Operating Instructions

Submersible pressure transmitter with ceramic measuring cell

VEGAWELL 52

4 … 20 mA/HART Pt 100

Document ID: 35402

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Editing status: 2025-09-03

1 About this document

1.1 Function

This instruction provides all the information you need for mounting, connection and setup as well as important instructions for maintenance, fault rectification, safety and the exchange of parts. 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 instruction manual is directed to trained personnel. The contents of this manual must be made available to the qualified personnel and implemented.

1.3 Symbols used

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

Information, note, tip: This symbol indicates helpful additional information and tips for successful work.

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

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

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

Danger: Non-observance of the information marked with this symbol results in serious or fatal personal injury.

Ex applications
This symbol indicates special instructions for Ex applications.

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

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

Disposal
This symbol indicates special instructions for disposal.

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2 For your safety

2.1 Authorised personnel

All operations described in this documentation must be carried out only by trained and authorized personnel.

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

2.2 Intended use

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

You can find detailed information about the area of application in chapter "*Product description*".

Operational reliability is ensured only if the instrument is properly used according to the specifications in the operating instructions manual as well as possible supplementary instructions.

2.3 Warning about incorrect use

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

2.4 General safety instructions

This is a state-of-the-art instrument complying with all prevailing regulations and directives. The instrument must only be operated in a technically flawless and reliable condition. The operating company is responsible for the trouble-free operation of the instrument. When measuring aggressive or corrosive media that can cause a dangerous situation if the instrument malfunctions, the operating company has to implement suitable measures to make sure the instrument is functioning properly.

The safety instructions in this operating instructions manual, the national installation standards as well as the valid safety regulations and accident prevention rules must be observed.

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 us. Arbitrary conversions or modifications are explicitly forbidden. For safety reasons, only the accessory specified by us must be used.

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

2.5 Conformity

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

The corresponding conformity declarations can be found on our homepage.

2.6 NAMUR recommendations

NAMUR is the automation technology user association in the process industry in Germany. The published NAMUR recommendations are accepted as the standard in field instrumentation.

The device fulfils the requirements of the following NAMUR recommendations:

- NE 21 – Electromagnetic compatibility of equipment
- NE 43 – Signal level for fault information from measuring transducers

For further information see www.namur.de.

2.7 Installation and operation in the USA and Canada

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

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

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

2.8 Environmental instructions

Protection of the environment is one of our most important duties. That is why we have introduced an environment management system with the goal of continuously improving company environmental protection. The environment management system is certified according to DIN EN ISO 14001.

Please help us fulfil this obligation by observing the environmental instructions in this manual:

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

3 Product description

3.1 Configuration

Scope of delivery

The scope of delivery encompasses:

- VEGAWELL 52 pressure transmitter with suspension cable
- Optionally, straining clamp, suspension cable or housing with thread
- 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 thread

The components are available in different versions.

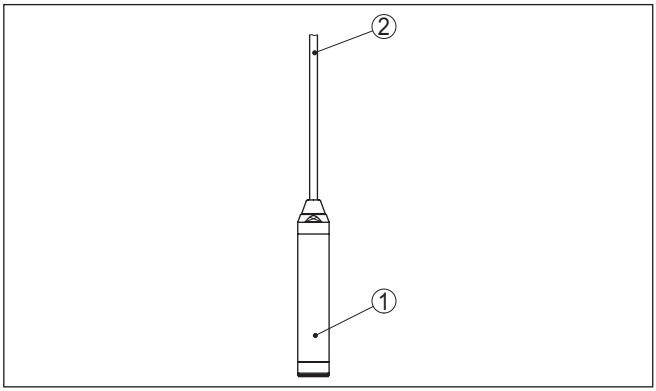


Fig. 1: Example of a VEGAWELL 52

1 Transmitter
2 Suspension cable

Type label

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

- Instrument type
- Information about approvals
- Configuration information
- Technical data
- Serial number of the instrument
- QR code for device identification
- Manufacturer information

Documents and software

To find order data, documents or software related to your device, you have the following options:

- Move to "www.vega.com" and enter in the search field the serial number of your instrument.
- Scan the QR code on the type label.
- Open the VEGA Tools app and enter the serial number under "***Documentation***".

3.2 Principle of operation

Application area

VEGAWELL 52 is suitable for continuous level measurement of liquids. Typical applications are measurements in water/waste water facilities, deep wells and in the shipbuilding industry.

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.

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 an external temperature transducer.

Seal concept

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

Instruments with double seal have an additional front seal.

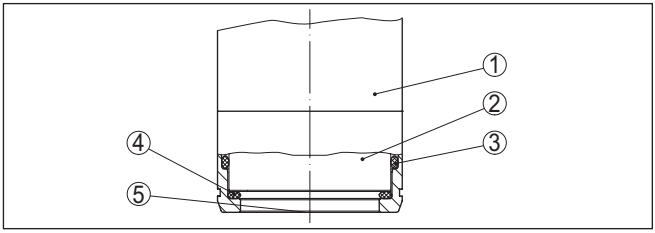


Fig. 2: Front-flush installation of the CERTEC® measuring cell with double seal

1 Housing, sensor
2 Measuring cell
3 Lateral seal for measuring cell
4 Additional, front seal for measuring cell
5 Diaphragm

3.3 Adjustment

The instrument can be adjusted with the following adjustment media:

- With the external display and adjustment unit VEGADIS 82
- 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 gener-

ally saved in the respective sensor, when adjusting with PACTware™ and PC optionally also in the PC.

3.4 Packaging, transport and storage

Packaging

Your instrument was protected by packaging during transport. Its capacity to handle normal loads during transport is assured by a test based on ISO 4180.

The packaging consists of environment-friendly, recyclable cardboard. For special versions, PE foam or PE foil is also used. Dispose of the packaging material via specialised recycling companies.

Transport

Transport must be carried out in due consideration of the notes on the transport packaging. Nonobservance of these instructions can cause damage to the device.

Transport inspection

The delivery must be checked for completeness and possible transit damage immediately at receipt. Ascertained transit damage or concealed defects must be appropriately dealt with.

Storage

Up to the time of installation, the packages must be left closed and stored according to the orientation and storage markings on the outside.

Unless otherwise indicated, the packages must be stored only under the following conditions:

- Not in the open
- Dry and dust free
- Not exposed to corrosive media
- Protected against solar radiation
- Avoiding mechanical shock and vibration

Storage and transport temperature

- Storage and transport temperature see chapter "*Technical data - Ambient conditions*"
- Relative moisture 20 … 85 %

Lifting and carrying

With instrument weights of more than 18 kg (39.68 lbs) suitable and approved equipment must be used for lifting and carrying.

3.5 Accessories

VEGABOX 02

The VEGABOX 02 is a breather housing for VEGAWELL 52. The housing contains a filter element for ventilation and optionally a temperature sensor for PT 100.

VEGABOX 03

The VEGABOX 03 is a breather housing for VEGAWELL 52. The housing contains a filter element for ventilation.

VEGACONNECT

The interface adapter VEGACONNECT enables the connection of communication-capable instruments to the USB interface of a PC.

VEGADIS 82

The VEGADIS 82 is suitable for measured value indication of 4 … 20 mA and 4 … 20 mA/HART sensors. It is looped into the signal cable.

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

Process conditions

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

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

These are mainly:

- Active measuring component
- Process fitting
- Process seal

Process conditions in particular are:

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

Ambient conditions

The instrument is suitable for standard and extended ambient conditions acc. to DIN/EN/BS EN/IEC/ANSI/ISA/UL/CSA 61010-1. It can be used indoors as well as outdoors.

Transport and mounting protection

Depending on the transmitter, the VEGAWELL 52 is supplied with a protective cap or a transport and mounting protection.

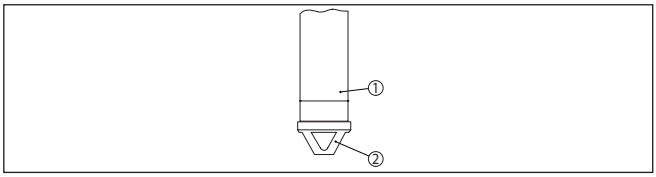


Fig. 3: VEGAWELL 52, transport and mounting protection

1 Transmitter
2 Transport and mounting protection

Remove this protection after mounting and before setting up the instrument.

In case of slightly contaminated measured media, the transport and mounting protection can remain on the instrument as an impact protection during operation.

Installation 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 suspension 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 03 or VEGADIS 82.

Mounting example

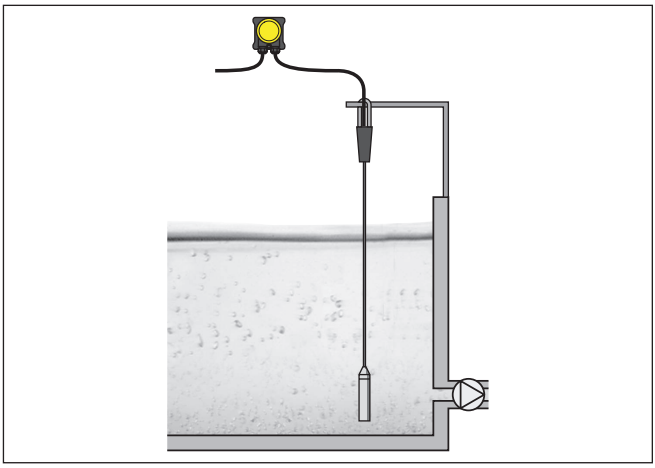


Fig. 4: Mounting example: VEGAWELL 52 in an open basin with breather housing VEGABOX 03

4.2 Mounting steps with straining clamp

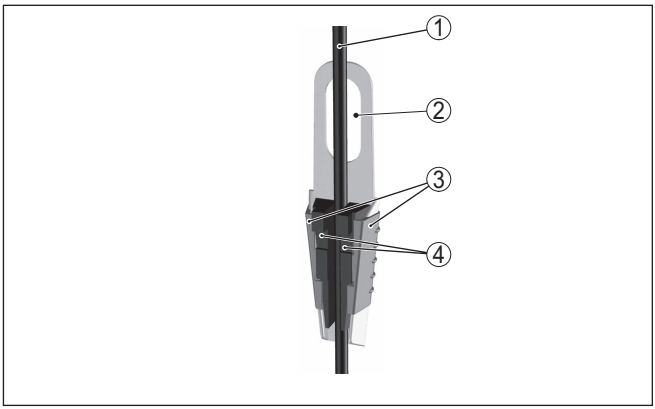


Fig. 5: Straining clamp

1 Suspension cable
2 Suspension opening
3 Clamping jaws
4 Guide brackets

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

Disassembly is carried out in reverse order.

4.3 Mounting steps with screw connection for suspension cable

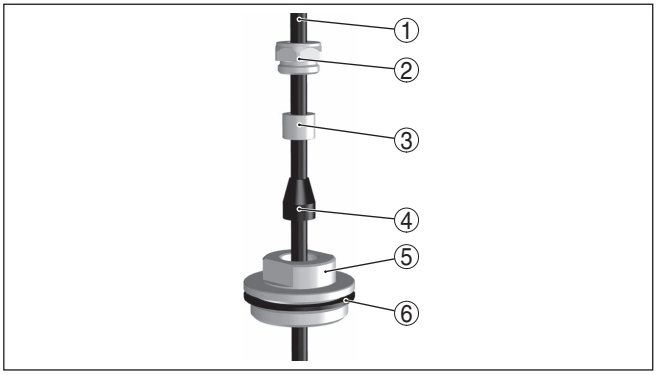


Fig. 6: Configuration, screw connection of suspension cable

1 Suspension cable
2 Sealing screw
3 Cone bushing
4 Seal cone
5 Screw connection for suspension cable
6 Seal

Mount VEGAWELL 52 with screw connection for suspension cable 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 or 1½ NPT on the vessel side
3. Shift the suspension cable from below through the opened threaded fitting
4. Slide the sealing cone and the cone sleeve over the suspension cable, fasten manually with the seal screw
5. Screw the screwed connection into the nozzle, tighten with SW 30 and then tighten 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

Disassembly is carried out in reverse order.

4.4 Mounting steps with threaded connection or housing

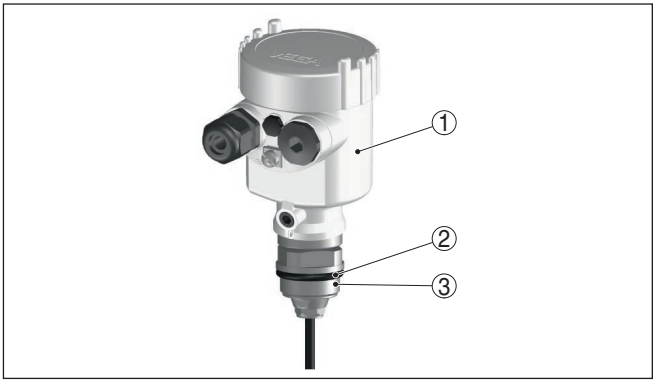


Fig. 7: Plastic housing

1 Housing
2 Seal
3 Thread

Mount into the vessel

Mount VEGAWELL 52 as follows:

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

Disassembly 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

[1)] Seal with resistant material with thread 1½ NPT.

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 voltage 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*".

Note:
Power the instrument via an energy-limited circuit (power max. 100 W) acc. to IEC 61010-1, e.g.:

- Class 2 power supply unit (acc. to UL1310)
- SELV power supply unit (safety extra-low voltage) with suitable internal or external limitation of the output current

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

- Lower output voltage of the power supply unit under nominal load (e.g. with a sensor current of 20.5 mA or 22 mA in case of fault signal)
- Influence of additional instruments in the circuit (see load values in chapter "*Technical data*")

Select installation cable

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

Make sure that the cable used has the required temperature resistance and fire safety for max. occurring ambient temperature

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 shielded cable for HART multidrop mode.

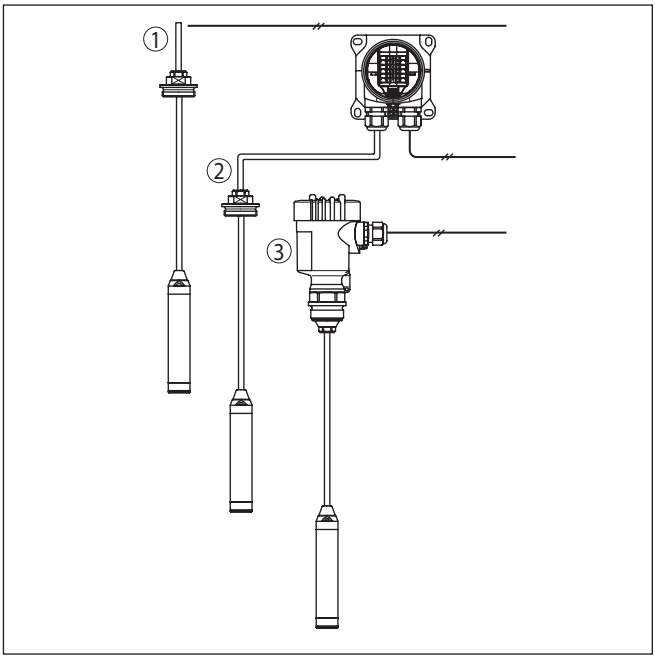


Fig. 8: Connect VEGAWELL 52 to voltage supply

1 Direct connection
2 Connection via VEGABOX 03
3 Connection via housing

Cable screening and grounding

If shielded cable is required, we recommend connecting the cable screening on both ends to ground potential. In the connection housing of the sensor or in VEGABOX, the shielding must be connected directly to the internal ground terminal. The ground terminal on the outside of the housing must be connected to the ground potential (low impedance).

In Ex systems, the grounding is carried out according to the installation regulations.

In electroplating plants as well as plants for cathodic corrosion protection it must be taken into account that significant potential differences exist. This can lead to unacceptably high currents in the cable screen if it is grounded at both ends.

Information:
The metallic parts of the instrument (process fitting, sensor, concentric tube, etc.) are connected with the internal and external ground terminal on the housing. This connection exists either directly via the conductive metallic parts or, in case of instruments with external electronics, via the screen of the special connection cable.

You can find specifications on the potential connections inside the instrument in chapter "*Technical data*".

5.2 Connection procedure

Direct connection

Proceed as follows:

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

Connection via VEGABOX

Connect the VEGAWELL 52 according to the description in the operating instructions of the respective VEGABOX.

Connection via housing

Proceed as follows:

1. Unscrew the housing lid
2. Remove the sealing plug and insert the installation 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 gland. The seal ring must completely encircle the cable
8. Retighten the housing cover

The electrical connection is finished.

5.3 Wiring plan

Direct connection

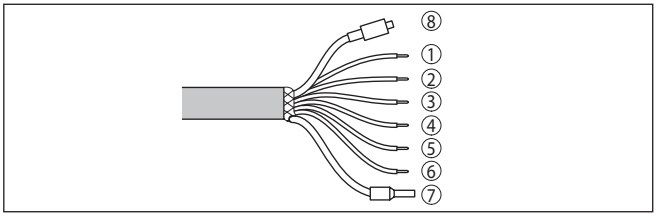


Fig. 9: Wire assignment, suspension cable

1 Brown (+): to voltage supply or to the processing system
2 Blue (-): to voltage 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

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

Connection via VEGABOX 03

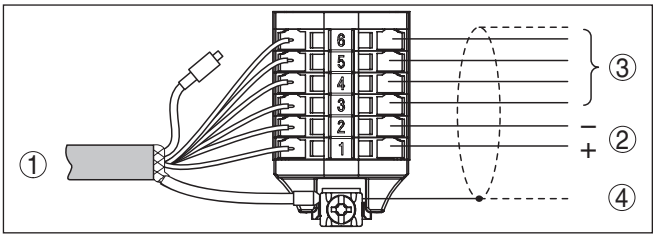


Fig. 10: Wiring plan VEGAWELL 52 for 4 … 20 mA/HART Pt 100

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

Wire number	Wire colour/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
5	Red	Measurement Pt 100
6	Black	Power supply Pt 100
	Shielding	Grounding

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

Connection via VEGABOX 02 with integrated transmitter for Pt 100

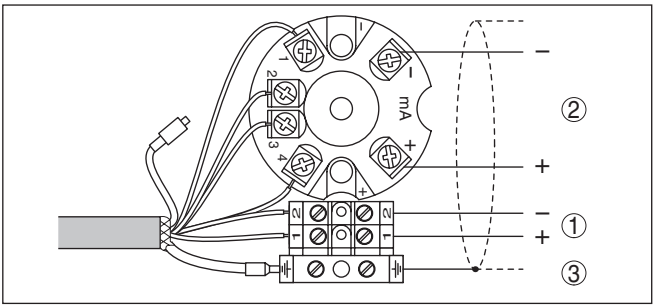


Fig. 11: Wiring plan VEGABOX 02 with integrated transmitter for Pt 100

1 To voltage supply or the processing system (signal pressure transmitter)
2 For voltage supply or to processing system (resistance thermometer Pt 100)
3 Shielding[4)]

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

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

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

Connection via housing

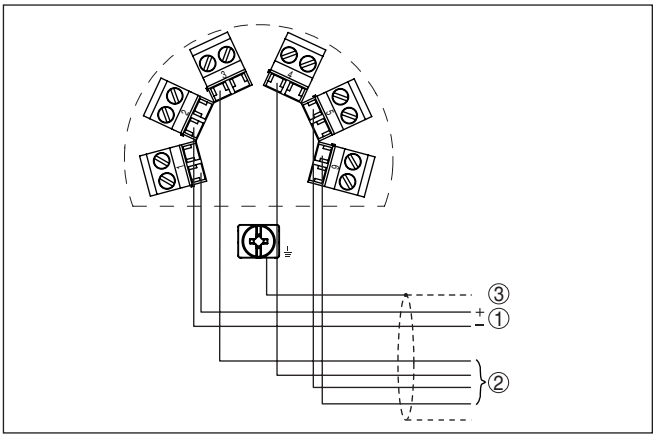


Fig. 12: Wiring plan VEGAWELL 52 for 4 … 20 mA/HART Pt 100

1 To voltage supply or the processing system (signal pressure transmitter)
2 To the temperature transmitter (connection cables resistance thermometer Pt 100)
3 Shielding[5)]

Terminal, housing	Wire colour/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
5	Red	Measurement Pt 100
6	Black	Power supply Pt 100
	Shielding	Grounding

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

Connection via VEGADIS 82

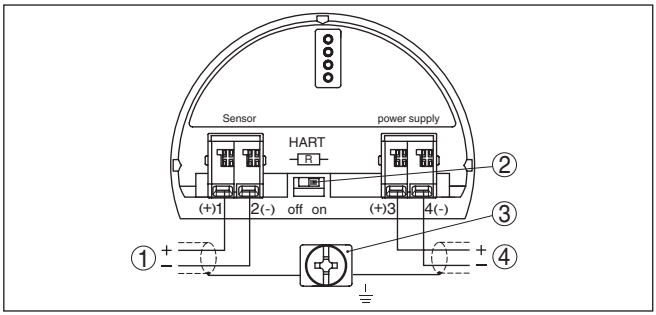


Fig. 13: Wiring plan VEGAWELL 52 4 … 20 mA/HART

1 To the sensor
2 Switch for communication resistor (on = activated, off = deactivated)
3 Terminal for connection of the cable screening
4 For power supply

Wire number	Wire colour/Polarity	Terminal VEGADIS 82
1	brown (+)	1
2	blue (-)	2
	Shielding	Ground terminal

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 fault 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 82

6.1 Principle of operation and connection

The VEGADIS 82 is an external display and adjustment unit without additional voltage supply.

The instrument is suitable for measured value indication and adjustment of sensors with HART protocol. It can be connected at any point to the 4 … 20 mA signal cable. A separate voltage supply is not required.

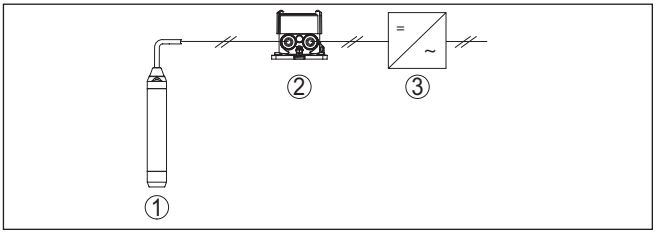
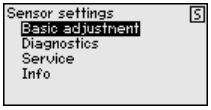


Fig. 14: Connection of the VEGADIS 82 to the sensor, adjustment via the display and adjustment module

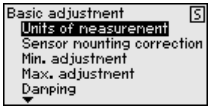
1 Sensor
2 VEGADIS 82
3 Voltage supply/Signal output

6.2 Adjustment volume

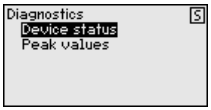
Main menu: Basic adjustment, Diagnosis, Service, Info



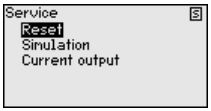
Basic adjustment: Settings, for example on position correction, adjustment, damping



Diagnosis: Information, for example, on device status, peak indicator



Service: Reset



Info: Indication of instrument type and serial number

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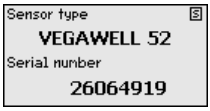

6.3 Setup steps

You can find a detailed description of the setup steps for VEGAWELL 52 in the operating instructions manual "*VEGADIS 82 - 4 … 20 mA/HART*".

7 Setup with PACTware

7.1 Connect the PC

Connecting the PC to the signal cable

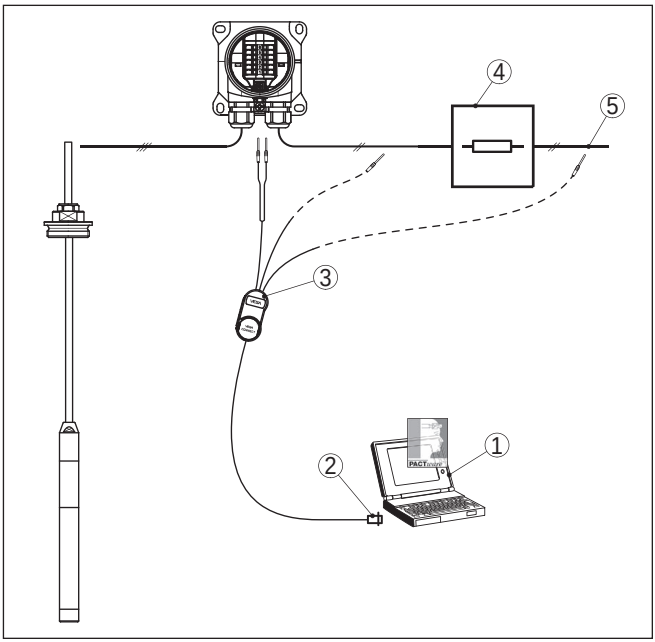

Fig. 15: Connection of the PC to VEGABOX 03 or communication resistor

1 *PC with PACTware*
2 *USB interface*
3 *VEGACONNECT*
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, VEGAMET 381/391/624/625, VEGASCAN 693). In such cases, VEGACONNECT can be connected parallel to the 4 … 20 mA cable.

7.2 Parameter adjustment with PACTware

Prerequisites

For parameter adjustment of the instrument via a Windows PC, the configuration software PACTware and a suitable instrument driver (DTM) according to FDT standard are required. The latest PACTware version as well as all available DTMs are compiled in a DTM Collection. The DTMs can also be integrated into other frame applications according to FDT standard.

Note:
To ensure that all instrument functions are supported, you should always use the latest DTM Collection. Furthermore, not all described functions are included in older firmware versions. You can download the latest instrument software from our homepage. A description of the update procedure is also available in the Internet.

Further setup steps are described in the operating instructions manual "*DTM Collection/PACTware*" attached to each DTM Collection and which can also be downloaded from the Internet. Detailed descriptions are available in the online help of PACTware and the DTMs.

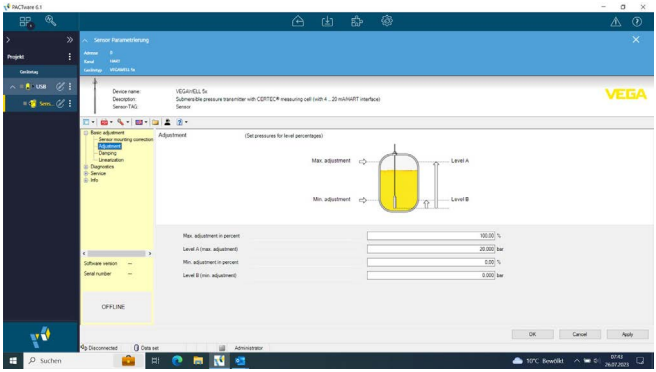

Fig. 16: Example of a DTM view

7.3 Saving the parameterisation 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 device is used properly, no special maintenance is required in normal operation.

Cleaning

The cleaning helps that the type label and markings on the instrument are visible.

Take note of the following:

- Use only cleaning agents which do not corrode the housings, type label and seals
- Use only cleaning methods corresponding to the housing protection rating

8.2 Rectify faults

Reaction when malfunction occurs

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

Causes of malfunction

The device offers maximum reliability. Nevertheless, faults can occur during operation. These may be caused by the following, e.g.:

- Sensor
- Process
- Voltage supply
- Signal processing

Fault rectification

The first measures to be taken are to check the output signals as well as to evaluate the error messages via the display 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 also available outside normal working hours, seven days a week around the clock.

Since we offer this service worldwide, the support is provided in English. The service itself is free of charge, the only costs involved are the normal call charges.

Check the 4 … 20 mA signal

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

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Error code	Cause	Rectification
4 … 20 mA signal not stable	Level fluctuations	Set damping
	No atmospheric pressure compensation	Check the capillariy and cut it 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, 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 "*Setup*" must be carried out again or must be checked for plausibility and completeness.

8.3 Shorten suspension cable

Shorten the suspension cable individually. Proceed as follows:

1. Remove the filter adapter from the capillary line
2. Cut the suspension cable to the requested length with side cutters

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

3. Remove approx. 10 cm of the cable mantle, strip off approx. 1 cm of insulation from the ends of the wires
4. Insert the filter adapter

The work steps are finished.

8.4 Shorten suspension cable - Version with housing

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

1. Unscrew the housing lid

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!

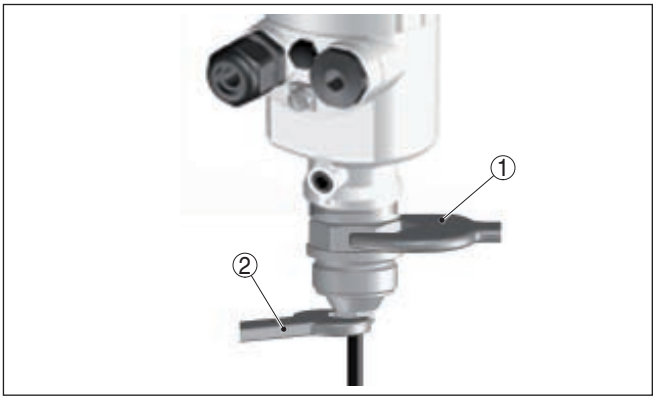

Fig. 17: Step 4

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 capillary line

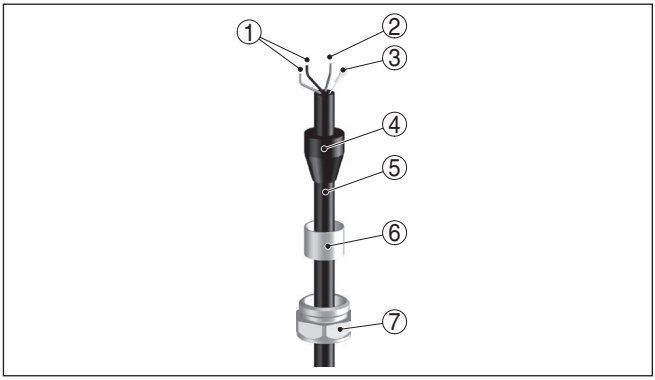

Fig. 18: Configuration of the cable seal

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 Sealing screw

6. Cut the suspension cable to the requested length with side cutters
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 How to proceed if a repair is necessary

On our homepage you will find detailed information on how to proceed in the event of a repair.

So that we can carry out the repair quickly and without queries, generate a instrument return form there with the data of your device.

The following is required:

- The serial number of the instrument
- A short description of the fault
- Details of the medium, if applicable

Print the generated instrument return form.

Clean the instrument and pack it damage-proof.

Send the printed instrument return form and possibly a safety data sheet together with the device.

You will find the address for the return on the generated instrument return form.

9 Dismount

9.1 Dismounting steps

To remove the device, carry out the steps in chapters "*Mounting*" and "*Connecting to power suplly*" in reverse.

Warning:
When dismounting, pay attention to the process conditions in vessels or pipelines. There is a risk of injury, e.g. due to high pressures or temperatures as well as aggressive or toxic media. Avoid this by taking appropriate protective measures.

9.2 Disposal

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

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

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

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

10 Supplement

10.1 Technical data

Note for approved instruments

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

All approval documents can be downloaded from our homepage.

Materials, weights, tensile force	
Materials, wetted parts	
– Transmitter	316L, Duplex steel (1.4462), Duplex steel (1.4462) with PE coating, PVDF, PP natural, Titanium
– Diaphragm	Sapphire ceramic® (99.9 % oxide ceramic)
– Joining material, diaphragm/base element of measuring cell	Glass solder
– Measuring cell seal - single	FKM (VP2/A) - FDA and KTW approved, FFKM (Perlast G75S), FFKM (Kalrez 6375), EPDM (A+P 70.10-02/70.503-00)
– Measuring cell seal - double	FFKM (Perlast G75S)+FKM (V75J), FFKM (Kalrez 6375)+ FFKM (Kalrez 6375), EPDM (A+P 70.10-02/70.503-00) +EPDM (A+P 70.10-02/70.503-00)
– Suspension cable	PE (FDA and KTW-approved), FEP, PUR
– Cable gland on the transmitter	316L
– Cable seal with PE, PUR suspension cable	FKM
– Cable seal with FEP suspension cable	FEP
– Straining clamp	316L
– Screw connection for suspension cable	316L, PVDF
– Threaded connection on the housing	316L
Materials, non-wetted parts	
– Housing	Plastic PBT (Polyester), 316L
– Type label support on suspension cable	PE hard
– transport protection net	PE
Materials, transmitter protection	
Transport protective cap, transmitter ø 22 mm	PE
Transport and mounting protection, transmitter ø 32 mm	PA
Transport and mounting protection, transmitter PVDF	PE
transport protection net	PE

Weight

– Basic weight	approx. 0.8 kg (1.764 lbs)
– Suspension cable	approx. 0.1 kg/m (0.07 lbs/ft)
– Straining clamp	approx. 0.2 kg (0.441 lbs)
– Screw connection for suspension cable	approx. 0.4 kg (0.882 lbs)
– Plastic housing	approx. 0.8 kg (1.764 lbs)
– Stainless steel housing	approx. 1.6 kg (3.528 lbs)

Tensile force

– Tensile force suspension cable	max. 500 N (112.4045 lbf)

Input variable

Adjustment

Adjustment range of the min./max. adjustment relating to the nominal measuring range:

– Percentage value	-10 … 110 %
– Pressure value	-20 … 120 %
Recommended max. turn down	10 : 1 (no limitation)

Nominal measuring ranges and overload capability in bar/kPa

The specifications are only an overview and refer to the measuring cell. Limitations due to the material and version of the process fitting are possible. The specifications on the nameplate apply.

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 psi

The specifications are only an overview and refer to the measuring cell. Limitations due to the material and version of the process fitting are possible. The specifications on the nameplate apply.

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
0 … 70 psi	900 psi	0 psi
0 … 150 psi	1300 psi	0 psi
0 … 350 psi	1900 psi	0 psi

Repeated operation of the pressure measuring device at the limit of its overload capacity may result in additional measurement deviations, which, however, typically do not exceed 0.2 %.

Output variable	
Output signal	4 … 20 mA/HART
Range of the output signal	3.8 … 20.5 mA/HART (default setting)
HART output values according to HART standard 5.0	
– Primary Value	Pressure
– Secondary Value	Temperature
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 %)

Additional output parameter - temperature	
Integrated resistance thermometer	Pt 100 according to DIN EN 60751
Tolerance class	B
Range	-50 … +100 °C (-58 … +212 °F)
Adjustment, external temperature transmitter	4 … 20 mA/HART according to -20 … +80 °C (-4 … +176 °F)

The data are an excerpt from the WIKA data sheet TE 32.04. You can find the data sheet under www.wika.com

Reference conditions and influencing variables (according 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 psig)
Determination of characteristics	Limit point adjustment according to IEC 61298-2
Characteristic 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[6)]

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 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 medium 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 upon execution < 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 upon execution < 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

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

Long-term stability (according to DIN 16086)

Applies to the respective **digital** signal output (e.g. HART, Profibus PA) as well as to **analogue** current output 4 … 20 mA under reference conditions. Specifications refer to the set span. Turn down (TD) is the ratio nominal measuring range/set span.

Long-term stability zero signal and output span

Time period	Measuring cell ø 28 mm	Measuring cell ø 17.5 mm
One year	< 0.05 % x TD	< 0.1 % x TD
Five years	< 0.1 % x TD	< 0.2 % x TD
Ten years	< 0.15 % x TD	< 0.4 % x TD

Total deviation (acc. 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

– Suspension cable PE	-40 … +60 °C (-40 … +140 °F)
– Suspension 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

– Measuring range 0.1 bar (1.45 psig)	15 bar (218 psig)[7]
– Measuring range 0.2 bar (2.9 psig)	20 bar (290 psig)[8]
– Measuring ranges from 0.4 bar (5.8 psig)	30 bar (435 psig)[9]

[7] Limited by the overload capability max. pressure of the measuring cell.
[8] Limited by the overload capability max. pressure of the measuring cell.
[9] Limitation by cable entry

Pressure stage, process fitting

- Screw connection for suspension cable: 316L: PN 3, PVDF: unpressurized
- Thread on the housing: PN 3

Product temperature, depending on the version

Suspension cable	Transmitter	Product temperature
PE	All versions	-20 … +60 °C (-4 … +140 °F)
PUR	All versions	-20 … +80 °C (-4 … +176 °F)
	PE coating	-20 … +60 °C (-4 … +140 °F)
FEP	All versions	-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[10)]

Shock resistance, version G1: 50 g, 2.3 ms according to EN 60068-2-27 (mechanical shock)

Electromechanical data

Suspension cable

- Configuration: six wires, one suspension wire, one breather capillary, screen braiding, foil, mantle
- Wire cross-section: 0.5 mm²
- Wire resistance: ≤ 0.036 Ω/m
- Max. tensile force: 1200 N (269.8 lbf)
- Max. length: 500 m (1640 ft)
- Min. bending radius: 25 mm (at 25 °C/77 °F)
- Diameter: approx. 8 mm (0.315 in)
- Cable extraction force transmitter: ≥ 650 N (146.1 lbf)
- colour (non-Ex/Ex) - PE, PUR: black/blue
- colour (non-Ex/Ex) - FEP: blue/blue
- Torque for sealing screw: 20 Nm

Cable entry housing: 1 x M20 x 1.5 cable gland (cable: ø 5 … 9 mm), 1 x M20 x 1.5-blind plug

Screw terminals for cable cross-section up to: 1.5 mm² (AWG 16)

Voltage supply

Operating voltage U_B

- Non-Ex instrument: 9.6 … 35 V DC
- Ex-ia instrument: 9.6 … 30 V DC

[10)] Tested according to the guidelines of German Lloyd, GL directive 2.

Permissible residual ripple	
– < 100 Hz	U_{ss} < 1 V
– 100 Hz … 10 kHz	U_{ss} < 10 mV
Reverse voltage protection	Available
Load resistor	
– Calculation	$(U_B - U_{min})/0.022$ A
– Example - Non-Ex instrument with U_B= 24 V DC	(24 V - 9.6 V)/0.022 A = 655 Ω

Integrated overvoltage protection

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

Potential connections in the instrument

Electronics	Non-floating
Galvanic connection between	Transmitter, shielding of the suspension cable as well as metallic process fitting and ground terminal on the housing

Electrical protective measures

Protection rating	
– Transmitter	IP68 (30 bar)
– Housing	IP66/IP67
Connection of the feeding power supply unit	Networks of overvoltage category III
Altitude above sea level	
– by default	up to 2000 m (6562 ft)
– with connected overvoltage protection	up to 5000 m (16404 ft)
Pollution degree[11)]	4
Protection class	III

[11)] When used with fulfilled protection.

10.2 Dimensions

VEGAWELL 52, 316L/Titanium 22 mm

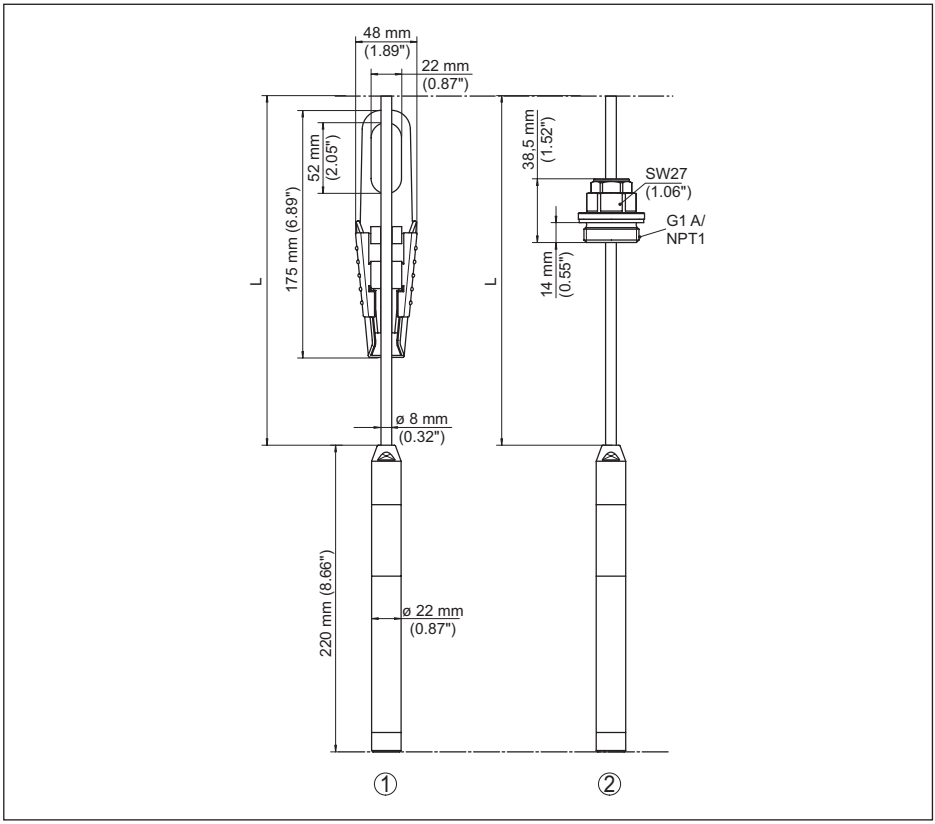

Fig. 19: VEGAWELL 52, with transmitter 316L/Titanium 22 mm

1 Transmitter with straining clamp
2 Transmitter with screw connection for suspension cable
L Total length from configurator

VEGAWELL 52, Titanium 33 mm

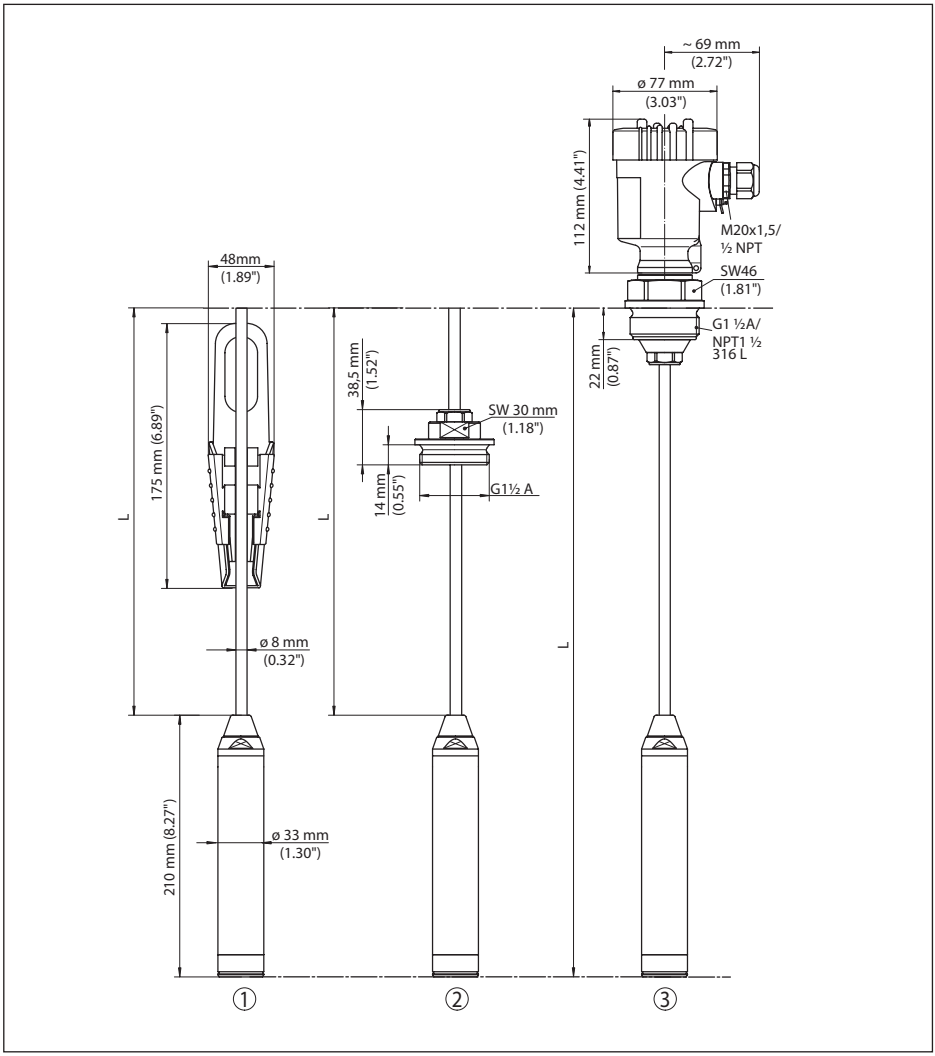

Fig. 20: VEGAWELL 52, with transmitter 316L/Titanium 33 mm

1 Transmitter of titanium with straining clamp
2 Transmitter of titanium with screw connection for suspension cable
3 Transmitter of titanium with thread and plastic housing
L Total length from configurator

VEGAWELL 52, Duplex steel (1.4462)/PVDF

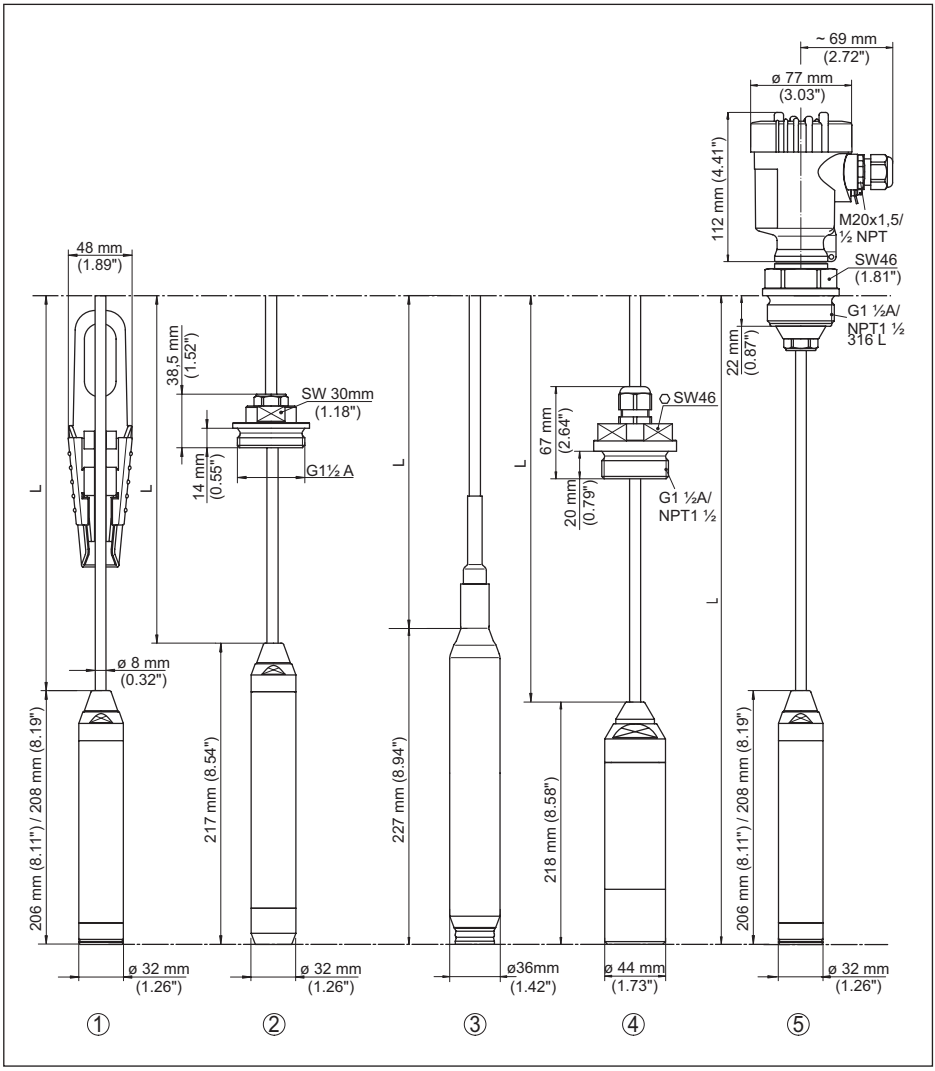

Fig. 21: VEGAWELL 52, with transmitter Duplex steel (1.4462)/PVDF

1 Transmitter Duplex steel (1.4462) standard/double seal with straining clamp
2 Transmitter Duplex steel (1.4462) for deep wells (end cap) with screw connection for suspension cable
3 Transmitter Duplex steel (1.4462) with PE coating
4 Transmitter with screw connection for suspension cable of PVDF
5 Transmitter Duplex steel (1.4462) standard/double seal with thread and plastic housing
L Total length from configurator

VEGAWELL 52, Duplex steel (1.4462) threaded fitting

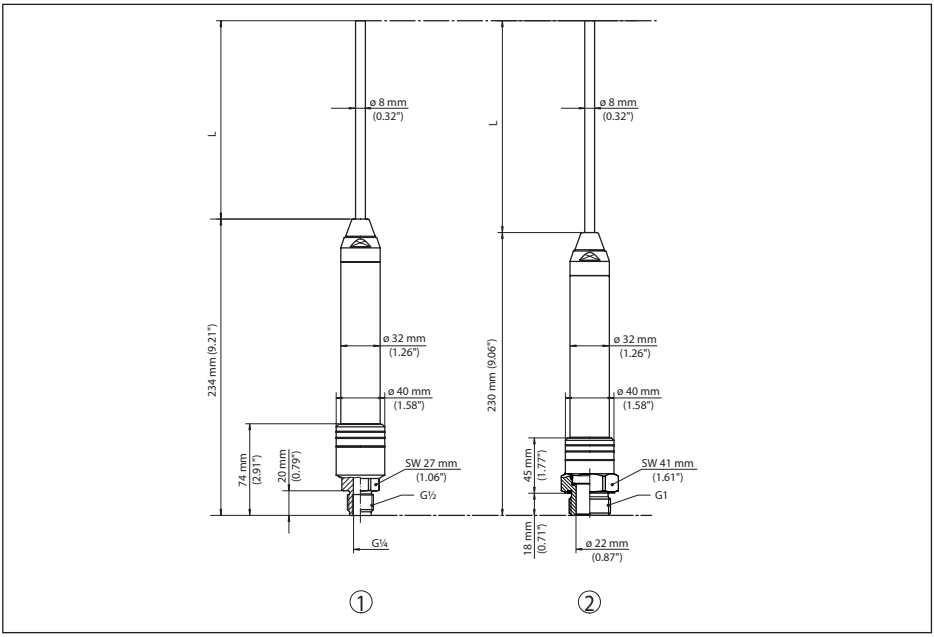

Fig. 22: VEGAWELL 52, with threaded fitting and transmitter Duplex steel (1.4462)

1 Threaded fitting G½ inner G¼
2 Threaded fitting G1
L Total length from configurator

10.3 Industrial property rights

VEGA product lines are global protected by industrial property rights. Further information see www.vega.com.

VEGA Produktfamilien sind weltweit geschützt durch gewerbliche Schutzrechte.

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Printing date:

35402-EN-250905

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