

# Operating Instructions

Submersible pressure transmitter with  
ceramic measuring cell

## VEGAWELL 52

4 ... 20 mA/HART Pt 100



Document ID: 35402



**VEGA**

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35402-EN-230227



**Safety instructions for Ex areas**

Take note of the Ex specific safety instructions for Ex applications. These instructions are attached as documents to each instrument with Ex approval and are part of the operating instructions.

Editing status: 2022-10-21

# 1 About this document

## 1.1 Function

This operating instructions provides all the information you need for mounting, connection and setup as well as important instructions for maintenance, fault rectification, the exchange of parts and the safety of the user. 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 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](http://www.vega.com) you will reach the document download.



### 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.



### SIL applications

This symbol indicates instructions for functional safety which must be taken into account particularly for safety-relevant applications.



### List

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



### Action

This arrow indicates a single action.



### Sequence of actions

Numbers set in front indicate successive steps in a procedure.



### Disposal

This symbol indicates special instructions for disposal.

## 2 For your safety

### 2.1 Authorised personnel

All operations described in this documentation must be carried out only by trained, qualified 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

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.

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 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 operator 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 operator 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 by the user.

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. For safety reasons, only the accessory specified by the manufacturer must be used.

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

## 2.5 Safety label on the instrument

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

## 2.6 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.

## 2.7 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 fulfils the requirements of the following NAMUR recommendations:

- NE 21 – Electromagnetic compatibility of equipment
- NE 43 – Signal level for fault information from measuring transducers
- NE 53 – Compatibility of field devices and display/adjustment components

## 2.8 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 (ANSI/NFPA 70).

Installations in Canada shall comply with the relevant requirements of the Canadian Electrical Code.

## 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 Configuration

#### Scope of delivery

The scope of delivery encompasses:

- VEGAWELL 52 pressure transmitter with suspension cable
- 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



#### Note:

Optional instrument features are also described in this operating instructions manual. The respective scope of delivery results from the order specification.

#### Constituent parts

VEGAWELL 52 with suspension cable consists of the following components:

- Transmitter
- Suspension cable
- Optionally, adjustable screw connection for suspension cable or housing with thread

The components are available in different versions.

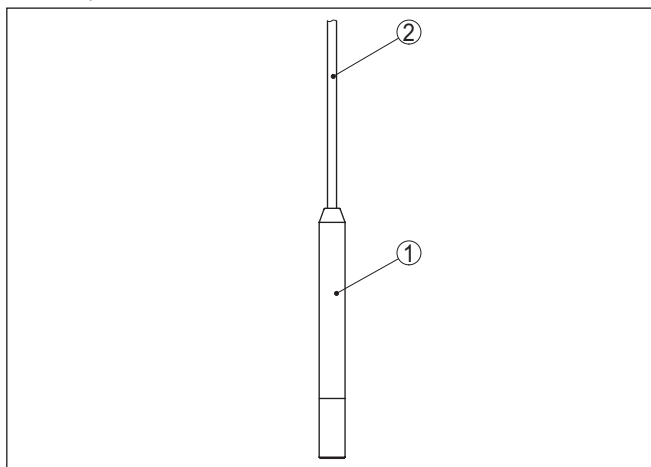


Fig. 1: Example of a VEGAWELL 52 with transmitter 22 mm

- 1 Transmitter
- 2 Suspension cable

#### Type label

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

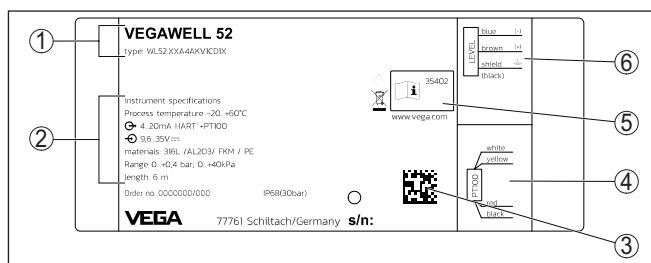


Fig. 2: Layout of the type label (example)

- 1 Instrument type, product code
- 2 Technical data
- 3 QR code for device documentation
- 4 Wire assignment suspension cable temperature (available depending on the version)
- 5 ID numbers, instrument documentation
- 6 Wire assignment suspension cable, level

### Serial number - Instrument search

The type label contains the serial number of the instrument. With it you can find the following instrument data on our homepage:

- Product code (HTML)
- Delivery date (HTML)
- Order-specific instrument features (HTML)
- Operating instructions at the time of shipment (PDF)
- Test certificate (PDF) - optional

Move to "[www.vega.com](http://www.vega.com)" and enter in the search field the serial number of your instrument.

Alternatively, you can access the data via your smartphone:

- Download the VEGA Tools app from the "Apple App Store" or the "Google Play Store"
- Scan the DataMatrix code on the type label of the instrument or
- Enter the serial number manually in the app

## 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.

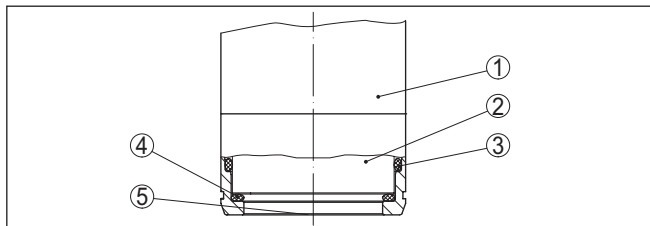


Fig. 3: Front-flush installation of the CERTEC® measuring cell with double seal

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

## Voltage supply

4 ... 20 mA/HART two-wire electronics for voltage supply and measured value transmission on the same cable.

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

## 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 generally 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 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 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 " *Supplement - 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.

**Measuring instrument holder**

The measuring instrument holder is used for wall/tube mounting of VEGABAR series 80 pressure transmitters and VEGAWELL 52 submersible 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

#### 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

#### Suitability for the ambient conditions

The instrument is suitable for standard and extended ambient conditions acc. to DIN/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.

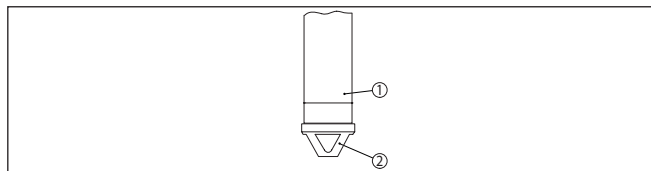


Fig. 4: VEGAWELL 52, transport and mounting protection

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.

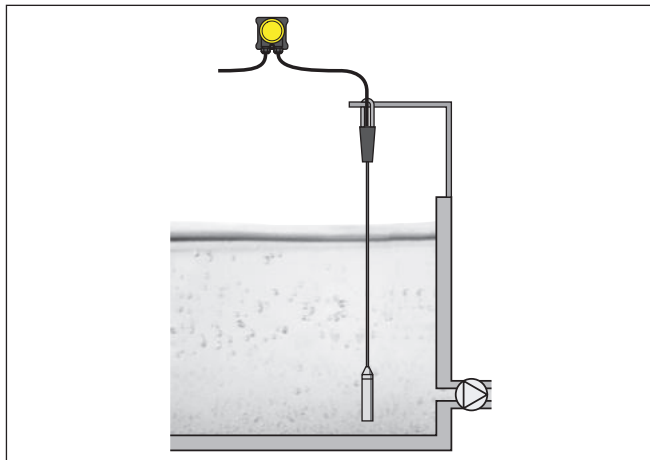
**Mounting example**

Fig. 5: Mounting example: VEGAWELL 52 in an open basin with breather housing VEGABOX 03

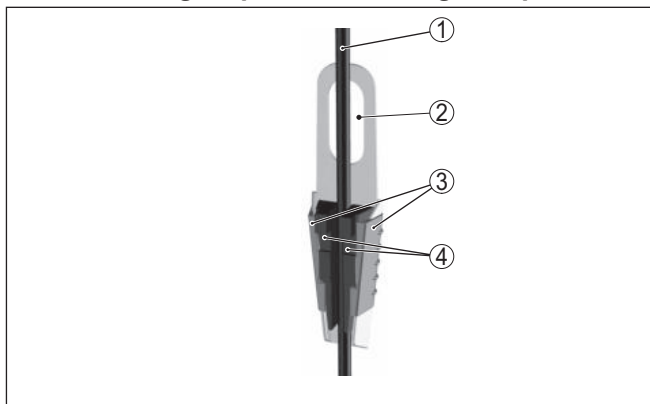
**4.2 Mounting steps with straining clamp**

Fig. 6: 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

Disassembly is carried out in reverse order.

### 4.3 Mounting steps with screw connection for suspension cable

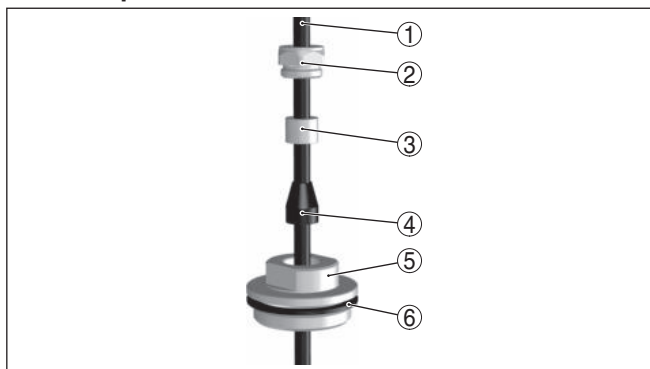


Fig. 7: Configuration, screw connection of suspension cable

- 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

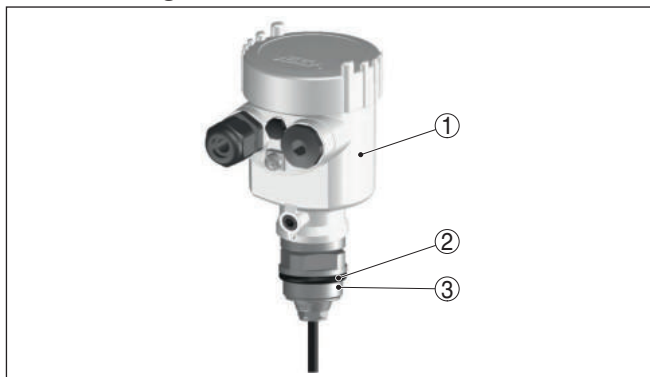


Fig. 8: Plastic housing

- 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 <sup>1)</sup>
- 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

<sup>1)</sup> 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.

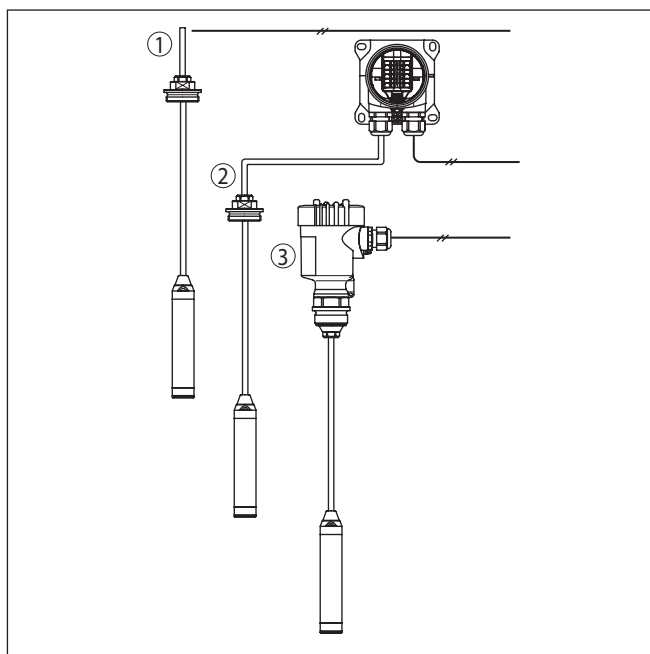


Fig. 9: Connect VEGAWELL 52 to voltage supply

- 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 <sup>2)</sup>
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

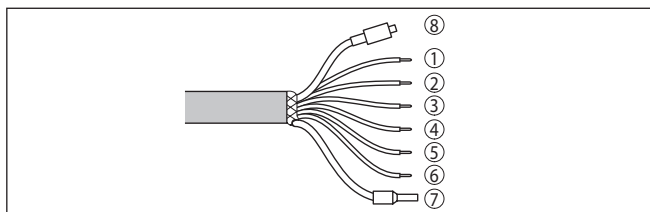


Fig. 10: Wire assignment, suspension cable

- 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

<sup>2)</sup> The suspension cable is already preconfecteded. After shortening the suspension cable, fasten the type plate with support again to the cable.

### Connection via VEGABOX 03

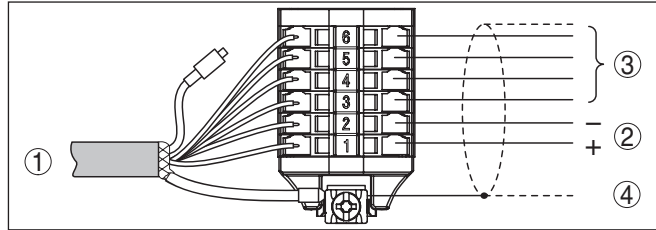


Fig. 11: Wiring plan VEGAWELL 52 for 4 ... 20 mA/HART Pt 100

- 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 <sup>3)</sup>

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

### Connection via VEGABOX 02 with integrated transmitter for Pt 100

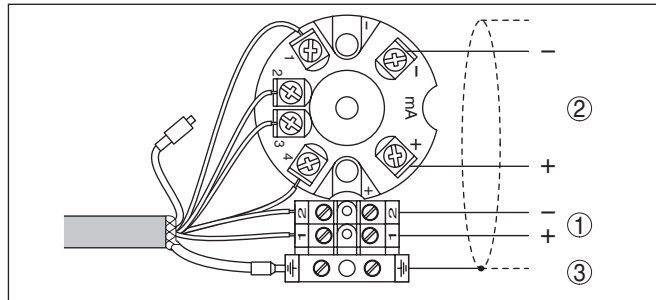


Fig. 12: Wiring plan VEGABOX 02 with integrated transmitter for Pt 100

- 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 <sup>4)</sup>

- <sup>3)</sup> Connect shielding to ground terminal. Connect ground terminal on the outside of the housing to ground as prescribed. The two terminals are galvanically connected.
- <sup>4)</sup> Connect shielding to ground terminal. Connect ground terminal on the outside of the housing to ground as prescribed. The two terminals are galvanically connected.

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

### Connection via housing

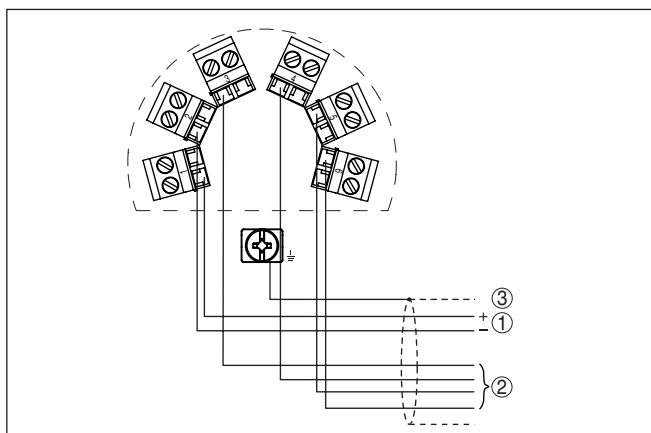


Fig. 13: Wiring plan VEGAWELL 52 for 4 ... 20 mA/HART Pt 100

- 1 To voltage supply or the processing system (signal pressure transmitter)
- 2 To the temperature transmitter (connection cables resistance thermometer Pt 100)
- 3 Shielding <sup>5)</sup>

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

<sup>5)</sup> Connect shielding to ground terminal. Connect ground terminal on the outside of the housing to ground as prescribed. The two terminals are galvanically connected.

Terminal, housing	Wire colour/Polarity	Function
	Shielding	Grounding

### Connection via VEGADIS 82

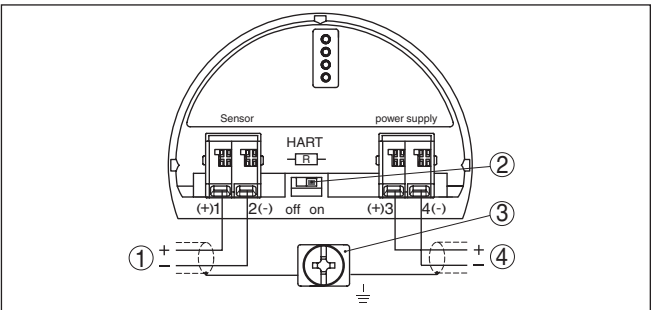


Fig. 14: Wiring plan VEGAWELL 52 4 ... 20 mA/HART

- 1 To the sensor
- 2 Switch for communication resistor (on = activated, off = deactivated)
- 3 Terminal for connection of the cable shielding
- 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.

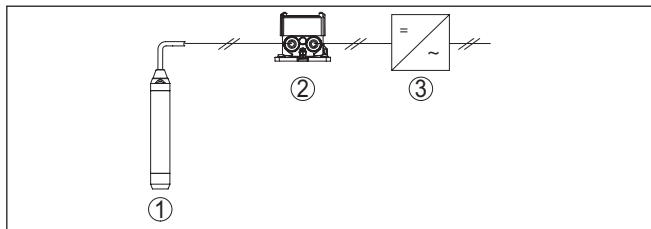
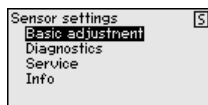


Fig. 15: Connection of the VEGADIS 82 to the sensor, adjustment via the display and adjustment module

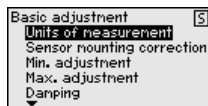
- 1 Sensor
- 2 VEGADIS 82
- 3 Voltage supply/Signal output

### 6.2 Adjustment volume

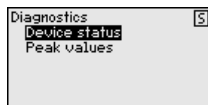
**Main menu:** Basic adjustment, Diagnosis, Service, Info



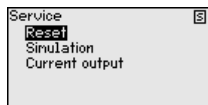
**Basic adjustment:** Settings, for example on position correction, adjustment, damping



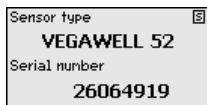
**Diagnostics:** Information, for example, on device status, peak indicator



**Service:** Reset



**Info:** Indication of instrument type and serial number



### 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

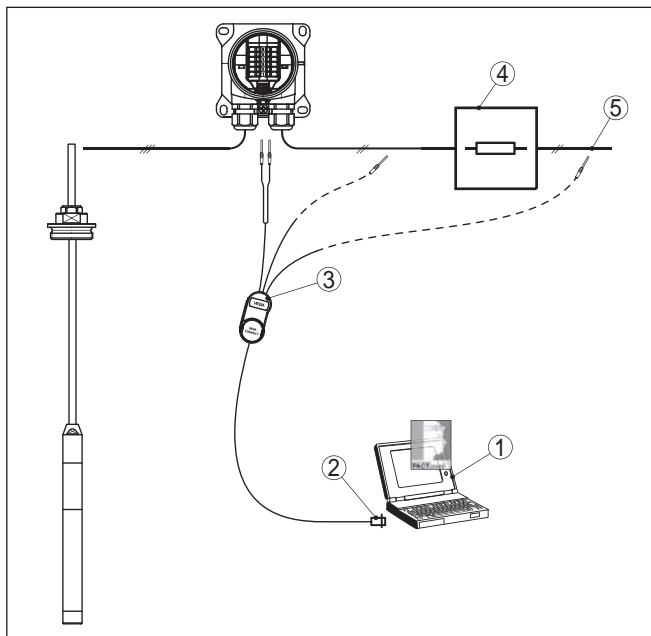


Fig. 16: Connection of the PC to VEGABOX 03 or communication resistor

- 1 PC with PACTware
- 2 USB interface
- 3 VEGACONNECT
- 4 Communication resistor 250  $\Omega$
- 5 Power supply unit

Necessary components:

- VEGAWELL 52
- PC with PACTware and suitable VEGA DTM
- VEGACONNECT with HART adapter cable
- HART resistance approx. 250  $\Omega$
- Power supply unit



#### Note:

With power supply units with integrated HART resistance (internal resistance approx. 250  $\Omega$ ), 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.

## Prerequisites

## 7.2 Parameter adjustment with PACTware

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.

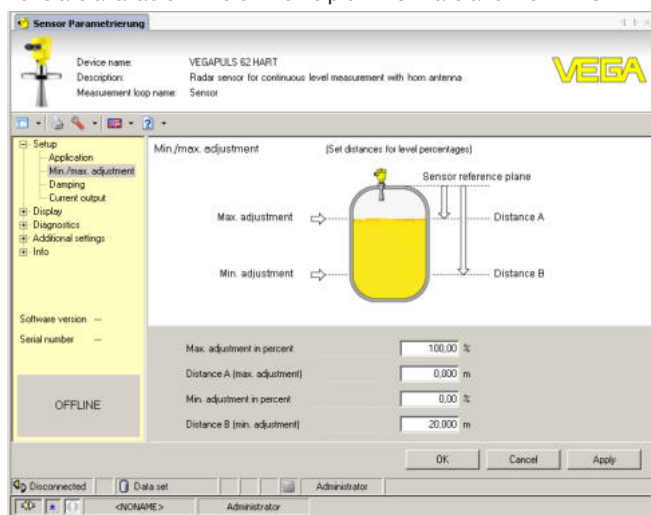


Fig. 17: Example of a DTM view

## Standard/Full version

All device DTMs are available as a free-of-charge standard version and as a full version that must be purchased. In the standard version, all functions for complete setup are already included. An assistant for simple project configuration simplifies the adjustment considerably. Saving/printing the project as well as import/export functions are also part of the standard version.

In the full version there is also an extended print function for complete project documentation as well as a save function for measured value and echo curves. In addition, there is a tank calculation program as well as a multiviewer for display and analysis of the saved measured value and echo curves.



The standard version is available as a download under [www.vega.com/downloads](http://www.vega.com/downloads). The full version is available on CD from the agency serving you.

### 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.

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 against the cleanig, see resistance list under "Service" on "[www.vega.com](http://www.vega.com)".

### 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 manned 7 days a week round-the-clock. Since we offer this service worldwide, the support is only available in the English language. The service is free, only standard call charges are incurred.

#### Check the 4 ... 20 mA signal

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

Error code	Cause	Rectification
4 ... 20 mA signal not stable	Level fluctuations	Set damping
	No atmospheric pressure compensation	Check the capillary and cut it clean Check the pressure compensation in the housing and clean the filter element, if necessary

Error code	Cause	Rectification
4 ... 20 mA signal missing	Connection to voltage supply wrong	Check connection according to chapter " <i>Connection steps</i> " and if necessary, correct according to chapter " <i>Wiring plan</i> "
	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 " *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, note breakaway torque!



Fig. 18: 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

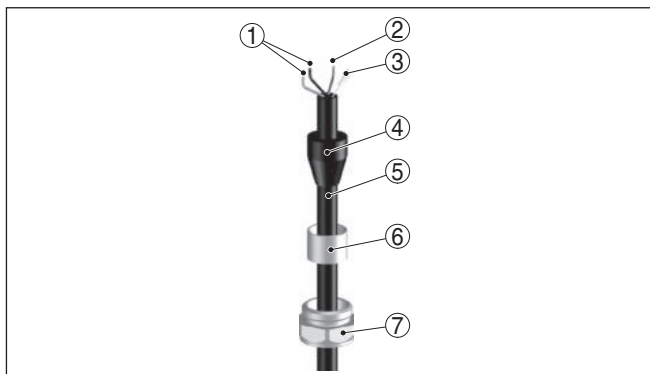


Fig. 19: Configuration of the cable seal

- 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

You can find an instrument return form as well as detailed information about the procedure in the download area of our homepage. By doing this you help us carry out the repair quickly and without having to call back for needed information.

In case of repair, proceed as follows:

- 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
- Ask the agency serving you to get the address for the return shipment. You can find the agency on our homepage.

## 9 Dismount

### 9.1 Dismounting steps

**Warning:**

Before dismantling, be aware of dangerous process conditions such as e.g. pressure in the vessel or pipeline, high temperatures, corrosive or toxic media etc.

Take note of chapters "*Mounting*" and "*Connecting to voltage supply*" and carry out the listed steps in reverse order.

### 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)
– Measuring cell seal - double	FFKM (Perlast G75S)+FKM (V75J), FFKM (Kalrez 6375)+ FFKM (Kalrez 6375), EPDM (A+P 70.10-02) +EPDM (A+P 70.10-02)
– 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

### 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](http://www.wika.com)

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**Reference conditions and influencing variables (according to DIN EN 60770-1)**


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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 &lt; 0.2 mbar/20 Pa (0.003 psig)

---

**Deviation determined according to the limit point method according to IEC 60770 <sup>6)</sup>**


---

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 &lt; 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 &lt; 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 &lt; 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 &lt; 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 (according to DIN 16086, DIN V 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 &lt; (0.1 % x TD)/year

<sup>6)</sup> Incl. non-linearity, hysteresis and non-repeatability.

## 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:

$$F_t = F_p + F_s$$

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

With

- $F_t$ :  $F_{\text{total}}$ , total deviation
- $F_p$ :  $F_{\text{perf}}$ , basic accuracy
- $F_s$ :  $F_{\text{stab}}$ , 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) <sup>7)</sup>
- Measuring range 0.2 bar (2.9 psig) 20 bar (290 psig) <sup>8)</sup>
- Measuring ranges from 0.4 bar (5.8 psig) 30 bar (435 psig) <sup>9)</sup>

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 <sup>10)</sup>

<sup>7)</sup> Limited by the overload capability max. pressure of the measuring cell.

<sup>8)</sup> Limited by the overload capability max. pressure of the measuring cell.

<sup>9)</sup> Limitation by cable entry

<sup>10)</sup> Tested according to the guidelines of German Lloyd, GL directive 2.

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 mm <sup>2</sup>
– 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

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 mm<sup>2</sup> (AWG 16)

**Voltage supply****Operating voltage U<sub>B</sub>**

– Non-Ex instrument	9.6 ... 35 V DC
– Ex-ia instrument	9.6 ... 30 V DC

**Permissible residual ripple**

– < 100 Hz	U <sub>ss</sub> < 1 V
– 100 Hz ... 10 kHz	U <sub>ss</sub> < 10 mV

Reverse voltage protection Available

**Load resistor**

– Calculation	(U <sub>B</sub> - U <sub>min</sub> )/0.022 A
– Example - Non-Ex instrument with U <sub>B</sub> = 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 <sup>11)</sup> 4

Protection class III

<sup>11)</sup> When used with fulfilled housing protection

## 10.2 Dimensions

### VEGAWELL 52, 316L/Titanium 22 mm

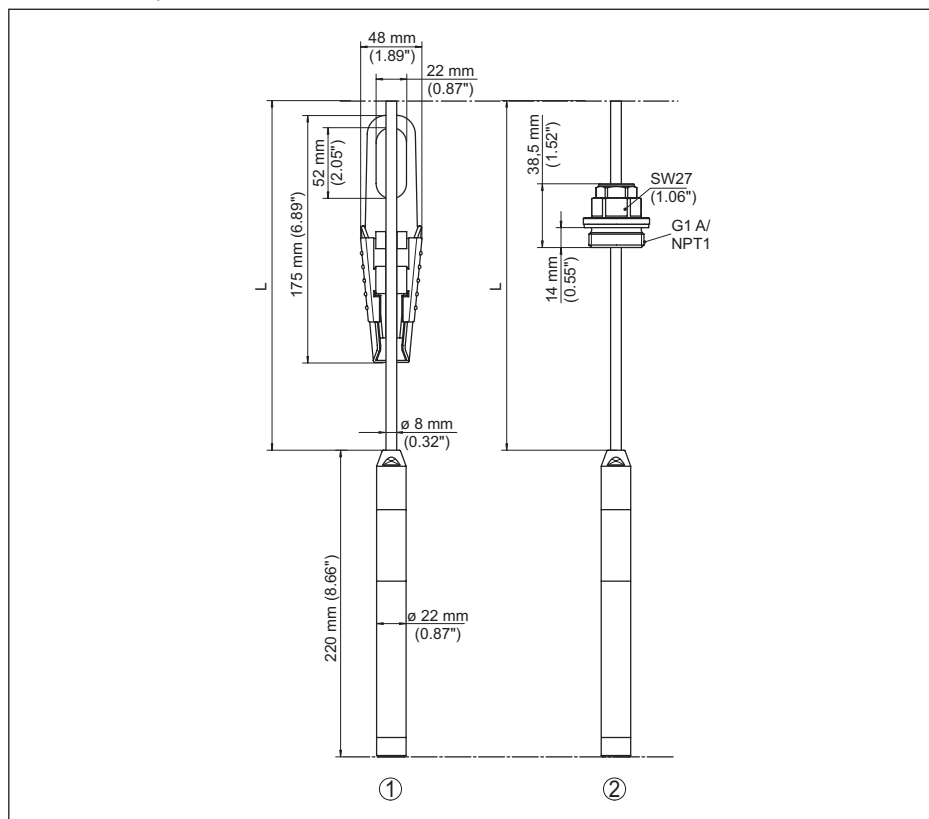


Fig. 20: VEGAWELL 52, with transmitter 316L/Titanium 22 mm

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

VEGAWELL 52, Titanium 33 mm

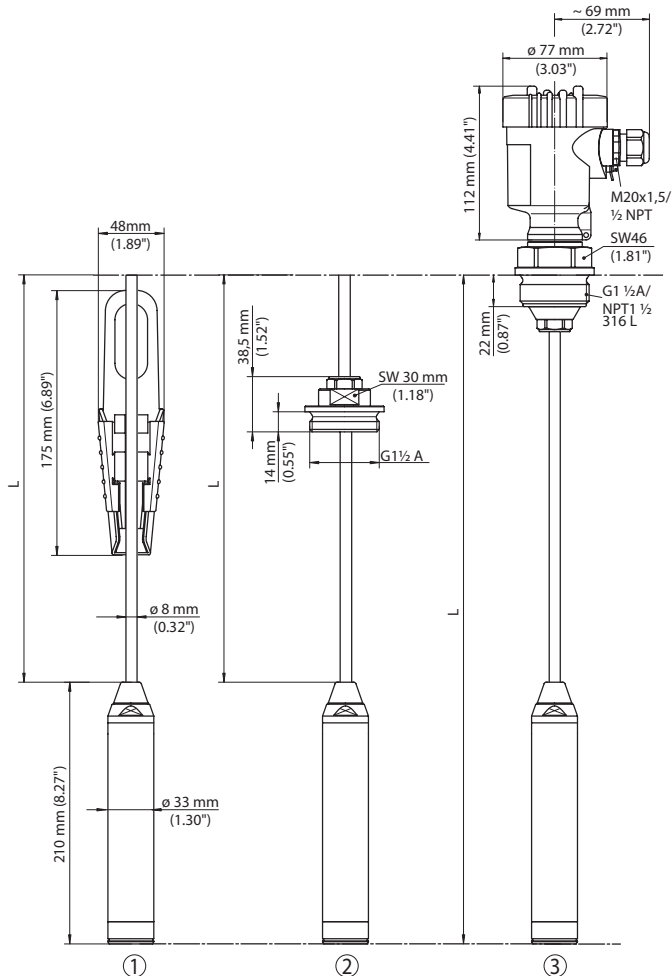


Fig. 21: VEGAWELL 52, with transmitter 316L/Titanium 33 mm

- 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

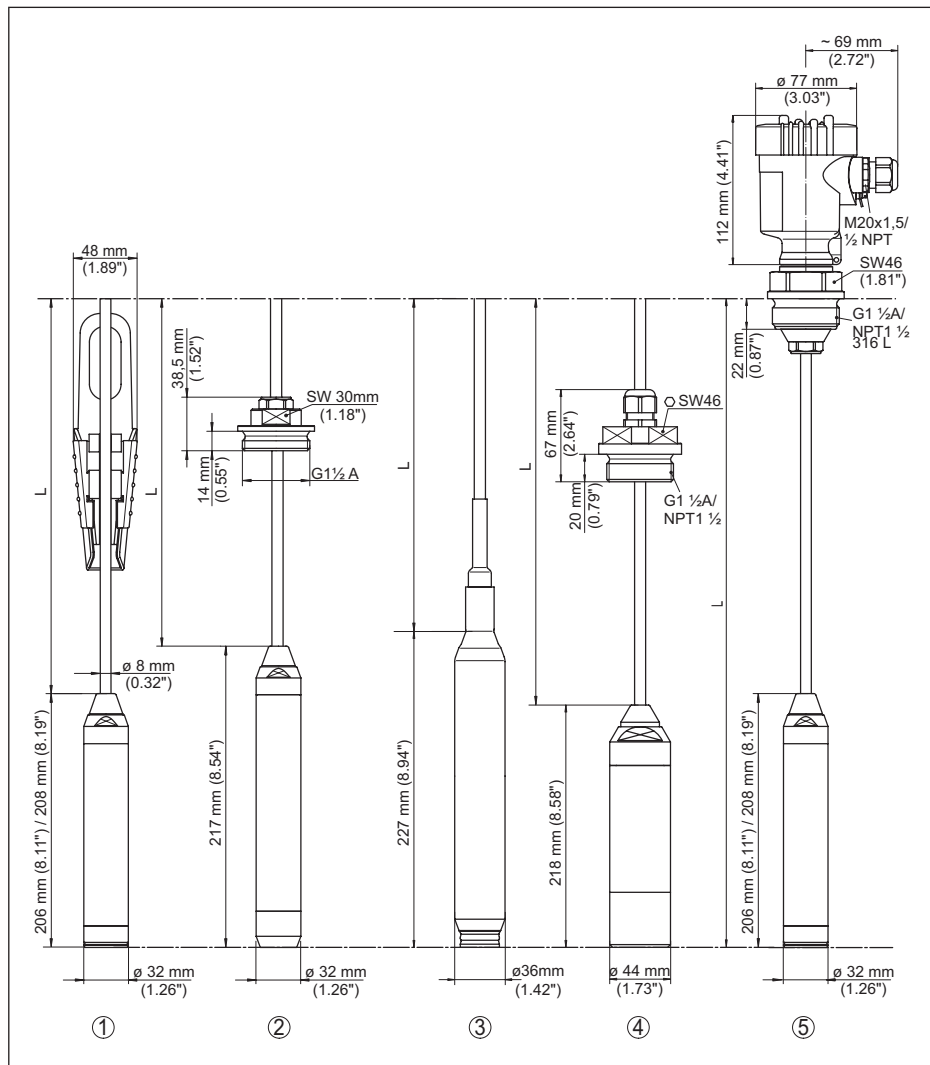


Fig. 22: VEGAWELL 52, with transmitter Duplex steel (1.4462)/PVDF

- 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**

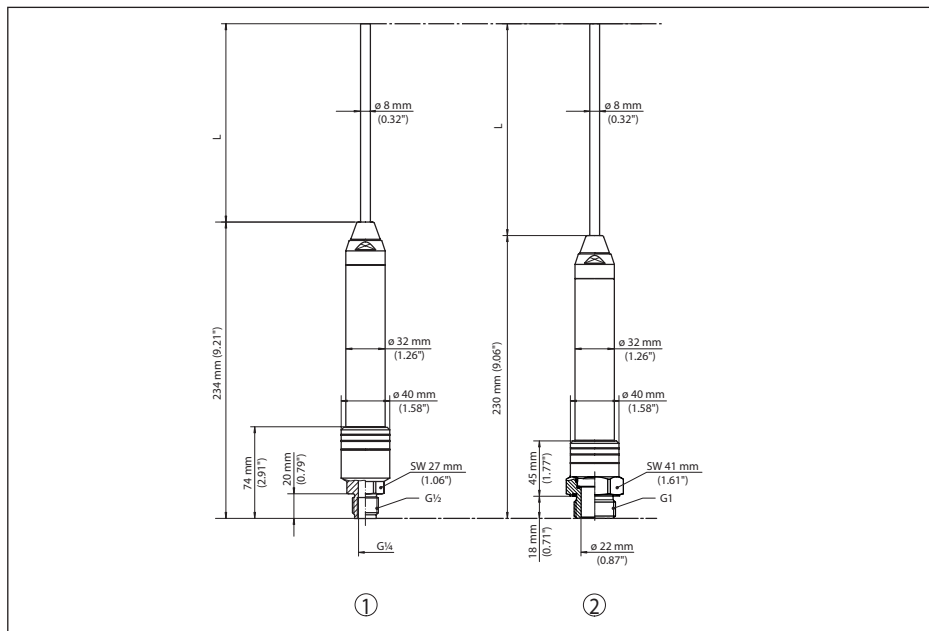


Fig. 23: VEGAWELL 52, with threaded fitting and transmitter Duplex steel (1.4462)

- 1 Threaded fitting G1/2 inner G1/4
- 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](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 [www.vega.com](http://www.vega.com).

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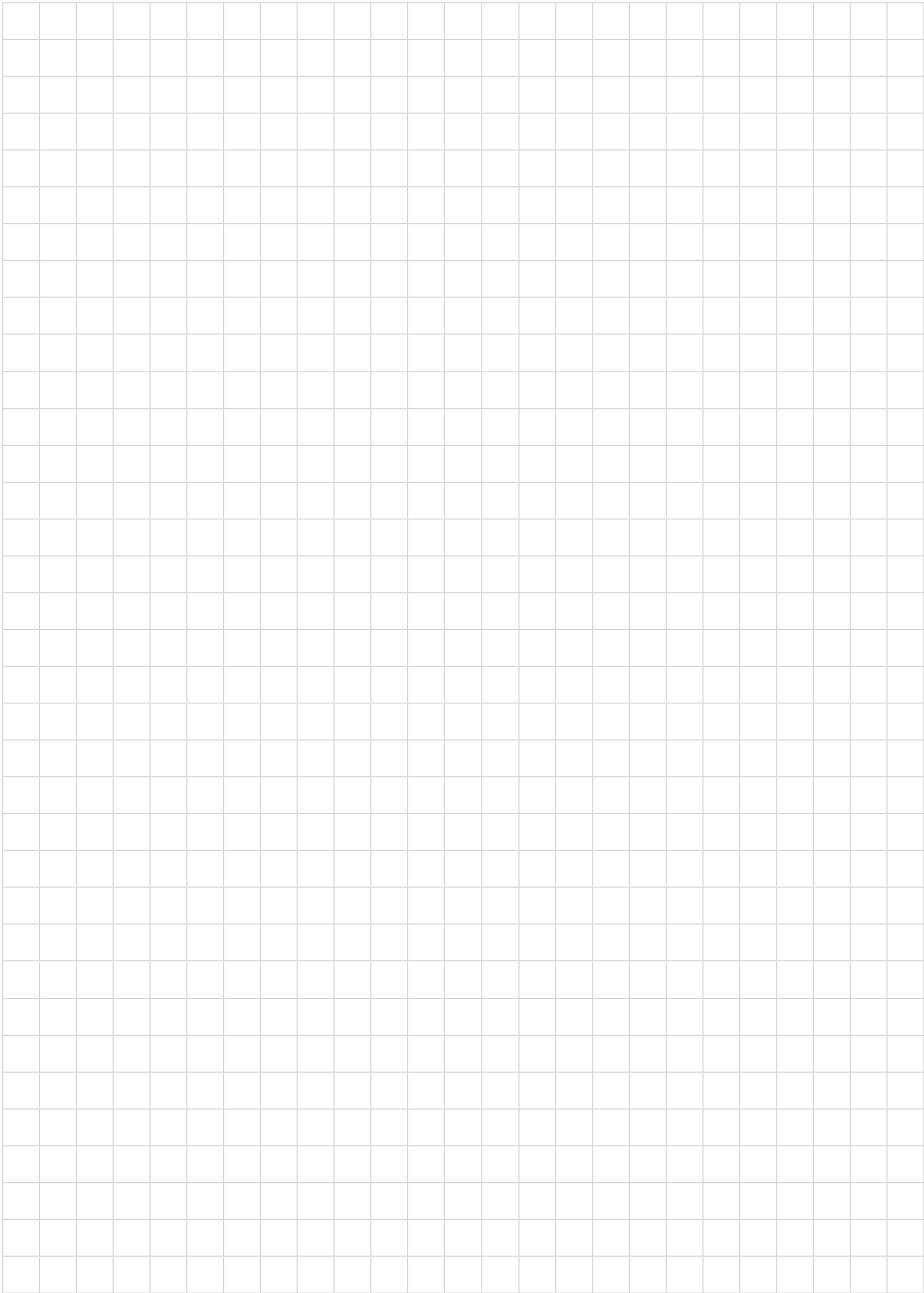
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35402-EN-230227

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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.

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35402-EN-230227

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