Admittance level measurement of bulk solids

VEGACAL 62
VEGACAL 65
VEGACAL 66

Product Information
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1 Description of the measuring principle

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

![Diagram of a capacitor with labels: 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 (DK value) of the product compared to air, the capacitance increases as the probe is gradually covered.

The capacitance as well as the resistance change are converted by the electronics module into a level-proportional signal.

The more constant the conductivity, concentration and temperature of a product, the better the conditions for admittance measurement. Changes in the measuring conditions are generally less critical when detecting materials with high DK values.

The sensors are maintenance free and rugged and can be implemented in all areas of industrial measurement engineering.

Admittance probes have no minimum distances or dead band in which measurement is not possible.

Whereas partly insulated versions are predominantly used for solids, fully insulated versions are preferred for liquids.

Corrosive and adhesive products
Implementation in very adhesive or corrosive products is no problem. Since the admittance measuring principle places no special requirements on mounting, a host of different applications can be equipped with VEGACAL series 60 probes.

Wide application range
With measuring ranges up to 32 m (105 ft), the sensors are well suited for tall vessels. Temperatures up to 200 °C (392 °F) and pressures from vacuum to 64 bar (928 psi) cover a wide range of applications.

1.1 Application examples

Bulk solids silo

![Diagram of a silo with a VEGACAL 65 sensor]

In the building industry, cement and additives are stored in tall silos. VEGACAL admittance sensors are used in silos up to 32 m (105 ft) high. In smaller silos where no lateral forces arise, it is also possible to use rod probes.

During the filling of the silo, large amounts of dust and noise are generated. Depending on the consistency of the solid and the kind of filling, the material cones that form can be very different. Admittance probes are not influenced by these conditions, and as a result, filling levels are always measured reliably.

The flexible suspension cable avoids excessive mechanical loads caused by movements of the bulk material.

To prevent the electrode from touching the vessel wall, the cable probe should be firmly anchored. In our line of accessories, you can find a straining spring which can be applied to avoid cable overload when anchoring.

Advantages:
- Insensitive to filling noise
- Wide application range
- Rugged construction
- High abrasion resistance
Wall mounting

If strong abrasion is expected in the silo or the mechanical forces acting on the probe are too large, an electrode built by the user can be implemented to increase the service life of the measuring system. The contact to the measuring probe is usually made at the top, and is accomplished with e.g. pipe clamps or a screwed fastening. But it can actually be located anywhere along the entire length of the electrode (brought in laterally or from below). It is only important that electrode be completely isolated from the vessel and installed at a min. distance of approx. 200 mm from the wall.

Advantages:
- Rugged - therefore long service life
- independent of the mounting position
- Unaffected by the shape of the material cone
- No dead bands
- Low min. distance
## 2 Type overview

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<td>Bulk solids</td>
<td>Bulk solids</td>
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<td><strong>Version:</strong></td>
<td>Rod - partly insulated</td>
<td>Cable - partly insulated</td>
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<td><strong>Insulation:</strong></td>
<td>PTFE</td>
<td>PA</td>
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<tr>
<td><strong>Length:</strong></td>
<td>0.2 … 6 m (0.656 … 19.69 ft)</td>
<td>0.4 … 32 m (1.312 … 104.99 ft)</td>
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<td><strong>Process fitting:</strong></td>
<td>Thread from G¾ A, flanges</td>
<td>Thread from G1 A, flanges</td>
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<td>-50 … +200 °C (-58 … +392 °F)</td>
<td>-50 … +200 °C (-58 … +392 °F)</td>
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<td><strong>Process pressure:</strong></td>
<td>-1 … 64 bar/-100 … 6400 kPa (-14.5 … 928 psi)</td>
<td>-1 … 64 bar/-100 … 6400 kPa (-14.5 … 928 psi)</td>
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3 Mounting instructions

Pressure/Vacuum
The process fitting must be sealed if there is gauge or low pressure in the vessel. Check if the seal material is resistant against the measured product and the process temperature.

Insulating measures in metal vessels such as e.g. covering the thread with teflon tape can interrupt the necessary electrical connection to the vessel. Ground the probe on the vessel.

Socket
In adhesive products, the probe should protrude into the vessel (horizontal mounting), to avoid buildup. In such cases, avoid sockets for flanges and threaded fittings.

Inflowing medium
If VEGACAL is mounted in the filling stream, unwanted false measurement signals can be generated. For this reason, mount VEGACAL 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.

Tensile load
If the cable version is used, make sure the max. tensile load of the suspension cable is not exceeded. Also keep the permissible roof load of your vessel in mind. This should be considered especially when using the instrument for very heavy solids and long meas. lengths. The max. permissible tensile load is stated in chapter "Technical data".

Material cone
Material cones can form in silos containing bulk solids, thereby altering the measuring result. Please keep this in mind when installing the sensor in the vessel. We recommend selecting an installation location where the probe detects an 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.

Vessel forms
If possible, the admittance probe should be mounted vertically or parallel to the counter electrode. This applies particularly to applications in non-conductive products.

In cylindrical tanks, spherical tanks or other asymmetrical tank forms, nonlinear level values are generated due to the varying distance to the vessel wall.

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 e.g. 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, e.g. in the form of a concentric tube.

To ensure sufficient grounding in concrete vessels, you should connect the ground terminal of the measuring probe to the steel reinforcement of the vessel.

Corrosive, abrasive products
Various isolating materials are available for very corrosive or abrasive products. If metal is not chemically resistant to the medium, use a plated flange.

Condensation
If condensation forms on the vessel top, the resulting liquid draining off can cause measurement errors (bridging) particularly with partly insulated probes.

For that reason, use a screening tube. The screening tube is permanently attached to the probe and must be specified in the order. The length of the screening tube depends on the amount of condensate and its flow behaviour.

Operating temperatures
If the housing is subject to high ambient temperatures, you have to either use a temperature adapter or disconnect the electronics from the probe and install it in a separate housing at a cooler place (from a process temperature of 200 °C).

With process temperatures up to 300 °C you can use a high temperature probe. With temperatures up to 400 °C, the electronics must be additionally located in a separate housing.

Make sure that the probe is not covered by an existing vessel insulation.

The temperature ranges of the probes are listed in chapter "Technical data".

Fixing

Rod versions
During operation, the probe must not touch any installations or the vessel wall. The measured value can also change if the distance to the vessel wall changes considerably. If necessary, secure the end of the probe (insulated).

Cable versions
Long cable versions are particularly susceptible to product movement, i.e. they may touch the vessel wall or "swim" to the top of the measured product. For that reason, the measuring probe should be firmly secured.

In the gravity weight there is a thread (M12), e.g. for a ring bolt (article no. 2.27424). The thread is already insulated in the gravity weight.

Make sure that the probe cable is not completely taut. Avoid tensile loads on the cable. In our line of accessories you will find a straining spring that can be applied to avoid cable overload.

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.

Measurement is not possible over the length of the gravity weight of the fully insulated probe. The measuring range of the probe ends at the upper edge of the gravity weight.
4 Electrical connection

4.1 General prerequisites
The supply voltage range can differ depending on the instrument version. You can find exact specifications in chapter "Technical data".

The national installation standards as well as the valid safety regulations and accident prevention rules must be observed.

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

4.2 Voltage supply

General information
Supply voltage and current signal are carried on the same two-wire cable. The requirements on the power supply are specified in chapter "Technical data".

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

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

4.3 Connection cable

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

Two-wire 4 ... 20 mA/HART, > 4 ... < 20 mA
If electromagnetic interference is expected, screened cable should be used for the signal lines.

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

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

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

4.4 Connection of the cable screen and grounding

Two-wire 4 ... 20 mA/HART, > 4 ... < 20 mA
The cable screen must be connected on both ends to ground potential. If potential equalisation currents are expected, the connection on the evaluation side must be made via a ceramic capacitor (e.g. 1 nF, 1500 V).

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

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

Fig. 9: Integration of instruments in a Profibus PA system via segment coupler DP/PA or data recording systems with Profibus PA input card

Foundation Fieldbus
Power supply via the H1 Fieldbus cable.
4.5 Wiring plan

Single chamber housing

Fig. 10: Connection HART two-wire, ProBus PA, Foundation Fieldbus
1 Voltage supply and signal output

Two-wire output > 4 ... < 20 mA

Fig. 11: Connection > 4 ... < 20 mA (not standardised) for connection to a signal conditioning instrument
1 Voltage supply/Signal output

Double chamber housing - two-wire

Fig. 12: Connection HART two-wire, ProBus PA, Foundation Fieldbus
1 Voltage supply and signal output
5 Operation

5.1 Adjustment, general
Per the electronics version, VEGACAL can be adjusted with the following adjustment media:
- With the indicating and adjustment module PLICSCOM (4 … 20 mA/HART; PA; FF)
- With an adjustment software according to FDT/DTM standard, e.g. PACTware™ and PC (4 … 20 mA/HART; PA; FF)
- A HART handheld (4 … 20 mA/HART)
- A configuration tool (Foundation Fieldbus)
- The Simatic adjustment program PDM (Proﬁbus PA)
- An external indication instrument (two-wire electronics > 4 … < 20 mA)

The entered parameters are generally saved in VEGACAL, optionally also in PLICSCOM or in PACTware™.

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

The integrated background lighting of the display can be switched on via the adjustment menu. ¹)

PLICSCOM adjustment

Fig. 13: 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
- [>] key to select:
  - Menu change
  - List entry
  - Select editing position
- [+] key:
  - Change value of the parameter
- [ESC] key:
  - Interrupt input
  - Jump to the next higher menu

5.3 Adjustment with PACTware™
PACTware™/DTM
The sensors VEGACAL can be adjusted via PACTware™ using the signal outputs 4 … 20 mA/HART, Proﬁbus PA or Foundation Fieldbus directly on the instrument. To adjust with PACTware™, an instrument driver for the particular VEGACAL model is required.

All currently available VEGA DTM’s are provided as DTM Collection with the current PACTware™ version on CD. They are available from the responsible VEGA agency for a token fee. The basic version of this DTM Collection incl. PACTware™ is available as a free-of charge download from the Internet.

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

Connecting the PC directly to the sensor

Fig. 14: Connection directly to the sensor
1 RS232 connection
2 VEGACAL
3 I© adapter cable for VEGACONNECT 3

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

¹) For instruments with national approvals such as e.g. according to FM or CSA, only available at a later date.
Connecting the PC to the signal cable (4 ... 20 mA/HART)

Fig. 15: Connecting the PC to the signal cable

1 RS232 connection
2 VEGACAL
3 HART adapter cable for VEGACONNECT 3
4 HART resistor 250 Ω

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

**Note:**

With power supply units with integrated HART resistance (internal resistance approx. 250 Ω), an additional external resistance is not necessary (e.g. VEGATRENN 149A, VEGADIS 371, VEGAMET 381/624/625, VEGA-SCAN 693). In such cases, VEGACONNECT can be connected parallel to the 4 ... 20 mA cable.
6 Technical data

General data
Material 316L corresponds to 1.4404 or 1.4435

VEGACAL 62
Materials, wetted parts
- Process fitting - thread 316L
- Process fitting - flange 316L
- Process seal Klingsorsil C-4400
- insulation (partly insulated) PTFE
- Electrode (rod partly PTFE insulated: Ø 12 mm/0.472 in) 316L
Materials, non-wetted parts
- Housing Plastic PBT (polyester), Alu die-casting powder-coated, 316L
- Seal between housing and housing cover NBR (stainless steel housing), silicone (Alu/plastic housing)
- Ground terminal 316L
Weight
- Instrument weight 1 ... 3 kg (2.2 ... 6.6 lbs)
- Rod weight: Ø 12 mm (0.472 in) 900 g/m (10 oz/ft)
Sensor length (L) 0.2 ... 6 m (0.656 ... 19.69 ft)
Max. lateral load 10 Nm (7.4 lbf ft)
Max. torque (process fitting - thread) 100 Nm (73 lbf ft)

VEGACAL 65
Materials, wetted parts
- Process fitting - thread 316L
- Process fitting - flange 316L
- Process seal Klingsorsil C-4400
- insulation (partly insulated) PA, PTFE
- Probe (cable partly PTFE insulated: Ø 6 mm/0.236 in) 316L
- Probe (cable partly PA insulated: Ø 8 mm/0.315 in) 316L
Materials, non-wetted parts
- Housing Plastic PBT (polyester), Alu die-casting powder-coated, 316L
- Seal between housing and housing cover NBR (stainless steel housing), silicone (Alu/plastic housing)
- Ground terminal 316L
Weight
- Instrument weight 1 ... 3 kg (2.2 ... 6.6 lbs)
- Gravity weight 900 g/m (32 oz)
- Cable weight: Ø 6 mm (0.236 in) 180 g/m (1.9 oz/ft)
- Cable weight: Ø 8 mm (0.315 in) 220 g/m (2.1 oz/ft)
Sensor length (L) 0.2 ... 32 m (0.656 ... 104.99 ft)
Max. tensile load (cable)
- PTFE partly insulated: Ø 6 mm (0.236 in) 10 KN (2248 lbs)
- PA partly insulated: Ø 8 mm (0.315 in) 10 KN (2248 lbs)
Max. torque (process fitting - thread) 100 Nm (73 lbf ft)

VEGACAL 66
Materials, wetted parts
- Process fitting - thread 316L
- Process fitting - flange 316L
- Process seal Klingsorsil C-4400
- insulation (fully insulated) PTFE
Materials, non-wetted parts
- Probe (cable fully PTFE insulated: Ø 8 mm/0.315 in) 316L
- Housing Plastic PBT (polyester), Alu die-casting powder-coated, 316L
- Seal between housing and housing cover NBR (stainless steel housing), silicone (Alu/plastic housing)
- Ground terminal 316L

2) Cable connected electrically conductive with the gravity weight.
Technical data

Weight
- Instrument weight: 1 ... 3 kg (2.2 ... 6.6 lbs)
- Gravity weight: 900 g (32 oz)
- Cable weight: 180 g/m (1.9 oz/ft)
Sensor length (L):
- Max. tensile load (cable): 0.4 ... 32 m (1.312 ... 104.99 ft)
- Cable weight: 10 KN (2248 lbs)
- Max. torque (process fitting - thread): 100 Nm (73 lbf ft)

VEGACAL 67
Materials, wetted parts
- Process fitting - thread: 316L
- Process fitting - flange: 316L
- Insulation (partly insulated): Ceramic (KER 221 according to DIN 40685)
- Probe - rod, ceramic partly insulated (ø 15 mm/0.591 in): 316L
- Probe - cable, ceramic partly insulated (ø 8 mm/0.315 in): 316 (1.4401)
Materials, non-wetted parts
- Housing: Plastic PBT (polyester), Alu die-casting powder-coated, 316L
- Seal between housing and housing cover: NBR (stainless steel housing), silicone (Alu/plastic housing)
- Ground terminal: 316L

Weight
- Instrument weight: 1 ... 3 kg (2.2 ... 6.6 lbs)
- Gravity weight: 1800 g (64 oz)
- Rod weight: 1400 g/m (15 oz/ft)
- Cable weight: 400 g/m (4.3 oz/ft)
Sensor length (L):
- Rod (ø 15 mm/0.591 in): 0.28 ... 6 m (0.919 ... 19.69 ft)
- Cable (ø 8 mm/0.315 in): 0.5 ... 40 m (1.64 ... 131.23 ft)
- Supporting tube length L1: 0.2 ... 1.7 m (0.656 ... 5.577 ft)
- Max. lateral load: 10 Nm (7.4 lbf ft)
- Ceramic partly insulated: 10 KN (2248 lbs)
- Max. torque (process fitting - thread): 80 Nm (58 lbf ft)

Output variable

4 ... 20 mA/HART
Output signal: 4 ... 20 mA/HART
Resolution: 1.6 µA
Fault message: Current output unchanged 20.5 mA, 22 mA, < 3.6 mA (adjustable)
Current limitation: 22 mA
Load: see load diagram under Power supply
Integration time (63 % of the input variable): 0 ... 999 s, adjustable
Rise time: 500 ms (ti: 0 s, 0 ... 100 %)
Fulfilled NAMUR recommendations: NE 43

Two-wire output > 4 ... < 20 mA
Output signal: in the range of > 4 ... < 20 mA (not standardised) - for connection to a signal conditioning instrument
Suitable signal conditioning instruments: VEGAMET 381, 513, 514, 515, 624
Fault message: > 22 mA
Current limitation: 28 mA
Load: see load diagram under Power supply
Integration time (63 % of the input variable): 0.1 s
Fulfilled NAMUR recommendations: NE 43

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3) Cable connected electrically conductive with the gravity weight.
### Technical data

#### Admittance level measurement of bulk solids

**Profibus PA**
- **Output signal**: digital output signal, format according to IEEE-754
- **Sensor address**: 126 (default setting)
- **Current value**: constantly 10 mA, ±0.5 mA
- **Integration time (63 % of the input variable)**: 0 ... 999 s, adjustable
- **Rise time**: 500 ms (tI: 0 s, 0 ... 100 %)

**Foundation Fieldbus**
- **Output**: digital output signal, Foundation Fieldbus protocol according to IEC 61158-2
- **Channel numbers**
  - Channel 1: Primary Value
  - Channel 2: Secondary Value 1
  - Channel 3: Secondary Value 2
- **Transmission rate**: 31.25 Kbit/s
- **Current value**: 10 mA, ±0.5 mA
- **Integration time (63 % of the input variable)**: 0 ... 999 s, adjustable
- **Rise time**: 500 ms (tI: 0 s, 0 ... 100 %)

#### Input variable

**4 ... 20 mA/HART, Profibus PA, Foundation Fieldbus**
- **Parameter**: Continuous level value
- **Measuring principle**: phase-selective admittance processing (PSA)
- **Measuring range**: 0 ... 3000 pF
- **Frequency**: 270 kHz

**Two-wire output > 4 ... < 20 mA**
- **Parameter**: Continuous level value
- **Measuring principle**: phase-selective admittance processing (PSA)
- **Measuring range**
  - range 1: 0 ... 120 pF
  - range 2: 0 ... 600 pF
  - range 3: 0 ... 3000 pF
- **Frequency**: 430 kHz

#### Accuracy (similar 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 psi)
- **Temperature error**
  - < 120 pF: < 1 pF
  - > 120 pF: 1 pF, +0.25 % of the current measured value
- **Linearity error**: < 0.25 % of the complete measuring range
- **Accuracy**: 0.025 % of the current measured value

#### Ambient conditions
- **Ambient, storage and transport temperature**
  - without PLICSCOM: -40 ... +80 °C (-40 ... +176 °F)
  - with PLICSCOM\(^4\): -20 ... +70 °C (-4 ... +158 °F)

\(^4\) Not with electronics version two-wire output > 4 ... < 20 mA.
Process conditions

Process pressure
- VEGACAL 62, 65, 66
- VEGACAL 67

The max. permissible pressure and max. permissible temperature depend on the process fitting used.
- 1 ... 64 bar/-100 ... 6400 kPa (-14.5 ... 928 psi)
- 1 ... 16 bar/-100 ... 1600 kPa (-14.5 ... 232 psi)

Process temperature
- VEGACAL 62 - PTFE insulation
- VEGACAL 65 - PTFE insulation
- VEGACAL 65 - PA insulation
- VEGACAL 66 - PTFE insulation
- VEGACAL 67 - ceramic insulation - standard
- VEGACAL 67 - ceramic insulation - with remote housing

VEGACAL 62:
12 bar (-174 ... -1720 psi)
max. ambient temperature 200°C (392°F)
max. product temperature 400°C (752°F)

VEGACAL 65:
12 bar (-174 ... -1720 psi)
max. ambient temperature 150°C (302°F)
max. product temperature 300°C (572°F)

VEGACAL 66:
12 bar (-174 ... -1720 psi)
max. ambient temperature 100°C (212°F)
max. product temperature 200°C (392°F)

VEGACAL 67:
12 bar (-174 ... -1720 psi)
max. ambient temperature 50°C (122°F)
max. product temperature 100°C (212°F)

Dielectric figure
≥ 1.5

Electromechanical data

Cable entry/plug (dependent on the version)
- Single chamber housing
  - 1 x cable gland M20 x 1.5 (cable: ø 5 ... 9 mm), 1 x blind stopper M20 x 1.5
  - 1 x closing cap ½ NPT, 1 x blind plug ½ NPT
  - 1 x plug M12 x 1; 1 x blind stopper M20 x 1.5
- Double chamber housing  
- 1 x cable entry M20 x 1.5 (cable: ø 5 … 9 mm), 1 x blind stopper M20 x 1.5; plug M12 x 1 for VEGADIS 61  
or:  
- 1 x closing cap ½ NPT, 1x blind stopper ½ NPT, plug M12 x 1 for VEGADIS 61  
or:  
- 1 x plug M12 x 1; 1 x blind cover M20 x 1.5; plug M12 x 1 for VEGADIS 61

Spring-loaded terminals for wire cross-section up to 2.5 mm² (AWG 14)

**Indicating and adjustment module PLICSCOM ⁵**

- Power supply and data transmission through sensor via gold-plated sliding contacts (I²C bus)
- Indication LC display in Dot matrix
- Adjustment elements 4 keys
- Protection  
  - unassembled IP 20  
  - mounted into the sensor without cover IP 40
- Materials  
  - Housing ABS  
  - Inspection window Polyester foil

**Voltage supply**

**Two-wire output 4 … 20 mA/HART**

- Supply voltage
  - Non-Ex instrument 12 … 36 V DC
  - EEx-ia instrument 12 … 30 V DC
  - EEx-d-ia instrument 18 … 36 V DC
- Permissible residual ripple  
  - < 100 Hz U_{\text{ss}} < 1 V  
  - 100 Hz … 10 kHz U_{\text{ss}} < 10 mV
- Load see diagram

**Fig. 18: Voltage diagram 4 … 20 mA/HART**

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

⁵) Not with electronics version two-wire output > 4 … < 20 mA.
⁶) Not with electronics version two-wire output > 4 … < 20 mA.
Two-wire output > 4 … < 20 mA - for connection to a signal conditioning instrument

Supply voltage
- Non-Ex instrument 12 … 36 V DC
- EEEx-ia instrument 12 … 30 V DC
- EEEx-d-ia instrument 18 … 36 V DC

Permissible residual ripple
- < 100 Hz $U_{ss} < 1$ V
- 100 Hz ... 10 kHz $U_{ss} < 10$ mV

Load
see diagram

Fig. 19: Voltage diagram > 4 … < 20 mA - for connection to a signal conditioning instrument

1 Voltage limit EEEx-ia instrument
2 Voltage limit non-Ex/Exd instrument
3 Supply voltage

Profi bus PA
Supply voltage
- Non-Ex instrument 9 … 32 V DC
- EEEx-ia instrument 9 … 24 V DC

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

Foundation Fieldbus
Supply voltage
- Non-Ex instrument 9 … 32 V DC
- EEEx-ia instrument 9 … 24 V DC

Power supply by/max. number of sensors
- H1 voltage supply max. 32 (max. 10 with Ex)

Electrical protective measures
Protection IP 66/IP 67
Overvoltage category III
Protection class II

CE conformity
EMC (89/336/EWG)
Emission EN 61326: 2004 (class B)
Susceptibility EN 61326: 2004 incl. supplement A
LVD (73/23/EWG), EN 61010-1: 2001

Admittance level measurement of bulk solids
7 Dimensions

Housing

Housing versions

1 Plastic housing
2 Stainless steel housing
3 Stainless steel housing - precision casting
4 Aluminium double chamber housing
5 Aluminium housing

VEGACAL 62

VEGACAL 65

Sensor length, see chapter "Technical data"

7) Not with electronics version two-wire output > 4 … < 20 mA.
VEGACAL 66

Fig. 23: VEGACAL 66 - threaded version

L Sensor length, see chapter "Technical data"

VEGACAL 67

Fig. 24: VEGACAL 67 - threaded version G1½ A and 1½ NPT, -50 ... +300 °C (-58 ... +572 °F)

Version -50 ... +400 °C (-58 ... +752 °F) only with remote housing.

See supplementary instructions manual "Remote housing - VEGACAP, VEGACAL"

L Sensor length, see chapter "Technical data"

L1 Supporting tube length, see chapter "Technical data"
# Product code

## VEGACAL 62

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<thead>
<tr>
<th>Approval</th>
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<tbody>
<tr>
<td>Version / Process temperature</td>
<td>A Standard / -50 ... 150°C</td>
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<tr>
<td>B Standard / -50 ... 200°C</td>
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<tr>
<td>with screening tube 316L / -50 ... 150°C</td>
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<tr>
<td>D with screening tube 316L / -50 ... 200°C</td>
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<tr>
<td>I with concentric tube 316L / -50 ... 150°C</td>
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<td>J with concentric tube 316L / -50 ... 200°C</td>
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<tr>
<td>Process fitting / Material</td>
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<td>NC Thread 1NPT PN64/316L</td>
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<td>ND Thread 1½NPT PN64/316L</td>
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<td>P Profibus PA</td>
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<tr>
<td>F Foundation Fieldbus</td>
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<tr>
<td>Housing / Protection</td>
<td>K Plastic / IP66/67</td>
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<tr>
<td>A Aluminium / IP66/IP68 (0.2 bar)</td>
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<tr>
<td>D Aluminium double chamber / IP66/IP68 (0.2 bar)</td>
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<tr>
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1) Only available with Housing / Protection "D"

## VEGACAL 65

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1) Only available with Housing / Protection "D"
You can find at www.vega.com
downloads of the following
● operating instructions manuals
● menu schematics
● software
● certificates
● approvals
and much, much more