Operating Instructions

VEGAPULS 68

Profibus PA

Contents

1 About this document

1.1 Function 5
1.2 Target group 5
1.3 Symbolism used 5

2 For your safety

2.1 Authorised personnel 6
2.2 Appropriate use 6
2.3 Warning about misuse 6
2.4 CE conformity 6
2.5 Fulfilling NAMUR recommendations 7
2.6 FCC and IC conformity (only for USA/Canada) . 7
2.7 Safety instructions for Ex areas 8
2.8 Manufacturer declaration 8
2.9 Functional range of approved instruments 9
2.10 Environmental instructions 9

3 Product description

3.1 Configuration 10
3.2 Principle of operation 11
3.3 Operation 12
3.4 Storage and transport 13

4 Mount

4.1 General instructions 14
4.2 Mounting preparations - Horn antenna 15
4.3 Mounting preparations - Parabolic antenna 16
4.4 Mounting instructions 18

5 Connecting to voltage supply

5.1 Preparing the connection 27
5.2 Connection steps - Instrument housing 28
5.3 Wiring plan, single chamber housing 29
5.4 Wiring plan, double chamber housing 31
5.5 Wiring plan, double chamber housing Exd 33
5.6 Wiring plan, version IP 66/IP 68, 1 bar 35
5.7 Switch-on phase 35

6 Set up with the indicating and adjustment module PLICSCOM

6.1 Short description 36
6.2 Insert the indicating and adjustment module . . . 36
6.3 Adjustment system 38

29263-EN-070305

6.4 Setup procedure 39
6.5 Menu schematic 45
6.6 Saving the parameter adjustment data 47

7 Setup with PACTware™ and other adjustment programs

7.1 Connecting the PC 48
7.2 Parameter adjustment with PACTware™ 48
7.3 Parameter adjustment with PDM 49
7.4 Saving the parameter adjustment data 49

8 Maintenance and fault rectification

8.1 Maintenance 50
8.2 Remove interferences 50
8.3 Exchange of the electronics module 52
8.4 Instrument repair 53

9 Dismounting

9.1 Dismounting steps 54
9.2 Disposal 54

10 Supplement

10.1 Technical data 55
10.2 Profibus PA 64
10.3 Dimensions 69
10.4 Industrial property rights 81
10.5 Trademark 81

29263-EN-070305

Supplementary operating instructions manuals

Information:
VEGAPULS 68 is available in many versions and is therefore supplied according to customer order. Depending on the selected version, supplementary operating instructions manuals also come with the delivery. You will find the supplementary operating instructions manuals in chapter "*Product description*".

Operating instructions manuals for accessories and replacement parts

Tip:

- Operating instructions manual 27835 "*Indicating and adjustment module PLICSCOM*"
- Operating instructions manual 25641 "*Interface adapter VEGACONNECT 3*"
- Operating instructions manual 32628 "*Interface adapter VEGACONNECT 4*"
- Supplementary instructions manual 31088 "*Flanges according to DIN-EN-ASME-JIS*"
- Operating instructions manual 27720 "*Oscillator VEGAPULS series 60*"
- Supplementary instructions manual 31381 "*Antenna impedance cone VEGAPULS 62 and 68*"

29263-EN-070305

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 68 is a sensor for continuous level measurement.

You find detailled specifications on the application range of VEGAPULS 68 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 68 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 the instrument is used correctly, no health-endangering effects are to be expected. There are no restrictions on using the instrument on the outside 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 68 is in CE conformity with EMC (89/336/EWG) and LVD (73/23/EWG).

Conformity has been judged according to the following standards:

- EMC:

29263-EN-070305

- Emission EN 61326: 1997 (class B)
- Susceptibility EN 61326: 1997/A1:1998

- R & TTE directive: I-ETS 300-440 Expert Opinion No. 05-111723, Notified Body No. 0700
- LVD: EN 61010-1: 2001

2.6 Fulfilling NAMUR recommendations

With regard to interference resistance and interference emission, VEGAPULS 68 fulfils NAMUR recommendation NE 21.

VEGAPULS 68 and its indicating and adjustment components fulfill NAMUR recommendation NE 53 in respect to compatibility. VEGA instruments are generally upward and downward compatible:

- Sensor software to DTM VEGAPULS 68 HART, PA or FF
- DTM VEGAPULS 68 for adjustment software PACTware™
- Indicating and adjustment module 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 68 can be determined as follows:

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

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 and IC conformity (only for USA/Canada)

VEGAPULS with all antenna versions are FCC and IC approved:

- FCC ID: O6QPULS68
- IC:3892A-PS68

Modifications not expressly approved by VEGA will lead to expiry of the operating licence according to FCC.

VEGAPULS 68 is in conformity with part 15 of the FCC regulations. Take note of the respective operating regulations:

- The instrument must not cause any interfering emissions
- The instrument must be insensitive to interfering emissions, also to such that may cause unwanted operating conditions.

2.8 Safety instructions for Ex areas

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

2.9 Manufacturer declaration

In conformity with DIN EN 60079-14/2004, para. 5.2.3, point c1, VEGAPULS 68 is suitable for use in zone 2.

The operator must use the instrument as it was intended to be used and follow the specifications of the following documents:

- this operating instructions manual
- this manufacturer declaration (24627)
- the applicable installation regulations

Max. increase of the surface temperature during operation: 15 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 85 °C (185 °F).

Measures to maintain explosion protection during operation:

- The instrument must be connected and operated on a Profibus DP/PA segment coupler or a VEGALOG 571 EP card.
- 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 from electrostatic charges is to be expected. The antenna, the process fitting or the 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 intend to operate the instrument with opened cover

29263-EN-070305

- 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 way that the sensor cannot touch the vessel wall or vessel installations. Keep in mind the influence of product movement in the vessel.
- The surface temperature of the housing must not exceed the ignition temperature of the surrounding explosive atmosphere

This instrument was assessed by a person who fulfils the DIN EN 60079-14 requirements.

2.10 Functional range of approved instruments

Instruments with national approvals are partly supplied with an earlier hardware or software version. For approval-technical reasons, some functions for these instruments will be available only at a later date.

You will find corresponding instructions in the description of the individual functions in this operating instructions manual.

2.11 Environmental instructions

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

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

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

3 Product description

3.1 Configuration

Scope of delivery

The scope of delivery encompasses:

- VEGAPULS 68 radar sensor
- Documentation
  - this operating instructions manual
  - 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 68 consists of the following components:

- Horn or parabolic antenna
- process fitting (depending on the version flange or thread)
- Optionally available with swivelling holder (only with flange), rinsing 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.

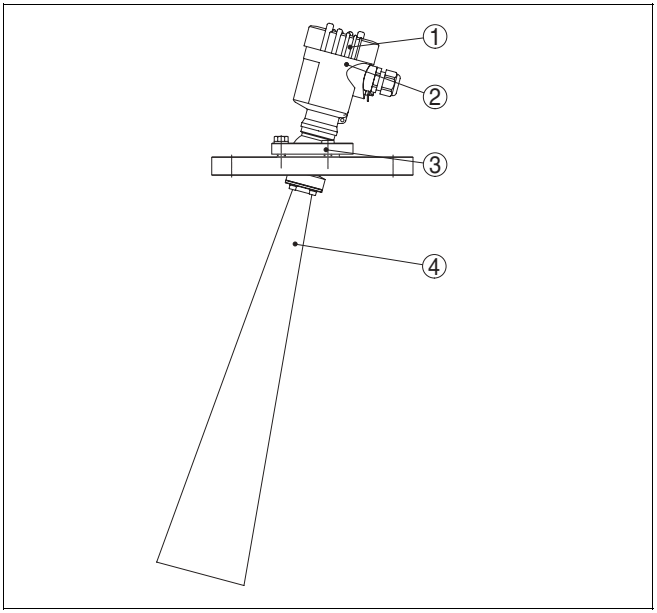


Fig. 1: VEGAPULS 68 with horn antenna and swivelling holder
1 Housing cover with integrated PLICSCOM (optional)
2 Housing with electronics
3 Swivelling holder with flange
4 Horn antenna

3.2 Principle of operation

Area of application

VEGAPULS 68 is a radar sensor in K-band technology for continuous level measurement of solids.

A version of VEGAPULS 68 is available for each area of application:

- The version with horn antenna is particularly suitable for measurement of virtually all bulk solids in small silos and vessels.
- The version with parabolic antenna is particularly suitable for large silos and vessels with up to 70 m (76 yd) measuring distance and for measurement of solids with low dielectric constant.

VEGAPULS 68 is also suitable for applications in liquids.

Functional 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.

Power supply and bus communication

Power supply via the Profibus DP/PA segment coupler or VEGALOG 571 EP cards. A two-wire cable according to Profibus specification serves as carrier of both power and digital data signals for multiple sensors. The instrument profile of VEGAPULS 68 corresponds to profile specification version 3.0.

GSD/EDD

The GSD (instrument master files) and bitmap files necessary for planning your Profibus-DP-(PA) communication network are available from the download section on the VEGA homepage www.vega.com under "*Services - Downloads - Software - Profibus*". There you can also find the appropriate certificates. In a PDM environment, an EDD (Electronic Device Description) is also required to enable the full range of sensor functions (also available as a download).A CD with the appropriate files can be ordered via e-mail under info@de.vega.com or by phone from one of the VEGA agencies under the order number "DRIVER.S".

The backlight of the indicating and adjustment module is powered by the sensor. Requirement is a certain height of the supply voltage.

The data for power supply are stated in chapter "*Technical data*" in the "*Supplement*".

For instruments with national approvals such as e.g. according to CSA, this function is available only at a later date.

The optional heating requires its own power supply. You can find detailed information in the supplementary instructions manual "*Heating for indicating and adjustment module*". This function is generally not available for approved instruments.

3.3 Operation

VEGAPULS 68 can be adjusted with different adjustment media:

- with indicating and adjustment module
- with the suitable VEGA DTM in conjunction with an adjustment software according to the FDT/DTM standard, e.g. PACTware™ and PC
- the Simatic adjustment program PDM

The entered parameters are generally saved in VEGAPULS 68, optionally also in the indicating and adjustment module 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 according to DIN EN 24180.

The packaging of standard instruments consists of environment-friendly, recyclable cardboard. For special versions, PE foam or PE foil is also used. Dispose of the packaging material via specialised recycling companies.

Storage and transport temperature

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

4 Mount

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 of the threaded versions must not be used to screw the instrument in! Applying tightening force on the housing can damage its rotational mechanical parts.

Moisture

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

You can give your VEGAPULS 68 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.

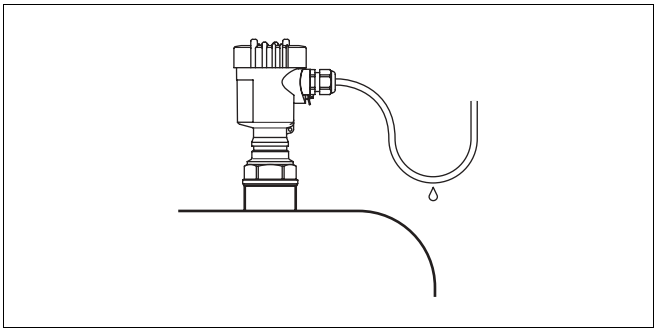


Fig. 2: Measures against moisture penetration

Measuring range

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

29263-EN-070305

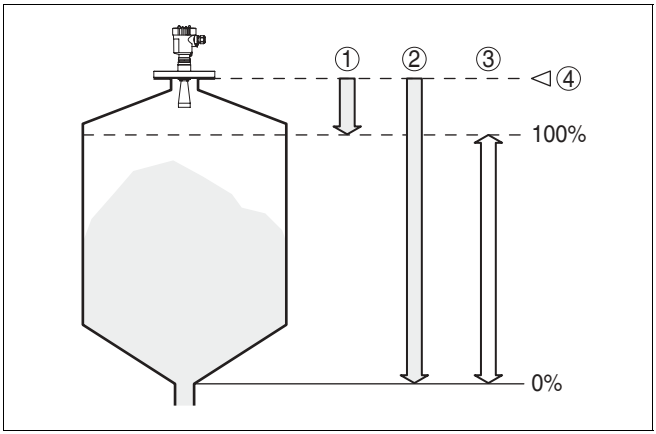


Fig. 3: Measuring range (operating range), max. measuring distance and reference plane
1 full
2 empty (max. measuring distance)
3 Measuring range
4 Reference plane

Information:
If the medium reaches the antenna, buildup can form on it and cause faulty measurements later on.

Wetted materials

Make sure that the wetted parts of VEGAPULS 68, especially the seal and process fitting, are suitable for the existing process conditions such as pressure, temperature etc. as well as the chemical properties of the medium.

You will find specification in chapter "*Technical data*" in the "*Supplement*".

4.2 Mounting preparations - Horn antenna

Information:
This information applies only to special versions!

VEGAPULS 68 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)

Note:
The plastic conemust not be pulled out of the antenna socket.

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 68 with rinsing air connection or antenna extension is provided with a notch on the antenna socket. This notch must correspond to the marking on the hexagon of the process fitting (the marking specifies the position of the polarisation level of the radar signal).

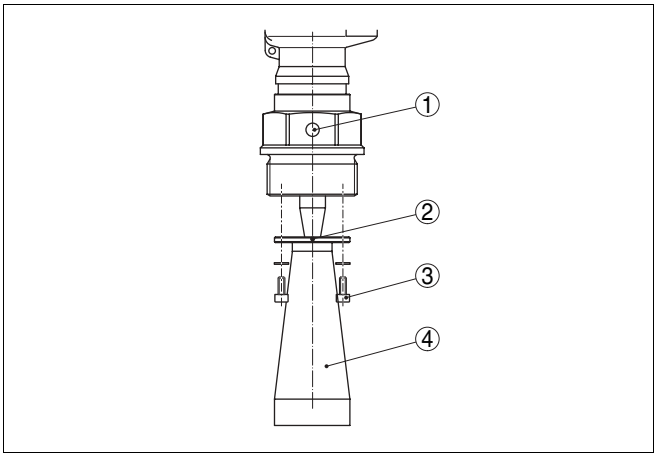


Fig. 4: Dismounting of the horn antenna
1 Marking
2 Notch
3 Hexagon screws on the antenna socket
4 Antenna

4.3 Mounting preparations - Parabolic antenna

Information:
This information applies only to special versions!

VEGAPULS 68 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 68 with the flange, e.g. in a bench vice
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 seal is available on the adapter and if it is not damaged.

Note:
A damaged O-ring seal must be replaced: 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:
Take note for VEGAPULS 68 with rinsing air connection that the holes in the antenna and in the process fitting correspond. This ensures a sufficient air flow (the air is led through the holes to the feed system. A rinsing of the parabolic antenna in total is not intended).

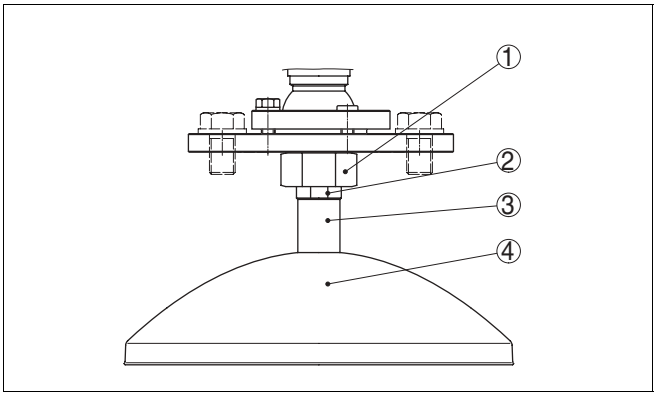


Fig. 5: Dismounting, parabolic antenna
1 Compression nut
2 Locknut
3 Connection piece
4 Parabolic antenna

4.4 Mounting instructions

Horn and parabolic antenna

The illustrations in the mounting instructions show a VEGAPULS 68 with horn antenna. The mounting instructions also apply to VEGAPULS 68 with parabolic antenna.

Installation position

Mount the sensor at 200 mm (7.874 in) away from the vessel wall.

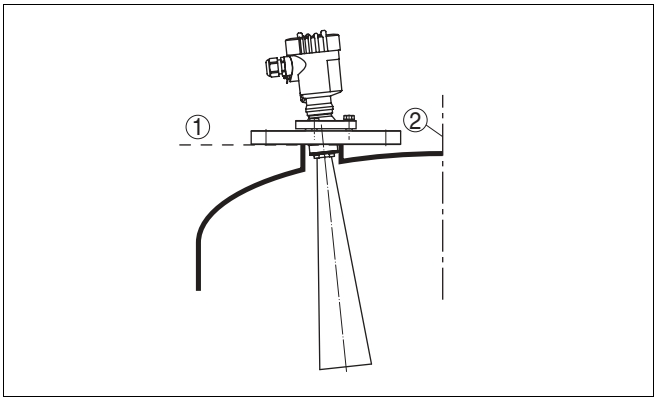


Fig. 6: Installation position
1 Reference plane

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.

Orientation

To detect nearly the complete vessel volume the sensor should be directed in such a way that the measuring beam reaches the lowest level in the vessel. In a cylindrical silo with conical outlet, it is the easiest way to mount in the center of the silo.

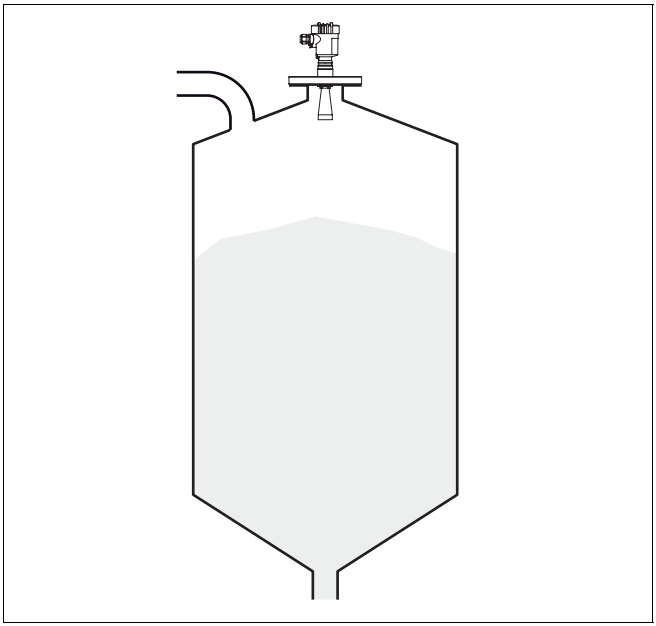


Fig. 7: Orientation

If mounting in the center of the silo is not possible, the sensor can be directed to the vessel center by means of an optional swivelling holder. The following description gives an overview on the determination of the necessary angle of inclination.

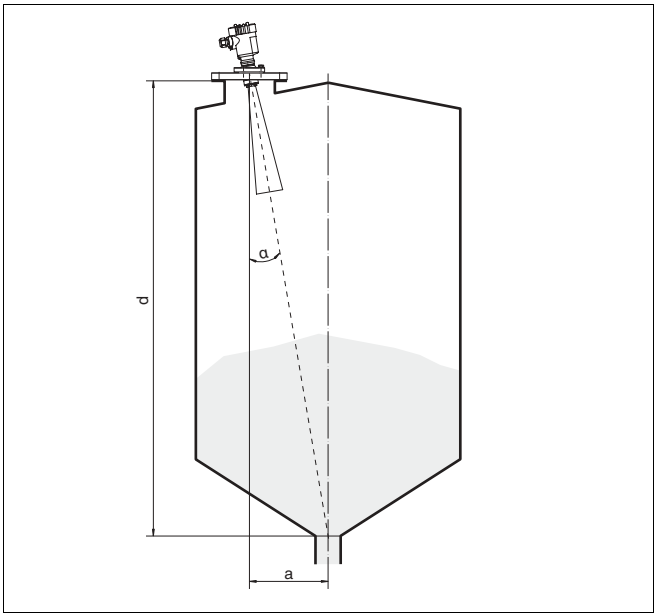


Fig. 8: Proposal for installation after orientation VEGAPULS 68

The angle of inclination depends on the vessel dimensions. It can be checked easily on the sensor with a suitable level or air-lever. The following chart states the distance "a" between installation position and vessel center depending on the measuring distance for an angle of inclination of 2° … 10°.

Distance d (m)	**2°**	**4°**	**6°**	**8°**	**10°**
2	0.1	0.1	0.2	0.3	0.4
4	0.1	0.3	0.4	0.6	0.7
6	0.2	0.4	0.6	0.8	1.1
8	0.3	0.6	0.8	1.1	1.4
10	0.3	0.7	1.1	1.4	1.8
15	0.5	1.0	1.6	2.1	2.6
20	0.7	1.4	2.1	2.8	3.5
25	0.9	1.7	2.6	3.5	4.4
30	1.0	2.1	3.2	4.2	5.3
35	1.2	2.4	3.7	4.9	6.2
40	1.4	2.8	4.2	5.6	7.1
45	1.6	3.1	4.7	6.3	7.9

29263-EN-070305

Distance d (m)	2°	4°	6°	8°	10°
50	1.7	3.5	5.3	7.0	8.8
55	1.9	3.8	5.8	7.7	9.7
60	2.1	4.2	6.3	8.4	10.6
65	2.3	4.5	6.8	9.1	11.5
70	2.4	4.9	7.4	9.8	12.3

Example:

In a vessel with 20 m height, the installation position of the sensor is 1.4 m away from the vessel center.

The necessary angle of inclination of 4° can be read out from this chart.

Proceed as follows to adjust the angle of inclination with the swivelling holder:

1 Loosen terminal screw of the swivelling holder with a fork spanner SW 13

2 Direct the sensor, check angle of inclination

Information:
The max. angle of inclination of the swivelling holder is approx. 15°

3 Tighten the terminal screw, torque max. 20 Nm.

Information:
The hexagon screws must not be loosened.

Inflowing medium

Mounting should not be too close to the inflowing material as the microwave signal will be interferred. The optimum mounting position is on the opposite of the filling. To avoid strong pollution, the distance to the filter or dust extraction must be as big as possible.

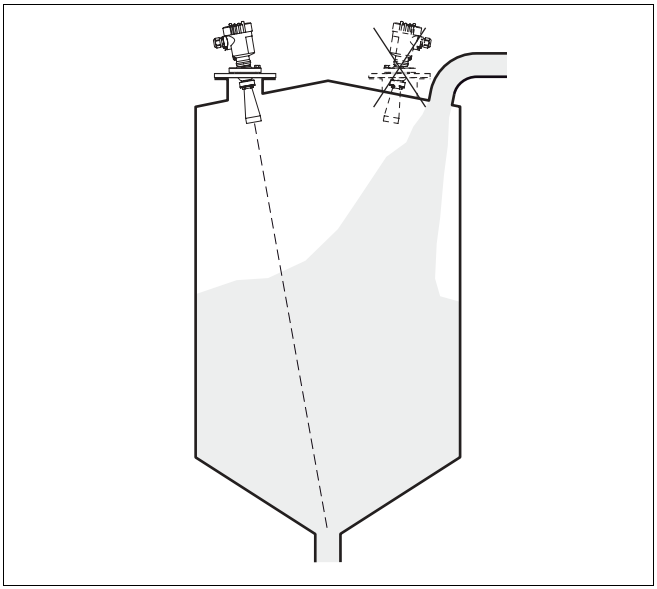


Fig. 9: Inflowing medium

Socket

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

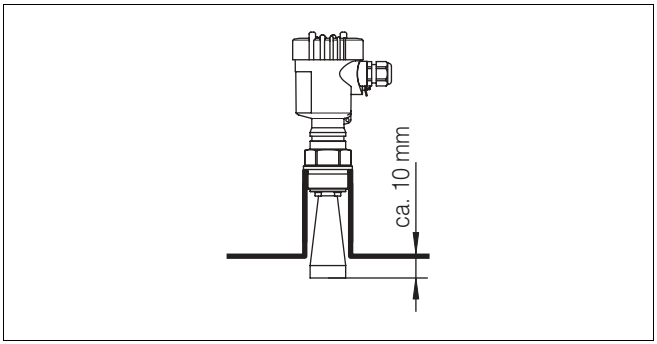
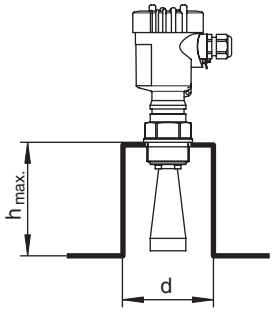


Fig. 10: Recommended socket mounting

If the reflective properties of the medium are good, you can mount VEGAPULS 68 on sockets which are higher than the length of the antenna. 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. After installation you must 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. 11: Deviating socket dimensions

Tip:
VEGAPULS 68 is optionally also available with antenna extension. Hence the antenna length can be selected such that the antenna end protrudes 10 mm (0.4 in) out of the socket.

Mounting in a multiple chamber silo

The silo walls of multiple chamber silos are often made of profile walls such as e.g. profile sheetings, to ensure the required stability. If the radar sensor is mounted very close to a heavily structured vessel wall, considerable false reflections can be caused. Hence the sensor should be mounted at a large distance to the separating wall. Optimum mounting is the outer wall of the silo with a sensor orientation to the emptying in the silo center.

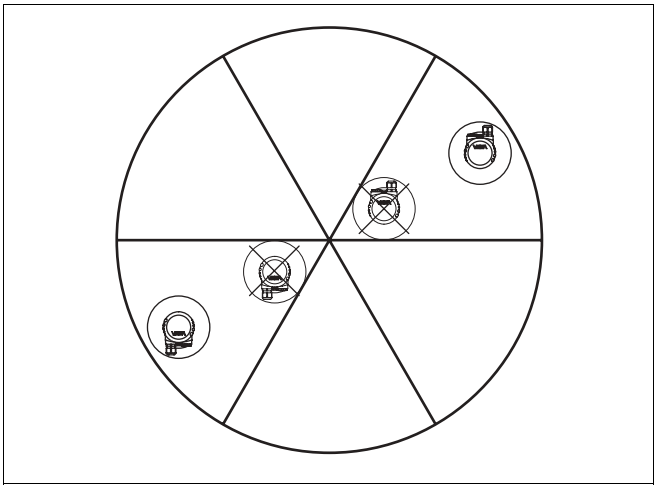


Fig. 12: Installation of VEGAPULS 68 in multiple chamber silos

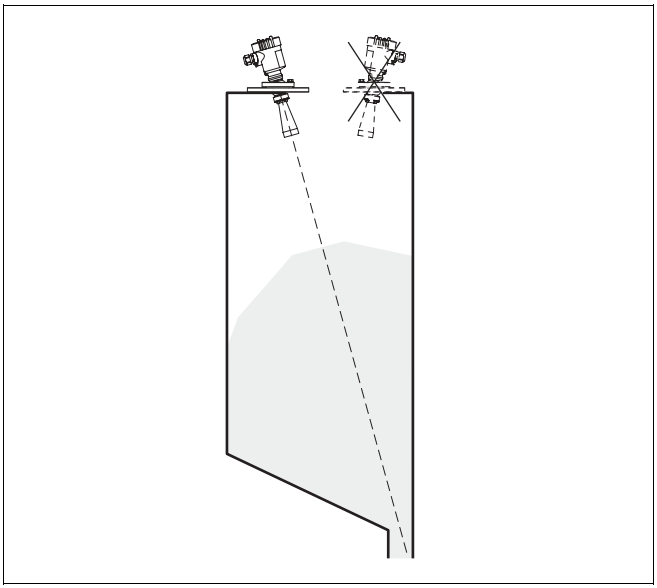


Fig. 13: Orientation of VEGAPULS 68 for emptying in the silo center

Vessel installations

Silo installations such as e.g. ladders, level switches, struts, and also structured vessel walls, can cause false echoes that get superimposed on the useful echo. The mounting location of the radar sensor should be a place where no installations

cross the microwave signals. Make sure when planning your measurement loop that the radar signals have a "clear view" to the product.

If there are existing vessel installations, a false signal 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 prevent direct interfering reflections.

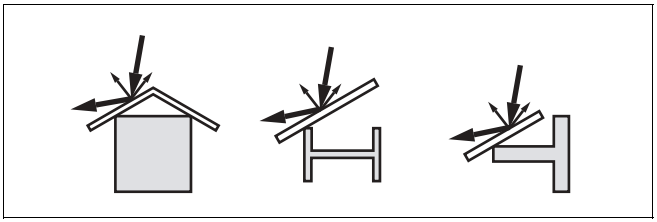


Fig. 14: Cover smooth profiles with deflectors

Air purging

To avoid strong buildup and dust in the antenna system, the sensor should not be mounted directly at the dust extraction of the vessel.

Tip:
In case of extreme dust in the antenna system, VEGAPULS 68 is available with purging connection e.g. for air. The air is distributed via channels in the antenna system and keeps is virtually clean from dust.

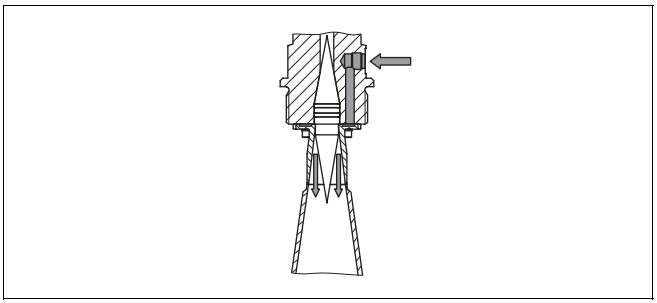


Fig. 15: Purging air connection with horn antenna

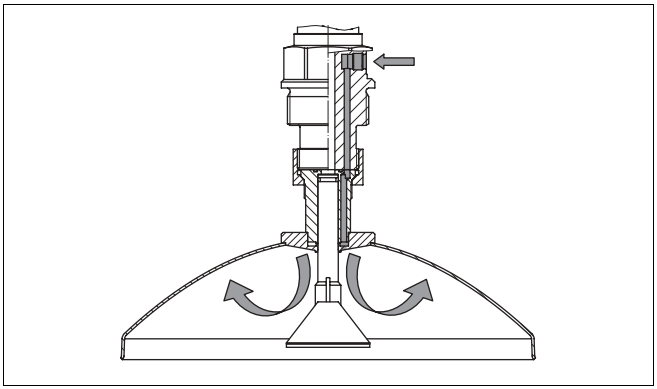


Fig. 16: Purging air connection with parabolic antenna

In practice it was shown that a pressure of approx. 0.2 … 1 bar is enough to provide a sufficient air flow (see diaphragm in chapter "*Technical data*").

Material heaps

Large material heaps are detected with several sensors, which can be mounted on e.g. traverse cranes. For this type of application, it is best to orient the sensor toward the solid surface. A mutual infuence of the sensor is not possible.

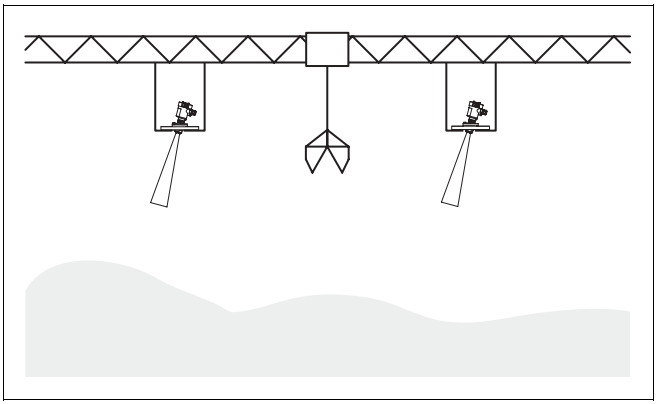


Fig. 17: Radar sensors on traverse crane

Information:
Keep in mind that for these applications, the sensors are designed for relatively slow level changes. When using VEGAPULS 68 on a movable bracket, the max. measuring rate must be observed (see chapter "*Technical data*").

5 Connecting to voltage supply

5.1 Preparing the connection

Note safety instructions

Always keep in mind the following safety instructions:

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

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 is supplied via a Profibus DP/PA segment coupler or a VEGALOG 571 EP input card. The power supply range can differ depending on the instrument version.

The data for power supply are stated in chapter "*Technical data*" in the "*Supplement*".

Selecting connection cable

VEGAPULS 68 is connected with screened cable according to the Profibus specification. Power supply and digital bus signal are carried over the same two-wire connection cable.

An outer cable diameter of 5 … 9 mm ensures the seal effect of the cable entry.

Please make sure that your installation is carried out according to the Profibus specification. In particular, make sure that the termination of the bus is done with appropriate terminating resistors.

Cable gland ½ NPT

On VEGAPULS 68 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 that corrode the connection between threaded insert and housing. This would influence the stability of the connection and the tightness of the housing.

Cable screening and grounding

In systems with potential equalisation, connect the cable screen directly to ground potential at the power supply unit, in the connection box and at the sensor. The screen in the sensor

must be connected directly to the internal ground terminal. The ground terminal outside on the housing must be connected to the potential equalisation (low impedance).

In systems without potential equalisation, connect the cable screen directly to ground potential at the power supply unit and at the sensor. In the connection box or T-distributor, the screen of the short stub to the sensor must not be connected to ground potential or to another cable screen. The cable screens to the power supply unit and to the next distributor must be connected to each other and also connected to ground potential via a ceramic capacitor (e.g. 1 nF, 1500 V). The low frequency potential equalisation currents are thus suppressed, but the protective effect against high frequency interference signals remains.

The total capacitance of the cable and of all capacitors must not exceed 10 nF in Ex applications.

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 steps - 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

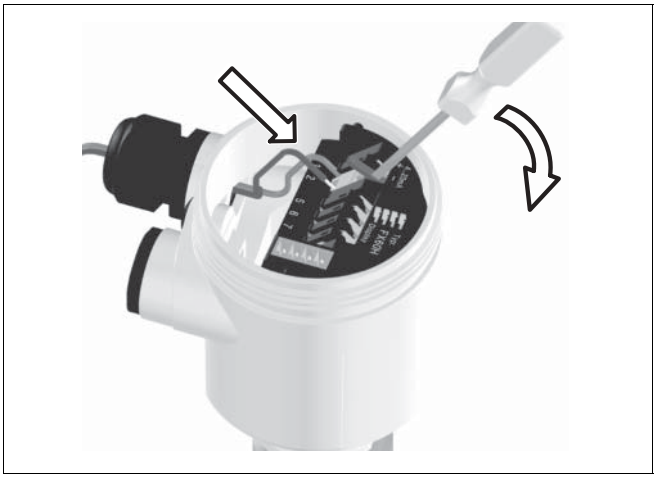


Fig. 18: Connection steps 6 and 7

8 Press down the opening levers of the terminals, you will hear the terminal spring closing

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

10 Connect the screen to the internal ground terminal 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 plan, single chamber housing

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

Housing overview

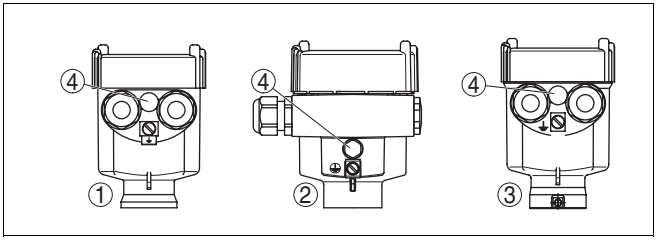


Fig. 19: Material versions, single chamber housing
1 Plastic
2 Aluminium
3 Stainless steel
4 Filter element for air pressure compensation of all material versions. Blind stopper with version IP 66/IP 68, 1 bar for Aluminium and stainless steel

Electronics and connection compartment

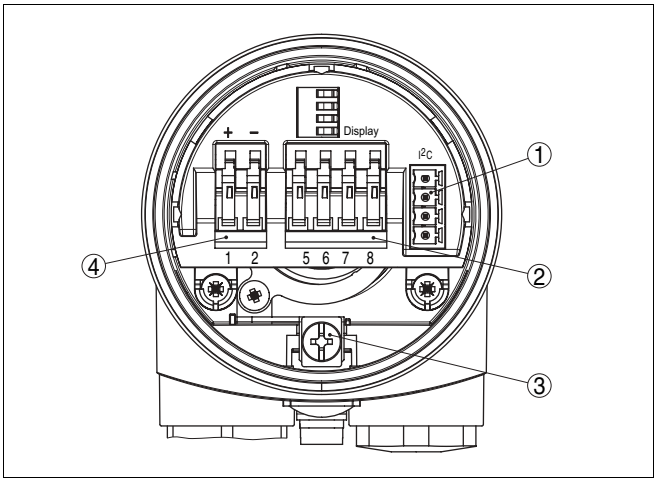


Fig. 20: Electronics and connection compartment, single chamber housing
1 Plug connector for VEGACONNECT (I^2C interface)
2 Spring-loaded terminals for connection of the external indication VEGADIS 61
3 Ground terminal for connection of the cable screen
4 Spring-loaded terminals for voltage supply

Wiring plan

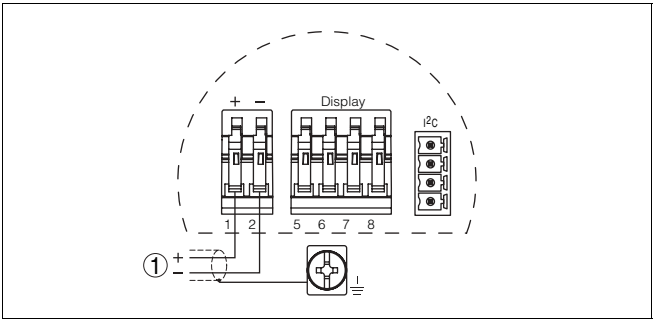


Fig. 21: Wiring plan, single chamber housing
1 Voltage supply/Signal output

5.4 Wiring plan, double chamber housing

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

Housing overview

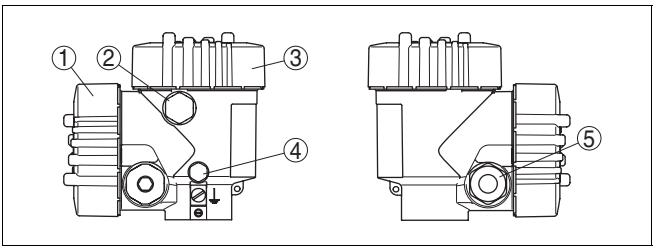


Fig. 22: Double chamber housing
1 Housing cover, connection compartment
2 Blind stopper or plug M12x1 for VEGADIS 61 (option)
3 Housing cover, electronics compartment
4 Filter element for pressure compensation or blind stopper with version IP 66/ IP 68, 1 bar[1)]
5 Cable entry or plug

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

Electronics compartment

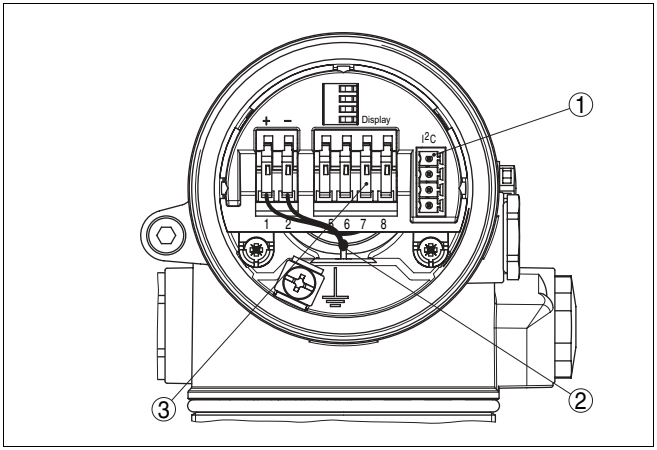


Fig. 23: Electronics compartment, double chamber housing
1 Plug connector for VEGACONNECT (I²C interface)
2 Internal connection cable to the connection compartment
3 Terminals for VEGADIS 61

Connection compartment

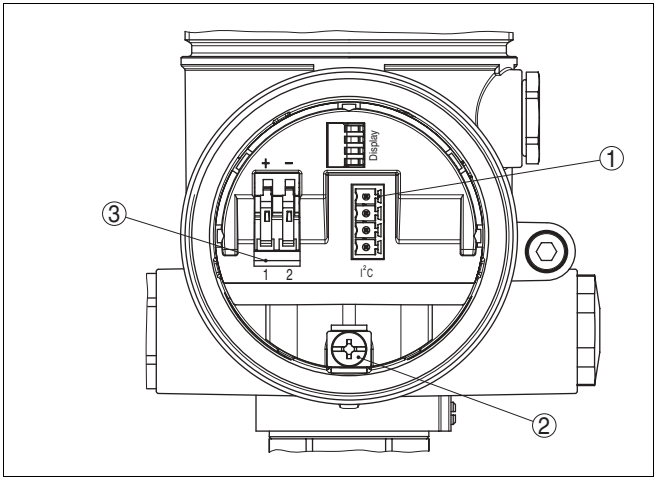


Fig. 24: Connection compartment, double chamber housing
1 Plug connector for VEGACONNECT (I²C interface)
2 Ground terminal for connection of the cable screen
3 Spring-loaded terminals for voltage supply

Wiring plan

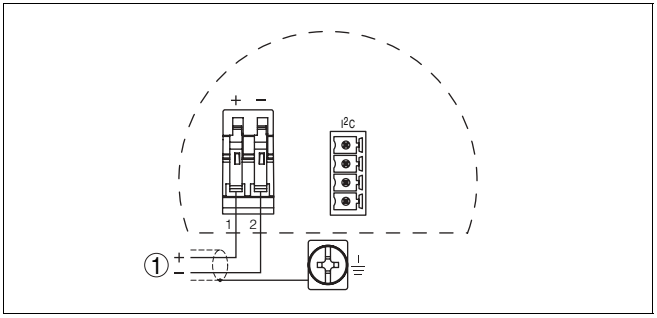


Fig. 25: Wiring plan, double chamber housing
1 Voltage supply/Signal output

5.5 Wiring plan, double chamber housing Exd

Information:
Instruments in Exd version with hardware revision …- 01 or higher as well as with national approvals such as e.g. according to FM or CSA at a later date.

Housing overview

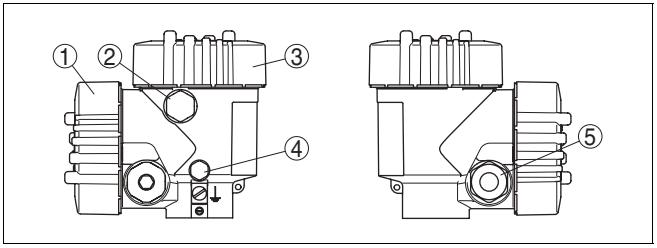


Fig. 26: Double chamber housing
1 Housing cover, connection compartment
2 Blind stopper or plug M12x1 for VEGADIS 61 (option)
3 Housing cover, electronics compartment
4 Filter element for pressure compensation or blind stopper with version IP 66/ IP 68, 1 bar[2)]
5 Cable entry or plug

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

Electronics compartment

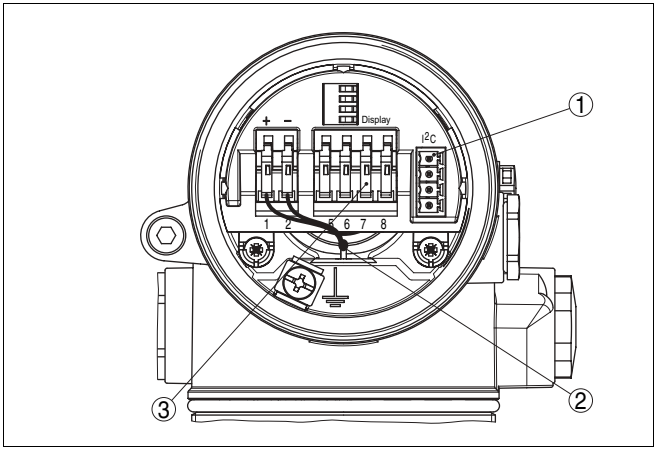


Fig. 27: Electronics compartment, double chamber housing
1 Plug connector for VEGACONNECT (I^2C interface)
2 Internal connection cable to the connection compartment
3 Terminals for VEGADIS 61

Connection compartment

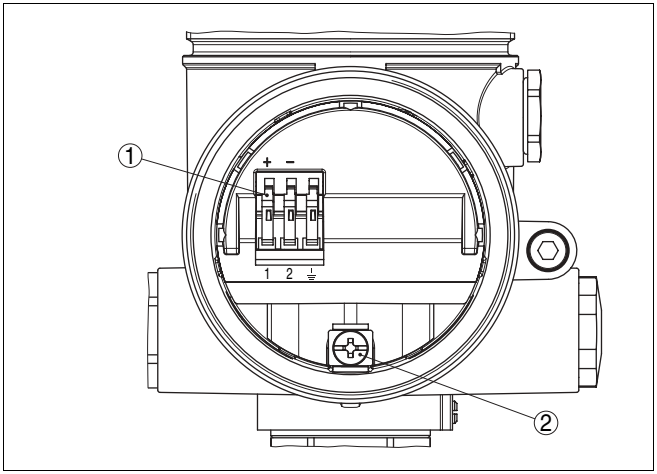


Fig. 28: Connection compartment, double chamber housing Exd
1 Spring-loaded terminals for power supply and cable screen
2 Ground terminal for connection of the cable screen

Wiring plan

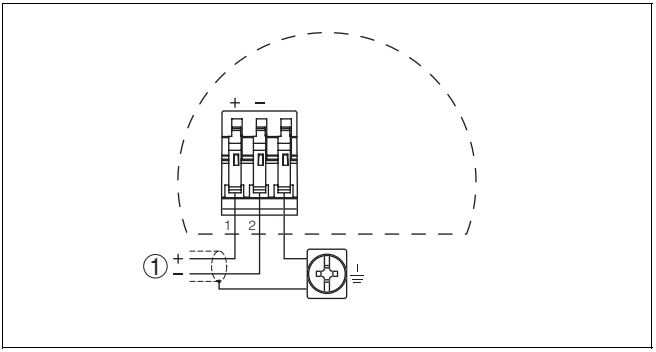


Fig. 29: Wiring plan, double chamber housing Exd
1 Voltage supply/Signal output

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

Wire assignment, connection cable

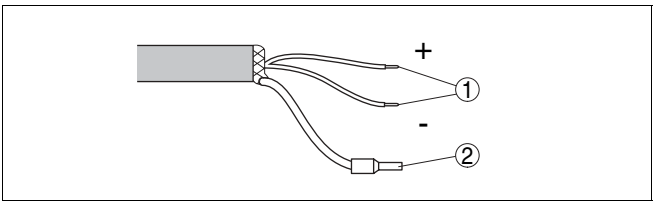


Fig. 30: Wire assignment, connection cable
1 brown (+) and blue (-) to power supply or to the processing system
2 Screen

5.7 Switch-on phase

Switch-on phase

After VEGAPULS 68 is connected to voltage supply or after voltage recurrence, the instrument carries out a self-check for approx. 30 seconds. The following steps are carried out:

- Internal check of the electronics
- Indication of the instrument type, the firmware as well as the sensor TAGs (sensor designation)
- Status byte goes briefly to fault value

Then the current measured value will be displayed and the corresponding digital output signal will be outputted to the cable.[3)]

[3)] The values correspond to the actual measured level as well as to the settings already carried out, e.g. default setting.

6 Set up with the indicating and adjustment module PLICSCOM

6.1 Short description

Function/Configuration

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

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

From a hardware revision …- 01 or higher of PLICSCOM as well as a hardware revision …- 01, 03 or higher of 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:
For instruments with national approvals such as e.g. according to CSA, this function only 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*".

6.2 Insert the indicating and adjustment module

Mounting/dismounting the indicating and adjustment module

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

Proceed as follows:

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

Removal is carried out in reverse order.

The indicating/adjustment module is powered by the sensor, an additional connection is not necessary.

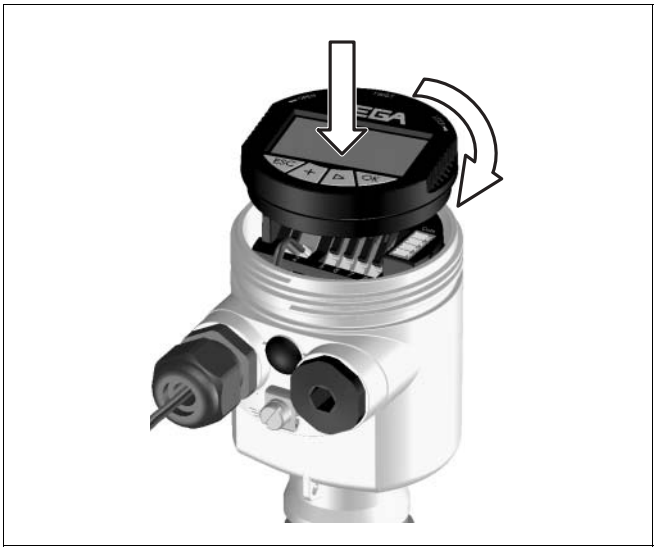


Fig. 31: Installation of the indicating and adjustment module

Note:
If you intend to retrofit VEGAPULS 68 with an indicating and adjustment module for continuous measured value indication, a higher cover with an inspection glass is required.

6.3 Adjustment system

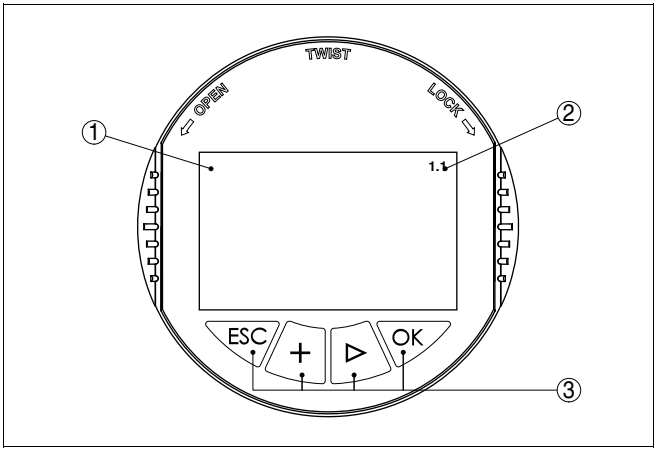


Fig. 32: Indicating and adjustment elements
1 LC display
2 Indication of the menu item number
3 Adjustment keys

Key functions

- ***[OK]*** key:
  - move to the menu overview
  - confirm selected menu
  - Edit parameter
  - Save value
- ***[->]*** key to select:
  - menu change
  - list entry
  - Select editing position
- ***[+]*** key:
  - Change 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

Before starting the actual parameter adjustment of a Profibus PA sensor, the address setting must first be carried out. You will find a detailed description in the operating instructions manual of the indicating and adjustment module or in the online help of PACTware™ or DTM.

Parameter adjustment

As VEGAPULS 68 is a distance measuring instrument, the distance from the sensor to the product surface is measured. To have the real product level displayed, an allocation of the measured distance to the percentage height must be made. To carry out this adjustment, the distance is entered with full and empty vessel. If these values are not known, an adjustment with the distance values, e.g. 10 % and 90 % is also possible. Starting point for these distance specifications is always the seal surface of the thread or flange. With these settings, the real level is calculated. Furthermore the operating range of the sensor is limited from maximum to the required range.

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

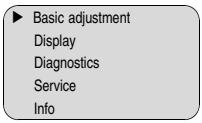
In the main menu item "*Basic adjustment*", the individual submenu items should be selected one after the other and provided with the correct parameter values.

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

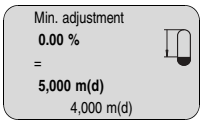
Carrying out min. adjustment

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.



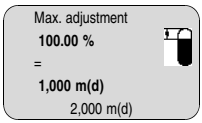
3 Prepare the % value for editing with ***[OK]*** and set the cursor to the requested position with ***[->]***. Set the requested percentage value with ***[+]*** and save with ***[OK]***. The cursor jumps now to the distance value.

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 ***[->]***.

Carrying out max. adjustment

Proceed as follows:



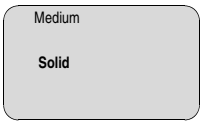
1 Prepare the % value for editing with ***[OK]*** and set the cursor to the requested position with ***[->]***. Set the requested percentage value with ***[+]*** and save with ***[OK]***. The cursor jumps now to the distance value.

2 Enter the appropriate distance value in m (corresponding to the percentage value) for the full vessel. Keep in mind that the max. level must lie below the dead band.

3 Save the settings with ***[OK]*** and move to "Medium selection" with ***[->]***.

Medium selection

Each product has different reflective properties. In solids, these are dust generation, material cones and additional echoes caused by the vessel wall. Due to the medium selection, the sensor is adapted in an optimum way to the product and the accuracy, particularly for products with bad reflective properties, is increased considerably.



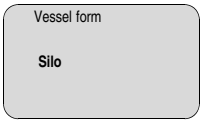
With solids, you can also choose between "*Powder/Dust*", "*Granular/Pellets*" or "*Ballast/Pebbels*".

In liquids, fluctuating surfaces and foam generation are further interfering factors. To adapt the sensor to the different conditions, a general selection is made in this menu item, i.e. "*Solid*" or "*Liquid*".

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

Vessel form

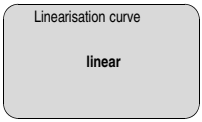
Apart from the medium, the vessel shape can also influence the measurement. To adapt the sensor to these measuring conditions, this menu item offers different options depending on whether liquid or solid is selected. With "*Solid*" these are "*Silo*" or "*Bunker*", with "*Liquid*", "*Storage tank*",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



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

Linearisation 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*".



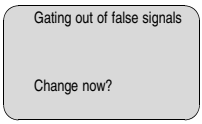
Enter the requested parameter via the appropriate keys, save your settings and jump to the next menu item with the ***[->]*** key.

Gating out of false signals

False reflections by vessel installations as described in chapter "*Mounting*", can influence the measurement. A gating our of false echoes detects, marks and saves these false signals so that they are no longer taken into account for level

measurement. To detect these over the complete measuring range, the gating our of false signals should be carried out with empty vessel.

Information:
However, the measuring signals are not damped by the product in completely empty, closed metal vessels. Due to this, considerable multiple reflections can be caused by which the noise level can increase. In such vessels, it is recommended to carry out the gating out of false echoes with part filling.



Proceed as follows:

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

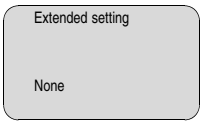
2 Select the menu item "*Service*" with ***[->]*** and confirm with ***[OK]***. Now the menu item "*False signal suppression*" is displayed.

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.

Extended setting/Quick level change

The menu item "*Extended setting*" offers the possibility to optimise VEGAPULS 68 for applications with quick level changes. For this purpose select the function "*Quick level change >1 m/min.*".



Note:
Since with the function "*Quick level change >1 m/min.*" the generation of an averafy value of the signal processing is considerably reduced, false reflections by agitators or vessel installations can cause measured value fluctuations. A false echo memory is thus recommended.

Copy sensor data

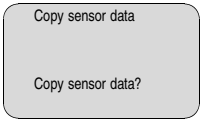
This function enables reading out parameter adjustment data as well as writing parameter adjustment data into the sensor via the indicating and adjustment module. A description of the function is available in the operating instructions manual "*Indicating and adjustment module*".

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

- Measured value presentation
- Adjustment
- Medium
- Standpipe inner diameter[4)]
- Vessel form
- Damping
- Linearisation curve
- Sensor-TAG
- Displayed value
- Scaling unit (Out-Scale unit)
- Positions after the decimal point (scaled)
- Scaling PA/Out-Scale 4 values
- Unit of measurement
- Language

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

- Sensor address
- PIN



Reset

Basic adjustment
If the "*Reset*" is carried out, the sensor resets the values of the following functions to the reset values (see chart):[5)]

Function	Reset value
Max. adjustment	0 m(d)

[4)] With standpipe versions.
[5)] Sensor-specific basic adjustment.

Min. adjustment	15 m(d) (VEGAPULS 67) 70 m(d) (VEGAPULS 68)
Medium	Solid
Vessel form	not known
Damping	0 s
Linearization	linear
Channel	PV lin. %
Sensor-TAG	Sensor
Displayed value	PA-Out
Extended settings	Keine
Additional PA value	Secondary Value 1 %
Out-Scale-Unit	%
PV-Out-Scale	0.00 lin-% = 0.0 % 100.0 lin-% = 100 %
Unit of measurement	m(d)

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

Function	**Reset value**
Sensor address	no reset
Language	no reset

Factory setting
Like basic setting, in addition special parameters are reset to default values.[6)]

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

Optional settings

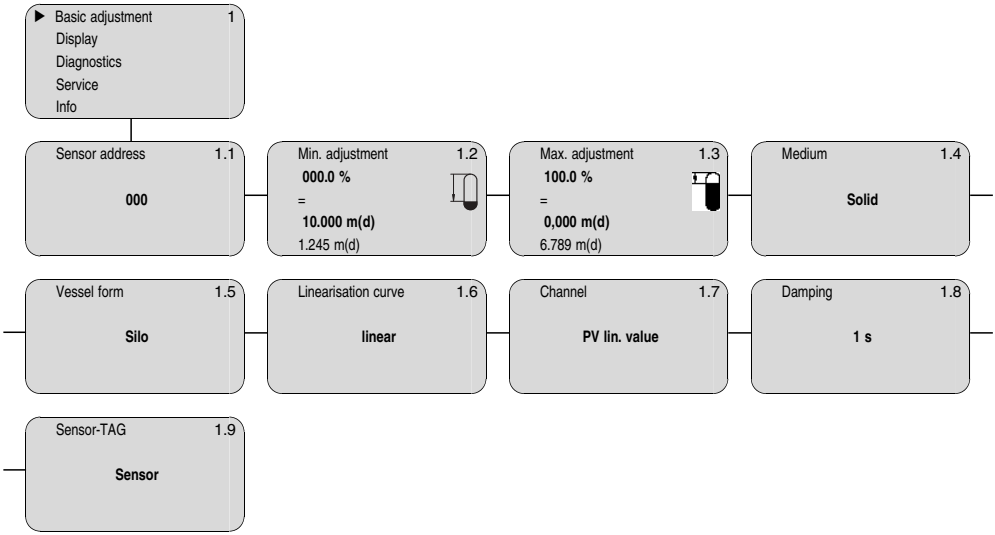
Additional adjustment and diagnosis options such as e.g. scaling, simulation or trend curve presentation are shown in the following menu schematic. You will find a detailed description of these menu items in the operating instructions manual "*Indicating and adjustment module*".

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

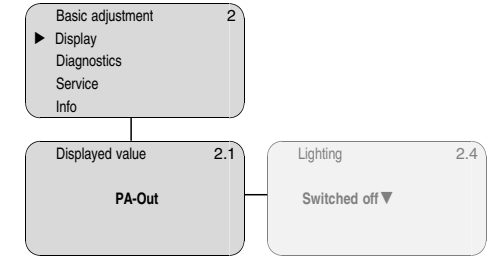
6.5 Menu schematic

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

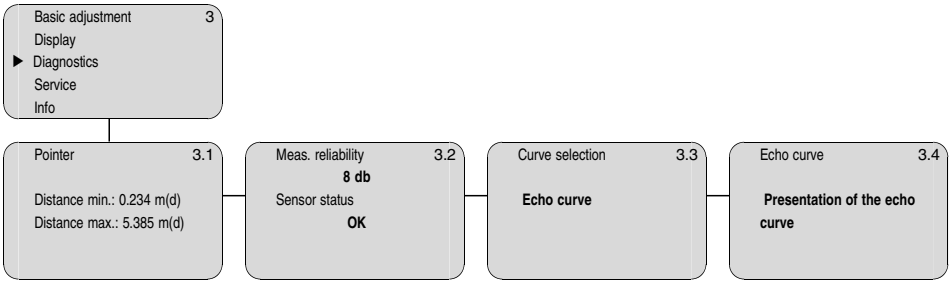
Basic adjustment



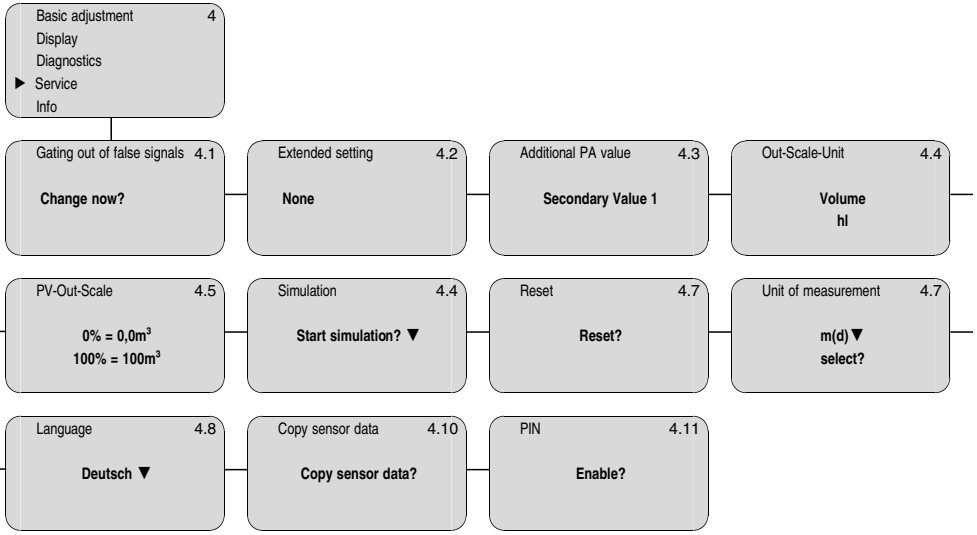
Display



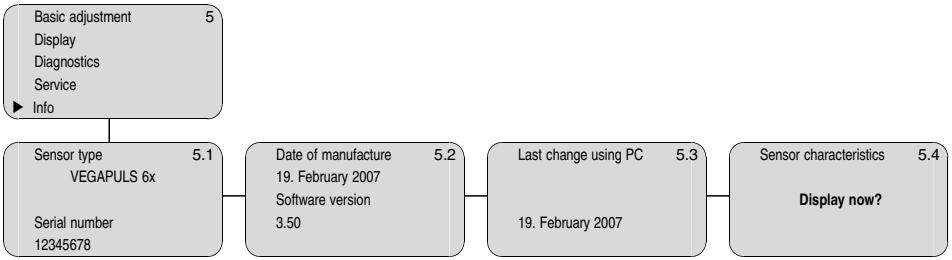
Diagnostics



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

If it is necessary to exchange VEGAPULS 68, the indicating and adjustment module is inserted into the replacement instrument and the data are written into the sensor via 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

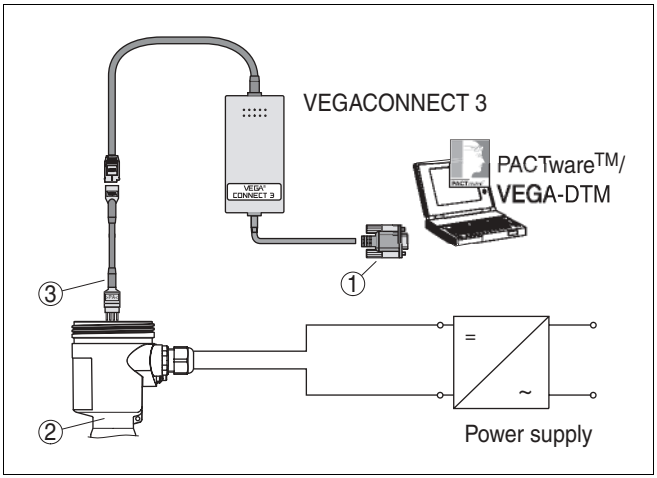


Fig. 33: Connection directly to the sensor
1 RS232 connection
2 VEGAPULS 68
3 I²C adapter cable for VEGACONNECT 3

Necessary components:

- VEGAPULS 68
- PC with PACTware™ and suitable VEGA DTM
- VEGACONNECT 3 with I²C adapter cable (article no. 2.27323)
- Power supply unit

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 68, the current version of the DTM Collection 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 PDM

For VEGA sensors, device descriptions are also available as EDD for the adjustment program PDM. The device descriptions are already implemented in the current versions of PDM. For older versions of PDM they are available as a free-of-charge download from the 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 68 is completely maintenance free.

In some applications, builup on the antenna system can influence the measuring result. Depending on the sensor and application, make arrangements to avoid strong pollution of the antenna system. If necessary, clean the antenna system in certain intervals.

8.2 Remove interferences

Causes of malfunction

VEGAPULS 68 offers maximum reliability. Nevertheless, faults can occur during operation. These may be caused by the following, e.g.:

- Sensor
- Process
- Supply
- Signal processing

Fault clearance

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

24 hour service hotline

However, should this measures not be successful, call the VEGA service hotline in urgent cases under the phone no. **+49 1805 858550**.

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

Checking Profibus PA

? When an additional instrument is connected, the segment fails.

- Max. supply current of the segment coupler exceeded

→ Measure the current consumption, reduce size of segment

? Wrong presentation of the measured value in Simatic S5

- Simatic S5 cannot interpret the number format IEEE of the measured value

→ Insert converting component from Siemens

? In Simatic S7 the measured value is always presented as 0

- Only four bytes are consistently loaded in the PLC

→ Use function component SFC14 to load 5 bytes consistently

? Measured value on the indicating and adjustment module does not correspond to the value in the PLC

- The menu item "*Display - Display value*" is not set to "*PA-Out*"

→ Check values and correct, if necessary

? No connection between PLC and PA network

- Incorrect adjustment of the bus parameter and the segment coupler-dependent baud rate

→ Check data and correct, if necessary

? Instrument does not appear during connection setup

- Profibus DP cable pole-reversed

→ Check cable and correct, if necessary

- Incorrect termination

→ Check termination at the beginning and end points of the bus and terminate, if necessary, according to the specification

- Instrument not connected to the segment, double assignment of an address

→ Check and correct, if necessary

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

Fault messages via the indicating/adjustment module

? 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 a software update or send the instrument for repair

? E041, E042, E043

- Hardware error, electronics defective

→ Exchange instrument or return instrument for repair

? E113

- Communication conflict

→ Exchange instrument or return instrument 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
- 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 "*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.

Profibus PA

Oscillator PS-E.60SP is suitable for VEGAPULS 67 and 68 - Profibus PA:

- PS-E.60SP**X** (X = without approvals)
- PS-E.60SP**D** (D = approvals KX, KF according to VEGA product list)
- PS-E.60SP**E** (E = approvals CX, DX, CK, DK, GX, GI, XM, CM, UX, UF according 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) in the Internet from our homepage www.vega.com under: "*Downloads - Forms and Certificates - Repair form*".

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

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

9 Dismounting

9.1 Dismounting steps

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

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

9.2 Disposal

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

WEEE directive 2002/96/EG
This instrument is not subject to the WEEE directive 2002/96/EG and the respective national laws (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 according to the WEEE directive.

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

Materials: see chapter "*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, wetted parts	
– Process fitting	316L, Hastelloy C22, Hastelloy C22 plated
– Antenna	316L, 316L electropolished, Hastelloy C22
– Seal, process fitting threaded version	Klingersil C-4400
– Antenna cone	PTFE (TFM 1600 PTFE)
– seal, antenna system	FKM (e.g. Viton), Kalrez 2035, 6230 (FDA), 6375
Materials, non-wetted parts	
– Housing	Plastic PBT (Polyester), Alu die-casting powder-coated, stainless steel 316L
– Seal ring between housing and housing cover	NBR (stainless steel housing), silicone (Alu/ plastic housing)
– Inspection window in housing cover for PLICSCOM	Polycarbonate (UL-746-C listed)
– Ground terminal	316Ti/316L
Weight with horn antenna	
– Process fitting - thread	2 … 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
– Process fitting swivelling holder with flange	5.2 … 16.4 kg (11.5 … 35.2 lbs), depending on the 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 … 16.2 kg (11 … 35.7 lbs), depending on the flange size and housing
– Process fitting swivelling holder with flange	6 … 17.2 kg (13.2 … 37.9 lbs), depending on the flange size and housing

29263-EN-070305

Output variable	
Output signal	digital output signal, format according to IEEE-754
Sensor address	126 (default setting)
Current value	10 mA, ±0.5 mA
Integration time (63 % of the input variable)	0 … 999 s, adjustable
Step response or adjustment time	≤250 ms (ti: 0 s, 10 … 90 %)

Input variable	
Parameter	distance between process fitting and product surface
Min. distance from antenn end	400 mm (15.748 in)
Max. measuring range	70 m (229.657 ft)

Reference conditions to measuring accuracy (similar to DIN EN 60770-1)	
Reference conditions according to DIN EN 61298-1	
– Temperature	+18 … +30 °C (+64 … +86 °F)
– Relative humidity	45 … 75 %
– Air pressure	860 … 1060 mbar/86 … 106 kPa (12.5 … 15.4 psi)
Other reference conditions	
– Reflector	Ideal reflector, e.g. metal plate 2x2 m
– False reflections	Biggest false echo, 20 dB smaller than the useful echo

Characteristics and performance data	
Frequency	K-band
Interval	approx. 1 s
Beam angle 3 dB with horn antenna, depending on antenna diameter	
– ø 40 mm (1.575 in)	22°
– ø 48 mm (1.89 in)	18°
– ø 75 mm (2.953 in)	10°
– ø 95 mm (3.74 in)	8°
– Beam angle 3 dB with parabolic antenna	4°

Step response or adjustment time[7]	>1 s (dependent on the parameter adjustment)
Max. level change	adjustable up to 1 m/min. (dependent on the parameter adjustment)

Received average emitted power reaching an object directly in front of the antenna

– Distance 1 m (3.28 ft)	108 nW per cm^2 (108^{-9} W/cm^2) or 108 nW per 0.155 in^2 ($108x10^{-9}$ W/0.155 in^2)
– Distance 5 m (16.404 ft)	4.3 nW per cm^2 (4.3^{-9} W/cm^2) or 4.3 nW per 0.155 in^2 ($4.3x10^{-9}$ W/0.155 in^2)

Measuring accuracy

Resolution, general	max. 1 mm (max. 0.039 in)
Deviation[8]	see diagrams

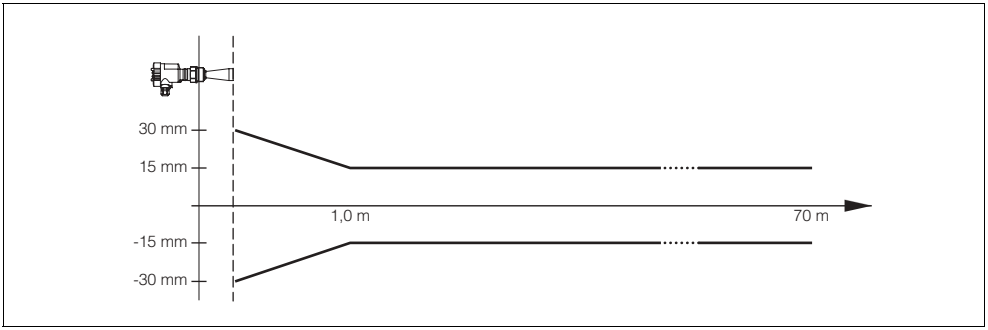


Fig. 34: Accuracy VEGAPULS 68 with horn antenna in mm, measuring range in m

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

[8] Incl. non-linearity, hysteresis and non-repeatability.

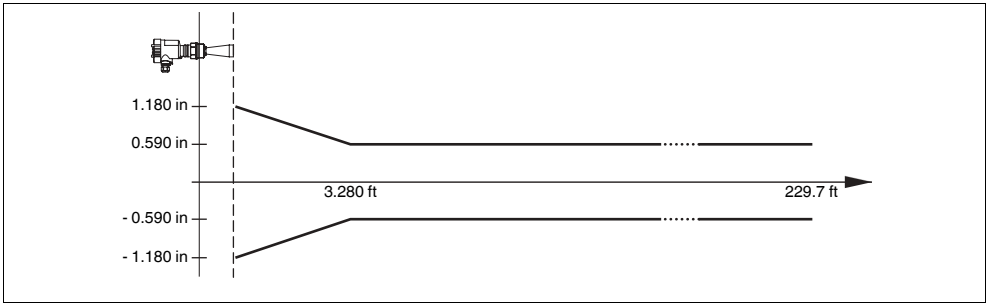


Fig. 35: Accuracy VEGAPULS 68 with horn antenna in Inch, measuring range in ft

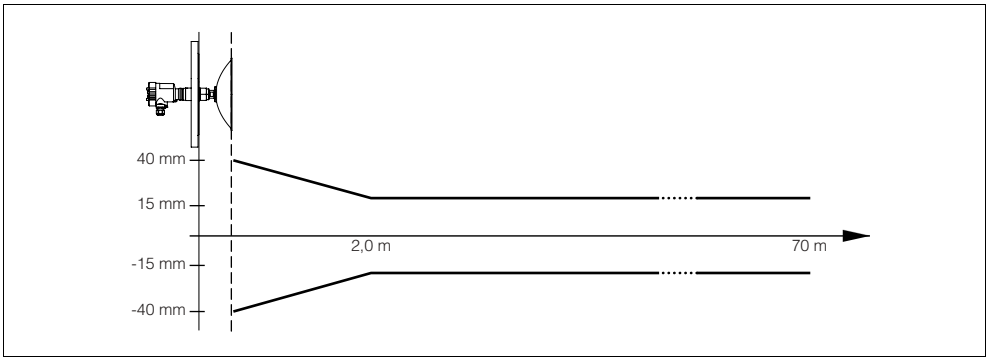


Fig. 36: Accuracy VEGAPULS 68 with parabolic antenna in mm, measuring range in m

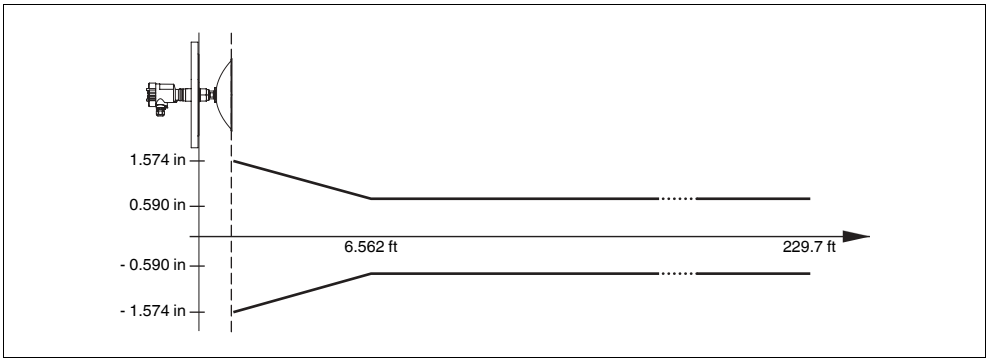


Fig. 37: Accuracy VEGAPULS 68 with parabolic antenna in Inch, measuring range in ft

29263-EN-070305

Influence of the ambient temperature to the sensor electronics[9)]

Average temperature coefficient of the zero signal (temperature error)	0.03 %/10 K

Ambient conditions

Ambient, storage and transport temperature	-40 … +80 °C (-40 … +176 °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)
– 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 temperature adapter	-20 … +200 °C (-4 … +392 °F)

For the vessel pressure, you also have to note the specifications on the type label. Always the lowest value is applicable.

Vessel pressure horn antenna	
– without swivelling holder	-1 … 40 bar/-100 … 4000 kPa (-14.5 … 580 psi)
– with swivelling holder	-1 … 1 bar/-100 … 100 kPa (-14.5 … 14.5 psi) not sealing
Vessel pressure parabolic antenna	
– without swivelling holder	-1 … 6 bar/-100 … 600 kPa (-14.5 … 87 psi)
– with swivelling holder	-1 … 1 bar/-100 … 100 kPa (-14.5 … 14.5 psi) not sealing
Vessel pressure relating to the flange nominal stage	see supplementary instructions manual "*Flanges according to DIN-EN-ASME-JIS*"
Vibration resistance	mechanical vibrations with 4 g and 5 … 100 Hz[10)]

Data on rinsing air connection

Pressure	max. 6 bar (87.02 psi)

9) Relating to the nominal measuring range.
10) Tested according to the regulations of German Lloyd, GL directive 2

Air quantity see diagram

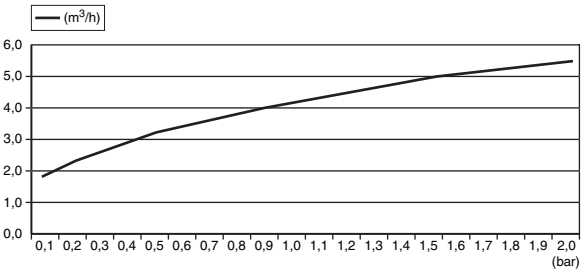


Fig. 38: Air quantity diagram

Thread	G⅛ A
Catch	
– with non-Ex	Dust protection cover of PE
– with Ex	Threaded plug of 316Ti

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

– Material	316Ti
– Seal	FKM (Viton), Kalrez
– for tube diameter	6 mm
– opening pressure	0.5 bar (7.25 psi)
– Nominal pressure stage	PN 250

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

Cable entry/plug[11)]

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

or:
- 1x cloasing cap M20x1.5, 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; 1x blind stopper M16x1.5 or optionally 1x plug M12x1 for VEGADIS 61

or:
- 1x closing cap ½ NPT, 1x blind stopper ½ NPT, 1x blind stopper M16x1.5 or optionally 1x plug M12x1 for VEGADIS 61

or:
- 1x plug (depending on the version); 1x blind stopper M20x1.5; 1x blind stopper M16x1.5 or optionally 1x plug M12x1 for VEGADIS 61

Spring-loaded terminals — for wire cross-sections up to 2.5 mm^2

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

Cable entry

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

– Double chamber housing — 1x IP 68 cable gland M20x1.5; 1x blind stopper M20x1.5; 1x blind stopper M16x1.5

Connection cable

– Wire cross-section — 0.5 mm^2

– wire resistance — <0.036 Ohm/m

– Tensile strength — >1200 N (270 lbf)

– Standard length — 5 m (16.4 ft)

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

– Max. length	1000 m (3280 ft)
– Min. bending radius	25 mm (1 in) at 25 °C (77 °F)
– Diameter	approx. 8 mm (0.315 in)
– Colour - standard PE	Black
– Colour - standard PUR	Blue
– Colour - Ex-version	Blue

Indicating and adjustment module

Power supply and data transmission	through the sensor
Indication	LC display in 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

Supply voltage	
– Non-Ex instrument	9 … 32 V DC
– EEx ia instrument	9 … 24 V DC
Supply voltage with lighted indicating and adjustment module	
– Non-Ex instrument	12 … 32 V DC
– EEx ia instrument	12 … 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)

Electrical protective measures	
Protection	
– Plastic housing	IP 66/IP 67
– Alu and stainless steel standard	IP 66/IP 68 (0.2 bar)[12)]
– Alu and stainless housing (optionally available)	IP 66/IP 68 (1 bar)
Overvoltage category	III
Protection class	II

Approvals[13)14)]	
ATEX ia	ATEX II 1G, 1/2G, 2G EEx ia IIC T5
ATEX ia+d	ATEX II 1/2G, 2G EEx d ia IIC T5
ATEX D	ATEX II 1/2D IP6X T
IECEx	Ex ia IIC T5, Ex tD A20/A21 IP66 T, A21
FM/CSA	(NI) CL I, DIV2, GP ABCD; (DIP) CL II, III, DIV1, GP EFG; (IS) CL I, II, III, DIV1, GP ABCDEF/G; (XP-IS) CL I, II, III, DIV1, GP ABCDEFG
Ship approvals	GL, LRS, ABS, CCS, RINA

12) Prerequisite for maintaining the protection is a suitable cable.
13) Deviating data in Ex applications: see separate safety instructions.
14) Depending on order specification.

10.2 Profibus PA

Instrument master file

The instrument master file (GSD) contains the characteristic data of the Profibus PA instrument. These data are, e.g. the permissible transmission rates as well as information on diagnostics values and the format of the measured value outputted by the PA instrument.

A bitmap file is also provided for the Profibus network planning tool. This file is installed automatically when the GSD file is integrated. The bitmap file is used for symbolic indication of the PA instrument in the configuration tool.

Ident number

Each Profibus instrument gets an unambiguous ident number (ID number) from the Profibus user organisation (PNO). This ID number is also included in the name of the GSD file. For VEGAPULS 68 the ID number is **0x0772(hex)** and the GSD file **„PS__0772.GSD“**. Optionally to this manufacturer-specific GSD file, PNO provides also a general so-called profile-specific GSD file. For VEGAPULS 68 you have to use the general GSD file **„PA139700.GSD“**. If the general GSD file is used, the sensor must be set to the profile-specific ident number via the DTM software. By default, the sensor operates with the manufacturer-specific ID number.

Cyclical data traffic

The master class 1 (e.g. PLC) cyclically reads out measured values from the sensor during operation. The below block diagram below shows which data can be accessed by the PLC.

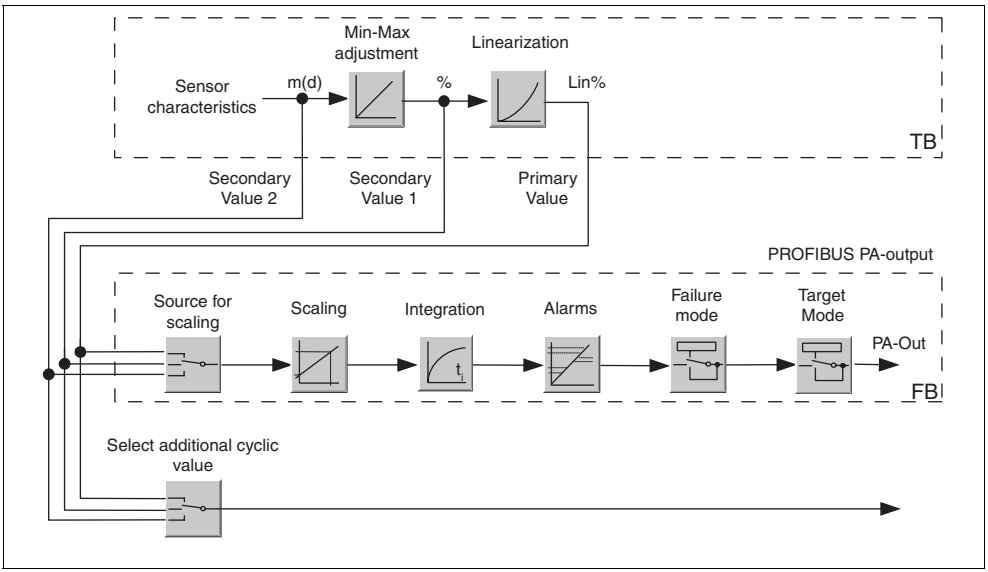


Fig. 39: VEGAPULS 68: Block diagram with AI (PA-OUT) value and additional cyclical value
TB Transducer Block
FB Function Block

Module of the PA sensors

For the cyclic data traffic, VEGAPULS 68 provides the following modules:

- AI (PA-OUT)
  - PA-OUT value of the FB1 after scaling
- Additional Cyclic Value
  - Additional cyclical value (depending on the source)
- Free Place
  - This module must be used if a value should not be used in the data telegram of the cyclical data traffic (e.g. replacement of temperature and Additional Cyclic Value)

Max. two modules can be active. By means of the configuration software of the Profibus master, you can determine the configuration of the cyclical data telegram with these modules. The procedure depends on the respective configuration software.

Note:

The modules are available in two versions:

- Short for Profibus masters that only support one "Identifier format" byte, e.g. Allen Bradley
- Long for Profibus master only supporting the "Identifier Format" byte, e.g. Siemens S7-300/400

Examples of telegram configuration
In the following you will see how the modules can be combined and how the appendant data telegram is structured.

Example 1 (standard setting) with distance value and additional cyclical value:

- AI (PA-OUT)
- Additional Cyclic Value

Byte-No.	1	2	3	4	5	6	7	8	9	10
Format	IEEE-754-Floating point value				Status	IEEE-754-Floating point value				Status
Value	PA-OUT (FB1)				Status (FB1)	Additional Cyclic Value				Status

Example 2 with distance value without additional cyclical value:

- AI (PA-OUT)
- Free Place

Byte-No.	1	2	3	4	5
Format	IEEE-754-Floating point value				Status
Value	PA-OUT (FB1)				Status (FB1)

Note:
Bytes 6-10 are not used in this example.

Data format of the output signal

Byte4	Byte3	Byte2	Byte1	Byte0
Status	Value (IEEE-754)			

Fig. 40: Data format of the output signal

The status byte corresponds to profile 3.0 "Profibus PA Profile for Process Control Devices" coded. The status "Measured value OK" is coded as 80 (hex) (Bit7 = 1, Bit6 … 0 = 0).

The measured value is transferred as a 32 bit floating point number in the IEEE-754 format.

Byte n								Byte n+1								Byte n+2								Byte n+3							
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
VZ	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0	2^{-1}	2^{-2}	2^{-3}	2^{-4}	2^{-5}	2^{-6}	2^{-7}	2^{-8}	2^{-9}	2^{-10}	2^{-11}	2^{-12}	2^{-13}	2^{-14}	2^{-15}	2^{-16}	2^{-17}	2^{-18}	2^{-19}	2^{-20}	2^{-21}	2^{-22}	2^{-23}
Sign Bit	Exponent							Significant								Significant								Significant							

$$\text{Value} = (-1)^{VZ} \bullet 2^{(\text{Exponent} - 127)} \bullet (1 + \text{Significant})$$

Fig. 41: Data format of the measured value

Coding of the status byte associated with the PA output value

Status code	Description according to Profibus standard	Possible cause
0x00	bad - non-specific	Flash-Update active
0x04	bad - configuration error	• Adjustment error • Configuration error with PV-Scale (PV-Span too small) • Unit irregularity • Error in the linearization table
0x0C	bad - sensor failure	• Hardware error • Converter error • Leakage pulse error • Trigger error
0x10	bad - sensor failure	• Measured value generation error • Temperature measurement error
0x1f	bad - out of service constant	"Out of Service" mode switched on
0x44	uncertain - last unstable value	Failsafe replacement value (Failsafe-Mode = "Last value" and already valid measured value since switching on)
0x48	uncertain substiute set	• Switch on simulation • Failsafe replacement value (Failsafe-Mode = "Fsafe value")
0x4c	uncertain - initial value	Failsafe replacement value (Failsafe-Mode = "Last valid value" and no valid measured value since switching on)
0x51	uncertain - sensor; conversion not accurate - low limited	Sensor value < lower limit
0x52	uncertain - sensor; conversion not accurate - high limited	Sensor value > upper limit
0x80	good (non-cascade) - OK	OK
0x84	good (non-cascade) - active block alarm	Static revision (FB, TB) changed (10 sec. active, after the parameter of the static category was written)
0x89	good (non-cascade) - active advisory alarm - low limited	Lo-Alarm
0x8a	good (non-cascade) - active advisory alarm - high limited	Hi-Alarm
0x8d	good (non-cascade) - active critical alarm - low limited	Lo-Lo-Alarm

Status code	Description according to Profibus standard	Possible cause
0x8e	good (non-cascade) - active critical alarm - high limited	Hi-Hi-Alarm

29263-EN-070305

10.3 Dimensions

Housing in protection IP 66/IP67 and IP 66/IP 68; 0.2 bar

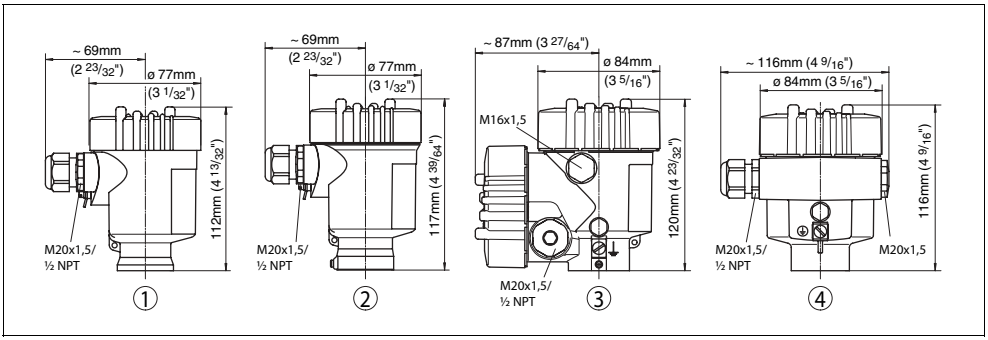


Fig. 42: Housing versions in protection IP 66 (with integrated PLICSCOM the housing is 9 mm/0.35 in higher)
1 Plastic housing
2 Stainless steel housing
3 Aluminium double chamber housing
4 Aluminium housing

Housing in protection IP 66/IP 68, 1 bar

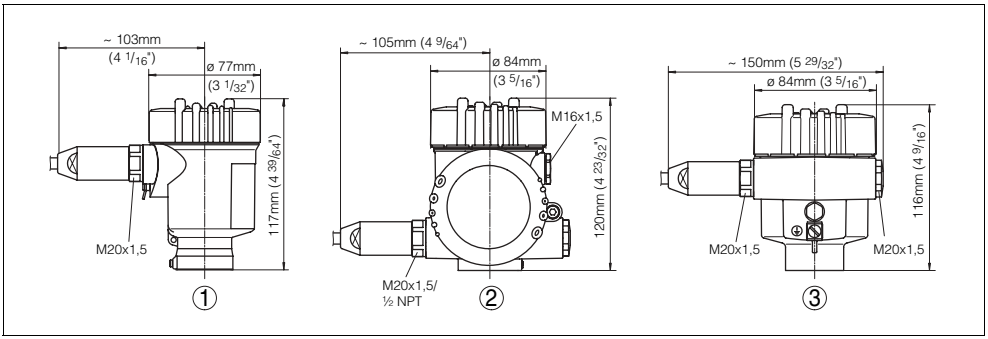
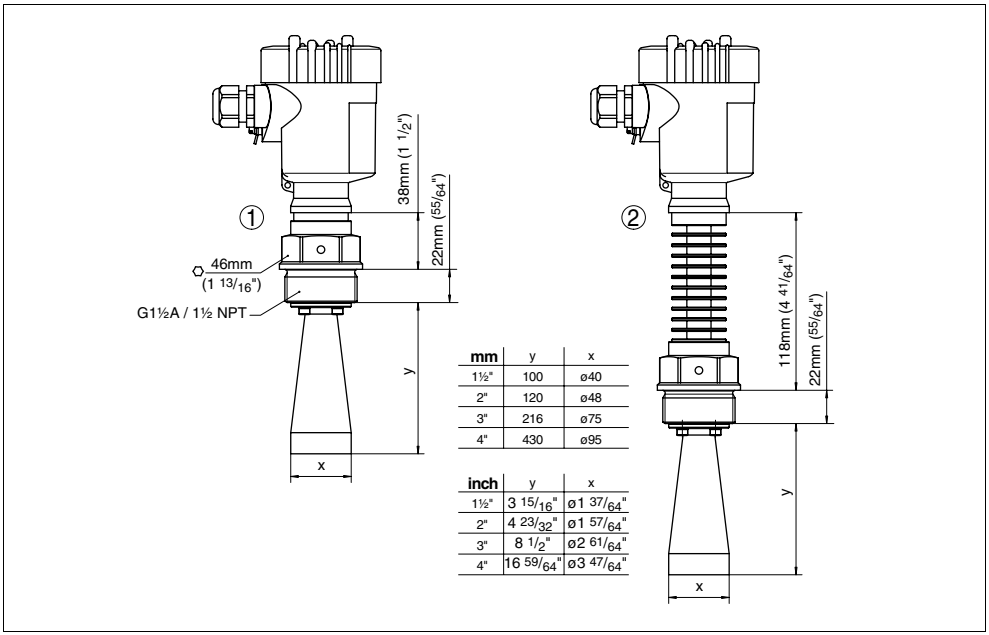


Fig. 43: Housing versions in protection IP 68 (with integrated PLICSCOM the housing is 9 mm/0.35 in higher)
1 Stainless steel housing
2 Aluminium double chamber housing
3 Aluminium housing

VEGAPULS 68, horn antenna in threaded version

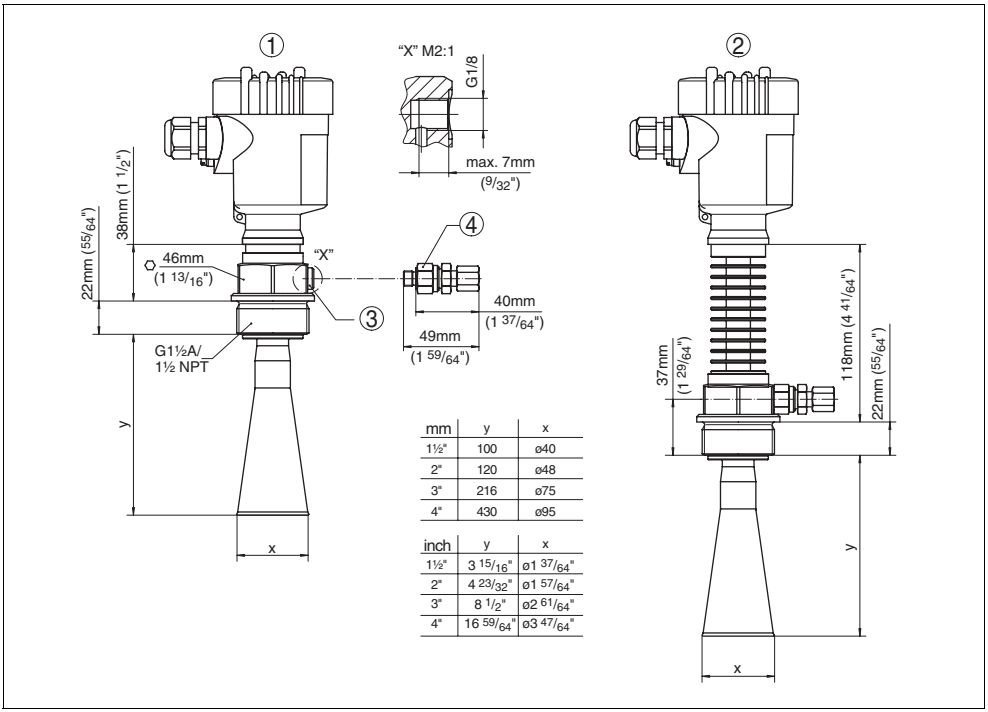


mm	y	x
1½"	100	ø40
2"	120	ø48
3"	216	ø75
4"	430	ø95

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. 44: VEGAPULS 68, horn antenna in threaded version
1 Standard
2 with temperature adapter

VEGAPULS 68, horn antenna in threaded version with purging air connection

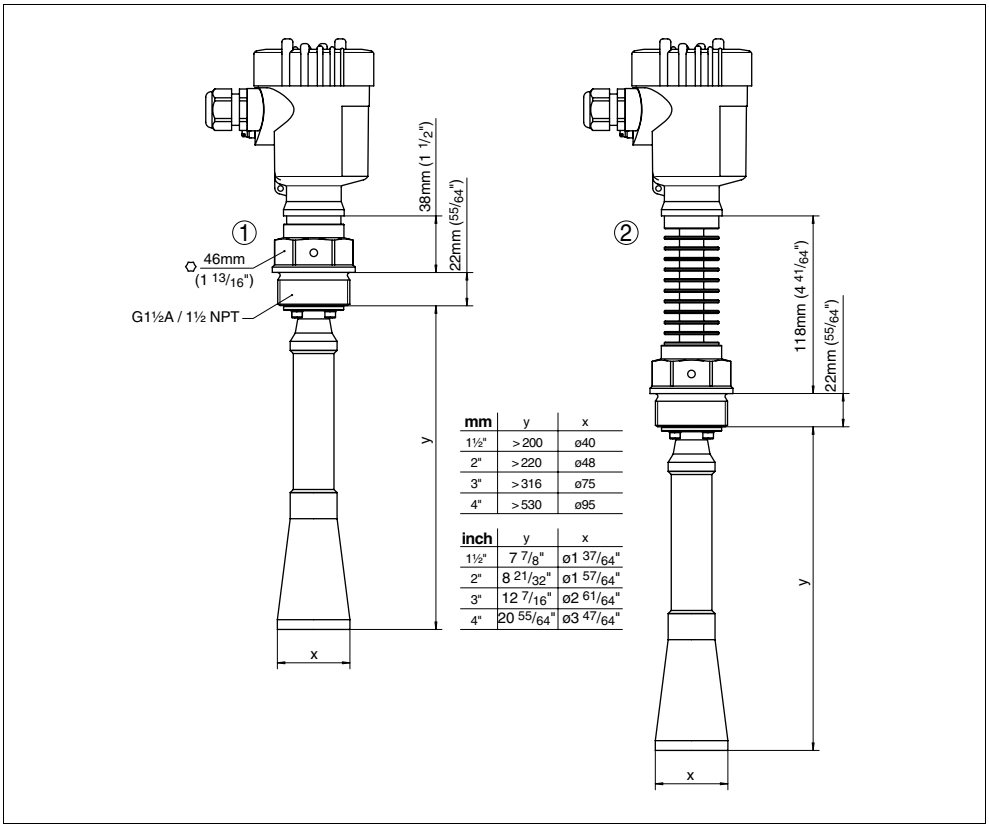


mm	y	x
1½"	100	ø40
2"	120	ø48
3"	216	ø75
4"	430	ø95

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. 45: VEGAPULS 68, horn antenna in threaded version with purging air connection
1 Standard
2 with temperature adapter
3 Purging air connection G⅛ A for mounting of a suitable adapter
4 Reflux valve - attached (with non-Ex optionally available, with Ex in the scope of delivery), for tube diameters 6 mm

VEGAPULS 68, horn antenna in threaded version with antenna extension



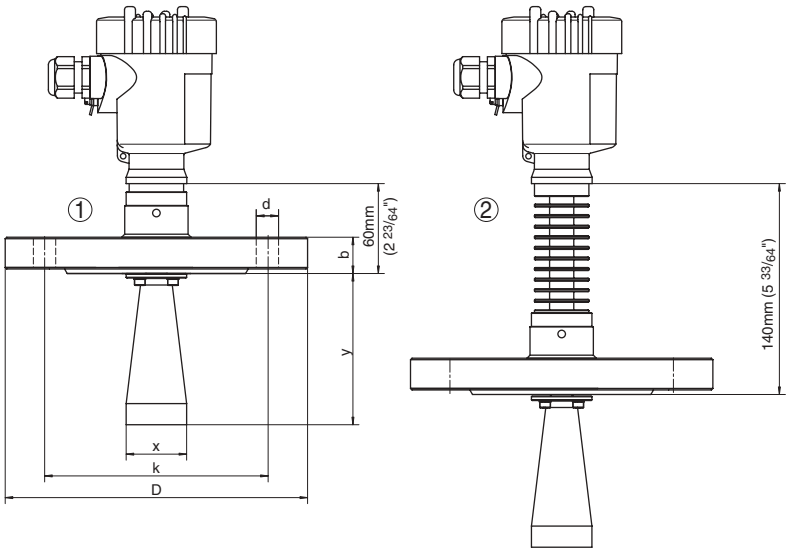
mm	y	x
1½"	> 200	ø40
2"	> 220	ø48
3"	> 316	ø75
4"	> 530	ø95

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. 46: VEGAPULS 68, horn antenna in threaded version with antenna extension[15)]
1 Standard
2 with temperature adapter

15) 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 68, horn antenna in flange version

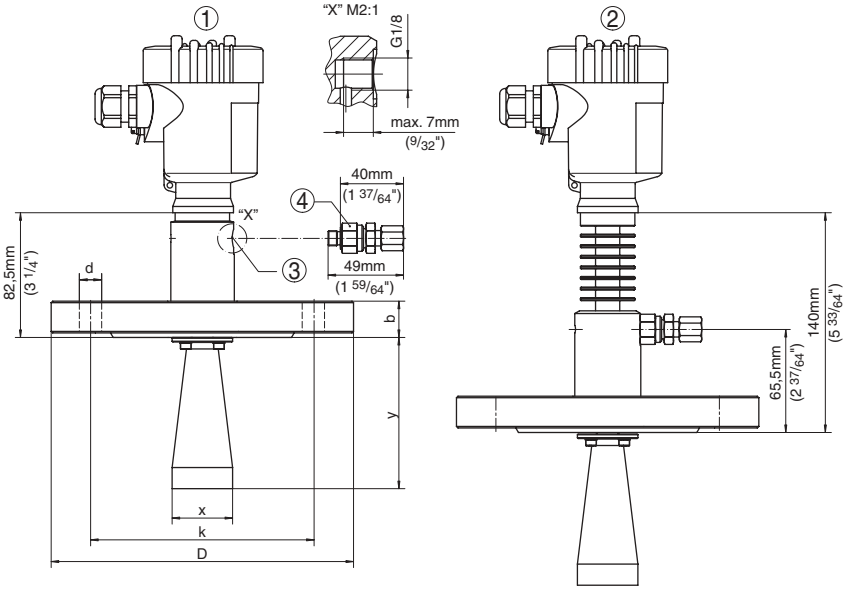


mm	D	b	k	d	x	y
DN 40 PN 40	150	18	110	4xø18	40	100
DN 50 PN 40	165	20	125	4xø18	48	120
DN 80 PN 40	200	24	160	8xø18	75	216
DN 100 PN 16	220	20	180	8xø18	95	430
DN 150 PN 16	285	22	240	8xø22	95	430
2" 150 lb	152,4	19,1	120,7	4xø19,1	48	120
3" 150 lb	190,5	23,9	152,4	4xø19,1	75	216
4" 150 lb	228,6	23,9	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. 47: VEGAPULS 68, horn antenna in flange version
1 Standard
2 with temperature adapter

VEGAPULS 68, horn antenna in flange version with purging air connection

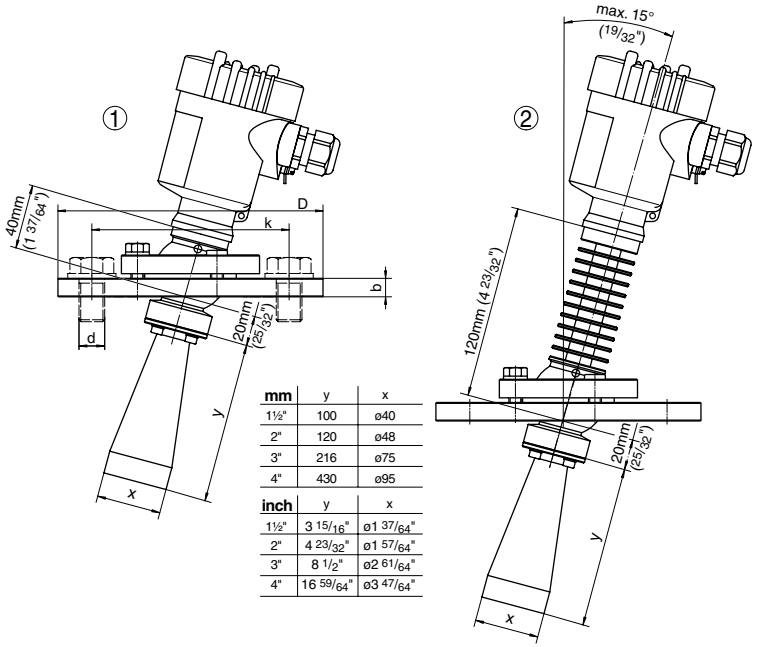


mm	D	b	k	d	x	y
DN 40 PN 40	150	18	110	4xø18	40	100
DN 50 PN 40	165	20	125	4xø18	48	120
DN 80 PN 40	200	24	160	8xø18	75	216
DN 100 PN 16	220	20	180	8xø18	95	430
DN 150 PN 16	285	22	240	8xø22	95	430
2" 150 lb	152,4	19,1	120,7	4xø19,1	48	120
3" 150 lb	190,5	23,9	152,4	4xø19,1	75	216
4" 150 lb	228,6	23,9	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. 48: VEGAPULS 68, horn antenna in flange version with purging air connection
1 Standard
2 with temperature adapter
3 Purging air connection G⅛ A for mounting of a suitable adapter
4 Reflux valve - attached (with non-Ex optionally available, with Ex in the scope of delivery), for tube diameters 6 mm

VEGAPULS 68, horn antenna and swivelling holder



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

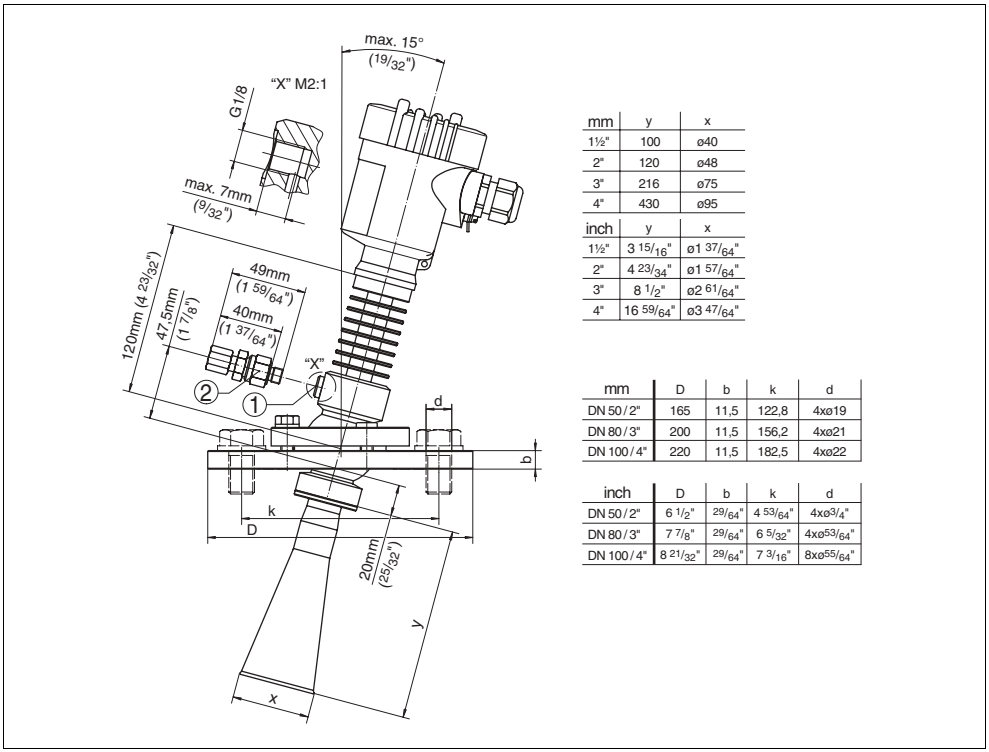
inch	y	x
1½"	3 15/16"	ø1 37/64"
2"	4 23/32"	ø1 57/64"
3"	8 1/2"	ø2 61/64"
4"	16 59/64"	ø3 47/64"

mm	D	b	k	d
DN 50 / 2"	165	11,5	122,8	4xø19
DN 80 / 3"	200	11,5	156,2	4xø21
DN 100 / 4"	220	11,5	182,5	4xø22

inch	D	b	k	d
DN 50 / 2"	6 1/2"	29/64"	4 53/64"	4xø3/4"
DN 80 / 3"	7 7/8"	29/64"	6 5/32"	4xø53/64"
DN 100 / 4"	8 21/32"	29/64"	7 3/16"	8xø55/64"

Fig. 49: VEGAPULS 68, horn antenna and swivelling holder
1 Standard
2 with temperature adapter

VEGAPULS 68, horn antenna, swivelling holder and 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 23/34"	ø1 57/64"
3"	8 1/2"	ø2 61/64"
4"	16 59/64"	ø3 47/64"

mm	D	b	k	d
DN 50 / 2"	165	11,5	122,8	4xø19
DN 80 / 3"	200	11,5	156,2	4xø21
DN 100 / 4"	220	11,5	182,5	4xø22

inch	D	b	k	d
DN 50 / 2"	6 1/2"	29/64"	4 53/64"	4xø3/4"
DN 80 / 3"	7 7/8"	29/64"	6 5/32"	4xø53/64"
DN 100 / 4"	8 21/32"	29/64"	7 3/16"	8xø55/64"

Fig. 50: VEGAPULS 68, horn antenna, swivelling holder and rinsing air connection
1 Purging air connection G⅛ A for mounting of a suitable adapter
2 Reflux valve - attached (with non-Ex optionally available, with Ex in the scope of delivery), for tube diameters 6 mm

VEGAPULS 68, parabolic antenna in threaded version

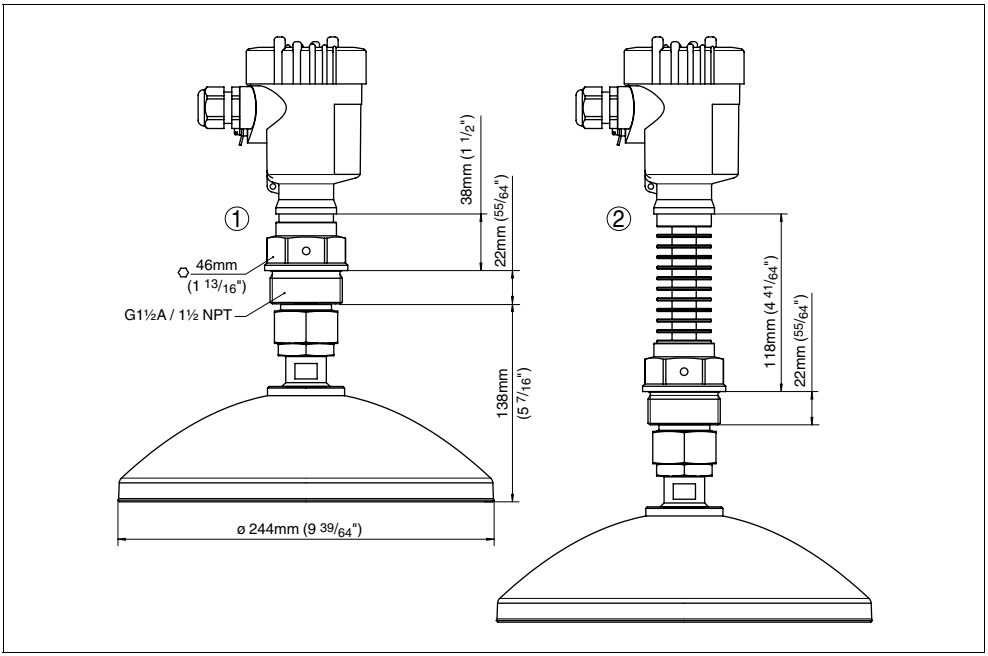
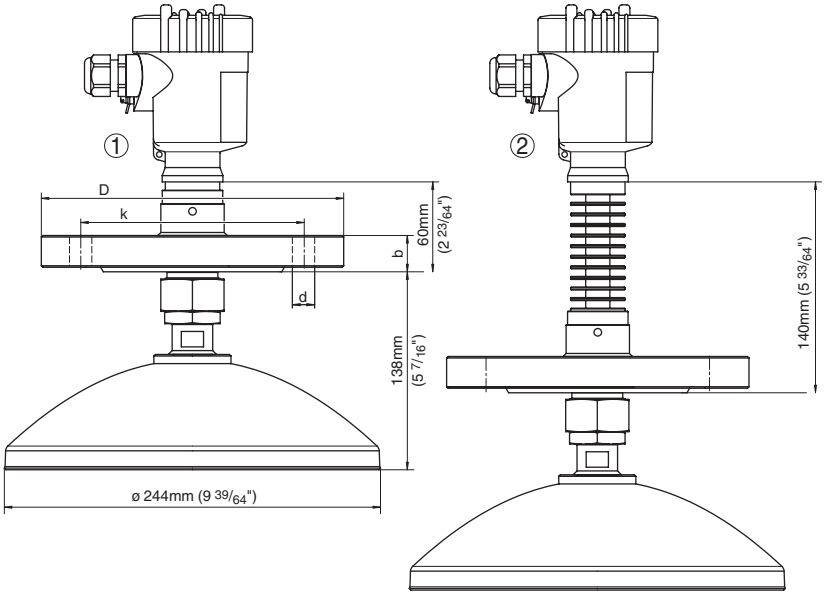


Fig. 51: VEGAPULS 68, parabolic antenna in threaded version
1 Standard
2 with temperature adapter

VEGAPULS 68, parabolic antenna in flange version

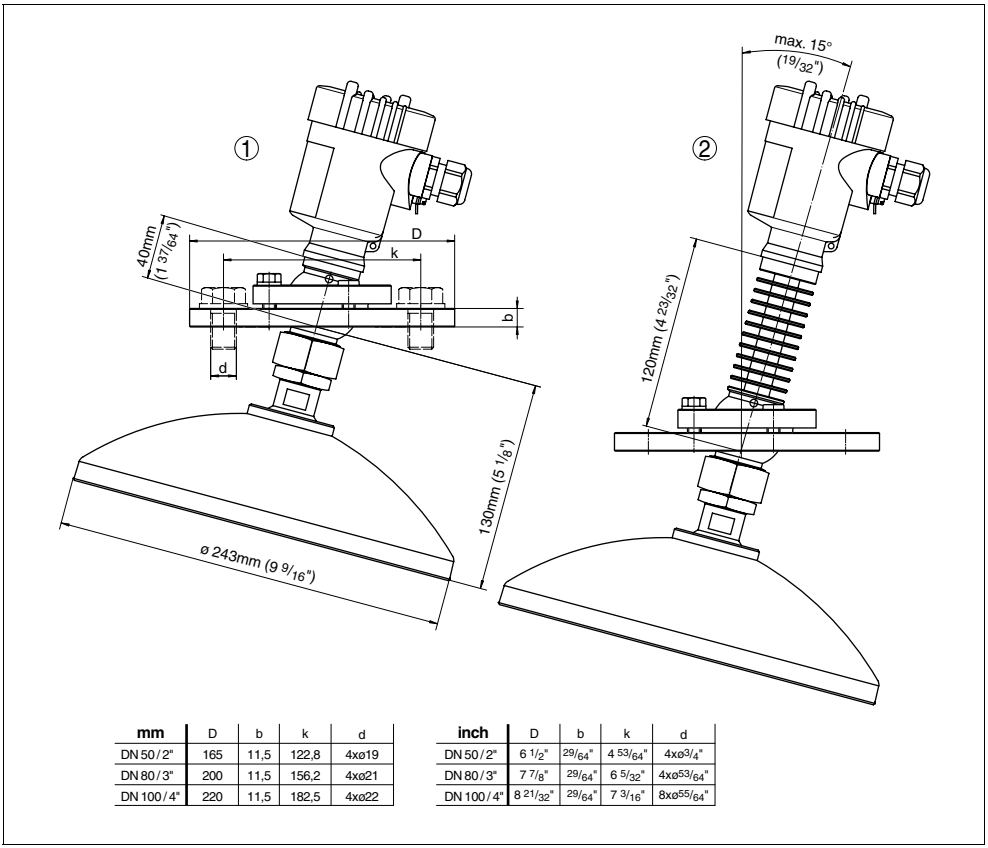


mm	D	b	k	d
DN 40 PN 40	150	18	110	4xø18
DN 50 PN 40	165	20	125	4xø18
DN 80 PN 40	200	24	160	8xø18
DN 100 PN 16	220	20	180	8xø18
DN 150 PN 16	285	22	240	8xø22
2" 150 lb	152,4	19,1	120,7	4xø19,1
3" 150 lb	190,5	23,9	152,4	4xø19,1
4" 150 lb	228,6	23,9	190,5	8xø19,1
6" 150 lb	279,4	25,4	241,3	8xø22,4

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. 52: VEGAPULS 68, parabolic antenna in flange version
1 Standard
2 with temperature adapter

VEGAPULS 68, parabolic antenna and swivelling holder

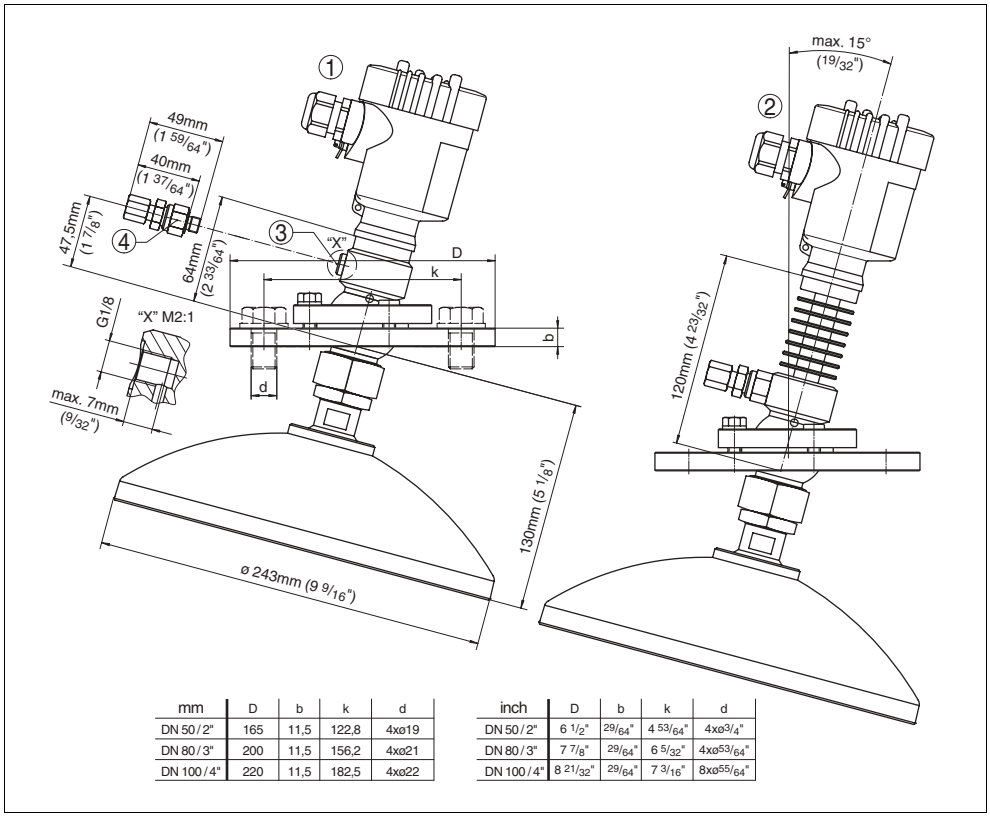


mm	D	b	k	d
DN 50 / 2"	165	11,5	122,8	4xø19
DN 80 / 3"	200	11,5	156,2	4xø21
DN 100 / 4"	220	11,5	182,5	4xø22

inch	D	b	k	d
DN 50 / 2"	6 1/2"	29/64"	4 53/64"	4xø3/4"
DN 80 / 3"	7 7/8"	29/64"	6 5/32"	4xø53/64"
DN 100 / 4"	8 21/32"	29/64"	7 3/16"	8xø55/64"

Fig. 53: VEGAPULS 68, parabolic antenna and swivelling holder
1 Standard
2 with temperature adapter

VEGAPULS 68, parabolic antenna and swivelling holder with purging air connection



mm	D	b	k	d
DN 50 / 2"	165	11,5	122,8	4xø19
DN 80 / 3"	200	11,5	156,2	4xø21
DN 100 / 4"	220	11,5	182,5	4xø22

inch	D	b	k	d
DN 50 / 2"	6 1/2"	29/64"	4 53/64"	4xø3/4"
DN 80 / 3"	7 7/8"	29/64"	6 5/32"	4xø53/64"
DN 100 / 4"	8 21/32"	29/64"	7 3/16"	8xø55/64"

Fig. 54: VEGAPULS 68, parabolic antenna and swivelling holder with purging air connection
1 Standard
2 with temperature adapter
3 Purging air connection G⅛ A for mounting of a suitable adapter
4 Reflux valve - attached (with non-Ex optionally available, with Ex in the scope of delivery), for tube diameters 6 mm

10.4 Industrial property rights

VEGA product lines are global protected by industrial property rights.
Further information see **http://www.vega.com**.
Only in U.S.A.: Further information see patent label at the sensor housing.
VEGA Produktfamilien sind weltweit geschützt durch gewerbliche Schutzrechte.
Nähere Informationen unter **http://www.vega.com**.

Les lignes de produits VEGA sont globalement protégées par des droits de propriété intellectuelle.
Pour plus d'informations, on pourra se référer au site **http://www.vega.com**.

VEGA lineas de productos están protegidas por los derechos en el campo de la propiedad industrial.
Para mayor información revise la pagina web **http://www.vega.com**.

Линии продукции фирмы ВЕГА защищаются по всему миру правами на интеллектуальную собственность.
Дальнейшую информацию смотрите на сайте **http://www.vega.com**.

德国VEGA公司列产品在全球享有知识产权保护。
进一步信息请参见网站<http://www.vega.com>。

10.5 Trademark

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

29263-EN-070305

VEGA Grieshaber KG
Am Hohenstein 113
77761 Schiltach
Germany
Phone +49 7836 50-0
Fax +49 7836 50-201
E-mail: info@de.vega.com
www.vega.com

All statements concerning scope of delivery, application, practical use and operating conditions of the sensors and processing systems correspond to the information available at the time of printing.

Subject to change without prior notice 29263-EN-070305