# Operating Instructions

**Pressure transmitter with metallic measuring cell**

## VEGABAR 83

HART and accumulator pack


Document ID: 45035

# Contents



45035-EN-220624

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

Editing status: 2022-04-20

45035-EN-220624

# 1 About this document

## 1.1 Function

This instruction provides all the information you need for mounting, connection and setup as well as important instructions for maintenance, fault rectification, 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, note, tip:** This symbol indicates helpful additional information and tips for successful work.

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

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

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

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

**Ex applications**
This symbol indicates special instructions for Ex applications.

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

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

**Disposal**
This symbol indicates special instructions for disposal.

# 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

The VEGABAR 83 is a pressure transmitter for process pressure and hydrostatic level measurement. Due to the integrated accumulator the instrument is particularly suitable as a portable measuring system or test sensor for special applications.

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

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

## 2.3 Warning about incorrect use

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

## 2.4 General safety instructions

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

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

For safety and warranty reasons, any invasive work on the device beyond that described in the operating instructions manual may be carried out only by personnel authorised by the manufacturer. Arbitrary conversions or modifications are explicitly forbidden. For safety reasons, only the accessory specified by the manufacturer must be used.

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

## 2.5 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.

Due to the design of its process fittings, the device does not subject of EU pressure device directive if it is operated at process pressures ≤ 200 bar. [1)]

## 2.6 NAMUR recommendations

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

The device fulfils the requirements of the following NAMUR recommendations:

- NE 21 – Electromagnetic compatibility of equipment
- NE 43 – Signal level for fault information from measuring transducers
- NE 53 – Compatibility of field devices and display/adjustment components
- NE 107 – Self-monitoring and diagnosis of field devices

For further information see www.namur.de.

## 2.7 Installation and operation in the USA and Canada

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

Installations in the US shall comply with the relevant requirements of the National Electrical Code (ANSI/NFPA 70).

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

## 2.8 Environmental instructions

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

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

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

[1)] Exception: Versions with measuring ranges from 250 bar. These are subject of the EU Pressure Device Directive.

# 3 Product description

## 3.1 Configuration

**Scope of delivery**

The scope of delivery encompasses:

- Sensor with integrated accumulator
- Battery charger

The further scope of delivery encompasses:

- Documentation
  - Quick setup guide VEGABAR 83
  - Test certificate for pressure transmitters
  - Instructions for optional instrument features
  - Ex-specific " *Safety instructions*" (with Ex versions)
  - If necessary, further certificates

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

**Scope of this operating instructions**

This operating instructions manual applies to the following instrument versions:

- Hardware from 1.0.0
- Software from 1.3.6

**Note:**
You can find the hardware and software version of the instrument as follows:

- On the type plate of the electronics module
- In the adjustment menu under " *Info*"

**Type label**

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


*Fig. 1: Layout of the type label (example)*

1 *Product code*
2 *Field for approvals*
3 *Technical data*
4 *Serial number of the instrument*
5 *QR code*
6 *Symbol of the device protection class*
7 *ID numbers, instrument documentation*

**Serial number - Instrument search**

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

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

Move to " www.vega.com" and enter in the search field the serial number of your instrument.

Alternatively, you can access the data via your smartphone:

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

## 3.2 Principle of operation

**Application area**

VEGABAR 83 is suitable for applications in virtually all industries. It is used for the measurement of the following pressure types.

- Gauge pressure
- Absolute pressure
- Vacuum

**Measured products**

Measured products are gases, vapours and liquids.

The device is especially suitable for applications with higher temperatures and high pressures.

**Measured variables**

The VEGABAR 83 is suitable for the measurement of the following process variables:

- Process pressure
- Level

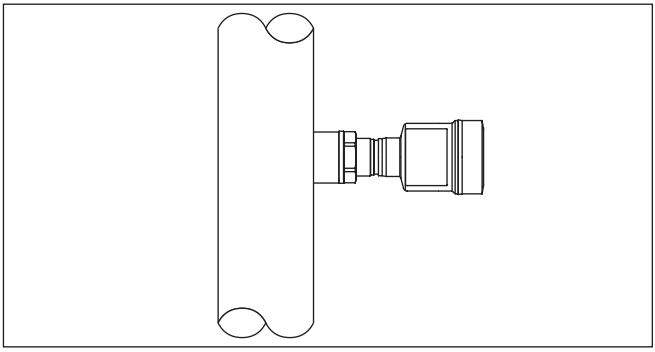


*Fig. 2: Process pressure measurement VEGABAR 83*

**Measuring system pressure**

The process pressure acts on the sensor element via the process diaphragm. The process pressure causes a resistance change which is converted into a corresponding output signal and output as measured value.

**Piezoresistive sensor element**

Measuring ranges up to 40 bar: piezoresistive sensor element with internal isolating liquid is used.

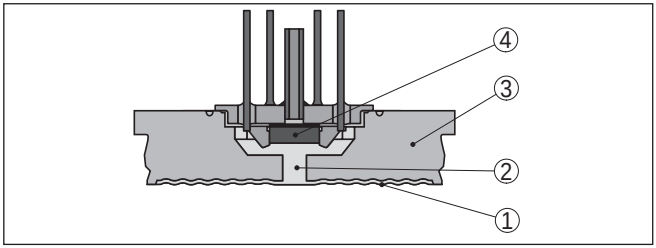



*Fig. 3: Configuration of the measuring system with piezoresistive sensor element*

*1 Diaphragm*
*2 Isolating liquid*
*3 Base element*
*4 Sensor element*

**Strain gauge (DMS) sensor element**

For measuring ranges above 100 bar, a strain gauge (DMS) sensor element (dry system) is used.

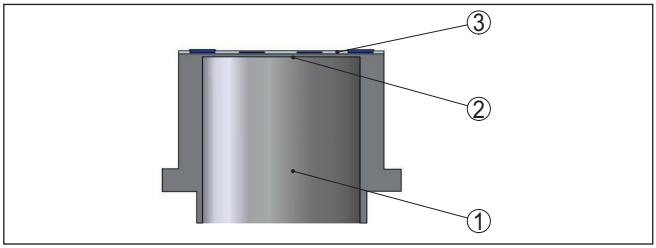



*Fig. 4: Configuration of the measuring system with strain gauge (DMS) sensor element*

*1 Pressure cylinder*
*2 Process diaphragm*
*3 Sensor element*

**Measuring system temperature**

A temperature sensor on the respective sensor element for pressure records the current process temperature. The temperature value is output via:

- The display and adjustment module
- The current output or the additional current output
- The digital signal output

**Ceramic/metallic measuring cell**

With small measuring ranges or higher temperatures, the ceramic/metallic METEC® measuring cell is the measuring unit. It consists of the ceramic-capacitive CERTEC® measuring cell and a special, temperature-compensated chemical seal system.

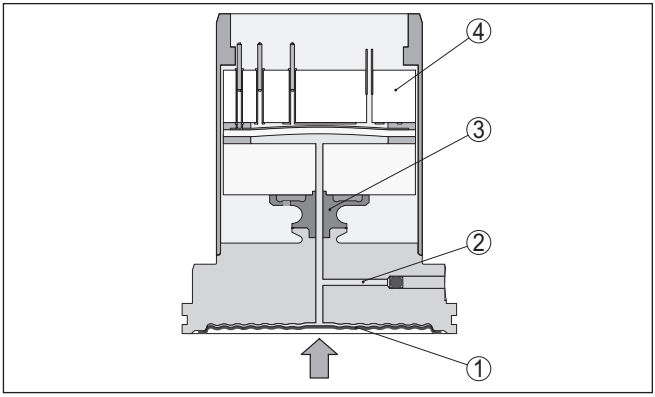



*Fig. 5: Configuration of the METEC® measuring cell*

*1 Process diaphragm*
*2 Isolating liquid*
*3 FeNi adapter*
*4 CERTEC® measuring cell*

**Measuring system temperature**

Temperature sensors in the ceramic diaphragm and the ceramic base of the CERTEC® measuring cell detect the actual process temperature. The temperature value is output via:

- The display and adjustment module
- The current output or the additional current output
- The digital signal output

**Pressure types**

The measuring cell design depends on the selected pressure type.

**Relative pressure**: the measuring cell is open to the atmosphere. The ambient pressure is detected in the measuring cell and compensated. It thus has no influence on the measured value.

**Absolute pressure**: the measuring cell contains vacuum and is encapsulated. The ambient pressure is not compensated and does hence influence the measured value.

**Relative pressure, climate-compensated**: the measuring cell is evacuated and encapsulated. The ambient pressure is detected through a reference sensor in the electronics and compensated. It thus has no influence on the measured value.

**Seal concept**

The measuring system is completely welded and thus sealed against the process.

The process fitting is sealed against the process by a suitable seal. It must be provided by the customer, depending on the process fitting

also included in the scope of delivery, see chapter " *Technical data*", " *Materials and weights*".

## 3.3 Packaging, transport and storage

**Packaging**

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

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

**Transport**

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

**Transport inspection**

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

**Storage**

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

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

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

**Storage and transport temperature**

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

**Lifting and carrying**

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

## 3.4 Accessories

The instructions for the listed accessories can be found in the download area on our homepage.

**Display and adjustment module**

The display and adjustment module is used for measured value indication, adjustment and diagnosis.

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

**VEGACONNECT**

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

**Protective cover**

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

**Flanges**

Screwed flanges are available in different versions according to the following standards: DIN 2501, EN 1092-1, BS 10, ASME B 16.5, JIS B 2210-1984, GOST 12821-80.

**Welded socket, threaded and hygienic adapter**

Welded sockets are used to connect the devices to the process.

Threaded and hygienic adapters enable simple adaptation of devices with standard threaded fittings to process-side hygiene connections.

# 4 Mounting

## 4.1 General instructions

**Process conditions**

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

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

These are mainly:

- Active measuring component
- Process fitting
- Process seal

Process conditions in particular are:

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

**Protection against moisture**

Protect your instrument against moisture ingress through the following measures:

- Use a suitable connection cable (see chapter " *Connecting to power supply*")
- Tighten the cable gland or plug connector
- Lead the connection cable downward in front of the cable entry or plug connector

This applies mainly to outdoor installations, in areas where high humidity is expected (e.g. through cleaning processes) and on cooled or heated vessels.

**Note:**
Make sure that during installation or maintenance no moisture or dirt can get inside the instrument.

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

**Screwing in**

Devices with threaded fitting are screwed into the process fitting with a suitable wrench via the hexagon.

See chapter " *Dimensions*" for wrench size.

**Warning:**
The housing or the electrical connection may not be used for screwing in! Depending on the device version, tightening can cause damage, e. g. to the rotation mechanism of the housing.

**Vibrations**

Avoid damages on the device by lateral forces, for example by vibrations. It is thus recommended to fix the devices with process fitting

thread G½ of plastic at the installation site via a suitable measuring instrument holder.

If there is strong vibration at the mounting location, the instrument version with external housing should be used. See chapter " *External housing*".

**Permissible process pressure (MWP) - Device**

The permissible process pressure range is specified by "MWP" (Maximum Working Pressure) on the type label, see chapter " *Structure*". The MWP takes the element of the measuring cell and processing fitting combination with the weakest pressure into consideration and may applied permanently. The specification refers to a reference temperature of +20 °C (+68 °F). It also applies when a measuring cell with a higher measuring range than the permissible pressure range of the process fitting is installed order-related.

In order to prevent damage to the device, a test pressure may only exceed the specified MWP briefly by 1.5 times at reference temperature. The pressure stage of the process fitting as well as the overload resistance of the measuring cell are taken into consideration here (see chapter " *Technical Data*").

In addition, a temperature derating of the process fitting, e. g. with flanges, can limit the permissible process pressure range according to the respective standard.

**Permissible process pressure (MWP) - Mounting accessory**

The permissible process pressure range is stated on the type label. The instrument should only be operated with these pressures if the mounting accessory used also fulfils these values. This should be ensured by suitable flanges, welded sockets, tension rings with Clamp connections, sealings, etc.

**Temperature limits**

Higher process temperatures often mean also higher ambient temperatures. 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.

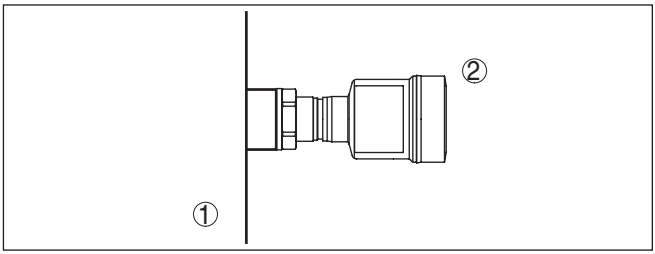



*Fig. 6: Temperature ranges*

*1 Process temperature*
*2 Ambient temperature*

## 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 system, e.g. measuring instruments, must be cleaned in accordance with the requirements of recognized regulations or standards
- 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 Ventilation and pressure compensation

**Filter element - Function**

The filter element in the electronics housing has the following functions:

- Ventilation of the electronics housing
- Atmospheric pressure compensation (with relative pressure measuring ranges)

**Caution:**
The filter element causes a time-delayed pressure compensation. When quickly opening/closing the housing cover, the measured value can change for approx. 5 s by up to 15 mbar.

For an effective ventilation, the filter element must be always free from buildup. In case of horizontal mounting, turn the housing so that the filter element points downward after the instrument is installed. This provides better protection against buildup.

**Caution:**
Do not use a high-pressure cleaner. The filter element could be damaged, which would allow moisture into the housing.

The following paragraphs describe how the filter element is arranged in the different instrument versions.

**Filter element - Position**

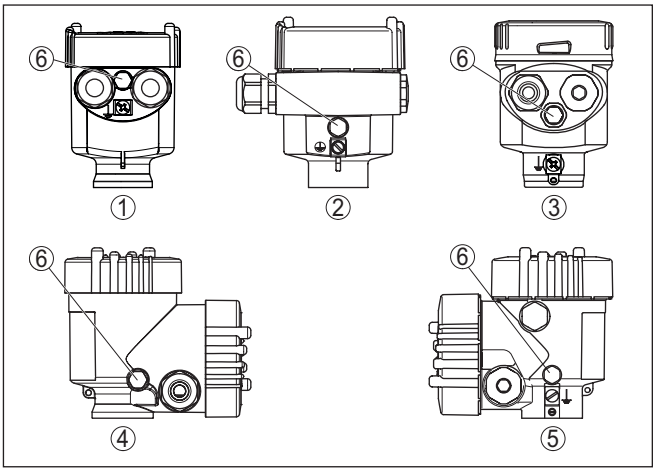



*Fig. 7: Position of the filter element*

*1 Plastic, stainless steel single chamber (precision casting)*
*2 Aluminium - single chamber*
*3 Stainless steel single chamber (electropolished)*
*4 Plastic double chamber*
*5 Aluminium, stainless steel double chamber housing (precision casting)*
*6 Filter element*

With the following instruments a blind plug is installed instead of the filter element:

- Instruments in protection IP66/IP68 (1 bar) - ventilation via capillaries in non-detachable cable
- Instruments with absolute pressure

## 4.4 Process pressure measurement

**Measurement setup in gases**

Keep the following in mind when setting up the measuring system:

- Mount the instrument above the measuring point

Possible condensation can then drain off into the process line.

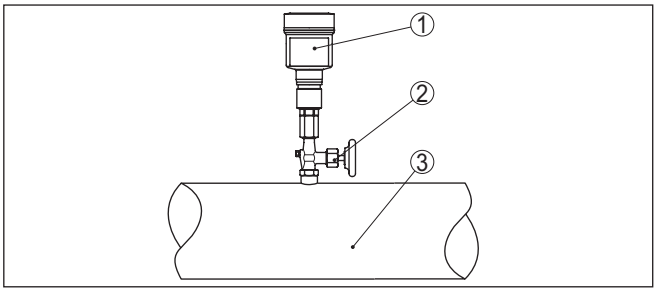



*Fig. 8: Measurement setup for process pressure measurement of gases in pipelines*

*1 VEGABAR 83*
*2 Blocking valve*
*3 Pipeline*

**Measurement setup in vapours**

Keep the following in mind when setting up the measuring system:

- Connect via a siphon
- Do not insulate the siphon
- Fill the siphon with water before setup

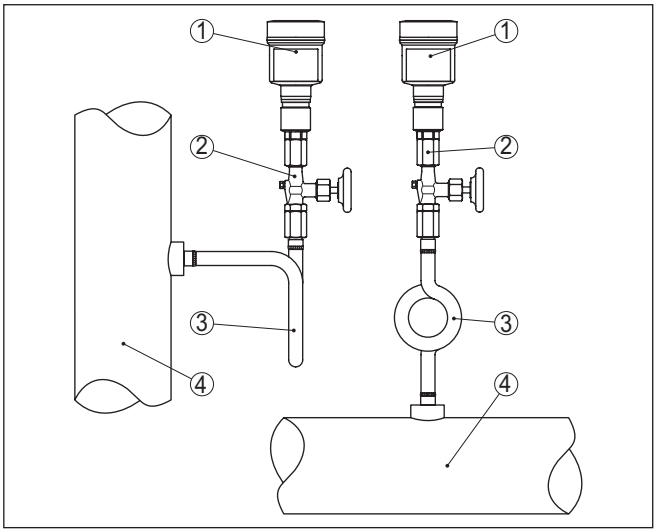



*Fig. 9: Measurement setup for the process pressure measurement of gases in pipelines*

*1 VEGABAR 83*
*2 Blocking valve*
*3 Siphon in U or circular form*
*4 Pipeline*

A protective accumulation of water is formed through condensation in the pipe bends. Even in applications with hot steam, a medium temperature < 100 °C on the transmitter is ensured.

**Measurement setup in liquids**

Keep the following in mind when setting up the measuring system:

- Mount the instrument below the measuring point

The effective pressure line is always filled with liquid and gas bubbles can bubble up to the process line.

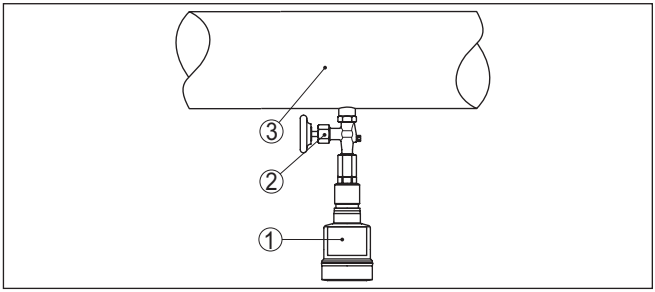



*Fig. 10: Measurement setup for the process pressure measurement of liquids in pipelines*

*1 VEGABAR 83*
*2 Blocking valve*
*3 Pipeline*

## 4.5 Level measurement

**Measurement setup**

Keep the following in mind when setting up the measuring system:

- Mount the instrument below the min. level
- Do not mount the instrument close to the filling stream or emptying area
- Mount the instrument so that it is protected against pressure shocks from the stirrer

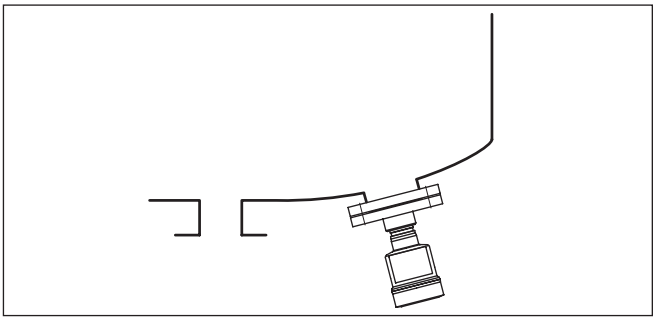


*Fig. 11: Measurement setup for the level measurement*

# 5 Connecting to power supply

## 5.1 Connection of the battery charger

We recommended charging the integrated accumulator completely before setting up the instrument. You can find the charging time in chapter " *Technical data*".

The battery charger is plugged into a socket in the supply room, see chapter " *Wiring plan*".

The LEDs in the supply room show the charging process and condition of the accumulator, see chapter " *Wiring plan*".

## 5.2 Wiring plan

**Overview**

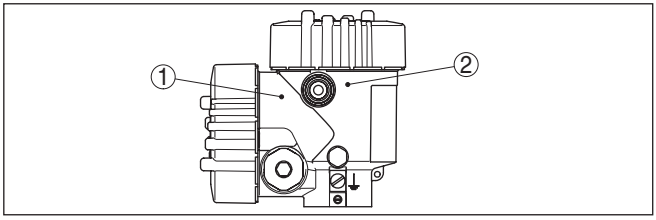



*Fig. 12: Position of the power supply and electronics compartment*

*1 Supply room (accumulator)*
*2 Electronics compartment*

**Electronics compartment**

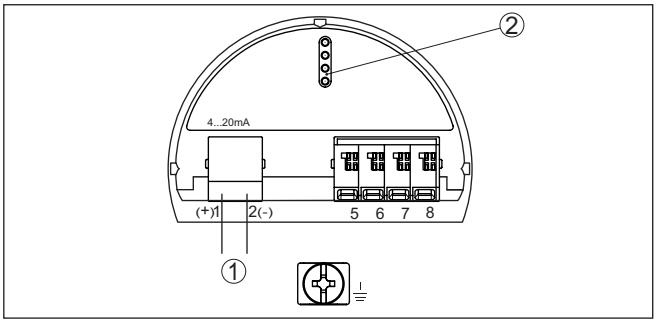



*Fig. 13: Electronics compartment - double chamber housing*

*1 Internal connection to the connection compartment*
*2 Contact pins for the display and adjustment module*

**Supply room**

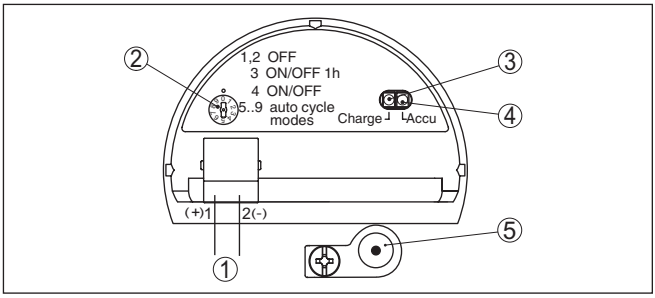



*Fig. 14: Supply room*

*1 Internal connection of the socket for the battery charger*
*2 Mode switch*
*3 LED green, charging process*
*4 LED yellow, charging status*
*5 Socket for the battery charger*

The mode switch enables the selection of the following modes:

- 0 = sensor off, LEDs show the accumulator status
- 1, 2 = sensor off, LEDs off
- 3 = sensor on for 1 hour after pressing a key (delivery status)
- 4 = sensor permanently on, switching on/off via button
- 5 = sensor is switched on every 30 minutes for 3 minutes
- 6 = sensor is switched on every hour for 3 min.
- 7 = sensor is switched on every 6 hours for 3 minutes
- 8 = sensor is switched on every 12 hours for 3 minutes
- 9 = sensor is switched on every 24 hours for 3 minutes

The green LED characterizes the charging process:

- LED flashes = Accumulator is charging
- LED lights = accumulator is full, battery charger should be unplugged (accumulator life time)

After pressing the key or changing the mode the yellow LED shows the accumulator status for approximately 10 s as follows:

- LED lights = accumulator is full
- LED flashes = accumulator should be charged
- LED off = accumulator is empty

## 5.3 Switch-on phase

The instrument is switched on and off by means of a button outside on the housing.

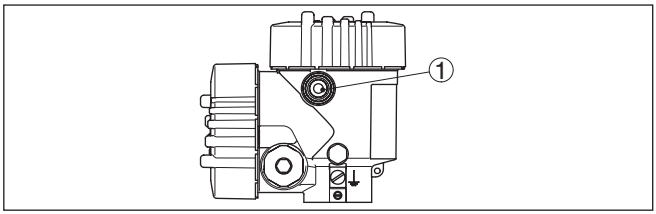



*Fig. 15: Switch on/off button outside on the housing*

*1 On/Off button*

After switching on, the instrument carries out a self-check for approximately 30 s:

- Internal check of the electronics
- Indication of a status message, e.g. " *F 105 Determine measured value*" on the display

Then the actual measured value is output to the signal cable. The value takes into account settings that have already been carried out, e.g. default setting.

# 6 Set up with the display and adjustment module

## 6.1 Insert display and adjustment module

The display and adjustment module can be inserted into the sensor and removed again at any time. You can choose any one of four different positions - each displaced by 90°. It is not necessary to interrupt the power supply.

Proceed as follows:

1. Unscrew the housing lid
2. Place the display and adjustment module on the electronics in the desired position and turn it to the right until it snaps in.
3. 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. 16: Insertion of the 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.

## 6.2 Adjustment system

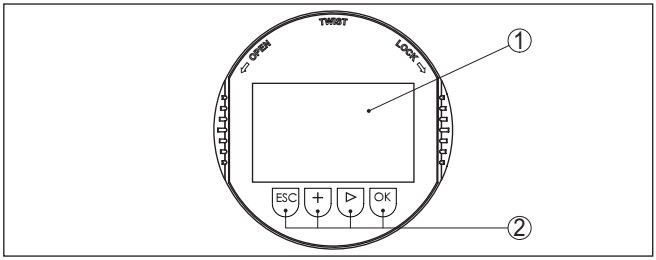



*Fig. 17: Display and adjustment elements*

*1 LC display*
*2 Adjustment keys*

**Key functions**

- ***[OK]*** key:
  - Move to the menu overview
  - Confirm selected menu
  - Edit parameter
  - Save value
- ***[->]*** key:
  - Change measured value presentation
  - Select list entry
  - Select menu items
  - 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.

**Adjustment system - keys via magnetic pen**

With the Bluetooth version of the display and adjustment module you can also adjust the instrument with the magnetic pen. The pen operates the four keys of the display and adjustment module right through the closed lid (with inspection window) of the sensor housing.

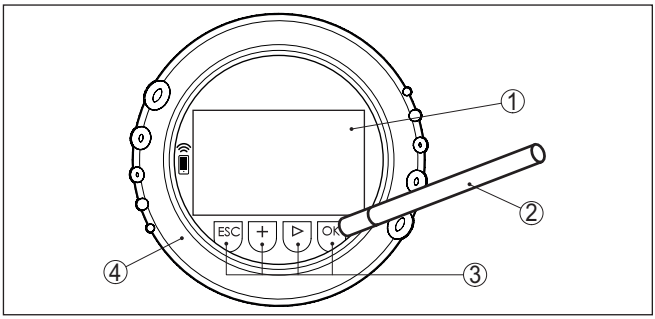



*Fig. 18: Display and adjustment elements - with adjustment via magnetic pen*

*1 LC display*
*2 Magnetic pen*
*3 Adjustment keys*
*4 Lid with inspection window*

**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.

## 6.3 Measured value indication

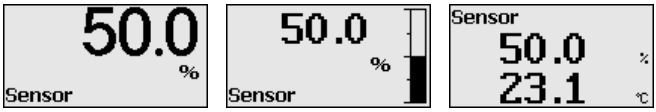
**Measured value indication**

With the ***[->]*** key you can move between three different indication modes.

In the first view, the selected measured value is displayed in large digits.

In the second view, the selected measured value and a respective bargraph presentation are displayed.

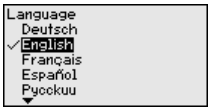
In the third view, the selected measured value as well as a second selectable value, e.g. the temperature, are displayed.




With the " ***OK***" key you move (during the initial setup of the instrument) to the selection menu " *Language*".

**Selection language**

In this menu item, you can select the national language for further parameterization.

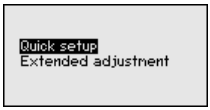



With the " ***[->]***" button, you can select the requested language, with " ***OK***" you confirm the selection and move to the main menu.

You can change your selection afterwards with the menu item " *Setup - Display, Menu language*".

## 6.4 Parameter adjustment - Quick setup

To quickly and easily adapt the sensor to the application, select the menu item " *Quick setup*" in the start graphic on the display and adjustment module.




Select the individual steps with the ***[->]*** key.

After the last step, " *Quick setup terminated successfully*" is displayed briefly.

The return to the measured value indication is carried out through the ***[->]*** or ***[ESC]*** keys or automatically after 3 s

**Note:**
You can find a description of the individual steps in the quick setup guide of the sensor.

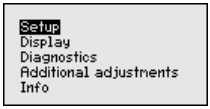
You can find " *Extended adjustment*" in the next sub-chapter.

## 6.5 Parameter adjustment - Extended adjustment

For technically demanding measuring points, you can carry out extended settings in " *Extended adjustment*".


**Main menu**

The main menu is divided into five sections with the following functions:




**Setup:** Settings e. g. for measurement loop name, application, units, position correction, adjustment, signal output, disable/enable operation

**Display:** Settings, e.g., for language, measured value display, lighting

**Diagnosis:** Information, for example, of device status, peak value, simulation

**Additional adjustments:** date/time, reset, copy function

**Info:** Instrument name, hardware and software version, calibration date, sensor features

**Note:**
For optimum setting of the measuring point, the individual submenu items in the main menu item "*Setup*" should be selected one after the other and provided with the correct parameters. If possible, go through the items in the given sequence.

The submenu points are described below.

### 6.5.1 Setup

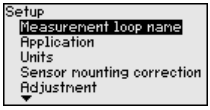
**Measurement loop name**

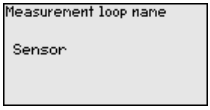
In the menu item "*Sensor TAG*" you edit a twelve-digit measurement loop designation.

You can enter an unambiguous designation for 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 must be entered for exact identification of individual measuring points.

The available digits include:

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



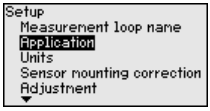

**Application**

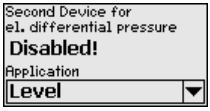
In this menu item you activate/deactivate the Secondary Device for electronic differential pressure and select the application.

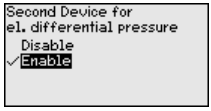
VEGABAR 83 can be used for process pressure and level measurement. The setting in the delivery status is process pressure measurement. The mode can be changed in this adjustment menu.

If you have connected **no** Secondary Device, you confirm this with "*Deactivate*".

Depending on the selected application, different subchapters in the following adjustment steps are important. There you can find the individual adjustment steps.



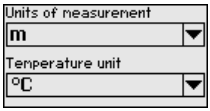




Enter the requested parameters via the appropriate keys, save your settings with ***[OK]*** and jump to the next menu item with the ***[ESC]*** and the ***[->]*** key.

**Units**

In this menu item, the adjustment units of the instrument are determined. The selection determines the unit displayed in the menu items " *Min. adjustment (Zero)*" and " *Max. adjustment (Span)*".

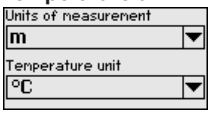
**Unit of measurement:**




If the level should be adjusted in a height unit, the density of the medium must also be entered later during the adjustment.

In addition, the temperature unit of the instrument is specified. The selection determines the unit displayed in menu items " *Peak value, temperature*" and "in the variables of the digital output signal".

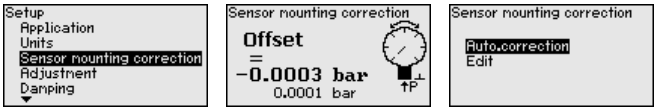
**Temperature unit:**




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

**Position correction**

Especially with chemical seal systems, the installation position of the instrument can shift (offset) the measured value. Position correction compensates this offset. In the process, the actual measured value is taken over automatically. With relative pressure measuring cells a manual offset can also be carried out.




**Note:**
If the current measured value is automatically accepted, it must not be falsified by medium coverage or static pressure.

With the manual position correction, the offset value can be determined by the user. Select for this purpose the function " *Edit*" and enter the requested value.

Save your settings with ***[OK]*** and move with ***[ESC]*** and ***[->]*** to the next menu item.

After the position correction is carried out, the actual measured value is corrected to 0. The corrective value appears with an inverse sign as offset value in the display.

The position correction can be repeated as often as necessary. However, if the sum of the corrective values exceeds 20 % of the nominal measuring range, then no position correction is possible.

**Adjustment**

VEGABAR 83 always measures pressure independently of the process variable selected in the menu item " *Application*". To output the

selected process variable correctly, an allocation of the output signal to 0 % and 100 % must be carried out (adjustment).

With the application " *Level*", the hydrostatic pressure, e.g. with full and empty vessel, is entered for adjustment. See following example:

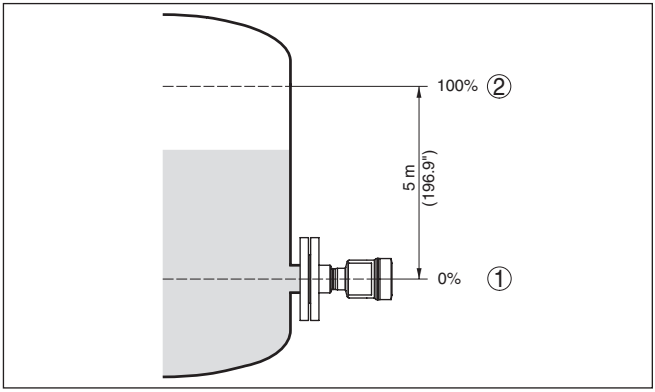



*Fig. 19: Parameter adjustment example Min./max. adjustment, level measurement*

*1 Min. level = 0 % corresponds to 0.0 mbar*
*2 Max. level = 100 % corresponds to 490.5 mbar*

If these values are not known, an adjustment with filling levels of e.g. 10 % and 90 % is also possible. By means of these settings, the real filling height is then calculated.

The actual product level during this adjustment is not important, because the min./max. adjustment is always carried out without changing the product level. These settings can be made ahead of time without the instrument having to be installed.

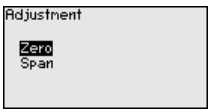
**Note:**
If the adjustment ranges are exceeded, the entered value will not be accepted. Editing can be interrupted with ***[ESC]*** or corrected to a value within the adjustment ranges.

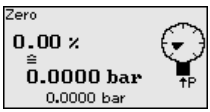
For the other process variables such as e.g. process pressure, differential pressure or flow, the adjustment is performed in like manner.

**Zero adjustment**

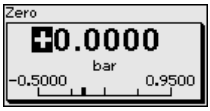
Proceed as follows:

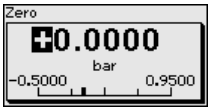
1. Select the menu item " *Setup*" with ***[->]*** and confirm with ***[OK]***. Now select with ***[->]*** the menu item " *Zero adjustment*" and confirm with ***[OK]***.




2. Edit the mbar value with ***[OK]*** and set the cursor to the requested position with ***[->]***.






3. Set the requested mbar value with ***[+]*** and store with ***[OK]***.
4. Go with ***[ESC]*** and ***[->]*** to the span adjustment

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.

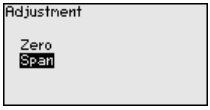
For an adjustment with pressure, simply enter the actual measured value indicated at the bottom of the display.

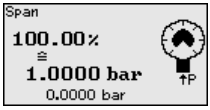
If the adjustment ranges are exceeded, the message " *Outside parameter limits*" appears. The editing procedure can be aborted with ***[ESC]*** or the displayed limit value can be accepted with ***[OK]***.

**Span adjustment**

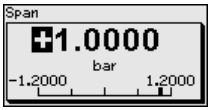
Proceed as follows:

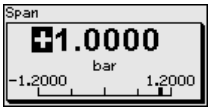
1. Select with ***[->]*** the menu item Span adjustment and confirm with ***[OK]***.






2. Edit the mbar value with ***[OK]*** and set the cursor to the requested position with ***[->]***.






3. Set the requested mbar value with ***[+]*** and store with ***[OK]***.

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

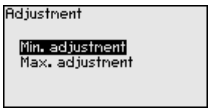
If the adjustment ranges are exceeded, the message " *Outside parameter limits*" appears. The editing procedure can be aborted with ***[ESC]*** or the displayed limit value can be accepted with ***[OK]***.

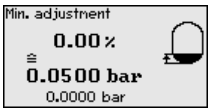
The span adjustment is finished.

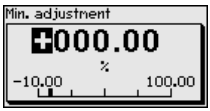
**Min. adjustment - Level**

Proceed as follows:

1. Select the menu item " *Setup*" with ***[->]*** and confirm with ***[OK]***. Now select with ***[->]*** the menu item " *Adjustment*", then " *Min. adjustment*" and confirm with ***[OK]***.







2. Edit the percentage value with ***[OK]*** and set the cursor to the requested position with ***[->]***.
3. Set the requested percentage value (e.g. 10 %) with ***[+]*** and save with ***[OK]***. The cursor jumps now to the pressure value.
4. Enter the pressure value corresponding to the min. level (e.g. 0 mbar).
5. Save settings with ***[OK]*** and move with ***[ESC]*** and ***[->]*** to the max. adjustment.

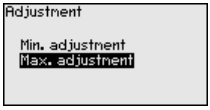
The min. adjustment is finished.

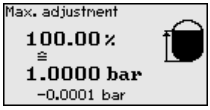
For an adjustment with filling, simply enter the actual measured value indicated at the bottom of the display.

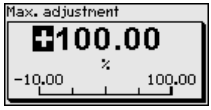
**Max. adjustment - Level**

Proceed as follows:

1. Select with ***[->]*** the menu item Max. adjustment and confirm with ***[OK]***.




2. Edit the percentage value with ***[OK]*** and set the cursor to the requested position with ***[->]***.
3. Set the requested percentage value (e.g. 90 %) with ***[+]*** and save with ***[OK]***. The cursor jumps now to the pressure value.
4. Enter the pressure value for the full vessel (e.g. 900 mbar) corresponding to the percentage value.
5. Save settings with ***[OK]***

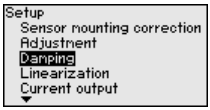
The max. adjustment is finished.

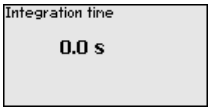
For an adjustment with filling, simply enter the actual measured value indicated at the bottom of the display.

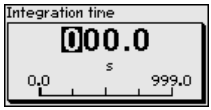
**Damping**

To damp process-dependent measured value fluctuations, set an integration time of 0 … 999 s in this menu item. The increment is 0.1 s.

The set damping is effective for level and process pressure measurement as well as for all applications of electronic differential pressure measurement.



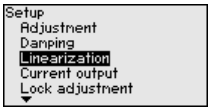



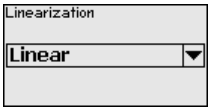



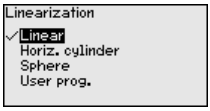

The default setting is a damping of 0 s.

**Linearisation**

A linearization is necessary for all vessels in which the vessel volume does not increase linearly with the level - e.g. a horizontal cylindrical or spherical tank - and the indication or output of the volume is required. Corresponding linearization curves are preprogrammed for these vessels. They represent the correlation between the level percentage and vessel volume. The linearization applies to the measured value indication and the current output.




With flow measurement and selection " *Linear*" display and output (percentage/current) are linear to " **Differential pressure**". This can be used, for example, to feed a flow computer.

With flow measurement and selection " *Extraction by root*"display and output (percentage/current) are linear to " **Flow**". [2)]

With flow in two directions (bidirectional) a negative differential pressure is also possible. This must already be taken into account in menu item " *Min. adjustment flow*".

**Caution:**
Note the following, if the respective sensor is used as part of an overfill protection system according to WHG:

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.

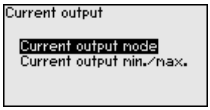
**Current output**

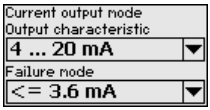
In the menu items " *Current output*" you determine the properties of the current output.

On instruments with integrated additional current output, the properties for each current output are adjusted individually. The following descriptions apply to both current outputs.

**Current output (mode)**

In the menu item " *Current output mode*" you determine the output characteristics and reaction of the current output in case of fault.

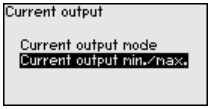


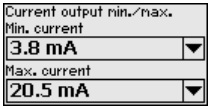




The default setting is output characteristics 4 … 20 mA, fault mode < 3.6 mA.

**Current output (min./max.)**

In the menu item " *Current output Min./Max.*", you determine the reaction of the current output during operation.



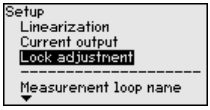

The default setting is min. current 3.8 mA and max. current 20.5 mA.

**Lock/Unlock adjustment**

In the menu item " *Lock/unlock adjustment*" you safeguard the sensor parameters against unauthorized or unintentional modifications.

[2)] The device assumes an approximately constant temperature and static pressure and converts the differential pressure into the flow rate via the characteristic curve extracted by root.

This is done by entering a four-digit PIN.




With active PIN, only the following adjustment functions are possible without entering a PIN:

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

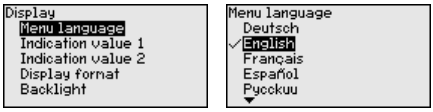
Releasing the sensor adjustment is also possible in any menu item by entering the PIN.

**Caution:**
With active PIN, adjustment via PACTware/DTM and other systems is also blocked.

### 6.5.2 Display

**Language**

This menu item enables the setting of the requested national language.



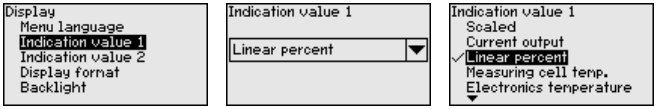

The following languages are available:

- German
- English
- French
- Spanish
- Russian
- Italian
- Dutch
- Portuguese
- Japanese
- Chinese
- Polish
- Czech
- Turkish

In delivery status, the VEGABAR 83 is set to English.

**Display value 1 and 2**

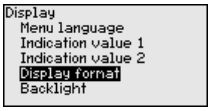
In this menu item, you define which measured value is displayed.

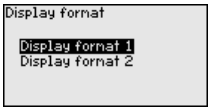



The setting in the delivery status for the display value is "*Lin. percent*".

**Display format 1 and 2**

In this menu item you define the number of decimal positions with which the measured value is displayed.



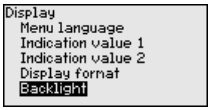





The setting in the delivery status for the display format is " *Automatic*".

**Backlight**

The display and adjustment module has a backlight for the display. In this menu item you can switch on the lighting. You can find the required operating voltage in chapter " *Technical data*".

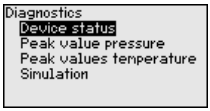


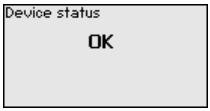


In delivery status, the lighting is switched on.

**Device status**

In this menu item, the device status is displayed.



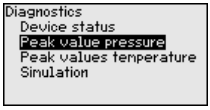

In case of error, e.g. the error code F017, e.g. the error description " *Adjustment span too small*" and a four digit figure are displayed for service purposes. You can find the error codes with description, reason as well as rectification in chapter " *Asset Management*".

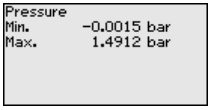
### 6.5.3 Diagnostics

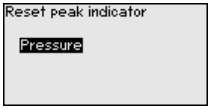
**Peak value, pressure**

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

In another window you can carry out a reset of the peak values separately.



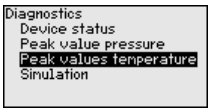



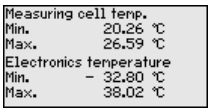



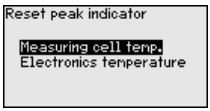

**Peak value, temperature**

The respective min. and max. measured values of the measuring cell and the electronics temperature are stored in the sensor. In menu item " *Peak value, temperature*", both values are displayed.

In another window you can carry out a reset of the two peak values separately.

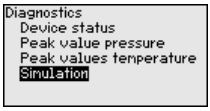


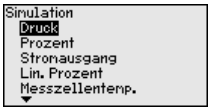



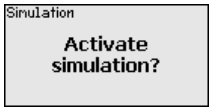



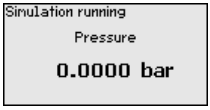

**Simulation**

In this menu item you can simulate measured values. This allows the signal path to be tested, e.g. through downstream indicating instruments or the input card of the control system.

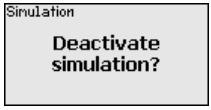







Select the requested simulation variable and set the requested value.

To deactivate the simulation, you have to push the ***[ESC]*** key and confirm the message " *Deactivate simulation*" with the ***[OK]*** key.

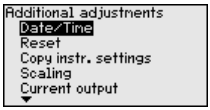
**Caution:**
During simulation, the simulated value is output as 4 … 20 mA current value and with instruments 4 … 20 mA/HART in addition as digital HART signal. The status message within the context of the asset management function is " *Maintenance*".

**Note:**
Without manual deactivation, the sensor terminates the simulation automatically after 60 minutes.

### 6.5.4 Additional adjustments

**Date/Time**

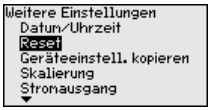
In this menu item, you adjust the internal clock of the sensor. There is no adjustment for summer/winter (daylight saving) time.





**Reset**

After a reset, certain parameter adjustments made by the user are reset.





The following reset functions are available:

**Delivery status:** Restores the parameter settings at the time of shipment from the factory, incl. the order-specific settings. Any user-defined linearisation curve as well as the measured value memory are deleted.

**Basic settings:** Resets the parameter settings, incl. special parameters, to the default values of the respective instrument. Any programmed linearisation curve as well as the measured value memory are deleted.

**Note:**
You can find the default values of the device in chapter " *Menu overview*".

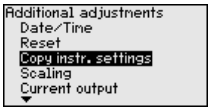
**Copy instrument settings**

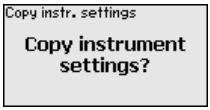
The instrument settings are copied with this function. The following functions are available:

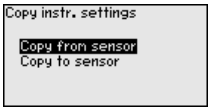
- **Read from sensor:** Read data from sensor and store into the display and adjustment module
- **Write into sensor:** Store data from the display and adjustment module back into the sensor

The following data or settings for adjustment of the display and adjustment module are saved:

- All data of the menu " *Setup*" and " *Display*"
- In the menu " *Additional adjustments*" the items " *Reset, Date/Time*"
- The user-programmable linearization curve



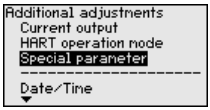

The copied data are permanently saved in an EEPROM memory in the display and adjustment module and remain there even in case of power failure. From there, they can be written into one or more sensors or kept as backup for a possible electronics exchange.

**Note:**
Before the data are saved in the sensor, a safety check is carried out to determine if the data match the sensor. In the process the sensor type of the source data as well as the target sensor are displayed. If the data do not match, a fault message is outputted or the function is blocked. The data are saved only after release.

**Special parameters**

In this menu item you gain access to the protected area where you can enter special parameters. In exceptional cases, individual parameters can be modified in order to adapt the sensor to special requirements.

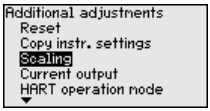
Change the settings of the special parameters only after having contacted our service staff.

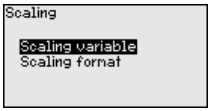


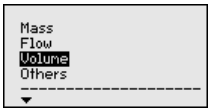


**Scaling (1)**

In menu item " *Scaling*" you define the scaling variable and the scaling unit for the level value on the display, e.g. volume in l.

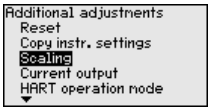


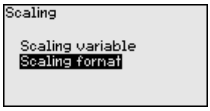



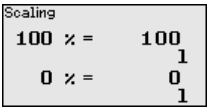




**Scaling (2)**

In menu item " *Scaling (2)*" you define the scaling format on the display and the scaling of the measured level value for 0 % and 100 %.

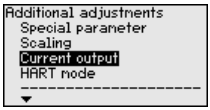


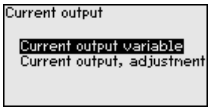



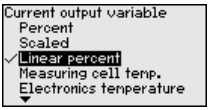




**Current output (meas. variable)**

In menu item " *Current output, variable*" you specify which measured variable is output via the current output.

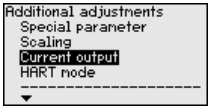


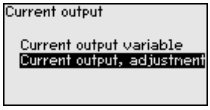



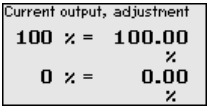




**Current output (adjustment)**

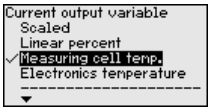
Depending on the selected measured variable, you assign in the menu item " *Current output, adjustment*" the measured values that 4 mA (0 %) and 20 mA (100 %) of the current output refer to.

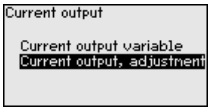


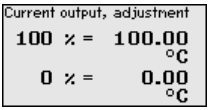




If the measuring cell temperature is selected as measured variable, then e.g. 0 °C refers to 4 mA and 100 °C to 20 mA.



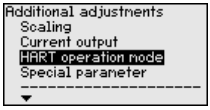

**HART mode**

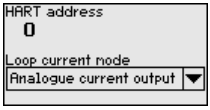
The sensor offers the HART modes " *Analogue current output*" and " *Fix current (4 mA)*". In this menu item you determine the HART mode and enter the address with Multidrop mode.

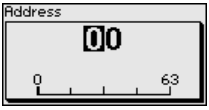
In the mode " *Fixed current output*" up to 63 sensors can be operated on one two-wire cable (Multidrop operation). An address between 0 and 63 must be assigned to each sensor.

If you select the function " *Analogue current output*" and also enter an address number, you can output a 4 … 20 mA signal in Multidrop mode.

In the mode " *Fixed current (4 mA)*" a fixed 4 mA signal is output independently of the actual level.



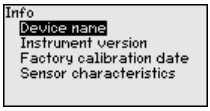




The setting in the delivery status is " *Analogue current output*" and the address 00.

### 6.5.5 Info

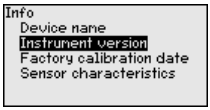
**Device name**

In this menu item, you can read out the instrument name and the instrument serial number:



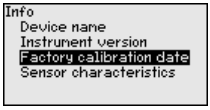

**Instrument version**

In this menu item, the hardware and software version of the sensor is displayed.



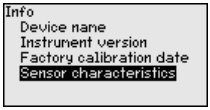

**Factory calibration date**

In this menu item, the date of factory calibration of the sensor as well as the date of the last change of sensor parameters are displayed via the display and adjustment module or via the PC.




**Sensor characteristics**

In this menu item, the features of the sensor such as approval, process fitting, seal, measuring range, electronics, housing and others are displayed.




## 6.6 Menu overview

The following tables show the adjustment menu of the instrument. Depending on the instrument version or application, all menu items may not be available or some may be differently assigned.

**Setup**

| Menu item | Parameter | Default value |
|---|---|---|
| Measurement loop name | | Sensor |
| Application | Application | Level |
| | Secondary sensor for electronic differential pressure | Deactivated |
| Units | Unit of measurement | mbar (with nominal measuring range ≤ 400 mbar)<br>bar (with nominal measuring ranges ≥ 1 bar) |
| | Temperature unit | °C |
| Position correction | | 0.00 bar |

| Menu item | Parameter | Default value |
|---|---|---|
| Adjustment | Zero/Min. adjustment | 0.00 bar<br>0.00 % |
| | Span/Max. adjustment | Nominal measuring range in bar<br>100.00 % |
| Damping | Integration time | 1 s |
| Lock adjustment | Blocked, released | Released |

### Display

| Menu item | Default value |
|---|---|
| Menu language | Selected language |
| Displayed value 1 | Current output in % |
| Displayed value 2 | Ceramic measuring cell: Measuring cell temperature in °C<br>Metallic measuring cell: Electronics temperature in °C |
| Display format | Number of positions after the decimal point, automatically |
| Backlight | Switched on |

### Diagnostics

| Menu item | Parameter | Default value |
|---|---|---|
| Device status | | - |
| Peak value | Pressure | Current pressure measured value |
| Pointer function temp. | Temperature | Actual measuring cell and electronic temperature |
| Simulation | | Process pressure |

### Additional adjustments

| Menu item | Parameter | Default value |
|---|---|---|
| Date/Time | | Actual date/Actual time |
| Reset | Delivery status, basic settings | |
| Copy instrument settings | Read from sensor, write into sensor | |
| Scaling | Scaling size | Volume in l |
| | Scaling format | 0 % corresponds to 0 l<br>100 % corresponds to 0 l |
| Special parameters | Service-Login | No reset |

### Info

| Menu item | Parameter |
|---|---|
| Device name | VEGABAR 83 |
| Instrument version | Hardware and software version |

| Menu item | Parameter |
|---|---|
| Factory calibration date | Date |
| Sensor characteristics | Order-specific characteristics |

## 6.7 Save parameter adjustment data

**On paper**

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.

**In the display and adjustment module**

If the instrument is equipped with a display and adjustment module, the parameter adjustment data can be saved therein. The procedure is described in menu item " *Copy device settings*".

# 7 Setup with PACTware

## 7.1 Connect the PC

**Via the interface adapter directly on the sensor**

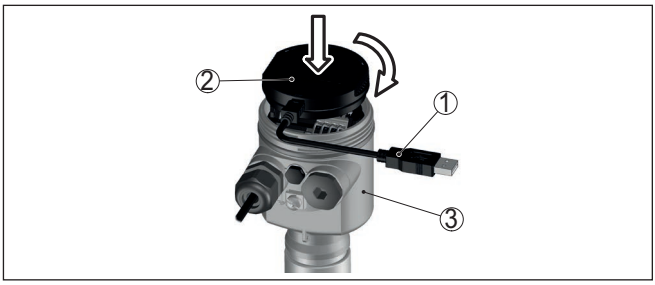



*Fig. 20: Connection of the PC directly to the sensor via the interface adapter*

*1 USB cable to the PC*
*2 Interface adapter VEGACONNECT*
*3 Sensor*

## 7.2 Parameterization

**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.

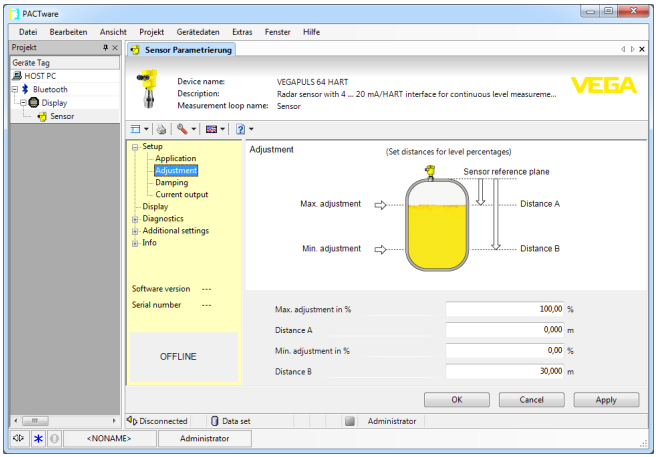



*Fig. 21: Example of a DTM view*

**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 and " *Software*". The full version is available on CD from the agency serving you.

## 7.3 Save parameter adjustment data

We recommend documenting or saving the parameterisation data via PACTware. That way the data are available for multiple use or service purposes.

# 8 Set up with other systems

## 8.1 DD adjustment programs

Device descriptions as Enhanced Device Description (EDD) are available for DD adjustment programs such as, for example, AMS™ and PDM.

The files can be downloaded at www.vega.com/downloads under "*Software*".

## 8.2 Field Communicator 375, 475

Device descriptions for the instrument are available as EDD for parameterisation with Field Communicator 375 or 475.

Integrating the EDD into the Field Communicator 375 or 475 requires the "Easy Upgrade Utility" software, which is available from the manufacturer. This software is updated via the Internet and new EDDs are automatically accepted into the device catalogue of this software after they are released by the manufacturer. They can then be transferred to a Field Communicator.

# 9 Diagnosis, asset management and service

## 9.1 Maintenance

**Maintenance**

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

**Precaution measures against buildup**

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

**Cleaning**

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

Take note of the following:

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

## 9.2 Diagnosis memory

The instrument has several memories available for diagnostic purposes. The data remain there even in case of voltage interruption.

**Measured value memory**

Up to 100,000 measured values can be stored in the sensor in a ring memory. Each entry contains date/time as well as the respective measured value.

Depending on the instrument version, values that can be stored are for example:

- Level
- Process pressure
- Differential pressure
- Static pressure
- Percentage value
- Scaled values
- Current output
- Lin. percent
- Measuring cell temperature
- Electronics temperature

When the instrument is shipped, the measured value memory is active and stores pressure value and measuring cell temperature every 10 s, with electronic differential pressure also the static pressure.

The requested values and recording conditions are set via a PC with PACTware/DTM or the control system with EDD. Data are thus read out and also reset.

**Event memory**

Up to 500 events are automatically stored with a time stamp in the sensor (non-deletable). Each entry contains date/time, event type, event description and value.

Event types are for example:

- Modification of a parameter
- Switch-on and switch-off times
- Status messages (according to NE 107)
- Error messages (according to NE 107)

The data are read out via a PC with PACTware/DTM or the control system with EDD.

## 9.3 Asset Management function

The instrument features self-monitoring and diagnostics according to NE 107 and VDI/VDE 2650. In addition to the status messages in the following tables there are more detailed error messages available under the menu item " *Diagnostics*" via the respective adjustment module.

**Status messages**

The status messages are divided into the following categories:

- Failure
- Function check
- Out of specification
- Maintenance required

and explained by pictographs:

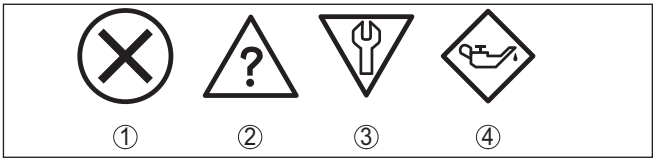



*Fig. 22: Pictographs of the status messages*

*1 Failure - red*
*2 Out of specification - yellow*
*3 Function check - orange*
*4 Maintenance required - blue*

**Malfunction (Failure):**
Due to a malfunction in the instrument, a fault signal is output.

This status message is always active. It cannot be deactivated by the user.

**Function check:**
The instrument is being worked on, the measured value is temporarily invalid (for example during simulation).

This status message is inactive by default.

**Out of specification:**
The measured value is unreliable because an instrument specification was exceeded (e.g. electronics temperature).

This status message is inactive by default.

**Maintenance required:**
Due to external influences, the instrument function is limited. The measurement is affected, but the measured value is still valid. Plan in

maintenance for the instrument because a failure is expected in the near future (e.g. due to buildup).

This status message is inactive by default.

### Failure

| Code<br>Text message | Cause | Rectification | DevSpec<br>State in CMD 48 |
|---|---|---|---|
| F013<br>No valid measured value available | Gauge pressure or low pressure<br>Measuring cell defective | Exchange measuring cell<br>Send instrument for repair | Byte 5, Bit 0 of Byte 0 … 5 |
| F017<br>Adjustment span too small | Adjustment not within specification | Change the adjustment according to the limit values | Byte 5, Bit 1 of Byte 0 … 5 |
| F025<br>Error in the linearization table | Index markers are not continuously rising, for example illogical value pairs | Check linearization table<br>Delete table/Create new | Byte 5, Bit 2 of Byte 0 … 5 |
| F036<br>no operable sensor software | Failed or interrupted software update | Repeat software update<br>Check electronics version<br>Exchanging the electronics<br>Send instrument for repair | Byte 5, Bit 3 of Byte 0 … 5 |
| F040<br>Error in the electronics | Hardware defect | Exchanging the electronics<br>Send instrument for repair | Byte 5, Bit 4 of Byte 0 … 5 |
| F041<br>Communication error | No connection to the sensor electronics | Check connection between sensor and main electronics (with separate version) | - |
| F042<br>Communication error Secondary sensor | No connection to the Secondary sensor | Check connection between Primary and Secondary sensor | - |
| F080<br>General software error | General software error | Disconnect operating voltage briefly | Byte 5, Bit 5 of Byte 0 … 5 |
| F105<br>Measured value is determined | The instrument is still in the switch-on phase, the measured value could not yet be determined | Wait for the end of the switch-on phase | Byte 5, Bit 6 of Byte 0 … 5 |
| F113<br>Communication error | Error in the internal instrument communication | Disconnect operating voltage briefly<br>Send instrument for repair | Byte 4, Bit 4 of Byte 0 … 5 |
| F260<br>Error in the calibration | Error in the calibration carried out in the factory<br>Error in the EEPROM | Exchanging the electronics<br>Send instrument for repair | Byte 4, Bit 0 of Byte 0 … 5 |
| F261<br>Error in the instrument settings | Error during setup<br>Error when carrying out a reset | Repeat setup<br>Repeat reset | Byte 4, Bit 1 of Byte 0 … 5 |

| Code<br>Text message | Cause | Rectification | DevSpec<br>State in CMD 48 |
|---|---|---|---|
| F264<br>Installation/Setup error | Inconsistent settings (e.g.: distance, adjustment units with application process pressure) for selected application<br>Invalid sensor configuration (e.g.: application electronic differential pressure with connected differential pressure measuring cell) | Modify settings<br>Modify connected sensor configuration or application | Byte 4, Bit 2 of Byte 0 … 5 |
| F265<br>Measurement function disturbed | Sensor no longer carries out a measurement | Carry out a reset<br>Disconnect operating voltage briefly | Byte 4, Bit 3 of Byte 0 … 5 |

### Function check

| Code<br>Text message | Cause | Rectification | DevSpec<br>State in CMD 48 |
|---|---|---|---|
| C700<br>Simulation active | A simulation is active | Finish simulation<br>Wait for the automatic end after 60 mins. | "Simulation Active" in "Standardized Status 0" |

*Tab. 7: Error codes and text messages, information on causes as well as corrective measures*

### Out of specification

| Code<br>Text message | Cause | Rectification | DevSpec<br>State in CMD 48 |
|---|---|---|---|
| S600<br>Impermissible electronics temperature | Temperature of the electronics in the non-specified range | Check ambient temperature<br>Insulate electronics | Byte 23, Bit 0 of Byte 14 … 24 |
| S603<br>Impermissible operating voltage | Operating voltage below specified range | Check electrical connection<br>If necessary, increase operating voltage | - |
| S605<br>Impermissible pressure value | Measured process pressure below or above the adjustment range | Check nominal measuring range of the instrument<br>If necessary, use an instrument with a higher measuring range | - |

### Maintenance

| Code<br>Text message | Cause | Rectification | DevSpec<br>State in CMD 48 |
|---|---|---|---|
| M500<br>Error in the delivery status | The data could not be restored during the reset to delivery status | Repeat reset<br>Load XML file with sensor data into the sensor | Bit 0 of Byte 14 … 24 |
| M501<br>Error in the non-active linearisation table | Index markers are not continuously rising, for example illogical value pairs | Check linearization table<br>Delete table/Create new | Bit 1 of Byte 14 … 24 |

| Code<br>Text message | Cause | Rectification | DevSpec<br>State in CMD 48 |
|---|---|---|---|
| M502<br>Error in the event memory | Hardware error EEPROM | Exchanging the electronics<br>Send instrument for repair | Bit 2 of<br>Byte 14 … 24 |
| M504<br>Error at a device interface | Hardware defect | Exchanging the electronics<br>Send instrument for repair | Bit 3 of<br>Byte 14 … 24 |
| M507<br>Error in the instrument settings | Error during setup<br>Error when carrying out a reset | Carry out reset and repeat setup | Bit 4 of<br>Byte 14 … 24 |

## 9.4 Rectify faults

**Reaction when malfunction occurs**

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

**Fault rectification**

The first measures are:

- Evaluation of fault messages
- Checking the output signal
- Treatment of measurement errors

A smartphone/tablet with the adjustment app or a PC/notebook with the software PACTware and the suitable DTM offer you further comprehensive diagnostic possibilities. In many cases, the causes can be determined in this way and the faults eliminated.

**4 … 20 mA signal**

Connect a multimeter in the suitable measuring range according to the wiring plan. The following table describes possible errors in the current signal and helps to eliminate them:

| Error | Cause | Rectification |
|---|---|---|
| 4 … 20 mA signal not stable | Fluctuating measured value | Set damping |
| 4 … 20 mA signal missing | Electrical connection faulty | Check connection, correct, if necessary |
| | Voltage supply missing | Check cables for breaks; repair if necessary |
| | Operating voltage too low, load resistance too high | Check, adapt if necessary |
| Current signal greater than 22 mA, less than 3.6 mA | Sensor electronics defective | Replace device or send in for repair depending on device version |

**Reaction after fault rectification**

Depending on the reason for the fault and the measures taken, the steps described in chapter "*Setup*" must be carried out again or must be checked for plausibility and completeness.

**24 hour service hotline**

Should these measures not be successful, please call in urgent cases the VEGA service hotline under the phone no. **+49 1805 858550**.

The hotline is also available outside normal working hours, seven days a week around the clock.

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

## 9.5 Exchanging the electronics module

In case of a defect, the user can replace the electronics module with another one of identical type.

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

You can find detailed information you need to carry out an electronics exchange in the handbook of the electronics module.

## 9.6 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.

You can find information about the installation in the download file.

**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.

## 9.7 How to proceed if a repair is necessary

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

Proceed as follows in case of repair:

- Print and fill out one form per instrument
- Clean the instrument and pack it damage-proof
- Attach the completed form and, if need be, also a safety data sheet outside on the packaging
- Ask the agency serving you to get the address for the return shipment. You can find the agency on our homepage.

# 10 Dismount

## 10.1 Dismounting steps

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

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

## 10.2 Disposal

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

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

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

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

**Battery/accumulator recycling**

**Note:**
The disposal is subject to the EU directive on batteries and accumulators.

Batteries and accumulators contain some environmentally harmful but also some valuable raw materials that can be recycled. For that reason batteries and accumulators must not be disposed of in household waste.

All users are legally obligated to bring spent batteries to a suitable collection point, e.g. public collection points. You can also return the batteries and accumulators to us for correct disposal. Due to the very strict transport regulations for lithium-based batteries/accumulators, this is normally not a good idea because shipment is very expensive.

Proceed as follows to dismount the accumulator:

- Unscrew the cover of the supply room
- Loosen the plug connector
- Loosen the fixing screws
- Pull out the complete insert by means of the plastic strap

# 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**

**Materials, wetted (piezoresistive/strain gauge measuring cell)**

| | |
|---|---|
| Process fitting | 316L, Alloy C276 (2.4819) |
| Diaphragm | |
| – Front-flush | 316L, Alloy C276 (2.4819) [3] |
| – Set back (measuring ranges up to and including 40 bar, from 1600 bar) | 316L |
| – Set back (measuring ranges from 100 bar up to and including 1000 bar) | Elgiloy (2.4711) |
| Seal ring, O-ring | FKM (VP2/A), EPDM (A+P 70.10-02), FFKM (Perlast G74S), FEPM (Fluoraz SD890) |
| Seal for process fitting (in the scope of delivery) | |
| – Thread G½ (EN 837), G1½ (DIN 3852-A) | Aramid/NBR |

**Materials, wetted (ceramic/metallic measuring cell)**

| | |
|---|---|
| Process fitting | 316L |
| Diaphragm | Alloy C276 (2.4819), gold-coated 20 µ, gold/rhodium-coated 5 µ/1 µ [4] |
| Seal for process fitting (in the scope of delivery) | |
| – Thread G1½ (DIN 3852-A) | Klingersil C-4400 |
| – Thread M44 x 1.25 (DIN 13) | FKM, FFKM, EPDM |
| Surface quality, hygienic process fittings, typ. | $R_a$ < 0.8 µm |

**Materials, non-wetted parts**

| | |
|---|---|
| Isolating liquid ceramic/metallic measuring cell | KN 92 medical white oil (FDA conform) |
| Internal isolating liquid piezoresistive measuring cell | Synthetic oil KN 77, Neobee M 20 KN 59 (FDA conform), Halocarbon oil 6.3 KN 21 [5] [6] |

[3] Alloy C276 (2.4819) with process fitting of Alloy C276 (2.4819)
[4] Not on instruments with SIL qualification.
[5] Isolating liquid with measuring ranges up to 40 bar. With measuring ranges from 100 bar dry measuring cell.
[6] Halocarbon oil: Generally in oxygen applications, not with vacuum measuring ranges, not with absolute measuring ranges < 1 $bar_{abs}$.

| | |
|---|---|
| Housing | |
| – Housing | Plastic PBT (Polyester), Aluminium AlSi10Mg (powder-coated, basis: Polyester), 316L |
| – Cable gland | PA, stainless steel, brass |
| – Cable gland: Seal, closure | NBR, PA |
| – Seal, housing lid | Silicone SI 850 R, NBR silicone-free |
| – Inspection window housing cover | Polycarbonate (UL-746-C listed), glass [7] |
| – Ground terminal | 316L |
| External housing - deviating materials | |
| – Housing and socket | Plastic PBT (Polyester), 316L |
| – Socket seal | EPDM |
| – Seal below wall mounting plate [8] | EPDM |
| – Inspection window housing cover | Polycarbonate (UL-746-C listed) |
| Ground terminal | 316Ti/316L |
| Connection cable with IP68 (25 bar) version [9] | |
| – Cable cover | PE, PUR |
| – Type label support on cable | PE hard |
| Connection cable with IP68 (1 bar) version [10] | PE, PUR |

**Weights**

| | |
|---|---|
| Total weight VEGABAR 83 | approx. 0.8 … 8 kg (1.764 … 17.64 lbs), depending on process fitting and housing |

**Torques**

| | |
|---|---|
| Max. torque, metric process fittings | |
| – G¼, G½ | 50 Nm (36.88 lbf ft) |
| – G½ front-flush, G1 front-flush | 40 Nm (29.50 lbf ft) |
| – G1½ front-flush (piezoresistive measuring cell) | 40 Nm (29.50 lbf ft) |
| – G1½ front-flush (ceramic/metallic measuring cell) | 200 Nm (147.5 lbf ft) |
| Max. torque, non-metric process fittings | |
| – ½ NPT, inside ¼ NPT ≤ 40 bar/500 psig | 50 Nm (36.88 lbf ft) |
| – ½ NPT, inside ¼ NPT > 40 bar/500 psig | 200 Nm (147.5 lbf ft) |
| – 7/16 NPT for tube ¼" | 40 Nm (29.50 lbf ft) |
| – 9/16 NPT for tube 3/8" | 50 Nm (36.88 lbf ft) |

[7] Glass with Aluminium and stainless steel precision casting housing
[8] Only for 316L with 3A approval
[9] Between transmitter and external electronics housing.
[10] Fix connected to the sensor.

Max. torque for NPT cable glands and Conduit tubes

- Plastic housing 10 Nm (7.376 lbf ft)
- Aluminium/Stainless steel housing 50 Nm (36.88 lbf ft)

## Input variable - Piezoresistive/Strain gauge measuring cell

The specifications are only an overview and refer to the measuring cell. Limitations due to the material and version of the process fitting as well as the selected pressure type are possible. The specifications on the nameplate apply. [11)]

### Nominal measuring ranges and overload capability in bar/kPa

| Nominal range | Overload capability | |
|---|---|---|
| | Maximum pressure | Minimum pressure |
| Gauge pressure | | |
| 0 … +0.4 bar/0 … +40 kPa | +1.2 bar/+120 kPa | -1 bar/-100 kPa |
| 0 … +1 bar/0 … +100 kPa | +3 bar/+300 kPa | -1 bar/-100 kPa |
| 0 … +2.5 bar/0 … +250 kPa | +7.5 bar/+750 kPa | -1 bar/-100 kPa |
| 0 … +10 bar/0 … +1000 kPa | +30 bar/+3000 kPa | -1 bar/-100 kPa |
| 0 … +25 bar/0 … +2500 kPa | +75 bar/+7500 kPa | -1 bar/-100 kPa |
| 0 … +40 bar/0 … +4000 kPa | +120 bar/+12 MPa | -1 bar/-100 kPa |
| 0 … +100 bar/0 … +10 MPa | +200 bar/+20 MPa | -1 bar/-100 kPa |
| 0 … +250 bar/0 … +25 MPa | +500 bar/+50 MPa | -1 bar/-100 kPa |
| 0 … +600 bar/0 … +60 MPa | +1200 bar/+120 MPa | -1 bar/-100 kPa |
| 0 … +1000 bar/0 … +100 MPa | +1500 bar/+150 MPa | -1 bar/-100 kPa |
| -1 … 0 bar/-100 … 0 kPa | +3 bar/+300 kPa | -1 bar/-100 kPa |
| -1 … +1.5 bar/-100 … +150 kPa | +7.5 bar/+750 kPa | -1 bar/-100 kPa |
| -1 … +10 bar/-100 … +1000 kPa | +30 bar/+3000 kPa | -1 bar/-100 kPa |
| -1 … +25 bar/-100 … +2500 kPa | +75 bar/+7500 kPa | -1 bar/-100 kPa |
| -1 … +40 bar/-100 … +4000 kPa | +120 bar/+12 MPa | -1 bar/-100 kPa |
| -0.2 … +0.2 bar/-20 … +20 kPa | +1.2 bar/+120 kPa | -1 bar/-100 kPa |
| -0.5 … +0.5 bar/-50 … +50 kPa | +3 bar/+300 kPa | -1 bar/-100 kPa |
| Absolute pressure | | |
| 0 … 1 bar/0 … 100 kPa | 3 bar/300 kPa | 0 bar abs. |
| 0 … 2.5 bar/0 … 250 kPa | 7.5 bar/750 kPa | 0 bar abs. |
| 0 … 10 bar/0 … 1000 kPa | 30 bar/3000 kPa | 0 bar abs. |
| 0 … 25 bar/0 … 2500 kPa | 75 bar/+7500 kPa | 0 bar abs. |
| 0 … 40 bar/0 … 4000 kPa | 120 bar/+12 MPa | 0 bar abs. |

[11)] Data on overload capability apply for reference temperature.

### Nominal measuring ranges and overload capacity in psi

| Nominal range | Overload capability | |
|---|---|---|
| | Maximum pressure | Minimum pressure |
| Gauge pressure | | |
| 0 … +5 psig | +15 psig | -14.5 psig |
| 0 … +15 psig | +45 psig | -14.5 psig |
| 0 … +30 psig | +90 psig | -14.5 psig |
| 0 … +150 psig | +450 psig | -14.5 psig |
| 0 … +300 psig | +900 psig | -14.5 psig |
| 0 … +500 psig | +1500 psig | -14.5 psig |
| 0 … +1450 psig | +3000 psig | -14.5 psig |
| 0 … +3000 psig | +6000 psig | -14.5 psig |
| 0 … +9000 psig | +18000 psig | -14.5 psig |
| 0 … +15000 psig | +22500 psig | -14.5 psig |
| -14.5 … 0 psig | +45 psig | -14.5 psig |
| -14.5 … +20 psig | +90 psig | -14.5 psig |
| -14.5 … +150 psig | +450 psig | -14.5 psig |
| -14.5 … +300 psig | +900 psig | -14.5 psig |
| -14.5 … +600 psig | +1200 psig | -14.5 psig |
| -3 … +3 psig | +15 psig | -14.5 psig |
| -7 … +7 psig | +45 psig | -14.5 psig |
| Absolute pressure | | |
| 0 … 15 psi | 45 psi | 0 psi |
| 0 … 30 psi | 90 psi | 0 psi |
| 0 … 150 psi | 450 psi | 0 psi |
| 0 … 300 psi | 600 psi | 0 psi |
| 0 … 500 psig | 1500 psi | 0 psi |

## Input variable - Ceramic/metallic measuring cell

The specifications are only an overview and refer to the measuring cell. Limitations due to the material and version of the process fitting are possible. The specifications on the nameplate apply. [12)]

### Nominal measuring ranges and overload capability in bar/kPa

| Nominal range | Overload capability | |
|---|---|---|
| | Maximum pressure | Minimum pressure |
| Gauge pressure | | |
| 0 … +0.1 bar/0 … +10 kPa | +15 bar/+1500 kPa | -1 bar/-100 kPa |
| 0 … +0.4 bar/0 … +40 kPa | +30 bar/+3000 kPa | -1 bar/-100 kPa |

[12)] Data on overload capability apply for reference temperature.

| Nominal range | Overload capability | |
|---|---|---|
| | Maximum pressure | Minimum pressure |
| 0 … +1 bar/0 … +100 kPa | +35 bar/+3500 kPa | -1 bar/-100 kPa |
| 0 … +2.5 bar/0 … +250 kPa | +50 bar/+5000 kPa | -1 bar/-100 kPa |
| 0 … +5 bar/0 … +500 kPa | +50 bar/+5000 kPa | -1 bar/-100 kPa |
| 0 … +10 bar/0 … +1000 kPa | +50 bar/+5000 kPa | -1 bar/-100 kPa |
| 0 … +25 bar/0 … +2500 kPa | +50 bar/+5000 kPa | -1 bar/-100 kPa |
| -1 … 0 bar/-100 … 0 kPa | +35 bar/+3500 kPa | -1 bar/-100 kPa |
| -1 … +1.5 bar/-100 … +150 kPa | +50 bar/+5000 kPa | -1 bar/-100 kPa |
| -1 … +5 bar/-100 … +500 kPa | +50 bar/+6500 kPa | -1 bar/-100 kPa |
| -1 … +10 bar/-100 … +1000 kPa | +50 bar/+5000 kPa | -1 bar/-100 kPa |
| -1 … +25 bar/-100 … +2500 kPa | +50 bar/+5000 kPa | -1 bar/-100 kPa |
| -0.05 … +0.05 bar/-5 … +5 kPa | +10 bar/+1000 kPa | -1 bar/-100 kPa |
| -0.2 … +0.2 bar/-20 … +20 kPa | +20 bar/+2000 kPa | -1 bar/-100 kPa |
| -0.5 … +0.5 bar/-50 … +50 kPa | +35 bar/+3500 kPa | -1 bar/-100 kPa |
| Absolute pressure | | |
| 0 … 1 bar/0 … 100 kPa | 35 bar/3500 kPa | 0 bar abs. |
| 0 … 2.5 bar/0 … 250 kPa | 50 bar/5000 kPa | 0 bar abs. |
| 0 … 10 bar/0 … 1000 kPa | 50 bar/5000 kPa | 0 bar abs. |
| 0 … 25 bar/0 … 2500 kPa | 50 bar/5000 kPa | 0 bar abs. |

### Nominal measuring ranges and overload capacity in psi

| Nominal range | Overload capability | |
|---|---|---|
| | Maximum pressure | Minimum pressure |
| Gauge pressure | | |
| 0 … +1.5 psig | +225 psig | -14.5 psig |
| 0 … +5 psig | +375 psig | -14.5 psig |
| 0 … +15 psig | +525 psig | -14.5 psig |
| 0 … +30 psig | +720 psig | -14.5 psig |
| 0 … +75 psig | +720 psig | -14.5 psig |
| 0 … +150 psig | +720 psig | -14.5 psig |
| 0 … +300 psig | +720 psig | -14.5 psig |
| -14.5 … 0 psig | +510 psig | -14.5 psig |
| -14.5 … +20 psig | +720 psig | -14.5 psig |
| -14.5 … +75 psig | +975 psig | -14.51 psig |
| -14.5 … +150 psig | +725 psig | -14.5 psig |
| -14.5 … +300 psig | +725 psig | -14.5 psig |
| -0.7 … +0.7 psig | +225 psi | -14.5 psig |

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| Nominal range | Overload capability | |
|---|---|---|
| | Maximum pressure | Minimum pressure |
| -3 … +3 psig | +190 psi | -14.5 psig |
| -7 … +7 psig | +525 psig | -14.5 psig |
| Absolute pressure | | |
| 0 … 15 psi | 525 psi | 0 psi |
| 0 … 30 psi | +720 psig | 0 psi |
| 0 … 150 psi | +720 psig | 0 psi |
| 0 … 300 psi | +720 psig | 0 psi |

## Adjustment ranges

Specifications refer to the nominal measuring range, pressure values lower than -1 bar cannot be set

| | |
|---|---|
| Min./Max. adjustment: | |
| – Percentage value | -10 … 110 % |
| – Pressure value | -20 … 120 % |
| Zero/Span adjustment: | |
| – Zero | -20 … +95 % |
| – Span | -120 … +120 % |
| – Difference between zero and span | max. 120 % of the nominal range |
| Max. permissible Turn Down | Unlimited (recommended 20 : 1) |

## 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 psi) |
| Determination of characteristics | Limit point adjustment according to IEC 61298-2 |
| Characteristic curve | Linear |
| Reference installation position | upright, diaphragm points downward |
| Influence of the installation position | |
| – Piezoresistive/strain gauge measuring cell | depending on the process fitting and the chemical seal |
| – Ceramic/metallic measuring cell | < 5 mbar/0.5 kPa (0.07 psig) |
| Deviation in the current output due to strong, high-frequency electromagnetic fields acc. to EN 61326-1 | < ±150 µA |

## Deviation (according to IEC 60770-1)

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

The deviation corresponds to the value $F_{KI}$ in chapter " *Calculation of the total deviation*". The value results out of the accuracy class and the respective turn down.

| Accuracy class [13] | Non-linearity, hysteresis and repeatability with TD 1 : 1 up to 5 : 1 | Non-linearity, hysteresis and repeatability with 5 : 1 |
|---|---|---|
| 0.075 % | < 0.075 % | < 0.015 % x TD |
| 0.1 % | < 0.1 % | < 0.02 % x TD |
| 0.2 % | < 0.2 % | < 0.04 % x TD |

## Influence of the medium or ambient temperature

### Thermal change zero signal and output span through product temperature

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

The thermal change of the zero signal and output span corresponds to the value $F_T$ in chapter " *Calculation of the total deviation (according to DIN 16086)*".

### Piezoresistive/strain gauge measuring cell

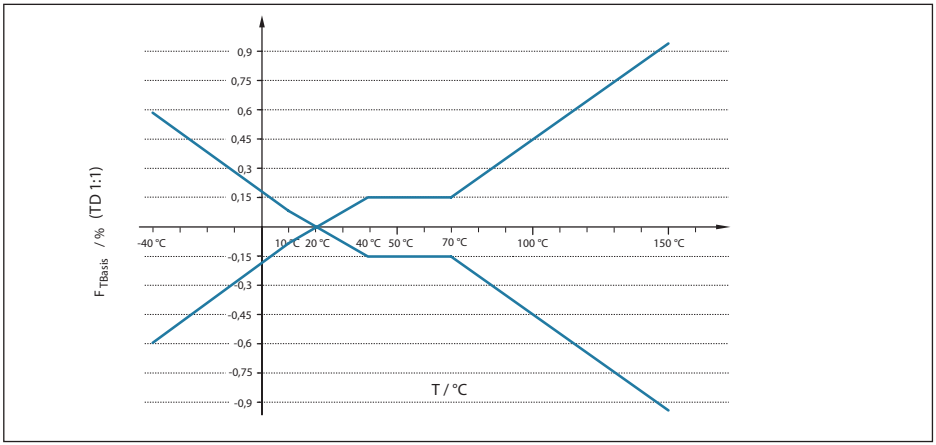



*Fig. 23: Basic temperature error $F_{TBasis}$ at TD 1 : 1*

The basic temperature error in % from the above graphic can increase due to the additional factors such as accuracy class (factor FMZ) and Turn Down (factor FTD). The additional factors are listed in the following tables.

### Additional factor through accuracy class

| Accuracy class | 0.075 %, 0.1 % | 0.2 % |
|---|---|---|
| Factor FMZ | 1 | 3 |

### Additional factor through Turn Down

[13] Different availability depending on measuring range and process fitting

The additional factor FTD through Turn down is calculated according to the following formula:

$F_{TD} = 0.5 \times TD + 0.5$

In the table, example values for typical Turn downs are listed.

| Turn Down | TD 1 : 1 | TD 2.5 : 1 | TD 5 : 1 | TD 10 : 1 | TD 20 : 1 |
|---|---|---|---|---|---|
| Factor FTD | 1 | 1.75 | 3 | 5.5 | 10.5 |

### Ceramic/metallic measuring cell

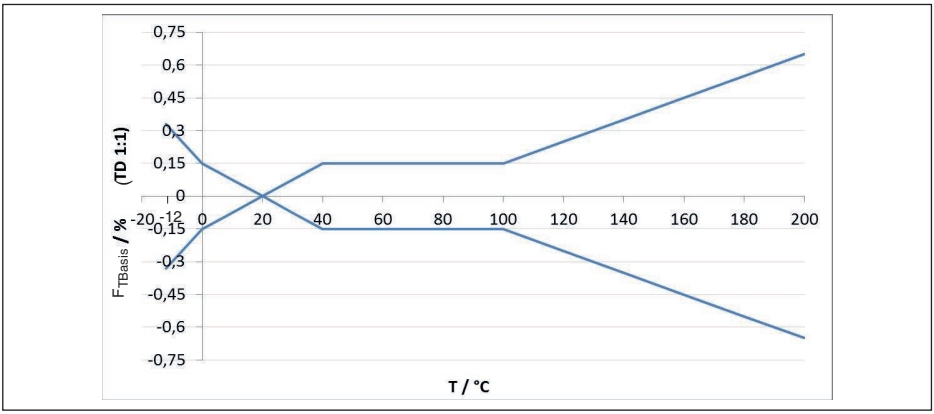



*Fig. 24: Basic temperature error $F_{TBasis}$ at TD 1 : 1*

The basic temperature error in % from the above graphic can increase due to the additional factors, depending on the measuring cell version (factor FMZ) and the Turn Down (factor FTD). The additional factors are listed in the following tables.

### Additional factor through measuring cell version

| Measuring cell version | Measuring cell - Standard | | Measuring cell climate-compensated, depending on measuring range | | |
|---|---|---|---|---|---|
| | 0.075 %, 0.1 % | 0.2 % | 10 bar, 25 bar | 1 bar, 2.5 bar | 0.4 bar |
| Factor FMZ | 1 | 3 | 1 | 2 | 3 |

### Additional factor through Turn Down

The additional factor FTD through Turn down is calculated according to the following formula:

$F_{TD} = 0.5 \times TD + 0.5$

In the table, example values for typical Turn downs are listed.

| Turn Down | TD : 1 | TD 2.5 : 1 | TD 5 : 1 | TD 10 : 1 | TD 20 : 1 |
|---|---|---|---|---|---|
| Factor FTD | 1 | 1.75 | 3 | 5.5 | 10.5 |

### Thermal change current output through ambient temperature

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

Thermal change, current output < 0.05 %/10 K, max. < 0.15 %, each with -40 … +80 °C (-40 … +176 °F)

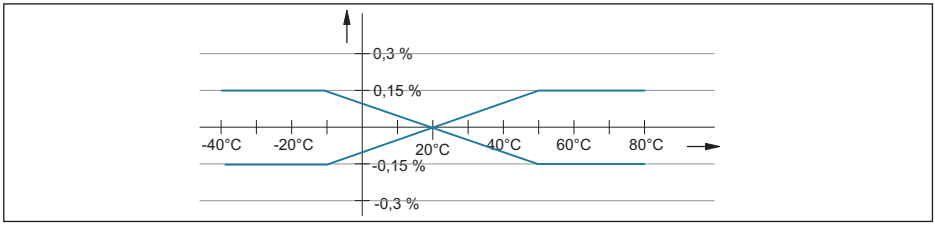



*Fig. 25: Thermal change, current output*

## Long-term stability (according to DIN 16086)

Applies to the respective **digital** signal output (e.g. HART, Profibus PA) as well as to **analogue** current output 4 … 20 mA under reference conditions. Specifications refer to the set span. Turn down (TD) is the ratio nominal measuring range/set span. [14)]

### Long-term staibility - Ceramic/metallic measuring cell

| Time period | |
|---|---|
| One year | < 0.05 % x TD |
| Five years | < 0.1 % x TD |
| Ten years | < 0.2 % x TD |

### Long-term stability - Piezoresistive/Strain gauge measuring cell

| Version | |
|---|---|
| Measuring ranges > 1 bar | < 0.1 % x TD/year |
| Measuring ranges > 1 bar, isolating liquid, synthetic oil, diaphragm Elgiloy (2.4711) | < 0.15 % x TD/year |
| Measuring range 1 bar | < 0.15 % x TD/year |
| Measuring range 0.4 bar | < 0.35 % x TD/year |

## Ambient conditions

| Version | Ambient temperature | Storage and transport temperature |
|---|---|---|
| Standard version | -40 … +80 °C (-40 … +176 °F) | -60 … +80 °C (-76 … +176 °F) |
| Version IP66/IP68 (1 bar) | -20 … +80 °C (-4 … +176 °F) | -20 … +80 °C (-4 … +176 °F) |
| Version IP68 (25 bar), with connection cable PUR | -20 … +80 °C (-4 … +176 °F) | -20 … +80 °C (-4 … +176 °F) |
| Version IP68 (25 bar), connection cable PE | -20 … +60 °C (-4 … +140 °F) | -20 … +60 °C (-4 … +140 °F) |

[14)] With ceramic/metallic measuring cell with gold-coated diaphragm, the values must be multiplied with factor 3.

## Process conditions - Piezoresistive/Strain gauge measuring cell

### Process temperature

| Seal | Sensor version | | | | |
|---|---|---|---|---|---|
| | Standard | Extended temperature range | Hygienic fittings | | Version for oxygen applications |
| | $p_{abs}$ ≥ 1 mbar | | $p_{abs}$ ≥ 1 mbar | $p_{abs}$ ≥ 10 mbar | $p_{abs}$ ≥ 10 mbar |
| Without consideration of the seal [15] | -20/-40 … +105 °C (-4/-40 … +221 °F) | – | – | – | -20 … +60 °C (-4 … +140 °F) |
| FKM (VP2/A) | -20 … +105 °C (-4 … +221 °F) | -20 … +150 °C (-4 … +302 °F) | -20 … +85 °C (-4 … +185 °F) | -20 … +150 °C (-4 … +302 °F) | |
| EPDM (A+P 70.10-02) | | | | | |
| FFKM (Perlast G74S) | -15 … +105 °C (+5 … +221 °F) | -15 … +150 °C (+5 … +302 °F) | -15 … +85 °C (+5 … +185 °F) | -15 … +150 °C (+5 … +302 °F) | -15 … +60 °C (+5 … +140 °F) |
| FEPM (Fluoraz SD890) | -5 … +105 °C (+23 … +221 °F) | – | – | – | -5 … +60 °C (+23 … +140 °F) |

### Temperature derating

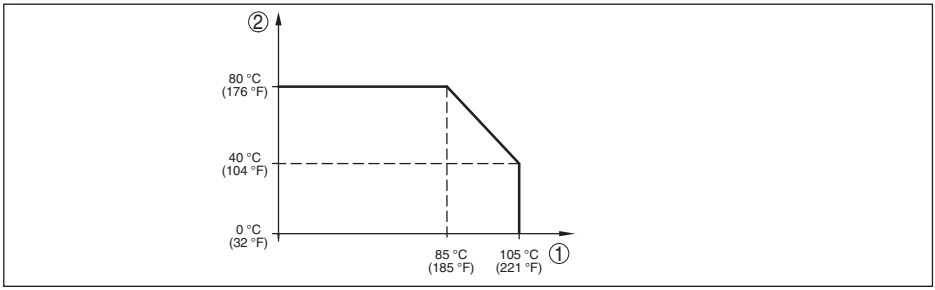



*Fig. 26: Temperature derating VEGABAR 83, version up to +105 °C (+221 °F)*

*1 Process temperature*
*2 Ambient temperature*

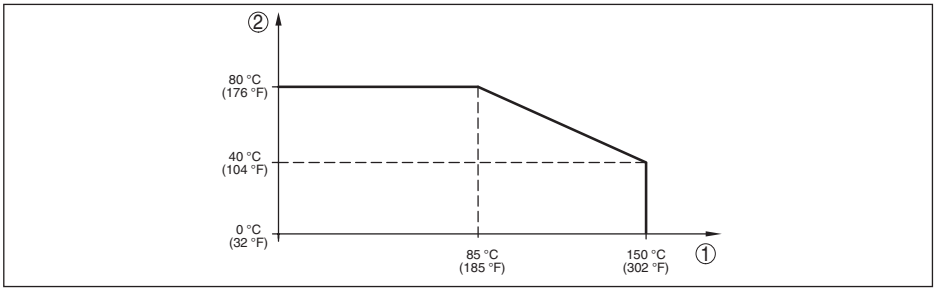



*Fig. 27: Temperature derating VEGABAR 83, version up to +150 °C (+302 °F)*

*1 Process temperature*
*2 Ambient temperature*

[15] Process fittings acc. to DIN 3852-A, EN 837

**SIP process temperature** (SIP = Sterilization in place)

Vapour stratification for 2 h [16] +150 °C (+302 °F)

**Process pressure**

Permissible process pressure see specification " *Process pressure*" on the type label

**Mechanical stress**

| Version | Without cooling zone | | With cooling zone | |
|---|---|---|---|---|
| | **All housing versions** | **Double chamber stainless steel housing** | **All housing versions** | **Double chamber stainless steel housing** |
| Vibration resistance 1 to 4 g at 5 … 200 Hz according to EN 60068-2-6 (vibration with resonance) | 4 g (GL characteristics 2) | 0.7 g (GL characteristics 1) | 4 g (GL characteristics 2) | 0.7 g (GL characteristics 1) |
| Shock resistance 2.3 ms according to EN 60068-2-27 (mechanical shock) | 50 g | | 50 g | 20 g |

## Process conditions - Ceramic/metallic measuring cell

**Process temperature**

| Version | Temperature range | | |
|---|---|---|---|
| | $p_{abs}$ ≥ 50 mbar | $p_{abs}$ ≥ 10 mbar | $p_{abs}$ ≥ 1 mbar |
| Standard | -12 … +150 °C (+10 … +284 °F) | | -12 … +120 °C (+10 … +248 °F) |
| Extended temperature range | -12 … +180 °C (+10 … +356 °F) | -12 … +160 °C (+10 … +320 °F) | |
| | -12 … +200 °C (+10 … +392 °F) | | |

**Temperature derating**

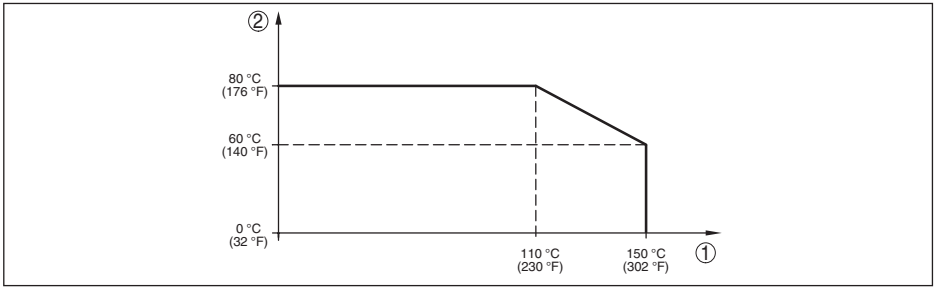



*Fig. 28: Temperature derating VEGABAR 83, version up to +150 °C (+302 °F)*

*1 Process temperature*
*2 Ambient temperature*

[16] Instrument configuration suitable for vapour

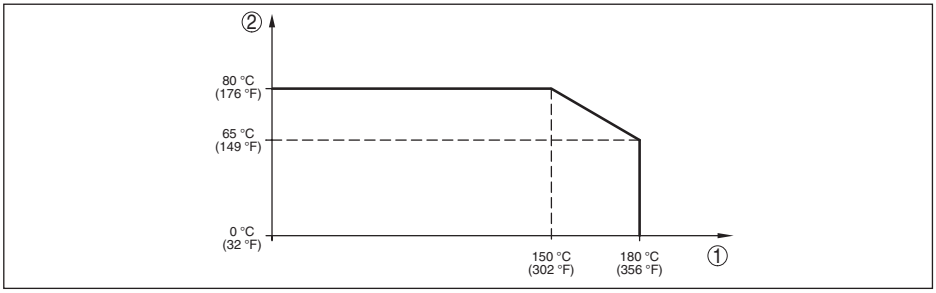



*Fig. 29: Temperature derating VEGABAR 83, version up to +180 °C (+356 °F)*

*1 Process temperature*
*2 Ambient temperature*

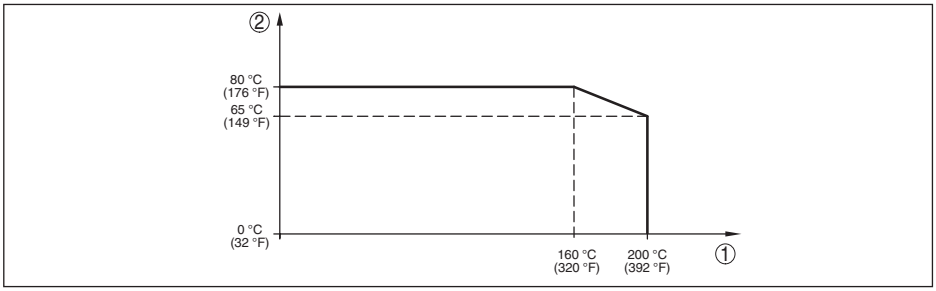



*Fig. 30: Temperature derating VEGABAR 83, version up to +200 °C (+392 °F)*

*1 Process temperature*
*2 Ambient temperature*

**Process pressure**

| | |
|---|---|
| Permissible process pressure | see specification " *Process pressure*" on the type label |

**Mechanical stress**[17)]

| | |
|---|---|
| Vibration resistance 1 to 4 g at 5 … 200 Hz according to EN 60068-2-6 (vibration with resonance) | 4 g |
| Shock resistance | 50 g, 2.3 ms according to EN 60068-2-27 (mechanical shock) [18)] |

**Electromechanical data - version IP66/IP67 and IP66/IP68 (0.2 bar) [19)]**

Options of the cable entry

| | |
|---|---|
| – Cable entry | M20 x 1.5; ½ NPT |
| – Cable gland | M20 x 1.5, ½ NPT (cable ø see below table) |
| – Blind plug | M20 x 1.5; ½ NPT |
| – Closing cap | ½ NPT |

[17)] Depending on the instrument version.
[18)] 2 g with housing version stainless steel double chamber
[19)] IP66/IP68 (0.2 bar), only with absolute pressure.

| Material cable gland/Seal insert | Cable diameter | | | |
|---|---|---|---|---|
| | 5 … 9 mm | 6 … 12 mm | 7 … 12 mm | 10 … 14 mm |
| PA/NBR | ● | ● | – | ● |
| Brass, nickel-plated/NBR | ● | ● | – | – |
| Stainless steel/NBR | – | – | ● | – |

Wire cross-section (spring-loaded terminals)

- Massive wire, stranded wire: 0.2 … 2.5 mm² (AWG 24 … 14)
- Stranded wire with end sleeve: 0.2 … 1.5 mm² (AWG 24 … 16)

**Display and adjustment elements, power pack**

Display elements

- Green LED in the supply room: Indication of the charging process
- Yellow LED in the supply room: Indication of the charging condition

Adjustment elements

- Rotary switch in the supply room: Selection of the mode
- Button outside on the housing: Switching on and off

**Integrated clock**

| | |
|---|---|
| Date format | Day.Month.Year |
| Time format | 12 h/24 h |
| Time zone, factory setting | CET |
| Max. rate deviation | 10.5 min/year |

**Additional output parameter - Electronics temperature**

| | |
|---|---|
| Range | -40 … +85 °C (-40 … +185 °F) |
| Resolution | < 0.1 K |
| Deviation | ± 3 K |

Availability of the temperature values

- Indication: Via the display and adjustment module
- Output: Via the respective output signal

**External battery charger**

| | |
|---|---|
| Mains voltage | 100 … 240 V AC |
| Output voltage | 24 V DC |
| Max. output current (short-circuit proof) | 500 mA |
| Load current limitation | 70 mA |
| DC plug (inside plus, outside minus) | 2.1 mm |

**Integrated accumulator**

| | |
|---|---|
| Type | Lithium ions |
| Voltage | 14.8 V |
| Accumulator capacity | 4.7 Wh |

| | |
|---|---|
| Charging period from 0 % to 100 % | approx. 4 h |
| Operating time after 10 minutes charging of 0 % | > 3 h |
| Operating time in mode 4 (sensor permanently on) with completely charged accumulator | > 60 h |
| Temperature range | |
| – Charge accumulator | 0 … +45° C (+32 … +167 °F) |
| – Accumulator operation | -20 … +60° C (-4 … +140 °F) |
| Temperature derating accumulator capacity | |
| – +25° C (+77 °F) | 100 % |
| – -10° C (+14 °F) | 50 % |

**Potential connections and electrical separating measures in the instrument**

| | |
|---|---|
| Electronics | Not non-floating |
| Reference voltage [20] | 500 V AC |
| Conductive connection | Between ground terminal and metallic process fitting |

**Electrical protective measures [21]**

| Housing material | Version | Protection acc. to IEC 60529 | Protection acc. to NEMA |
|---|---|---|---|
| Plastic | Single chamber | IP66/IP67 | Type 4X |
| | Double chamber | | |
| Aluminium | Single chamber | IP66/IP67<br>IP66/IP68 (0.2 bar)<br>IP68 (1 bar) | Type 4X<br>Type 6P<br>- |
| | Double chamber | IP66/IP67<br>IP66/IP68 (0.2 bar) | Type 4X<br>Type 6P |
| Stainless steel (electro-polished) | Single chamber | IP66/IP67<br>IP69K | Type 4X |
| Stainless steel (precision casting) | Single chamber | IP66/IP67<br>IP66/IP68 (0.2 bar)<br>IP68 (1 bar) | Type 4X<br>Type 6P<br>- |
| | Double chamber | IP66/IP67<br>IP66/IP68 (0.2 bar) | Type 4X<br>Type 6P |
| Stainless steel | Transmitter, version with external housing | IP68 (25 bar) | - |

| | |
|---|---|
| Connection of the feeding power supply unit | Networks of overvoltage category III |

[20] Galvanic separation between electronics and metal housing parts
[21] Protection rating IP66/IP68 (0.2 bar) only in conjunction with absolute pressure.

| | |
|---|---|
| Altitude above sea level | |
| – by default | up to 2000 m (6562 ft) |
| – with connected overvoltage protection | up to 5000 m (16404 ft) |
| Pollution degree [22] | 2 |
| Protection rating (IEC/EN 61010-1) | II |

## 11.2 Dimensions

The following dimensional drawings represent only an extract of the possible versions. Detailed dimensional drawings can be downloaded at www.vega.com under " *Downloads*" and " *Drawings*".

**Housing**

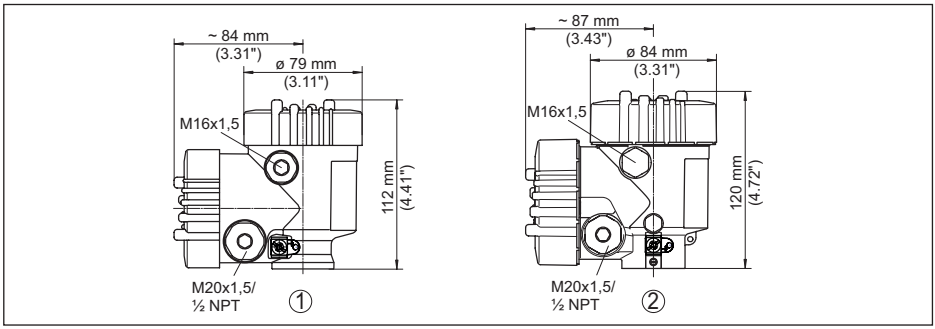



*Fig. 31: Dimensions of housing (with integrated display and adjustment module the housing is 9 mm/0.35 inches or 18 mm/0.71 in higher)*

*1 Plastic double chamber*
*2 Aluminium/Stainless steel double chamber*

[22] When used with fulfilled housing protection.

## External housing on IP68 version

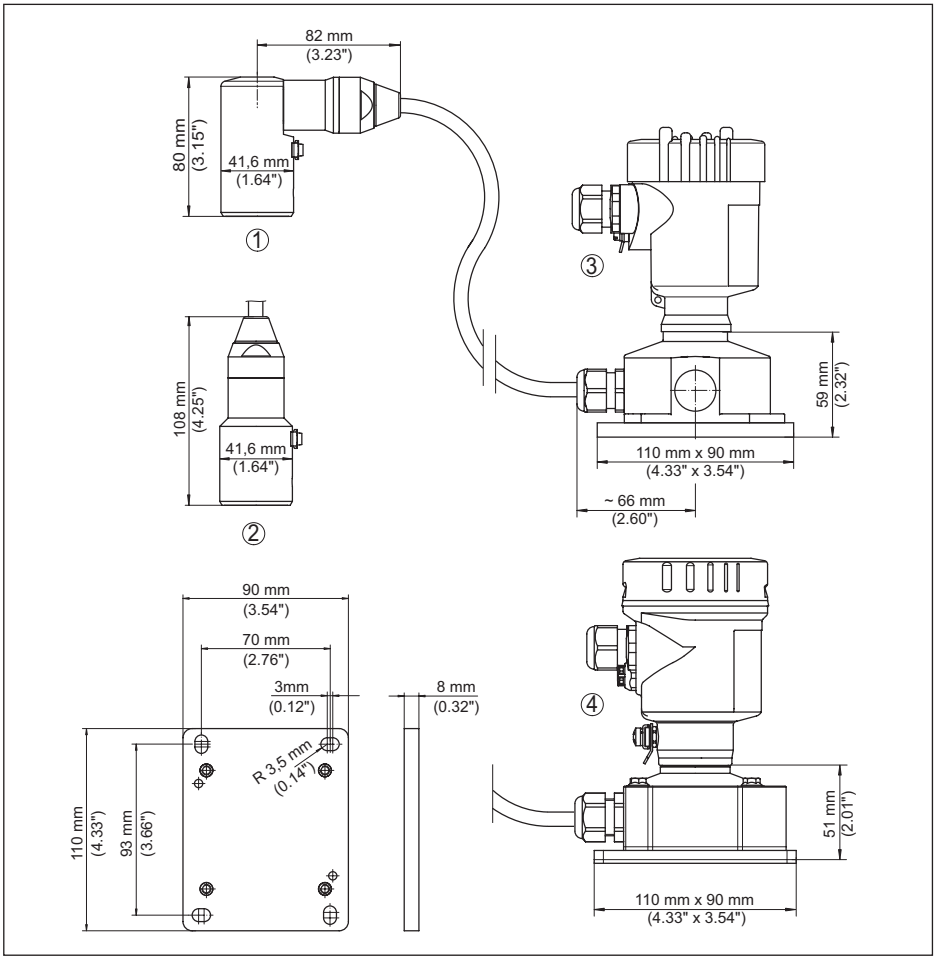



*Fig. 32: VEGABAR 83, IP68 version with external housing*

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

## VEGABAR 83, threaded fitting not front-flush

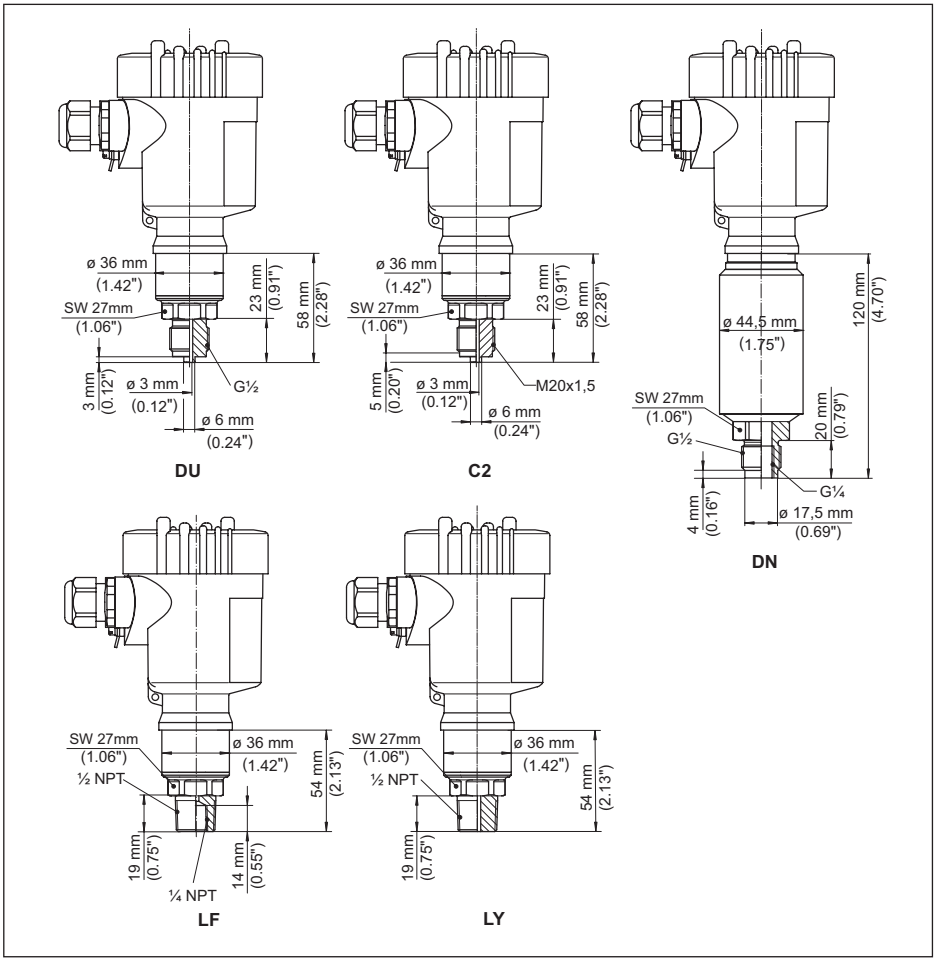



*Fig. 33: VEGABAR 83, threaded fitting not front-flush*

*DU G½, EN 837; manometer connection*
*C2 M20 x 1.5 EN 837; manometer connection*
*DN G½, inside G¼, ISO 228-1*
*LF ½ NPT, inside ¼ NPT, ASME B1.20.1*
*LY ½ NPT PN 1000*

## VEGABAR 83, threaded fitting front-flush

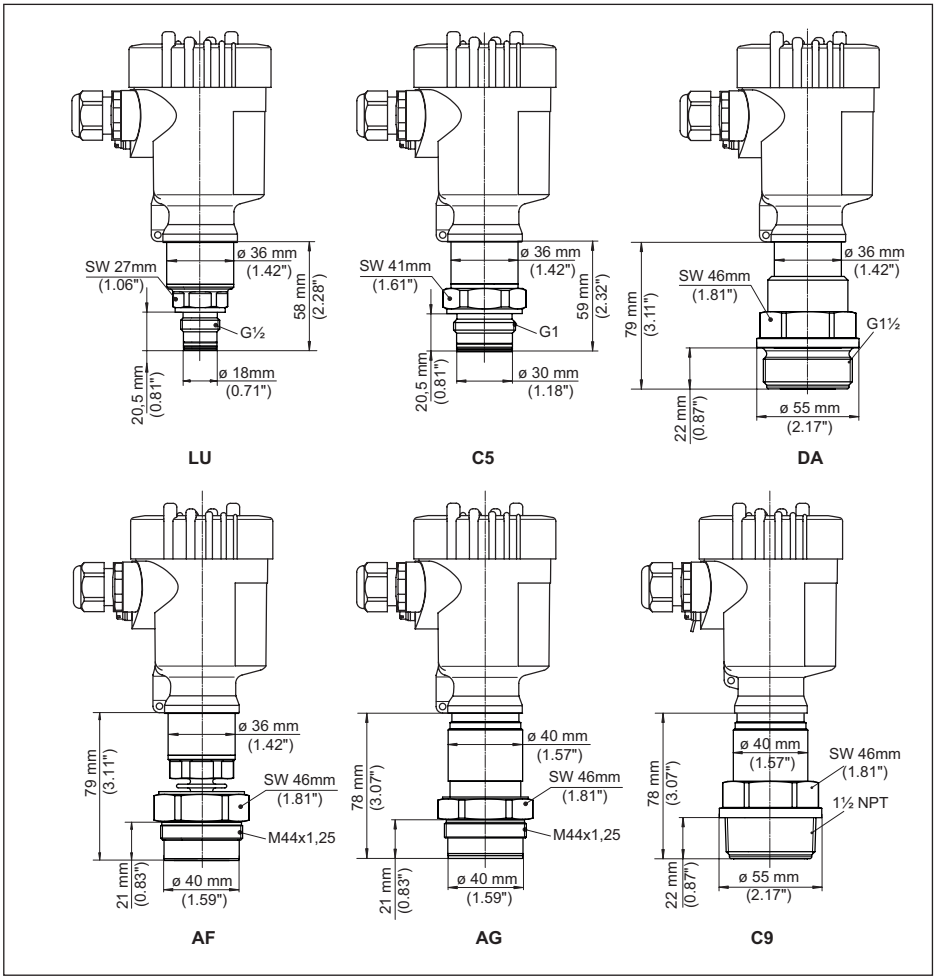



*Fig. 34: VEGABAR 83, threaded fitting front-flush*

*LU G½, ISO 228-1; front-flush; with O-ring*
*C5 G1, ISO 228-1*
*DA G1½, DIN 3852-A*
*AF M44 x 1.25 DIN 13; pressure screw: Aluminium*
*AG M44 x 1.25 DIN 13; pressure screw: 316L*
*AF/AG/DA with temperature adapter and screen sheet for 180 °C/200 °C*
*C9 1½ NPT, ASME B1.20.1*

**VEGABAR 83, hygienic fitting 150 °C (piezoresistive/strain gauge measuring cell)**

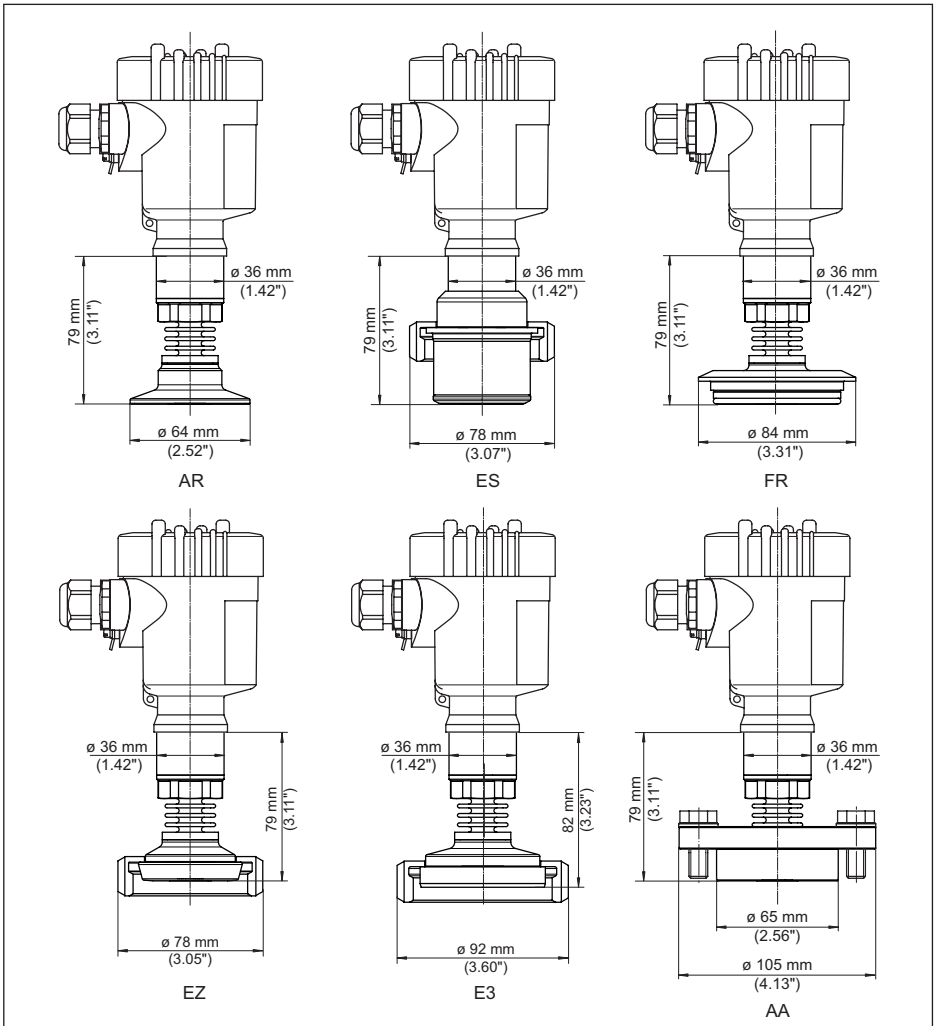



*Fig. 35: VEGABAR 83, hygienic fitting 150 °C (piezoresistive/strain gauge measuring cell)*

*AR Clamp 2" PN 16 (ø 64 mm) DIN 32676, ISO 2852*
*ES Hygienic connection with compression nut F40 PN 25*
*FR Varivent N50-40 PN 25*
*EZ Collar socket DN 40 PN 40, DIN 11851*
*E3 Collar socket DN 50 PN 25 Form A, DIN 11864; for tube 53 x 1.5*
*AA DRD PN 40*

**VEGABAR 83, hygienic fitting 150 °C (METEC® measuring cell)**

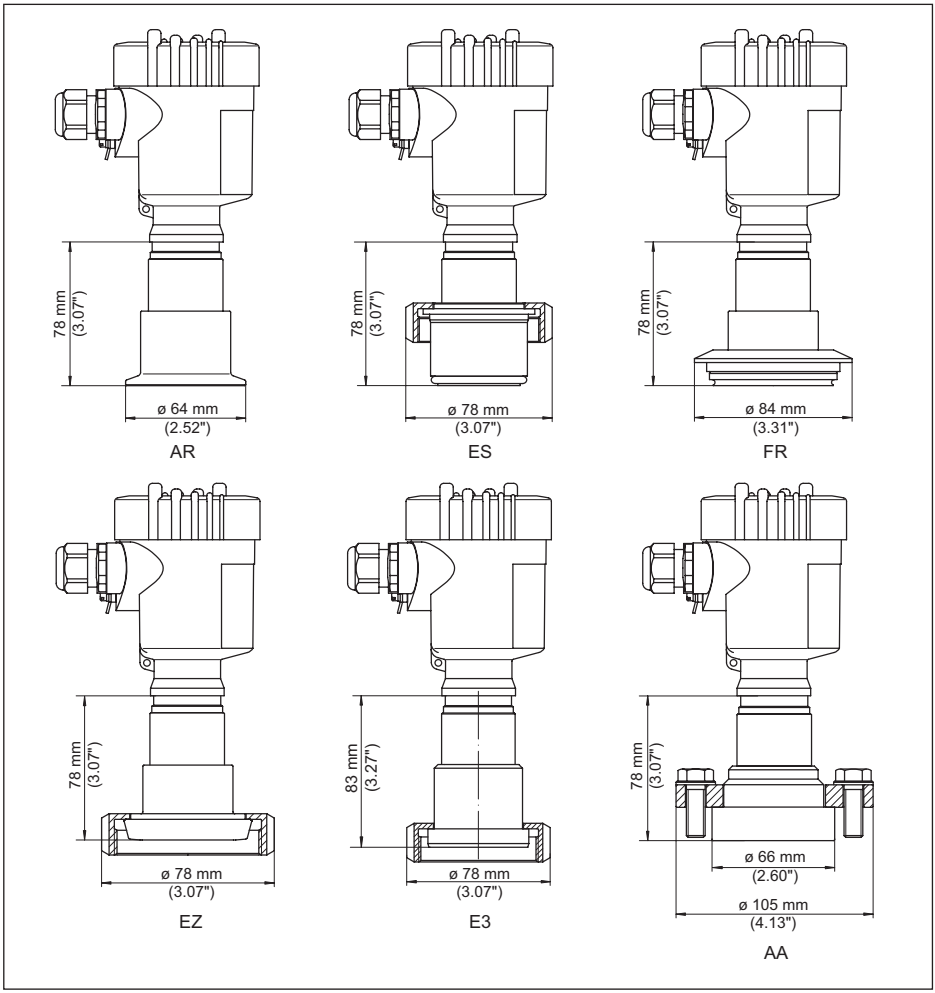
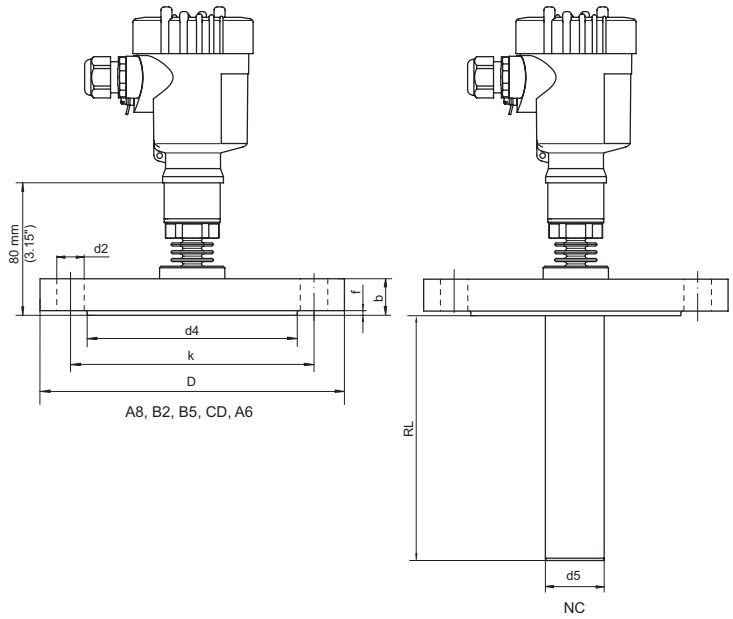



*Fig. 36: VEGABAR 83, hygienic fitting 150 °C (METEC® measuring cell)*

*AR Clamp 2" PN 16 (ø 64 mm) DIN 32676, ISO 2852*
*ES Hygienic fitting with compression nut F 40 PN 25*
*FR Varivent N50-40 PN 25*
*EZ Collar socket DN 40 PN 40, DIN 11851*
*E3 Collar socket DN 50 PN 25 Form A, DIN 11864; for tube 53 x 1.5*
*AA DRD PN 40*

## VEGABAR 83, flange connection 150 °C (piezoresistive/strain gauge measuring cell)

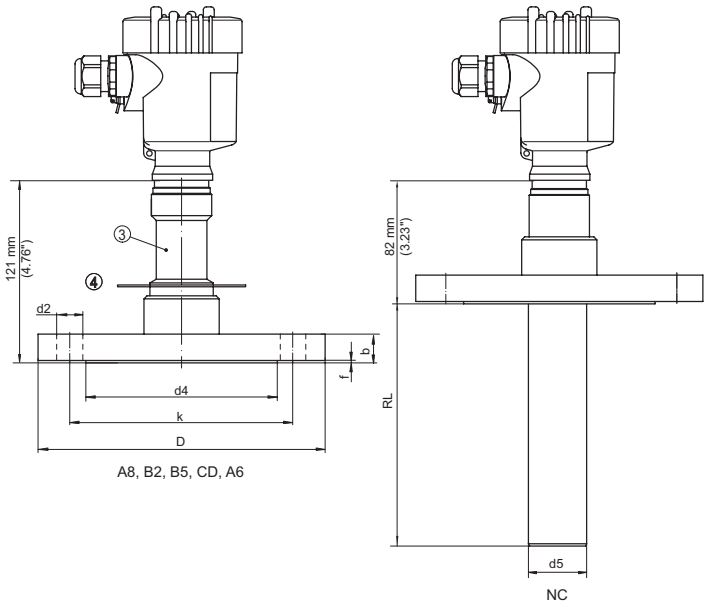



| ① | mm | DN | PN | D | b | k | d2 | d4 | f | RL | d5 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | A8 | 40 | 40 | 150 | 18 | 110 | 4xø18 | 88 | 3 | - | - |
| | B2 | 50 | 40 | 165 | 20 | 125 | 4xø18 | 102 | 3 | - | - |
| | B5 | 80 | 40 | 200 | 24 | 160 | 8xø18 | 138 | 3 | - | - |
| | CD | 100 | 40 | 235 | 24 | 190 | 8xø22 | 162 | 3 | - | - |
| | A6 | 150 | 16 | 285 | 22 | 240 | 8xø22 | 212 | 3 | - | - |
| | NC | 50 | 40 | 165 | 20 | 125 | 4xø18 | 102 | 3 | ③ | ④ |
| | inch | | | | | | | | | | |
| | A8 | 40 | 40 | 5.91" | 0.71" | 4.33" | 4xø 0.71" | 3.47" | 0.12" | - | - |
| | B2 | 50 | 40 | 6.50" | 0.79" | 4.92" | 4xø 0.71" | 4.02" | 0.12" | - | - |
| | B5 | 80 | 40 | 7.87" | 0.95" | 6.30" | 8xø 0.71" | 5.43" | 0.12" | - | - |
| | CD | 100 | 40 | 9.25" | 0.95" | 7.48" | 8xø 0.87" | 6.38" | 0.12" | - | - |
| | A6 | 150 | 16 | 11.22" | 0.87" | 9.45" | 8xø 0.87" | 8.35" | 0.12" | - | - |
| | NC | 50 | 40 | 6.50" | 0.79" | 4.92" | 4xø 0.71" | 4.02" | 0.12" | ③ | ④ |
| ② | | | | | | | | | | | |
| | CA | 2“ 150 lbs | | 6.00" | 0.75" | 4.75" | 4xø 0.75" | 3.62" | 0.06" | - | - |
| | CB | 3“ 150 lbs | | 7.50" | 0.94" | 6“ | 4xø 0.75" | 5“ | 0.06" | - | - |

*Fig. 37: VEGABAR 83, flange connection 150 °C (piezoresistive/strain gauge measuring cell)*

1 *Flange connection according to DIN 2501*
2 *Flange connection according to ASME B16.5*
3 *Order-specific*
4 *Order-specific*

## VEGABAR 83, flange connection 180 °C/200 °C (METEC® measuring cell)




| ① mm | DN | PN | D | b | k | d2 | d4 | f | RL | d5 |
|---|---|---|---|---|---|---|---|---|---|---|
| A8 | 40 | 40 | 150 | 18 | 110 | 4xø18 | 88 | 3 | - | - |
| B2 | 50 | 40 | 165 | 20 | 125 | 4xø18 | 102 | 3 | - | - |
| B5 | 80 | 40 | 200 | 24 | 160 | 8xø18 | 138 | 3 | - | - |
| CD | 100 | 40 | 235 | 24 | 190 | 8xø22 | 162 | 3 | - | - |
| A6 | 150 | 16 | 300 | 28 | 250 | 8xø26 | 218 | 3 | - | - |
| NC | 50 | 40 | 165 | 20 | 125 | 4xø18 | 102 | 3 | ⑤ | ⑥ |
| inch | | | | | | | | | | |
| A8 | 40 | 40 | 5.91" | 0.71" | 4.33" | 4xø 0.71" | 3.47" | 0.12" | - | - |
| B2 | 50 | 40 | 6.50" | 0.79" | 4.92" | 4xø 0.71" | 4.02" | 0.12" | - | - |
| B5 | 80 | 40 | 7.87" | 0.95" | 6.30" | 8xø 0.71" | 5.43" | 0.12" | - | - |
| CD | 100 | 40 | 9.25" | 0.95" | 7.48" | 8xø 0.87" | 6.38" | 0.12" | - | - |
| A6 | 150 | 16 | 11.81" | 1.10" | 9.84" | 8xø 1.02" | 8.58" | 0.12" | - | - |
| NC | 50 | 40 | 6.50" | 0.79" | 4.92" | 4xø 0.71" | 4.02" | 0.12" | ⑤ | ⑥ |
| ② | | | | | | | | | | |
| CA | 2“ 150 lbs | | 5.91" | 0.77" | 4.75" | 4xø 0.75" | 3.62" | 0.12" | - | - |
| CB | 3“ 150 lbs | | 7.48" | 0.96" | 6“ | 4xø 0.75" | 5“ | 0.12" | - | - |

*Fig. 38: VEGABAR 83, flange connection 180 °C/200 °C (METEC® measuring cell)*

1 *Flange connection according to DIN 2501*
2 *Flange connection according to ASME B16.5*
3 *Temperature adapter up to 180 °C*
4 *Temperature screen sheet up to 200 °C*
5 *Order-specific*
6 *Order-specific*

## VEGABAR 83, connection acc. to IEC 61518

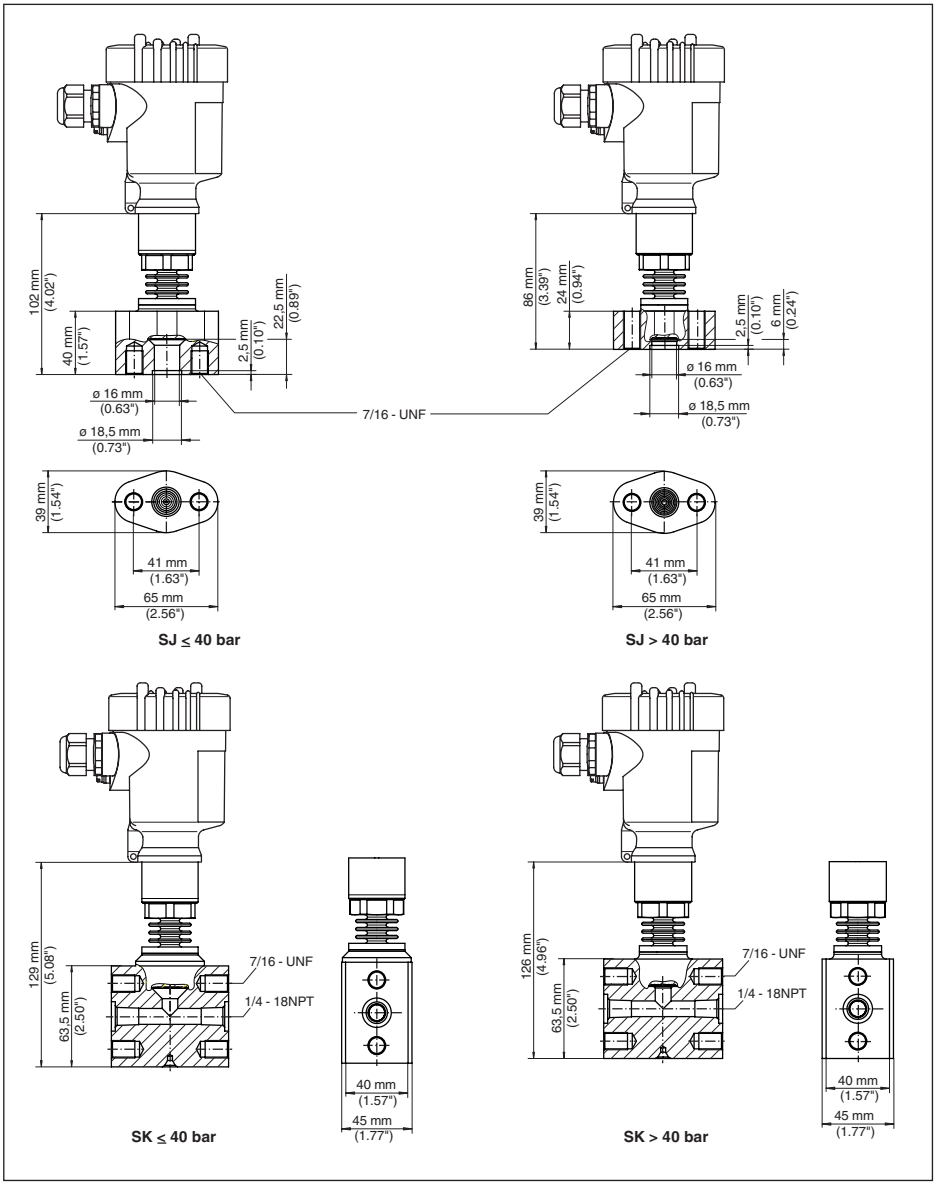



*Fig. 39: VEGABAR 83, connection acc. to IEC 61518*

*SJ Oval flange adapter*
*SK Top flange*

For the version with " *Second Line of Defense*", the measure of length increases by 17 mm (0.67 in).

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45035-EN-220624

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45035-EN-220624

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