Operating Instructions

Capacitive cable electrode for level detection

VEGACAP 66

Relay (DPDT)





Document ID: 30020







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1 About this document

11 Function

This instruction provides all the information you need for mounting, connection and setup as well as important instructions for maintenance, fault rectification, the exchange of parts and the safety of the user. Please read this information before putting the instrument into operation and keep this manual accessible in the immediate vicinity of the device.

1.2 Target group

This operating instructions manual is directed to trained personnel. The contents of this manual must be made available to the gualified personnel and implemented.

1.3 Symbols used

Document ID

This symbol on the front page of this instruction refers to the Document ID. By entering the Document ID on www.vega.com you will reach the document download.



Note: This symbol indicates notes to prevent failures, malfunctions. damage to devices or plants.

Caution: Non-observance of the information marked with this symbol may result in personal injury.

Warning: Non-observance of the information marked with this symbol may result in serious or fatal personal injury.

Danger: Non-observance of the information marked with this symbol

Ex applications

This symbol indicates special instructions for Ex applications.

results in serious or fatal personal injury.

List

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

1 Sequence of actions

Numbers set in front indicate successive steps in a procedure.



Disposal

This symbol indicates special instructions for disposal.



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2 For your safety

2.1 Authorised personnel

All operations described in this documentation must be carried out only by trained, qualified personnel authorised by the plant operator.

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

2.2 Appropriate use

The VEGACAP 66 is a sensor for point level detection.

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.

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.

2.3 Warning about incorrect use

Inappropriate or incorrect use of this product can give rise to application-specific hazards, e.g. vessel overfill through incorrect mounting or adjustment. Damage to property and persons or environmental contamination can result. Also, the protective characteristics of the instrument can be impaired.

2.4 General safety instructions

This is a state-of-the-art instrument complying with all prevailing regulations and directives. 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. When measuring aggressive or corrosive media that can cause a dangerous situation if the instrument malfunctions, the operator has to implement suitable measures to make sure the instrument is functioning properly.

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. For safety reasons, only the accessory specified by the manufacturer must be used.

To avoid any danger, the safety approval markings and safety tips on the device must also be observed.



2.5 Conformity

The device complies with the legal requirements of the applicable country-specific directives or technical regulations. We confirm conformity with the corresponding labelling.

The corresponding conformity declarations can be found on our homepage.

2.6 Installation and operation in the USA and Canada

This information is only valid for USA and Canada. Hence the following text is only available in the English language.

Installations in the US shall comply with the relevant requirements of the National Electrical Code (NEC - NFPA 70) (USA).

Installations in Canada shall comply with the relevant requirements of the Canadian Electrical Code (CEC Par I) (Canada).

2.7 Safety instructions for Ex areas

For applications in explosion-proof areas (Ex), only devices with corresponding Ex approval may be used. Observe the Ex-specific safety instructions. These are an integral part of the operating instructions and are enclosed with every device with Ex approval.

2.8 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 fulfil this obligation by observing the environmental instructions in this manual:

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



3.1 Configuration

Scope of delivery

- The scope of delivery encompasses:
- VEGACAP 66 point level switch

The further scope of delivery encompasses:

- Documentation
 - Operating instructions VEGACAP 66
 - Safety Manual (SIL)
 - Instructions for optional instrument features
 - Ex-specific " Safety instructions" (with Ex versions)
 - If necessary, further certificates

Information:

Optional instrument features are also described in this operating instructions manual. The respective scope of delivery results from the order specification.

Scope of this operating instructions

- ng This operating instructions manual applies to the following instrument versions:
 - Hardware from 1.0.0
 - Software from 1.3.0
 - Only for instrument versions without SIL qualification

Constituent parts

The VEGACAP 66 consists of the components:

- Process fitting with probe
- Housing with electronics
- Housing cover, optionally available with display and adjustment
 module





Fig. 1: VEGACAP 66, cable version with plastic housing

- Housing lid with integrated display and adjustment module (optional)
 Housing with electronics
- 3 Process fitting

Type label

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





Fig. 2: Layout of the type label (example)

- 1 Instrument type
- 2 Product code
- 3 Approvals
- 4 Process and ambient temperature, process pressure
- 5 Power supply and signal output, electronics
- 6 Protection rating
- 7 Probe length
- 8 Order number
- 9 Serial number of the instrument
- 10 Material wetted parts
- 11 Symbol of the device protection class
- 12 Reminder to observe the instrument documentation
- 13 ID numbers, instrument documentation
- 14 Notified authority for CE marking
- 15 Approval directives

With the serial number, you can access the delivery data of the instrument via "<u>www.vega.com</u>", "*Search*". You can find the serial number on the inside of the instrument as well as on the type label on the outside.

Serial number - Instrument search The type label conta you can find the follo

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)
- Test certificate (PDF) optional

Move to "www.vega.com" and enter in the search field the serial number of your instrument.

Alternatively, you can access the data via your smartphone:

- Download the VEGA Tools app from the "Apple App Store" or the "Google Play Store"
- Scan the QR-code on the type label of the device or
- Enter the serial number manually in the app



Application area

Functional principle

3.2 Principle of operation

VEGACAP 66 is a point level sensor for universal use in non-abrasive liquids and bulk solids.

The cable probe is fully insulated and the proven mechanical construction offers high functional safety.

Probe, measured product and vessel wall form an electrical capacitor. The capacitance is influenced by three main factors.



Fig. 3: Functional principle - Plate capacitor

- 1 Distance between the electrode surfaces
- 2 Size of the electrode surfaces
- 3 Type of dielectric between the electrodes

The probe and the vessel wall are the capacitor plates. The measured product is the dielectric. Due to the higher dielectric constant of the product compared to air, the capacitance increases as the probe is gradually covered.

The capacitance change is converted by the electronics module into a switching command.

Voltage supply VEGACAP 66 is a compact instrument, i.e. it can be operated without external evaluation system. The integrated electronics evaluates the level signal and outputs a switching signal. With this switching signal, a connected device can be operated directly (e.g. a warning system, a pump etc.).

The data for power supply are specified in chapter " Technical data".

3.3 Adjustment

The probe can be adapted to the dielectric constant of the product directly on the electronics module.

A switching command can be triggered when the probe is covered or laid bare.

On the electronics module you will find the following display and adjustment elements:

- Signal lamp for indication of the switching condition (green/red)
- Potentiometer for switching point adaptation
- DIL switch for measuring range selection

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	DIL switch for mode adjustment
	3.4 Packaging, transport and storage
Packaging	Your instrument was protected by packaging during transport. Its capacity to handle normal loads during transport is assured by a test based on ISO 4180.
	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.
Transport	Transport must be carried out in due consideration of the notes on the transport packaging. Nonobservance of these instructions can cause damage to the device.
Transport inspection	The delivery must be checked for completeness and possible transit damage immediately at receipt. Ascertained transit damage or concealed defects must be appropriately dealt with.
Storage	Up to the time of installation, the packages must be left closed and stored according to the orientation and storage markings on the outside.
	Unless otherwise indicated, the packages must be stored only under the following conditions:
	 Not in the open Dry and dust free Not exposed to corrosive media Protected against solar radiation Avoiding mechanical shock and vibration
Storage and transport temperature	 Storage and transport temperature see chapter " Supplement - Technical data - Ambient conditions" Relative moisture 20 85 %
Lifting and carrying	With instrument weights of more than 18 kg (39.68 lbs) suitable and approved equipment must be used for lifting and carrying.
	3.5 Accessories
	The instructions for the listed accessories can be found in the down- load area on our homepage.
Protective cover	The protective cover protects the sensor housing against soiling and intense heat from solar radiation.
Flanges	Screwed flanges are available in different versions according to the following standards: DIN 2501, EN 1092-1, BS 10, ASME B 16.5, JIS B 2210-1984, GOST 12821-80.



4 Mounting

4.1 General instructions

Process conditions



Note:

For safety reasons, the instrument must only be operated within the permissible process conditions. You can find detailed information on the process conditions in chapter "*Technical data*" of the operating instructions or on the type label.

Hence make sure before mounting that all parts of the instrument exposed to the process are suitable for the existing process conditions.

These are mainly:

- Active measuring component
- Process fitting
- Process seal

Process conditions in particular are:

- Process pressure
- Process temperature
- · Chemical properties of the medium
- Abrasion and mechanical influences

Switching point		In general, VEGACAP 66 must be mounted vertically. The instrument must be mounted in such a way that the probe is at the height of the requested switching point.
Welding work		Before beginning the welding work, remove the electronics module from the sensor. By doing this, you avoid damage to the electronics through inductive coupling.
		Ground the probe before welding directly on the rod or cable.
Screwing in		Devices with threaded fitting are screwed into the process fitting with a suitable wrench via the hexagon.
		See chapter " Dimensions" for wrench size.
	\land	Warning: The housing or the electrical connection may not be used for screwing in! Depending on the device version, tightening can cause dam-

age, e. g. to the rotation mechanism of the housing.

landling

Handling

With threaded versions, the housing must not be used to screw in the instrument! Applying tightening forces on the housing can damage its internal parts.

Use the hexagon for screwing in.

Moisture

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

You can give your instrument additional protection against moisture penetration by leading the connection cable downward in front of the cable gland. Rain and condensation water can thus drain off. This



applies mainly to outdoor mounting as well as installation in areas where high humidity is expected (e.g. through cleaning processes) or on cooled or heated vessels.

To maintain the housing protection, make sure that the housing lid is closed during operation and locked, if necessary.



Fig. 4: Measures against moisture ingress

Pressure/Vacuum	The process fitting must be sealed if there is gauge or low pressure
	in the vessel. Before use, check if the sealing material is resistant
	against the measured product and the process temperature.
	The max. permissible pressure is specified in chapter " Technical
	data" or on the type label of the sensor.

Vessel material Metal vessel

Make sure that the mechanical connection of the probe to the vessel is electrically conductive to ensure sufficient grounding.

Use conductive seals, such as those made of copper or lead, etc. Insulating measures, such as covering the thread with Teflon tape, can interrupt the necessary electrical connection with metal vessels. For this reason, ground the probe on the vessel or use a conductive seal material.

Non-conductive vessels

In non-conductive vessels, e.g. plastic tanks, the second pole of the capacitor must be provided separately.

Condensation If condensate forms on the vessel top, the run-off liquid can cause bridging and hence faulty switchings.

For this reason, use a screening tube . The length of the screening tube depends on the amount of condensate and the drain-off behaviour of the product.

Cable entries - NPT Metric threads thread In the case of ins

Cable glands

In the case of instrument housings with metric thread, the cable glands are screwed in at the factory. They are sealed with plastic plugs as transport protection.

You have to remove these plugs before electrical connection.



NPT thread

In the case of instrument housings with self-sealing NPT threads, it is not possible to have the cable entries screwed in at the factory. The free openings for the cable glands are therefore covered with red dust protection caps as transport protection.

Prior to setup you have to replace these protective caps with approved cable glands or close the openings with suitable blind plugs.

4.2 Mounting instructions

Agitators and fluidization Due to the effects of agitators, equipment vibration or similar, the level switch can be subjected to strong lateral forces. For this reason, do not use an overly long electrode for VEGACAP 66, but check if you can mount a short level switch on the side of the vessel in horizontal position.

Inflowing medium If the instrument is mounted in the filling stream, unwanted false measurement signals can be generated. For this reason, mount the instrument at a position in the vessel where no disturbances, e.g. from filling openings, agitators, etc., can occur.

This applies particularly to instrument versions with a longer probe.



Fig. 5: Inflowing medium

Nozzle

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Material cone

The probe should protrude into the vessel to avoid buildup. For that reason, avoid using mounting bosses for flanges and screwed fittings. This applies particularly to use with adhesive products.

In silos with bulk solids, material cones can form which change the switching point. Please keep this in mind when installing the sensor in the vessel. We recommend selecting an installation location where the probe detects the average value of the material cone.



The probe must be mounted in a way that takes the arrangement of the filling and emptying apertures into account.

To compensate measurement errors caused by the material cone in cylindrical vessels, the sensor must be mounted at a distance of d/6 from the vessel wall.



Fig. 6: Filling and emptying centred





Fig. 7: Filling in the centre, emptying laterally

- 1 VEGACAP 66
- 2 Discharge opening
- 3 Filling opening

Tensile load

Make sure that the max. permissible tensile load of the suspension cable is not exceeded. The danger of this happening exists particularly with very heavy solids and large meas. lengths. The max. permissible load is stated in chapter "*Technical data*".



		5 Connecting to power supply
Safety instructions	Â	 5.1 Preparing the connection Always keep in mind the following safety instructions: Carry out electrical connection by trained, qualified personnel authorised by the plant operator Warning: Only connect or disconnect in de-energized state.
Voltage supply		Connect the operating voltage according to the connection diagrams. The electronics module is designed in protection class I. To maintain this protection class, it is absolutely necessary that the earth conduc- tor be connected to the inner earth conductor terminal. Keep the general installation regulations in mind. Take note of the correspond- ing installation regulations for hazardous areas with Ex applications.
Connection cable		The data for power supply are specified in chapter " <i>Technical data</i> ". The instrument is connected with standard three-wire cable without shielding. If electromagnetic interference is expected which is above the test values of EN 61326 for industrial areas, shielded cable should be used.
		ance and fire safety for max. occurring ambient temperature Use cable with round cross section for instruments with housing and cable gland. To ensure the seal effect of the cable gland (IP protection rating), find out which cable outer diameter the cable gland is suitable for. Use a cable gland fitting the cable diameter. Cover all housing openings conforming to standard according to EN 60079-1.
	€;∕	 5.2 Connection procedure With Ex instruments, the housing cover may only be opened if there is no explosive atmosphere present. Proceed as follows: Unscrew the housing lid Loosen compression nut of the cable gland and remove blind plug Remove approx. 10 cm (4 in) of the cable mantle, strip approx. cm (0.4 in) of insulation from the ends of the individual wires

- 4. Insert the cable into the sensor through the cable entry
- 5. Lift the opening levers of the terminals with a screwdriver (see following illustration)
- 6. Insert the wire ends into the open terminals according to the wiring plan



- 7. Press down the opening levers of the terminals, you will hear the terminal spring closing
- 8. Check the hold of the wires in the terminals by lightly pulling on them
- 9. Tighten the compression nut of the cable entry gland. The seal ring must completely encircle the cable
- 10. If necessary, carry out a fresh adjustment
- 11. Screw the housing lid back on

The electrical connection is finished.



Fig. 8: Connection steps 5 and 6

5.3 Wiring plan - single chamber housing



Fig. 9: Material versions - single chamber housing

- 1 Plastic (not with dust-Ex)
- 2 Aluminium
- 3 Stainless steel
- 4 Filter element for air pressure compensation

Housing overview





Electronics and connection compartment



Fig. 10: Electronics and connection compartment

- 1 Potentiometer for switching point adaptation
- 2 DIL switch for measuring range selection
- 3 DIL switch for mode adjustment
- 4 Ground terminal
- 5 Connection terminals
- 6 Control lamp

Wiring plan

We recommend connecting VEGACAP 66 in such a way that the switching circuit is open when there is a level signal, line break or failure (safe state).

The relays are always shown in non-operative condition.



Fig. 11: Wiring plan

- 1 Relay output
- 2 Relay output
- 3 Voltage supply

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Connection to a PLC	If inductive loads or stronger currents are switched through, the gold plating on the relay contact surface will be permanently damaged. The contact is then no longer suitable for switching low-voltage circuits.
	Inductive loads also result from the connection to a PLC input or output and/or in combination with long cables. It is imperative that you

output and/or in combination with long cables. It is imperative that you take measures to extinguish sparks to protect the relay contact (e.g. Z diode) or use an electronic version with transistor output.



6 Setup

6.1 General information

The figures in brackets refer to the following illustrations.

Function/Configuration

 On the electronics module you will find the following display and adjustment elements:

- Potentiometer for switching point adaptation
- DIL switch for measuring range selection
- DIL switch for mode adjustment min./max.
- Control lamp

Note:

As a rule, always set the mode with the mode switch (3) before starting setup VEGACAP 66. The switching output will change if you set the mode switch (3) afterwards. This could possibly trigger other connected instruments or devices.

6.2 Adjustment elements



Fig. 12: Oscillator - Relay output

- 1 Potentiometer for switching point adaptation
- 2 DIL switch for measuring range selection (with compensation button)
- 3 DIL switch for mode adjustment
- 4 Ground terminal
- 5 Connection terminals
- 6 Control lamp

The switching status of the electronics can be checked with closed housing (only plastic housing), see "*Function table*".

Note:

Screw the housing cover tightly up to the thread stop so that the inspection glass is above the control lamp (LED).



	To adjust VEGACAP 66, first of all remove the housing cover.		
Switching point adapta- tion (1)	You can adapt the switching point to the solid with the potentiometer.		
Measuring range selec- tion switch (2)	With the potentiometer (1) and the measuring range selection switch (2) you can change the sensitivity of the probe to the electrical proper- ties of the product and the conditions in the vessel. This is necessary so that the level switch can also reliably detect products e.g. with very low or very high dielectric figure.		
	range 1: 0 20 pF		
	Range 2: 0 85 pF		
	Range 3: 0 450 pF		
Mode adjustment (3)	With the mode switch (3) you can change the switching condition of the relay. You can set the required mode (max max. detection or overfill protection, min min. detection or dry run protection).		
	We recommend connecting according to the idle current principle (relay contact deenergizes when the switching point is reached), because the relay always takes on the same (safe) state if a failure is detected.		
Signal lamp (6)	Control lamp for indication of the switching status.		
	• green = relay energized		
	• red = relay deenergized		
	• red (flashing) = failure		
Switching point adjust- ment	The adjustment of the switching point is only possible in installed condition.		
	The specifications in parenthesis refer to the preceding illustration.		
Mode max. (max. level	Vertically mounted probes 1. Set mode switch (3) to mode max.		
detection)	2. Set meas. range selection switch (2) to range 1.		
	3. Fill the vessel up to the requested level.		
	4. Turn potentiometer (1) to position 10.		
	When the control lamp (6) lights red: set the measuring range selection switch (2) to the next higher measuring range.		
	When the control lamp (6) lights green: continue with the next item.		
	 Turn the potentiometer (1) very slowly anticlockwise until the control lamp (6) lights red. 		
	The measuring system is now ready for operation.		
Mode min. (min. level	1. Set mode switch (3) to mode min.		
detection)	2. Set meas. range selection switch (2) to range 1.		
	3. Lower the level to the requested min. level.		
	4. Turn the potentiometer (1) to 0, the control lamp (6) lights green.		



5. Turn the potentiometer (1) very slowly clockwise until the control lamp (6) lights red. If the control lamp does not light red, set the meas. range selection switch (2) to the next higher stage and repeat the setting with the potentiometer (1) until the control lamp lights red.

The measuring system is now ready for operation.

6.3 Function table

The following table provides an overview of the switching conditions depending on the set mode and the level.

	Level	Switching status	Control lamp
Mode max. Overflow protection		3 4 5 (6) (7) (8)	-ờ́-
		Relay energized	Green
Mode max. Overflow protection		$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	-ờ-
		Relay deenergized	Red
Mode min. Dry run protection		3 4 5 (6) (7) (8)	-兴-
		Relay energized	Green
Mode min. Dry run protection		3 4 5 (6) (7) (8)	
		Relay deenergized	Red
Failure of the supply volt- age (min./max. mode)	any	3 4 5 (6) (7) (8)	0
		Relay deenergized	
Fault	any	3 4 5 (6) (7) (8)	*
		Relay deenergized	flashes red



7 Diagnostics and servicing

	7.1 Maintenance	
Maintenance	If the device is used properly, no special maintenance is required in normal operation.	
Cleaning	The cleaning helps that the type label and markings on the instrument are visible.	
	Take note of the following:	
	• Use only cleaning agents which do not corrode the housings, type label and seals	
	Use only cleaning methods corresponding to the housing protec- tion rating	
	7.2 Rectify faults	
Reaction when malfunc- tion occurs	The operator of the system is responsible for taking suitable measures to rectify faults.	
Causes of malfunction	 The device offers maximum reliability. Nevertheless, faults can occur during operation. These may be caused by the following, e.g.: Sensor Process Voltage supply Signal processing 	
Fault rectification	The first measure to take is to check the output signal. In many cases, the causes can be determined this way and the faults quickly rectified.	
Reaction after fault recti- fication	Depending on the reason for the fault and the measures taken, the steps described in chapter " <i>Setup</i> " must be carried out again or must be checked for plausibility and completeness.	
24 hour service hotline	Should these measures not be successful, please call in urgent cases the VEGA service hotline under the phone no. +49 1805 858550 .	
	The hotline is also available outside normal working hours, seven days a week around the clock.	
	Since we offer this service worldwide, the support is provided in English. The service itself is free of charge, the only costs involved are the normal call charges.	



Checking the switching signal

Error	Cause	Rectification
• The instrument signals covered without being covered by the meas- ured medium	Wrong mode selected on the controller	Set the correct mode on the mode switch of the con- troller (A: overflow protection, B: dry run protection). Wiring should be carried out according to the idle cur- rent principle.
 The instrument signals uncovered while covered 	Operating voltage too low	Check operating voltage
with the measured medium	Shortcircuit in the probe, e.g. because of moisture in the housing	Remove the electronics module. Check the resistance between the marked plug connections. See the follow- ing instructions.
	Electronics defective	Push the mode switch (A/B) on the controller. If the controller then changes the mode, the probe may be mechanically damaged. Should the switching function in the correct mode still be faulty, return the probe for repair.
		Check if there is buildup on the probe, and if so, re- move it.
	Unfavourable installation location	Check if the probe is covered by buildup on the nozzle.
		Mount the instrument at a location in the vessel where e.g. no mounds can form.
Signal lamp flashes red	Electronics module has detected a failure	Exchange the instrument or send it in for repair

Check the resistance in the probe

Remove the electronics module. Check the resistance between the two plug connections.

There must no longer be a connection (high impedance). If there is still a connection, exchange the instrument or return it for repair



Fig. 13: Check the resistance in the probe

- 1 Shielding
- 2 Measuring probe
- 3 Ground potential

7.3 Exchange of the electronics module

In general, all oscillators of series CP60 can be interchanged.



If you want to use an electronics module with a different signal output, you can download the corresponding operating instructions manual from our homepage.

Electronic versions with specific factory settings (e.g. foam detection) can only be exchanged for identical electronic versions.

Proceed as follows:

- 1. Switch off voltage supply
- 2. Unscrew the housing lid
- 3. Lift the opening levers of the terminals with a screwdriver
- 4. Pull the connection cables out of the terminals
- Loosen the two screws with a screw driver (Torx size T10 or slot 4)



Fig. 14: Loosen the holding screws

- 1 Electronics module
- 2 Screws (2 pcs.)
- 6. Pull out old electronics module
- Compare the new electronics module with the old one. The type label of the electronics module must correspond to that of the old electronics module. This applies particularly to instruments used in hazardous areas.
- Compare the settings of the two electronics modules. Set the adjustment elements of the new electronics module to the same setting of the old one.

Information:

Make sure that the housing is not rotated during the electronics exchange. Otherwise the plug may be in a different position later.

- 9. Insert the electronics module carefully. Make sure that the plug is in the correct position.
- 10. Screw in and tighten the two holding screws with a screwdriver (Torx size T10 or Phillips 4)
- 11. Insert the wire ends into the open terminals according to the wiring plan
- 12. Press down the opening levers of the terminals, you will hear the terminal spring closing



- 13. Check the hold of the wires in the terminals by lightly pulling on them
- 14. Check cable gland on tightness. The seal ring must completely encircle the cable.
- 15. Mount the probe into the vessel. Make sure that the probe is uncovered.



Fig. 15: Compensation key

- 1 Measuring range selection switch (compensation key)
- 2 Control lamp
- 16. Keep the measuring range selection switch (1) pushed until the control lamp (2) flashes green.
- 17. Carry out the adjustment again. See chapter " Set-up, adjustment elements".
- 18. Screw the housing lid back on

The electronics exchange is now finished.

7.4 How to proceed if a repair is necessary

You can find an instrument return form as well as detailed information about the procedure in the download area of our homepage. By doing this you help us carry out the repair quickly and without having to call back for needed information.

Proceed as follows in case of repair:

- Print and fill out one form per instrument
- Clean the instrument and pack it damage-proof
- Attach the completed form and, if need be, also a safety data sheet outside on the packaging
- Ask the agency serving you to get the address for the return shipment. You can find the agency on our homepage.



8 Dismount

8.1 Dismounting steps

Warning:

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

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

8.2 Disposal



Pass the instrument on to a specialised recycling company and do not use the municipal collecting points.

Remove any batteries in advance, if they can be removed from the device, and dispose of them separately.

If personal data is stored on the old device to be disposed of, delete it before disposal.

If you have no way to dispose of the old instrument properly, please contact us concerning return and disposal.

9 Supplement

9.1 Technical data

Note for approved instruments

The technical data in the respective safety instructions which are included in delivery are valid for approved instruments (e.g. with Ex approval). These data can differ from the data listed herein, for example regarding the process conditions or the voltage supply.

All approval documents can be downloaded from our homepage.

General data			
Material 316L corresponds to 1.4404 or 1.4435			
Materials, wetted parts			
 Process fitting - thread 	316L, steel C22.8 (1.0460)		
 Process fitting - flange 	316L		
- Process seal	Klingersil C-4400		
 Insulation (fully insulated) 	PTFE		
 Probe (cable fully PTFE insulated: ø 8 mm/0.315 in) 	316L		
 Gravity weight 	316L		
 Screening tube 	316L		
Materials, non-wetted parts			
 Plastic housing 	Plastic PBT (Polyester)		
 Aluminium die-cast housing 	Aluminium die-casting AlSi10Mg, powder-coated (Basis: Polyester)		
 Stainless steel housing (precision casting) 	316L		
 Stainless steel housing (electropol- ished) 	316L		
- Seal between housing and housing lid	Silicone		
 Inspection window in housing cover (optional) 	Plastic housing: Polycarbonate (UL746-C listed) Metal housing: Glass ¹⁾		
 Ground terminal 	316L		
 Cable gland 	PA, stainless steel, brass		
 Sealing, cable gland 	NBR		
 Blind plug, cable gland 	PA		
Process fittings			
- Pipe thread, cylindrical (DIN 3852-A)	G1, G1½		
- Pipe thread, conical (ASME B1.20.1)	1 NPT, 1½ NPT		
- Flanges	DIN from DN 40, ASME from 2"		
Weight			
 Instrument weight (depending on process fitting) 	0.8 4 kg (0.18 8.82 lbs)		

¹⁾ Aluminium, stainless steel (precision casting) and Ex d housing



FGΔ



 Gravity weight 	900 g (32 oz)
- Cable weight: ø 8 mm (0.315 in)	200 g/m (2.1 oz/ft)
Sensor length (L)	0.4 35 m (1.312 114.8 ft)
Max. tensile load (cable)	10 KN (2248 lbf)
Max. torque (process fitting - thread)	100 Nm (73 lbf ft)
Torque for NPT cable glands and Conduit	tubes
 Plastic housing 	max. 10 Nm (7.376 lbf ft)
- Aluminium/Stainless steel housing	max. 50 Nm (36.88 lbf ft)
Measuring frequency	430 kHz

Output variable	
Output	Relay output (DPDT), 2 floating change-over contacts
Switching voltage	max. 253 V AC/DC
	With circuits > 150 V AC/DC, the relay contacts must be in the same circuit.
Switching current	max. 3 A AC (cos phi > 0.9), 1 A DC
Breaking capacity	
– Min.	50 mW
– Max.	750 VA AC, 40 W DC (at U < 40 V DC)
	If inductive loads or stronger currents are switched through, the gold plating on the relay contact surface will be permanently damaged. The contact is then no longer suitable for switching low-level signal circuits.
Contact material (relay contacts)	AgNi or AgSnO2 each with 3 μm gold plating
Modes (switchable)	Min./Max.
Switching delay	
- When immersed	0.7 s
- When laid bare	0.7 s
 In the event of a fault 	1 s

Measurement accuracy (according to DIN EN 60770-1)

Reference conditions according to DIN EN 61298-1

- Temperature	+18 +30 °C (+64 +86 °F)
 Relative humidity 	45 75 %
– Air pressure	+860 +1060 mbar/+86 +106 kPa (+12.5 +15.4 psig)
Deviation due to strong, high-frequency electromagnetic fields acc. to EN 61326	< 3 % of the adjusted measuring range $^{\mbox{\tiny 2)}}$
Influence of the ambient temperature	$<$ 0.15 %/10 K of the adjusted measuring range $^{\rm 3)}$

²⁾ Distance from the process fittings to the set switching point.
 ³⁾ Distance from the process fittings to the set switching point.

Ambient conditions

Ambient temperature on the housing	-40 +80 °C (-40 +176 °F)
Storage and transport temperature	-40 +80 °C (-40 +176 °F)

Process conditions

 Process pressure
 -1 ... 40 bar/-100 ... 4000 kPa (-14.5 ... 580 psig)

 Process temperature VEGACAP 66 of
 -50 ... +150 °C (-58 ... +302 °F)

Process temperature VEGACAP 66 c 316L

Process temperature VEGACAP 66 of St -20 ... +150 °C (-4 ... +302 °F) C22.8



Fig. 16: Ambient temperature - Process temperature

1 Process temperature

2 Ambient temperature

3 Temperature range with temperature adapter

Dielectric constant

≥ 1.5

Electromechanical data		
Options of the cable entry		
 Cable entry 	M20 x 1.5; 1⁄2 NPT	
 Cable gland 	M20 x 1.5; 1⁄2 NPT	
 Blind plug 	M20 x 1.5; 1⁄2 NPT	
 Closing cap 	1/2 NPT	
Wire cross-section (spring-loaded tern	ninals)	
- Massive wire, stranded wire	0.2 2.5 mm ² (AWG 24 14)	
- Stranded wire with end sleeve	0.2 1.5 mm ² (AWG 24 16)	

Adjustment elements

Mode switch

– Min.	Min. detection or dry run protection
- Max.	Max. detection or overflow protection
DIL switch for measuring range selection	
- range 1	0 20 pF
- range 2	0 85 pF





– range 3	0 450 pF
Potentiometer	Switching point adaptation
Voltage supply	
Operating voltage	20 253 V AC, 50/60 Hz, 20 72 V DC (at U >60 V DC, the ambient temperature can be max. 50 °C/122 °F)
Power consumption	1 8 VA (AC), approximately 1 W (DC)
Electrical protective measures	
Protection rating	IP66/IP67 (NEMA Type 4X)
Altitude above sea level	up to 5000 m (16404 ft)
Overvoltage category	
– up to 2000 m (6562 ft)	III
– up to 5000 m (16404 ft)	II
Protection class	I
Functional safety (SIL)	
Functional safety according to IEC 61508	B/IEC 61511
 Single channel architecture (1001D) 	up to SIL2
 Multiple channel architecture 	see supplementary instructions manual " <i>Safety Manual</i> (<i>SIL</i>)"

Approvals

Instruments with approvals can have different technical specifications depending on the version.

For that reason the associated approval documents of these instruments have to be carefully noted. They are part of the delivery or can be downloaded by entering the serial number of your instrument into the search field under <u>www.vega.com</u> as well as in the general download area.

9.2 Dimensions

The following dimensional drawings represent only an extract of all possible versions. Detailed dimensional drawings can be downloaded at <u>www.vega.com/downloads</u> under " *Drawings*".



VEGACAP 66, housing



Fig. 17: Housing versions

- 1 Plastic single chamber
- 2 Stainless steel single chamber (electropolished)
- 3 Stainless steel single chamber (precision casting)
- 4 Aluminium single chamber





Fig. 18: VEGACAP 66, threaded version G1 (ISO 228 T1)

L Sensor length, see chapter "Technical data"





Fig. 19: VEGACAP 66, screening tube, for example against strong condensation

L Length of the screening tube, see chapter "Technical data"



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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.

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