Product information
Radar

Level measurement in liquids
VEGAPULS WL 61
VEGAPULS 61
VEGAPULS 62
VEGAPULS 63
VEGAPULS 64
VEGAPULS 65
VEGAPULS 66
## Contents

1. Measuring principle ................................................................. 3
2. Type overview ........................................................................ 4
3. Instrument selection ............................................................... 6
4. Selection criteria .................................................................... 8
5. Measuring range dimensioning ............................................. 9
6. Housing overview ................................................................. 10
7. Mounting ............................................................................ 11
8. Electronics - 4 ... 20 mA/HART - two-wire ......................... 13
9. Electronics - 4 ... 20 mA/HART - four-wire ......................... 14
10. Electronics - Profibus PA ...................................................... 15
11. Electronics - Foundation Fieldbus ....................................... 16
12. Electronics - Modbus, Levelmaster protocol ....................... 17
13. Operation ........................................................................... 18
14. Dimensions ......................................................................... 20

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### Take note of safety instructions for Ex applications

Please note the Ex specific safety information that you can find at [www.vega.com](http://www.vega.com) and that comes with each 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 Measuring principle

Measuring principle VEGAPULS WL 61, 61, 62, 65, 66
Extremely short microwave pulses are emitted by the antenna system in the direction of the measured product, reflected by the product surface and received back again by the antenna system. They propagate 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 allows reliable and precise measurement of the extremely short transit times. The radar sensors operate with low emitted power in the C and K band frequency range.

Measuring principle VEGAPULS 64
The instrument emits a continuous radar signal through its antenna. This signal is frequency modulated in the form of a sawtooth wave. The emitted signal is reflected by the medium and received by the antenna as an echo.

The frequency of the received signal always deviates from the actual emitted frequency. The frequency difference is calculated by special algorithms in the sensor electronics. It is proportional to the level in the vessel.

The VEGAPULS 64 operates with low emitted power in the W band frequency range.

Applications in liquids
Low frequency C-band sensors are able to penetrate foam and strong condensation and are thus suitable for very difficult process conditions. Completely unaffected by vapour, gas composition, pressure and temperature changes, the sensors reliably detect the surface of widely different products.

The compact, high frequency K-band sensors are particularly suitable for applications where high accuracy is required. Excellent signal focussing is achieved even with small antennas.

The compact, W-band sensors with higher frequency are particularly suitable for applications where maximum accuracy is required. Excellent signal focussing is achieved even with small antennas.

Advantages
Non-contact radar technology is characterized by extremely high accuracy. The measurement is influenced neither by fluctuating product features nor by changing process conditions such as temperature, pressure or strong dust generation. The user-friendly adjustment without vessel filling and emptying saves time.

Input variable
The measured quantity is the distance between process fitting of the sensor and product surface. Depending on the sensor version, the reference plane is the seal surface on the hexagon or the lower side of the flange.

![Diagram](image.png)

Fig. 1: Data of the input variable with VEGAPULS 62

1 Reference plane
2 Measured variable, max. measuring range
3 Antenna length
4 Utilisable measuring range
## 2 Type overview

<table>
<thead>
<tr>
<th>Application</th>
<th>Max. measuring range</th>
<th>Antenna/Material</th>
<th>Process fitting/Material</th>
<th>Process temperature</th>
<th>Process pressure</th>
<th>Deviation</th>
<th>Frequency range</th>
<th>Signal output</th>
<th>Indication/Adjustment</th>
<th>Approvals</th>
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<tbody>
<tr>
<td>Water processing, pump stations, storm water overflow tank, flow measurement in open flumes and level monitoring</td>
<td>15 m (49.21 ft)</td>
<td>Plastic horn antenna</td>
<td>Thread G1½/PBT or mounting strap/316L</td>
<td>-40 … +80 °C (-40 … +176 °F)</td>
<td>-1 … +2 bar/-100 … +200 kPa (-14.5 … +29.0 psi)</td>
<td>±2 mm</td>
<td>K-band</td>
<td>• 4 … 20 mA/HART - two-wire • Proflbus PA • Foundation Fieldbus • PACIware • VEGADIS 62</td>
<td>• ATEX • IEC</td>
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<td>Corrosive liquids in small vessels under easy process conditions</td>
<td>35 m (114.8 ft)</td>
<td>Plastic horn antenna/completely PVDF encapsulated</td>
<td>Thread G1½/PVDF, mounting strap/316L or flange/PP</td>
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<td>Storage tanks and process vessels under extremely difficult process conditions</td>
<td>35 m (114.8 ft)</td>
<td>Horn antenna or standpipe antenna ½”/316L</td>
<td>Thread G1½/316L according to DIN 3852-A or flange/316L, Alloy C22 (2.4602)</td>
<td>-196 … +450 °C (-321 … +842 °F)</td>
<td>-1 … +160 bar/-100 … +16000 kPa (-14.5 … +2320 psi)</td>
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### Instrument selection

#### Application areas

The radar sensors of the VEGAPULS series described in this manual are used for non-contact level measurement of liquids. They measure all kinds of liquids, even under high pressure and at extreme temperatures. The sensors can be used in simple but also aggressive liquids and are suitable for applications with maximum hygienic requirements.

**VEGAPULS WL 61**

VEGAPULS WL 61 is the ideal sensor for all applications in water and sewage water applications. It is particularly suitable for use in water processing, pump stations as well as overflow basins, for flow measurement in open flumes and gauge monitoring. VEGAPULS WL 61 provides an economical solution through versatile and simple mounting options. The flood-proof IP 68 housing ensures continuous, maintenance-free operation.

**VEGAPULS 61**

The VEGAPULS 61 is a sensor for continuous level measurement of liquids under simple process conditions. Due to its simple and versatile mounting options, VEGAPULS 61 offers a truly cost-effective solution. The encapsulated antenna system ensures maintenance-free operation. The version with encapsulated antenna system is particularly suitable for level measurement of aggressive liquids in small vessels. The version with plastic horn antenna is particularly suitable for flow measurement in open flumes or gauge measurement of open waters.

**VEGAPULS 62**

VEGAPULS 62 is a universally implementable sensor for continuous level measurement of liquids. It is suitable for level measurement in storage containers, reactors and process vessels, even under difficult process conditions. With its various antenna versions and materials, VEGAPULS 62 is the optimal solution for almost all applications and processes. Its wide temperature and pressure range makes project planning simple.

The version with horn antenna is particularly suitable for storage tanks and process vessels for measurement of products like solvents, hydrocarbons and fuels. The version with parabolic antenna is particularly suitable for measurement of products with low εₚ value at large measuring distances.

**VEGAPULS 63**

The VEGAPULS 63 is a sensor for continuous level measurement of aggressive liquids or liquids with hygienic requirements. It is suitable for applications in storage tanks, process vessels, dosing vessels and reactors. The encapsulated antenna system of VEGAPULS 63 protects against pollution and ensures continuous, maintenance-free operation. Front-flush mounting ensures optimum cleanability even in case of the most stringent hygienic requirements.

**VEGAPULS 64**

The VEGAPULS 64 is a radar sensor for continuous level measurement of liquids.

Special advantages result from the small process fittings for small tanks and the very good focussing in applications in large tanks. This is made possible by the sensor’s functional principle: distance measurement through frequency shifting with an especially small beam angle.

**VEGAPULS 65**

The VEGAPULS 65 is a radar sensor for continuous measurement of liquids under difficult process conditions. It is particularly suitable for level measurement in vessels with small process fittings and simple process conditions. The slim rod antenna allows installation in small vessel openings.

**VEGAPULS 66**

The VEGAPULS 66 is a radar sensor for continuous level measurement of liquids under difficult process conditions. It is suitable for applications in storage tanks, process vessels or standpipes. VEGAPULS 66 can be used universally thanks to its different antenna versions.

### Applications

#### Level measurement in vessels

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

![Fig. 9: Level measurement in vessels with conical bottom](image)

#### Measurement in a surge pipe

By using a surge pipe in the vessel, influences from internal vessel installations and turbulence can be excluded. Under these prerequisites, the measurement of products with low dielectric values (εᵣ value ≥ 1.6) is possible. In very adhesive products, measurement in a surge pipe is not recommended.

![Fig. 10: Configuration surge pipe](image)

1. Radar sensor
2. Polarisation marking
3. Thread or flange on the instrument
4. Vent hole
5. Holes
6. Weld joint
7. Welding neck flange
8. Ball valve with complete opening
9. Fastening of the surge pipe
Flow measurement
Flow measurement in open flumes with a defined constriction, such as e.g. a rectangular overflow, can be realized with a level measurement.

Fig. 11: Flow measurement with rectangular overflow: $d_{min}$ minimum distance of the sensor; $h_{max} = \text{max. filling of the rectangular overflow}$
1 Overflow orifice (side view)
2 Headwater
3 Tailwater
4 Overfall orifice (view from tailwater)

Measurement in difficult applications
The electronics version with increased sensitivity enables use of the instrument also in applications with very poor reflective properties and products with low $\varepsilon_r$ value.
### Selection criteria

<table>
<thead>
<tr>
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<tr>
<td>Foodstuffs</td>
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<td>●</td>
<td>●</td>
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<td>Metal production</td>
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<td>Offshore</td>
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<td>Paper</td>
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<tr>
<td>Petrochemical</td>
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<td>●</td>
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<td>●</td>
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<tr>
<td>Pharmaceutical</td>
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<td>●</td>
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<td>●</td>
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</tr>
<tr>
<td>Shipbuilding</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>●</td>
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<td>●</td>
</tr>
<tr>
<td>Environment and recycling industry</td>
<td>–</td>
<td>–</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>–</td>
<td>●</td>
</tr>
<tr>
<td>Water, waste water</td>
<td>●</td>
<td>●</td>
<td>–</td>
<td>●</td>
<td>●</td>
<td>–</td>
<td>●</td>
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<tr>
<td>Cement industry</td>
<td>–</td>
<td>–</td>
<td>●</td>
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<td>–</td>
</tr>
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</table>
### 5 Measuring range dimensioning

<table>
<thead>
<tr>
<th>Applications</th>
<th>Storage tank</th>
<th>Storage tank with product circulation</th>
<th>Stirrer vessel</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>VEGAPULS 62</td>
<td>VEGAPULS 63</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DN 50 (antenna ø 48 mm)</td>
<td>DN 80 (antenna ø 75 mm)</td>
<td>DN 80 (antenna ø 75 mm)</td>
</tr>
<tr>
<td></td>
<td>DN 100 (antenna ø 95 mm)</td>
<td>DN 80 (antenna ø 95 mm)</td>
<td>DN 100 (antenna ø 95 mm)</td>
</tr>
<tr>
<td>Dielectric constant &lt;3</td>
<td>up to 20 m (65.62 ft)</td>
<td>up to 35 m (114.83 ft)</td>
<td>up to 10 m (32.81 ft)</td>
</tr>
<tr>
<td>Dielectric constant 3 … 10</td>
<td>up to 20 m (65.62 ft)</td>
<td>up to 35 m (114.83 ft)</td>
<td>up to 10 m (32.81 ft)</td>
</tr>
<tr>
<td>Dielectric constant &gt;10</td>
<td>up to 20 m (65.62 ft)</td>
<td>up to 35 m (114.83 ft)</td>
<td>up to 20 m (65.62 ft)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Surge pipe</th>
<th>Bypass</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>VEGAPULS 62</td>
<td>VEGAPULS 63</td>
</tr>
<tr>
<td></td>
<td>DN 50 (antenna ø 48 mm)</td>
<td>DN 80 (antenna ø 75 mm)</td>
</tr>
<tr>
<td></td>
<td>DN 100 (antenna ø 95 mm)</td>
<td>DN 80 (antenna ø 95 mm)</td>
</tr>
<tr>
<td>Dielectric constant &lt;3</td>
<td>up to 30 m (98.43 ft)</td>
<td>up to 35 m (114.83 ft)</td>
</tr>
<tr>
<td>Dielectric constant 3 … 10</td>
<td>up to 30 m (98.43 ft)</td>
<td>up to 35 m (114.83 ft)</td>
</tr>
<tr>
<td>Dielectric constant &gt;10</td>
<td>up to 30 m (98.43 ft)</td>
<td>up to 35 m (114.83 ft)</td>
</tr>
</tbody>
</table>

1) Free radiating radar possible, however, guided radar is recommended as there is less influence from bypass openings.
## 6 Housing overview

<table>
<thead>
<tr>
<th>Material</th>
<th>Protection rating</th>
<th>Version</th>
<th>Application area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plastic PBT</td>
<td>IP 66/IP 67</td>
<td>Single chamber</td>
<td>Industrial environment</td>
</tr>
<tr>
<td></td>
<td>IP 66/IP 67</td>
<td>Double chamber</td>
<td>Industrial environment</td>
</tr>
<tr>
<td>Aluminium</td>
<td>IP 66/IP 67, IP 66/IP 68 (1 bar)</td>
<td>Single chamber</td>
<td>Industrial environment with increased mechanical stress</td>
</tr>
<tr>
<td></td>
<td>IP 66/IP 67, IP 66/IP 68 (1 bar)</td>
<td>Double chamber</td>
<td>Industrial environment with increased mechanical stress</td>
</tr>
<tr>
<td>Stainless steel 316L</td>
<td>IP 66/IP 67</td>
<td>Single chamber, electropolished</td>
<td>Aggressive environment, food processing, pharmaceutical</td>
</tr>
<tr>
<td></td>
<td>IP 66/IP 67, IP 66/IP 68 (1 bar)</td>
<td>Single chamber, precision casting</td>
<td>Aggressive environment, extreme mechanical stress</td>
</tr>
<tr>
<td></td>
<td>IP 66/IP 67, IP 66/IP 68 (1 bar)</td>
<td>Double chamber, precision casting</td>
<td>Aggressive environment, extreme mechanical stress</td>
</tr>
</tbody>
</table>
7 Mounting

Installation position
The sensor is mounted in a position which is at least 200 mm (7.874 in) away from the vessel wall. If the sensor is installed in the center of dished or round vessel tops, multiple echoes can arise. However, these can be suppressed by an appropriate adjustment.

Fig. 24: Mounting of the radar sensor on round vessel tops

Mounting examples
The following illustrations show mounting examples and measurement setups for the individual sensors.

Pump shaft

Fig. 25: Level measurement in the pump shaft with VEGAPULS WL 61

The strongly focussed measuring signal of VEGAPULS WL 61 offers considerable advantages particularly in tight spaces. The sensor operates reliably even with foam and buildup on the shaft wall.

Acid tank

Fig. 26: Level measurement in an acid tank with VEGAPULS 61

A non-contact measuring principle is particularly suitable for level measurement in acid tanks. VEGAPULS 61 is characterised by a small process fitting and a PVDF encapsulated antenna. The sensor is insensitive to temperature fluctuations and gas phases.

Reactor

Fig. 27: Level measurement in a reactor with VEGAPULS 62

For the production of resins, different basic substances are mixed with solvents and a reaction is caused by adding process heat. Non-contact measurement with the radar sensor VEGAPULS 62 is ideal for use in the production of reaction products. Since the measurement is performed without direct contact to the medium, virtually no buildup forms on the sensor.
Sugar evaporator

Fig. 28: Level measurement in a sugar evaporator with VEGAPULS 63

The VEGAPULS 63 radar sensor is particularly suitable for level measurement in the sugar evaporator.

The PTFE encapsulated horn antenna is protected against contamination or adhesion by the juice. The instrument is gauge and low pressure resistant, even with dynamic pressure and suction.

Process vessels

Fig. 29: Level measurement in a small process vessel with VEGAPULS 64

The strongly focussed measuring signal of VEGAPULS 64 offers considerable advantages particularly in small process vessels in the food processing industry. The sensor operates reliably even with frequently changing filling and emptying processes.

Storage tank

Fig. 30: Level measurement in a storage tank with VEGAPULS 65

The VEGAPULS 65 radar sensor is particularly suitable for level measurement in a storage tank.

Storage tower

Fig. 31: Level measurement in a storage tower with VEGAPULS 66

The VEGAPULS 66 radar sensor is particularly suitable for level measurement in a storage tower for paper suspension.

With the large antenna and the low frequency measuring system, the sensor functions even in case of steam and fluctuating surface.
8 Electronics - 4 … 20 mA/HART - two-wire

Configuration of the electronics
The plug-in electronics is mounted in the electronics compartment of the instrument and can be exchanged by the user when servicing is required. The electronics is completely encapsulated to protect against vibration and moisture. The terminals for voltage supply as well as the contact pins with I²C interface for parameter adjustment are located on the upper side of the electronics. In the double-chamber housing, the terminals are located in the separate terminal compartment.

Voltage supply
Power supply and current signal are carried on the same two-wire cable. The operating voltage can differ depending on the instrument version. You can find the data of the voltage supply in chapter "Technical data" in the operating instructions manual of the respective instrument.

You can find the data of the voltage supply in chapter "Technical data" in the operating instructions manual of the respective instrument.

Specifications of the voltage supply:
- Operating voltage
  - 9.6 … 35 V DC
  - 12 … 35 V DC
- Permissible residual ripple - Non-Ex, Ex-ia instrument
  - for 9.6 V < U_N < 14 V: ≤ 0.7 V eff (16 … 400 Hz)
  - for 18 V < U_N < 35 V: ≤ 1.0 V eff (16 … 400 Hz)

Keep in mind the following additional factors that influence the operating voltage:
- Lower output voltage of the power supply unit under nominal load (e.g. with a sensor current of 20.5 mA or 22 mA in case of fault)
- Influence of additional instruments in the circuit (see load values in chapter "Technical data" of the operating instructions of the respective instrument)

Connection cable
The instrument is connected with standard two-wire cable without screen. If electromagnetic interference is expected which is above the test values of EN 61326-1 for industrial areas, screened cable should be used.

We generally recommend the use of screened cable for HART multidrop mode.

Cable screening and grounding
If screened cable is required, we recommend connecting the cable screen on both ends to ground potential. In the sensor, the screen should be connected directly to the internal ground terminal. The ground terminal on the outside of the housing must be connected to the ground potential (with low impedance).
9  Electronics - 4 … 20 mA/HART - four-wire

Configuration of the electronics
The plug-in electronics is mounted in the electronics compartment of the instrument and can be exchanged by the user when servicing is required. The electronics is completely encapsulated to protect against vibration and moisture.

The contact pins with I²C interface for parameter adjustment are located on the upper side of the electronics. The terminals for the power supply are located in the separate connection compartment.

Voltage supply
If a reliable separation is required, the power supply and the current output are transmitted over separate two-wire connection cables.

- Operating voltage with version for low voltage
  - 9.6 … 48 V DC; 20 … 42 V AC; 50/60 Hz
- Operating voltage with version for mains voltage
  - 90 … 253 V AC; 50/60 Hz

Connection cable
The 4 … 20 mA current output is connected with standard two-wire cable without screen. If electromagnetic interference is expected which is above the test values of EN 61326 for industrial areas, screened cable should be used.

For power supply, an approved installation cable with PE conductor is required.

Cable screening and grounding
If screened cable is required, we recommend connecting the cable screen on both ends to ground potential. In the sensor, the screen should be connected directly to the internal ground terminal. The ground terminal on the outside of the housing must be connected to the ground potential (with low impedance).

Connection, double chamber housing

![Fig. 35: Terminal compartment, double chamber housing](image)

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Function</th>
<th>Polarity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Voltage supply</td>
<td>+/-L</td>
</tr>
<tr>
<td>2</td>
<td>Voltage supply</td>
<td>-/-N</td>
</tr>
<tr>
<td>5</td>
<td>4 … 20 mA output (active)</td>
<td>+</td>
</tr>
<tr>
<td>6</td>
<td>4 … 20 mA output (passive)</td>
<td>+</td>
</tr>
<tr>
<td>7</td>
<td>Mass - output</td>
<td>-</td>
</tr>
<tr>
<td>8</td>
<td>Functional ground with installa-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>tion according to CSA</td>
<td></td>
</tr>
</tbody>
</table>
10 Electronics - Profibus PA

Configuration of the electronics
The plug-in electronics is mounted in the electronics compartment of the instrument and can be exchanged by the user when servicing is required. The electronics is completely encapsulated to protect against vibration and moisture.

The terminals for voltage supply as well as the plug with I²C interface for parameter adjustment are located on the upper side of the electronics. In the double-chamber housing, these connection elements are located in the separate terminal compartment.

Voltage supply
The voltage supply is provided by a Profibus DP /PA segment coupler.
Specifications of the voltage supply:
- Operating voltage
  - 9 ... 32 V DC
- Max. number of sensors per DP/PA segment coupler
  - 32

Connection cable
Connection is carried out with screened cable according to Profibus specification.
Make sure that the entire installation is carried out according to the Profibus specification. In particular, make sure that the bus is terminated with suitable terminating resistors.

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 on the power supply unit and the sensor. In the connection box or T-distributor, the screen of the short stub to the sensor may not be connected to ground potential or to another cable screen.

Connection
Single chamber housing

Double chamber housing

Voltage supply/Signal output
1  Voltage supply, signal output
2  For display and adjustment module or interface adapter
3  For external display and adjustment unit
4  Ground terminal for connection of the cable screen

Connection cable

Wire assignment connection cable VEGAPULS WL 61
1  brown (+) and blue (-) to power supply or to the processing system
2  Shielding

Fig. 36: Electronics and terminal compartment, single chamber housing

Fig. 37: Terminal compartment, double chamber housing

Fig. 38: Wire assignment in permanently connected connection cable
11 Electronics - Foundation Fieldbus

Configuration of the electronics
The plug-in electronics is mounted in the electronics compartment of the instrument and can be exchanged by the user when servicing is required. The electronics is completely encapsulated to protect against vibration and moisture.

The terminals for voltage supply as well as the contact pins with I²C interface for parameter adjustment are located on the upper side of the electronics. In the double-chamber housing, the terminals are located in the separate terminal compartment.

Voltage supply
Power supply via the H1 Fieldbus cable.

 Specifications of the voltage supply:

- Operating voltage
  - 9 ... 32 V DC
- max. number of sensors
  - 32

Connection cable
Connection is carried out with screened cable according to Fieldbus specification.

Make sure that the entire installation is carried out according to the Fieldbus specification. In particular, make sure that the bus is terminated with suitable terminating resistors.

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 on the power supply unit and the sensor. In the connection box or T-distributor, the screen of the short stub to the sensor may not be connected to ground potential or to another cable screen.

Connection

Single chamber housing

Double chamber housing

Fig. 39: Electronics and terminal compartment, single chamber housing
1 Voltage supply/Signal output
2 Contact pins for the display and adjustment module or interface adapter
3 Selection switch for bus address
4 For external display and adjustment unit
5 Ground terminal for connection of the cable screen

Fig. 40: Terminal compartment, double chamber housing
1 Voltage supply, signal output
2 For display and adjustment module or interface adapter
3 For external display and adjustment unit
4 Ground terminal for connection of the cable screen

Fig. 41: Wire assignment in permanently connected connection cable
1 brown (+) and blue (-) to power supply or to the processing system
2 Shielding

Wire assignment connection cable VEGAPULS WL 61

Fig. 41: Wire assignment connection cable VEGAPULS WL 61
12 Electronics - Modbus, Levelmaster protocol

Configuration of the electronics
The plug-in electronics is mounted in the electronics compartment of the instrument and can be exchanged by the user when servicing is required. The electronics is completely encapsulated to protect against vibration and moisture.

The contact pins with I²C interface for parameter adjustment are located on the upper side of the electronics. The terminals for the power supply are located in the separate connection compartment.

Voltage supply
Power supply via the Modbus host (RTU)
- Operating voltage
  - 8 … 30 V DC
- max. number of sensors
  - 32

Connection cable
Connection is carried out with screened cable according to Fieldbus specification.

For power supply, a separate two-wire cable is required.
In the product configurator of VEGAPULS, different cable glands can be selected. They cover all cable diameters in the range of 4 … 12 mm (0.16 … 0.47 in).

Make sure that the entire installation is carried out according to the Fieldbus specification. In particular, make sure that the bus is terminated with suitable terminating resistors.

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 on the power supply unit and the sensor. In the connection box or T-distributor, the screen of the short stub to the sensor may not be connected to ground potential or to another cable screen.

Connection

Double chamber housing

Fig. 42: Terminal compartment
1 USB interface
2 Slide switch for integrated termination resistor (120 Ω)
3 Voltage supply
4 Modbus signal
13 Operation

13.1 Adjustment on the measurement loop

Via the display and adjustment module through keys
The plug-in display and adjustment module is used for measured value indication, adjustment and diagnosis. It is equipped with an illuminated full dot matrix as well as four keys for adjustment.

PACTware is an adjustment software for configuration, parameter adjustment, documentation and diagnosis of field devices. The corresponding device drivers are called DTM.

13.2 Operation in the measurement loop environment - wireless via Bluetooth

Via a smartphone/tablet
The display and adjustment module with integrated Bluetooth functionality allows wireless connection to smartphones/tablets with iOS or Android operating system. The adjustment is carried out via the VEGA Tools app from the Apple App Store or Google Play Store.

Via a PC with PACTware/DTM
The wireless connection from the PC to the sensor is carried out via the Bluetooth USB adapter and a display and adjustment module with integrated Bluetooth function. The adjustment is carried out via the PC with PACTware/DTM.

13.3 Adjustment carried out at position remote from the measuring point - wired

Via external display and adjustment units
For this, the external display and adjustment units VEGADIS 81 and 82 are available. The adjustment is carried out via the keys of the built-in display and adjustment module.

The VEGADIS 81 is mounted at a distance of 50 m from the sensor and directly to the sensor electronics. VEGADIS 82 is looped directly into the signal cable at any point.
Fig. 48: Connection of VEGADIS 81 to the sensor
1 Voltage supply/Signal output sensor
2 Sensor
3 Connection cable sensor - external display and adjustment unit
4 External display and adjustment unit
5 Display and adjustment module

Via a PC with PACTware/DTM
The sensor adjustment is carried out via a PC with PACTware/DTM.

Fig. 49: Connection of VEGADIS 82 to the sensor
1 Voltage supply/Signal output sensor
2 External display and adjustment unit
3 Display and adjustment module
4 4 ... 20 mA/HART signal cable
5 Sensor

13.4 Adjustment carried out at position remote from the measuring point - wireless through mobile network
As an option, the radio module PLICSMOBILE can be mounted into a plics® sensor with double chamber housing. It is used for transmission of measured values and for remote parameter adjustment of the sensor.

13.5 Alternative adjustment programs

DD adjustment programs
Device descriptions as Enhanced Device Description (EDD) are available for DD adjustment programs such as, for example, AMS™ and PDM. The files can be downloaded at www.vega.com/downloads under “Software”.

Field Communicator 375, 475
Device descriptions for the instrument are available as EDD for parameter adjustment with the Field Communicator 375 or 475.
For the integration of the EDD in the Field Communicator 375 or 475, the software “Easy Upgrade Utility” is required which is available from the manufacturer. This software is updated via the Internet and new EDDs are automatically taken over into the device catalogue of this software after they are released by the manufacturer. They can then be transferred to a Field Communicator.
14 Dimensions

**Plastic housing**

1. Single chamber housing
2. Double chamber housing

**Aluminium housing**

1. Single chamber housing
2. Double chamber housing

**Stainless steel housing**

1. Single chamber housing, electropolished
2. Single chamber housing, precision casting
3. Double chamber housing, precision casting

**VEGAPULS WL 61**

- [Diagram of VEGAPULS WL 61]

1. Mounting strap
2. Combi compression flange

**VEGAPULS 61**

1. Version with encapsulated antenna system (ø 40 mm)
2. Version with plastic horn antenna (ø 80 mm)
3. Mounting strap
4. Adapter flange

---

Fig. 55: Dimensions VEGAPULS

1. Mounting strap
2. Combi compression flange

---

Dimensions VEGAPULS WL 61

1. Single chamber housing
2. Double chamber housing

---

Dimensions VEGAPULS 61

1. Version with encapsulated antenna system (ø 40 mm)
2. Version with plastic horn antenna (ø 80 mm)
3. Mounting strap
4. Adapter flange

---

Dimensions of plastic housing:

- Height: ~90 mm (3.54")
- Diameter: ø 79 mm (3.11")
- Length: 112 mm (4.41")

Dimensions of aluminium housing:

- Height: ~116 mm (4.57")
- Diameter: ø 86 mm (3.39")
- Length: 120 mm (4.72")

Dimensions of stainless steel housing:

- Height: ~117 mm (4.61")
- Diameter: ø 80 mm (3.15")
- Length: 112 mm (4.41")

---

1. Single chamber housing
2. Double chamber housing
VEGAPULS 62

1. Threaded version
2. Threaded version with temperature adapter up to 250 °C
3. Flange version

VEGAPULS 63

1. Flange version DN 50
2. Flange version DN 80
3. Clamp version 2"

VEGAPULS 64

1. Flange version DN 50
2. Flange version DN 80
3. Clamp version 2"

VEGAPULS 65

1. Threaded version G1½
2. Flange version DN 80
VEGAPULS 66

1 Version with horn antenna ø 145 mm
2 Version with standpipe antenna

The listed drawings represent only an excerpt of the available process fittings. You can find more drawings at www.vega.com/downloads under "Drawings".
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

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