Operating Instructions

Differential pressure transmitter with metallic measuring diaphragm

VEGADIF 65

4 … 20 mA/HART

📖

Document ID: 36128

VEGA

Contents

36128-EN-200124

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.

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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 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.

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

Battery disposal
This symbol indicates special information about the disposal of batteries and accumulators.

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

VEGADIF 65 is a differential pressure transmitter for measurement of flow, level, differential pressure, density and interface.

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.

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

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 and their meaning read in this operating instructions manual.

2.5 Safety label on the instrument

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

2.6 EU conformity

The device fulfils the legal requirements of the applicable EU directives. By affixing the CE marking, we confirm the conformity of the instrument with these directives.

The EU conformity declaration can be found on our homepage.

2.7 Fulfillment of 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
- NE 53 – Compatibility of field devices and display/adjustment components

For further information see www.namur.de.

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 Safety instructions for oxygen applications

For instruments in oxygen applications the special instructions in chapters "*Storage and transport*", "*Mounting*" as well as "*Technical data*" under "*Process conditions*"must be noted. Furthermore the valid national regulations, implementation instructions and memorandums of the professional assocations must be noted.

2.10 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:

● VEGADIF 65 differential pressure transmitter
● Depending on the version, ventilation valves and/or screw plugs (details see chapter "*Dimensions*")
● Optional accessory
● Documentation
  – This operating instructions manual
  – Operating instructions "*Display and adjustment module*" (optional)
  – Supplementary instructions manual "*Heating for display and adjustment module*" (optional)
  – Operating instructions "*Chemical seal CSB*" (optional)
  – Operating instructions "*Chemical seal CSS*" (optional)
  – Supplementary instructions manual "*Plug connector for continuously measuring sensors*" (optional)
  – Ex-specific "*Safety instructions*" (with Ex versions)
  – Certificate "*For oxygen application*" (with respective versions)
  – If necessary, further certificates

Constituent parts

The following illustration shows the components of VEGADIF 65:
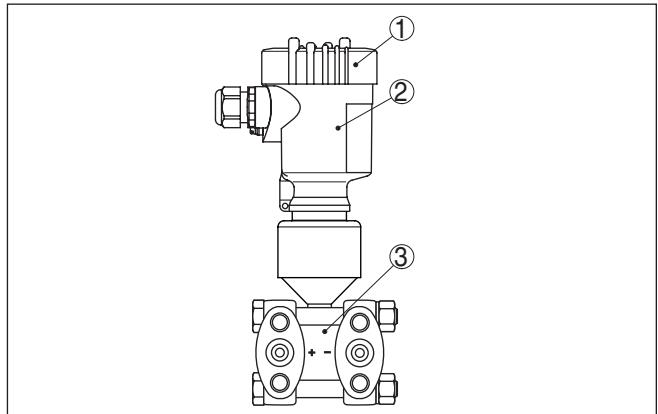
Fig. 1: VEGADIF 65 in basic version

1   Housing cover, optionally with integrated display and adjustment module
2   Housing with electronics
3   Process component with measuring cell

The components are available in different versions.

The type label contains the most important data for identification and use of the instrument:
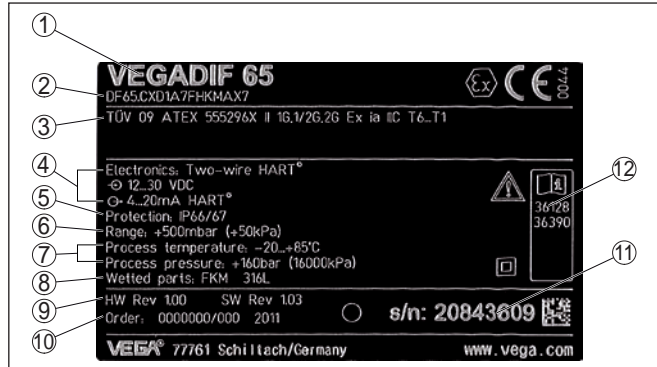
Fig. 2: Layout of the type label (example)

1 Instrument type
2 Product code
3 Approvals
4 Electronics
5 Protection rating
6 Measuring range
7 Process temperature, process pressure
8 Material, wetted parts
9 Hardware and software version
10 Order number
11 Serial number of the instrument
12 ID numbers, instrument documentation

With the serial number, you can access the delivery data of the instrument via "www.vega.com", "*VEGA Tools*" and "*serial number search*". You can find the serial number on the inside of the instrument as well as on the type label on the outside.

3.2 Principle of operation

Application area

VEGADIF 65 is a differential pressure transmitter for measurement of flow, level, differential pressure, density and interface. Measured products are gases, vapours and liquids.

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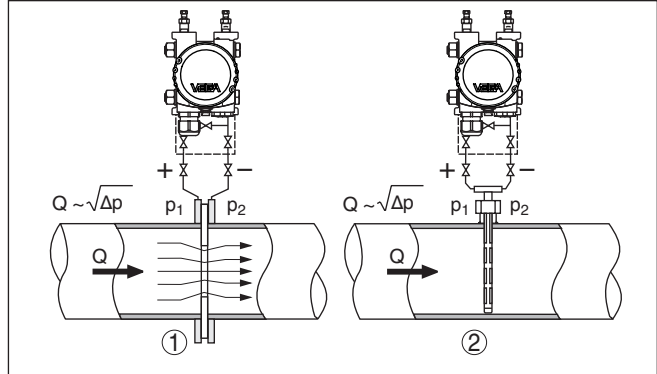
Flow measurement

Fig. 3: Flow measurement with VEGADIF 65 and DP flow element, Q = flow, Δp = differential pressure, Δp = p$_1$ - p$_2$

1   Orifice
2   Pitot tube

Level measurement
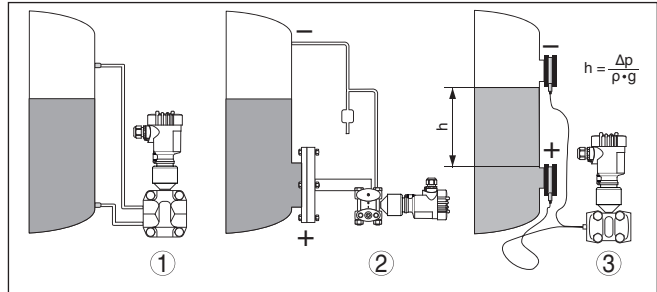
Fig. 4: Level measurement with VEGADIF 65. Δp = differential pressure, ρ = density of the medium, g = acceleration of gravity

1   Basic version with effective pressure lines
2   Version with flange chemical seal
3   Version with capillaries and cell chemical seals

Differential pressure measurement
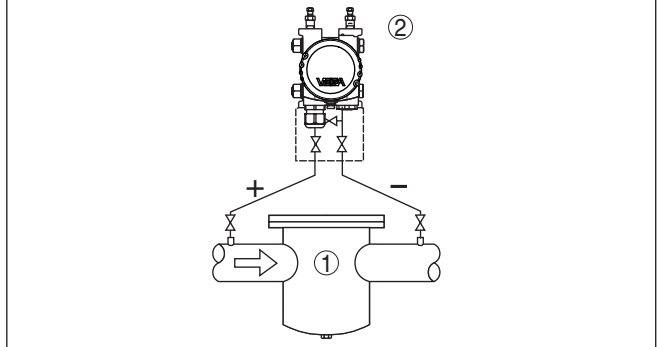
Fig. 5: Differential pressure measurement with VEGADIF 65

1   Filter
2   VEGADIF 65

Density measurement

$$\varrho = \frac{\Delta p}{h \cdot g}$$
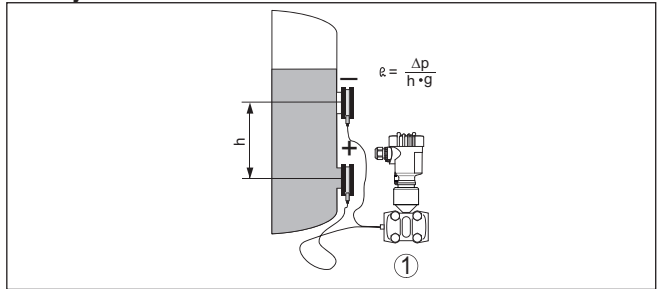
Fig. 6: Density measurement with VEGADIF 65, h = defined mounting distance,
Δp = differential pressure, ρ = density of the medium, g = acceleration of gravity

1   VEGADIF 65

Interface measurement
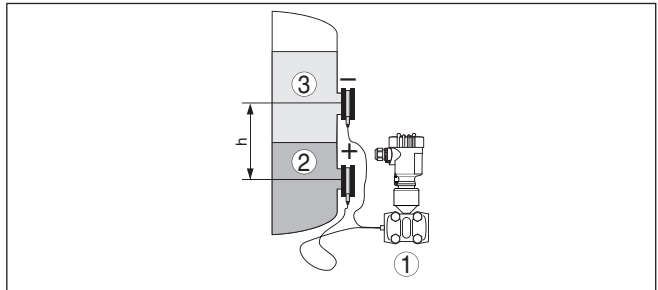
Fig. 7: Interface measurement with VEGADIF 65

1   VEGADIF 65
2   Liquid with higher density
3   Liquid with lower density

Functional principle

A metallic measuring cell is used as sensor element. The process pressures are transmitted via the separating diaphragms and filling oils to a piezoresistive measuring element (resistance measuring bridge in semi-conductor technology).

The difference between the acting pressures changes the bridge voltage. This change is measured, further processed and converted into a corresponding output signal.
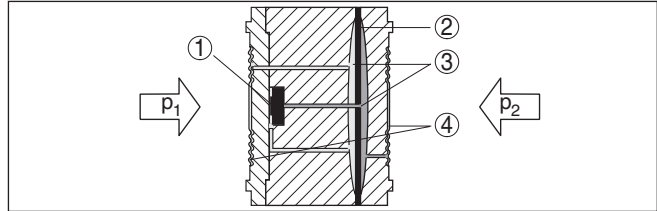
Fig. 8: Configuration metallic measuring cell

1   Measuring element
2   Overload diaphragm/Middle diaphragm
3   Filling oil
4   Separating diaphragms
p_1, p_2 Process pressures

The markings "**+**" and "**-**" on the process component in chapter "*Mounting and connection instructions*" must therefore be noted when connecting to the process. The pressure acting on "**+**" goes positive, the pressure acting on "**-**" goes negative into the calculation of the pressure difference.

Voltage supply

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

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

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

The backlight of the display and adjustment module is powered by the sensor. The prerequisite for this is a supply voltage at a certain level. The exact voltage specifications are stated in chapter "*Technical data*".

The optional heating requires its own voltage supply. You can find further details in the supplementary instructions manual "*Heating for display and adjustment module*".

This function is generally not available for approved instruments.

3.3 Adjustment

The instrument can be adjusted with the following adjustment media:

- With the display and adjustment module
- with the suitable VEGA DTM in conjunction with an adjustment software according to the FDT/DTM standard, e.g. PACTware and PC
- With manufacturer-specific adjustment programs AMS↑ or PDM
- With a HART handheld

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.

⚠ **Caution:**
Instruments for oxygen applications are sealed in PE foil and provided with a label "Oxygen! Use no Oil". Remove this foil just before mounting the instrument! See instruction under "*Mounting*".

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 humidity 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 and replacement parts

PLICSCOM

The display and adjustment module PLICSCOM is used for measured value indication, adjustment and diagnosis. It can be inserted into the sensor or the external display and adjustment unit and removed at any time.

The integrated Bluetooth module (optional) enables wireless adjustment via standard adjustment devices:

● Smartphone/tablet (iOS or Android operating system)
● PC/notebook with Bluetooth USB adapter (Windows operating system)

You can find further information in the operating instructions "*Display and adjustment module PLICSCOM*" (Document-ID 36433).

VEGACONNECT

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

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

VEGADIS 81

The VEGADIS 81 is an external display and adjustment unit for VEGA plics® sensors.

For sensors with double chamber housing the interface adapter "*VEGADIS adapter*" is also required for VEGADIS 81.

You can find further information in the operating instructions "*VEGADIS 81*" (Document-ID 43814).

VEGADIS 82

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

You can find further information in the operating instructions "*VEGADIS 82*" (Document-ID 45300).

Protective cover

The protective cover protects the sensor housing against soiling and intense heat from solar radiation.

You will find additional information in the supplementary instructions manual "*Protective cover*" (Document-ID 34296).

Oval flange adapter

The oval flange adapter enables the connection of a ½ NPT tube to a VEGADIF 65 or a valve block. By selecting the suitable materials, the oval flange adapter can be adapted to all processes.

You can find additional information in the supplementary instructions "*Mounting accessories, pressure*" (Document-ID 43478).

Valve blocks

Valve blocks enable simple installation and setup of a differential pressure transmitter. When the process valves are closed, the equalization valve enables a pressure compensation for the measuring chambers. This allows the zero point of the pressure transmitter to be adjusted.

You can find additional information in the supplementary instructions "*Mounting accessories, pressure*" (Document-ID 43478).

Mounting bracket

The mounting bracket is used for wall or tube mounting of VEGADIF 65. It is supplied with strap for tube mounting and faxing screws 7/16 UNF, M10 for VEGADIF 65. The material used is 316L.

You can find additional information in the supplementary instructions "*Mounting accessories, pressure*" (Document-ID 43478).

Chemical seal

By connecting chemical seals CSS and CSB, the application range can be extended. For example, it is also possible to realize interface and density measurements with connected chemical seals CSB.

By installing chemical seals, applications with corrosive, highly viscous and hot products can be also be realized.

You can find additional information in the operating instructions "*Chemical seal CSS or CSB*" (Document-ID 36133 or 36134).

Electronics module

The electronics module is a replacement part for pressure transmitter VEGABAR. One version is available for each type of signal output.

You find further information in the operating instructions "*Electronics module VEGABAR series 50 and 60* " (Document-ID 30175).

4 Mounting

4.1 General instructions for use of the instrument

Suitability for the process conditions

Make sure that all parts of the instrument coming in direct contact with the process, especially the sensor element, process seal and process fitting, are suitable for the existing process conditions, such as process pressure, process temperature as well as the chemical properties of the medium.

You can find the specifications or references in chapters "*Technical data*", "*Dimensions, versions process component*" and on the nameplate.

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.

Moisture

Use the recommended cables (see chapter "*Connecting to power supply*") and tighten the cable gland.

You can give your instrument additional protection against moisture penetration by leading the connection cable downward in front of the cable gland. Rain and condensation water can thus drain off. This applies mainly to outdoor mounting as well as installation in areas where high humidity is expected (e.g. through cleaning processes) or on cooled or heated vessels.

To maintain the housing protection, make sure that the housing lid is closed during operation and locked, if necessary.

Make sure that the degree of contamination specified in chapter "*Technical data*" meets the existing ambient conditions.

Ventilation

The ventilation for the electronics housing is realised via a filter element in the vicinity of the cable glands.
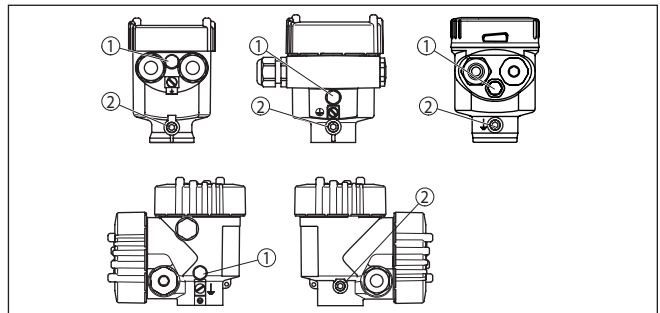

Fig. 9: Position of the filter element with single and double chamber housing

1 Filter element for ventilation of the electronics housing
2 Blind plug

ℹ Information:
Make sure that the filter element is always free of buildup during operation. A high-pressure cleaner may not be used for cleaning.

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DP flow element

DP flow elements are calculated for certain pipeline and operating data. Therefore, check the pipeline data before installation at the measuring point and compare the measurement loop number.

Detailed instructions for mounting the DP flow element are stated in DIN EN ISO 5167 as well as in the instrument documentation from the respective manufacturer.

Effective pressure lines

When wiring the effective pressure lines outdoors, make sure that you use a suitable antifreeze, e.g. by using a heat tracing. Wire the effective pressure lines with a monotonous gradient of at least 10 %. Effective pressure lines for gases must remain dry, condensate must be avoided. Effective pressure lines for liquids must be completely filled and ventilated.

General recommendations for wiring of effective pressure lines are stated in the corresponding national and international standards.

Vibrations

In case of strong vibrations at the application position, the instrument version with external electronics should be used.

Temperature limits

Higher process temperatures often mean also higher ambient temperatures for electronics and connection cable. Make sure that the upper temperature limits stated in chapter "*Technical data*" for the environment of the electronics housing and connection cable are not exceeded.

4.2 Instructions for oxygen applications

Oxygen applications

Oxygen and other gases can be explosive when brought into contact with oils, grease and plastics, so the following measures must also be taken:

- All components of the plant, such as e.g. measuring instruments must be cleaned according to the requirements of BAM (DIN 19247)
- Depending on the seal material, certain temperatures and pressures must not be exceeded in oxygen applications, see chapter "*Technical data*"

⚠️ **Danger:**
Instruments for oxygen applications must be unpacked just before mounting. After removing the protective cover of the process fitting, the label "O_2" will be visible on the process fitting. Penetration of oil, grease and dirt should be avoided. Danger of explosion!

4.3 Mounting and connection instructions

Connection plus/minus side

When connecting the VEGADIF 65 to the measurement loop, take note of the plus/minus side of the process component. The plus side is marked with a "**+**", the minus side with a "**-**" on the process component next to the oval flanges.
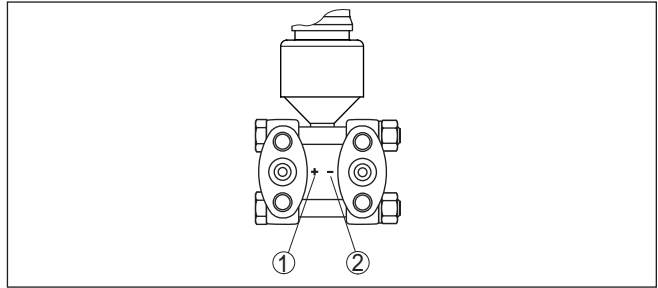
Fig. 10: Marking for plus/minus side on the process component

1   Plus side
2   Minus side

Mounting arrangement   The following illustration shows the elements for a tube mounting and
an example for a mounting arrangement with valve block.
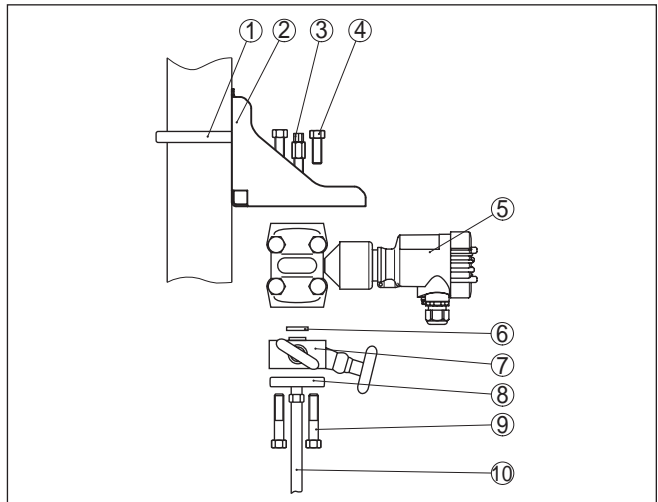
Fig. 11: Mounting arrangement with tube mounting

1   Strap for tube mounting
2   Mounting bracket
3   Ventilation valve
4   Fixing screws
5   VEGADIF 65
6   PTFE seal
7   Valve block
8   Oval flange adapter
9   Fixing screws
10 Effective pressure line

Valve blocks   Valve blocks enable the simple installation and setup of the differential
pressure transmitter. They separate the pressure transmitter from the
process side and enable also a check of the measurement loop. They

are available as 3-fold and 5-fold version. The integrated equalization valve enables a pressure compensation between plus and minus side during the setup. Thanks to the valve block it is possible to dismount the VEGADIF 65 without interrupting the process. This means higher plant availability and simpler setup or maintenance.

The 3-fold valve block with flanging on both sides enables a mechanically stable connection between the VEGADIF 65 and e.g. the tapping points or the flange plate of a pitot tube. With the five-fold valve block, two additional valves allow blowing out the process lines or checking the VEGADIF 65 in installed condition.

3-fold valve block

The following illustration shows the connection of the 3-fold valve block.
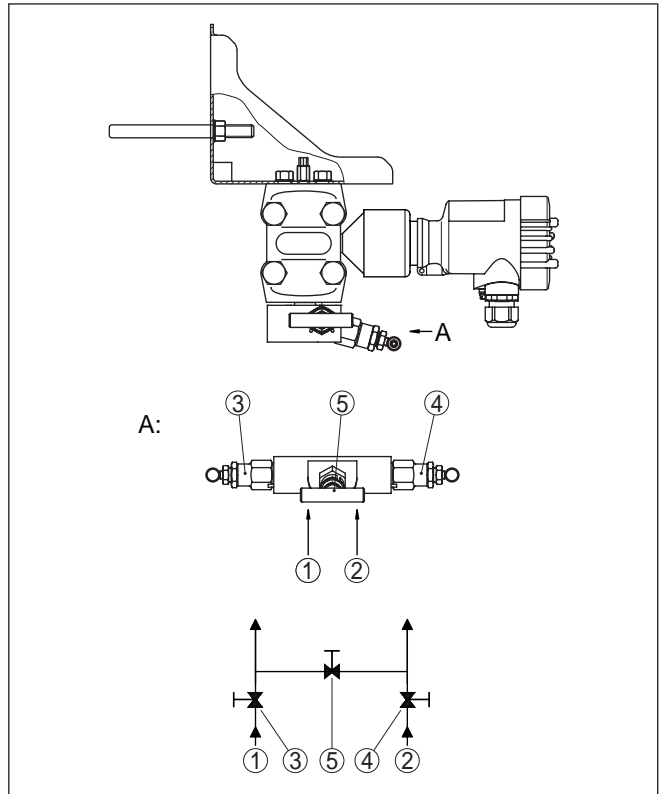
Fig. 12: Connection of a 3-fold valve block

1   Process fitting
2   Process fitting
3   Inlet valve
4   Inlet valve
5   Breather valve

3-fold valve block, flanging on both sides

The following illustration shows the connection of the 3-fold valve block, flanging on both sides.
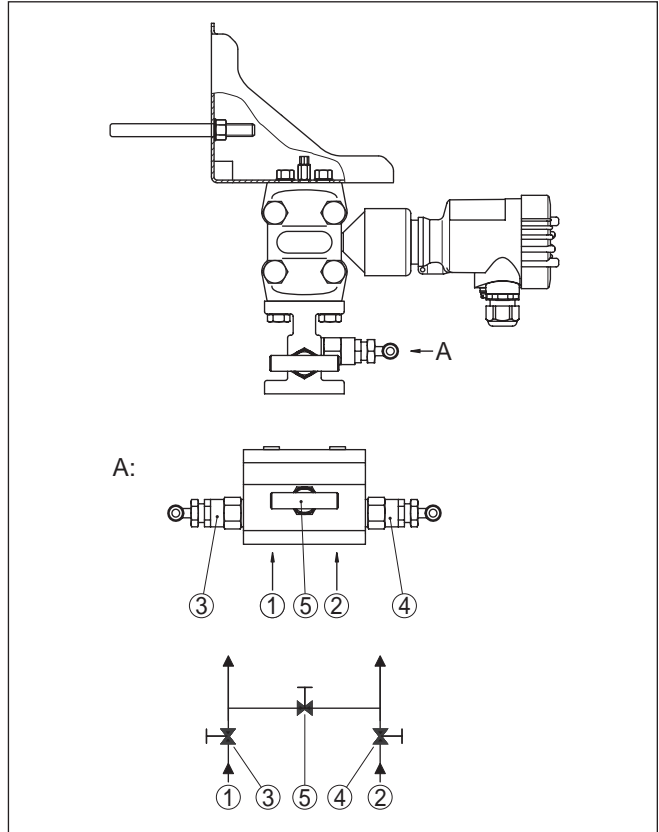
Fig. 13: Connection of a 3-fold valve block, flanging on both sides

1   *Process fitting*
2   *Process fitting*
3   *Inlet valve*
4   *Inlet valve*
5   *Breather valve*

5-fold valve block

The following illustration shows the connection of the 5-fold valve block.
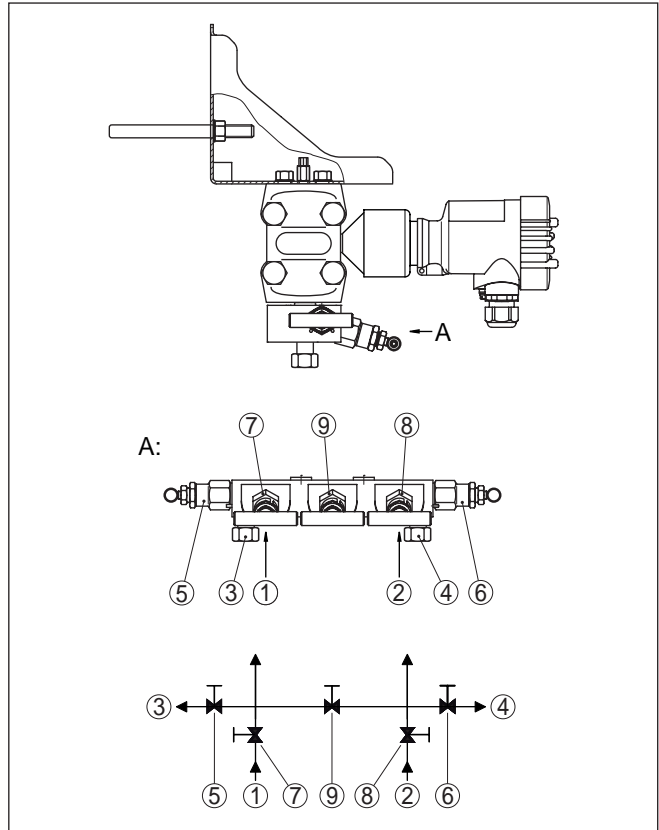
Fig. 14: Connection of a 5-fold valve block

1   Process fitting
2   Process fitting
3   Check/Ventilate
4   Check/Ventilate
5   Valve for checking/ventilating
6   Valve for checking/ventilating
7   Inlet valve
8   Inlet valve
9   Breather valve

4.4   Measurement setup - Flow

In gases
→ Mount VEGADIF 65 above the measurement loop so that condensate can drain off in the process cable.
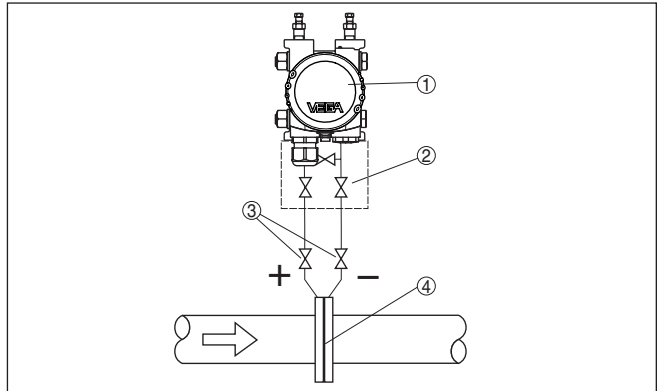
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Fig. 15: Measurement setup with flow measurement of gases, connection via 3-fold valve block

1   VEGADIF 65
2   3-fold valve block
3   Blocking valves
4   Orifice or impact pressure probe
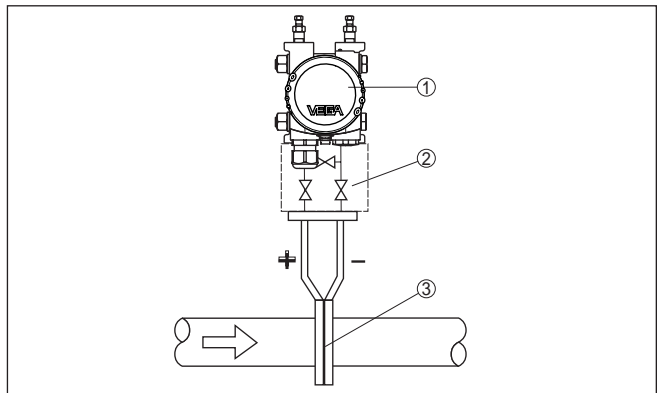
Fig. 16: Measurement setup with flow measurement of gases, connection via 3-fold valve block, flanging on both sides

1   VEGADIF 65
2   3-fold valve block, flanging on both sides
3   Orifice or impact pressure probe

In vapours

. Mount VEGADIF 65 below the measurement loop

. Mount condensate vessels at the same height with the discharge socket and at the same distance to VEGADIF 65

. Fill the effective pressure lines to the height of the condensate vessels before setup
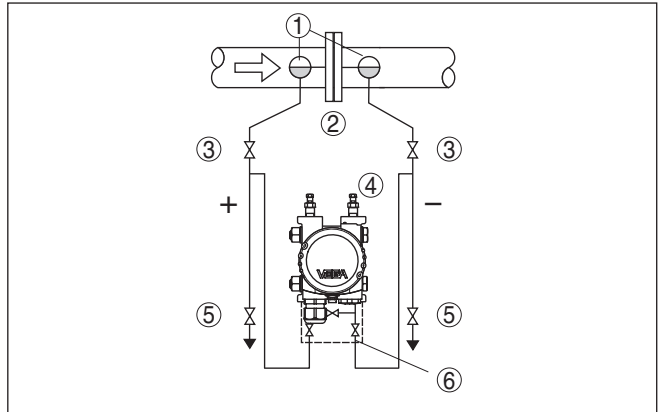
Fig. 17: Measurement setup, flow measurement in vapours

1   Condensate vessels
2   Orifice or impact pressure probe
3   Blocking valves
4   VEGADIF 65
5   Drain or blow-off valves
6   3-fold valve block

When using a 5-fold valve block, the drain or blow-off valves are already integrated.

In liquids

. Mount VEGADIF 65 below the measurement loop so that the effective pressure lines are always filled with liquid and gas bubbles can bubble up to the process line

. For measurements in products with solid content such as e.g. dirty liquids, the installation of separators and drain valves is recommended to enable collection and removal of debris and sediment.

. Fill the effective pressure lines to the height of the condensate vessels before setup
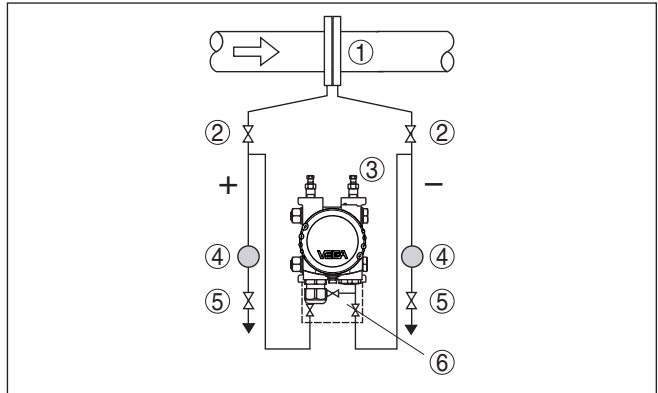
VEGA

Fig. 18: Measurement setup, flow measurement in liquids

1 Orifice or impact pressure probe
2 Blocking valves
3 VEGADIF 65
4 Precipitator
5 Drain valves
6 3-fold valve block

4.5 Measurement setup level

**In open vessels with ef-
fective pressure line**

. Mount VEGADIF 65 below the lower measurement connection so
that the effective pressure lines are always filled with liquid

. Minus side is open to the atmospheric pressure

. When measuring liquids with solid content, the mounting of sepa-
rators and drain valves is useful to be able to avoid and remove
buildup.
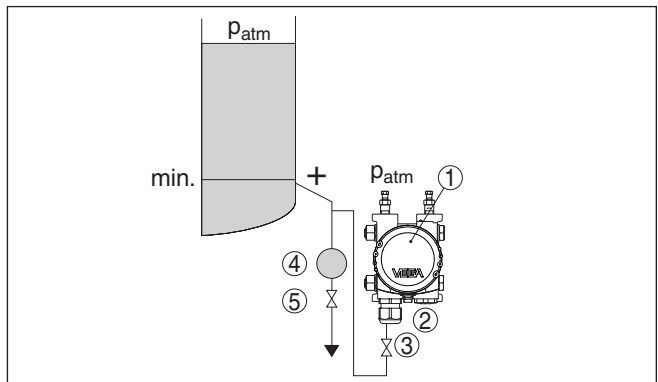
Fig. 19: Measurement setup, level measurement in the open vessel

1 VEGADIF 65
2 Minus side is open to the atmospheric pressure
3 Blocking valve
4 Precipitator
5 Drain valve

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In open vessels with single chemical seal

. Mount VEGADIF 65 directly to the vessel

. Minus side is open to the atmospheric pressure
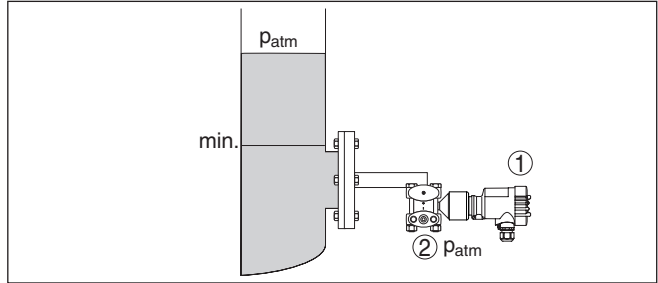
Fig. 20: Measurement setup, level measurement in the open vessel

1   VEGADIF 65
2   Minus side is open to the atmospheric pressure

In closed vessels with effective pressure lines

. Mount VEGADIF 65 below the lower measurement connection so that the effective pressure lines are always filled with liquid

. Connect minus side always above the max. level

. For measurements in products with solid content such as e.g. dirty liquids, the installation of separators and drain valves is recommended to enable collection and removal of debris and sediment.

Fig. 21: Measurement setup, level measurement in closed vessel

1   Blocking valves
2   VEGADIF 65
3   Precipitator
4   Drain valves
5   3-fold valve block

In closed vessels with single chemical seal

.   Mount VEGADIF 65 directly to the vessel

.   Connect minus side always above the max. level

.   For measurements in products with solid content such as e.g. dirty liquids, the installation of separators and drain valves is recommended to enable collection and removal of debris and sediment.

Fig. 22: Measurement setup, level measurement in closed vessel

1   Blocking valve
2   Precipitator
3   Drain valve
4   VEGADIF 65

In closed vessels with double chemical seal

.   Mount VEGADIF 65 below the lower chemical seal

.   The ambient temperature should be the same for both capillaries

ℹ Information:
Level measurement is only ensured between the upper edge of the lower and the lower edge of the upper chemical seal.
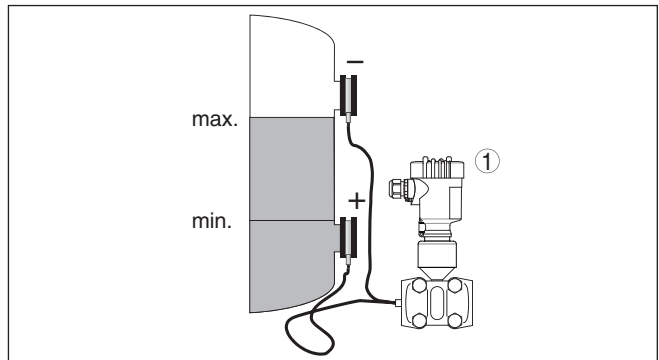
Fig. 23: Measurement setup, level measurement in closed vessel
1   VEGADIF 65

In closed vessels with steam layering with effective pressure line

.   Mount VEGADIF 65 below the lower measurement connection so that the effective pressure lines are always filled with liquid

.   Connect minus side always above the max. level

. The condensate vessel ensures a constant pressure on the minus side

. For measurements in products with solid content such as e.g. dirty liquids, the installation of separators and drain valves is recommended to enable collection and removal of debris and sediment.
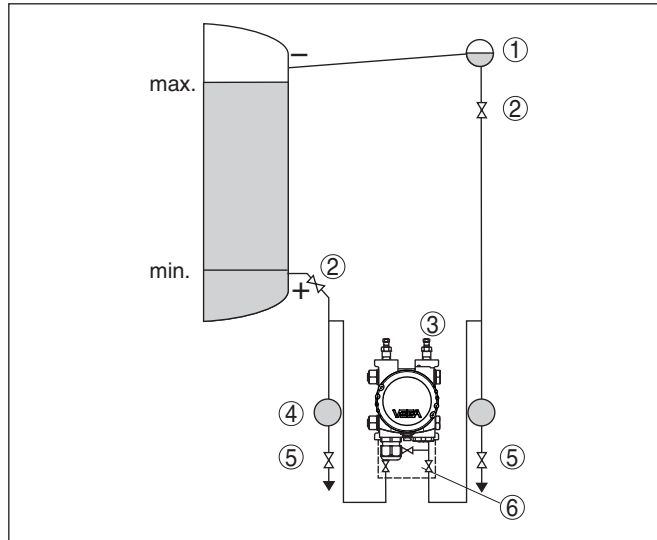
Fig. 24: Measurement setup in closed vessel with superimposed steam

1   Condensate vessel
2   Blocking valves
3   VEGADIF 65
4   Precipitator
5   Drain valves
6   3-fold valve block

In closed vessels with superimposed steam with single chemical seal

. Mount VEGADIF 65 directly to the vessel

. Connect minus side always above the max. level

. The condensate vessel ensures a constant pressure on the minus side

. For measurements in products with solid content such as e.g. dirty liquids, the installation of separators and drain valves is recommended to enable collection and removal of debris and sediment.
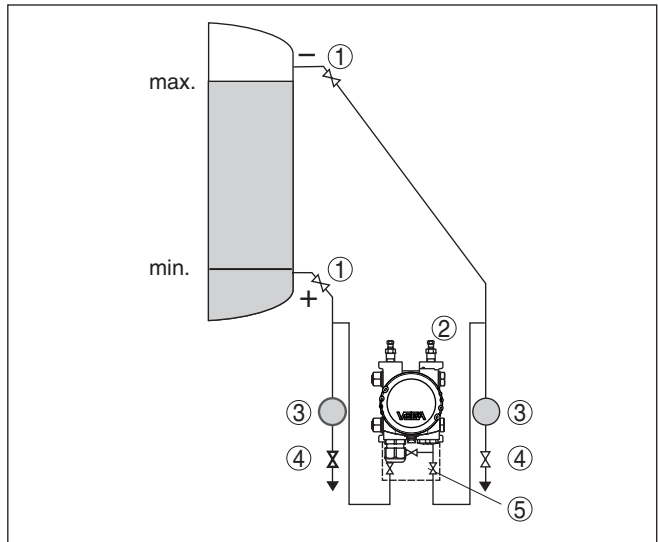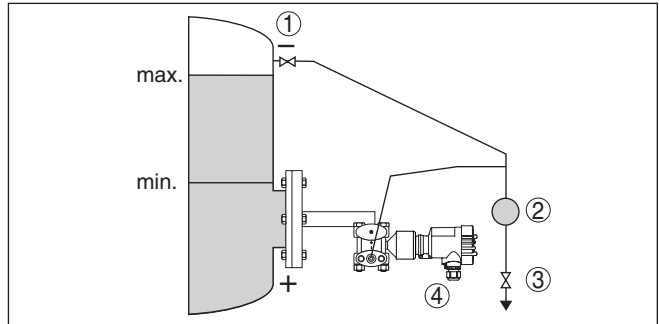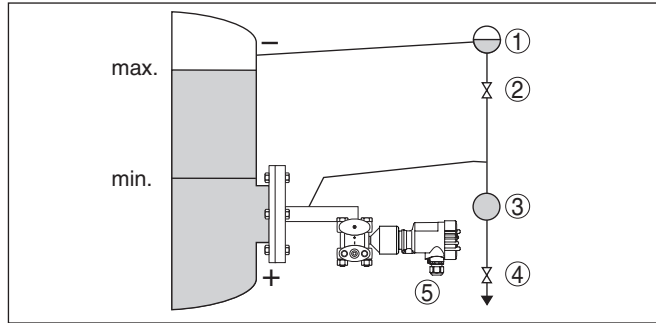
Fig. 25: Measurement setup in closed vessel with superimposed steam

1 Condensate vessel
2 Blocking valve
3 Precipitator
4 Drain valve
5 VEGADIF 65

4.6 Measurement setup density and interface

Density measurement

In a vessel with varying level and homogeneous density distribution, density measurement with a differential pressure transmitter can be realized. The connection to the vessel is made via a chemical seal on two measuring points. To reach a high accuracy, the distance between these points must be as big as possible. The density measurement is only ensured with a level above the upper measuring point. If the level drops below the upper measuring point, the density measurement is interrupted.

This density measurement functions with open but also with closed vessels. Make sure that small density changes cause only small changes to the measured differential pressure. Select a suitable measuring range.

The density measurement is carried out in the mode level measurement.

. Mount VEGADIF 65 below the lower chemical seal

. The ambient temperature should be the same for both capillaries

Example for a density measurement:

Distance between the two measurement points: 0.3 m

Min. density: 1000 kg/m^3

Max. density: 1200 kg/m^3

Measured differential pressure: $\Delta p = \rho \bullet g \bullet h$

The min. adjustment is carried out for the differential pressure measured at density 1.0:

$\Delta p = \rho \bullet g \bullet h$

$= 1000 \text{ kg/m}^3 \bullet 9.81 \text{ m/s}^2 \bullet 0,3 \text{ m}$

$= 2943 \text{ Pa} = 29.43 \text{ mbar}$

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The max. adjustment is carried out for the differential pressure measured at density 1.2:

$\Delta p = \rho \cdot g \cdot h$

$= 1200 \ kg/m^3 \cdot 9.81 \ m/s^2 \cdot 0.3 \ m$

$= 3531 \ Pa = 35.31 \ mbar$
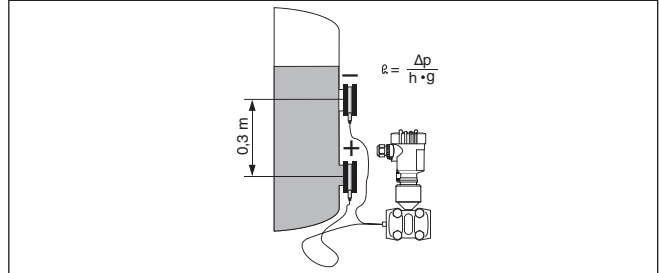
Fig. 26: Measurement setup for density measurement

Interface measurement

In a vessel with varying level, an interface measurement with a differential pressure transmitter can be realized. The connection on the vessel is carried out via a chemical seal on two measuring points. An interface measurement is only possible if the densities of the two products remain the same and the interface is always between the two measuring points. The total level must always be above the upper measuring point.

This density measurement functions with open but also with closed vessel.

Example for an interface measurement:

Distance between the two measurement points: 0.3 m

Min. density: 800 kg/m³

Max. density: 1000 kg/m³

The min. adjustment is carried out for the differential pressure occuring with density 0.8:

$\Delta p = \rho \cdot g \cdot h$

$= 800 \ kg/m^3 \cdot 9.81 \ m/s \cdot 0.3 \ m$

$= 2354 \ Pa = 23.54 \ mbar$

The max. adjustment is carried out for the differential pressure occuring with density 1.0:

$\Delta p = \rho \cdot g \cdot h$

$= 1000 \ kg/m^3 \cdot 9.81 \ m/s \cdot 0.3 \ m$

$= 2943 \ Pa = 29.43 \ mbar$

. Mount VEGADIF 65 below the lower chemical seal

. The ambient temperature should be the same for both capillaries

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Fig. 27: Measurement setup with interface measurement

4.7 Measurement setup differential pressure

In gases and vapours

→ Mount VEGADIF 65 above the measurement loop so that condensate can drain off in the process cable.
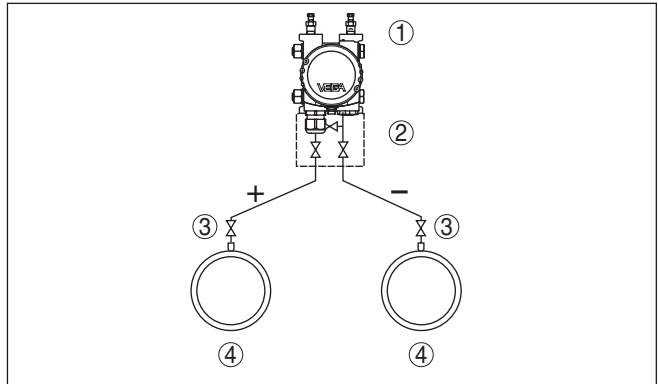
Fig. 28: Measurement setup with differential pressure measurement between two pipelines in gases and vapours

1 VEGADIF 65
2 3-fold valve block
3 Blocking valves
4 Pipelines

In vapour and condensate plants

→ Mount VEGADIF 65 below the measurement loop so that some condensate can collect in the effective pressure lines.

The ventilation is carried out via the ventilation valves on the instrument, the 5-fold valve block enables blowing out the cables.
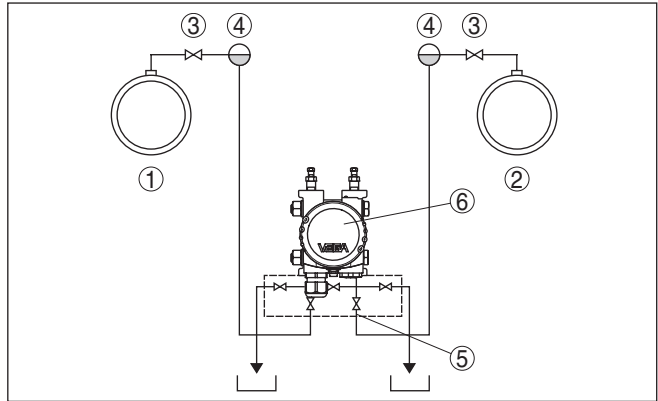
Fig. 29: Measurement setup with differential pressure measurement between a vapour and a condensate cable

1 Vapour cable
2 Condensate cable
3 Blocking valves
4 Condensate vessels
5 5-fold valve block
6 VEGADIF 65

In liquids

. Mount VEGADIF 65 below the measurement loop so that the effective pressure lines are always filled with liquid and gas bubbles can bubble up to the process line

. For measurements in products with solid content such as e.g. dirty liquids, the installation of separators and drain valves is recommended to enable collection and removal of debris and sediment.
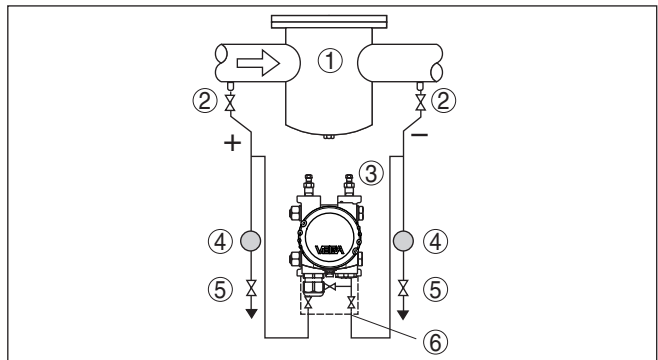
Fig. 30: Measurement setup, flow measurement in liquids

1 E.g. filter
2 Blocking valves
3 VEGADIF 65
4 Precipitator
5 Drain valves
6 3-fold valve block

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When chemical seal systems are used in all products

.   Mount chemical seal with capillaries on top or laterally on the pipeline

.   In vacuum applications: Mount VEGADIF 65 below the measurement loop

.   The ambient temperature should be the same for both capillaries
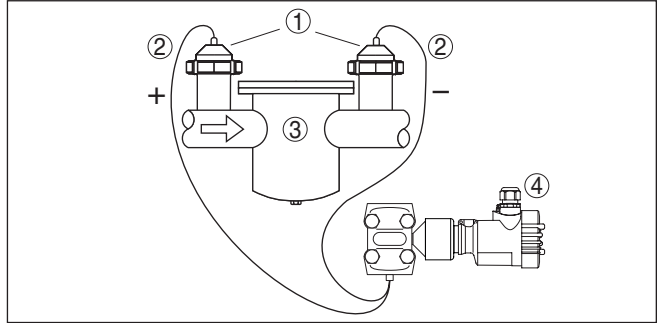
Fig. 31: Measurement setup, differential pressure measurement in gases, vapours and liquids

1   Chemical seal with slotted nut
2   Capillaries
3   E.g. filter
4   VEGADIF 65

4.8   Mounting external housing

1.   Mark the holes according to the following drilling template

2.   Depending on the mounting surface, fasten the wall mounting plate with 4 screws
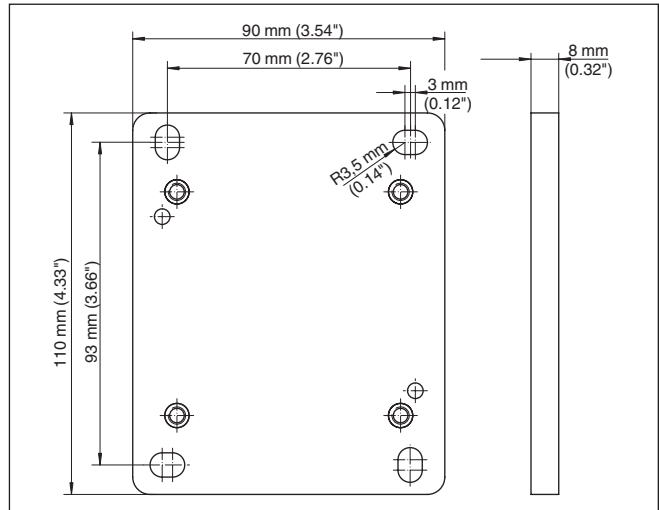
Fig. 32: Drilling template - wall mounting plate

Mount the wall mounting plate so that the cable entry of the socket housing points downward. The socket housing can be displaced by 180° to the wall mounting plate.

4.9 Installation control

Check the following after mounting the instrument:

● Did you tighten all screws?
● Closing screws and ventilation valves closed

5 Connecting to power supply

5.1 Preparing the connection

Safety instructions

Always keep in mind the following safety instructions:

- Connect only in the complete absence of line voltage
- If overvoltage surges are expected, overvoltage arresters should be installed.

Tip:
We recommend using VEGA overvoltage arresters B63-48 and ÜSB 62-36G.X.

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

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*".

Provide a reliable separation between the supply circuit and the mains circuits according to DIN EN 61140 VDE 0140-1. The VEGA power supply units VEGATRENN 149A Ex, VEGASTAB 690 as well as all VEGAMETs and VEGASCANs meet this requirement.

Information:
The controllers VEGAMET 624 and 625 as well as VEGASCAN 693 have a digital sensor recognition. When connecting VEGADIF 65, a software version from 1.92 is required with the controller. For software update move under "www.vega.com/downloads" to "*Software*".

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

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

Connection cable

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

Cable gland ½ NPT

On the instrument with cable entry ½ NPT and plastic housing there is a metallic ½" threaded insert moulded into the plastic housing.

⚠ Caution:
No grease should be used when screwing the NPT cable gland or steel tube into the threaded insert. Standard grease can contain additives that corrode the connection between threaded insert and housing. This would influence the stability of the connection and the tightness of the housing.

Cable screening and grounding

If screened cable is required, we recommend connecting the cable screen on both ends to ground potential. In the sensor, the screen 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

Single/Double chamber housing

Proceed as follows:

1. Unscrew the housing lid
2. If a display and adjustment module is installed, remove it by turning it to the left
3. Loosen compression nut of the cable gland and remove blind plug
4. Remove approx. 10 cm of the cable mantle, strip approx. 1 cm insulation from the individual wires
5. Insert the cable into the sensor through the cable entry
6. Lift the opening levers of the terminals with a screwdriver (see following illustration)
7. Insert the wire ends into the open terminals according to the wiring plan
8. Press down the opening levers of the terminals, you will hear the terminal spring closing
9. Check the hold of the wires in the terminals by lightly pulling on them

10. Connect the screen to the internal ground terminal, connect the external ground terminal to potential equalisation

11. Tighten the compression nut of the cable entry gland. The seal ring must completely encircle the cable

12. Screw the housing lid back on

The electrical connection is finished.
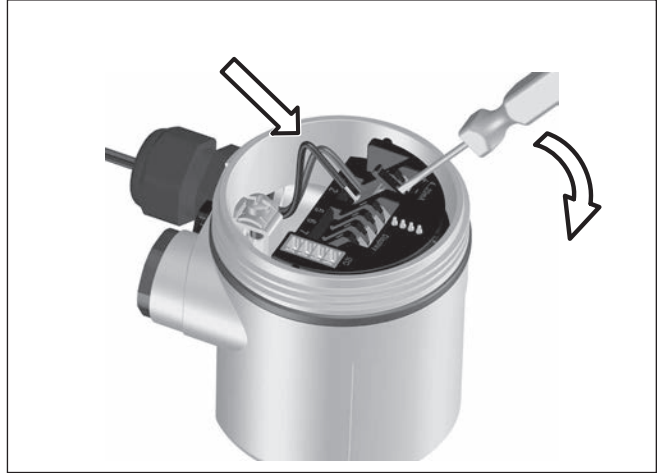
Fig. 33: Connection steps 6 and 7

IP68 version with external housing

Proceed as follows:

1. Loosen the four screws on the housing base with an Allen key size 4

2. Remove the mounting plate from the housing socket
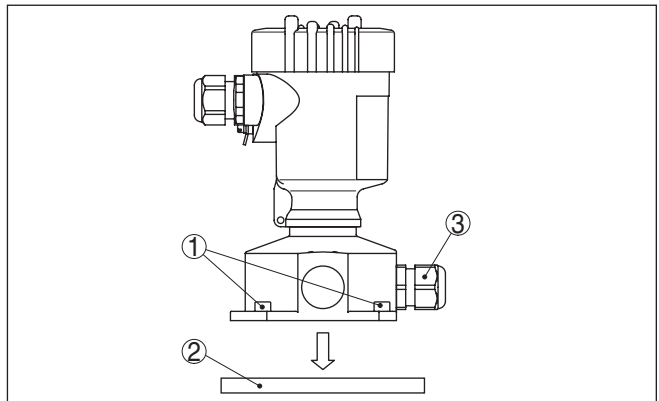
Fig. 34: Components of the external housing

1   Screws
2   Wall mounting plate
3   Cable gland

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3. Loop the connection cable through the cable entry on the housing base[1]

Information:
The cable gland can be mounted in three positions each displaced by 90°. Simply exchange the cable gland against the blind plug in the suitable thread opening.

4. Connect the wire ends as described under "*Single/Double chamber housing*" according to the numbering

5. Connect the screen to the internal ground terminal, connect the outer ground terminal above on the housing to potential equalisation

6. Tighten the compression nut of the cable entry gland. The seal ring must completely encircle the cable

7. Attach the mounting plate again and tighten the screws

The electrical connection of the sensor to the external housing is finished.

5.3 Single chamber housing

Electronics and connection compartment
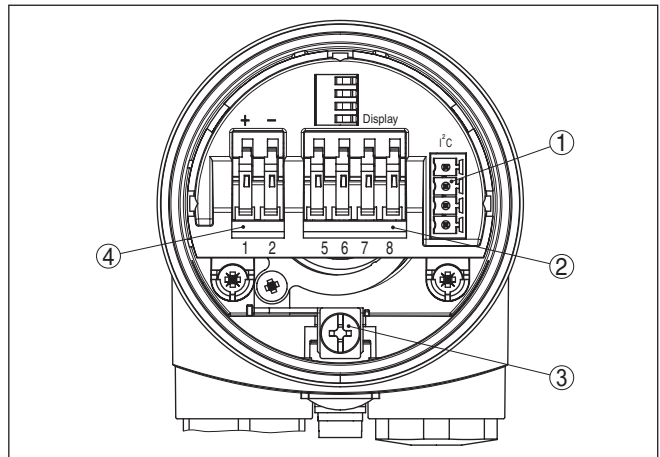
Fig. 35: Electronics and connection compartment - single chamber housing

1 Plug connector for VEGACONNECT (I²C interface)
2 Spring-loaded terminals for connection of the external indication VEGADIS 81
3 Ground terminal for connection of the cable screening
4 Spring-loaded terminals for voltage supply

---

[1] The connection cable comes pre-assembled. If necessary, shorten it to the requested length, cut the breather capillaries clean. Remove approx. 5 cm of the cable mantle, strip approx. 1 cm insulation from the ends of the individual wires. After shortening the cable, fasten the type plate with support back on the cable.

Wiring plan
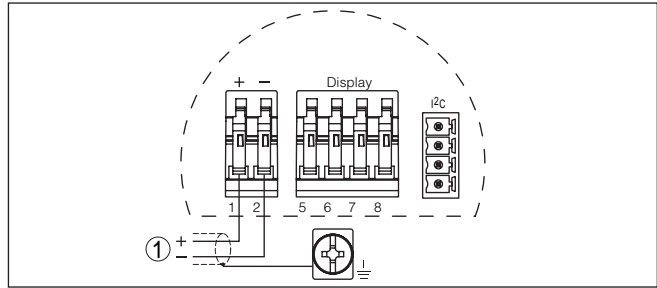
Fig. 36: Wiring plan - single chamber housing

1   Voltage supply, signal output

5.4   Double chamber housing

Connection compartment
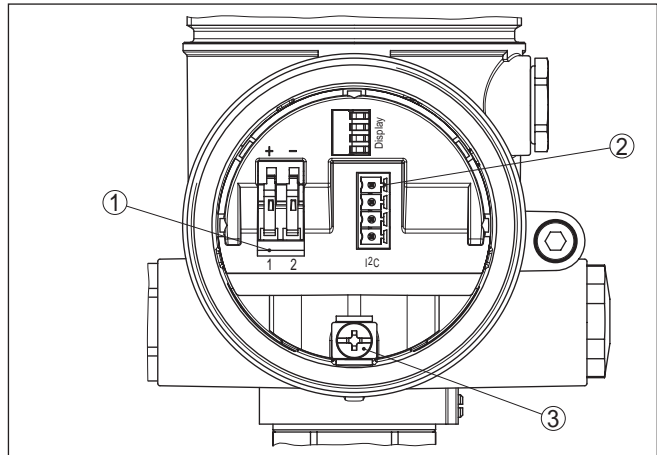
Fig. 37: Connection compartment - double chamber housing

1   Spring-loaded terminals for voltage supply
2   Plug connector for service (I²C interface)
3   Ground terminal for connection of the cable screening

Wiring plan
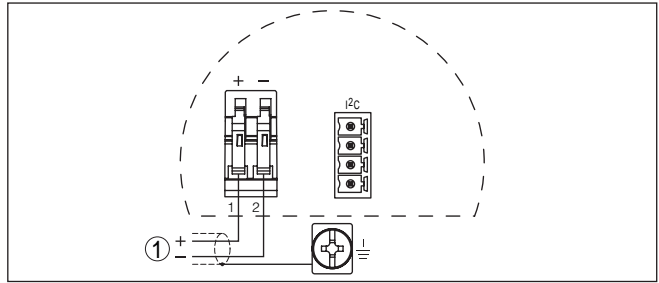
Fig. 38: Wiring plan - double chamber housing

1 Voltage supply, signal output

5.5 Double chamber housing Ex d ia

Electronics compartment
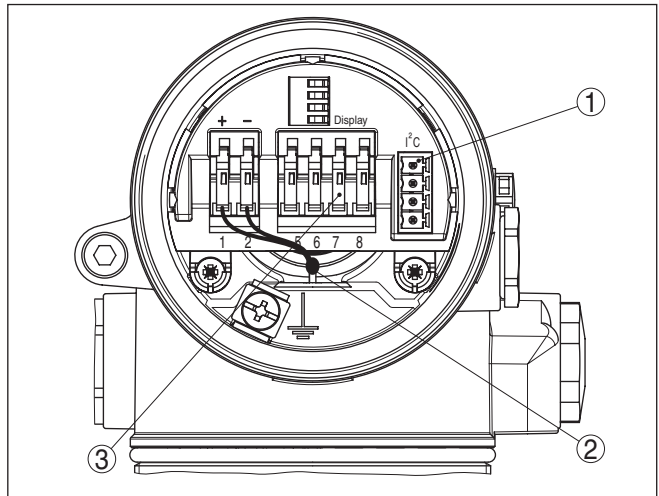
Fig. 39: Electronics compartment, double chamber housing

1 Plug connector for service (I²C interface)
2 Internal connection cable to the connection compartment
3 Terminals for the external display and adjustment unit

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Connection compartment
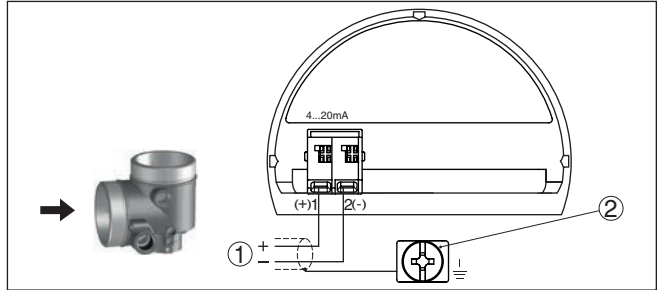
Fig. 40: Connection compartment - Ex-d-ia double chamber housing

1   Voltage supply, signal output
2   Ground terminal for connection of the cable screening

Plug M12 x 1 for external display and adjustment unit
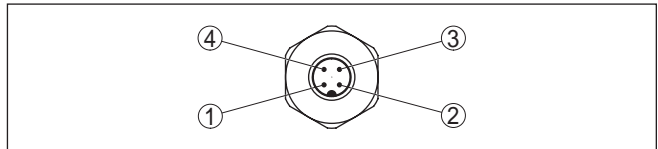
Fig. 41: Top view of the plug connector

1   Pin 1
2   Pin 2
3   Pin 3
4   Pin 4

Contact pin	Colour, connection cable in the sensor	Terminal, electronics module
Pin 1	Brown	5
Pin 2	White	6
Pin 3	Blue	7
Pin 4	Black	8

5.6   Version IP66/IP68, 1 bar

Wire assignment, connection cable
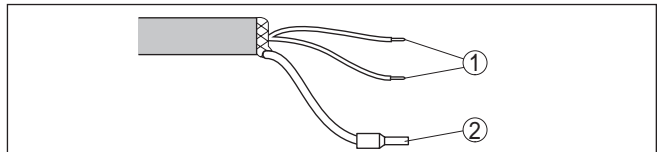
Fig. 42: Wire assignment, connection cable

1   Brown (+) and blue (-) to power supply or to the processing system
2   Shielding

5.7   External housing on IP68 version

Electronics and connection compartment for power supply
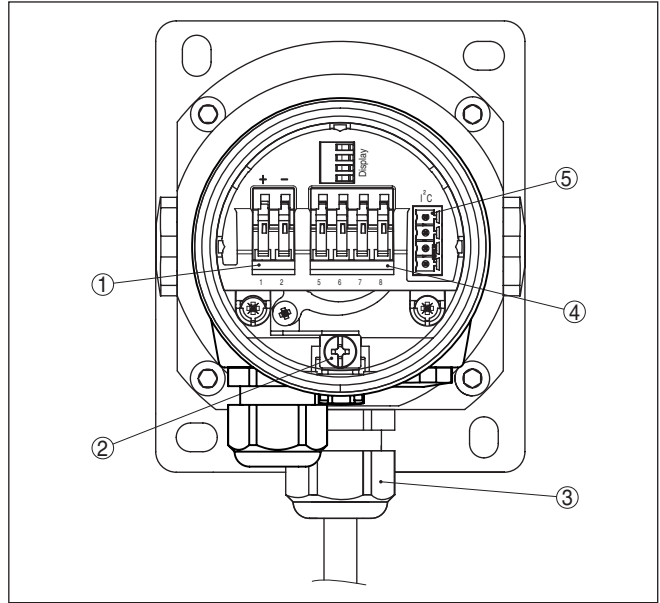
Fig. 43: Electronics and connection compartment

1   Spring-loaded terminals for voltage supply
2   Ground terminal for connection of the cable screening
3   Cable gland to the process component
4   For external display and adjustment unit, Slave sensor
5   Plug connector for service interface

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Terminal compartment for sensor connection
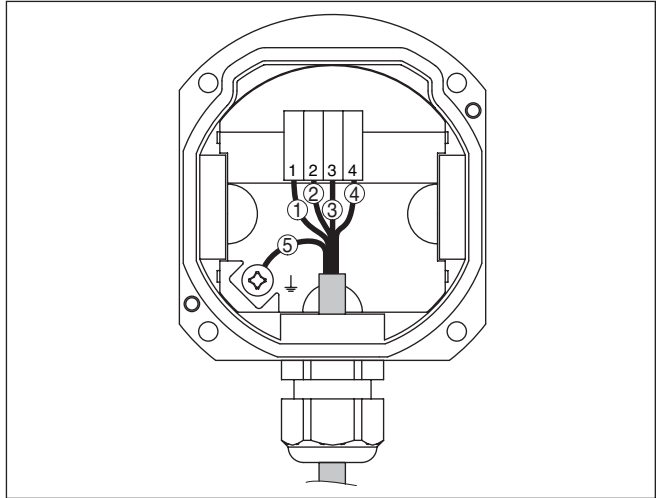
Fig. 44: Connection of the sensor in the housing base

1   Brown
2   Blue
3   Yellow
4   White
5   Shielding

Wiring plan external electronics
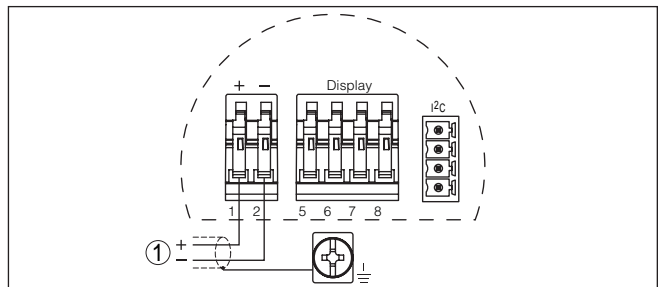
Fig. 45: Wiring plan external electronics

1   Voltage supply

5.8   Switch-on phase

Switch-on phase

After connecting VEGADIF 65 to power supply or after a voltage recurrence, the instrument carries out a self-check for approx. 30 seconds:

● Internal check of the electronics
● Indication of the instrument type, the firmware as well as the sensor TAGs (sensor designation)
● Output signal jumps for approx. 15 seconds to the set fault current

Then the corresponding current is output to the cable (the value corresponds to the actual level as well as the settings already carried out, e.g. factory setting).

6 Adjustment with the display and adjustment module PLICSCOM

6.1 Short description

The display and adjustment module is used for measured value display, adjustment and diagnosis. It can be mounted in the following housing versions and instruments:

● All continuously measuring sensors in single as well as double chamber housing version (optionally in the electronics or terminal compartment)
● External display and adjustment unit

6.2 Insert display and adjustment module

Mount/dismount display and adjustment module

The display and adjustment module can be inserted into the sensor and removed again at any time. It is not necessary to interrupt the voltage supply.

Proceed as follows:

1. Unscrew the housing lid

2. Place the display and adjustment module in the desired position on the electronics (you can choose any one of four different positions - each displaced by 90°)

3. Press the display and adjustment module onto the electronics and turn it to the right until it snaps in

4. Screw housing lid with inspection window tightly back on

Disassembly is carried out in reverse order.

The display and adjustment module is powered by the sensor, an additional connection is not necessary.

Fig. 46: Insert display and adjustment module

● **Note:**
  If you intend to retrofit the instrument with a display and adjustment module for continuous measured value indication, a higher lid with an inspection glass is required.

6.3 Adjustment system
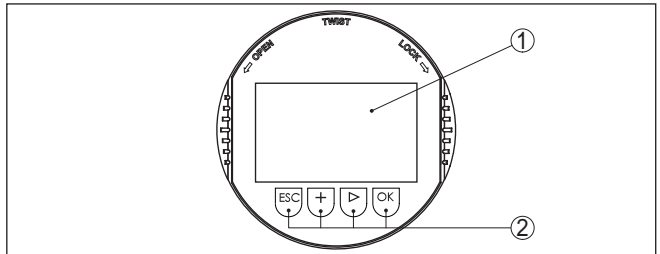
Fig. 47: Display and adjustment elements

1 LC display
2 Indication of the menu item number
3 Adjustment keys

Key functions

● *[OK]* key:
  – Move to the menu overview
  – Confirm selected menu
  – Edit parameter
  – Save value

● *[->]* key to select:
  – Menu change

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– Select list entry
– Select editing position

● *[+]* key:
– Change value of the parameter

● *[ESC]* key:
– Interrupt input
– Jump to next higher menu

Adjustment system

The instrument is operated via the four keys of the display and adjustment module. The individual menu items are shown on the LC display. You can find the function of the individual keys in the previous illustration.

Time functions

When the *[+]* and *[->]* keys are pressed quickly, the edited value, or the cursor, changes one value or position at a time. If the key is pressed longer than 1 s, the value or position changes continuously.

When the *[OK]* and *[ESC]* keys are pressed simultaneously for more than 5 s, the display returns to the main menu. The menu language is then switched over to "*English*".

Approx. 60 minutes after the last pressing of a key, an automatic reset to measured value indication is triggered. Any values not confirmed with *[OK]* will not be saved.

6.4 Set parameters

Introduction

This chapter describes the device-specific adjustment parameters.

> **Information:**
> If the adjustment limits of the adjustment parameters are exceeded, the message "*Outside parameter limits*" appears. The editing procedure can be aborted with *[ESC]* or the displayed limit value can be accepted with *[OK]*.

Basic adjustmen - Application

The VEGADIF 65 can be used for differential pressure, level, flow as well as density and interface measurement. The selection of the respective application is carried out in the menu item "*Application*". Dependent on the selected application, the adjustment is carried out as zero/span or min./max. adjustment.

> **Information:**
> The applications density and interface measurement are also realized via the application level measurement.

Proceed as follows to switch over to the application differential pressure or flow measurement:

1. Push the *[OK]* button in the measured value display, the menu overview is displayed.

```
► Basic adjustment
  Display
  Diagnostics
  Service
  Info
```
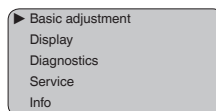
2. Confirm the menu "*Basic adjustment*" with *[OK]*.

> Application
>
> **Level** ➤

3. Confirm the menu item "*Application*" with *[OK]*.

⚠ **Warning:**
Note the warning: "*Output can change*".

4. Select with *[->]* "*OK*" and confirm with *[OK]*.

5. Select the requested application in the selection list, for example "*Flow*" and confirm with *[OK]*.

Basic adjustment - Unit   In this menu item you select the adjustment unit as well as the unit for the temperature indication in the display.

To select the adjustment unit (in the example switching over from mbar to bar), proceed as follows:

1. Push the *[OK]* button in the measured value display, the menu overview is displayed.

> ▶ Basic adjustment
> Display
> Diagnostics
> Service
> Info
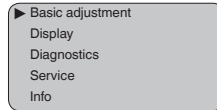
2. Confirm the menu "***Basic adjustment***" with *[OK]*, the menu item "*Unit*" will be displayed.

> Unit
> Unit of measurement
> **mbar** ➤
> Temperature unit
> °C ➤
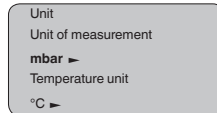
3. Activate the selection with *[OK]* and select "***Units of measurement***" with *[->]*.

4. Activate the selection with *[OK]* and select the requested unit with *[->]* (in the example bar).

5. Confirm with *[OK]* and move to position correction with *[->]*.

The adjustment unit is thus switched over from mbar to bar.

● **Information:**
ℹ When switching over to adjustment in a height unit (for example for level measurement), the density also has to be entered.

Proceed as follows to enter the density:

1. Push the *[OK]* button in the measured value display, the menu overview is displayed.

2. Confirm the menu "***Basic adjustment***" with *[OK]*, the menu item "*Units of measurement*" will be displayed.

3. Activate the selection with *[OK]* and select the requested unit with *[->]* (in the example m).

4. Confirm with *[OK]*, the submenu "*Density unit*" appears.

```
Unit of measurement

Density unit
▶ kg/dm³
  pcf
```
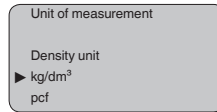
5. Select the requested unit, e.g. kg/dm³ with *[->]* and confirm with *[OK]*, the submenu "*Density*" appears.

```
Unit of measurement

Density
0001000
kg/dm³
```
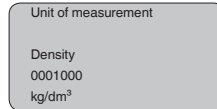
6. Enter the requested density value with *[->]* and *[+]*, confirm with *[OK]* and move to position correction with *[->]*.

The adjustment unit is thus switched over from bar to m.

Proceed as follows to select the temperature unit:

. Activate the selection with *[OK]* and select "***Temperature unit*** with *[->]*.

. Activate the selection with *[OK]* and select the requested unit with *[->]* (e.g. °F).

. Confirm with *[OK]*.

The temperature unit is hence switched over from °C to °F.

Basic adjustment - Position correction

The position correction compensates the influence of the installation position of the instrument on the measured value. In this menu item, the offset value as well as the current measured value are displayed.

Proceed as follows:

1. Activate in the menu item "*Position correction*" the selection with *[OK]*.

```
Position correction
Offset
=
0.0000 bar          DP
0.0035 bar
```
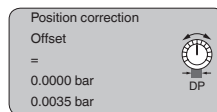
2. Select with *[->]*, e.g. to accept the actual measured value 0.0035 bar.

```
Position correction
Accept current measured
value?
▶ Accept
  Edit
```

3. Confirm with *[OK]*.

```
Position correction
Offset
=
-0.0035 bar         DP
0.0000 bar
```
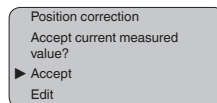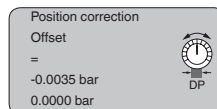
4. Move to min. (zero) adjustment with *[->]*.

The current measured value was corrected to 0, the corrective value is available in the display as offset value with sign reversal.

If a known value should be taken over as position correction which is not the current value, then you have to select the function "*Edit*" and enter the requested value.

Basic adjustment - Zero adjustment with differential pressure

In this menu item, the min. differential pressure is entered.

Proceed as follows:

1. Edit the bar value in the menu item "*zero*" with *[OK]*.

Zero adjustment
0.00 %
=
0.0000 bar
0.0000 bar
DP
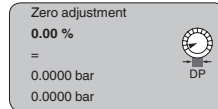
2. Set the requested value with *[+]* and *[->]*.

3. Confirm with *[OK]* and move to span adjustment with *[->]*.

For an adjustment with pressure, simply enter the actual measured value indicated at the bottom of the display.

The zero adjustment is finished.

● **Information:**
The Zero adjustment shifts the value of the span adjustment. The span, i.e. the difference between these values, however, remains unchanged.

Basic adjustment - Span adjustment with differential pressure

In this menu item, the max. differential pressure is entered.

Proceed as follows:

1. Edit the bar value in the menu item "*span*" with *[OK]*.

Span adjustment
100.00 %
=
0.5000 bar
0.0000 bar
DP

● **Information:**
If the instrument has not yet been adjusted, the displayed pressure for 100 % corresponds to the nominal measuring range of the sensor (in the above example 500 mbar).

2. Set the requested value with *[+]* and *[->]*.

3. Confirm with *[OK]* and move to the menu overview with *[ESC]*.

For an adjustment with pressure, simply enter the actual measured value indicated at the bottom of the display.

The span adjustment is finished.

VEGA

Basic adjustment - Min. adjustment with level

Proceed as follows:

1. Edit the % value in the menu item "*Min. adjustment*" with *[OK]*.

```
Min. adjustment
0.00 %
=
0.0000 bar
0.0000 bar
```

2. Set the requested value with *[+]* and *[->]*.

3. Confirm with *[OK]* and edit the requested bar value.

4. Set the requested bar value with *[+]* and *[->]*.

5. Confirm with *[OK]* and move to max. adjustment with *[->]*.

For an adjustment with filling, simply enter the actual measured value indicated at the bottom of the display.

The min. adjustment is finished.

Basic adjustment - Max. adjustment with level

Proceed as follows:

1. Edit the % value in the menu item "*Max. adjustment*" with *[OK]*.

```
100.00 %
=
0.5000 bar
0.0000 bar
```

●
ⅰ   **Information:**
If the instrument has not yet been adjusted, the displayed pressure for 100 % corresponds to the nominal measuring range of the sensor (in the above example 500 mbar).

2. Set the requested value with *[->]* and *[OK]*.

3. Confirm with *[OK]* and edit the requested mbar value.

4. Set the requested value with *[+]* and *[->]*.

5. Confirm with *[OK]* and move to the menu overview with *[ESC]*.

For an adjustment with filling, simply enter the actual measured value indicated at the bottom of the display.

The max. adjustment is finished.

Basic adjustment - Min. adjustment with density

For the min. adjustment with density, a filling of the vessel is not necessary. The numeric examples are stated in chapter *Mounting*, *Measurement setup, Density and interface* of this instructions manual.

Proceed as follows:

1. Edit the % value in the menu item "*Min. adjustment*" with *[OK]*.

```
Min. adjustment
0.00 %
=
0.0000 bar
0.0000 bar
```
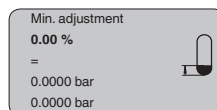
2. Set the requested value with *[+]* and *[->]*, for example 100 %.

3. Confirm with *[OK]* and edit the requested bar value.

4. Set the requested bar value with *[+]* and *[->]*, for example 29.4 mbar.

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5. Confirm with **[OK]** and move to max. adjustment with **[->]**.

For an adjustment with filling, simply enter the actual measured value indicated at the bottom of the display.

The min. adjustment is finished.

Basic adjustment - Max. adjustment with density

For the max. adjustment with density, a filling of the vessel is not necessary. The numeric examples are stated in chapter *Mounting, Measurement setup, Density and interface* of this instructions manual.

Proceed as follows:

1. Edit the % value in the menu item "*Max. adjustment*" with **[OK]**.

```
100.00 %
=
0.1000 bar
0.0000 bar
```

●
ℹ **Information:**
If the instrument has not yet been adjusted, the displayed pressure for 100 % corresponds to the nominal measuring range of the sensor (in the above example 100 mbar).

2. Set the requested value with **[->]** and **[OK]**, for example 0.0 %.
3. Confirm with **[OK]** and edit the requested mbar value.
4. Set the requested value with **[+]** and **[->]**, for example 35.3 mbar.
5. Confirm with **[OK]** and move to the menu overview with **[ESC]**.

For an adjustment with filling, simply enter the actual measured value indicated at the bottom of the display.

The max. adjustment is finished.
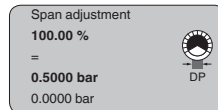
Basic adjustment - Min. adjustment with flow

Proceed as follows:

1. Edit the bar value in the menu item "*Min. adjustment*" with **[OK]**.

```
Min. adjustment
0.00 %
=
0.0000 bar        DP
0.0000 bar
```
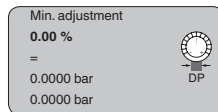
2. Set the requested bar value with **[+]** and **[->]**.
3. Confirm with **[+]** and move to max. adjustment with **[->]**.

For an adjustment with flow, simply enter the actual measured value indicated at the bottom of the display.

●
ℹ **Information:**
The VEGADIF 65 is also suitable for bidirectional flow measurement (flow in both directions). The selection is carried out in the menu item "*Linearization curve*". With the bidirectional flow measurement, the min. adjustment value must be equal to the negative max. adjustment value.

Example: Max. adjustment value **+100 mbar**, as min. adjustment value, **-100 mbar** must hence be entered.

The min. adjustment is finished.

Basic adjustment - Max. adjustment with flow

Proceed as follows:

1. Edit the bar value in the menu item "*Max. adjustment*" with *[OK]*.

> Max. adjustment
> **100.00 %**
> =
> **0.5000 bar**
> 0.0000 bar   DP
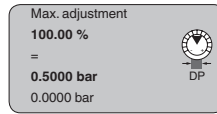
ℹ Information:
If the instrument has not yet been adjusted, the displayed pressure for 100 % corresponds to the nominal measuring range of the sensor (in the above example 500 mbar).

2. Set the requested mbar value with *[->]* and *[OK]*.

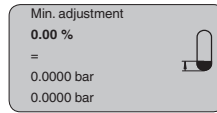3. Confirm with *[OK]* and move to the menu overview with *[ESC]*.

For an adjustment with flow, simply enter the actual measured value indicated at the bottom of the display.

The max. adjustment is finished.

Menu section, basic adjustment

Basic adjustment - Damping

To damp process-dependent measured value fluctuations, set an integration time of 0 … 999 s in this menu item.

Depending on the sensor type, the factory setting is 0 s or 1 s.

> Damping
>
> 0 s
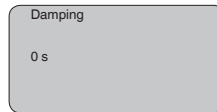
Basic adjustment - Linearization curve with level

For level measurement, a linearization is necessary for all vessels in which the vessel volume does not increase linearly with the level - e.g. in a cylindrical or spherical tank - and the indication or output of the volume is requested.

Respective linearisation curves are stored for these vessels. They indicate the relation between the percentage level and the vessel volume. By activating the suitable curve, the percentage vessel volume is displayed correctly.
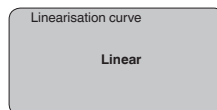
> Linearisation curve
>
> **Linear**

Enter the requested parameters via the appropriate keys, save your settings and jump to the next menu item with the *[->]* key.

⚠ Caution:
Note the following if the VEGADIF 65 with corresponding approval is used as part of an overfill protection system according to WHG (Water Resources Act):

If a linearisation curve is selected, the measuring signal is no longer necessarily linear to the filling height. This must be considered by the

user especially when setting the switching point on the limit signal transmitter.

Basic adjustment - Linearization curve with flow

The square of the flow is proportional to the pressure difference at the orifice or the back pressure probe:

$(Q_n)^2 = c \cdot \Delta p$

To provide a linear relation between flow and output variable, an extraction by root is necessary:

$Q_n = \sqrt{(c \cdot \Delta p)}$

The VEGADIF 65 has a root extraction function. It is selected in the menu item "*Linearization curve*".
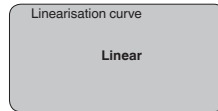
Linearisation curve

Linear

Enter the requested parameters via the appropriate keys, save your settings and jump to the next menu item with the *[->]* key.

Information:
When selecting flow bidirectional, the min. adjustment must be entered with negative sign.

Basic adjustment - Leak flow volume suppression with flow

In some application, small flow quantities should not be detected. With the creeping quantity suppression, the flow value can be suppressed up to a certain % value. The default value is 5 % of the max. flow value, corresponding to 0.25 % of the max. differential pressure value. The limit value is 50 %. This function depends on the selected linearization function and is only available with root extracted characteristics.

The square root/bidirectional square root characteristics is very steep at the zero point. This means that small changes in the measured differential pressure cause big changes in the output signal. The leak volume suppression stabilises the signal output.

Basic adjustment - Sensor TAG

In the menu item "*Sensor-TAG*" you edit a 12-digit measurement loop name. An unambiguous designation can hence be assigned to the sensor, e.g. the measurement loop name or the tank or product designation. In digital systems and in the documentation of larger plants, a singular designation should be entered for exact identification of individual measuring sites.

The available digits include:

- Letters from A … Z
- Numbers from 0 … 9
- Special characters +, -, /, -

Factory setting is "*Sensor*".

Sensor-TAG

Sensor

Display - Indicated value   In the menu item "*Display*" you can define how the measured value should be presented on the display.

The following indication values are available:

- Height
- Pressure (only with pressure transmitters)
- Current
- Scaled
- Percent
- Lin. percent
- Temperature

The selection "*scaled*" opens the menu items "*Display unit*" and "*Scaling*". In "*Display unit*" there are the following options:

- Height
- Ground
- Flow
- Volume
- Without unit

Depending on selection, the different units are in turn available.

In the menu item "*Scaling*", the requested numerical value with decimal point is entered for 0 % and 100 % of the measured value.

There is the following relationship between the indication value in the menu "*Display*" and the adjustment unit in the menu "*Device settings*":

- With pressure, the displayed value "*Pressure*" or "*Height*" means: presentation of the measured value in the selected adjustment unit, e.g. bar or m.

Displayed value

Scaled

Display unit

Volume
l

Scaling

0 % = 0.0 l
100 % = 100.0 l
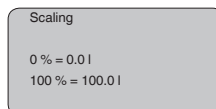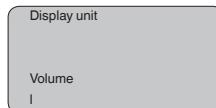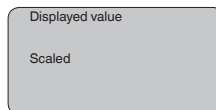
Display - Backlight   An integrated background lighting can be switched on via the adjustment menu.

The function depends on the height of the operating voltage, see operating instructions of the respective sensor.

To maintain the function of the device, the lighting is temporarily switched off if the power supply is insufficient.

In the default setting, the lightning is switched on.

Diagnosis - Peak value

The respective min. and max. measured values are saved in the sensor. The values are displayed in the menu item "*Peak values*".

- Min. and max. pressure[2]
- Min. and max. temperature[3]

Peak value indicator
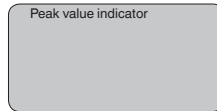
Diagnostics - Device status

The instrument status is displayed in this menu item. If no failure is detected by the sensor, "*OK*" will be displayed. If a failure is detected, there will be a sensor-specific flashing fault signal, for example "*E013*". The failure is also displayed in clear text, for example "*No measured value available*".

ℹ Information:
The fault message as well as the clear text indication are also carried out in the measured value display.

Measurement reliability

Sensor status
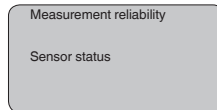
Diagnostics - Trend curve

Available with the trend curve:

- "X-Zoom": Resolution in minutes, hours or days
- "Stop/Start": Interrupt a recording or start a new recording
- "Unzoom": Reset the resolution to minutes

Trend curve
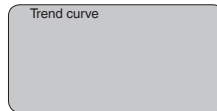
Diagnosis - Total amounts counter and subtotalizer with flow

The VEGADIF 65 has two internal totalizers. For both you can adjust volume or mass as count function as well as separately the unit.

Proceed as follows:

1. Select, for example, menu item "*Part sum counter*".

---

[2] Pressure: -50 … +150 % of the nominal measuring range.
[3] Temperature: -50 … +150 °C.

Part sum counter
0.0000 10⁰⁰
gal
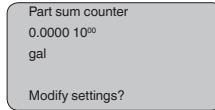
Modify settings?

2. Activate the function "*Modify settings?*" with *[OK]*.

Part sum counter

▶ DP flow element
   Unit
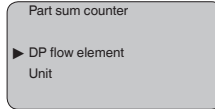
3. Confirm with *[OK]* "*DP flow element*".

Part sum counter

▶ Mass flow
▶ Volume flow
   Without unit
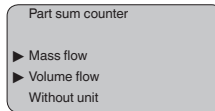
4. Select the requested variable with *[->]* and confirm with *[OK]*.
5. Select calibration unit of the DP flow element with *[->]*, for example m³/s and confirm with *[OK]*.

Part sum counter
0 % = +0000
m³/s=
100 % = +0000
m³/s=
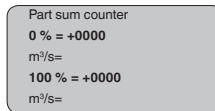
6. Edit with *[OK]* and set the requested values with *[+]* and *[->]*.
7. Confirm with *[OK]* and jump back to the indication of the part sum counter.
8. Select with *[->]* the unit of the sum counter, adjust the requested unit with *[->]*, for example m³/s and confirm with *[OK]*.

The setting of the part sum counter is hence terminated, the counting function is activated.

The procedure of the total sum counter is the same.

Service - Current output

In the menu item "*Current output*" you determine the behaviour of the current output during operation and in case of failure. The following options are available:

Current output

Characteristics	**4 … 20 mA**
	20 … 4 mA
Failure mode[4]	Hold value
	20.5 mA
	22 mA
	< 3.6 mA

[4] Value of the current output in case of failure, e.g. if no valid measured value is delivered.

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Min. current[5]	**3.8 mA**
	4 mA
Max. current[6]	**20 mA**
	20.5 mA

The values in bold font represent the data of the factory setting.

In HART multidrop mode, the current is constantly 4 mA. This value does not change even in case of failure.

```
Current output

Characteristic: 4-20 mA ►
Failure mode: 22 mA ►
Min. current 3.8 mA ►
```
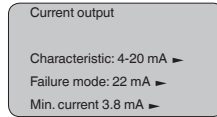
Menu section, service

Service - Simulation

In this menu item you simulate a user-defined level or pressure value via the current output. This allows you to test the signal path, e.g. through connected indicating instruments or the input card of the control system.

The following simulation variables are available:

● Percent
● Current
● Pressure

With Profibus PA sensors, the selection of the simulated value is made via the "Channel" in the menu "*Basic adjustments*".

How to start the simulation:

1. Push *[OK]*
2. Select the requested simulation variable with *[->]* and confirm with *[OK]*.
3. Set the requested numerical value with *[+]* and *[->]*.
4. Push *[OK]*

The simulation is now running, with 4 … 20 mA/HART a current is output and with Profibus PA or Foundation Fieldbus a digital value.

How to interrupt the simulation:

→ Push *[ESC]*

Information:
The simulation is automatically terminated 10 minutes after the last pressing of a key.

```
Simulation

Start simulation?
```

---
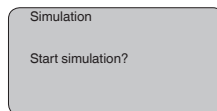
[5] This value is not underrun during operation.
[6] This value is not exceeded during operation.

Service - Reset

Basic adjustment

The reset "*Basic adjustment*" resets the values of the following menu items to the reset values (see table):

Menu section	Menu item	Reset value
Basic settings	Zero/Min. adjustment	Measuring range begin
	Span/Max. adjustment	Measuring range end
	Density	1 kg/l
	Density unit	kg/l
	Damping	1 s
	Linearisation	Linear
	Sensor-TAG	Sensor
Display	Displayed value	Differential pressure
	Display unit	Mass/kg
	Scaling	0.00 to 100.0
	Decimal point indication	8888.8
Diagnostics	Totalizer	$0.0000 \ 10^{00}$ gal
	Part sum counter	$0.0000 \ 10^{00}$ gal
Service	Current output - characteristics	4 … 20 mA
	Current output - failure mode	< 3.6 mA
	Current output - min. current	3.8 mA
	Current output - max. current	20.5 mA

The values of the following menu items are *not* reset with "**Reset**:

Menu section	Menu item	Reset value
Basic settings	Unit of measurement	bar
	Temperature unit	°C
	Position correction	No reset
Display	Backlight	No reset
Service	Language	No reset
	HART mode	No reset
	Application	No reset

Peak value indicator

The min. and max. temperature or pressure values are each reset to the actual value.

Totalizer

The total and part sum counter are reset to zero.

Service - Language

The sensor is already set to the ordered national language. In this menu item you can change the language. The following languages are available as of software version 3.50:

- Deutsch
- English
- Français
- Espanõl
- Pycckuu
- Italiano
- Netherlands
- Japanese
- Chinese

```
Language

German
```
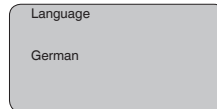
Service - HART mode

HART offers standard and multidrop mode.

The mode "standard" with the fixed address 0 means outputting the measured value as a 4 … 20 mA signal.

In Multidrop mode, up to 15 sensors can be operated on one two-wire cable. An address between 1 and 15 must be assigned to each sensor.[7]

In this menu item you determine the HART mode and enter the address for multidrop.

```
HART mode

Standard
Address 0
```
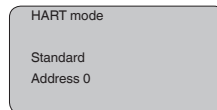
The default setting is standard with address 0.

Service - Copy sensor data

This function enables the upload of parameter adjustment data to the display and adjustment module or the download of parameter adjustment data to the sensor.

The following data are loaded or downloaded with this function:

- Measured value presentation
- Application
- Adjustment
- Damping
- Linearisation curve
- Leak flow volume suppression
- Sensor-TAG
- Displayed value
- Display unit
- Scaling

---

[7] The 4 … 20 mA signal of the sensor is switched off. The sensor uses a constant current of 4 mA. The measuring signal is transmitted exclusively as a digital HART signal.

- Current output
- Unit of measurement
- Language

The following safety-relevant data are **not** uploaded or downloaded:

- HART mode
- PIN

```
Copy sensor data


Copy sensor data?
```
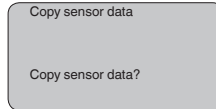
Service - PIN

In this menu item, the PIN is activated/deactivated permanently. Entering a 4-digit PIN protects the sensor data against unauthorized access and unintentional modifications. If the PIN is activated permanently, it can be deactivated temporarily (i.e. for approx. 60 min.) in any menu item. The instrument is delivered with the PIN set to 0000.

```
PIN

Disable permanently?
```
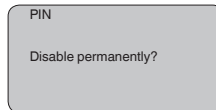
Only the following functions are permitted with activated PIN:

- Select menu items and show data
- Read data from the sensor into the display and adjustment module

Info

In this menu item the most important sensor information can be displayed:

- Instrument type
- Serial number: 8-digit number, e.g. 12345678

```
Instrument type


Serial number
```
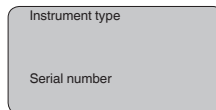
- Date of manufacture: Date of the factory calibration
- Software version: Edition of the sensor software

```
Date of manufacture

Software version
```
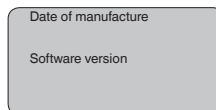
- Date of last change using PC: Date of the last change of sensor parameters via PC

```
Last change using PC
```
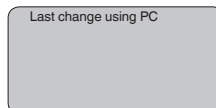
- Sensor details, e.g. approval, process fitting, seal, measuring cell, measuring range, electronics, housing, cable entry, plug, cable length etc.

Sensor characteristics
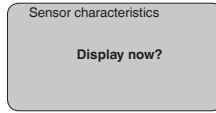
Display now?

6.5 Menu schematic

Information:
Depending on the version and application, the highlighted menu windows may not always be available.

Basic adjustment differential pressure
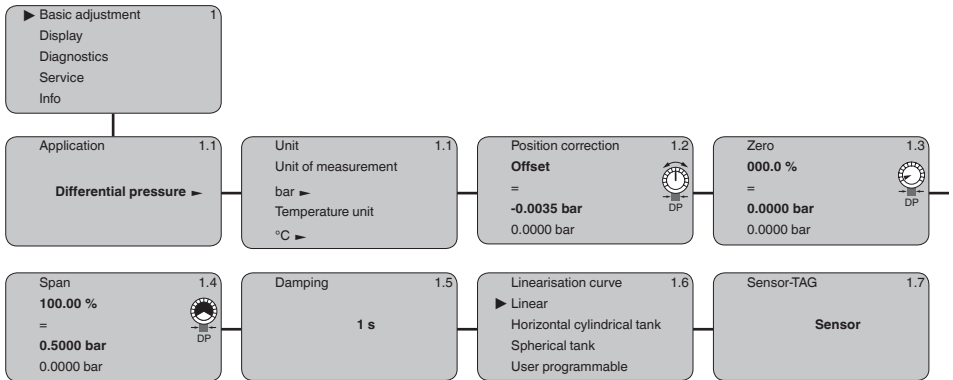
Basic setting level

Basic adjustment flow

Basic adjustment	1
▶ Basic adjustment	
Display	
Diagnostics	
Service	
Info	

Application	1.1
Flow ▶	

Unit	1.1
Unit of measurement	
bar ▶	
Temperature unit	
°C ▶	

Position correction	1.2
Offset	DP
=	
-0.0035 bar	
0.0000 bar	

Min. adjustment	1.3
000.0 %	DP
=	
0.0000 bar	
0.0000 bar	

Max. adjustment	1.4
100.00 %	DP
=	
0.5000 bar	
0.0000 bar	

Damping	1.5
1 s	

Linearisation curve	1.6
▶ Linear	
Extracted by root	
Bidirectionally linear	
▶	

Creeping distance suppres.	1.7
Activated ▶	

Sensor-TAG	1.8
Sensor	

Display

Basic adjustment	2
Basic adjustment	
▶ Display	
Diagnostics	
Service	
Info	

Displayed value	2.1
Differential pressure ▶	

Displayed value ▶	2.1
Scaled	

Display unit	2.2
Volume ▶	
l ▶	

Scaling	2.3
0 % = 0.0	
100 % = 100.0	

Backlight	2.4
Switched off ▶	

Diagnostics

Basic adjustment	3
Display	
▶ Diagnostics	
Service	
Info	

Peak value indicator	3.1
p-min.: -5.8 mbar	
p-max.: 167.5 mbar	
T-min.: -12.5 °C	
T-max.: +85.5 °C	

Sensor status	3.2
OK	

Trend curve	3.3
Start trend curve?	

Totalizer	3.4
$0.0000\ 10^{00}$	
gal	
Modify settings?	

Part sum counter	3.5
$0.0000\ 10^{00}$	
gal	
Modify settings?	

Service

Basic adjustment	4
Display	
Diagnostics	
▶ Service	
Info	

Current output	4.1
Characteristic: 4-20 mA ►	
Fail.mode: < 3.6 mA ►	
Min. current: 3.8 mA ►	
max. current: 20.5 mA ►	

Simulation	4.2
Start simulation ►	

Reset	4.3
Select reset ►	

Language	4.4
Deutsch ►	

HART mode	4.6
Standard	
Address 0	

Copy sensor data	4.7
Copy sensor data?	

PIN	4.8
Enable?	

Info

Basic adjustment	5
Display	
Diagnostics	
Service	
▶ Info	

Instrument type	5.1
Serial number	
12345678	

Date of manufacture	5.2
Software version	

Last change using PC	5.3

Sensor characteristics	5.4
Display now?	

6.6   Saving the parameterisation data

We recommended writing down the adjustment data, e.g. in this operating instructions manual, and archiving them afterwards. They are thus available for multiple use or service purposes.

If the VEGADIF 65 is equipped with a dsiplay and adjustment module, the most important data can be read from the sensor into the display and adjustment module. The data remain permanently saved there even in case of sensor supply failure.

If it is necessary to exchange the sensor, the display and adjustment module is inserted into the replacement instrument and the data are written into the sensor under the menu item "*Copy sensor data*".

7 Operating with PACTware and other adjustment programs

7.1 Connect the PC via VEGACONNECT

VEGACONNECT directly on the sensor
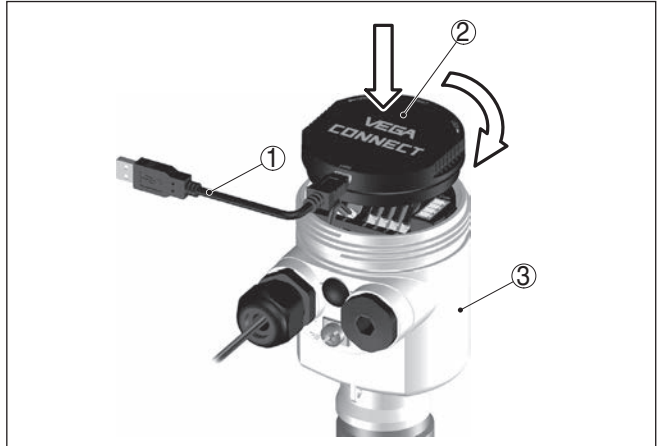
Fig. 48: Connection of the PC via VEGACONNECT directly to the sensor

1 USB cable to the PC
2 VEGACONNECT
3 Sensor

VEGACONNECT externally
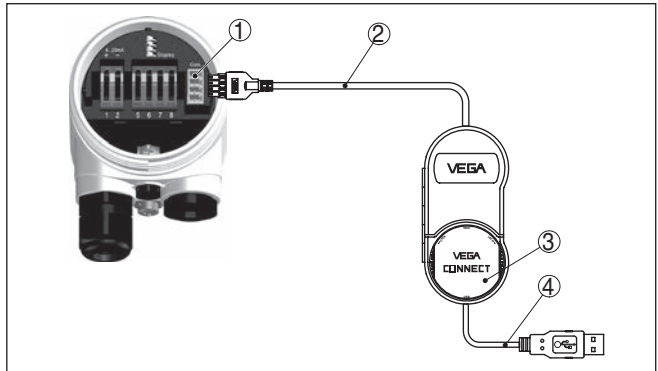
Fig. 49: Connection via VEGACONNECT externally

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

Necessary components:

● VEGADIF 65
● PC with PACTware and suitable VEGA DTM

VEGA

- VEGACONNECT
- Power supply unit or processing system

VEGACONNECT via HART
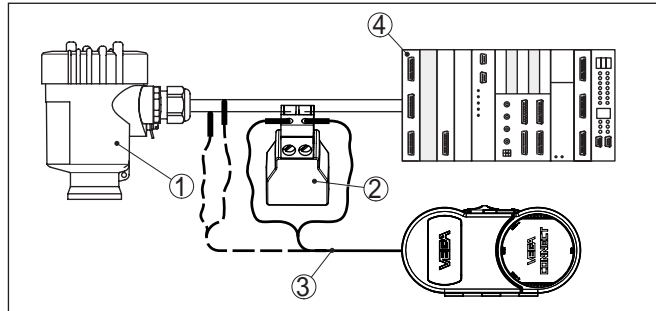
Fig. 50: Connecting the PC via HART to the signal cable

1 VEGADIF 65
2 HART resistance 250 Ω (optional depending on evaluation)
3 Connection cable with 2 mm pins and terminals
4 Processing system/PLC/Voltage supply

Necessary components:

- VEGADIF 65
- PC with PACTware and suitable VEGA DTM
- VEGACONNECT
- HART resistance approx. 250 Ω
- Power supply unit or processing system

Note:

With power supply units with integrated HART resistance (internal resistance approx. 250 Ω), an additional external resistance is not necessary. This applies, e. g. to the VEGA instruments VEGATRENN 149A, VEGADIS 371, VEGAMET 381. Common Ex separators are also usually equipped with a sufficient current limitation resistance. In such cases, VEGACONNECT 4 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.
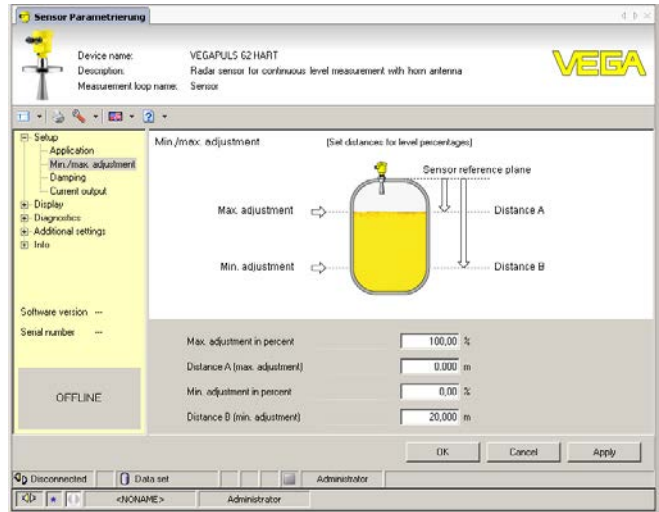
Fig. 51: Example of a DTM view

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. The full version is available on CD from the agency serving you.

7.3 Parameter adjustment with AMS↑ and PDM

Also device descriptions will be available for VEGADIF 65 as DD or EDD for the adjustment programs AMS↑ and PDM.

A free-of-charge download is available via Internet. Move via www.vega.com and "*Downloads*" to "*Software*".

7.4 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 Setup

8.1 General instructions

Before adjusting VEGADIF 65, you have to clean the effective pressure lines and the instrument must be filled with the medium.

VEGADIF 65 with double chemical seal is immediately ready for operation.

The VEGADIF 65 without chemical seal or with single chemical seal is ready for operation after opening a blocking valve, in case one is present.

8.2 Flow measurement

Gases
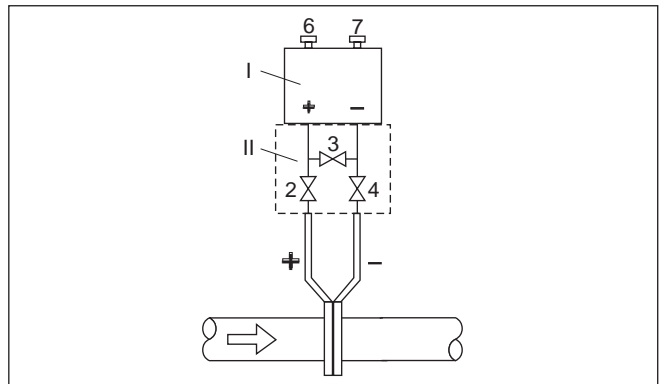
Fig. 52: Prefered measurement setup for gases, connection via 3-fold valve block, flanging on both sides

I   VEGADIF 65
II   3-fold valve block
2, 4 Inlet valves
3   Breather valve
6, 7 Vent valves on VEGADIF 65

Liquids
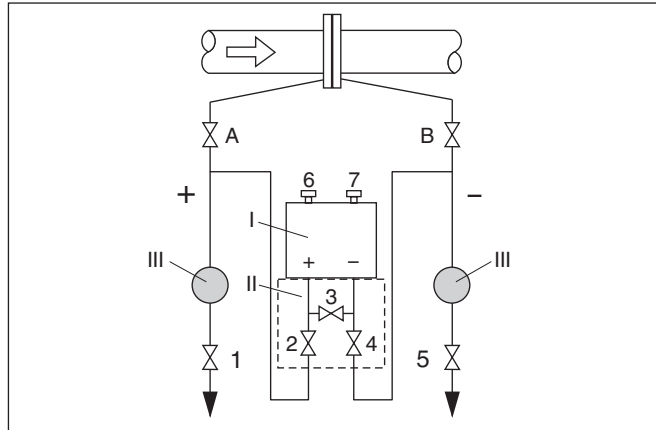
Fig. 53: Preferred measurement setup for liquids

I   VEGADIF 65
II   3-fold valve block
III   Precipitator
1, 5 Drain valves
2, 4 Inlet valves
3   Breather valve
6, 7 Vent valves on VEGADIF 65
A, B Blocking valves

Proceed as follows:

1. Close valve 3
2. Fill measuring system with medium.

   For this purpose, open valves A, B (if available) as well as 2, 4: Medium flows in

   If necessary, clean the differential pressure lines: - with gases by blowing out with compressed air - with liquids by rinsing.[8]

   For this purpose close valve 2 and 4, i.e. block the instrument.

   Then open valve 1 and 5 so that the effective pressure lines blow out/rinse.

   Close valves 1 and 5 (if available) after cleaning

3. Remove air from instrument:

   Open valves 2 and 4: Medium flows in

   Close valve 4: Low pressure side is closed

   Open valve 3: Equalisation high and low pressure side

   Briefly open valve 6 and 7, then close again: Fill the measuring instrument completely with the medium and remove air

4. Carry out a position correction if the following conditions apply. If the conditions are not fulfilled, then carry out the position correction after step 6.

   Conditions:

[8] Arrangement with 5 valves.

The process cannot be sealed off.

The pressure extraction points (A and B) are at the same geo-desic height.

5. Put measurement loop into operation:

    Close valve 3: Separate high and low pressure side

    Open valve 4: Connect low pressure side

    Now:

    Valves 1, 3, 5, 6 and 7 are closed[9]

    Valves 2 and 4 are open

    Valves A and B open

6. Carry out position correction, if flow can be blocked. In this case, step 5 is not required.

8.3 Level measurement

Closed vessel
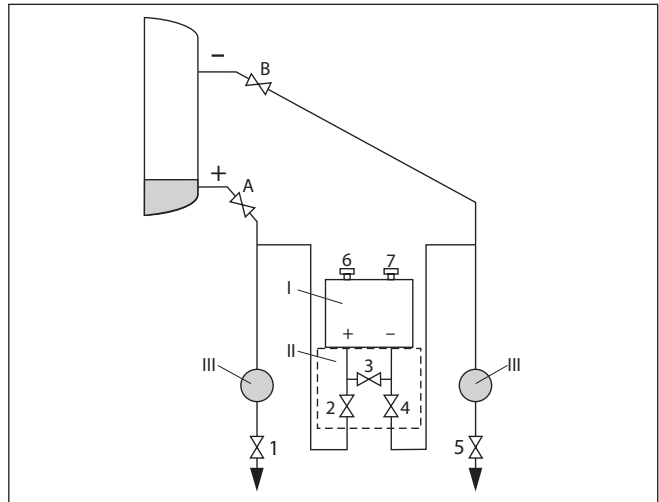
Fig. 54: Preferred measurement setup for closed vessels

I   VEGADIF 65
II   3-fold valve block
III Precipitator
1, 5 Drain valves
2, 4 Inlet valves
6, 7 Vent valves on VEGADIF 65
A, B Blocking valves

Proceed as follows:

1. Fill the vessel to just above the lower tap

2. Fill measuring system with medium

    Close valve 3: Separate high/low pressure side

[9] Valves 1, 3, 5: Configuration with 5 valves.

Open valve A and B: Open block valves

3. Vent high pressure side (probably empty low pressure side)

Open valve 2 and 4: Discharge medium on the high pressure side

Briefly open valve 6 and 7, then close again: Fill the high pressure side completely with the medium and remove air.

4. Set measurement loop to operation

Now:

Valve 3, 6 and 7 are closed

Valves 2, 4, A and B are open

Closed vessel with steam layer
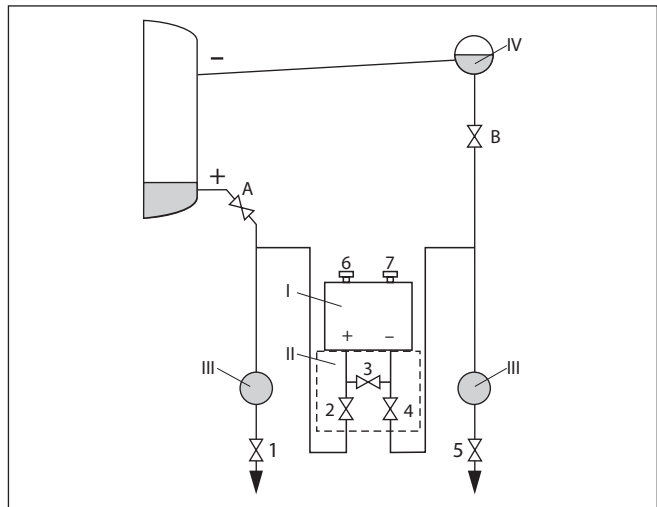
Fig. 55: Preferred measurement setup for closed vessels with steam overlay

I   VEGADIF 65
II   3-fold valve block
III Precipitator
IV Condensate vessel
1, 5 Drain valves
2, 4 Inlet valves
3   Breather valve
6, 7 Vent valves on VEGADIF 65
A, B Blocking valves

Proceed as follows:

1. Fill the vessel to just above the lower tap

2. Fill measuring system with medium

Open valve A and B: Open block valves

Fill the low pressure effective pressure line on the height of the condensation pot

3. Remove air from instrument:

Open valve 2 and 4: Discharge medium

Open valve 3: Equalisation high and low pressure side

VEGADIF 65 • 4 … 20 mA/HART

Briefly open valve 6 and 7, then close again: Fill the measuring instrument completely with the medium and remove air

4. Put measurement loop into operation:

    Close valve 3: Separate high and low pressure side

    Open valve 4: Connect low pressure side

    Now:

    Valve 3, 6 and 7 are closed

    Valves 2, 4, A and B are open.

8.4   Density and interface measurement

For density and interface measurements, VEGADIF 65 with double chemical seal is used.

VEGADIF 65 in this version is immediately ready for operation.

8.5   Differential pressure measurement

Instructions   For differential pressure measurements, VEGADIF 65 without chemical seal or with double chemical seal is used.

VEGADIF 65 with double chemical seal is immediately ready for operation.

Before adjusting VEGADIF 65 without chemical seal, the effective pressure lines must be cleaned and the instrument filled with medium.

9 Maintenance and fault rectification

9.1 Maintenance

Maintenance

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

In some applications, product buildup on the separating diaphragms 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.

9.2 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 the integration time via the display and adjustment module or PACTware
4 … 20 mA signal missing	Wrong connection to voltage supply	Check connection according to chapter "*Connection steps*" and if necessary, correct according to chapter "*Wiring plan*"
	No power supply	Check cables for breaks; repair if necessary
	Operating voltage too low or load resistance too high	Check, adapt if necessary

VEGADIF 65 • 4 … 20 mA/HART

Error code	Cause	Rectification
Current signal greater than 22 mA or less than 3.6 mA	Electronics module or measuring cell defective	Exchange the instrument or send it in for repair

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

Error messages via the display and adjustment module

Error code	Cause	Rectification
E013	no measured value available[10]	Exchange the instrument or send it in for repair
E017	Adjustment span too small	repeat with modified values
E036	no operable sensor software	Carry out a software update or send instrument for repair
E041	Hardware error	Exchange the instrument or send it in for repair

Reaction after fault rectification

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

9.3 Exchanging the electronics module

In case of a defect, the electronics module can be exchanged by the user against an identical type. If no electronics module is available on site, the module can be ordered for the agency serving you.

⟨Ex⟩ In Ex applications, only instruments and electronics modules with appropriate Ex approval may be used.

The sensor serial number is required to order an exchange electronics. You will find this number on the type label of the instrument or on the delivery note.

9.4 Software update

The following components are required to update the instrument software:

● Instrument
● Voltage supply
● Interface adapter VEGACONNECT
● PC with PACTware
● Current instrument software as file

You can find the current instrument software as well as detailed information on the procedure in the download area of our homepage: www.vega.com.

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[10] Fault message can also appear if the pressure is higher than the nominal range.

VEGA

Caution:
Instruments with approvals can be bound to certain software versions. Therefore make sure that the approval is still effective after a software update is carried out.

You can find detailed information in the download area at www.vega.com.

9.5 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: www.vega.com.

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

If a repair is necessary, please 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
● Please contact the agency serving you to get the address for the return shipment. You can find the agency on our home page www.vega.com.

10 Dismount

10.1 Dismounting steps

⚠️ **Warning:**
Before dismounting, be aware of dangerous process conditions such as e.g. pressure in the vessel or pipeline, high temperatures, corrosive or toxic products etc.

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

10.2 Disposal

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

WEEE directive
The instrument does not fall in the scope of the EU WEEE directive. Article 2 of this Directive exempts electrical and electronic equipment from this requirement if it is part of another instrument that does not fall in the scope of the Directive. These include stationary industrial plants.

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

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

11 Supplement

11.1 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 and weights

Material 316L corresponds to stainless steel 1.4404 or 1.4435	
Materials, wetted parts	
– Process fitting with lateral flanges	C22.8, 316L, Alloy C276 (2.4819)
– Separating diaphragm	316L, Alloy C276 (2.4819), Alloy 400 (2.4360), Tantalum, Rhodium-Gold-Alloy coated
– Seal	FKM, PTFE, FFKM (Kalrez 6375), EPDM, NBR, copper
– Screw plugs	316L
Internal transmission liquid	
– Standard applications	Synthetic oil
– Oxygen applications	Halocarbon oil[11]
Materials, non-wetted parts	
– Electronics housing	Plastic PBT (polyester), Alu die-casting, powder-coated, 316L
– Cable gland	PA, stainless steel, brass
– Sealing, cable gland	NBR
– Blind plug, cable gland	PA
– External housing	Plastic PBT (Polyester), 316L
– Socket, wall mounting plate external electronics housing	Plastic PBT (Polyester)
– Seal between housing socket and wall mounting plate	TPE (fixed connected)
– Seal ring, housing cover	Silicone (Aluminium/plastic housing), NBR (stainless steel housing)
– Inspection window in housing lid for display and adjustment module	Polycarbonate (UL-746-C listed)
– Screws and nuts for lateral flange	PN 160: Hexagon screw DIN 931 M12 x 90 A4 70, hexagon nut DIN 934 M12 A4 70
	PN 420: Hexagon screw ISO 4014 M12 x 90 A4, hexagon nut ISO 4032 M12 A4 bs
– Ground terminal	316Ti/316L
– Connection between IP68 transmitter and external electronics housing	PUR

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[11] Not with vacuum and absolute pressure measuring ranges < 1 bar$_{abs}$.

VEGADIF 65 • 4 … 20 mA/HART

– Type label support with IP68 version on cable	PE hard
Conductive connection	Between ground terminal and process fitting
Max. torque screws mounting strap	30 Nm
Max. torque screws socket external housing	5 Nm (3.688 lbf ft)
Weight approx.	4.2 … 4.5 kg (9.26 … 9.92 lbs), depending on process fitting

Output variable

Output signal	4 … 20 mA/HART
HART output values	
– HART value (Primary Value)	Process pressure
– HART value (Secondary Value)	Temperature
Signal resolution	1.6 µA
Fault signal, current output (adjustable)	mA-value unchanged 20.5 mA, 22 mA, < 3.6 mA
Max. output current	22 mA
Load	see load diagram under Power supply
Met NAMUR recommendation	NE 43

Dynamic behaviour output

Run-up time	≤ 20 s
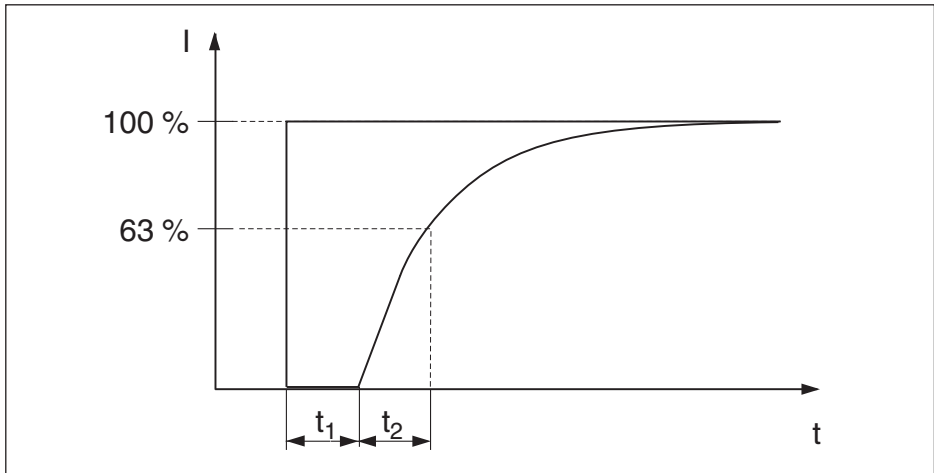
Fig. 56: Presentation of the dead time t_1 and the time constant t_2

The following specified total dead time applies to the 4 … 20 mA current output:

Version, nominal measuring range	Dead time t_1	Time constant t_2
Basic version 10 bar and 30 bar	100 ms	450 ms

Version, nominal measuring range	Dead time t_1	Time constant t_2
Basic version 100 mbar	100 ms	180 ms
Basic version 500 mbar	100 ms	180 ms
Basic version, 3 bar	100 ms	180 ms
Basic version 16 bar and 40 bar	100 ms	180 ms
Chemical seal version, all nominal measuring ranges	Dependent on the chemical seal	Dependent on the chemical seal

Damping (63 % of the input variable)   0 … 999 s, adjustable

Additional output parameter - temperature

Processing is made via output signal HART multidrop, Profibus PA and Foundation Fieldbus

Range   -50 … +150 °C (-58 … +302 °F)

Resolution   1 °C (1.8 °F)

Accuracy in the range of 0 … +100 °C   ±3 K
(+32 … +212 °F)

Accuracy in the range of -50 … 0 °C   typ. ±3 K
(-58 … +32 °F) and +100 … +150 °C
(+212 … +302 °F)

Input variable

Measured variable   Differential pressure, flow and level derived from it

Adjustment differential pressure

Adjustment range of the zero/span adjustment relating to the nominal measuring range:

− Pressure value zero   -120 … +120 %

− Pressure value span   Zero + (-220 … +220 %)[12]

Adjustment level

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

− Percentage value   -10 … +110 %

− Pressure value   -120 … +120 %[13]

Adjustment flow

Adjustment range of the zero/span adjustment relating to the nominal measuring range:

− Pressure value zero   -120 … +120 %

− Pressure value span   -120 … +120 %[14]

Recommended max. turn down   15 : 1 (no limitation)

Nominal measuring ranges, measurement limits and smallest spans to be calibrated

Nominal range	Lower measurement limit	Upper measuring limit	Smallest adjustable span
10 mbar (1 kPa)	-10 mbar (-1 kPa)	+10 mbar (+1 kPa)	0.25 mbar (25 Pa)
30 mbar (3 kPa)	-30 mbar (-3 kPa)	+30 mbar (+3 kPa)	0.3 mbar (30 Pa)

[12] Values less than -1 bar cannot be set.
[13] Values less than -1 bar cannot be set.
[14] Values less than -1 bar cannot be set.

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Nominal range	Lower measurement limit	Upper measuring limit	Smallest adjustable span
100 mbar (10 kPa)	-100 mbar (-10 kPa)	+100 mbar (+10 kPa)	1 mbar (100 Pa)
500 mbar (50 kPa)	-500 mbar (-50 kPa)	+500 mbar (+50 kPa)	5 mbar (500 Pa)
3 bar (300 kPa)	-3 bar (-300 kPa)	+3 bar (+300 kPa)	30 mbar (3 kPa)
16 bar (1600 kPa)	-16 bar (-1600 kPa)	+16 bar (+1600 kPa)	160 mbar (16 kPa)
40 bar (4000 kPa)	-40 bar (-4000 kPa)	+40 bar (+4000 kPa)	400 mbar (40 kPa)

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

Reference conditions according to DIN EN 61298-1

- Temperature   +18 … +30 °C (+64 … +86 °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

Calibration position of the measuring cell   Vertical, i.e. upright process component

Influence of the installation position to the   ≤ 4 mbar[15]
zero point

A position-dependent zero-point shift can be corrected (see also chapter "*Adjust parameter*").

Position of the span in the measuring   Based on the zero point
range

Diaphragm material   316L, Alloy C276 (2.4819), gold rhodium plated, Alloy 400 (2.4360)

Filling oil   Silicone oil

Material, lateral flanges   316L

A position-dependent zero-point shift can be corrected (see also chapter "*Adjust parameter*").

Deviation determined according to the limit point method according to IEC 60770[16]

Applies to **digital** interfaces (HART, Profibus PA, Foundation Fieldbus) as well as to **analogue** current output 4 … 20 mA. Specifications refer to the set span. Turn down (TD) is the ratio nominal measuring range/set span.

All versions

The following applies to square root extracted characteristics: The accuracy data of VEGADIF 65 are entered with factor 0.5 in the accuracy calculation of the flow.

Basic version

10 mbar, 30 mbar measuring cell

- Turn down 1 : 1   ±0.09 % of the set span

- Turn down > 1 : 1   ±0.09 % of the set span x TD

100 mbar measuring cell

- Turn down 1 : 1 to 4 : 1   ±0.075 % of the set span

[15] Max. value with horizontal process component. Specification applies to the basic version without chemical seal. The value doubles with instruments with inert oil.
[16] Incl. non-linearity, hysteresis and non-repeatability.

– Turn down > 4 : 1	±(0.012 x TD + 0.027) % of the set span

Measuring cells ≥ 500 mbar

– Turn down 1 : 1 to 15 : 1	±0.075 % of the set span
– Turn down > 15 : 1	±(0.0015 x TD + 0.053) % of the set span

Chemical seal versions

100 mbar measuring cell

– Turn down 1 : 1 to 4 : 1	±0.075 % of the set span + influence of the chemical seal
– Turn down > 4 : 1	±(0.012 x TD + 0.027) % of the set span + influence of the chemical seal

Measuring cells ≥ 500 mbar

– Turn down 1 : 1 to 15 : 1	±0.075 % of the set span + influence of the chemical seal
– Turn down > 15 : 1	±(0.0015 % x TD + 0.053 %) of the set span + influence of the chemical seal

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Influence of the medium or ambient temperature

Thermal change zero signal and output span

Applies to instruments in basic version with **digital** signal output (HART, Profibus PA, Foundation Fieldbus) as well as to instruments with **analogue** current output 4 … 20 mA. Specifications refer to the set span. Turn down (TD) = nominal measuring range/set span.

Temperature range	Measuring range	
-10 … +60 °C (+14 … +140 °F)	10 mbar, 30 mbar	±(0.30 x TD + 0.06) %
	100 mbar	±(0.18 x TD + 0.02) %
	500 mbar, 3 bar	±(0.08 x TD + 0.05) %
	16 bar	±(0.1 x TD + 0.1) %
	40 bar	±(0.08 x TD + 0.05) %
-40 … +10 °C (-40 … +50 °F) +60 … +85 °C (+140 … +185 °F)	10 mbar, 30 mbar	±(0.45 x TD + 0.1) %
	100 mbar	±(0.3 x TD + 0.15) %
	500 mbar, 3 bar	±(0.12 x TD + 0.1) %
	16 bar	±(0.15 x TD + 0.2) %
	40 bar	±(0.37 x TD + 0.1) %

Thermal change, current output

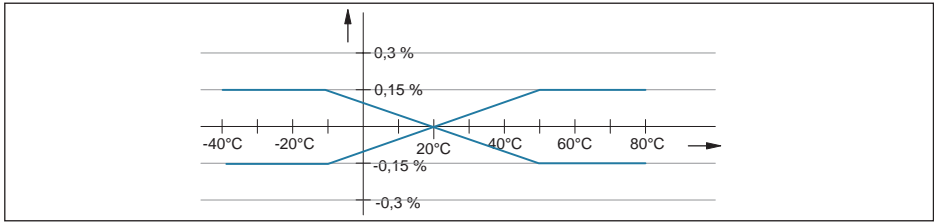Applies also to instruments with **analogue** 4 … 20 mA current output and refers to the set span.

Fig. 57: Thermal change, current output

Influence of the system pressure on the zero point and span

316L, Alloy C276 (2.4819), Alloy 400 (2.4360) diaphragm

Measuring cell	10 mbar	30 mbar	100 mbar	500 mbar
Influence of the system pressure to the zero point	±0.15 % of URL/7 bar	±0.50 % of URL/70 bar	±0.15 % of URL/70 bar	±0.075 % of URL/70 bar
Influence of the system pressure to the span	±0.035 % of URL/7 bar	±0.14 % of URL/70 bar	±0.14 % of URL/70 bar	±0.14 % of URL/70 bar

Measuring cell	3 bar	16 bar	40 bar
Influence of the system pressure to the zero point	±0.075 % of URL/7 bar	±0.075 % of URL/70 bar	±0.075 % of URL/70 bar
Influence of the system pressure to the span	±0.14 % of URL/7 bar	±0.14 % of URL/70 bar	±0.14 % of URL/70 bar

Alloy gold rhodium-coated diaphragm

Measuring cell	10 mbar	30 mbar	100 mbar	500 mbar
Influence of the system pressure to the zero point	±0.15 % of URL/7 bar	±0.77 % of URL/70 bar	±0.42 % of URL/70 bar	±0.075 % of URL/70 bar
Influence of the system pressure to the span	±0.035 % of URL/7 bar	±0.14 % of URL/70 bar	±0.42 % of URL/70 bar	±0.14 % of URL/70 bar

Measuring cell	3 bar	16 bar	40 bar
Influence of the system pressure to the zero point	±0.075 % of URL/7 bar	±0.075 % of URL/70 bar	±0.075 % of URL/70 bar
Influence of the system pressure to the span	±0.14 % of URL/7 bar	±0.14 % of URL/70 bar	±0.14 % of URL/70 bar

Tantalum diaphragm

Measuring cell	10 mbar	30 mbar	100 mbar	500 mbar
Influence of the system pressure to the zero point	±0.32 % of URL/7 bar	±1.60 % of URL/70 bar	±0.42 % of URL/70 bar	±0.14 % of URL/70 bar

Measuring cell	10 mbar	30 mbar	100 mbar	500 mbar
Influence of the system pressure to the span	±0.07 % of URL/7 bar	±0.32 % of URL/70 bar	±0.42 % of URL/70 bar	±0.14 % of URL/70 bar

Measuring cell	3 bar	16 bar	40 bar
Influence of the system pressure to the zero point	±0.14 % of URL/7 bar	±0.14 % of URL/70 bar	±0.14 % of URL/70 bar
Influence of the system pressure to the span	±0.14 % of URL/7 bar	±0.14 % of URL/70 bar	±0.14 % of URL/70 bar

Total accuracy

Total Performance - Basic version

The specification "*Total Performance*" comprises the non-linearity incl. hysteresis and non-repeatability, the thermal change of the zero point and the static pressure influence (p_{st} = 70 bar). All specifications refer to the adjusted span and apply to the temperature range +10 … +60 °C (+50 … +140 °F).

Diaphragm material	Turn Down up to	316L, Alloy	Alloy gold rhodium	Tantalum
Measuring cell				
10 mbar	1 : 1	< ±0.35 %	< ±0.64 %	< ±0.61 %
30 mbar	1 : 1	< ±0.77 %	< ±0.99 %	< ±1.66 %
100 mbar	2 : 1	< ±0.27 %	< ±0.50 %	< ±0.30 %
≥500 mbar	2 : 1	< ±0.15 %	< ±0.15 %	< ±0.30 %

Total Error - basic version

The specification "*Total Error*" comprises the longterm stability and the total performance.

Diaphragm material	316L, Alloy	Alloy gold rhodium	Tantalum
Measuring cell			
10 mbar	< ±0.36 %	< ±0.64 %	< ±0.62 %
30 mbar	< ±0.77 %	< ±0.99 %	< ±1.66 %
100 mbar	< ±0.33 %	< ±0.50 %	< ±0.48 %
≥500 mbar	< ±0.20 %	< ±0.20 %	< ±0.35 %

Long-term stability (according to DIN 16086 and IEC 60770-1)

Applies to **digital** interfaces (HART, Profibus PA, Foundation Fieldbus) as well as to **analogue** current output 4 … 20 mA. Specifications refer to the measuring range final value.

Measuring range	1 year	5 years	10 years
10 mbar	< ±0.100 %	< ±0.150 %	-
100 mbar	< ±0.180 %	-	-
500 mbar	< ±0.025 %	< ±0.050 %	< ±0.075 %

Measuring range	1 year	5 years	10 years
3 bar	< ±0.038 %	< ±0.075 %	< ±0.150 %
16 bar	< ±0.025 %	< ±0.110 %	< ±0.210 %

Ambient conditions

Ambient, storage and transport temperature

- Standard version — -40 … +80 °C (-40 … +176 °F)
- Version for oxygen applications[17) — -40 … +60 °C (-40 … +140 °F)
- Versions IP66/IP68 (1 bar), connection cable PE — -20 … +60 °C (-4 … +140 °F)
- Versions IP66/IP68 (1 bar) and IP68, connection cable PUR — -20 … +80 °C (-4 … +176 °F)

Process conditions

The pressure and temperature specifications are used as overview. In general, the max. pressure for the pressure transmitter depends on the weakest (with regard to pressure) link. In detail, the respective specifications of the type label apply.

Process temperature limits

Specifications apply to the basic version as well as to the minus side with version with single chemical seal[18)

- With measuring cells PN 420 — Lower temperature limit -10 °C (+14 °F).
- With effective pressure lines longer than 100 mm — -40 … +120 °C (-40 … +248 °F)
- With effective pressure lines longer than 100 mm, process fitting steel C 22.8 (1.0460) — -40 … +120 °C (-40 … +248 °F)

Specifications apply to suitable chemical seals

- Chemical seal CSS plus side, CSB both sides — -40 … +400 °C (-40 … +752 °F)

Process temperature limits according to the seal material

Seal material	Version	Temperature limits
FKM	Standard	-20 … +85 °C (-4 … +185 °F)
	Cleaned	-10 … +85 °C (+14 … +185 °F)
	For oxygen application	-10 … +60 °C (-4 … +140 °F)
FFKM (Kalrez 6375)		-5 … +85 °C (23 … +185 °F)
EPDM		-40 … +85 °C (-40 … +185 °F)
PTFE	Standard	-40 … +85 °C (-40 … +185 °F)
	For oxygen application	-20 … +60 °C (-4 … +140 °F)
NBR		-20 … +85 °C (-4 … +185 °F)

[17) Up to 60 °C (140 °F).
[18) For the version for oxygen application, note chapter "Oxygen applications".

Seal material	Version	Temperature limits
Copper	Standard	-40 … +85 °C (-40 … +185 °F)
	For oxygen application	-20 … +60 °C (-4 … +140 °F)
PTFE, for oxygen application		-20 … +60 °C (-4 … +140 °F)

Process pressure limits according to measuring range[19]

Nominal range	Nominal pressure	Overload one-sided	Overload two-sided	Min. system pressure
10 mbar (1 kPa)	160 bar (16000 kPa)	160 bar (16000 kPa)	240 bar (24000 kPa)	
30 mbar (3 kPa)	160 bar (16000 kPa)	160 bar (16000 kPa)	240 bar (24000 kPa)	
100 mbar (10 kPa)	160 bar (16000 kPa)	160 bar (16000 kPa)	240 bar (24000 kPa)	
500 mbar (50 kPa)	160 bar (16000 kPa)	160 bar (16000 kPa)	240 bar (24000 kPa)	
	420 bar (42000 kPa)	420 bar (42000 kPa)	630 bar (63000 kPa)	
3 bar (300 kPa)	160 bar (16000 kPa)	160 bar (16000 kPa)	240 bar (24000 kPa)	0.1 mbar$_{abs}$ (10 Pa$_{abs}$)
	420 bar (42000 kPa)	420 bar (42000 kPa)	630 bar (63000 kPa)	
16 bar (1600 kPa)	160 bar (16000 kPa)	160 bar (16000 kPa)	240 bar (24000 kPa)	
	420 bar (42000 kPa)	420 bar (42000 kPa)	630 bar (63000 kPa)	
40 bar (4000 kPa)	160 bar (16000 kPa)	160 bar (16000 kPa)	240 bar (24000 kPa)	
	420 bar (42000 kPa)	420 bar (42000 kPa)	630 bar (63000 kPa)	

Process pressure limits according to the seal material[20]

Seal material	Nominal pressure	Overload one-sided	Overload two-sided	Min. system pressure
FFKM (Kalrez 6375)	100 bar (10000 kPa)	100 bar (10000 kPa)	150 bar (15000 kPa)	0.1 mbar$_{abs}$ (10 Pa$_{abs}$)
FFKM (Kalrez 6375)	160 bar (16000 kPa)	160 bar (16000 kPa)	240 bar (24000 kPa)	

Vibration resistance (mechanical vibrations with 5 … 100 Hz), depending on the version as well as the material and series of the electronics housing[21]

- Plastic single and double chamber housing, Aluminium single chamber housing   4 g
- Aluminium double chamber housing, stainless steels single chamber housing   1 g
- Stainless steel double chamber housing   < 1 g

Shock resistance   Acceleration 100 g/6 ms[22]

[19] Reference temperature +20 °C (+68 °F)
[20] Reference temperature +20 °C (+68 °F)
[21] Tested according to the guidelines of German Lloyd, GL directive 2.
[22] Tested according to EN 60068-2-27.

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Electromechanical data - version IP66/IP67

Cable entry/plug[23)]

− Single chamber housing	– 1 x cable gland M20 x 1.5 (cable: ø 5 … 9 mm), 1 x blind plug M20 x 1.5
	or:
	– 1 x closing cap ½ NPT, 1 x blind plug ½ NPT
	or:
	– 1 x plug (depending on the version), 1 x blind stopper M20 x 1.5
	or:
	– 2 x blind plug M20 x 1,5
− Double chamber housing	– 1 x cable entry M20 x 1.5 (cable: ø 5 … 9 mm), 1 x blind plug M20 x 1.5; plug M12 x 1 for the external display and adjustment unit (optional)
	or:
	– 1 x closing cap ½ NPT, 1 x blind plug ½ NPT, plug M12 x 1 for the external display and adjustment unit (optional)
	or:
	– 1 x plug (depending on the version), 1 x blind plug M20 x 1.5; plug M12 x 1 for the external display and adjustment unit (optional)
	or:
	– 2 x blind stoppers M20 x 1.5; plug M12 x 1 for the external display and adjustment unit (optional)
Spring-loaded terminals for wire cross-section	< 2.5 mm² (AWG 14)

Electromechanical data - version IP66/IP68 (1 bar)

Cable entry

− Single chamber housing	– 1 x IP68 cable gland M20 x 1.5; 1 x blind plug M20 x 1.5
	or:
	– 1 x closing cap ½ NPT, 1 x blind plug ½ NPT

Connection cable

− Configuration	four wires, one suspension wire, one breather capillary, screen braiding, metal foil, mantle
− Wire cross-section	0.5 mm² (AWG 20)
− Wire resistance	< 0.036 Ω/m (0.011 Ω/ft)
− Tensile strength	> 1200 N (270 pounds force)
− Standard length	5 m (16.4 ft)
− Max. length	1000 m (3281 ft)
− Min. bending radius at 25 °C/77 °F	25 mm (0.985 in)
− Diameter approx.	8 mm (0.315 in)

[23)] Depending on the version M12 x 1, according to ISO 4400, Harting, 7/8" FF.

− Colour - Non-Ex version	Black
− Colour - Ex-version	Blue

Electromechanical data - version IP68 with external electronics

Connection cable between IP68 instrument and external housing:	
− Configuration	Four wires, screen braiding, inner cover, screen braiding, outer cover
− Wire cross-section	0.5 mm² (AWG 20)
− Standard length	5 m (16.40 ft)
− Max. length	25 m (82.02 ft)
− Min. bending radius at 25 °C/77 °F	25 mm (0.985 in)
− Diameter approx.	8 mm (0.315 in)
− Colour	Blue
Cable entry/plug[24]	
− External housing	– 2 x cable gland M20 x 1.5 (cable: ø 5 … 9 mm), 1 x blind plug M20 x 1.5 or: – 1 x cable gland M20 x 1.5, 1 x plug (depending on version), 1 x blind plug M20 x 1.5
Spring-loaded terminals for wire cross-section up to	2.5 mm² (AWG 14)

Display and adjustment module

Voltage supply and data transmission	through the sensor
Indication	LC display in dot matrix
Adjustment elements	4 keys
Protection rating	
− unassembled	IP20
− Mounted into the sensor without cover	IP40
Ambient temperature - Display and adjustment module	-20 … +70 °C (-4 … +158 °F)
Material	
− Housing	ABS
− Inspection window	Polyester foil

Voltage supply

Operating voltage	
− Non-Ex instrument	12 … 36 V DC
− Ex-ia instrument	12 … 30 V DC
− Ex-d-ia instrument	15 … 35 V DC
Operating voltage with illuminated display and adjustment module	
− Non-Ex instrument	20 … 36 V DC

[24] Depending on the version M12 x 1, according to ISO 4400, Harting, 7/8" FF.

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− Ex-ia instrument	20 … 30 V DC
− Ex-d-ia instrument	No lighting possible (integrated ia barrier)
Permissible residual ripple	
− < 100 Hz	$U_{ss} < 1$ V
− 100 Hz … 10 kHz	$U_{ss} < 10$ mV
Load resistor	
− Calculation	$(U_B - U_{min})/0.022$ A
− Example - Non-Ex instrument with $U_B = 24$ V DC	(24 V - 12 V)/0.022 A = 545 Ω

Electrical protective measures

Protection rating	
− Housing, standard	IP 66/IP 67
− Aluminium and stainless housing (optionally available)	IP 68 (1 bar)
− Process component in IP 68 version	IP 68 (25 bar)
− External housing	IP 65
Overvoltage category	For voltage supply via separator through networks of overvoltage category III
Protection class	II

Approvals

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

For that reason the associated approval documents of these instruments have to be carefully noted. They are part of the delivery or can be downloaded by entering the serial number of your instrument into the search field under www.vega.com as well as in the general download area.

11.2 Dimensions, versions process component

Plastic housing
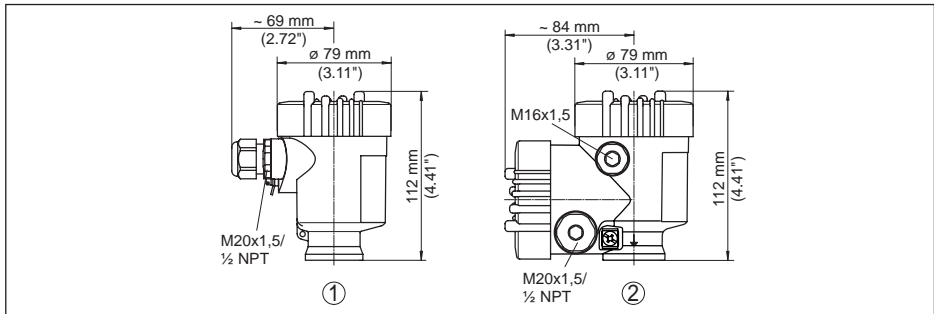
1 Single chamber version
2 Double chamber version

Aluminium housing
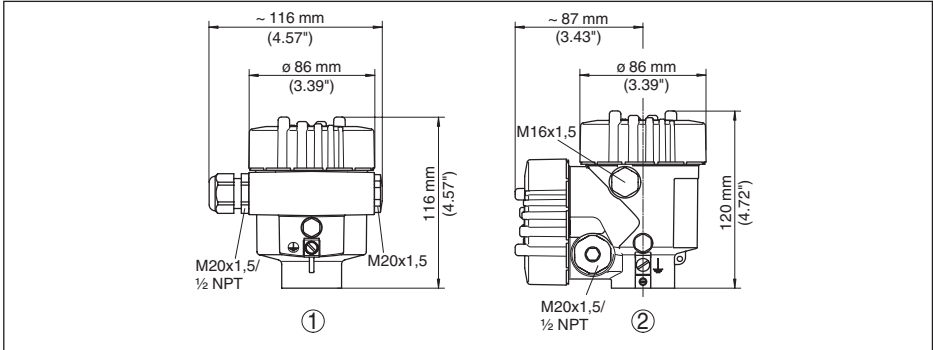
1 Single chamber version
2 Double chamber version

Stainless steel housing
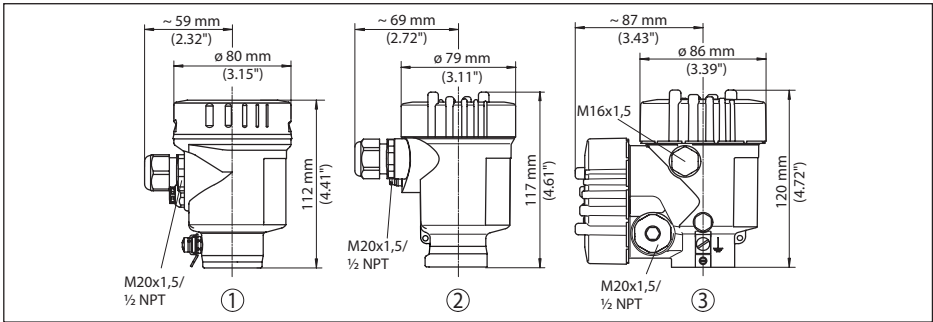
1 Single chamber version, electropolished
2 Single chamber version, precision casting
3 Double chamber version, precision casting

Aluminium and stainless steel housing in protection IP 66/IP 68 (1 bar)
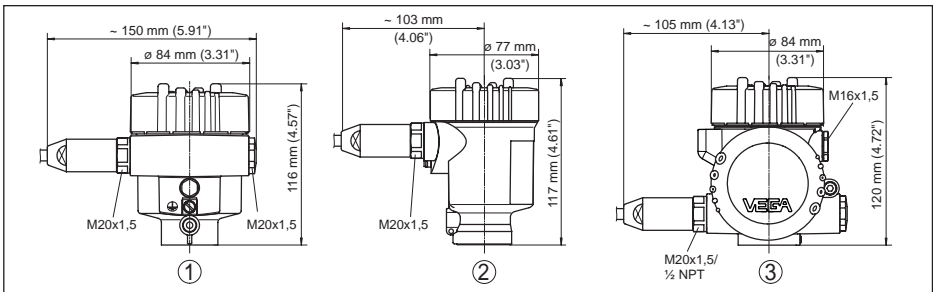
1 Single chamber version, Aluminium
2 Single chamber version, stainless steel electropolished
3 Single chamber version, stainless steel precision casting
4 Double chamber housing, aluminium/stainless steel precision casting

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External housing on IP 68 version
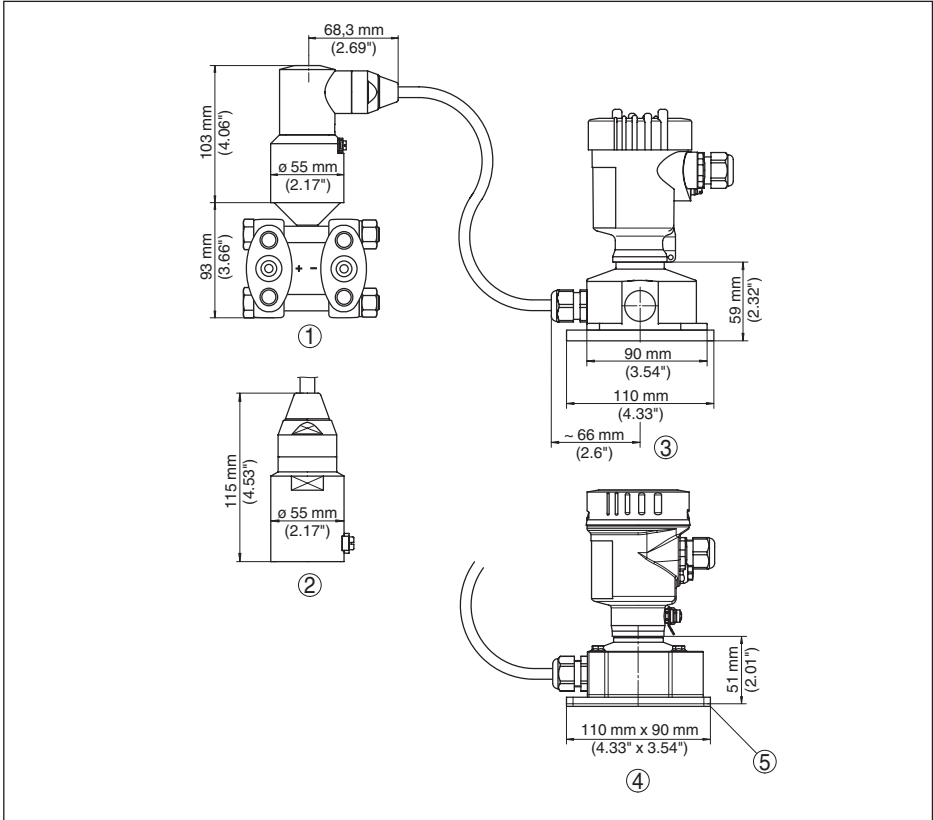
Fig. 58: External housing

1   *Lateral cable outlet*
2   *Axial cable outlet*
3   *Plastic version*
4   *Stainless steel version*
5   *Seal 2 mm (0.079 in) - only with 3A approval*

Oval flange, connection ¼-18 NPT or RC ¼
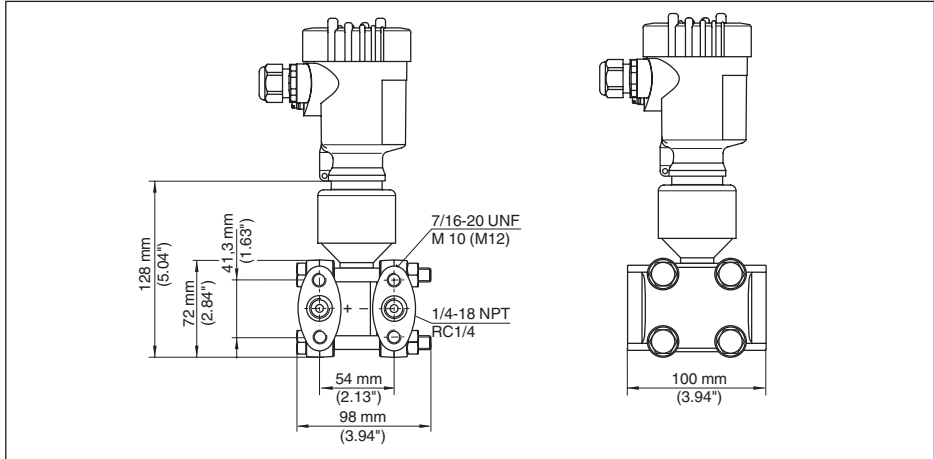
Fig. 59: VEGADIF 65 - Connection ¼-18 NPT or RC ¼

Version	Connection	Fastening	Material	Scope of delivery
B	1/4-18 NPT IEC 61518	7/16-20 UNF	Steel C 22.8 (1.0460)	incl. 2 vent valves (316L)
D	1/4-18 NPT IEC 61518	7/16-20 UNF	AISI 316L (1.4435 or 1.4404)	incl. 2 vent valves (316L)
F	1/4-18 NPT IEC 61518	7/16-20 UNF	Alloy C276 (2.4819)	without valves/closing screws
U	RC 1/4	7/16-20 UNF	AISI 316L (1.4435 or 1.4404)	incl. 2 vent valves (316L)
1	1/4-18 NPT IEC 61518	PN 160: M10, PN 420: M12	Steel C 22.8 (1.0460)	incl. 2 vent valves (316L)
2	1/4-18 NPT IEC 61518	PN 160: M10, PN 420: M12	AISI 316L (1.4435 or 1.4404)	incl. 2 vent valves (316L)
3	1/4-18 NPT IEC 61518	PN 160: M10, PN 420: M12	Alloy C276 (2.4819)	without valves/closing screws

The oval flanges of steel C 22.8 (1.0460) are zinc-coated. For applications with water we recommend oval flanges of 316L.

Oval flange, connection ¼-18 NPT or RC ¼, with lateral ventilation
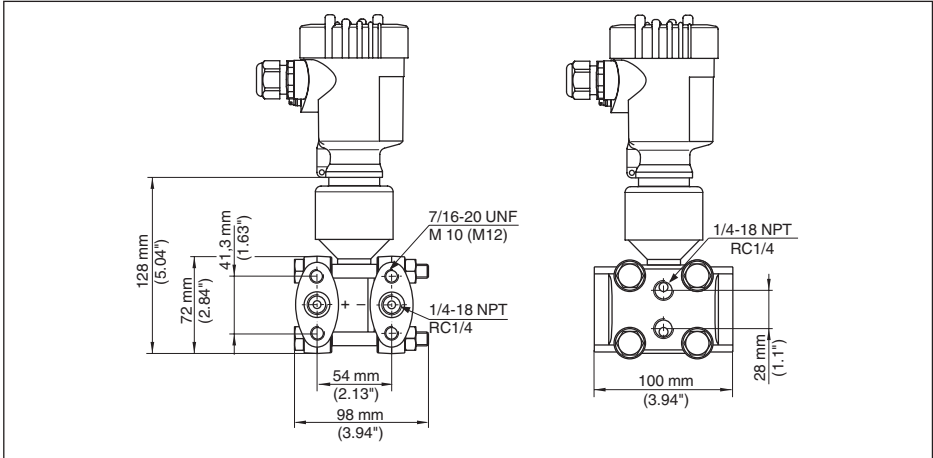

Fig. 60: VEGADIF 65 - Connection ¼-18 NPT or RC ¼, with lateral ventilation

Version	Connection	Fastening	Material	Scope of delivery
C	1/4-18 NPT IEC 61518	7/16-20 UNF	Steel C 22.8 (1.0460)	incl. 4 closing screws (AISI 316L) and 2 ventilation valves
E	1/4-18 NPT IEC 61518	7/16-20 UNF	AISI 316L (1.4435 or 1.4404)	incl. 4 closing screws (AISI 316L) and 2 ventilation valves
H	1/4-18 NPT IEC 61518	7/16-20 UNF	Alloy C276 (2.4819)	without valves/closing screws
V	RC 1/4	7/16-20 UNF	AISI 316L (1.4435 or 1.4404)	without valves/closing screws

The oval flanges of steel C 22.8 (1.0460) are zinc-coated. For applications with water we recommend oval flanges of 316L.

Oval flange, prepared for chemical seal connection
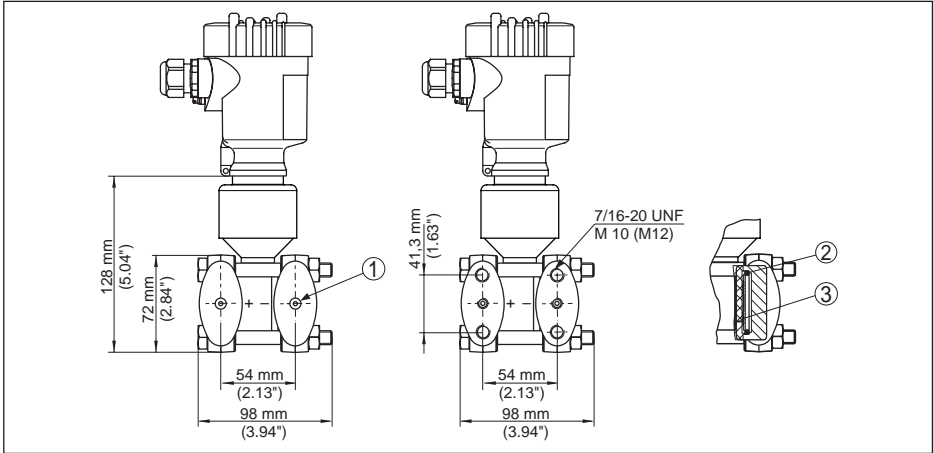
Fig. 61: left: Process fitting VEGADIF 65 prepared for chemical seal assembly. right: Position of the copper ring seal

1   *Chemical seal connection*
2   *Copper ring seal*
3   *Cup diaphragm*

11.3   Industrial property rights

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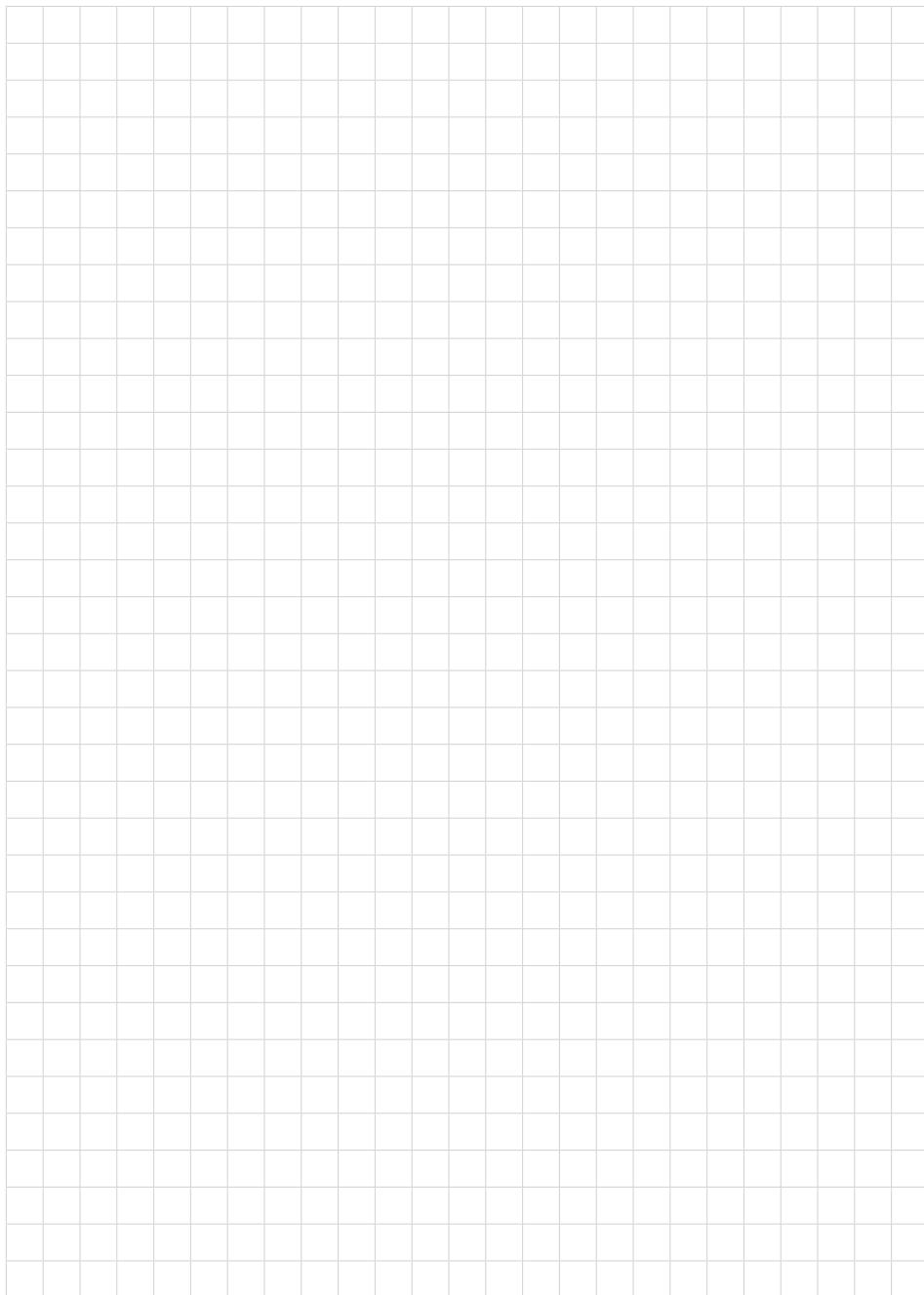36128-EN-200124

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