Level measurement

Process pressure/Hydrostatic

VEGABAR 66
VEGABAR 67

Product Information
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1 Application, function, configuration

Application range
VEGABAR 66 and 67 are rugged suspension pressure transmitters for level measurement via top mounting. Their universal use is made possible by an application-optimised housing concept, medium-resistant sensors and high accuracy. Comprehensive indicating and adjustment options as well as electronics modules with signal outputs 4 … 20 mA/HART, Profibus PA and Foundation Fieldbus make for easy integration into the system environment.

VEGABAR 66 and 67 transmitters are especially designed for measurement in wells, basins and open vessels. They offer a wide variety of process fittings, housings and protection classes. High resistance materials are available for wetted parts. Many different mediums, from water/waste water to fuels and aggressive products, can thus be measured.

User advantages
- small deviation in characteristics < 0.1 %
- Up to 150-fold overload resistance
- Product temperature up to 100 °C
- Functional safety according to IEC 61508-4/61511 up to SIL3
- Exchangeable indicating and adjustment module
- Quick setup via easy menu guidance
- Comprehensive monitoring and diagnostics functions

Measuring principle
The hydrostatic pressure of the product causes via the diaphragm a capacitance change in the measuring cell. This capacitance change is converted into an appropriate output signal.

VEGABAR 66
The sensor element of VEGABAR 66 is the dry ceramic-capacitive CERTEC® measuring cell. Base element and diaphragm consist of high purity sapphire-ceramic.

The CERTEC® measuring cell is also equipped with a temperature sensor. The temperature value can be displayed via the indicating and adjustment module or processed via the signal output.

VEGABAR 66 - climate compensated
The sensor element is an encapsulated CERTEC® absolute pressure measuring cell with front-flush, abrasion-resistant ceramic diaphragm. The hydrostatic pressure of the medium causes a capacitance change in the measuring cell via the ceramic diaphragm. This capacitance change is converted into an electrical signal, checked against an integrated reference pressure measurement and outputted as measured value via the output signal.

VEGABAR 67
The METEC® measuring cell is the measuring unit of VEGABAR 67. This unit consists of a CERTEC® measuring cell and a special isolating system with metallic process diaphragm. A special feature of this isolating system is the direct mechanical compensation of temperature influence.

Fig. 2: Configuration of the METEC® measuring cell in VEGABAR 67
1 Diaphragm Hastelloy C276
2 Isolating liquid (approx. 0.3 cm³, med. white oil, FDA-listed)
3 FeNi adapter
4 CERTEC® measuring cell

The features of the METEC® measuring cell are:
- Completely welded, elastomer-free
- Good thermo-shock reaction
- Excellent long-term stability
- High degree of flushness

Configuration
VEGABAR 66 and 67 pressure transmitters are available in different versions:

Fig. 1: Configuration of the CERTEC® measuring cell in VEGABAR 66
1 Diaphragm
2 Soldered glass bond
3 Base element

The features of the CERTEC® measuring cell are:
- Very high abrasion resistance
- Excellent long-term stability
- No hysteresis
- Good corrosion resistance
1 Housing with integrated electronics
2 Suspension cable
3 Connection tube
4 Threaded fitting
5 Transmitter
6 Protective cap

1.1 Application examples

Ballast water

On ships, ballast water measurements go directly into the stability calculations. Since the measuring sites during operation on board are virtually inaccessible, reliability and stability are an absolute must. Pressure shocks, abrasive sand particles and brackish water place additional heavy demands on the instrumentation. Thanks to its separate electronics, sensor housing in IP 69K and ceramic measuring cell, VEGABAR 66 is the perfect sensor for these harsh conditions. The mounting bosses, which are located on deck, are sealed with stainless steel process fittings and can thus withstand the effects of the atmosphere or breaking waves. The separate electronics can be installed and ventilated in a protected area.

Water from part cleaning and degreasing equipment is often contaminated with oil. With modern microfiltration technology, oil can be easily separated from water. To enable automatic operation of the microfiltration facility, level measurements in the receivers are necessary. The levels in the operating, rinsing, and filtrate vessels are measured with the VEGABAR 67 suspension pressure transmitter. The unique advantages it offers for these applications are the front-flush metal METEC® measuring cell, the suspension cable of chemically high resistance FEP and easy mounting from above.

Information:
Continuative documentation such as operating instructions manuals and Safety Manual (SIL):

- 27537 - VEGABAR 66
- 27543 - VEGABAR 67
- 31637 - Safety Manual VEGABAR 50/60 – 4…20 mA/HART

Fig. 3: Examples of a VEGABAR 66 with suspension cable (left), threaded fitting and remote electronics as well as extension tube and housing and thread (right)

Fig. 4: Level measurement in ballast water tanks with VEGABAR 66

Fig. 5: Level measurement in a receiver with VEGABAR 67
2 Type overview

<table>
<thead>
<tr>
<th>Measuring cell:</th>
<th>CERTEC®</th>
<th>METEC®</th>
</tr>
</thead>
<tbody>
<tr>
<td>Media:</td>
<td>drinking water and waste water</td>
<td>also corrosive products, fuels</td>
</tr>
<tr>
<td>Process fitting:</td>
<td>straining clamp, screwed fitting, thread, flange</td>
<td>Straining clamp, threaded fitting, thread, flange, hygienic fittings</td>
</tr>
<tr>
<td>Lock fitting</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Material process fitting:</td>
<td>316L, PVDF</td>
<td>316L</td>
</tr>
<tr>
<td>Material suspension cable/ connection tube:</td>
<td>PE, PUR, FEP/316L</td>
<td>PE, PUR, FEP/316L</td>
</tr>
<tr>
<td>Material transmitter:</td>
<td>316L, PE-coating, PVDF</td>
<td>316L</td>
</tr>
<tr>
<td>Material diaphragm:</td>
<td>Ceramic</td>
<td>Hastelloy C276</td>
</tr>
<tr>
<td>Diameter transmitter:</td>
<td>40 mm</td>
<td>40 mm</td>
</tr>
<tr>
<td>Measuring range:</td>
<td>0 ... 0.1 bar up to 0 ... 25 bar (0 ... 1.45 psi up to 0 ... 363 psi)</td>
<td>0 ... 0.1 bar up to 0 ... 25 bar (0 ... 1.45 psi up to 0 ... 363 psi)</td>
</tr>
<tr>
<td>Process temperature:</td>
<td>-40 ... +100 °C (-40 ... +212 °F)</td>
<td>-12 ... +100 °C (+10.4 ... +212 °F)</td>
</tr>
<tr>
<td>Deviation in characteristics:</td>
<td>&lt; 0.1 %</td>
<td>&lt; 0.1 %</td>
</tr>
<tr>
<td>Signal output:</td>
<td>4 ... 20 mA/HART, Profibus-PA, Foundation Fieldbus</td>
<td>4 ... 20 mA/HART, Profibus-PA, Foundation Fieldbus</td>
</tr>
<tr>
<td>Remote adjustment/ indication:</td>
<td>VEGADIS 61</td>
<td>VEGADIS 61</td>
</tr>
<tr>
<td>Functional safety:</td>
<td>up to SIL3</td>
<td>up to SIL3</td>
</tr>
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</table>
### Indicating and adjustment module

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLICSCOM</td>
<td></td>
</tr>
</tbody>
</table>

### Housing

<table>
<thead>
<tr>
<th>Material</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plastic</td>
<td></td>
</tr>
<tr>
<td>Stainless steel</td>
<td></td>
</tr>
<tr>
<td>Aluminium</td>
<td></td>
</tr>
<tr>
<td>Aluminium (double chamber)</td>
<td></td>
</tr>
</tbody>
</table>

### Electronics

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4...20 mA/HART</td>
<td>Profillbus PA</td>
</tr>
<tr>
<td></td>
<td>Foundation Fieldbus</td>
</tr>
</tbody>
</table>

### Process fitting

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Straining clamp</td>
<td>Threaded fitting</td>
</tr>
<tr>
<td>Thread</td>
<td></td>
</tr>
</tbody>
</table>

### Sensors

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CERTEC® measuring cell</td>
<td>METEC® measuring cell</td>
</tr>
</tbody>
</table>

### Approvals

<table>
<thead>
<tr>
<th>Certification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIL</td>
<td>FM</td>
</tr>
<tr>
<td></td>
<td>CSA</td>
</tr>
</tbody>
</table>
3 Mounting instructions

Mounting position
The following illustrations show mounting examples for VEGA-BAR 66 and 67. The VEGA price list offers suitable mounting brackets under section Accessories. With these parts, standard mounting arrangements can be realised quickly and reliably.

Fig. 6: Version with connection tube in open vessel

Fig. 7: Version with suspension cable in pump shaft

Suspension cable
The suspension cable versions must be mounted in a calm area or in a suitable protective tube. This avoids lateral movements of the transmitter and the resulting distortion of measurement data.

Information:
As an alternative method of fastening the transmitter, we recommend using the instrument holder from the line of VEGA accessories, article no. BARMONT.A.

The suspension cable contains, apart from the connection cables and the suspension wire, also the capillaries for atmospheric pressure compensation.

When installing VEGABAR with open cable end, the cable end must be looped directly to the remote electronics and connected to the supplied plug. Pressure compensation is carried out via a ventilation filter in the electronics housing. With VEGABAR in housing version, pressure compensation is carried out via a ventilation filter in the connection housing.

Mounting versions
The following illustrations show the different mounting versions depending on the instrument type.

Mounting with straining clamp

Fig. 8: Straining clamp for VEGABAR 66 and 67
1 Suspension cable
2 Suspension opening
3 Clamping jaws

Mounting with screwed fitting

Fig. 9: Screwed fitting for VEGABAR 66 and 67
1 Suspension cable
2 Seal screw
3 Cone bushing
4 Seal cone
5 Threaded fitting
6 Seal ring
Mounting with lock fitting

Fig. 10: Lock fitting for VEGABAR 66 and 67

1. Upper hexagon
2. Fixing screw
3. Clamping disc
4. Lower hexagon
5. Fixing screw

Mounting with housing and thread

Fig. 11: Housing and thread for VEGABAR 66 and 67

1. Housing
2. Seal
3. Thread
4 Electrical connection

4.1 General requirements
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
Depending on the version, the supply voltage and current signal are carried on the same two-wire connection cable or over separate connection cables. The requirements on the voltage supply are specified in chapter "Technical data".

4 ... 20 mA/HART two-wire
The VEGA power supply units VEGATRENN 149AEx, VEGASTAB 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.

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

![Diagram of Profinet PA system integration](image1)

**Foundation Fieldbus**
Power supply via the H1 Fieldbus cable.

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.

4 ... 20 mA/HART two-wire and four-wire
If electromagnetic interference is expected which is above the test values of EN 61326 for industrial areas, screened cable should be used. In HART multidrop mode the use of screened cable is generally recommended.

Profinet PA, Foundation Fieldbus
The installation must be carried out according to the appropriate bus specification. VEGABAR is connected appropriately with screened cable according to the bus specification. Power supply and digital bus signal are transmitted via the same two-wire connection cable. Make sure that the bus is terminated via appropriate terminating resistors.

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

4.4 Cable screening and grounding
If screened cable is necessary, 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).

Profinet 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.

4.5 Wiring plan VEGABAR 66, 67
Single chamber housing

![Diagram of wiring plan VEGABAR 66, 67](image2)

**Legend**
1 Voltage supply and signal output
Double chamber housing - two-wire

Fig. 14: Connection HART two-wire, Profibus PA, Foundation Fieldbus
1 Voltage supply and signal output

Wire assignment, connection cable with version IP 66/IP 68, 1 bar

Fig. 15: Wire assignment, connection cable
1 brown (+) and blue (-) to power supply or to the processing system
2 Shielding

Terminal assignment, housing socket with version IP 68

Fig. 16: Connection of the sensor in the housing socket
1 Brown
2 Blue
3 Yellow
4 White
5 Shielding
6 Breather capillaries
5 Operation

5.1 Overview
The sensors can be adjusted with the following adjustment media:
- with indicating and adjustment module
- an adjustment software according to FDT/DTM standard, e.g. PACTware and PC

and, depending on the signal output, also with:
- A HART handheld (4 ... 20 mA/HART)
- The adjustment program AMS (4 ... 20 mA/HART and Foundation Fieldbus)
- The adjustment program PDM (Proibus PA)
- A configuration tool (Foundation Fieldbus)

The entered parameters are generally saved in the sensor, optionally also in the indicating and adjustment module or in the adjustment program.

5.2 Compatibility according to NAMUR NE 53
VEGABAR meet NAMUR recommendation NE 53. VEGA instruments are generally upward and downward compatible:
- Sensor software for DTM VEGABAR HART, PA or FF
- DTM VEGABAR for adjustment software PACTware
- Indicating and adjustment module PLICSCOM 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.

5.3 Adjustment with the indicating and adjustment module PLICSCOM
Setup and indication
PLICSCOM is a pluggable indication and adjustment module for plics® 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. 17: 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 the parameter
- [ESC] key:
  - interrupt input
  - jump to the next higher menu

5.4 Adjustment with PACTware
PACTware™/DTM
Independent of the respective signal output 4 ... 20 mA/HART, Proibus PA or Foundation Fieldbus, the sensors can be operated directly on the instrument via PACTware. The sensors with signal output 4 ... 20 mA/HART can be also operated via the HART signal on the signal cable.

An VEGACONNECT interface adapter as well as an instrument driver for the respective sensor is necessary for the adjustment with PACTware. All currently available VEGA DTMs are included as DTM Collection with the current PACTware version on a CD. They are available for a protective fee from our respective VEGA agency. In addition, this DTM Collection incl. the basic version of PACTware can be downloaded free-of-charge from the Internet.

To use the entire range of functions of a DTM, incl. project documentation, a DTM licence is required for that particular instru-

¹) For instruments with national approvals such as e.g. according to FM or CSA, only available at a later date.
ment family. This licence can be bought from the VEGA agency serving you.

**Connection of the PC via VEGACONNECT**

![Diagram of connection via VEGACONNECT](image)

**Fig. 18: Connection of the PC via VEGACONNECT directly to the sensor**

1. USB cable to the PC
2. VEGACONNECT
3. Sensor

![Diagram of connection via I²C](image)

**Fig. 19: Connection via I²C connection cable**

1. I²C bus (com.) interface on the sensor
2. I²C connection cable of VEGACONNECT
3. VEGACONNECT
4. USB cable to the PC

**Necessary components:**
- VEGABAR
- PC with PACTware and suitable VEGA DTM
- VEGACONNECT
- Power supply unit or processing system

### 5.5 Adjustment with other adjustment programs

**PDM**

For VEGA PA sensors, instrument descriptions for the adjustment program PDM are available as EDD. The instrument descriptions are already implemented in the current version of AMS™. For older versions of AMS™, a free-of-charge download is available via Internet.

**AMS**

For VEGA FF sensors, instrument descriptions for the adjustment program AMS™ are available as DD. The instrument descrip-
6 Technical data

General data

Common data
316L corresponds to 1.4404 or 1.4435

Materials, non-wetted parts
- Straining clamp
- Threaded fitting
- External housing, non-Ex
- External housing, Ex
- Socket, wall mounting plate external housing
- Seal between housing socket and wall mounting plate
- Seal between housing and housing cover
- Inspection window in housing cover for PLICSCOM
- Ground terminal
- Type label support on the suspension cable

VEGABAR 66
Materials, wetted parts
- Transmitter
- Transmitter protection (optional)
- Diaphragm
- Suspension cable
- Connection tube, process fitting
- Measuring cell seal
- Seal, suspension cable PE, PUR
- Seal, suspension cable FEP
- Protective cover for transmitter

VEGABAR 67
Materials, non-wetted parts
- Isolating liquid

Materials, wetted parts
- Transmitter
- Process diaphragm
- Suspension cable
- Connection tube, process fitting
- Protective cover for transmitter
- Seal, suspension cable PE, PUR
- Seal, suspension cable FEP

Common data
Weight approx.
- Transmitter
- Suspension cable
- Connection tube
- Straining clamp
- Threaded fitting
- Process fitting
- Plastic housing
- Aluminium single chamber housing
- Aluminium double chamber housing
- Stainless steel housing

Lengths
Connection tube

<table>
<thead>
<tr>
<th>Material</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>316L PVDF</td>
<td>PE plastic coating</td>
</tr>
<tr>
<td>sapphire-ceramic® (99.9 % oxide ceramic Al₂O₃)</td>
<td>PE (KTW-approved), FEP, PUR</td>
</tr>
<tr>
<td>FKM (VP2/A) - FDA and KTW approved, FFKM (Kalrez 6375), EPDM (A+P 75.5/KW75F)</td>
<td>FKM (VP2/A) - FDA and KTW approved</td>
</tr>
<tr>
<td>FEP</td>
<td>FEP</td>
</tr>
<tr>
<td>Essomarcal (med. white oil, FDA-approved)</td>
<td></td>
</tr>
<tr>
<td>316L</td>
<td></td>
</tr>
<tr>
<td>Hastelloy C276</td>
<td>PE (KTW-approved), FEP, PUR</td>
</tr>
<tr>
<td>316L</td>
<td>FKM (Viton)</td>
</tr>
<tr>
<td>FEP</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Material</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.7 kg (1.543 lbs)</td>
<td></td>
</tr>
<tr>
<td>0.1 kg/m (0.07 lbs/ft)</td>
<td></td>
</tr>
<tr>
<td>1.5 kg/m (1 lbs/ft)</td>
<td></td>
</tr>
<tr>
<td>0.2 kg (0.441 lbs)</td>
<td></td>
</tr>
<tr>
<td>0.4 kg (0.882 lbs)</td>
<td></td>
</tr>
<tr>
<td>0.5 kg (1.102 lbs)</td>
<td></td>
</tr>
<tr>
<td>0.35 kg (0.772 lbs)</td>
<td></td>
</tr>
<tr>
<td>0.75 kg (1.7 lbs)</td>
<td></td>
</tr>
<tr>
<td>1.1 kg (2.4 lbs)</td>
<td></td>
</tr>
<tr>
<td>1.15 kg (2.5 lbs)</td>
<td></td>
</tr>
<tr>
<td>0.25 ... 6 m (0.82 ... 19.69 ft)</td>
<td></td>
</tr>
</tbody>
</table>
## Technical data

### Output variable

<table>
<thead>
<tr>
<th></th>
<th>4 ... 20 mA/HART</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output variable</td>
<td>4 ... 20 mA/HART</td>
</tr>
<tr>
<td>Output signal</td>
<td>4 ... 20 mA/HART</td>
</tr>
<tr>
<td>Resolution</td>
<td>1.6 µA</td>
</tr>
<tr>
<td>Fault message</td>
<td>current output unchanged 20.5 mA, 22 mA, &gt; 22 mA, &lt; 3.6 mA (adjustable depending on the instrument type)</td>
</tr>
<tr>
<td>Current limitation</td>
<td>22 mA</td>
</tr>
<tr>
<td>Load</td>
<td>see load diagram under Power supply</td>
</tr>
<tr>
<td>Integration time</td>
<td>0 … 999 s, adjustable</td>
</tr>
<tr>
<td>Step response time</td>
<td>150 ms (t: 0 s, 0 … 100 %)</td>
</tr>
<tr>
<td>Fulfilled NAMUR recommendations</td>
<td>NE 43</td>
</tr>
</tbody>
</table>

**ProfiBus PA**

<table>
<thead>
<tr>
<th></th>
<th>digital output signal, format according to IEEE-754</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output signal</td>
<td>digital output signal, format according to IEEE-754</td>
</tr>
<tr>
<td>– Sensor address</td>
<td>126 (default setting)</td>
</tr>
<tr>
<td>Current value</td>
<td>constantly 10 mA, ± 1 mA</td>
</tr>
<tr>
<td>Integration time</td>
<td>0 … 999 s, adjustable</td>
</tr>
</tbody>
</table>

**Foundation Fieldbus**

<table>
<thead>
<tr>
<th>Output</th>
<th>digital output signal, Foundation Fieldbus protocol according to IEC 61158-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>– Signal</td>
<td>digital output signal, Foundation Fieldbus protocol according to IEC 61158-2</td>
</tr>
<tr>
<td>– Physical layer</td>
<td>digital output signal, Foundation Fieldbus protocol according to IEC 61158-2</td>
</tr>
<tr>
<td>Channel Numbers</td>
<td>digital output signal, Foundation Fieldbus protocol according to IEC 61158-2</td>
</tr>
<tr>
<td>– Channel 1</td>
<td>Primary Value</td>
</tr>
<tr>
<td>– Channel 2</td>
<td>Secondary Value 1</td>
</tr>
<tr>
<td>– Channel 3</td>
<td>Secondary Value 2</td>
</tr>
<tr>
<td>– Channel 4</td>
<td>Temperature Value</td>
</tr>
<tr>
<td>Current value</td>
<td>10 mA, ±0.5 mA</td>
</tr>
</tbody>
</table>

### Additional output parameter - temperature

- Processing is made via HART multidrop, Profibus PA and Foundation Fieldbus
- Range: -50 ... +150 °C (-58 ... +302 °F)
- Resolution: 1 °C (1.8 °F)

### Input variable

<table>
<thead>
<tr>
<th>Measured value</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring range</td>
<td>see product code</td>
</tr>
<tr>
<td>Recommended max. turn down</td>
<td>1 : 10 (no limitation)</td>
</tr>
</tbody>
</table>

### Reference conditions and actuating variables (similar to DIN EN 60770-1)

<table>
<thead>
<tr>
<th>Reference conditions according to DIN EN 61298-1</th>
<th>+18 ... +30 °C (+64 ... +86 °F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>– Temperature</td>
<td>45 ... 75 %</td>
</tr>
<tr>
<td>– Relative humidity</td>
<td>860 ... 1060 mbar/86 ... 106 kPa (12.5 ... 15.4 psi)</td>
</tr>
<tr>
<td>Determination of characteristics</td>
<td>limit point adjustment according to DIN 16086</td>
</tr>
<tr>
<td>Characteristics curve</td>
<td>linear</td>
</tr>
<tr>
<td>Calibration position</td>
<td>upright, diaphragm points downward</td>
</tr>
</tbody>
</table>

### Deviation in characteristics

<table>
<thead>
<tr>
<th>Deviation in characteristics</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>– Turn down 1 : 1</td>
<td>&lt; 0.1 %</td>
</tr>
<tr>
<td>– Turn down up to 1 : 5</td>
<td>&lt; 0.1 %</td>
</tr>
<tr>
<td>– Turn down up to 1 : 10</td>
<td>&lt; 0.15 %</td>
</tr>
</tbody>
</table>

2) Relating to the nominal range, incl. hysteresis and repeatability, determined according to the limit point method.
Influence of the product or ambient temperature VEGABAR 61, 63
Applies to digital interfaces (HART, Proﬁbus PA, Foundation Fieldbus) as well as to analogue current output 4 ... 20 mA. Specifications refer to the set span. Turn down (TD) = nominal measuring range/set span.

- Thermal change zero signal, reference temperature 20 °C (68 °F):
  - In the compensated temperature range 0 ... +100 °C < 0.05 %/10 K
  - Outside the compensated temperature range typ. < 0.05 %/10 K

- Applies also to the analogue 4 ... 20 mA current output and refers to the set span.
  - Thermal change, current output < 0.15 % at -40 ... +80 °C (-40 ... +176 °F)

Long-term stability (similar to DIN 16086, DIN 19259-1 and IEC 60770-1)
Applies to digital HART interface as well as to analogue current output 4 ... 20 mA. Specifications refer to the set span. Turn down (TD) is the relation nominal measuring range/set span.

- Long-term drift of the zero signal < (0.1 % x TD)/year

Ambient conditions
- Ambient, storage and transport temperature
  - Standard version
  - Version IP 66/IP 68, 1 bar with connection cable PE

Process conditions

VEGABAR 66
- Product temperature, suspension cable/measuring cell seal -20 ... +60 °C (-4 ... +140 °F)
  - PE/FKM -20 ... +60 °C (-4 ... +140 °F)
  - PE/EPDM -20 ... +60 °C (-4 ... +140 °F)
  - PUR/FKM -20 ... +60 °C (-4 ... +140 °F)
  - PUR/EPDM -20 ... +60 °C (-4 ... +140 °F)
  - FEP/FKM -20 ... +100 °C (-4 ... +212 °F)
  - FEP/FFKM -10 ... +100 °C (+14 ... +212 °F)
  - FEP/FFKM -40 ... +100 °C (-40 ... +212 °F)
- Product temperature, connection tube/seal meas. cell
  - FKM -20 ... +100 °C (-4 ... +212 °F)
  - FFKM -10 ... +100 °C (+14 ... +212 °F)
  - EPDM -20 ... +100 °C (-4 ... +212 °F)
- Product temperature, transmitter protection/seal meas. cell
  - PVDF/FKM or EPDM -20 ... +60 °C (-4 ... +140 °F)
  - PVDF/FFKM -10 ... +60 °C (+14 ... +140 °F)
  - PE/FKM or EPDM -20 ... +60 °C (-4 ... +140 °F)

VEGABAR 67
- Product temperature
  - Suspension cable -12 ... +100 °C (+10 ... +212 °F)
  - Connection tube -12 ... +100 °C (+10 ... +212 °F)

Electromechanical data - version IP 66/IP 67
- Cable entry/plug
  - Single chamber housing
    - 1 x cable gland M20 x 1.5 (cable: ø 5 ... 9 mm), 1 x blind stopper M20 x 1.5

3) Depending on the version M12 x 1, according to DIN 43650, Harting, Amphenol-Tuchel, 7/8” FF.
### Technical data

#### Electromechanical data - version IP 66/IP 68, 1 bar

Version IP 66/IP 68, 1 bar is only available for instruments with absolute pressure measuring ranges.

**Cable entry**

- Single chamber housing
  - 1 x IP 68 cable gland M20 x 1.5; 1 x blind stopper M20 x 1.5
  - 1 x closing cap ½ NPT; 1 x blind plug ½ NPT

- Double chamber housing
  - 1 x cable gland M20 x 1.5 (cable: ø 5 … 9 mm), 1 x blind stopper M20 x 1.5; plug M12 x 1 for VEGADIS 61 (optional)
  - 1 x closing cap ½ NPT, 1 x blind stopper ½ NPT, plug M12 x 1 for VEGADIS 61 (optional)
  - 1 x plug (depending on the version), 1 x blind stopper M20 x 1.5; plug M12 x 1 for VEGADIS 61 (optional)

**Connection cable**

- **Configuration**
  - four wires, one suspension cable, one breather capillary, screen braiding, foil, mantle
- **Wire cross-section**
  - 0.5 mm²
- **Wire resistance**
  - < 0.036 Ω/m
- **Tensile strength**
  - > 1200 N (270 pounds force)
- **Standard length**
  - 5 m (16.4 ft)
- **Max. length**
  - 1000 m (3280 ft)
- **Min. bending radius**
  - 25 mm (with 25 °C/77 °F)
- **Diameter**
  - approx. 8 mm
- **Colour - standard PE**
  - Black
- **Colour - standard PUR**
  - Blue
- **Colour - Ex-version**
  - Blue

#### Electromechanical data - version IP 68

**Suspension cable**

- **Wire cross-section**
  - 0.5 mm²
- **Wire resistance**
  - < 0.036 Ω/m
- **Tensile strength**
  - > 1200 N
- **Max. length non-Ex**
  - 250 m (820.21 ft)
- **Max. length Ex**
  - 180 m (590.55 ft)
- **Min. bending radius**
  - 25 mm (with 25 °C/77 °F)
- **Diameter approx.**
  - 8 mm

**Cable entry/plug**

- **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

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*Depending on the version M12 x 1, according to DIN 43650, Harting, Amphenol-Tuchel, 7/8" FF.*
Double chamber housing

- 1 x closing cap ½ NPT
- 1 x blind stopper ½ NPT
- 1 x plug M12 x 1

Spring-loaded terminals

Remote electronics in addition

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

Connection flag for plug connector according to DIN 43650

-or:

- 1 x plug (depending on the version), 1 x blind stopper M20 x 1.5
- 1 x cable gland M20 x 1.5 (cable: ø 5 … 9 mm), 1 x blind stopper M20 x 1.5; plug M12 x 1 for VEGADIS 61 (optional)

-or:

- 1 x closing cap ½ NPT, 1 x blind stopper ½ NPT, plug M12 x 1 for VEGADIS 61 (optional)

-or:

- 1 x plug (depending on the version), 1 x blind stopper M20 x 1.5; plug M12 x 1 for VEGADIS 61 (optional)

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

Connection flag for plug connector according to DIN 43650

Indicating and adjustment module

- Voltage supply and data transmission
- 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

Supply voltage - 4 … 20 mA/HART

- Supply voltage:
  - Non-Ex instrument: 12 … 36 V DC
  - EX-ia instrument: 12 … 30 V DC
  - Exd instrument: 18 … 36 V DC
- Load: see diagram

Voltage supply - Profibus PA

- Supply voltage:
  - Non-Ex instrument: 9 … 32 V DC
  - EX-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)
Power supply - Foundation Fieldbus

Supply voltage
- Non-Ex instrument: 9 ... 32 V DC
- EEx-ia instrument: 9 ... 24 V DC

Power supply by/max. number of sensors
- H1 Fieldbus cable/Voltage supply: max. 32 (max. 10 with Ex)

Electrical protective measures

Protection
- Transmitter: IP 68 (25 bar)
- Housing, standard: IP 66/IP 67
- Aluminium and stainless housing (optionally available): IP 68 (1 bar)
- External housing: IP 65

Overvoltage category: III

Protection class: II

Existing approvals or approvals applied for *

FM NI: FM(NI) CL I, Div2, GP ABCD (DIP) CL II, III, DIV1, GP EFG
FM IS: FM(IS) CL I, II, III, DIV1, GP ABCDEFGF
FM: FM(XP-IS) CL I, II, III, DIV1, GP ABCDEFGFG

CE conformity


Functional safety (SIL)

You can find detailed information in the supplementary instructions manual "Functional safety VEGABAR series 50 and 60" or under www.vega.com.
Functional safety according to IEC 61508-4/61511
- Single channel architecture (1oo1D): up to SIL2
- Double channel architecture (1oo2D): up to SIL3

Environmental instructions

VEGA environment management system: certified according to DIN EN ISO 14001
You can find detailed information under www.vega.com.

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5) Instruments with gauge pressure measuring ranges cannot detect the ambient pressure when submerged, e.g. in water. This can lead to falsification of the measured value.
6) Only with instruments with absolute pressure ranges.
7) Deviating data in Ex applications: see separate safety instructions.
8) Depending on order specification.
7 Dimensions

Housing in protection IP 66/IP 67

- Plastic housing
- Stainless steel housing
- Special steel casting housing
- Aluminium double chamber housing
- Aluminium housing

Fig. 21: Housing versions in protection IP 66/IP 67 (with integrated indicating and adjustment module the housing is 9 mm/0.35 in higher)

Housing in protection IP 66/IP 68, 1 bar

- Stainless steel housing
- Special steel casting housing
- Aluminium double chamber housing
- Aluminium housing

Fig. 22: Housing versions in protection IP 66/IP 68, 1 bar (with integrated indicating and adjustment module the housing is 9 mm/0.35 in higher)

VEGABAR 66 - standard version

- with straining clamp
- with threaded fitting G1½ A (1½ NPT), transmitter with PE plastic coating
- with thread G1½ A (1½ NPT)
- with direct cable outlet
- Lock fitting

Fig. 23: VEGABAR - standard version
VEGABAR 66 - flange fitting

1  DIN flanges
2  ASME flanges

Fig. 24: VEGABAR 66 - flange fitting

VEGABAR 66 - hygienic fittings

1  Tri-Clamp 2"
2  Bolting DN 50

Fig. 25: VEGABAR - hygienic fittings
VEGABAR 67

Fig. 26: VEGABAR - standard fittings

1 Straining clamp
2 Threaded fitting
3 Thread G1½ A
4 Thread 1½ NPT
5 Lock fitting

VEGABAR 67 - flange fitting

Fig. 27: VEGABAR 67 - flange fitting

1 DIN flanges
2 ASME flanges
VEGABAR 67 - hygienic fittings

Fig. 28: VEGABAR 67 - hygienic fittings

1 Tri-Clamp 2"
2 Bolting DN 50
8 Product code

VEGABAR 66

**Approval**
- XX without
- UX FM Cl.I, Div.2 (NI)•Cl.II, III, Div 1 (DP)
- UF FM Cl.III, Div.1(15)
- UB FM Cl.III, Div.1(15)•Cl.I·III,Div 1 Gh-C-G(XP)

**Version / Material**
- A Suspension cable / PE
- C Suspension cable / PUR
- B Suspension cable / FEP
- D Connection tube / 316L

**Process connection / Material**
- AA Straining clamp / 1.4301
- NN Thread 1½NPT PN3 / 316L
- GB Thread 1½NPT PN25 / 316L
- CA Tri-Clip 2” PN10/316L
- FL Flange DN100PN40 C/DN250/136L
- FO Flange 2¼”RF, ANSI B16.5/316L
- PA Flange 2¼”RF /
- FI Flange 3¼”RF, ANSI B16.5/316L
- PD Flange 3¼”RF /
- PB Flange 3¼”RF /
- PE Flange 4¼”RF /
- PC Flange 4¼”RF /

**Pressure / Measuring range**
- A rel. / 0...0.1bar (0...10kPa)
- B rel. / 0...0.2bar (0...20kPa)
- C rel. / 0...0.4bar (0...40kPa)
- D rel. / 0...1.0bar (0...100kPa)
- E rel. / 0...2.5bar (0...250kPa)
- F rel. / 0...5.0bar (0...500kPa)
- G rel. / 0...10.0bar (0...1000kPa)
- H rel. / 0...25.0bar (0...2500kPa)
- 1 abs. / 0...0.1bar (0...100kPa)
- 2 abs. / 0...0.2bar (0...200kPa)
- 3 abs. / 0...0.5bar (0...500kPa)
- 4 abs. / 0...1.0bar (0...1000kPa)
- 5 abs. / 0...2.5bar (0...2500kPa)
- 6 abs. / 0...5.0bar (0...5000kPa)
- 7 abs. / 0...10.0bar (0...10000kPa)

**Electronics**
- H 4...20mA/HART®
- P Profibus PA
- F Foundation Fieldbus

**Housing / Protection**
- K Plastic / IP66/IP67
- A Aluminium / IP66/IP67
- D Aluminum double chamber / IP66/IP67
- V Stainless steel 316L / IP66/IP67
- T Cable outlet / IP68, ext. housing plastic IP65
- E PE-cable axial IP68, ext. housing K IP65
- F PUR-cable axial IP68, ext. housing K IP65
- G PE-cable axial IP68, ext. housing A IP65
- H PUR-cable axial IP68, ext. housing A IP65
- P FEP-cable axial IP68, ext. housing V IP65
- M PUR-cable axial IP68, ext. housing V IP65
- N FEP-cable axial IP68, ext. housing V IP65

**Cable entry / Plug connection**
- N 1½NPT / without
- N 1½NPT with...

**Indicating/adjustment module (PLICSCOM)**
- X without
- A top mounted
- B side mounted

**Max. suspension cable length 180 m**
**Only in conjunction with Housing / Protection “T”**
**Includes wall and rail mounting set - only with process fitting/material “N” or “A”**
**Only with Housing / Protection “D”**

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**VEGABAR 67**

**Approval**
- XX without
- UX FM Cl.I, Div.2 (NI)•Cl.II, III, Div 1 (DP)
- UF FM Cl.III, Div.1(15)
- UB FM Cl.III, Div.1(15)•Cl.I·III,Div 1 Gh-C-G(XP)

**Version / Material**
- B Suspension cable / FEP
- D Connection tube / 316L

**Process fitting / Material**
- AA Straining clamp / 1.4301
- NN Screwed connection 1½NPT PN3 / 316L
- GB Thread 1½NPT PN25 / 316L
- VB Lock fitting thread NPT11(unpressurized)
- FO Flange 2¼”RF, ANSI B16.5/316L
- FI Flange 3¼”RF, ANSI B16.5/316L
- PE Flange 4¼”RF, ANSI B16.5/316L

**Pressure / Measuring range**
- A rel. / 0...0.1bar (0...10kPa)
- B rel. / 0...0.2bar (0...20kPa)
- C rel. / 0...0.4bar (0...40kPa)
- D rel. / 0...1.0bar (0...100kPa)
- E rel. / 0...2.5bar (0...250kPa)
- F rel. / 0...5.0bar (0...500kPa)
- G rel. / 0...10.0bar (0...1000kPa)
- H rel. / 0...25.0bar (0...2500kPa)
- 1 abs. / 0...0.1bar (0...100kPa)
- 2 abs. / 0...0.2bar (0...200kPa)
- 3 abs. / 0...0.5bar (0...500kPa)
- 4 abs. / 0...1.0bar (0...1000kPa)
- 5 abs. / 0...2.5bar (0...2500kPa)
- 6 abs. / 0...5.0bar (0...5000kPa)
- 7 abs. / 0...10.0bar (0...10000kPa)

**Electronics**
- H 4...20mA/HART®
- P Profibus PA
- F Foundation Fieldbus

**Housing / Protection**
- K Plastic / IP66/IP67
- A Aluminium / IP66/IP67
- D Aluminum double chamber / IP66/IP67
- V Stainless steel (precision casting) 316L / IP66/IP67
- T Cable outlet / IP68, ext. housing plastic IP65
- E PE-cable axial IP68, ext. housing K IP65
- B PE-cable lateral IP68, ext. housing K IP65

**Cable entry / Plug connection**
- N 1½NPT / without
- N 1½NPT with...

**Indicating/adjustment module (PLICSCOM)**
- X without
- A top mounted
- B laterally mounted

**Additional equipment**
- X without

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1 Max. suspension cable length 180 m
2 Only in conjunction with Housing / Protection “T”
3 Includes wall and rail mounting set - only with process fitting/material “N” or “A”
4 Only with Housing / Protection “D”
You can find at www.ohmartvega.com downloads of the following
● operating instructions manuals
● menu schematics
● software
● certificates
● approvals
and much, much more

Subject to change without prior notice