

Operating Instructions VEGAPULS 66 enamel 4 ... 20 mA/HART







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Supplementary operating instructions manuals

Information:

VEGAPULS 66 is available in many versions and is therefore supplied according to customer order. Depending on the selected version, supplementary operating instructions manuals also come with the delivery. You will find the supplementary operating instructions manuals in chapter "*Product description*".

Operating instructions manuals for accessories and replacement parts

Tip:

To ensure reliable setup and operation of your VEGAPULS 66, we offer accessories and replacement parts. The associated documents are:

- Operating instructions manual "External indicating and adjustment unit VEGADIS 61"
- Operating instructions manual "Oscillator VEGAPULS series 60"
- Supplementary instructions manual "Flanges according to DIN-EN-ASME-JIS"

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1 About this document

1.1 Function

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

1.2 Target group

This operating instructions manual is directed to trained, qualified personnel. The contents of this manual should be made available to these personnel and put into practice by them.

1.3 Symbolism used



Information, tip, note

This symbol indicates helpful additional information.



Caution: If this warning is ignored, faults or malfunctions can result.

Warning: If this warning is ignored, injury to persons and/or serious damage to the instrument can result.

Danger: If this warning is ignored, serious injury to persons and/or destruction of the instrument can result.



Ex applications

This symbol indicates special instructions for Ex applications.



List

The dot set in front indicates a list with no implied sequence.



1

Action

This arrow indicates a single action.

Sequence

Numbers set in front indicate successive steps in a procedure.



2 For your safety

2.1 Authorised personnel

All operations described in this operating instructions manual must be carried out only by trained specialist personnel authorised by the operator. For safety and warranty reasons, any internal work on the instruments must be carried out only by personnel authorised by the manufacturer.

2.2 Appropriate use

VEGAPULS 66 is a sensor for continuous level measurement.

Detailed information on the application range of VEGAPULS 66 is available in chapter "*Product description*".

2.3 Warning about misuse

Inappropriate or incorrect use of the instrument can give rise to application-specific hazards, e.g. vessel overfill or damage to system components through incorrect mounting or adjustment.

2.4 General safety instructions

VEGAPULS 66 is a high-tech instrument requiring the strict observance of standard regulations and guidelines. The emitting frequencies of all radar sensors are in the C or K-band range (depending on the instrument version). The low transmitting power is far below the internationally permitted limit values, and when the instrument is used correctly, no healthendangering effects are to be expected. There are no restrictions on using the instrument on the outside of metallic, closed vessels. The user must take note of the safety instructions in this operating instructions manual, the countryspecific installation standards (e.g. the VDE regulations in Germany) as well as all prevailing safety regulations and accident prevention rules.

2.5 CE conformity

VEGAPULS 66 is in CE conformity with EMVG (89/336/EWG), R & TTE directive (1999/5/EC) and LVD (73/23/EWG).

Conformity has been judged according to the following standards:

• EMC: EN 61326: 2004



- Emission: Class B
- Susceptibility: Industrial areas
- R & TTE directive: I-ETS 300-440 Expert opinion No. 0043052-01/SEE, Notified Body No. 0499
- LVD: EN 61010-1: 2002

2.6 Fulfilling NAMUR recommendations

With regard to interference resistance and interference emission, VEGAPULS 66 fulfils NAMUR recommendation NE 21.

VEGAPULS 66 and its indicating and adjustment components fulfill NAMUR recommendation NE 53 in respect to compatibility. VEGA instruments are generally upward and downward compatible:

- Sensor software to DTM VEGAPULS 66 HART, PA or FF
- DTM VEGAPULS 66 for adjustment software PACTware[™]
- Indicating and adjustment module for sensor software

The parameter adjustment of the basic sensor functions is independent of the software version. The range of available functions depends on the respective software version of the individual components.

The software version of VEGAPULS 66 can be determined as follows:

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

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

2.7 FCC and IC conformity (only for USA/Canada)

VEGAPULS 66 is FCC and IC approved:

- FCC ID: O6QPULS6566
- IC: 3892A-PS6566

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

VEGAPULS 66 is in conformity with part 15 of the FCC regulations. Take note of the respective operating regulations:

• The instrument must not cause any interfering emissions



 The instrument must be insensitive to interfering emissions, also to such that may cause unwanted operating conditions.

VEGAPULS 66 was tested and meets the limit values for a digital instrument of class B, according to part 15 of the FCC regulations. The limit values are for protection against interfering emissions during operation in industrial environment.

The instrument can generate, use and emit high frequency energy and can generate interfering emissions if not used as described in the operator's manual. Because interfering emissions have to be reckoned with when the instrument is used in residential areas, the user must make sure necessary countermeasures are implemented.

2.8 Safety instructions for Ex areas

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

2.9 Manufacturer declaration

In conformity with DIN EN 60079-14/2004, para. 5.2.3, point c1, VEGAPULS 66 is suitable for use in zone 2.

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

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

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

With an ambient temperature of 70 $^{\circ}$ C (158 $^{\circ}$ F) on the housing and a process temperature of 70 $^{\circ}$ C (158 $^{\circ}$ F), the max. ambient temperature during operation is 97 $^{\circ}$ C (207 $^{\circ}$ F).

Measures to maintain explosion protection during operation:

 Operate the instrument in the range of the specified electrical limit values. Permissible supply voltage: see "Technical data"

- Mount and operate the instrument in such a way that no danger of ignition from electrostatic charges is to be expected. The antenna, the process fitting or the housing (as the case may be depending on instrument version) are made of electrically non-conductive plastic.
- Make sure that the seal is mounted correctly between lower part of the housing and cover. Screw the cover on tightly.
- Make sure there is no explosive atmosphere present if you intend to operate the instrument with opened cover
- Make sure that the cable gland is tight and strain-relieved. The outer diameter of the connection cable must be adapted to the cable gland. Tighten the pressure screw of the cable gland carefully.
- Cover unused openings for cable glands tightly
- Mount the instrument in such a way that the sensor cannot touch the vessel wall or vessel installations. Keep in mind the influence of product movement in the vessel.
- The surface temperature of the housing must not exceed the ignition temperature of the surrounding explosive atmosphere

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

2.10 Functional range of approved instruments

Instruments with national approvals such as according to FM or CSA are partly supplied with a previous hardware or software version. For approval-technical reasons, some functions for these instruments will be only available at a later date.

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

2.11 Environmental instructions

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

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

• Chapter "Storage and transport"



• Chapter "Disposal"



Scope of delivery

3 Product description

3.1 Configuration

The scope of delivery encompasses:

- VEGAPULS 66 radar sensor
- Documentation
 - this operating instructions manual
 - Supplementary instructions manual "Safety Manual according to IEC 61508/IEC 61511 (SIL)"
 - Operating instructions manual "Indicating and adjustment module" (optional)
 - Supplementary instructions manual "Heating for indicating and adjustment module" (optional)
 - Supplementary instructions manual "Plug connector for continuously measuring sensors" (optional)
 - Ex-specific "Safety instructions" (with Ex-versions)
 - if necessary, further certificates

Components

VEGAPULS 66 consists of the following components:

- Process fitting with enamelled antenna system
- Housing with electronics, optionally available with plug connector, optionally available with connection cable
- Housing cover, optionally available with indicating and adjustment module PLICSCOM

The components are available in different versions.





Fig. 1: VEGAPULS 66 in enamel version with plastic housing

- Housing cover with integrated PLICSCOM (optional) 1
- Housing with electronics 2
- 3 Process fitting with antenna system

3.2 Principle of operation

VEGAPULS 66 is a radar sensor in C-band technology for continuous level measurement.

The antenna of the radar sensor emits short radar pulses with a duration of approx. 1 ns. These pulses are reflected by the 'and received by the antenna as echoes. The running The version with **enamelled antenna** is particularly suitable

Functional principle

Area of application

Supply

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

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

The supply voltage range can differ depending on the instrument version.

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

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

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

The optional heating requires its own power supply. You can find further details in the supplementary instructions manual "*Heating for indicating and adjustment module*".

This function is generally not available for approved instruments.

3.3 Operation

VEGAPULS 66 can be adjusted with different adjustment media:

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

The entered parameters are generally saved in VEGAPULS 66, optionally also in the indicating and adjustment module or in PACTware™.

3.4 Storage and transport

Your instrument was protected by packaging during transport. Its capacity to handle normal loads during transport is assured by a test according to DIN EN 24180.

Packaging



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

Storage and transport temperature

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

Installation position

4 Mounting

41 General instructions

Select an installation position you can easily reach for mounting and connecting as well as later retrofitting of an indicating and adjustment module. The housing can be rotated by 330° without the use of any tools. You can also install the indicating and adjustment module in four different positions (each displaced by 90°).

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

> You can give your VEGAPULS 66 additional protection against moisture penetration by leading the connection cable downward in front of the cable entry. Rain and condensation water can thus drain off. This applies mainly to mounting outdoors, in areas where moisture is expected (e.g. by cleaning processes) or on cooled or heated vessels.



Fig. 2: Measures against moisture penetration

The reference plane for the measuring range is the lower edge of the flange.

Measuring range





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

Information:

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

Make sure that the wetted parts of VEGAPULS 66, especially the seal and process fitting, are suitable for the existing process conditions such as pressure, temperature etc. as well as the chemical properties of the medium.

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

Instruments with enamel coating should be treated very carefully and shocks should be avoided. Unpack VEGAPULS 66 directly before installation. Insert VEGAPULS 66 carefully into the vessel opening and avoid touching any sharp vessel parts.

Mounting instructions 4.2

Mount VEGAPULS 66 at least 500 mm (19.685 in) from the vessel wall. If the sensor is installed in the center of vessels with dished or round tops, multiple echoes can arise. These can, however, be suppressed by an appropriate adjustment (see "Setup").

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Materials, wetted parts

Enamel coating

Installation position



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



Fig. 4: Mounting on round vessel tops

- 1 Reference plane
- 2 Vessel center or symmetry axis

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



Fig. 5: Vessel with conical bottom



Inflowing medium

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. 6: Inflowing liquid

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



Fig. 7: Recommended socket mounting

In liquids, direct the sensor as perpendicular as possible to the product surface to achieve an optimum measurement.

Socket

Sensor orientation

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Fig. 8: Orientation in liquids

Vessel installations

The mounting location of the radar sensor should be a place where no other equipment or fixtures cross the path of the microwave signals.

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

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

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



Fig. 9: Cover smooth profiles with deflectors

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

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Agitators

Foam generation

Measurement in the stand-

pipe (surge or bypass tube)





Fig. 10: Agitators

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 are causing measurement errors, the biggest possible radar antenna should be used.

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

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

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

Surge pipe

Make sure you provide the necessary upper vent hole in the surge pipe. The hole must be aligned so that it and the polarisation marking on the sensor flange are in the same plane (see illustration: "*Pipe antenna system in a tank*").

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Fig. 11: Pipe antenna system in a tank. The vent hole in the surge pipe must be in one plane with the polarisation marking on the sensor.

- 1 Marking of the polarisation direction
- 2 Vent holde max. ø 5 mm (0.2 in)

If possible, the diameter of the sensor antenna should correspond to the inner diameter of the tube. With VEGAPULS 66 this is approx. 50 mm (1.969 in) depending on the antenna. The sensor can be used with tube diameters between 50 ... 250 mm (1.969 ... 9.843 in).

Bypass tube

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

Align the sensor in such a way that the polarisation marking on the sensor flange is in the same plane as the tube holes or the tube connection openings (see illustration: "VEGAPULS in a bypass tube").







1 Marking of the polarisation direction

When the sensor is mounted on a bypass tube, the distance from VEGAPULS 66 to the upper tube connection should be approx. 500 mm (19.685 in) or more. In case of extremely rough tube inner walls, you should use an inserted tube (tube in tube) or a radar sensor with tube antenna.

1

Information:

With VEGAPULS 66 in flange version, the polarisation plane always lies in centre between two flange holes.



5 Connecting to voltage supply

5.1 Preparing the connection

Generally note the following safety instructions:

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

Tip:

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

Take note of safety instructions for Ex applications

Select power supply

Note safety instructions



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

Power supply and current signal are carried on the same twowire cable. The voltage supply range can differ depending on the instrument version.

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

Provide a reliable separation between the supply circuit and the mains circuits according to DIN VDE 0106 part 101. The VEGA power supply units VEGATRENN 149A Ex, VEGAS-TAB 690 as well as all VEGAMETs meet this requirement.

Bear in mind the following factors regarding supply voltage:

- Output voltage of the power supply unit can be lower under nominal load (with a sensor current of 20.5 mA or 22 mA in case of failure message)
- Influence of additional instruments in the circuit (see load values in chapter "Technical data")

Selecting connection cable VEGAPULS 66 is connected with standard two-wire cable without screen. An outer cable diameter of 5 ... 9 mm ensures the seal effect of the cable gland. If electromagnetic interference is expected which is above the test values of EN 61326 for industrial areas, screened cable should be used. For HART multidrop operation we recommend as standard practice the use of screened cable.

 Cable gland ½ NPT
 On VEGAPULS 66 with cable gland ½ NPT and plastic housing, a metal ½" threaded insert is moulded in the plastic housing.





Caution:

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

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

If potential equalisation currents are expected, the connection on the processing side must be made via a ceramic capacitor (e.g. 1 nF, 1500 V). The low frequency potential equalisation currents are thus suppressed, but the protective effect against high frequency interference signals remains.

Select connection cable for Ex applications



Take note of the corresponding installation regulations for Ex applications. In particular, make sure that no potential equalisation currents flow over the cable screen. In case of grounding on both sides this can be achieved by the use of a capacitor or a separate potential equalisation.

5.2 Connection steps, instrument housing

Proceed as follows:

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





Fig. 13: Connection steps 6 and 7

- 8 Press down the opening levers of the terminals, you will hear the terminal spring closing
- 9 Check the hold of the wires in the terminals by lightly pulling on them
- 10 Connect the screen to the internal ground terminal and the external ground terminal to potential equalisation
- 11 Tighten the compression nut of the cable entry. The seal ring must completely encircle the cable
- 12 Screw the housing cover back on

The electrical connection is finished.

5.3 Wiring plan, single chamber housing



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

Electronics and connection

compartment



Housing overview



Fig. 14: Material versions, single chamber housing

- 1 Plastic
- 2 Aluminium
- 3 Stainless steel
- 4 Filter element for air pressure compensation of all material versions. Blind stopper with version IP 66/IP 68, 1 bar for Aluminium and stainless steel



Fig. 15: Electronics and connection compartment, single chamber housing

- 1 Plug connector for VEGACONNECT (I²C interface)
- 2 Spring-loaded terminals for connection of the external indication VEGADIS 61
- 3 Ground terminal for connection of the cable screen
- 4 Spring-loaded terminals for voltage supply



Wiring plan



Fig. 16: Wiring plan, single chamber housing 1 Power supply/Signal output

5.4 Wiring plan, double chamber housing



Housing overview

The following illustration apply to non-Ex as well as Ex ia versions. The Exd version is described in the next subchapter.



- Fig. 17: Double chamber housing
- 1 Housing cover, connection compartment
- 2 Blind stopper or plug M12x1 for VEGADIS 61 (option)
- 3 Housing cover, electronics compartment
- 4 Filter element for pressure compensation or blind stopper with version IP 66/ IP 68, 1 bar¹)
- 5 Cable entry or plug

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



Electronics compartment

Connection compartment



- Fig. 18: Electronics compartment, double chamber housing
- 1 Plug connector for VEGACONNECT (I²C interface)
- 2 Internal connection cable to the connection compartment
- 3 Terminals for VEGADIS 61



Fig. 19: Connection compartment, double chamber housing

- 1 Plug connector for VEGACONNECT (I²C interface)
- 2 Ground terminal for connection of the cable screen
- 3 Spring-loaded terminals for voltage supply



Wiring plan

Housing overview



Fig. 20: Wiring plan, double chamber housing 1 Power supply/Signal output

5.5 Wiring plan, double chamber housing Exd

- Fig. 21: Double chamber housing
- 1 Housing cover, connection compartment
- 2 Blind stopper or plug M12x1 for VEGADIS 61 (option)
- 3 Housing cover, electronics compartment
- 4 Filter element for pressure compensation or blind stopper with version IP 66/ IP 68, 1 bar²)
- 5 Cable entry or plug

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



Electronics compartment



- Fig. 22: Electronics compartment, double chamber housing
- Plug connector for VEGACONNECT (I²C interface) 1
- 2 Internal connection cable to the connection compartment з
- Terminals for VEGADIS 61

2



- Fig. 23: Connection compartment, double chamber housing Exd 1
 - Spring-loaded terminals for power supply and cable screen Ground terminal for connection of the cable screen

Connection compartment



Wiring plan



Fig. 24: Wiring plan, double chamber housing Exd 1 Power supply/Signal output

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

Wire assignment, connection cable

Switch-on phase



- Fig. 25: Wire assignment, connection cable
- 1 brown (+) and blue (-) to power supply or to the processing system
- 2 Screen

5.7 Switch-on phase

After connecting VEGAPULS 66 to power supply or after a voltage recurrence, the instrument carries out a self-check for approx. 30 seconds:

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

Then the corresponding current is outputted to the cable (the value corresponds to the actual level as well as the settings already carried out, e.g. factory setting).



6 Setup with the indicating and adjustment module PLICSCOM

6.1 Short description

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

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

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

Information:

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

Note:

You will find detailed information on the adjustment in the operating instructions manual of the "*Indicating and adjustment module*".

6.2 Insert the indicating and adjustment module

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

Proceed as follows:

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

Mounting/dismounting the indicating and adjustment module

Function/Configuration



Removal is carried out in reverse order.

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



Fig. 26: Installation of the indicating and adjustment module

Note:

If you intend to retrofit VEGAPULS 66 with an indicating and adjustment module for continuous measured value indication, a higher cover with an inspection glass is required.



6.3 Adjustment system



Fig. 27: Indicating and adjustment elements

- 1 LC display
- 2 Indication of the menu item number
- 3 Adjustment keys

Key functions

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

Adjustment system

The sensor is adjusted via the four keys of the indicating and adjustment module. The LC display indicates the individual menu items. The functions of the individual keys are shown in the above illustration. Approx. 10 minutes after the last pressing of a key, an automatic reset to measured value indication is triggered. Any values not confirmed with **[OK]** will not be saved.



Address setting HART-Multidrop

In HART-Multidrop mode (several sensors on one input) the address must be set before continuing with the parameter adjustment. You will find a detailed description in the operating instructions manual "*Indicating and adjustment module*" or in the online help of PACTware[™] or DTM.

HART mode	
Standard Address 0	

6.4 Setup procedure

Parameter adjustment

As VEGAPULS 66 is a distance measuring instrument, the distance from the sensor to the product surface is measured. To have the real product level displayed, an allocation of the measured distance to the percentage height must be made. To carry out this adjustment, the distance is entered with full and empty vessel. If these values are not known, an adjustment with the distance values, e.g. 10 % and 90 % is also possible. Starting point for these distance specifications is always the seal surface of the thread or flange. With these settings, the real level is calculated. Furthermore the operating range of the sensor is limited from maximum to the required range.

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



Caution:

If there is a separation of liquids with different dielectric values in the vessel, e.g. by condensation, VEGAPULS 66 can detect under certain circumstances only the medium with the higher dielectric value.

Keep in mind that interfaces can cause faulty measurements.

If you want to measure the total height of both liquids reliably, please contact our service department or use an instrument specially designed for interface measurement.

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



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

Carrying out min. adjustment

Proceed as follows:

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



2 Select the menu item "Basic adjustment" with [->] and confirm with [OK]. Now the menu item "Min. adjustment" is displayed.



- 3 Prepare the % value for editing with [OK] and set the cursor to the requested position with [->]. Set the requested percentage value with [+] and save with [OK]. The cursor jumps now to the distance value.
- 4 Enter the appropriate distance value in m (corresponding to the percentage value) for the empty vessel (e.g. distance from the sensor to the vessel bottom).
- 5 Save the settings with *[OK]* and move to "Max. adjustment" with *[->]*.

Carrying out max. adjustment

Proceed as follows:



- Prepare the % value for editing with [OK] and set the cursor to the requested position with [->]. Set the requested percentage value with [+] and save with [OK]. The cursor jumps now to the distance value.
- 2 Enter the appropriate distance value in m (corresponding to the percentage value) for the full vessel. Keep in mind that the max. level must lie below the dead band.
- 3 Save the settings with *[OK]* and move to "Medium selection" with *[->]*.

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Medium selection	Each product has there are various in account: agitated p liquids); dust gene vessel wall (with so conditions, you sho	different reflective properties. In addition, interfering factors which have to be taken into product surfaces and foam generation (with ration, material cones and echoes from the olids). To adapt the sensor to these different ould first select " <i>Liquid</i> " or " <i>Solid</i> ".
	Medium Liquid	
	According to the co the reflection prop additional options "Water based" are	onductivity and the dielectric value of liquids, erties can differ considerably. Therefore such as " <i>Solvent</i> ", " <i>Chem. mixture</i> " and offered below the menu item Liquid.
	With solids, you ca "Granular/Pellets"	an also choose between " <i>Powder/Dust</i> ", or " <i>Ballast/Pebbels</i> ".
	Through this additi perfectly to the pro- ularly in products w increased.	onal selection, the sensor is adapted oduct and measurement reliability, partic- vith bad reflective properties, is considerably
	Enter the requeste your settings and ju	d parameter via the appropriate keys, save ump to the next menu item with the <i>[->]</i> key.
Vessel form Apart from the the measure conditions, th on whether li "Storage tank vessel", with		dium, the vessel shape can also influence To adapt the sensor to these measuring enu item offers different options depending or solid is selected. With " <i>Liquid</i> " these are <i>tilling tube</i> ", " <i>Open vessel</i> " or " <i>Stirred</i> J", " <i>Silo</i> " or " <i>Bunker</i> ".
	Vessel form Storage tank	

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

A linearization is necessary for all vessels in which the vessel volume does not increase linearly with the level - e.g. with a cylindrical or spherical tank - and the indication or output of the volume is required. Corresponding linearization curves are preprogrammed for these vessels. They represent the correlation between the level percentage and vessel volume.

Linearisation curve



By activating the appropriate curve, the volume percentage of the vessel is displayed correctly. If the volume should not be displayed in percent but e.g. in I or kg, a scaling can be also set in the menu item "*Display*".

Linearisation curve
linear

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



Caution:

Note the following, if VEGAPULS 66 is used as part of an overfill protection system according to WHG:

If a linearisation curve is selected, the measuring signal is no longer compulsorily linear proportional to the level. This must be taken into consideration by the user, particularly when adjusting the switching point on the level switch.

Gating out of false signals

High sockets or vessel installations, such as e.g. struts or agitators as well as buildup and weld joints on the vessel walls cause interfering reflections which can impair the measurement. A false echo storage detects and marks these false echoes, so that they are no longer taken into account for the level measurement. A false echo memory should be created with empty vessel so that all potential interfering reflections will be detected.

Gating out of false signals
Change now?

Proceed as follows:

- 1 Move from the measured value display to the main menu by pushing *[OK]*.
- 2 Select the menu item "Service" with [->] and confirm with [OK]. Now the menu item "False signal suppression" is displayed.



3 Confirm "False signal suppression - Change now" with [OK] and select in the below menu "Create new". Enter the actual distance from the sensor to the product surface. All false signals in this area are detected by the sensor and saved after confirming with [OK].

Note:

Check the distance to the product surface, because if an incorrect (too large) value is entered, the existing level will be saved as false signal. The filling level would then no longer be detectable in this area.

The menu item "*Extended setting*" offers the possibility to optimise VEGAPULS 66 for applications in which the level changes very quickly. For this reason, select the function "*Quick level change >1m/min.*".

Extended setting
None

Note:

Because the average value generation of the signal processing is clearly reduced with the function "*Quick level change* >1m/min.", false reflections caused by agitators or vessel installations can cause measured value fluctuations. A false echo storage is recommended.

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

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

- Measured value presentation
- Adjustment
- Medium
- Inner diameter of the standpipe (with standpipe versions)
- Vessel form
- Damping
- Linearisation curve
- Sensor-TAG
- Displayed value
- Display unit



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