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Take note of safety instructions for Ex applications

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

Measuring principle
Extremely short microwave pulses with low emitted power are transmitted by the antenna system to the measured product, reflected by the product surface and received by the antenna system. Radar waves travel at the speed of light. The time from emission to reception of the signals is proportional to the level in the vessel. A special time stretching procedure ensures reliable and precise measurement of the extremely short transmission periods.

The latest microprocessor technology and the proven software ECHOFOX select the level echo from among a large number of false echoes and measure it precisely.

By simply entering the vessel dimensions, a level-proportional signal is generated from the distance. It is not necessary to fill the vessel for setup and adjustment.

Wide application range
The VEGAPULS 68 radar sensor is particularly suitable for measurement of bulk solids, but can also be used for liquids. Its mechanical configuration as well as its electronics were optimised for this application. Thanks to special horn and parabolic antennas and the increased dynamic range of the receiver, levels in measuring ranges up to 60 m (197 ft), optionally also up to 70 m (230 ft) can be detected. A reliable measurement is possible with dielectric values from 1.6.

Versions for real-world applications
Adaptable sensors are required for the widely varying product characteristics and mounting situations. That is why VEGAPULS 68 is available with thread and flange fittings as well as swivelling holder. An integrated connection for air rinsing is also available. This prevents dirt from collecting on the antenna. An optional temperature adapter extends the application range to product temperatures up to 200 °C (392 °F). Mounting on VEGAPULS 68 is very easy and requires no additional work on the measurement loop.

Unaffected by product properties
Fluctuations in product composition or even complete product changes do not influence the measuring result. A fresh adjustment is not necessary.

Instrument selection
VEGAPULS 68 radar sensors are available with horn and parabolic antennas. This yields a variety of instrument-specific beam angles and measurement characteristics. Selection of a suitable antenna depends on the respective application. For detailed selection you can use the tools "Finder" and "Configurator" on our website or contact our respective agency.

1.1 Application examples

Clinker silo

![Fig. 1: Level measurement in a clinker silo with VEGAPULS 68](image)

Clinker is an additive for concrete and is stored in large silos or bunkers. Its abrasive properties as well as extreme dust generation during filling place heavy demands on the level measurement.

VEGAPULS 68 is the optimum solution for level measurement. Its parabolic antenna powerfully focuses the microwaves, generating a strong useful signal. Interference from struts or installations is excluded.
Plastic granules

The efficient VEGAPULS 68 has high dynamics. It thus delivers reliable measuring results even with high pulp densities, temperatures up to 95 °C, steam generation and buildup.

Plastic granules and powder are often stored in high, narrow silos which are filled pneumatically. Typical conditions are filling noise, material cones and poor reflective properties.

The high sensitivity of VEGAPULS 68 provides sufficient power reserves for a reliable level measurement even with widely varying product surface geometries.

Bleaching tower

Through multi-stage bleaching, cellulose is brought to the degree of whiteness necessary for white papers. Uniform, steady filling of the bleaching tower is decisive for the quality of the bleaching process.
## Type overview

<table>
<thead>
<tr>
<th>VEGAPULS 68 with horn antenna</th>
<th>VEGAPULS 68 with parabolic antenna</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Preferred application:</strong></td>
<td>Solids</td>
</tr>
<tr>
<td><strong>Measuring range:</strong></td>
<td>70 m (230 ft)</td>
</tr>
<tr>
<td><strong>Process fitting:</strong></td>
<td>Thread, swivelling holder, flange</td>
</tr>
<tr>
<td><strong>Material:</strong></td>
<td>316L, Hastelloy C22 plated, Hastelloy C22</td>
</tr>
<tr>
<td><strong>Process temperature:</strong></td>
<td>-40 … +200 °C (-40 … +392 °F)</td>
</tr>
<tr>
<td><strong>Process pressure:</strong></td>
<td>-1 … 40 bar/-100 … 4000 kPa</td>
</tr>
<tr>
<td></td>
<td>(-14.5 … 580 psi)</td>
</tr>
<tr>
<td><strong>Signal output:</strong></td>
<td>4 … 20 mA/HART two-wire, four-wire, Profinbus PA, Foundation Fieldbus</td>
</tr>
<tr>
<td></td>
<td>4 … 20 mA/HART two-wire, four-wire, Profinbus PA, Foundation Fieldbus</td>
</tr>
</tbody>
</table>

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Radar – Level measurement of bulk solids
<table>
<thead>
<tr>
<th>Indicating and adjustment module</th>
<th>PLICSCOM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing</td>
<td>Plastic</td>
</tr>
<tr>
<td>Electronics</td>
<td>4 ... 20 mA/ HART</td>
</tr>
<tr>
<td>Process fitting</td>
<td>Thread</td>
</tr>
<tr>
<td>Sensors</td>
<td>Horn antenna</td>
</tr>
<tr>
<td>Approvals</td>
<td>FM</td>
</tr>
</tbody>
</table>
3 Mounting information

Measuring range
The reference plane of the sensor measuring range is the seal surface of the thread or flange. All information relating to the measuring range as well as the internal signal processing relate to the reference plane.

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

Pressure/Vacuum
The process fitting must be sealed if there is gauge or low pressure in the vessel. Before use, check if the seal material is resistant against the measured product. The max. permissible pressure is stated in the “Technical data” or on the type label of the sensor.

Installation position
When mounting VEGAPULS 68, keep a distance of at least 200 mm to the vessel wall. If the sensor is installed in the center of dished or spherical vessel tops, multiple echoes can arise. These can, however, be faded out by an appropriate adjustment.

If you cannot keep this distance, 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.

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

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

If the reflective properties of the medium are good, you can mount VEGAPULS 68 on sockets higher than the antenna length. You will find recommended values for socket heights in the following illustration. The socket end should be smooth and burr-free, if possible also rounded.
Sensor orientation
With liquids, align the sensor as close to vertical as possible to achieve optimum measuring results.

![Fig. 9: Deviating socket dimensions](image)

**Fig. 9: Deviating socket dimensions**

**Sensor orientation**

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

![Fig. 12: Radar sensors on traverse crane](image)

**Fig. 12: Radar sensors on traverse crane**

The version with swivelling holder is recommended for optimum orientation to solids.

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

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

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

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

![Fig. 11: Cover smooth profiles with deflectors](image)

**Fig. 11: Cover smooth profiles with deflectors**

**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 direct the sensor perpendicularly to the solid surface.

![Fig. 13: Inflowing material](image)

**Fig. 13: Inflowing material**

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

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

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

4.1 General requirements
The supply voltage range can differ depending on the instrument version. The exact range is stated in the "Technical data". Take note of country-specific installation standards (e.g. the VDE regulations in Germany) as well as prevailing safety regulations and accident prevention rules.

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

4.2 Voltage supply
General
Power supply and current signal are carried over the same two-wire connection cable. The requirements on the power supply are stated in the Technical data of this Product Information manual.

4 … 20 mA/HART two-wire
The VEGA power supply units VEGATRENN 149AEx, VEGASTAB 690, VEGADIS 371 as well as VEGAMET signal conditioning instruments are suitable for power supply. When one of these instruments is used, a reliable separation of the supply circuits from the mains circuits acc. to DIN VDE 0106 part 101 is ensured for VEGAPULS 68.

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

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

The instrument is designed in protection class I. To maintain this protection class, it is absolutely necessary that the ground conductor be connected to the internal ground conductor terminal.

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

Foundation Fieldbus
Power supply via the H1 Fieldbus cable.

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

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

ProfiBus PA, Foundation Fieldbus
The installation must be carried out acc. to the appropriate bus specification. VEGAPULS 68 is connected respectively with screened cable acc. to the bus specification. Make sure that the bus is terminated via appropriate terminating resistors.

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

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

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

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

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

4.5 Wiring plans
Single chamber housing

Fig. 14: Connection HART two-wire, Profibus PA, Foundation Fieldbus

1 Power supply and signal output
Double chamber housing - two-wire

Fig. 15: Connection HART two-wire, Proftbus PA, Foundation Fieldbus
1 Power supply and signal output

Version IP 66/IP 68, 1 bar

Fig. 16: Wire assignment, connection cable
1 br (+) and bl (-) for power supply or to the processing system
2 Screen

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

Fig. 17: Connection 4 ... 20 mA/HART four-wire
1 Voltage supply
2 Signal output
5 Adjustment

5.1 Overview
VEGAPULS 68 can be adjusted with the following adjustment media:
- the indicating and adjustment module PLICSCOM
- an adjustment software acc. to FDT/DTM standard, e.g. PACTware™ and PC

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

The entered parameters are generally saved in VEGAPULS 68, optionally also in PLICSCOM or in the adjustment program.

5.2 Adjustment with the indicating and adjustment module PLICSCOM

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

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

PLICSCOM adjustment

Fig. 18: Indicating and adjustment elements
1 LC display
2 Indication of the menu item number
3 Adjustment keys

Key functions
- [OK] key:
  - move to the menu overview
  - confirm selected menu
  - edit parameter
  - save value
- [>] key to select:
  - menu change
  - list entry
  - editing position
- [+] key:
  - modify value of a parameter
- [ESC] key:
  - interrupt input
  - jump to the next higher menu

5.3 Adjustment with PACTware™
PACTware™/DTM
Independent of the signal output 4 … 20 mA/HART, Profibus PA or Foundation Fieldbus, the VEGAPULS 68 sensors can be operated directly on the instrument via PACTware™. An instrument driver for the respective VEGAPULS 68 is necessary for the adjustment with PACTware™. All currently available VEGA DTM are composed as DTM Collection with the current PACTware™ version on a CD. They are available for a protective fee from our respective VEGA agency. In addition, this DTM Collection incl. PACTware™ can be downloaded free-of-charge in the basic version via the Internet.

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

Connecting the PC directly to the sensor

Fig. 19: PC connected directly to the sensor
1 RS232 connection
2 VEGAPULS 68
3 I²C adapter cable for VEGACONNECT 3

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

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

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

PDM
For VEGA PA 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.

AMS
For VEGA FF sensors, device descriptions are also available as DD for the adjustment program AMS™. The device descriptions are already implemented in the current version of AMS™. For older versions of AMS™, a free-of-charge download is available via internet.

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

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

Connecting the PC to the signal cable (4 ... 20 mA/HART four-wire)
6 Technical data

General data
316L corresponds to 1.4404 or 1.4435
Materials, non-wetted parts
- Housing
- Seal ring between housing and housing cover
- Inspection window in housing cover for PLICSCOM
- Ground terminal
316TI/316L (1.4571/1.4435)
Materials, wetted parts
- Process fitting
- Antenna
- Antenna cone
- Seal, antenna system
316L, Hastelloy C22, Hastelloy C22 plated
316L, 316L electropolished, Hastelloy C22
PTFE (TFM 1600 PTFE)
FKM (Viton), Kalrez 2035, 6230, 6375
Weight with horn antenna
- Process fitting - Thread
2.0 … 2.8 kg (4.4 … 6.2 lbs), depending on thread size and housing
- Process fitting - Flange
4.2 … 15.4 kg (9.3 … 34 lbs), depending on flange size and housing
- 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
5.0 … 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

Output variable
4 … 20 mA/HART
Output signal
4 … 20 mA/HART
Resolution
1.6 µA
Fault signal
current output unchanged; 20.5 mA; 22 mA; <3.6 mA (adjustable)
Current limitation
22 mA
Load
- Two-wire instrument - 4 … 20 mA/HART
see load diagram in Power supply
- Four-wire instrument - 4 … 20 mA/HART
max. 500 Ohm²
Integration time (63 % of the input variable)
0 … 999 s, adjustable
Fulfilled NAMUR recommendation
NE 43
Profibus PA
Output signal
digital output signal, format acc. to IEEE-754
Sensor address
126 (default setting)
Current value
constantly 10 mA; ±0.5 mA
Integration time (63 % of the input variable)
0 … 999 s, adjustable
Foundation Fieldbus
Output
digital output signal, Foundation Fieldbus protocol
- Signal
acc. to IEC 61158-2
- Physical layer
Channel Numbers
- Channel 1
Primary value
- Channel 2
Secondary value 1
- Channel 3
Secondary Value 2
Transmission rate
31.25 Kbit/s
Current value
10 mA; ±0.5 mA
Integration time (63 % of the input variable)
0 … 999 s, adjustable

Input variable
Parameter
distance between process fitting and product surface
Min. distance from antenna end
400 mm (15.7 in)
Max. measuring range
70 m (230 ft)

² With inductive load, ohmic share at least 25 Ohm/mH.
Accuracy (similar to DIN EN 60770-1)

Reference conditions acc. to DIN EN 61298-1

- Temperature: +18 ... +30 °C (+64 ... +86 °F)
- Relative humidity: 45 ... 75 %
- Atmospheric pressure: 860 ... 1060 mbar/86 ... 106 kPa (12.5 ... 15.4 psi)

Temperature +18 ... +30 °C (+64 ... +86 °F)

Relative humidity 45 ... 75 %

Atmospheric pressure 860 ... 1060 mbar/86 ... 106 kPa (12.5 ... 15.4 psi)

Characteristic curve deviation and measurement characteristics

Average temperature coefficient of the zero signal (temperature error): 0.06 %./10 K

Resolution, general: max. 1 mm

Frequency: K-band

Interval: >typ. 4 s

Adjustment time: >4 s (dependent on the parameter adjustment)

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

- Distance 1 m: 108 nW per cm² (108x10⁻⁹ W/cm²)
- Distance 5 m: 4.3 nW per cm² (4.3x10⁻⁹ W/cm²)

Beam angle with horn antenna, depending on the antenna diameter

- ø 40 mm (1.6 in): 22°
- ø 46 mm (1.9 in): 18°
- ø 75 mm (3 in): 10°
- ø 95 mm (3.7 in): 8°

Accuracy with horn antenna: see diagram

Fig. 22: Accuracy VEGAPULS 68 with horn antenna

Beam angle with parabolic antenna: 4°

Accuracy with parabolic antenna: see diagram

Fig. 23: Accuracy VEGAPULS 68 with parabolic antenna

Ambient conditions

Ambient, storage and transport temperature

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

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

4 Time required to output the correct level (with max. 10 % deviation) after a sudden level change.
### Technical data

**Process conditions**

Note the nominal pressure stage of the flange and temperature derating acc. to the operating instructions manual!

<table>
<thead>
<tr>
<th>Vessel pressure - Horn antenna</th>
<th>- without swivelling holder</th>
<th>-1 ... 40 bar/-100 ... 4000 kPa (-14.5 ... 580 psi)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- with swivelling holder</td>
<td>-1 ... 1 bar/-100 ... 100 kPa (-14.5 ... 14.5 psi) not sealing</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vessel pressure - Parabolic antenna</th>
<th>- without swivelling holder</th>
<th>-1 ... 6 bar/-100 ... 6000 kPa (-14.5 ... 87 psi)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- with swivelling holder</td>
<td>-1 ... 1 bar/-100 ... 100 kPa (-14.5 ... 14.5 psi) not sealing</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Process temperature (measured on the process fitting), depending on the seal of the antenna system</th>
<th>FKM (Viton)</th>
<th>-40 ... +130 °C (-40 ... +266 °F)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FKM (Viton) with temperature adapter</td>
<td>-40 ... +200 °C (-40 ... +392 °F)</td>
</tr>
<tr>
<td></td>
<td>Kalrez 2035, 6230</td>
<td>-15 ... +130 °C (+5 ... +266 °F)</td>
</tr>
<tr>
<td></td>
<td>Kalrez 2035, 6230 with temperature adapter</td>
<td>-15 ... +200 °C (+5 ... +392 °F)</td>
</tr>
<tr>
<td></td>
<td>Kalrez 6375</td>
<td>-20 ... +130 °C (-4 ... +266 °F)</td>
</tr>
<tr>
<td></td>
<td>Kalrez 6375 with temperature adapter</td>
<td>-20 ... +200 °C (-4 ... +392 °F)</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Cable entry/plug</th>
<th>Single chamber housing</th>
<th>● 1x cable entry M20x1.5 (cable ø 5 ... 9 mm), 1x blind stopper M20x1.5 or:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>● 1x closing cap ½ NPT, 1x blind plug ½ NPT or:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>● 1x plug (depending on the version), 1x blind plug M20x1.5</td>
</tr>
<tr>
<td></td>
<td>Double chamber housing</td>
<td>● 1x cable entry M20x1.5 (cable ø 5 ... 9 mm), 1x blind stopper M20x1.5 or:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>● 1x closing cap ½ NPT, 1x blind stopper ½ NPT, plug M12x1 for VEGADIS 61 (optional) or:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>● 1x plug (depending on the version), 1x blind stopper M20x1.5; plug M12x1 for VEGADIS 61 (optional)</td>
</tr>
<tr>
<td>Spring-loaded terminals</td>
<td>for wire cross sections up to 2.5 mm²</td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Cable gland</th>
<th>Single chamber housing</th>
<th>● 1x IP 68 cable entry M20x1.5; 1x blind stopper M20x1.5 or:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>● 1x closing cap ½ NPT, 1x blind plug ½ NPT</td>
</tr>
<tr>
<td></td>
<td>Double chamber housing</td>
<td>● 1x IP 68 cable entry M20x1.5; 1x blind stopper M20x1.5; plug M12x1 for VEGADIS 61 (option) or:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>● 1x closing cap ½ NPT, 1x blind stopper ½ NPT, plug M12x1 for VEGADIS 61 (optional)</td>
</tr>
</tbody>
</table>

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15 Tested acc. to the regulations of German Lloyd, GL directive 2

2 Depending on the version M12x1, acc. to DIN 43650, Harting, Amphenol-Tuchel, 7/8" FF; note plug protection.
Connection cable
- Configuration: four cores, one suspension cable, one breather capillary, screen braiding, foil, mantle
- Wire cross section: 0.5 mm²
- Wire resistance: <0.036 Ohm/m
- Tensile load: >1200 N (270 pounds force)
- Standard length: 5 m (16.4 ft)
- Max. length: 1000 m (3280 ft)
- Min. bending radius: approx. 8 mm
- Diameter: Black
- Colour - standard PE: Blue
- Colour - standard PUR: Blue
- Colour - Ex-version: Blue

Indicating and adjustment module
- Power supply and data transmission through sensor via gold-plated sliding contacts (I²C bus)
- Display: LC display in full dot matrix
- Adjustment elements: 4 keys
- Protection
  - Unassembled: IP 20
  - Mounted into the sensor without cover: IP 40
- Materials
  - Housing: ABS
  - Inspection window: Polyester foil

Voltage supply VEGAPULS 68 - two-wire instrument

4 ... 20 mA/HART
- Voltage supply
  - Non-Ex instrument: 15 ... 36 V DC (14 ... 36 V DC with VEGAMET)
  - Ex ia instrument: 15 ... 30 V DC (14 ... 30 V DC with VEGAMET)
  - Exd ia instrument: 20 ... 36 V DC
- Permissible residual ripple
  - <100 Hz: $U_{\text{as}} < 1 \text{ V}$
  - 100 Hz ... 10 kHz: $U_{\text{as}} < 10 \text{ mV}$
- Load: see voltage diagram

Fig. 24: Voltage diagram VEGAPULS 68

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

Profibus PA
- Voltage supply
  - Non-Ex instrument: 9 ... 32 V DC
  - Ex ia instrument: 9 ... 24 V DC
Technical data

Power supply by/max. number of sensors
- DP/PA segment coupler max. 32 (max. 10 with Ex)
- VEGALOG 571 EP card max. 15 (max. 10 with Ex)

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

Voltage supply VEGAPULS 68 - four-wire instrument 4 ... 20 mA

Four-wire instruments
Voltage supply 20 ... 72 V DC, 20 ... 253 V AC, 50/60 Hz
Power consumption max. 4 VA; max. 2.1 W

Electrical protective measures
Protection
- Plastic housing IP 66/IP 67
- Double chamber Alu-housing, four-wire instruments IP 66/IP 67
- Alu and stainless steel housing, two-wire instruments IP 66/IP 68 (0.2 bar)\(^7\)
- Alu and stainless steel housing optional, two-wire instruments IP 66/IP 68 (1 bar)
- Overvoltage category III

Protection class
- two-wire, Profibus PA, Foundation Fieldbus II
- four-wire I

Approvals\(^8\)
- 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
- IEC IEC EEx ia IIC T5
- CSA CSA CI.I, Div2 (NI)+CI.II, II, Div1 (DIP), CSA CI.I-III, Div 1 (IS), CSA CI.I-III, Div 1 (IS)+CI.II, Div 1 Gr.C-G(XP)

CE conformity

- R & TTE directive I-ETS 300-440 Expert opinion No. 0043052-02/SEE, Notified Body No. 0499
- LVD (73/23/EWG) EN 61010-1: 2001

FCC conformity (only for USA/Canada)
Conformity to part 15 of the FCC regulations

Environmental instructions
VEGA environment management system\(^9\) certified acc. to DIN EN ISO 14001

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\(^7\) Requirement to maintain the protection is the suitable cable.
\(^8\) Deviating data in Ex applications: see separate safety instructions.
\(^9\) You will find detailed information under www.vega.com.
7 Dimensions

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

![Diagram of housing versions in protection IP 66/IP67 and IP 66/IP 68, 0.2 bar](image)

Fig. 25: Housing versions in protection IP 66/IP 67 and IP 66/IP 68, 0.2 bar (with integrated PLICSCOM the housing is 9 mm/0.35 in higher)

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

Housing in protection IP 66/IP 68, 1 bar

![Diagram of housing in protection IP 66/IP 68, 1 bar](image)

Fig. 26: Housing versions in protection IP 66/IP 68, 1 bar (with integrated PLICSCOM the housing is 9 mm/0.35 in higher)

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

VEGAPULS 68 - horn antenna in threaded version

![Diagram of VEGAPULS 68 - horn antenna in threaded version](image)

Fig. 27: VEGAPULS 68 - horn antenna in threaded version

1 Standard
2 with temperature adapter

VEGAPULS 68 - horn antenna in threaded version with rinsing air connection

![Diagram of VEGAPULS 68 - horn antenna in threaded version with rinsing air connection](image)

Fig. 28: VEGAPULS 68 - horn antenna in threaded version with purging air connection and reflux valve (option)

1 Standard
2 with temperature adapter

VEGAPULS 68 - horn antenna in flange version

![Diagram of VEGAPULS 68 - horn antenna in flange version](image)

Fig. 29: VEGAPULS 68 - horn antenna in flange version

1 Standard
2 with temperature adapter
Dimensions

VEGAPULS 68 - horn antenna and swivelling holder

Fig. 30: VEGAPULS 68 - horn antenna and swivelling holder

1 Standard
2 With temperature adapter

VEGAPULS 68 - parabolic antenna in threaded version

Fig. 31: VEGAPULS 68 - parabolic antenna in threaded version

1 Standard
2 With temperature adapter

VEGAPULS 68 - parabolic antenna in flange version

Fig. 32: VEGAPULS 68 - parabolic antenna in flange version

1 Standard
2 With temperature adapter

VEGAPULS 68 - parabolic antenna and swivelling holder

Fig. 33: VEGAPULS 68 - parabolic antenna and swivelling holder

1 Standard
2 With temperature adapter
# 8 Product code

**VEGAPULS 68**

<table>
<thead>
<tr>
<th>Approval</th>
</tr>
</thead>
<tbody>
<tr>
<td>XX without</td>
</tr>
<tr>
<td>CX ATEX II 1G, 1/2G, 2G Ex ia IIC T5</td>
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</table>
| CK ATEX II 1G, 1/2G, 2G Ex ia IIC T5+ATEX II 1/2 D Ex T5[
| DX ATEX II 1/2G, 2G Ex d ia IIC T5[
| GX ATEX II 1/2 D Ex T5[

<table>
<thead>
<tr>
<th>Version / Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>B with horn antenna ø40 mm / 316L</td>
</tr>
<tr>
<td>C with horn antenna ø48 mm / 316L</td>
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<tr>
<td>D with horn antenna ø75 mm / 316L</td>
</tr>
<tr>
<td>E with horn antenna ø95 mm / 316L</td>
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<tr>
<td>K with parabolic antenna ø245 mm / 316L</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Process connection / Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>GD Thread G1/4 A PN40 / 316L</td>
</tr>
<tr>
<td>ND Thread 1½ NPT PN40 / 316L</td>
</tr>
<tr>
<td>1C Swivelling holder with flange DN50/2&quot; / 316L</td>
</tr>
<tr>
<td>1D Swivelling holder with flange DN80/3&quot; / 316L</td>
</tr>
<tr>
<td>1E Swivelling holder with flange DN100/4&quot; / 316L</td>
</tr>
<tr>
<td>FC Flange DN50 PN40 Form C, DIN2501 / 316L</td>
</tr>
<tr>
<td>FD Flange DN80 PN40 Form C, DIN2501 / 316L</td>
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<tr>
<td>FE Flange DN100 PN16 Form C, DIN2501 / 316L</td>
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<tr>
<td>FK Flange DN150 PN16 Form C, DIN2501 / 316L</td>
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<tr>
<td>AE Flange 2&quot; 150lb RF, ANSI B16.5 / 316L</td>
</tr>
<tr>
<td>AI Flange 3&quot; 150lb RF, ANSI B16.5 / 316L</td>
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<tr>
<td>AK Flange 4&quot; 150lb RF, ANSI B16.5 / 316L</td>
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<tr>
<td>AM Flange 6&quot; 150lb RF, ANSI B16.5 / 316L</td>
</tr>
<tr>
<td>1C Swivelling holder with flange DN50/2&quot; / 316L</td>
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<tr>
<td>1D Swivelling holder with flange DN80/3&quot; / 316L</td>
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<tr>
<td>1E Swivelling holder with flange DN100/4&quot; / 316L</td>
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<tr>
<td>FC Flange DN50 PN40 Form C, DIN2501 / 316L</td>
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<td>AE Flange 2&quot; 150lb RF, ANSI B16.5 / 316L</td>
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<td>AK Flange 4&quot; 150lb RF, ANSI B16.5 / 316L</td>
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<table>
<thead>
<tr>
<th>Seal / Process temperature</th>
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<tbody>
<tr>
<td>2 FKM (Viton) / -40...130°C</td>
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<tr>
<td>3 Kalrez 6375 / -20...130°C</td>
</tr>
<tr>
<td>4 FKM (Viton) / -40...200°C</td>
</tr>
<tr>
<td>5 Kalrez 6375 / -20...200°C</td>
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<table>
<thead>
<tr>
<th>Electronics</th>
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</thead>
<tbody>
<tr>
<td>H Two-wire 4...20mA/HART®</td>
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<tr>
<td>V Four wire 4...20mA/HART®</td>
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<tr>
<td>F Foundation Fieldbus</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Housing / Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Aluminium / IP65/IP67 (0.2 bar)</td>
</tr>
<tr>
<td>D Aluminium double chamber / IP65/IP68 (0.2 bar)</td>
</tr>
<tr>
<td>V Stainless steel 316L / IP66/IP68 (0.2 bar)</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Cable entry / Plug connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>M M20x1.5 / without</td>
</tr>
<tr>
<td>N ½NPT / without</td>
</tr>
<tr>
<td>X without</td>
</tr>
<tr>
<td>A top mounted</td>
</tr>
</tbody>
</table>

1) Only in conjunction with Housing / Protection "A", "D" or "V"  
2) Only in conjunction with Housing / Protection "D"
You can find at www.vega.com downloads of the following

- operating instructions manuals
- menu schematics
- software
- certificates
- approvals
and much, much more