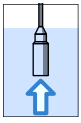
Operating Instructions

VEGAWELL 52

4 … 20 mA/HART Pt 100

Document ID:
35402

Process pressure/
Hydrostatic



Contents

35402-EN-111021

Supplementary documentation

Information:
Supplementary documents appropriate to the ordered version come with the delivery. You can find them listed in chapter "*Product description*".

Editing status: 2011-10-10

1 About this document

1.1 Function

This operating instructions manual provides all the information you need for mounting, connection and setup as well as important instructions for maintenance and fault rectification. 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 qualified personnel. The contents of this manual should be made available to these personnel and put into practice by them.

1.3 Symbolism used

Information, tip, note
This symbol indicates helpful additional information.

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

Ex applications
This symbol indicates special instructions for Ex applications.

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

→ **Action**
This arrow indicates a single action.

1 **Sequence**
Numbers set in front indicate successive steps in a procedure.

2 For your safety

2.1 Authorised personnel

All operations described in this operating instructions manual must be carried out only by trained specialist personnel authorised by the plant operator.

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

2.2 Appropriate use

VEGAWELL 52 is a suspension pressure transmitter for level and gauge measurement.

You can find detailed information on the application range 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 misuse

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

2.4 General safety instructions

This is a high-tech instrument requiring the strict observance of standard regulations and guidelines. The user must take note of the safety instructions in this operating instructions manual, the country-specific installation standards as well as all prevailing safety regulations and accident prevention rules.

The instrument must only be operated in a technically flawless and reliable condition. The operator is responsible for trouble-free operation of the instrument.

During the entire duration of use, the user is obliged to determine the compliance of the necessary occupational safety measures with the current valid rules and regulations and also take note of new regulations.

2.5 Safety label on the instrument

The safety approval markings and safety tips on the device must be observed.

2.6 CE conformity

This device fulfills the legal requirements of the applicable EC guidelines. By attaching the CE mark, VEGA provides a confirmation of successful testing. You can find the CE conformity declaration in the download area of www.vega.com.

2.7 NAMUR recommendations

NAMUR is a user association for automation technology in the process industries in Germany. Several of its key activities are defining standards as well as setting user requirements on new devices, systems and technologies. The published NAMUR recommendations (NE) are accepted as the standard in field instrumentation.

The device fulfills the requirements of the following NAMUR recommendations:

- NE 21 – Electromagnetic compatibility of equipment
- NE 43 – Standardization of the signal level for the breakdown information of digital transmitters
- NE 53 – Compatibility of field devices and indicating/adjustment components

2.8 Safety instructions for Ex areas

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

2.9 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 Product description

3.1 Structure

Scope of delivery

The scope of delivery encompasses:

- VEGAWELL 52 pressure transmitter with suspension cable
- optionally available with straining clamp, screwed connection or housing with cable locking
- Documentation
  - this operating instructions manual
  - test certificate
  - Supplementary instructions "*Suitable for drinking water*" (optional)
  - Ex-specific "*Safety instructions*" (with Ex versions)
  - if necessary, further certificates

Constituent parts

VEGAWELL 52 with suspension cable consists of the following components:

- Transmitter
- Suspension cable
- Optional fastening element or housing with threaded fitting

The components are available in different versions.

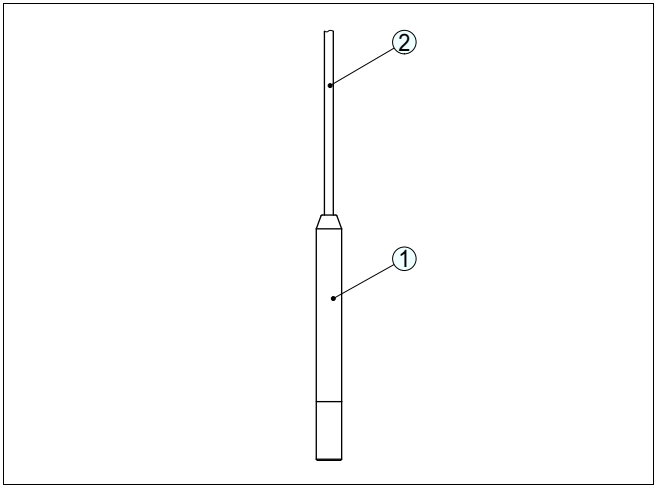


Fig. 1: Example of a VEGAWELL 52 with transmitter 22 mm

1 Transmitter
2 Suspension cable

Type label

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

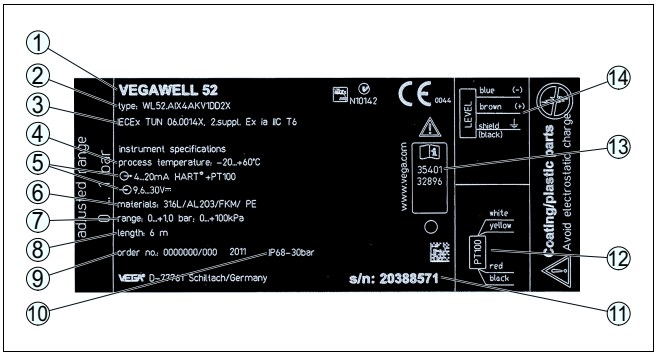


Fig. 2: Structure type label VEGAWELL 52 (example)

1 *Instrument type*
2 *Product code*
3 *Approvals*
4 *Process temperature*
5 *Signal output/Voltage supply*
6 *Materials transmitter/Measuring cell/Measuring cell seal/Connection cable*
7 *Measuring range*
8 *Cable length*
9 *Order number*
10 *Protection rating*
11 *Serial number of the instrument*
12 *Assignment connection cable temperature*
13 *ID numbers, instrument documentation*
14 *Assignment connection cable level*

The serial number allows you to access the delivery data of the instrument via www.vega.com, "*VEGA Tools*" and "*serial number search*". You can also find the serial number on the type label on the suspension cable or on the housing.

3.2 Principle of operation

Application area

VEGAWELL 52 is used for level and gauge measurement in wells, basins and vessels open to the atmosphere, particularly in the water/waste water industry as well as in the shipbuilding industry.[1)]

Functional principle

The actual sensor element is the CERTEC® measuring cell with rugged ceramic diaphragm. The hydrostatic pressure causes a capacitance change in the measuring cell via the ceramic diaphragm. This change is converted into an appropriate output signal.

1) For use in closed vessels under vacuum, the instrument is available with absolute pressure measuring ranges.

The CERTEC® measuring cell is also equipped with a temperature sensor Pt 100 in four-wire technology. The resistance value is accessed via the wires of the suspension cable. The power supply or the processing is carried out via a temperature transducer, e.g. in the VEGABOX 02.

Seal concept

As a standard feature, the CERTEC® measuring cell is equipped with a lateral, recessed seal.

Instruments with double seal have an additional seal in front.

Voltage supply

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

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

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

3.3 Operation

The instrument can be adjusted with the following adjustment media:

- With the external indicating and adjustment instrument VEGADIS 62
- an adjustment software according to FDT/DTM standard, e.g. PACTware and PC
- With a HART handheld

The type of adjustment and the adjustment options depend on the selected adjustment component. The entered parameters are generally saved in the respective sensor, when adjusting with PACTware™ and PC optionally also in the PC.

3.4 Packaging, transport and storage

Packaging

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

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 under 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 humidity 20 … 85 %

3.5 Accessories and replacement parts

Interface adapter

The interface adapter VEGACONNECT 4 enables the connection of communication-capable instruments to the USB interface of a PC. For parameter adjustment of these instruments, an adjustment software such as PACTware with VEGA-DTM is required.

You can find further information in the operating instructions "*Interface adapter VEGACONNECT*" (Document-ID 32628).

External indicating and adjustment unit VEGADIS 62

VEGADIS 62 is suitable for measured value indication and adjustment of sensors with HART protocol. It is looped into the 4 … 20 mA/HART signal cable.

VEGADIS 62 is suitable for measured value indication with sensors without HART protocol.

You can find further information in the operating instructions "*VEGADIS 62*" (Document-ID 36469).

Measuring instrument holder

The measuring instrument holder is used for wall/tube mounting of VEGABAR series 50 pressure transmitters and VEGAWELL 52 suspension pressure transmitters. Supplied reducers enable the adaptation to different instrument diameters. The material used is 316L.

Mounting bracket

The robust, heavy-duty bracket of 1.4301/304 is designed for wall mounting VEGA instruments. The required fastening elements are included in the shipment.

4 Mounting

4.1 General instructions

Suitability for the process conditions

Make sure that all parts of the instrument exposed to the process, in particular the sensor element, process seal and process fitting, are suitable for the existing process conditions. These include above all the process pressure, process temperature as well as the chemical properties of the medium.

You can find the specifications in chapter "*Technical data*" or on the type label.

Mounting position

Lateral movements of the transmitter can cause measurement errors. For this reason, mount the instrument in a calm area or in a suitable protective tube.

Pressure compensation

The connection cable has a capillary for atmospheric pressure compensation. Therefore lead the cable end into a dry environment or a suitable terminal housing, for example VEGABOX 02 or VEGADIS 62.

Mounting example

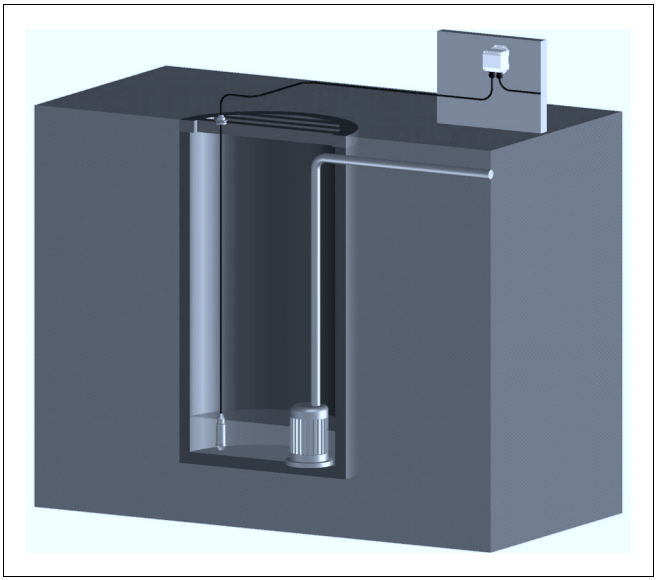


Fig. 3: Mounting example: VEGAWELL 52 in a pump shaft with breather housing VEGABOX 02

4.2 Mounting steps with straining clamp

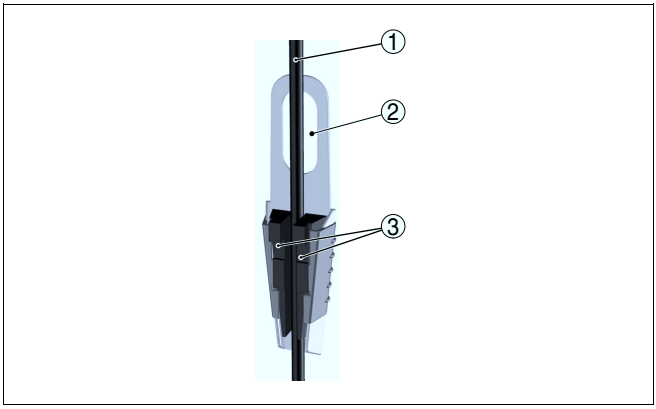


Fig. 4: Straining clamp

1 Suspension cable
2 Suspension opening
3 Clamping jaws

Mount VEGAWELL 52 with straining clamp as follows:

1 Hang the straining clamp on a suitable wall hook
2 Lower VEGAWELL 52 to the requested height
3 Slide the clamping jaws upward and push the suspension cable between them
4 Hold the suspension cable, push the clamping jaws downward and fix them with a light blow

Removal is carried out in reverse order.

4.3 Mounting steps with screwed connection

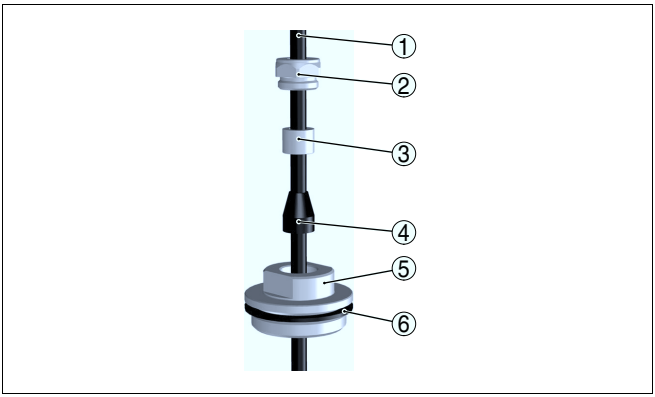


Fig. 5: Threaded fitting

1 Suspension cable
2 Seal screw
3 Cone bushing
4 Seal cone
5 Threaded fitting
6 Seal

Mount VEGAWELL 52 with screwed connection as follows:

1 Weld the welded socket into the vessel top
2 Lower VEGAWELL 52 to the requested height by means on the welded socket G1½ A or 1½ NPT on the vessel side
3 Insert the suspension cable from below into the open screwed connection
4 Slide the seal cone and the cone sleeve over the suspension cable, fasten manually with the seal screw
5 Screw the screwed connection into the socket, fasten with SW 30 and then fasten seal screw with SW 19

How to correct the height:

1 Loosen seal screw with SW 19
2 Slide seal cone and cone sleeve to the requested position on the cable
3 Fasten the seal screw

Removal is carried out in reverse order.

4.4 Mounting steps with threaded connection or housing

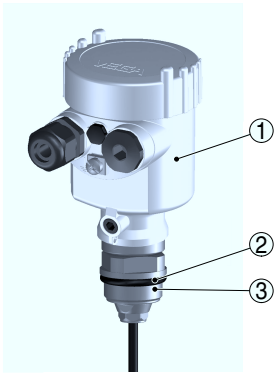


Fig. 6: Plastic housing

1 Housing
2 Seal
3 Thread

Mount into the vessel

Mount VEGAWELL 52 as follows:

1 Weld the welded socket G1½ A or 1½ NPT to the vessel top
2 Shift transmitter through the mounting boss
3 Turn the thread with seal into the socket and tighten with SW 46[2)]

Removal is carried out in reverse order.

Mounting into the basin

Mount VEGAWELL 52 as follows:

1 Fasten the mounting bracket at the suitable height on the basin wall
2 Lead the transmitter through the opening of the mounting bracket and the counter nut
3 Fasten counter nut with SW 46 on the thread

2) Seal the 1½ NPT thread with teflon, hemp or a similar resistant material.

5 Connecting to power supply

5.1 Preparing the connection

Safety instructions

Generally connect the instrument only in the complete absence of line voltage.

The instrument is equipped with an integrated overvoltage protection. For additional protection of the signal circuit, we recommend further external overvoltage arresters:

- Type B63-48 (use with VEGAWELL 52 with plastic housing) or
- Type ÜSB 62-36G.X (use in a separate housing)

Take note of safety instructions for Ex applications

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

Select power supply

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

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

Provide a reliable separation between the supply circuit and the mains circuits according to DIN VDE 0106 part 101.

VEGA power supply units VEGATRENN 149AEx, VEGASTAB 690, VEGADIS 371 as well as all VEGAMETs meet this requirement. When using one of these instruments, protection class III is ensured for VEGAWELL 52.

Keep in mind the following additional factors that influence the operating voltage:

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

Select connection cable

The instrument is connected with standard two-wire cable without screen. If electromagnetic interference is expected which is above the test values of EN 61326 for industrial areas, screened cable should be used.

Use cable with round cross-section. A cable outer diameter of 5 … 9 mm (0.2 … 0.35 in) ensures the seal effect of the cable gland. If you are using cable with a different diameter or cross-section, exchange the seal or use a suitable cable gland.

We generally recommend the use of screened cable for HART multidrop mode.

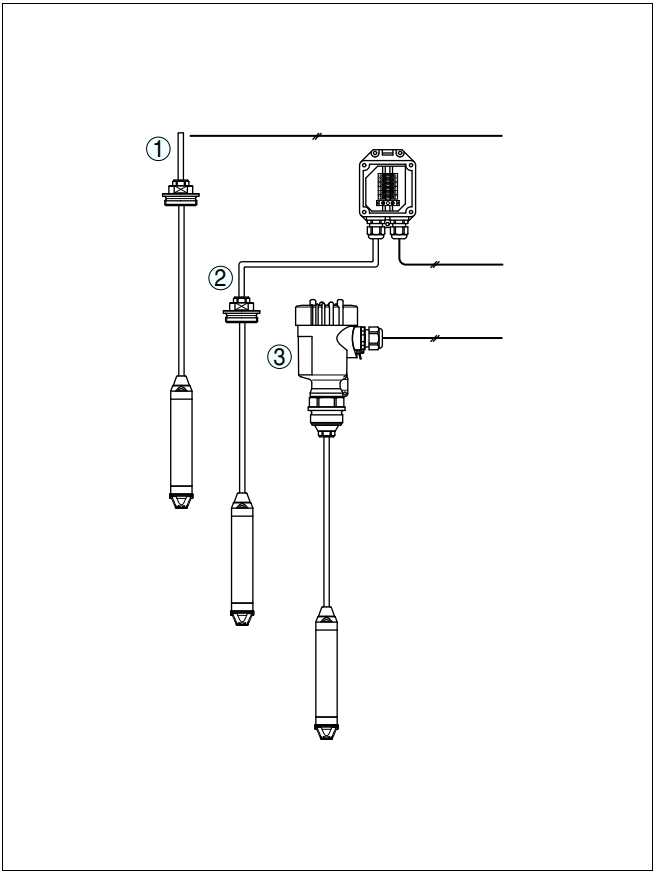


Fig. 7: Connect VEGAWELL 52 to power supply

1 Direct connection
2 Connection via VEGABOX 02
3 Connection via housing

Cable screening and grounding

If screened cable is necessary, connect the cable screen on both ends to ground potential. In the plastic housing, in VEGABOX 02 or in VEGADIS 12, the screen must be connected directly to the internal ground terminal. The ground terminal outside on the housing must be connected to the potential equalisation.

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

Warning:
Within galvanic plants as well as vessels with cathodic corrosion protection there are considerable potential differences. Considerably equalisation currents can be caused via the cable scrren when the screen is earthed on both ends. To avoid this, the cable screen must only connected to ground potential on one side of the switching cabinet in such applications. The cable screen must **not** be connected to the internal ground terminal in the sensor and the outer ground terminal on the housing **not** to the potential equalisation!

Information:
The metallic parts of the instrument (antenna, transmitter, concentric tube, etc.) are conductively connected with the inner and outer ground terminal on the housing. This connection exists either as a direct metallic contact or via the shielding of the special connection cable on instruments with external electronics. You can find specifications on the potential connections within the instrument in chapter "*Technical data*".

Select connection cable for Ex applications

Take note of the corresponding installation regulations for Ex applications.

5.2 Connection procedure

Direct connection

Proceed as follows:

1. Wire the connection cable up to the connection compartment[3)]
2. Connect the wire ends to the screw terminals according to the wiring plan

Connection via VEGABOX 02

Proceed as follows:

1. Snap VEGABOX 02 onto the carrier rail or screw it to the mounting plate
2. Loosen the cover screws and remove the cover
3. Push the cable into VEGABOX 02 through the cable entry
4. Loosen the screws with a screwdriver
5. Insert the wire ends into the open terminals according to the wiring plan
6. Tighten the screws with a screwdriver
7. Check the hold of the wires in the terminals by lightly pulling on them
8. Tighten the compression nut of the cable entry. The seal ring must completely encircle the cable
9. Connect the supply cable according to steps 3 to 8

[3)] The connection cable is already preconfectioned. After shortening the cable, fasten the type plate with support again to the cable.

10 Screw the housing cover on

The electrical connection is finished.

Connection via housing

Proceed as follows:

1 Unscrew the housing cover
2 Insert the connection cable through the cable entry into the plastic housing
3 Loosen the screws with a screwdriver
4 Insert the wire ends into the open terminals according to the wiring plan
5 Tighten the screws with a screwdriver
6 Check the hold of the wires in the terminals by lightly pulling on them
7 Tighten the compression nut of the cable entry. The seal ring must completely encircle the cable
8 Retighten the housing cover

The electrical connection is finished.

5.3 Wiring plan

Direct connection

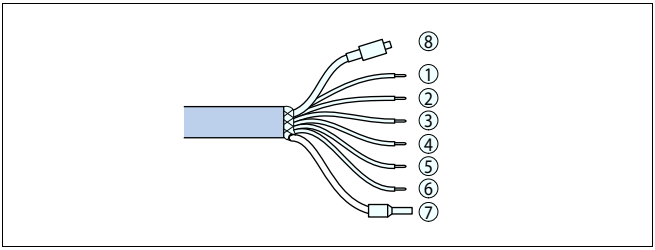


Fig. 8: Wire assignment connection cable

1 Brown (+): to power supply or to the processing system
2 Blue (-): to power supply or to the processing system
3 White: for processing of the integrated Pt 100 (power supply)
4 Yellow: for processing of the integrated Pt 100 (measurement)
5 Red: for processing of the integrated Pt 100 (measurement)
6 Black: for processing of the integrated Pt 100 (power supply)
7 Shielding
8 Breather capillaries with filter element

Connection via VEGABOX 02

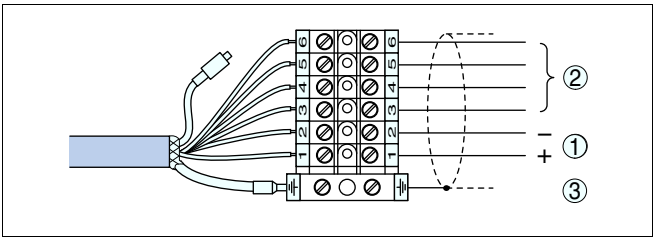


Fig. 9: Wiring plan VEGABOX 02

1 To power supply or the processing system (signal pressure transmitter)
2 To power supply or the processing system (connection cables resistance thermometer Pt 100)
3 Shielding[4)]

Wire number	Wire colour/Polarity	Terminal VEGABOX 02
1	brown (+)	1
2	blue (-)	2
3	White	3
4	Yellow	4
5	Red	5
6	Black	6
	Shielding	Ground

Connection via VEGABOX 02 with integrated transmitter for Pt 100

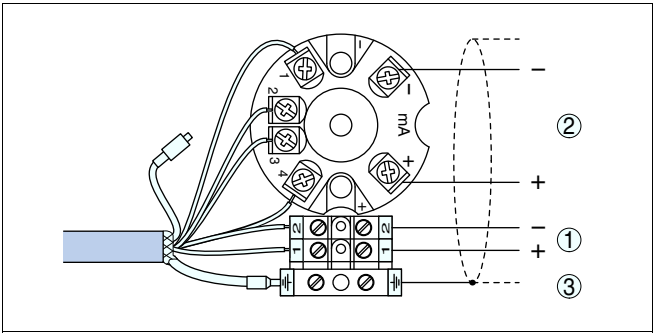


Fig. 10: Wiring plan VEGABOX 02 with integrated transmitter for Pt 100

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[5)]

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

Wire number	Wire colour/Polarity	Terminal VEGABOX 02
1	brown (+)	1
2	blue (-)	2
3	Shielding	Ground

Wire number	Wire colour/Polarity	Terminal temperature transmitter
3	White	1
4	Yellow	2
5	Red	3
6	Black	4

Connection via housing

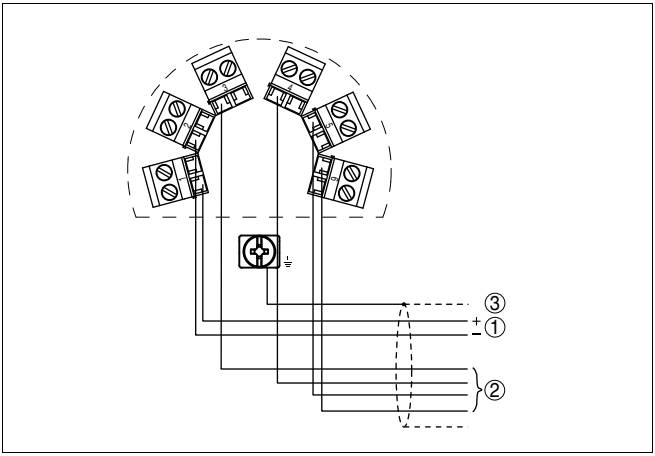


Fig. 11: Wiring plan housing VEGAWELL 52

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[6)]

Terminal, housing	Wire colour transmitter/polarity	Function
1	brown (+)	Power supply/signal pressure transmitter
2	blue (-)	Power supply/signal pressure transmitter
3	White	Power supply Pt 100
4	Yellow	Measurement Pt 100

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

Terminal, housing	Wire colour transmitter/polarity	Function
5	Red	Measurement Pt 100
6	Black	Power supply Pt 100

Connection via VEGADIS 62

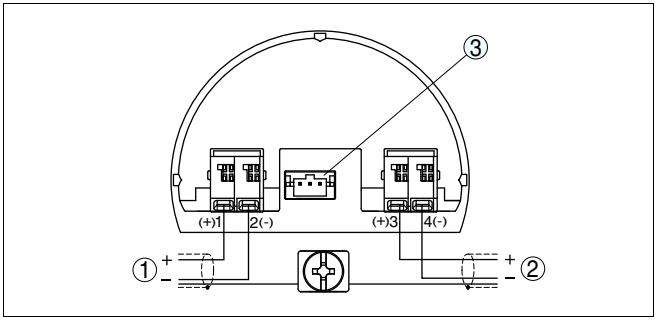


Fig. 12: Wiring plan, VEGADIS 62

1 To the sensor
2 For power supply
3 Coupling for the connection cable to the indicating and adjustment module

Wire number	Wire colour/Polarity	Terminal VEGADIS 62
1	brown (+)	1
2	blue (-)	2
	Shielding	Ground

5.4 Switch-on phase

After connecting VEGAWELL 52 to power supply or after a voltage recurrence, the instrument carries out a self-check:

- Internal check of the electronics
- 4 … 20 mA output jumps to the failure signal

After the run-up period (specification see "*Technical data*"), the instrument delivers an output signal of 4 … 20 mA. The value corresponds to the actual level as well as the settings already carried out, e.g. factory setting.

6 Set up with VEGADIS 62

6.1 Connection

The VEGADIS 62 is an indicating and adjustment unit without external energy for looping into 4 … 20 mA/HART circuits.

The parameter adjustment of the sensor is carried out via HART communication. During the parameter adjustment, the VEGADIS 62 acts as a Secondary Master with respect to the sensor.

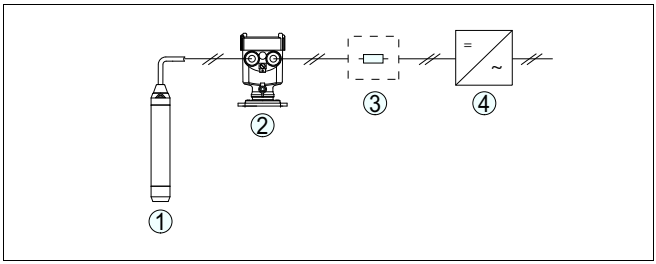


Fig. 13: Connection of VEGADIS 62 to the sensor

1 Sensor
2 VEGADIS 62
3 HART resistor > 150 Ω (with low impedance power supply necessary)
4 Voltage supply/Processing

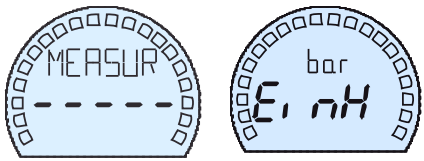
The following adjustment volume of the connected HART sensor is available:

- Min./Max. adjustment
- zero/span adjustment (live adjustment)
- Damping

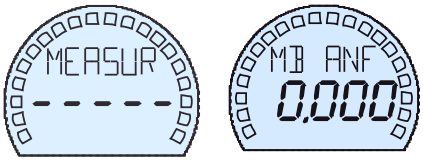
6.2 Adjust the sensor

Push "***OK***" to reach the adjustment menu. Select with ***[↑]*** and ***[↓]*** the submenu "*Measurement*" and confirm with "***OK***".

Move to the menu item "*Unit*". There the instrument unit of the sensor is displayed, for example "*bar*".

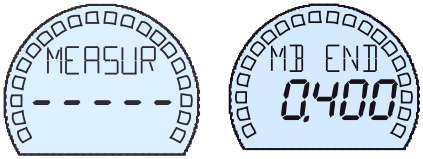


Move further to the menu item "*MB begin*", there the measuring range begin is displayed, for example the default setting 0 bar.



If you want to change this value, edit the value via "***OK***" and adjust the requested value via ***[↑]*** and ***[↓]***. Save the value via "***OK***", the VEGAWELL 52 displays briefly "*Wait*", then the value is written into the sensor.

Move further to the menu item "*MB end*", there the measuring range end is displayed, for example the default setting 0.4 bar.



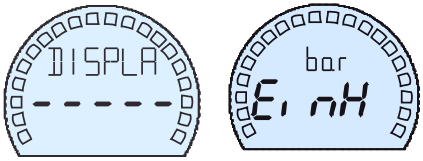
Proceed in the same way for "*MB end*, by entering for example the value 0.2 bar and save as described before.

The min./max. adjustment is thereby finished. After "***[ESC]***" is pressed, the display shows in the measured value display the currently measured level in bar (digital) and on the bargraph (quasianalogue).

6.3 Scale the indication

Often the level should not be display in bar but in %.

For this purpose, push "***OK***" to reach the adjustment menu. Select with ***[↑]*** and ***[↓]*** the submenu "*Indication*" and confirm with "***OK***". Then move to the menu item "*Unit*". There the actual indicating unit of the sensor and the VEGAWELL 52 is displayed, for example, "*bar*".



Edit the indicating unit, select % and save the value with "***OK***".

After "***[ESC]***", the display shoes the level in % (digital) on the measured value indication and on the bargraph (quasianalog).

7 Setup with PACTware

7.1 Connecting the PC

Connecting the PC to the signal cable

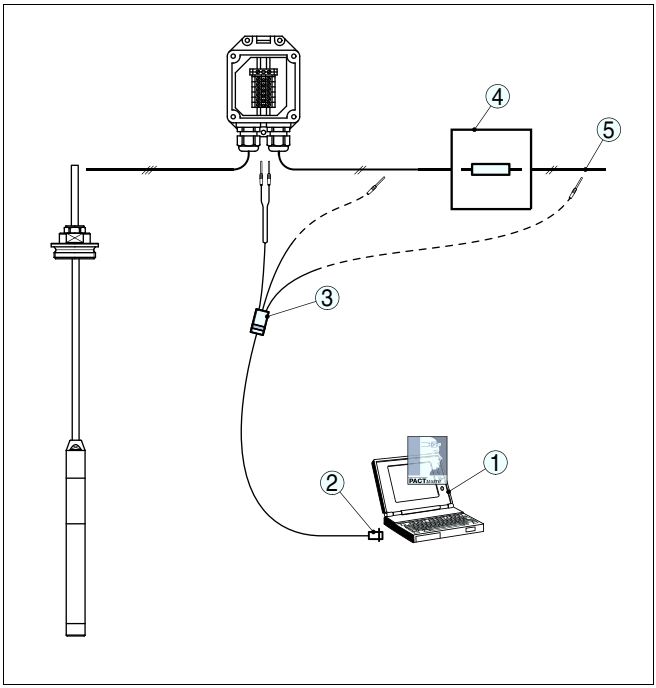


Fig. 14: Connection of the PC to VEGABOX 02 or communication resistor

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 resistance 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, VEGADIS 371, VEGAMET 381/624/625, VEGASCAN 693). In such cases, VEGACONNECT can be connected parallel to the 4 … 20 mA cable.

7.2 Parameter adjustment with PACTware

Further setup steps are described in the operating instructions manual "*DTM Collection/PACTware*" attached to each CD and which can also be downloaded from our homepage. A detailed description is available in the online help of PACTware and the VEGA DTMs.

Note:
Keep in mind that for setup of VEGAWELL 52, DTM-Collection in the actual version must be used.

All currently available VEGA DTMs are included as a DTM Collection on a CD. They can be purchased for a token fee from the responsible VEGA agency. In addition, the actual PACTware version is also available on this CD.

In addition, this DTM Collection incl. the basic version of PACTware can be downloaded free of charge from the Internet. Move via www.vega.com and "*Downloads*" to "*Software*".

7.3 Saving the parameter adjustment data

It is recommended to document or save the parameter adjustment data. That way they are available for multiple use or service purposes.

The VEGA DTM Collection and PACTware in the licensed, professional version provide suitable tools for systematic project documentation and storage.

8 Maintenance and fault rectification

8.1 Maintenance

Maintenance

If the instrument is used properly, no special maintenance is required in normal operation.

In some applications, product buildup on the diaphragm can influence the measuring result. Depending on the sensor and application, take precautions to ensure that heavy buildup, and especially a hardening thereof, is avoided.

Cleaning

If necessary, clean the diaphragm. Make sure that the materials are resistant to the cleaning process, see resistance list under "*Services*" on "www.vega.com". The wide variety of applications of isolating diaphragms makes special cleaning instructions necessary for each application. Please ask the VEGA agency serving you.

8.2 Remove interferences

Reaction when malfunctions occur

The operator of the system is responsible for taking suitable measures to rectify faults.

Failure reasons

VEGAWELL 52 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 measures to be taken are to check the output signals as well as to evaluate the error messages via the indicating and adjustment module. The procedure is described below. Further comprehensive diagnostics can be carried out on a PC with the software PACTware and the suitable DTM. In many cases, the causes can be determined and the faults rectified this way.

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 available to you 7 days a week round-the-clock. Since we offer this service world-wide, the support is only available in the English language. The service is free of charge, only the standard telephone costs will be charged.

Checking the 4 … 20 mA signal

Connect a handheld multimeter in the suitable measuring range according to the wiring plan.

? 4 … 20 mA signal not stable

- Level fluctuations
- → Adjust integration time via PACTware
- no atmospheric pressure compensation
- → Check the capillaries and cut them clean
- → Check the pressure compensation in the housing and clean the filter element, if necessary

? 4 … 20 mA signal missing

- Connection to voltage supply wrong
- → Check connection according to chapter "*Connection steps*" and if necessary, correct according to chapter "*Wiring plan*"
- No power supply
- → Check cables for breaks; repair if necessary
- Operating voltage too low or load resistance too high
- → Check, adapt if necessary

? Current signal 3.6 mA; 22 mA

- electronics module or measuring cell defective
- → Exchange the instrument or send it in for repair

In Ex applications, the regulations for the wiring of intrinsically safe circuits must be observed.

Reaction after fault rectification

Depending on the reason for the fault and the measures taken, the steps described in chapter "*Set up*" may have to be carried out again.

8.3 Shorten suspension cable

Shorten the suspension cable individually. Proceed as follows:

1 Remove the filter adapter from the transparent capillary line

2 Cut the suspension cable with an edge cutter to the requested length

Caution:
Do not squeeze the capillary cable, this will influence the pressure compensation. If necessary, rework with a sharp knife.

3 Remove approx. 10 cm of the cable mantle, strip off approx. 1 cm of the wire ends

Insert the filter adapter

The work steps are finished.

8.4 Shorten suspension cable

The suspension cable can be shortened individually. For the version with plastic or stainless steel housing proceed as follows:

1 Unscrew the housing cover

2 Loosen the screw terminals and remove the wire ends of the suspension cable out of the screw terminals

3 Hold the hexagon on the screwed socket with SW 46 and loosen with seal screw SW 22

Caution:
Seal screw is secured with Loctide pink, mote breakaway torque!

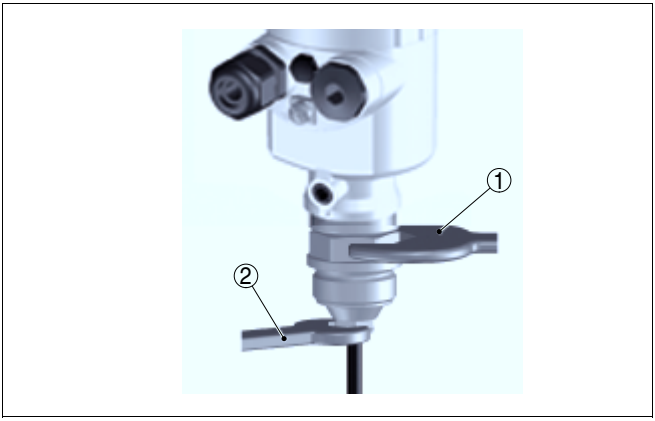


Fig. 15: Step 4

1 SW 46
2 SW 22

4 Pull the suspension cable out of the screwed socket, remove the pressure screw, cone sleeve and seal cone from the cable

5 Remove the filter adapter from the transparent capillary line

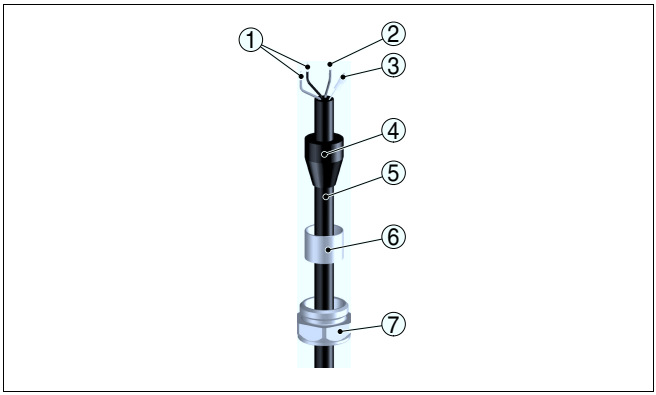


Fig. 16: Configuration of the cable seal

1 Connection cable (up to 6 pieces depending on the version)
2 Cable screening
3 Breather capillaries with filter element
4 Seal cone
5 Suspension cable
6 Cone bushing
7 Seal screw

6 Cut the suspension cable with an edge cutter to the requested length

7 Remove approx. 10 cm of the cable mantle, strip off approx. 1 cm of the wire ends, insert the filter adapter

8 Shift the seal screw, cone sleeve and seal cone to the suspension cable and insert the cable into the screwed socket, insert the wire ends through the cable entry into the mounting plate

The work steps are finished.

8.5 Instrument repair

If a repair is necessary, please proceed as follows:

You can download a return form (23 KB) from our Internet homepage www.vega.com under: "*Downloads - Forms and certificates - Repair form*".

By doing this you help us carry out the repair quickly and without having to call back for needed information.

- 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
- Please ask the agency serving you for the address of your return shipment. You can find the respective agency on our website www.vega.com under: "*Company - VEGA worldwide*"

9 Dismounting

9.1 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 power supply*" and carry out the listed steps in reverse order.

9.2 Disposal

The instrument consists of materials which can be recycled by specialised recycling companies. We use recyclable materials and have designed the electronics to be easily separable.

WEEE directive 2002/96/EG
This instrument is not subject to the WEEE directive 2002/96/EG and the respective national laws. Pass the instrument directly on to a specialised recycling company and do not use the municipal collecting points. These may be used only for privately used products according to the WEEE directive.

Correct disposal avoids negative effects on humans and the environment and ensures recycling of useful raw materials.

Materials: see chapter "*Technical data*"

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

10 Supplement

10.1 Technical data

General data	
Measured variable	Level
Measuring principle	Ceramic-capacitive, dry measuring cell
Communication interface	HART signal on 4 … 20 mA cable

Materials and weights	
Materials, wetted parts	
– Transmitter	316L, 316L with PE coating, 1.4462 (Duplex), 1.4462 with PE coating, PVDF, Titanium
– Protective cap	PA, PE
– Diaphragm	sapphire ceramic® (99.9 % oxide ceramic)
– Joining material diaphragm/Basic element measuring cell	Glass solder
– Measuring cell seal	FKM (VP2/A) - FDA and KTW approved, FFKM (Perlast G75S), EPDM (A+P 75.5/KW75F)
– Suspension cable	PE (FDA and KTW-approved), FEP, PUR
– Cable gland on the transmitter	316L
– Cable seal with PE, PUR cable	FKM
– Cable seal with FEP cable	FEP
– Process fitting	316L
– Straining clamp	1.4301
– Unassembled screw connection	316L, PVDF
– Threaded connection on the housing	316L
Ohmic contact	Between ground terminal, metallic process fitting and transmitter
Materials, non-wetted parts	
– Housing	plastic PBT (Polyester), 316L
– type label support on cable	PE hard
– transport protection net	PE
Weight approx.	
– Basic weight	0.8 kg (1.764 lbs)
– Suspension cable	0.1 kg/m (0.07 lbs/ft)
– Straining clamp	0.2 kg (0.441 lbs)
– Threaded fitting	0.4 kg (0.882 lbs)
– Plastic housing	0.8 kg (1.764 lbs)
– Stainless steel housing	1.6 kg (3.528 lbs)

Input variable

Percentage value	-10 … +110 % of the nominal measuring range
Pressure value	-20 … +120 % of the nominal measuring range
Recommended max. turn down	10 : 1 (no limitation)

Nominal measuring ranges and overload capacity in bar/kPa

Nominal range	Overload capacity, max. pressure	Overload capacity, min. pressure
Gauge pressure		
0 … 0.1 bar/0 … 10 kPa	15 bar/1500 kPa	-0.2 bar/-20 kPa
0 … 0.2 bar/0 … 20 kPa	20 bar/2000 kPa	-0.4 bar/-40 kPa
0 … 0.4 bar/0 … 40 kPa	30 bar/3000 kPa	-0.8 bar/-80 kPa
0 … 1 bar/0 … 100 kPa	35 bar/3500 kPa	-1 bar/-100 kPa
0 … 2.5 bar/0 … 250 kPa	50 bar/5000 kPa	-1 bar/-100 kPa
0 … 5 bar/0 … 500 kPa	65 bar/6500 kPa	-1 bar/-100 kPa
0 … 10 bar/0 … 1000 kPa	90 bar/9000 kPa	-1 bar/-100 kPa
0 … 25 bar/0 … 2500 kPa	130 bar/13000 kPa	-1 bar/-100 kPa
Absolute pressure		
0 … 1 bar/0 … 100 kPa	35 bar/3500 kPa	0 bar abs.
0 … 2.5 bar/0 … 250 kPa	50 bar/5000 kPa	0 bar abs.
0 … 5 bar/0 … 500 kPa	65 bar/6500 kPa	0 bar abs.
0 … 10 bar/0 … 1000 kPa	90 bar/9000 kPa	0 bar abs.
0 … 25 bar/0 … 2500 kPa	130 bar/13000 kPa	0 bar abs.

Nominal measuring ranges and overload capacity in psig

Nominal range	Overload capacity, max. pressure	Overload capacity, min. pressure
Gauge pressure		
0 … 1.5 psig	200 psig	-3 psig
0 … 3 psig	290 psig	-6 psig
0 … 6 psig	430 psig	-12 psig
0 … 15 psig	500 psig	-15 psig
0 … 35 psig	700 psig	-15 psig
0 … 70 psig	950 psig	-15 psig
0 … 150 psig	1300 psig	-15 psig
0 … 350 psig	1900 psig	-15 psig
0 … 900 psig	2900 psig	-15 psig
Absolute pressure		
0 … 15 psi	500 psi	0 psi
0 … 35 psi	700 psi	0 psi

Nominal range	Overload capacity, max. pressure	Overload capacity, min. pressure
0 … 70 psi	900 psi	0 psi
0 … 150 psi	1300 psi	0 psi
0 … 350 psi	1900 psi	0 psi

Output variable

Output signal	4 … 20 mA/HART
Signal resolution	1 µA
Fault signal	< 3.6 mA; 20.5 mA; 22 mA; unchanged (adjustable via PACTware)
Max. output current	22 mA
Run-up time approx.	15 s
Step response time	≤ 200 ms (ti: 0 s, 0 … 63 %)
HART output value according to HART 5.0	
– PV (Primary Value)	Pressure

Additional output parameter - temperature

integrated resistance thermometer	Pt 100 according to DIN EN 60751
Range	-50 … +100 °C (-58 … +212 °F)
Resolution	1 °K
Adjustment external temperature transmitter in VEGABOX 02	4 … 20 mA/HART according to -20 … +80 °C (-4 … +176 °F)

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

Reference conditions according to DIN EN 61298-1	
– Temperature	+15 … +25 °C (+59 … +77 °F)
– Relative humidity	45 … 75 %
– Air pressure	860 … 1060 mbar/86 … 106 kPa (12.5 … 15.4 psi)
Determination of characteristics	Limit point adjustment according to IEC 61298-2
Characterstic curve	Linear
Reference installation position	upright, diaphragm points downward
Influence of the installation position	< 0.2 mbar/20 Pa (0.003 psig)

Deviation determined according to the limit point method according to IEC 60770[7)]

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 %

7) Incl. non-linearity, hysteresis and non-repeatability.

- Turn down up to 10 : 1 < 0.04 % x TD

Deviation with version < 0.1 %
- Turn down 1 : 1 up to 5 : 1 < 0.1 %
- Turn down up to 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 with version < 0.2 %
- Turn down 1 : 1 < 0.15 %/10 K
- Turn down up to 5 : 1 < 0.2 %/10 K
- Turn down up to 10 : 1 < 0.25 %/10 K

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

Outside the compensated temperature range:

Average temperature coefficient of the zero signal
- Turn down 1 : 1 typ. < 0.15 %/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

Total deviation (similar to DIN 16086)

The total deviation F_t, also called practical deviation, is the sum of the basic accuracy F_p and long-term stability:

$F_t = F_p + F_s$

$F_{perf} = \sqrt{((F_T)^2 + (F_{KI})^2)}$

With
- F_t: F_{total}, total deviation
- F_p: F_{perf}, basic accuracy
- F_s: F_{stab}, long-term drift
- F_T: Temperature coefficient (influence of medium or ambient temperature)
- F_{KI}: Deviation

Ambient conditions

Ambient temperature

- Connection cable PE: -40 … +60 °C (-40 … +140 °F)
- Connection cable PUR, FEP: -40 … +80 °C (-40 … +176 °F)

Storage and transport temperature: -40 … +80 °C (-40 … +176 °F)

Process conditions

Max. process pressure, transmitter[8]

- 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 ranges from 0.4 bar (5.8 psig): 25 bar (363 psig)

Pressure stage, process fitting

- Unassembled screw connection: 316L: PN 3, PVDF: unpressurized
- Thread on the housing: PN 3

Product temperature, depending on the version

Suspension cable	Transmitter	Product temperature
PE	All	-20 … +60 °C (-4 … +140 °F)
PUR	All	-20 … +80 °C (-4 … +176 °F)
PUR	PE coating	-20 … +60 °C (-4 … +140 °F)
FEP	All	-20 … +80 °C (-4 … +176 °F)
FEP	PE coating	-20 … +60 °C (-4 … +140 °F)

Vibration resistance: mechanical vibrations with 4 g and 5 … 100 Hz[9]

Electromechanical data

Suspension cable

- Structure: six wires, one suspension cable, one breather capillary, screen braiding, foil, mantle
- Wire cross-section: 0.5 mm^2
- Wire resistance: ≤ 0.036 Ω/m
- 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)
- Cable extraction force[10]: ≥ 650 N (146.1 lbf)
- colour (non-Ex/Ex) - PE: black/blue
- colour (non-Ex/Ex) - PUR, FEP: blue/blue

8) Limited by the overpressure resistance of the measuring cell.
9) Tested according to the guidelines of German Lloyd, GL directive 2.
10) With this extraction force, the suspension cable can be extracted out of the transmitter.

Cable entry housing	1 x cable gland M20 x 1.5 (cable: ø 5 … 9 mm), 1 x blind stopper M20 x 1.5
Screw terminals for cable cross-section up to	1.5 mm² (AWG 16)

Voltage supply

Operating voltage	9.6 … 36 V DC
Permissible residual ripple	
– < 100 Hz	U_{ss} < 1 V
– 100 Hz … 10 kHz	U_{ss} < 10 mV
Load	see diagram

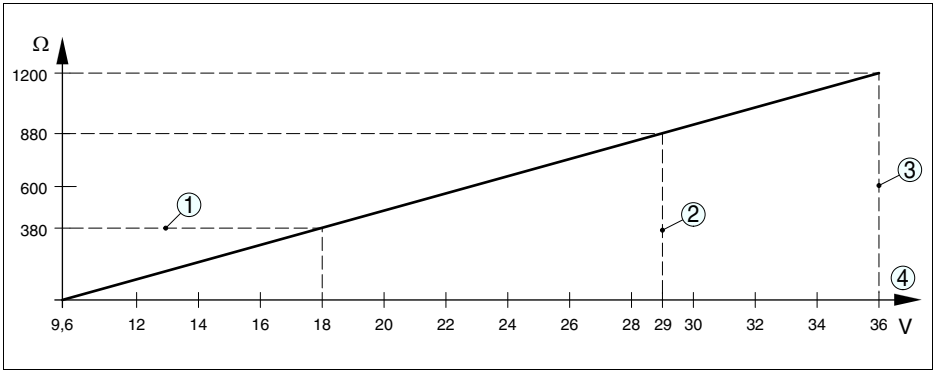


Fig. 17: Voltage diagram

1 HART load
2 Voltage limit Ex ia
3 Voltage limit non-Ex
4 Operating voltage

Integrated overvoltage protection

Nominal leakage current (8/20 µs)	5 kA
Min. response time	< 25 ns

Electrical protective measures

Protection rating	
– Transmitter	IP 68 (30 bar)
– Housing	IP 66/IP 67
Overvoltage category	III
Protection class	III

Approvals

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

That's why the associated approval documents have to be noted with these instruments. They are part of the delivery or can be downloaded under www.vega.com via "*VEGA Tools*" and "*serial number search*" as well as via "*Downloads*" and "*Approvals*".

10.2 Dimensions

VEGAWELL 52 - 316L/Titanium 22 mm

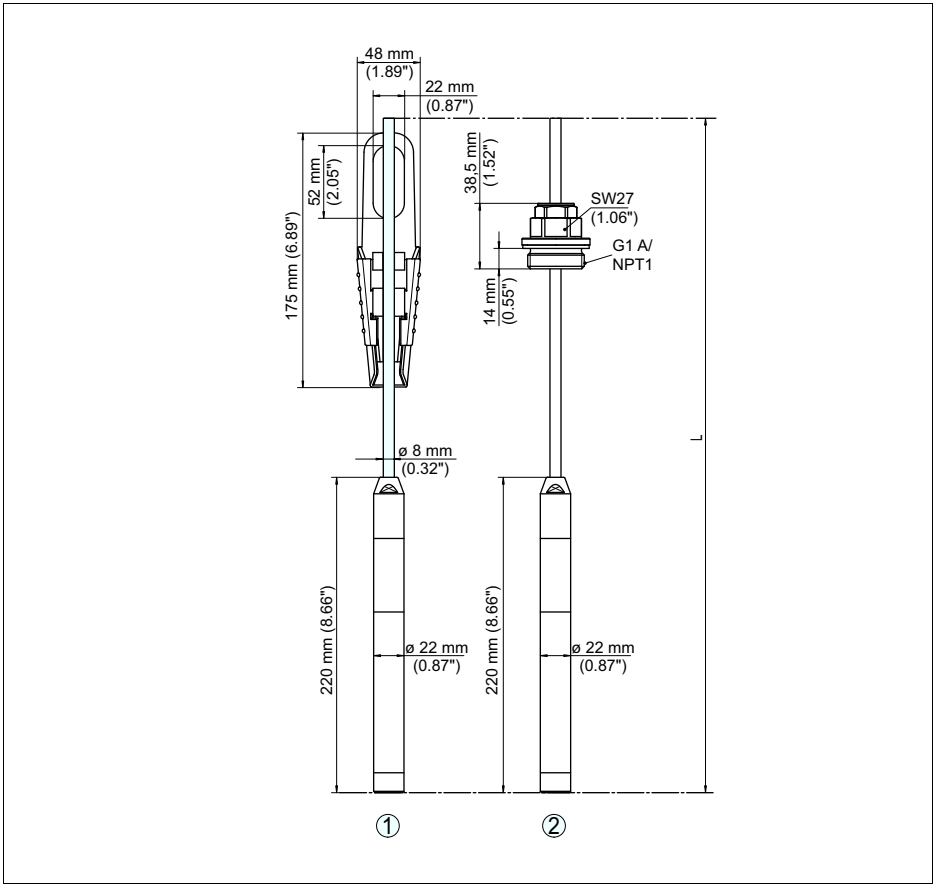


Fig. 18: VEGAWELL 52 - with transmitter 316L/Titanium 22 mm

1 Transmitter with straining clamp
2 Transmitter with unassembled threaded fitting

VEGAWELL 52 - Titanium 33 mm

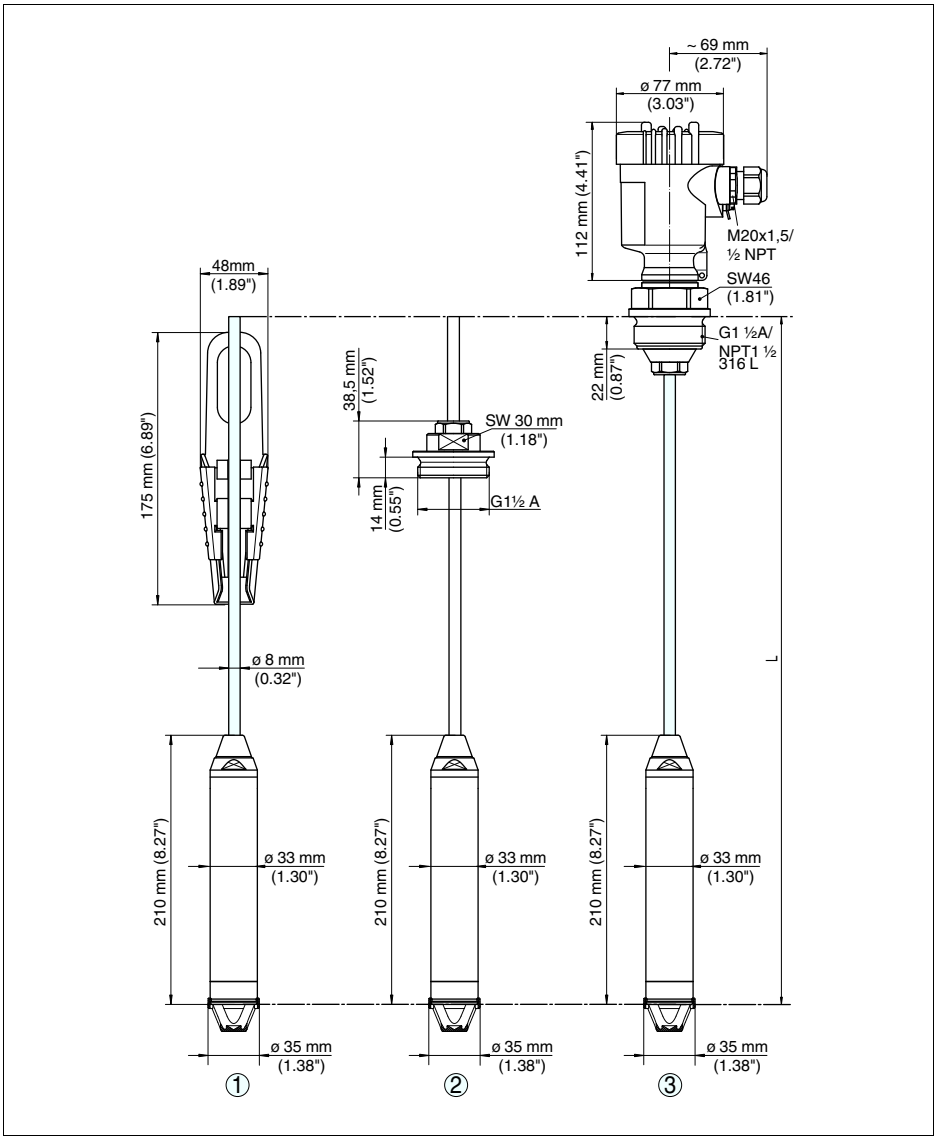


Fig. 19: VEGAWELL 52 - with transmitter 316L/Titanium 33 mm

1 *Transmitter of titanium with straining clamp*
2 *Transmitter of titanium with unassembled threaded fitting*
3 *Transmitter of titanium with thread and plastic housing*

VEGAWELL 52 - Duplex/PVDF

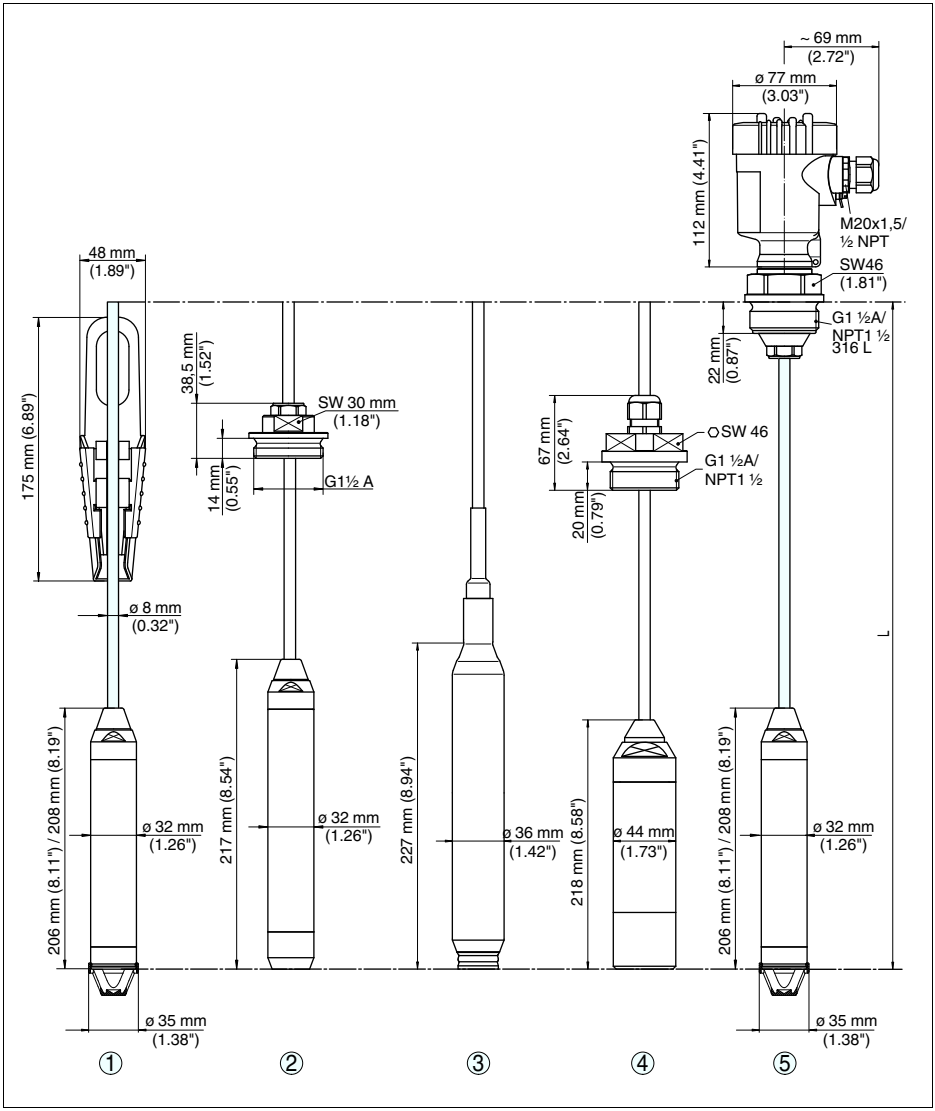


Fig. 20: VEGAWELL 52 - with transmitter Duplex/PVDF

1 *Transmitter Duplex standard/double seal with straining clamp*
2 *Transmitter Duplex for deep wells (end cap) with unassembled threaded fitting*
3 *Transmitter Duplex with PE coating*
4 *Transmitter with screwed connection of PVDF*
5 *Transmitter Duplex standard/double seal with thread and plastic housing*

VEGAWELL 52 - Duplex threaded fitting

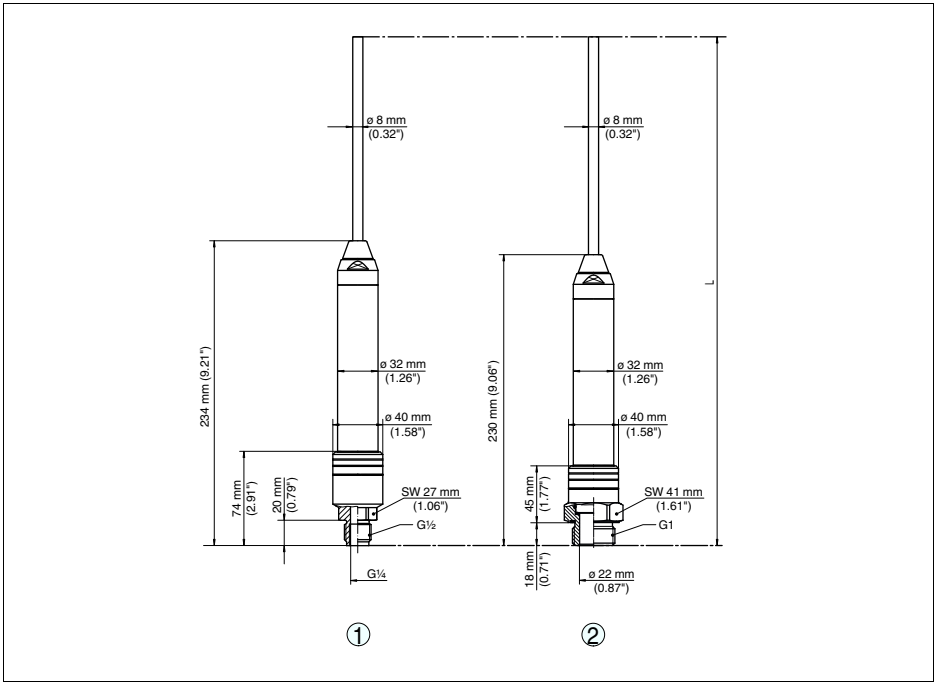


Fig. 21: VEGAWELL 52 - with threaded fitting and transmitter Duplex

1 Threaded fitting G½ inner G¼
2 Threaded fitting G1

10.3 Industrial property rights

VEGA product lines are global protected by industrial property rights.
Further information see http://www.vega.com.
Only in U.S.A.: Further information see patent label at the sensor housing.

VEGA Produktfamilien sind weltweit geschützt durch gewerbliche Schutzrechte.
Nähere Informationen unter http://www.vega.com.

Les lignes de produits VEGA sont globalement protégées par des droits de propriété intellectuelle.
Pour plus d'informations, on pourra se référer au site http://www.vega.com.

VEGA lineas de productos están protegidas por los derechos en el campo de la propiedad industrial.
Para mayor información revise la pagina web http://www.vega.com.

Линии продукции фирмы ВЕГА защищаются по всему миру правами на интеллектуальную собственность.
Дальнейшую информацию смотрите на сайте http://www.vega.com.

VEGA系列产品在全球享有知识产权保护。
进一步信息请参见网站<http://www.vega.com>。

10.4 Trademark

All the brands as well as trade and company names used are property of their lawful proprietor/originator.

INDEX

35402-EN-111021

Printing date:

VEGA Grieshaber KG
Am Hohenstein 113
77761 Schiltach
Germany
Phone +49 7836 50-0
Fax +49 7836 50-201
E-mail: info.de@vega.com
www.vega.com

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.