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## Quick setup guide

**Radar sensor for continuous level  
measurement of bulk solids**

### VEGAPULS 69

4 ... 20 mA/HART - four-wire



Document ID: 47255



**VEGA**

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### Information:

This quick setup guide enables quick setup and commissioning of your instrument.

You can find supplementary information in the corresponding, more detailed Operating Instructions Manual as well as the Safety Manual that comes with instruments with SIL qualification. These manuals are available on the supplied DVD or in the download area of "[www.vega.com](http://www.vega.com)".

**Operating instructions VEGAPULS 69 - 4 ... 20 mA/HART - four-wire: Document-ID 47249**

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## 1 For your safety

### 1.1 Authorised personnel

All operations described in this operating instructions manual must be carried out only by trained specialist personnel authorised by the plant operator.

During work on and with the device the required personal protective equipment must always be worn.

### 1.2 Appropriate use

VEGAPULS 69 is a sensor for continuous level measurement.

You can find detailed information about the area of application in chapter "*Product description*".

Operational reliability is ensured only if the instrument is properly used according to the specifications in the operating instructions manual as well as possible supplementary instructions.

### 1.3 Warning about incorrect use

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.

### 1.4 General safety instructions

This is a state-of-the-art instrument complying with all prevailing regulations and guidelines. The instrument must only be operated in a technically flawless and reliable condition. The operator is responsible for the trouble-free operation of the instrument.

During the entire duration of use, the user is obliged to determine the compliance of the necessary occupational safety measures with the current valid rules and regulations and also take note of new regulations.

The safety instructions in this operating instructions manual, the national installation standards as well as the valid safety regulations and accident prevention rules must be observed by the user.

For safety and warranty reasons, any invasive work on the device beyond that described in the operating instructions manual may be carried out only by personnel authorised by the manufacturer. Arbitrary conversions or modifications are explicitly forbidden.

The safety approval markings and safety tips on the device must also be observed.

Depending on the instrument version, the emitting frequencies are in the C or K band range. The low emitting frequencies are far below the internationally approved limit values. When used correctly, there is no danger to health.

## 1.5 CE conformity

The device fulfills the legal requirements of the applicable EC guidelines. By affixing the CE marking, we confirm successful testing of the product.

You can find the CE Certificate of Conformity in the download section of our homepage.

## 1.6 NAMUR recommendations

NAMUR is the automation technology user association in the process industry in Germany. The published NAMUR recommendations are accepted as the standard in field instrumentation.

The device fulfills the requirements of the following NAMUR recommendations:

- NE 21 – Electromagnetic compatibility of equipment
- NE 43 – Signal level for malfunction information from measuring transducers
- NE 53 – Compatibility of field devices and display/adjustment components
- NE 107 – Self-monitoring and diagnosis of field devices

For further information see [www.namur.de](http://www.namur.de).

## 1.7 Radio license for Europe

The instrument meets the LPR (Level Probing Radar) radio standard EN 302729-1/2.

It is approved for unrestricted use inside and outside of closed vessels in countries of the EU and EFTA that have implemented this standard.

For operation outside of closed vessels, the following conditions must be fulfilled:

- The installation must be carried out by trained qualified personnel
- The instrument must be stationary mounted and the antenna directed vertically downward
- The mounting location must be at least 4 km away from the radio astronomy stations, unless special permission was granted by the responsible national approval authority
- When installed within 4 to 40 km of a radio astronomy station, the instrument must not be mounted higher than 15 m above the ground.

You can find a list with the respective radio astronomy stations in chapter "*Supplement*".

## 1.8 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 fulfill this obligation by observing the environmental instructions in this manual:

- Chapter "*Packaging, transport and storage*"
- Chapter "*Disposal*"

## 2 Product description

### 2.1 Configuration

#### Type label

The type label contains the most important data for identification and use of the instrument:

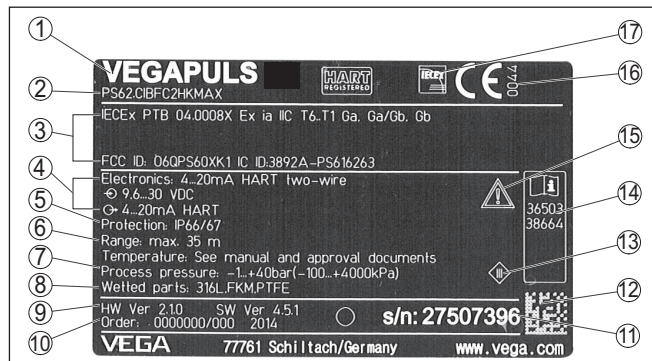


Fig. 1: Layout of the type label (example)

- 1 Instrument type
- 2 Product code
- 3 Approvals
- 4 Power supply and signal output, electronics
- 5 Protection rating
- 6 Measuring range
- 7 Process and ambient temperature, process pressure
- 8 Material, wetted parts
- 9 Hardware and software version
- 10 Order number
- 11 Serial number of the instrument
- 12 Data-Matrix-Code for Smartphone-App
- 13 Symbol of the device protection class
- 14 ID numbers, instrument documentation
- 15 Reminder to observe the instrument documentation
- 16 Notified authority for CE marking
- 17 Approval directive

#### Serial number - Instrument search

The type label contains the serial number of the instrument. With it you can find the following instrument data on our homepage:

- Product code (HTML)
- Delivery date (HTML)
- Order-specific instrument features (HTML)
- Operating instructions and quick setup guide at the time of shipment (PDF)
- Order-specific sensor data for an electronics exchange (XML)
- Test certificate (PDF) - optional

Go to [www.vega.com](http://www.vega.com), "VEGA Tools" and "Instrument search". Enter the serial number.

Alternatively, you can access the data via your smartphone:

- Download the smartphone app "*VEGA Tools*" from the "*Apple App Store*" or the "*Google Play Store*"
- Scan the Data Matrix code on the type label of the instrument or
- Enter the serial number manually in the app

## 3 Mounting

### 3.1 Mounting preparations, mounting strap

The strap is supplied unassembled and must be screwed to the sensor before setup with three hexagon screws M5 x 10 and spring washers. Max. torque, see chapter "Technical data". Required tools: Allen wrench size 4.

There are two ways to screw the strap onto the sensor. Depending on the selected version, the sensors can be swivelled in the strap as follows:

- Single chamber housing
  - Angle of inclination 180°, infinitely variable
  - Angle of inclination in three steps 0°, 90° and 180°
- Double chamber housing
  - Angle of inclination 90°, infinitely variable
  - Angle of inclination in two steps 0° and 90°

### 3.2 Mounting instructions

#### Polarisation

Radar sensors for level measurement emit electromagnetic waves. The polarization is the direction of the electrical component of these waves.

The polarization direction is marked by a nose on the housing, see following drawing:

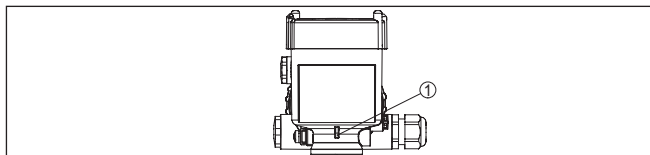


Fig. 2: Position of the polarisation

1 Nose for marking the direction of polarisation



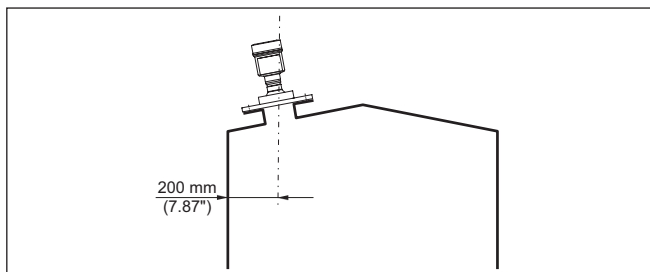
#### Information:

When the housing is rotated, the direction of polarization changes and hence the influence of the false echo on the measured value. Please keep this in mind when mounting or making changes later.

#### Installation position

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





*Fig. 3: Mounting the radar sensor on the vessel top*

If you cannot maintain this distance, you should carry out a false signal storage during setup. This applies particularly if buildup on the vessel wall is expected. In such cases, we recommend repeating the false signal storage at a later date with existing buildup.

## 4 Connecting to power supply

### 4.1 Connection

#### Connection technology

The voltage supply and signal output are connected via the spring-loaded terminals in the housing.

Connection to the display and adjustment module or to the interface adapter is carried out via contact pins in the housing.



#### Information:

The terminal block is pluggable and can be removed from the electronics. To do this, lift the terminal block with a small screwdriver and pull it out. When reinserting the terminal block, you should hear it snap in.

#### Connection procedure

Proceed as follows:

1. Unscrew the housing cover
2. Loosen compression nuts of the cable glands
3. Remove approx. 10 cm (4 in) of the cable mantle (signal output), strip approx. 1 cm (0.4 in) insulation from the ends of the individual wires
4. Insert the cable into the sensor through the cable entry



Fig. 4: Connection steps 5 and 6

5. Insert the wire ends into the terminals according to the wiring plan



#### Information:

Solid cores as well as flexible cores with wire end sleeves are inserted directly into the terminal openings. In case of flexible cores without end sleeves, press the terminal from above with a small screwdriver, the terminal opening is then free. When the screwdriver is released, the terminal closes again.

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

7. Connect the screen to the internal ground terminal, connect the outer ground terminal to potential equalisation in case of power supply via low voltage
8. Connect the lead cable for power supply in the same way according to the wiring plan, in addition connect the ground conductor to the inner ground terminal when powered with mains voltage.
9. Tighten the compression nut of the cable glands. The seal ring must completely encircle the cables
10. Screw the housing cover back on

The electrical connection is finished.



#### Information:

The terminal blocks are pluggable and can be removed from the housing insert. To do this, lift the terminal block with a small screwdriver and pull it out. When inserting the terminal block again, you should hear it snap in.

## 4.2 Wiring plan, double chamber housing



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

### Connection compartment with mains voltage

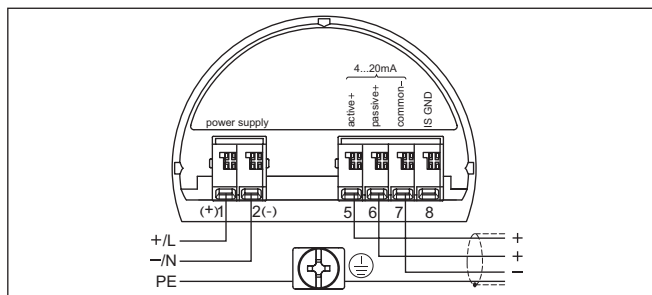


Fig. 5: Connection compartment with double chamber housing with mains voltage

Terminal	Function	Polarity
1	Voltage supply	+/L
2	Voltage supply	-/N
5	4 ... 20 mA output (active)	+
6	4 ... 20 mA output (passive)	+
7	Mass - output	-
8	Function ground with installation according to CSA	

# Connection compartment with low voltage

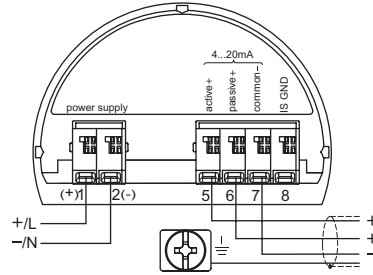


Fig. 6: Connection compartment with double chamber housing with low voltage

Terminal	Function	Polarity
1	Voltage supply	+/L
2	Voltage supply	-/N
5	4 ... 20 mA output (active)	+
6	4 ... 20 mA output (passive)	+
7	Mass - output	-
8	Function ground with installation according to CSA	

## 5 Set up with the display and adjustment module

### 5.1 Insert display and adjustment module

The display and adjustment module can be inserted into the sensor and removed again at any time. You can choose any one of four different positions - each displaced by 90°. It is not necessary to interrupt the power supply.

Proceed as follows:

1. Unscrew the housing cover
2. Place the display and adjustment module on the electronics in the desired position and turn it to the right until it snaps in.
3. Screw housing cover with inspection window tightly back on

Disassembly is carried out in reverse order.

The display and adjustment module is powered by the sensor, an additional connection is not necessary.



Fig. 7: Insertion of the display and adjustment module with single chamber housing

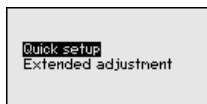


#### Note:

If you intend to retrofit the instrument with a display and adjustment module for continuous measured value indication, a higher cover with an inspection glass is required.

### 5.2 Parameter adjustment - Quick setup

To quickly and easily adapt the sensor to the application, select the menu item "Quick setup" in the start graphic on the display and adjustment module.

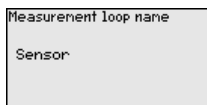


Carry out the following steps in the below sequence.

You can find "Extended adjustment" in the next sub-chapter.

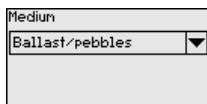
### 1. Measurement loop name

In the first menu item you assign a suitable measurement loop name. Permitted are names with max. 19 characters.



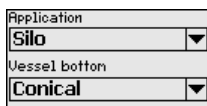
### 2. Medium

In this menu item you select the type of bulk solid. The selection comprises different granulate sizes.



### 3. Application/Vessel bottom

In this menu item you specify the application and the form of the vessel bottom.



### 4. Vessel height/Measuring range

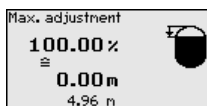
In this menu item you enter the height of the vessel and hence the active measuring range.



### 5. Max. adjustment

In this menu item you carry out the max. adjustment.

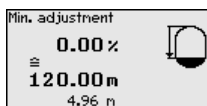
Enter the measuring distance for 100 % filling.



### 6. Min. adjustment

In this menu item you carry out the min. adjustment.

Enter the measuring distance for 0 % filling.



The quick setup is finished.

## Setup - Adjustment

### 5.3 Parameter adjustment - Extended adjustment

Since the radar sensor is a distance measuring instrument, the distance from the sensor to the product surface is measured. For indication of the real level, an allocation of the measured distance to the percentage height must be carried out.

To perform the adjustment, enter the distance with full and empty vessel, see the following example:

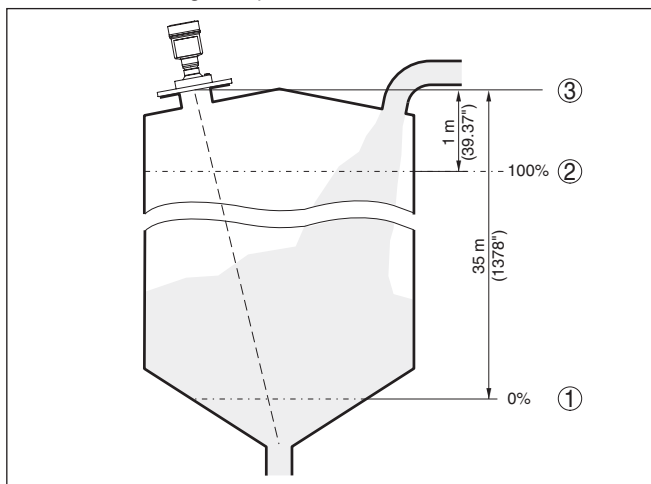


Fig. 8: Parameter adjustment example min./max. adjustment

- 1 Min. level = max. meas. distance
- 2 Max. level = min. meas. distance
- 3 Reference plane

If these values are not known, an adjustment with the distances of for example 10 % and 90 % is possible. Starting point for these distance specifications is always the seal surface of the thread or flange. You can find specifications of the reference plane in chapter "Technical data". By means of these settings, the real level will be calculated.

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.

## Diagnostics - Echo curve memory

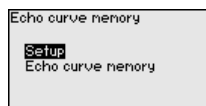
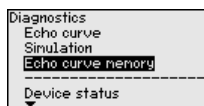
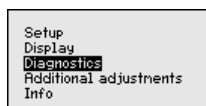
The function "Setup" allows the echo curve to be saved at the time of setup.

**Information:**

This is generally recommended, however, for use of the Asset Management functions it is absolutely necessary. Saving should be carried out with a very low level.

The function "Echo curve memory" allows up to ten individual echo curves to be stored, for example to detect the measurement behaviour of the sensor in different operating conditions.

With the adjustment software PACTware and the PC, the stored echo curves can be displayed with high resolution and used to recognize signal changes over time. In addition, the echo curve saved during setup can also be displayed in the echo curve window and compared with the actual echo curve.



### Additional adjustments - False signal suppression

The following circumstances cause interfering reflections and can influence the measurement:

- High sockets
- Vessel installations such as struts
- Agitators
- Buildup or welded joints on vessel walls

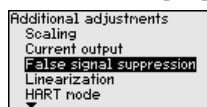
**Note:**

A false signal suppression detects, marks and saves these false signals so that they are no longer taken into account in the level measurement.

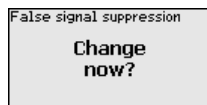
This should be done with a low level so that all potential interfering reflections can be detected.

Proceed as follows:

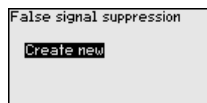
1. Select with **[->]** the menu item "False signal suppression" and confirm with **[OK]**.



2. Confirm again with **[OK]**.

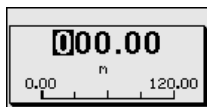


3. Confirm again with **[OK]**.





4. Confirm again with **[OK]** and enter the actual distance from the sensor to the product surface.



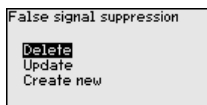
5. All interfering signals in this section are detected by the sensor and stored after confirming with **[OK]**.



**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.

If a false signal suppression has already been created in the sensor, the following menu window appears when selecting "*False signal suppression*":



**Delete:** An already created false signal suppression will be completely deleted. This is useful if the saved false signal suppression no longer matches the metrological conditions in the vessel.

**Extend:** is used to extend an already created false signal suppression. This is useful if a false signal suppression was carried out with a too high level and not all false signals could be detected. When selecting "*Extend*", the distance to the product surface of the created false signal suppression is displayed. This value can now be changed and the false signal suppression can be extended to this range.

## 6 Supplement

### 6.1 Technical data

#### Electromechanical data - version IP 66/IP 67

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Cable gland	M20 x 1.5 or ½ NPT
-------------	--------------------

Wire cross-section (spring-loaded terminals)	
--	--

- |                                 |   |
|---------------------------------|---|
| – Massive wire, stranded wire   | 0.2 ... 2.5 mm <sup>2</sup> (AWG 24 ... 14) |
| – Stranded wire with end sleeve | 0.2 ... 1.5 mm <sup>2</sup> (AWG 24 ... 16) |
- 

#### Voltage supply

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Operating voltage	
-------------------	--

- |                             |   |
|-----------------------------|---|
| – Version for low voltage   | 9.6 ... 48 V DC, 20 ... 42 V AC, 50/60 Hz |
| – Version for mains voltage | 90 ... 253 V AC, 50/60 Hz                 |

Reverse voltage protection	Integrated
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Max. power consumption	4 VA; 2.1 W
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# VEGA

Printing date:

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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