Pressure measurement

Process pressure/Hydrostatic

VEGAWELL 52

Product Information
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Take note of safety instructions for Ex applications

Please note the Ex specific safety information which you can find on our homepage www.vega.com/services/downloads and which comes with every instrument. In hazardous areas you should take note of the appropriate regulations, conformity and type approval certificates of the sensors and power supply units. The sensors must only be operated on intrinsically safe circuits. The permissible electrical values are stated in the certificate.
1  Description of the measuring principle

Measuring principle

VEGAWELL 52 pressure transmitters work according to the hydrostatic measuring principle, which functions independently of the dielectric properties of the product and is not influenced by foam generation.

The sensor element of VEGAWELL 52 is the dry ceramic-capacitive CERTEC® measuring cell in two sizes. Base element and diaphragm consist of high purity sapphire-ceramic®.

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.

![Diagram](image)

*Fig. 1: Configuration of the CERTEC® measuring cell with VEGAWELL 52*

1  Diaphragm
2  Soldered glass bond
3  Base element

The advantages of the CERTEC® measuring cell are:

- Very high overload resistance
- No hysteresis
- Excellent long-term stability
- Completely front flush installation
- Good corrosion resistance
- Very high abrasion resistance

Wide application range

VEGAWELL 52 is suitable for level measurement in deep wells and ballast tanks as well as for gauge measurement in open flumes. Typical media are drinking water and waste water as well as water containing abrasive substances. All signal outputs are available in 4 … 20 mA and 4 … 20 mA/HART - Pt 100.

In the 4 … 20 mA/HART - Pt 100 version, a temperature sensor Pt 100 in four-wire technology is integrated in the transducer. Power supply or processing are carried out via an external temperature transducer.
2 Type overview

VEGAWELL 52

Measuring cell: CERTEC®
Media: drinking water and waste water
Process fitting: Straining clamp, screw connection, thread
Material process fitting: 316L
Material, suspension cable: PE, PUR, FEP
Material transmitter: 316L, 1.4462 (Duplex), each also with PE coating, PVDF, Titanium
Diameter transmitter: depending on material and version at least 22 mm
Measuring range: 0 … 0.1 bar up to 0 … 25 bar
Process temperature: -20 … +80 °C (-4 … +176 °F)
Deviation: < 0.2 %, < 0.1 %
Signal output: 4 … 20 mA, 4 … 20 mA/HART
Operation: depending on the version via PACTware/PC
3 Mounting instructions

Mounting position
The following illustration shows a mounting example for VEGA-WELL 52. The VEGA price list contains suitable mounting brackets under the section Accessories. With these parts, standard mounting arrangements can be realised quickly and reliably.

![Mounting example](image)

**Fig. 2: VEGA WELL 52 in a pump shaft with VEGABOX 02**

VEGA WELL 52 must be mounted in a calm area or in a suitable protective tube. This avoids lateral movements of the transmitter and the resulting corruption of measurement data.

**Note:**
As an alternative to fixing the transmitter, the use of a measuring instrument holder from VEGA's line of mounting accessories is recommended.

Beside the connection and suspension cables, the suspension cable also contains a capillary for atmospheric pressure compensation. All versions can be shortened on site.

With VEGA WELL 52, the electronics is completely integrated in the transmitter. The cable end can be lead directly to a dry connection compartment. Pressure compensation is then carried out via the filter element of the capillaries.

**Note:**
The pressure compensation housing VEGABOX 02 is recommended for connecting VEGA WELL 52.

It contains a high-quality ventilation filter and terminals. A protective cover is optionally available for use outdoors.

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

**Mounting with straining clamp**

![Straining clamp](image)

**Fig. 3: Straining clamp**

1. Suspension cable
2. Suspension opening
3. Clamping jaws

**Mounting with screw connection**

![Screw connection](image)

**Fig. 4: Screw connection**

1. Suspension cable
2. Seal screw
3. Cone bushing
4. Seal cone
5. Screw connection
6. Seal
Mounting with housing and thread

Fig. 5: Housing with thread G1\(\frac{1}{2}\) A

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.

\[\text{In hazardous areas you should take note of the appropriate regulations, conformity and type approval certificates of the sensors and power supply units.}\]

4.2 Power supply
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".

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.

4.3 Connection cable
In general
An outer diameter of 5…9 mm ensures the seal effect of the cable entry. If electromagnetic interference is expected, screened cable should be used for the signal lines.

The sensors are connected with standard two-wire cable without screen.

\[\text{In Ex applications, the corresponding installation regulations must be noted for the connection cable.}\]

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).

4.5 Wiring plan VEGAWELL 52 - 4 … 20 mA
Direct connection

\[\text{Connection via VEGABOX 02}\]

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1) Connect screen to ground terminal. Connect ground terminal on the outside of the housing as prescribed. The two terminals are galvanically connected.
4.6 Wiring plan VEGAWELL 52 - 4 ... 20 mA/ HART - Pt 100

Direct connection

Connection via housing

Connection via VEGABOX 02

Connection via VEGABOX 02 with integrated temperature sensor

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2) Connect screen to ground terminal. Connect ground terminal on the outside of the housing as prescribed. The two terminals are galvanically connected.

3) Connect screen to ground terminal. Connect ground terminal on the outside of the housing as prescribed. The two terminals are galvanically connected.

4) Connect screen to ground terminal. Connect ground terminal on the outside of the housing as prescribed. The two terminals are galvanically connected.
Connection via housing

![Diagram of terminal assignment of the housing]

Fig. 12: Terminal assignment of the housing

1. To power supply or the processing system (signal pressure transmitter)
2. For voltage supply or to processing system (resistance thermometer Pt 100)
3. Shielding

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5) Connect screen to ground terminal. Connect ground terminal on the outside of the housing as prescribed. The two terminals are galvanically connected.
5 Operation

5.1 Overview

VEGAWELL 52 4 ... 20 mA
VEGAWELL 52 - 4 ... 20 mA has no adjustment options.

VEGAWELL 52 4 ... 20 mA/HART - Pt 100
- Adjustment software according to FDT/DTM standard, e.g. PACTware and PC
- HART handheld

5.2 Adjustment with PACTware

Connecting the PC to the signal cable

![Diagram of PC connection](image)

**Fig. 13: Connection of the PC to VEGABOX 02 or communication resistor**

1. PC with PACTware
2. RS232 interface (with VEGACONNECT 3), USB interface (with VEGACONNECT 4)
3. VEGACONNECT 3 or 4
4. Communication resistor 250 Ω
5. Power supply unit

**Necessary components:**
- VEGAWELL 52
- PC with PACTware and suitable VEGA DTM
- VEGACONNECT with HART adapter cable
- HART resistor approx. 250 Ω
- Power supply unit

**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, VEGAMET 381/624/625, VEGASCAN 693). In such cases, VEGACONNECT can be connected parallel to the 4 ... 20 mA cable.
6 Technical data

Materials and weights

<table>
<thead>
<tr>
<th>Materials, wetted parts</th>
<th>316L, 316L with PE coating, 1.4462 (Duplex), 1.4462 with PE coating, PVDF, Titanium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmitter</td>
<td>sapphire ceramic® (99.9 % oxide ceramic)</td>
</tr>
<tr>
<td>Diaphragm</td>
<td>FKM (VP2/A) - FDA and KTW approved, FFKM (Perlast G75S), EPDM (A-P 75.5/KW75F)</td>
</tr>
<tr>
<td>Measuring cell seal</td>
<td>PE (FDA and KTW-approved), FEP, PUR</td>
</tr>
<tr>
<td>Suspension cable</td>
<td></td>
</tr>
<tr>
<td>Cable gland on the transmitter</td>
<td>316L</td>
</tr>
<tr>
<td>Process fitting</td>
<td>316L</td>
</tr>
<tr>
<td>Straining clamp</td>
<td>1.4301</td>
</tr>
<tr>
<td>Unassembled screw connection</td>
<td>316L, PVDF</td>
</tr>
<tr>
<td>Threaded connection on the housing</td>
<td>316L</td>
</tr>
<tr>
<td>Materials, non-wetted parts</td>
<td>plastic PBT (Polyester), 316L</td>
</tr>
<tr>
<td>Housing</td>
<td>0.8 kg (1.764 lbs)</td>
</tr>
<tr>
<td>Basic weight</td>
<td>0.1 kg/m (0.07 lbs/ft)</td>
</tr>
<tr>
<td>Suspension cable</td>
<td>0.2 kg (0.441 lbs)</td>
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<tr>
<td>Straining clamp</td>
<td>0.4 kg (0.882 lbs)</td>
</tr>
<tr>
<td>Screw connection</td>
<td>0.8 kg (1.764 lbs)</td>
</tr>
<tr>
<td>Plastic housing</td>
<td>1.6 kg (3.528 lbs)</td>
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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>
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<tr>
<td>Recommended max. turn down</td>
<td>10 : 1</td>
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</table>

Output variable

<table>
<thead>
<tr>
<th>4 ... 20 mA</th>
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<tbody>
<tr>
<td>Output signal</td>
</tr>
<tr>
<td>Signal resolution</td>
</tr>
<tr>
<td>Failure signal</td>
</tr>
<tr>
<td>Max. output current</td>
</tr>
<tr>
<td>Run-up time</td>
</tr>
<tr>
<td>Step response time</td>
</tr>
<tr>
<td>Fulfilled NAMUR recommendations</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>4 ... 20 mA/HART - Pt 100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output signal</td>
</tr>
<tr>
<td>Signal resolution</td>
</tr>
<tr>
<td>Failure signal</td>
</tr>
<tr>
<td>Max. output current</td>
</tr>
<tr>
<td>Run-up time</td>
</tr>
<tr>
<td>Step response time</td>
</tr>
<tr>
<td>Fulfilled NAMUR recommendations</td>
</tr>
</tbody>
</table>

Additional output parameter - temperature

<table>
<thead>
<tr>
<th>integrated resistance thermometer</th>
<th>Pt 100 according to DIN EN 60751</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range</td>
<td>-50 ... +100 °C (-58 ... +212 °F)</td>
</tr>
<tr>
<td>Resolution</td>
<td>1 °K</td>
</tr>
</tbody>
</table>

Deviation for 4 ... 20 mA version®

Specifications refer to the set span. Turn down (TD) = nominal measuring range/set span.

® Determined according to the limit point method according to IEC 60770, incl. non-linearity, hysteresis and non-repeatability.
Deviation with version < 0.2 %
- Turn down 1 : 1 up to 5 : 1 < 0.2 %
- Turn down > 10 : 1 < 0.04 % x TD

Deviation with version < 0.1 %
- Turn down 1 : 1 up to 5 : 1 < 0.1 %
- Turn down > 10 : 1 < 0.02 % x TD

**Deviation for version 4 ... 20 mA/HART - Pt 100°**

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.

Deviation with version < 0.2 %
- Turn down 1 : 1 up to 5 : 1 < 0.2 %
- Turn down > 10 : 1 < 0.04 % x TD

Deviation with version < 0.1 %
- Turn down 1 : 1 up to 5 : 1 < 0.1 %
- Turn down > 10 : 1 < 0.02 % x TD

**Influence of the product or ambient temperature**

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.

**Average temperature coefficient of the zero signal**

In the compensated temperature range of 0 ... +80 °C (+32 ... +176 °F), reference temperature 20 °C (68 °F).

Average temperature coefficient of the zero signal
- Turn down 1 : 1 < 0.05 %/10 K
- Turn down 1 : 1 up to 5 : 1 < 0.1 %/10 K
- Turn down > 10 : 1 < 0.15 %/10 K

Outside the compensated temperature range
Average temperature coefficient of the zero signal
- Turn down 1 : 1 typ. < 0.05 %/10 K

**Long-term stability (similar to DIN 16086, DINV 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 temperature
  - Connection cable PE -40 ... +60 °C (-40 ... +140 °F)
  - Connection cable PUR, FEP -40 ... +85 °C (-40 ... +185 °F)
- Storage and transport temperature -20 ... +80 °C (-4 ... +176 °F)

7) Determined according to the limit point method according to IEC 60770, incl. non-linearity, hysteresis and non-repeatability.
Process conditions

Process pressure

Max. process pressure, transmitter
- Measuring range 0.1 bar (1.45 psig)  15 bar (218 psig)
- Measuring range 0.2 bar (2.9 psig)  20 bar (290 psig)
- Measuring range ≤ 0.4 bar (5.8 psig)  25 bar (363 psig)
- Unassembled screw connection
- Thread on the housing
Product temperature, depending on the version

Transmitter | Product temperature
--- | ---
All | -20 ... +60 °C (-4 ... +140 °F)
All | -20 ... +80 °C (-4 ... +176 °F)
PE coating | -20 ... +60 °C (-4 ... +140 °F)
All | -20 ... +80 °C (-4 ... +176 °F)
PE coating | -20 ... +60 °C (-4 ... +140 °F)

Vibration resistance

mechanical vibrations with 4 g and 5 ... 100 Hz

Electromechanical data

Suspension cable
- Configuration
- Tensile strength  ≥ 1200 N (270 pound force)
- Max. length  1000 m (3280 ft)
- Min. bending radius  25 mm (with 25 °C/77 °F)
- Diameter approx.  8 mm (0.315 in)
- colour (non-Ex/Ex) - PE  black/blue
- colour (non-Ex/Ex) - PUR, FEP  blue/blue
- Cable entry housing or VEGABOX 02  1 x cable gland M20 x 1.5 (cable: ø 5 ... 9 mm), 1 x blind stopper M20 x 1.5 for wire cross section 1.5 mm² (AWG 16), screen up to 4 mm² (AWG 12)
- Screw terminals

Supply voltage - 4 ... 20 mA

Operating voltage  8 ... 36 V DC
Permissible residual ripple
- < 100 Hz  Uss < 1 V
- 100 Hz ... 10 kHz  Uss < 10 mV
Load  see diagram

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8) Limited by the overpressure resistance of the measuring cell.
9) Tested according to the regulations of German Lloyd, GL directive 2.
Fig. 14: Voltage diagram
1 Voltage limit
2 Operating voltage

Supply voltage - 4 … 20 mA/HART - Pt 100

<table>
<thead>
<tr>
<th>Operating voltage</th>
<th>9.6 … 36 V DC</th>
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</thead>
<tbody>
<tr>
<td>Permissible residual ripple</td>
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<tr>
<td>– &lt; 100 Hz</td>
<td>$U_{ss} &lt; 1$ V</td>
</tr>
<tr>
<td>– 100 Hz … 10 kHz</td>
<td>$U_{ss} &lt; 10$ mV</td>
</tr>
</tbody>
</table>

Load  
see diagram

Fig. 15: Voltage diagram
1 HART load
2 Voltage limit
3 Operating voltage

Electrical protective measures

Protection
- Transmitter  
  IP 68 (30 bar)
- Housing  
  IP 66/IP 67
- VEGABOX 02  
  IP 65

Overvoltage category  III
Protection class  III
# Existing approvals or approvals applied for

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<th>Approval Type</th>
<th>According To</th>
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<td>Gas explosion protection</td>
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<tr>
<td>Fire-damp protection</td>
<td>e.g. according to ATEX</td>
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<tr>
<td>Overfill protection</td>
<td>e.g. according to WHG</td>
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<tr>
<td>Ship approval</td>
<td>e.g. according to GL, LRS, ABS, RINA</td>
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The available approvals can be selected via the configurator on [www.vega.com](http://www.vega.com).

Depending on the version, instruments with approvals can have different technical data. For these instruments, please note the corresponding approval documents. They can be downloaded in the download section on [www.vega.com](http://www.vega.com).

# CE conformity

<table>
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<tr>
<th>Standard</th>
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<tr>
<td>LVD (2006/95/EG)</td>
<td>61010-1: 2001</td>
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# Environmental instructions

- VEGA environment management system certified according to DIN EN ISO 14001

You can find detailed information under [www.vega.com](http://www.vega.com).
7 Dimensions

VEGA WELL 52 - suspension cable 1

VEGA WELL 52 - suspension cable 2

Fig. 16: VEGA WELL 52 - suspension cable

1 Transmitter Duplex, with straining clamp
2 Transmitter Duplex for deep wells, with unassembled screw connection G1½ A (1½ NPT) and closing cap
3 Transmitter Duplex, with PE coating
4 Transmitter with screwed connection of PVDF
5 Transmitter Titanium/Titanium with glass leadthrough, with thread G1 A (1 NPT) and plastic housing

VEGA WELL 52 - threaded fitting

Fig. 17: VEGA WELL 52 - suspension cable

1 Transmitter 316L, with straining clamp
2 Transmitter Titanium, with unassembled screw connection G1 A (1 NPT)

Fig. 18: VEGA WELL 52 - thread

1 Threaded fitting G½ inner G½
2 Threaded fitting G1
8 Product code

VEGAWELL 52

Approval
XX without
XM Ship approval
AX ATEX II 2G Ex ia IIC T6
AM ATEX II 2G Ex ia IIC T6 + Ship approval
AI IEC Ex ia IIC T6

Fastening / Material
X4 without
A4 Straining clamp / 1.4301 (304)
GA Threaded fitting, unassembled G1½A PN2 / 316L
NP Threaded fitting, unassembled G1½A PN0,2 / PVDF
GC Threaded fitting, unassembled G1A PN3 / 316L
OK Thread G1½A PN3 / 316L with plastic housing
GV Thread G1½A PN3 / 316L w. hous. StSt (precision casting)

Version / Process temperature
A Suspension cable PE / -20...60°C
D Suspension cable PUR / -20...80°C
B Suspension cable FEP / -20...80°C

Length
K 6 m suspension cable PE
L 12 m suspension cable PE
M 27 m suspension cable PE

T Individually selectable length (PE/PUR/FEP)

Transmitter material / Diameter
D Duplex 1.4462 / 32mm
V 316L / 22mm
K Duplex 1.4462 with PE coating / 35mm
P PVDF / 44 mm

Seal measuring cell
1 FKM (VP2/A)
3 EPDM (A+P 75,9/KW75F)
P FFKM (Perlast G75S)

Measuring range
A rel. / 0...0,1 bar (0...10 kPa)
B rel. / 0...0,2 bar (0...20 kPa)
C rel. / 0...0,4 bar (0...40 kPa)
D rel. / 0...1 bar (0...100 kPa)
E rel. / 0...2,5 bar (0...250 kPa)
F rel. / 0...5 bar (0...500 kPa)
G rel. / 0...10 bar (0...1000 kPa)
2 abs. / 0...2,5 bar (0...250 kPa)
3 abs. / 0...5 bar (0...500 kPa)

Electronics
C 4...20mA
D 4...20mA/HART® + PT100 4-wire

Deviation in characteristic
1 0,20
2 0,10

Transmitter options
X without
V for deep wells
You can find at www.ohmartvega.com downloads of the following
- operating instructions manuals
- menu schematics
- software
- certificates
- approvals
and much, much more