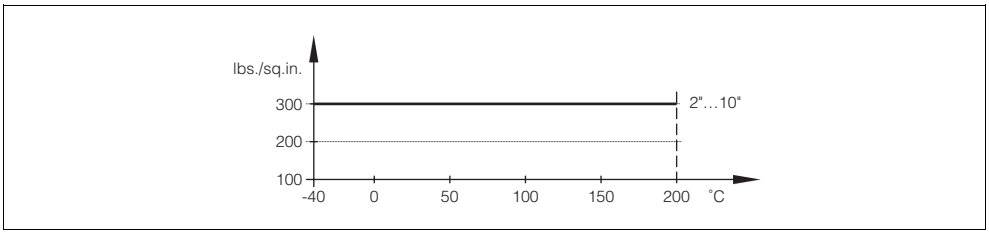


Fig. 45: ANSI flange 300 lbs temperature derating based on °C

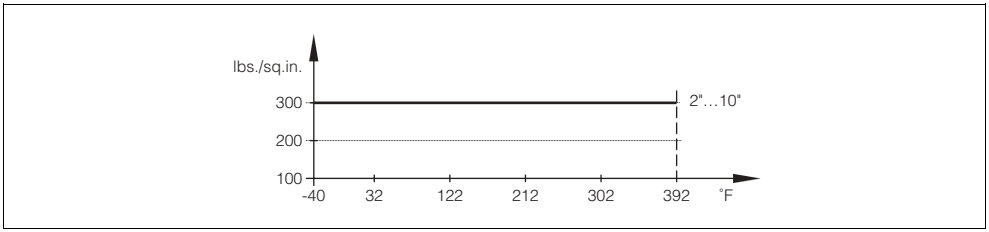


Fig. 46: ANSI flange 300 lbs temperature derating based on °F

Vessel pressure relating to ANSI flange 600 lbs (note nominal pressure stage of the flange and temperature derating!)

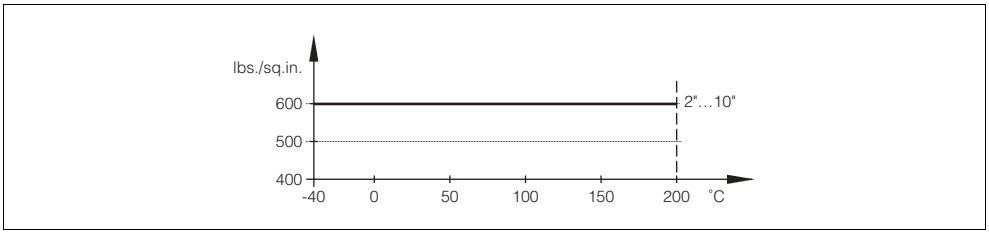


Fig. 47: ANSI flange 600 lbs temperature derating based on °C

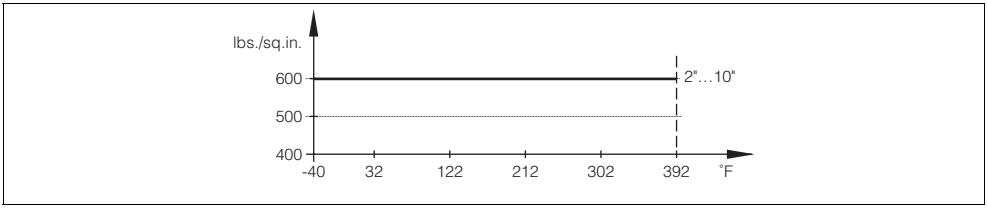


Fig. 48: ANSI flange 600 lbs temperature derating based on °F

Vessel pressure relating to ANSI flange 900 lbs (note nominal pressure stage of the flange and temperature derating!)

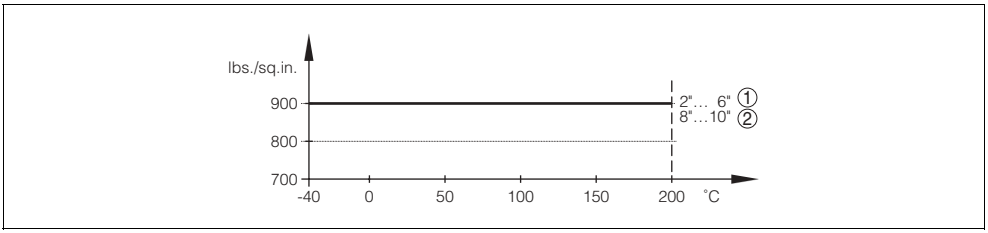


Fig. 49: ANSI flange 900 lbs temperature derating based on °C
1 RF
2 TG small/large

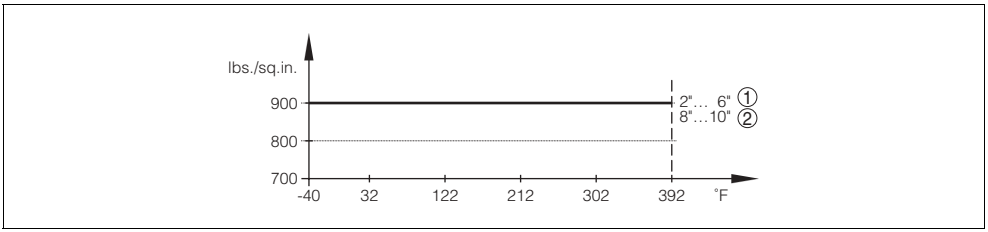


Fig. 50: ANSI flange 900 lbs temperature derating based on °F
1 RF
2 TG small/large

Vibrating resistance	mechanical vibrations with 4 g and 5 … 100 Hz[13)]

[13)] Tested acc. to the regulations of German Lloyd, GL directive 2

Data on rinsing air connection

Pressure	max. 6 bar (87 psi)
Air flow	
– with 0.5 bar (7.3 psi)	approx. 50 l/min
– with 3.0 bar (43.5 psi)	approx. 100 l/min
Air flow with reflux valve	
– with 0.55 bar (8.0 psi)	approx. 20 l/min
– with 3.0 bar (43.5 psi)	approx. 85 l/min
Thread	G⅛A
Catch	
– with non-Ex	Dust protection cover of PE
– with Ex	Plug of 316Ti (1.4571)

Reflux valve - attached (with non-Ex option, with Ex in the scope of delivery)

– Material	316Ti (1.4571)
– Seal	FKM (Viton)
– for tube diameter	6 mm
– opening pressure	0.5 bar (7.3 psi)
– nominal pressure stage	PN 250

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

Cable entry/plug [14)]

– Single chamber housing
- 1x cable entry M20x1.5 (cable-ø 5 … 9 mm), 1x blind stopper M20x1.5

or:
- 1x closing cap ½ NPT, 1x blind plug ½ NPT

or:
- 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)

or:
- 1x closing cap ½ NPT, 1x blind stopper ½ NPT, plug M12x1 for VEGADIS 61 (optional)

or:
- 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 mm^2

Electromechanical data - version IP 66/IP 68, 1 bar

Cable gland

– Single chamber housing
- 1x IP 68 cable entry M20x1.5; 1x blind stopper M20x1.5

or:
- 1x closing cap ½ NPT, 1x blind plug ½ NPT

– Double chamber housing
- 1x IP 68 cable entry M20x1.5; 1x blind stopper M20x1.5; plug M12x1 for VEGADIS 61 (option)

or:
- 1x closing cap ½ NPT, 1x blind stopper ½ NPT, plug M12x1 for VEGADIS 61 (optional)

[14)] Depending on the version M12x1, acc. to DIN 43650, Harting, Amphenol-Tuchel, 7/8" FF

Connection cable	
– Configuration	four cores, one suspension cable, one breather capillary, screen braiding, foil, mantle
– wire cross section	0.5 mm²
– wire resistance	<0.036 Ohm/m
– tensile load	>1200 N (270 pounds force)
– Standard length	5 m (16.4 ft)
– Max. length	1000 m (3280 ft)
– Min. bending radius	25 mm (at +25°C/+77°F)
– Diameter	approx. 8 mm
– Colour - standard PE	Black
– Colour - standard PUR	Blue
– Colour - Ex-version	Blue

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

Voltage supply

Voltage supply	
– non-Ex instrument	14 … 36 V DC
– EEx ia instrument	14 … 30 V DC
– EExd ia instrument	20 … 36 V DC
Supply voltage with lighted indicating and adjustment module	
– non-Ex instrument	20 … 36 V DC
– EEx ia instrument	20 … 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

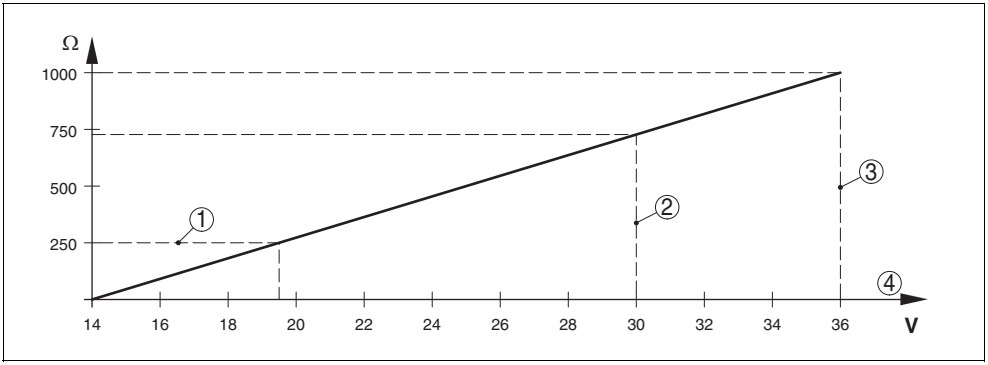


Fig. 51: Voltage diagram
1 HART load
2 Voltage limit EEx ia instrument
3 Voltage limit non-Ex/Exd instrument
4 Voltage supply

Voltage supply - Version with increased sensitivity

Supply voltage

– non-Ex instrument	15 … 36 V DC
– EEx ia instrument	15 … 30 V DC
– EExd ia instrument	20 … 36 V DC

Supply voltage with lighted indicating and adjustment module

– non-Ex instrument	20 … 36 V DC
– EEx ia instrument	20 … 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

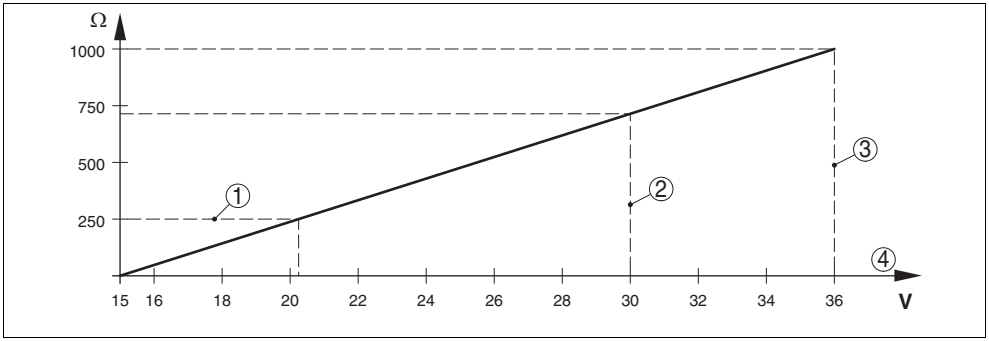


Fig. 52: Voltage diagram for version with increased sensitivity
1 HART load
2 Voltage limit EEx ia instrument
3 Voltage limit non-Ex/Exd instrument
4 Supply voltage

Electrical protective measures

Protection	
– Plastic housing	IP 66/IP 67
– Alu and stainless steel standard	IP 66/IP 68 (0.2 bar)[15]
– Alu and stainless housing, optionally available	IP 66/IP 68 (1 bar)
Overvoltage category	III
Protection class	II

Functional safety (SIL)[16]

Functional safety acc. to IEC 61508-4	
– Single channel architecture (1oo1 D)	up to SIL2
– double channel diversitary redundant architecture (1oo2 D)	up to SIL3

[15] Requirement to maintain the protection is the suitable cable.
[16] Not with increased sensitivity.

28435-EN-060317

Approvals[17)]

ATEX ia	ATEX II 1G, 1/2G, 2G EEx ia IIC T6; ATEX II 1G, 1/2G, 2G EEx ia IIC T5+ATEX II 1/2D IP6X T6
ATEX D	ATEX II 1/2 D IP6X T
ATEX ia + D	ATEX II 1G, 1/2G, 2G EEx ia IIC T5+ATEX II 1/2D IP6X T6
ATEX d	ATEX II 1/2G, 2G EExd ia IIC T6
ATEX d + D	ATEX II 1/2G, 2G EExd ia IIC T5+ATEX II 1/2D IP6X T6
IEC ia	IEC Ex ia IIC T6
IEC d	IEC Exd ia IIC T6
IECEx	Ex tD A20/A21 IP66 T, A21
FM	FM Cl.I, Div2 (NI)+Cl.II, III, Div1 (DIP); FM Cl.I-III, Div 1 (IS); FM Cl.I-III, Div 1(IS)+Cl.I-III, Div 1 Gr.C-G (XP)
CSA	CSA Cl.I, Div2 (NI)+Cl.II, III, Div1 (DIP); CSA Cl.I-III, Div 1 (IS); CSA Cl.I-III, Div 1(IS)+Cl.I-III, Div 1 Gr.C-G (XP)
Ship approvals	GL, LRS, ABS, CCS, RINA
Others	WHG

[17)] Available or applied for, depending on the order specification. Deviating data with Ex applications: see separate safety instructions.

10.2 Dimensions

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

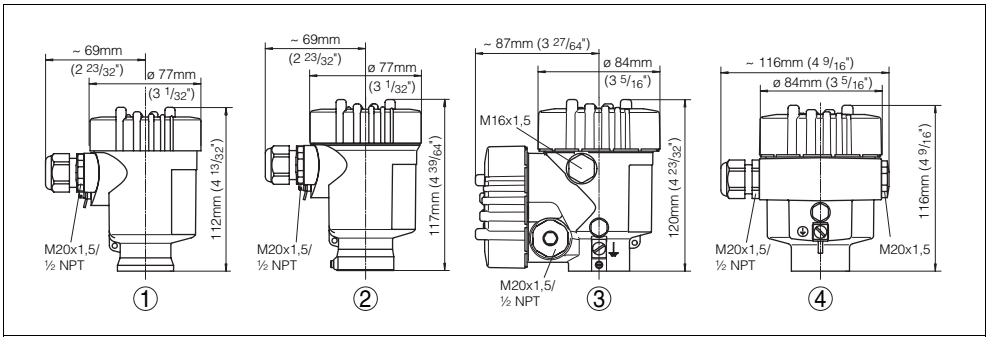


Fig. 53: Housing versions in protection IP 66/IP 67 and IP 66/IP 68, 0.2 bar (with integrated PLICSCOM the housing is 9 mm/0.35 in higher)
1 Plastic housing
2 Stainless steel housing
3 Aluminium double chamber housing
4 Aluminium housing

Housing in protection IP 66/IP 68, 1 bar

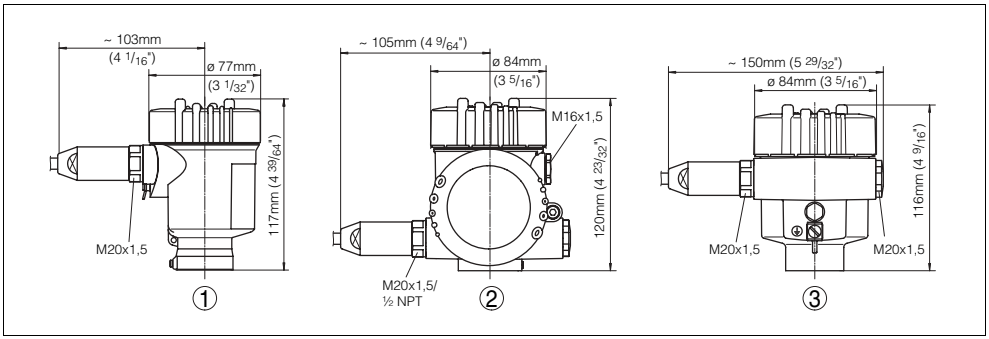
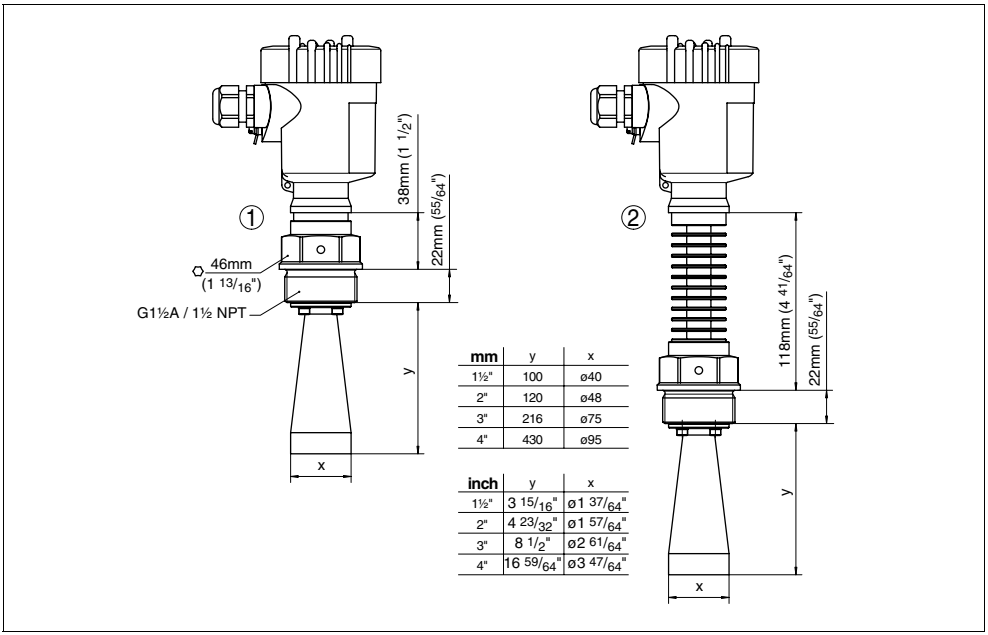


Fig. 54: Housing versions in protection IP 66/IP 68, 1 bar (with integrated PLICSCOM the housing is 9 mm/0.35 in higher)
1 Stainless steel housing
2 Aluminium double chamber housing
3 Aluminium housing

VEGAPULS 62 - horn antenna in threaded version

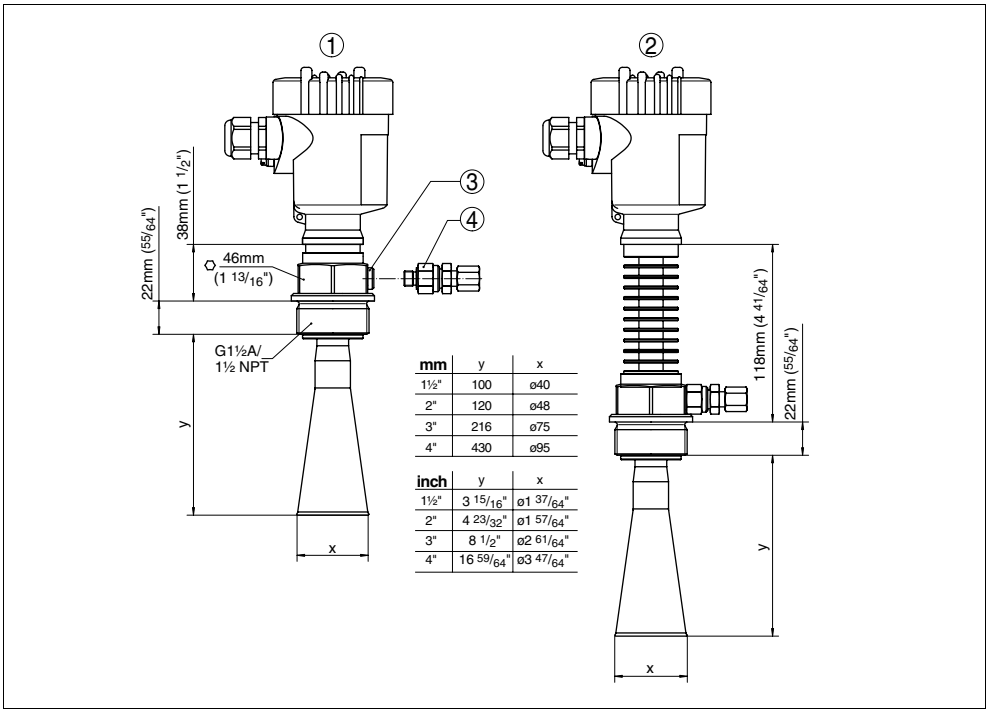


mm	y	x
1½"	100	ø40
2"	120	ø48
3"	216	ø75
4"	430	ø95

inch	y	x
1½"	3 15/16"	ø1 37/64"
2"	4 23/32"	ø1 57/64"
3"	8 1/2"	ø2 61/64"
4"	16 59/64"	ø3 47/64"

Fig. 55: VEGAPULS 62 - horn antenna in threaded version
1 Standard
2 with temperature adapter

VEGAPULS 62 - horn antenna in threaded version with rinsing air connection

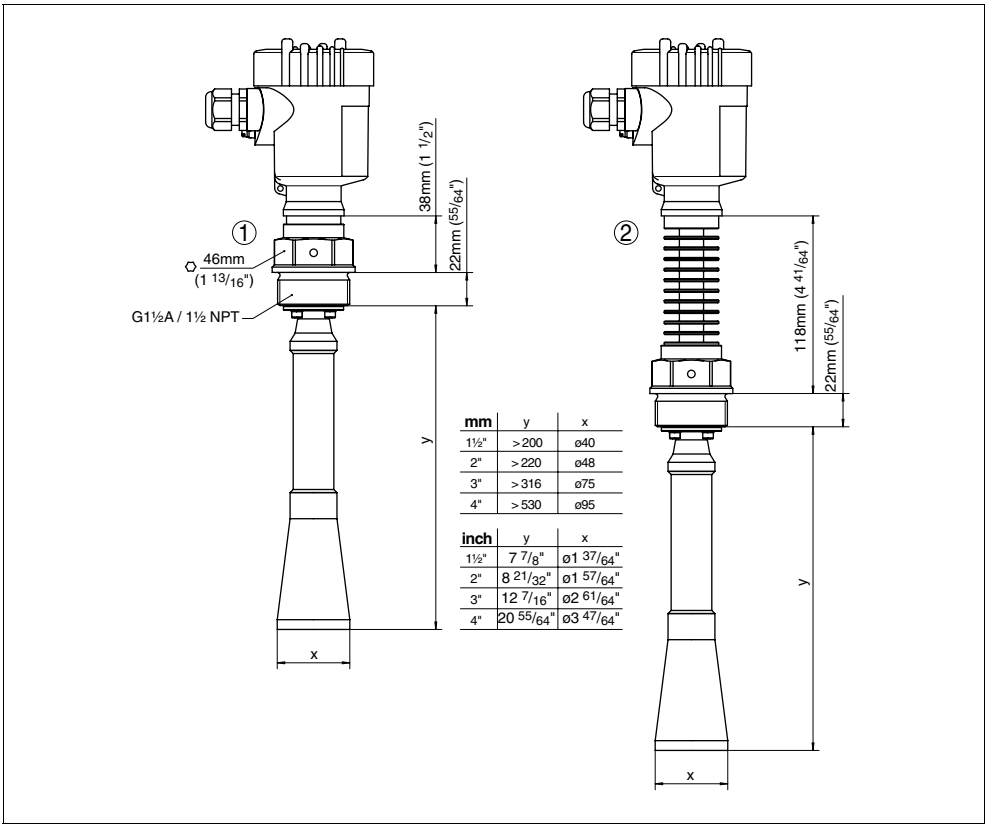


mm	y	x
1½"	100	ø40
2"	120	ø48
3"	216	ø75
4"	430	ø95

inch	y	x
1½"	3 15/16"	ø1 37/64"
2"	4 23/32"	ø1 57/64"
3"	8 1/2"	ø2 61/64"
4"	16 59/64"	ø3 47/64"

Fig. 56: VEGAPULS 62 - horn antenna in threaded version with rinsing air connection
1 Standard
2 with temperature adapter
3 Purging air connection G⅛A for mounting a suitable fitting
4 Reflux valve - attached (with non-Ex option, with Ex in the scope of delivery)

VEGAPULS 62 - horn antenna in threaded version with antenna extension



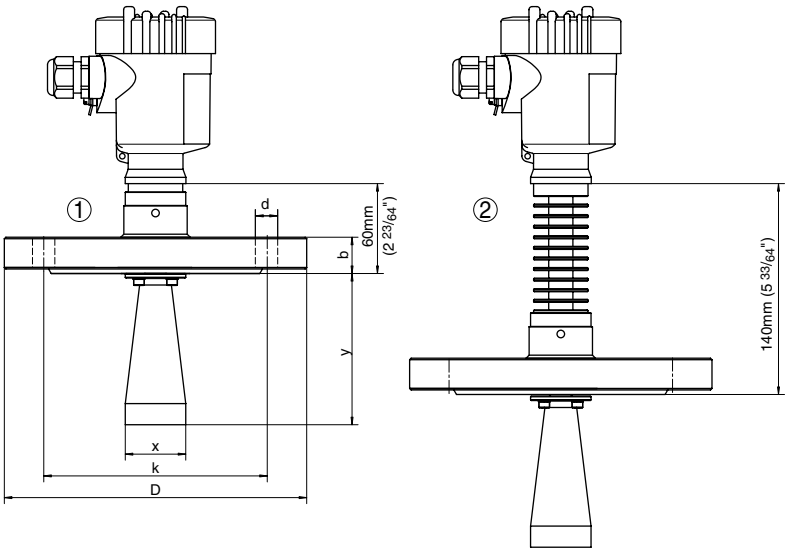
mm	y	x
1½"	> 200	ø40
2"	> 220	ø48
3"	> 316	ø75
4"	> 530	ø95

inch	y	x
1½"	7 7/8"	ø1 37/64"
2"	8 21/32"	ø1 57/64"
3"	12 7/16"	ø2 61/64"
4"	20 55/64"	ø3 47/64"

Fig. 57: VEGAPULS 62 - horn antenna in threaded version with purging air connection and antenna extension[18)]
1 Standard
2 with temperature adapter

18) Depending on the product properties, an antenna extension causes a reduction of the sensitivity in the narrow range. Depending on the length, a suitable support of the antenna extensions must be provided.

VEGAPULS 62 - horn antenna in flange version

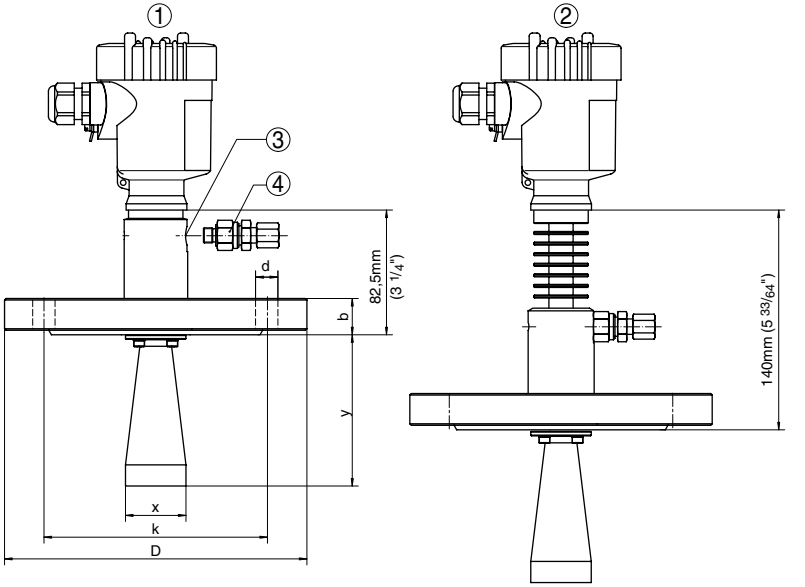


mm	D	b	k	d	x	y
DN 40 PN 40	150	18	110	4xø18	40	100
DN 50 PN 40	165	20	125	4xø18	48	120
DN 80 PN 40	200	24	160	8xø18	75	216
DN 100 PN 16	220	20	180	8xø18	95	430
DN 150 PN 16	285	22	240	8xø22	95	430
2" 150 lb	152,4	19,1	120,7	4xø19,1	48	120
3" 150 lb	190,5	23,9	152,4	4xø19,1	75	216
4" 150 lb	228,6	23,9	190,5	8xø19,1	95	430
6" 150 lb	279,4	25,4	241,3	8xø22,4	95	430

inch	D	b	k	d	x	y
DN 40PN 40	5 29/32"	45/64"	4 21/64"	4xø45/64"	1 37/64"	3 15/16"
DN 50 PN 40	6 1/2"	25/32"	4 59/64"	4xø45/64"	1 57/64"	4 23/32"
DN 80 PN 40	7 7/8"	15/16"	6 19/64"	8xø45/64"	2 61/64"	8 1/2"
DN 100 PN 16	8 21/32"	25/32"	7 3/32"	8xø45/64"	3 47/64"	16 59/64"
DN 150 PN 16	11 7/32"	55/64"	9 29/64"	8xø55/64"	3 47/64"	16 59/64"
2" 150 lb	6"	3/4"	4 3/4"	4xø3/4"	1 57/64"	4 23/32"
3" 150 lb	7 1/2"	15/16"	6"	4xø3/4"	2 61/64"	8 1/2"
4" 150 lb	9"	15/16"	7 1/2"	8xø3/4"	3 47/64"	16 59/64"
6" 150 lb	11"	1"	9 1/2"	8xø7/8"	3 47/64"	16 59/64"

Fig. 58: VEGAPULS 62 - horn antenna in flange version
1 Standard
2 with temperature adapter

VEGAPULS 62 - horn antenna in flange version with rinsing air connection



mm	D	b	k	d	x	y
DN 40 PN 40	150	18	110	4xø18	40	100
DN 50 PN 40	165	20	125	4xø18	48	120
DN 80 PN 40	200	24	160	8xø18	75	216
DN 100 PN 16	220	20	180	8xø18	95	430
DN 150 PN 16	285	22	240	8xø22	95	430
2" 150 lb	152,4	19,1	120,7	4xø19,1	48	120
3" 150 lb	190,5	23,9	152,4	4xø19,1	75	216
4" 150 lb	228,6	23,9	190,5	8xø19,1	95	430
6" 150 lb	279,4	25,4	241,3	8xø22,4	95	430

inch	D	b	k	d	x	y
DN 40PN 40	5 29/32"	45/64"	4 21/64"	4xø45/64"	1 37/64"	3 15/16"
DN 50 PN 40	6 1/2"	25/32"	4 59/64"	4xø45/64"	1 57/64"	4 23/32"
DN 80 PN 40	7 7/8"	15/16"	6 19/64"	8xø45/64"	2 61/64"	8 1/2"
DN 100 PN 16	8 21/32"	25/32"	7 3/32"	8xø45/64"	3 47/64"	16 59/64"
DN 150 PN 16	11 7/32"	55/64"	9 29/64"	8xø55/64"	3 47/64"	16 59/64"
2" 150 lb	6"	3/4"	4 3/4"	4xø3/4"	1 57/64"	4 23/32"
3" 150 lb	7 1/2"	15/16"	6"	4xø3/4"	2 61/64"	8 1/2"
4" 150 lb	9"	15/16"	7 1/2"	8xø3/4"	3 47/64"	16 59/64"
6" 150 lb	11"	1"	9 1/2"	8xø7/8"	3 47/64"	16 59/64"

Fig. 59: VEGAPULS 62 - horn antenna in flange version with rinsing air connection
1 Standard
2 with temperature adapter
3 Purging air connection G⅛A for mounting a suitable fitting
4 Reflux valve - attached (with non-Ex option, with Ex in the scope of delivery)

VEGAPULS 62 - parabolic antenna in threaded version

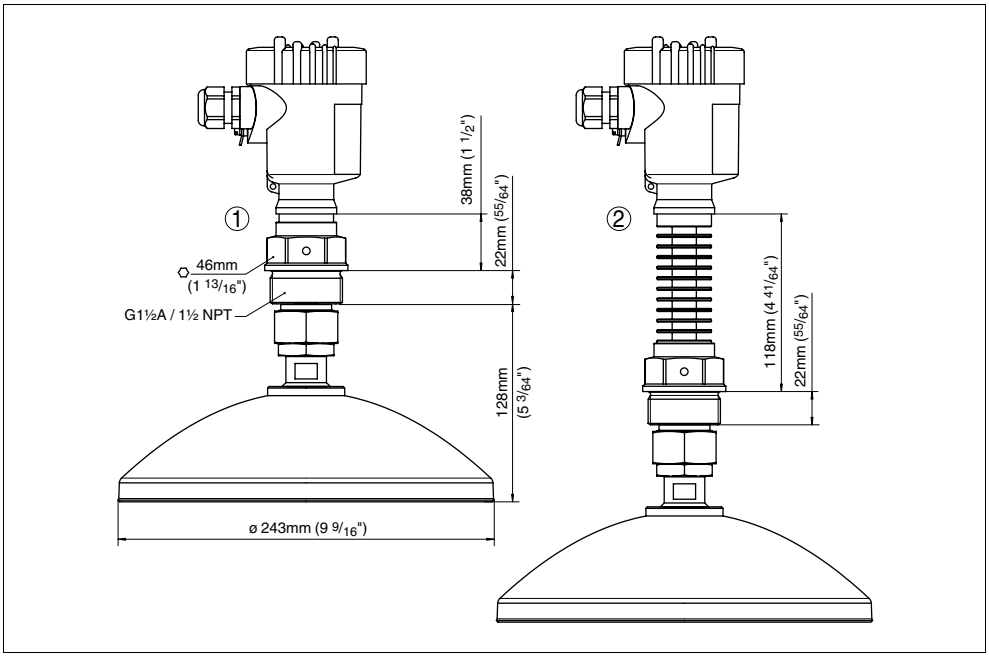
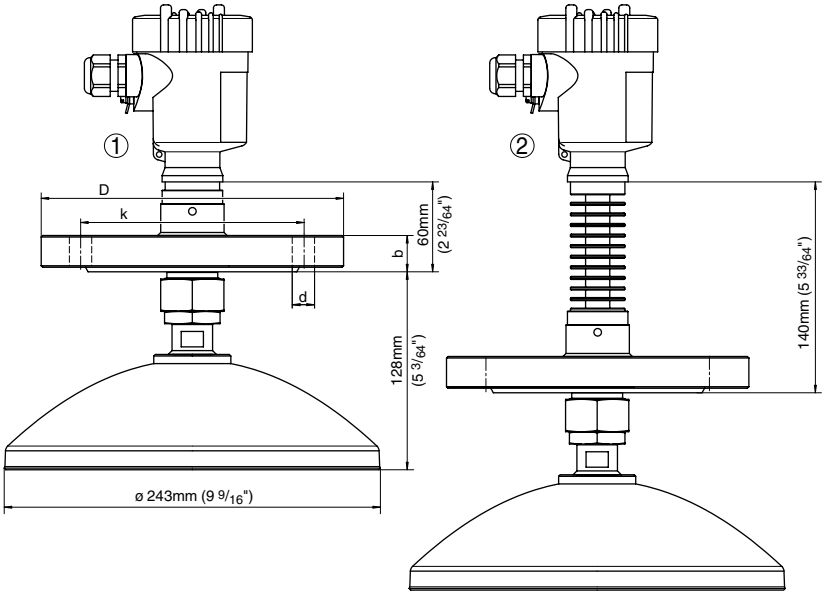


Fig. 60: VEGAPULS 62 - parabolic antenna in threaded version
1 Standard
2 with temperature adapter

VEGAPULS 62 - parabolic antenna in flange version



mm	D	b	k	d
DN 40 PN 40	150	18	110	4xø18
DN 50 PN 40	165	20	125	4xø18
DN 80 PN 40	200	24	160	8xø18
DN 100 PN 16	220	20	180	8xø18
DN 150 PN 16	285	22	240	8xø22
2" 150 lb	152,4	19,1	120,7	4xø19,1
3" 150 lb	190,5	23,9	152,4	4xø19,1
4" 150 lb	228,6	23,9	190,5	8xø19,1
6" 150 lb	279,4	25,4	241,3	8xø22,4

inch	D	b	k	d
DN 40PN 40	5 29/32"	45/64"	4 21/64"	4xø45/64"
DN 50 PN 40	6 1/2"	25/32"	4 59/64"	4xø45/64"
DN 80 PN 40	7 7/8"	15/16"	6 19/64"	8xø45/64"
DN 100 PN 16	8 21/32"	25/32"	7 3/32"	8xø45/64"
DN 150 PN 16	11 7/32"	55/64"	9 29/64"	8xø55/64"
2" 150 lb	6"	3/4"	4 3/4"	4xø3/4"
3" 150 lb	7 1/2"	15/16"	6"	4xø3/4"
4" 150 lb	9"	15/16"	7 1/2"	8xø3/4"
6" 150 lb	11"	1"	9 1/2"	8xø7/8"

Fig. 61: VEGAPULS 62 - parabolic antenna in flange version
1 Standard
2 with temperature adapter

10.3 Industrial property rights

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