Operating Instructions

Pressure sensor with ceramic measuring cell

VEGABAR 38
Two-wire 4 … 20 mA
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Safety instructions for Ex areas

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

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1 About this document

1.1 Function
This 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.

Battery disposal
This symbol indicates special information about the disposal of batteries and accumulators.
2 For your safety

2.1 Authorised personnel
All operations described in this documentation must be carried out only by trained, qualified personnel authorised by the plant operator. During work on and with the device, the required personal protective equipment must always be worn.

2.2 Appropriate use
The VEGABAR 38 is a pressure transmitter for process pressure and hydrostatic level measurement.
You can find detailed information about the area of application in chapter "Product description".
Operational reliability is ensured only if the instrument is properly used according to the specifications in the operating instructions manual as well as possible supplementary instructions.

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

2.4 General safety instructions
This is a state-of-the-art instrument complying with all prevailing regulations and directives. The instrument must only be operated in a technically flawless and reliable condition. The 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 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.
3 Product description

3.1 Configuration

The scope of delivery encompasses:

- VEGABAR 38 pressure transmitter
- Information sheet "Documents and software" with:
  - Instrument serial number
  - QR code with link for direct scanning
- Information sheet "PINs and Codes" (with Bluetooth versions) with:
  - Bluetooth access code
- Information sheet "Access protection" (with Bluetooth versions) with:
  - Bluetooth access code
  - Emergency Bluetooth unlock code
  - Emergency device code

The further scope of delivery encompasses:

- Documentation
  - Quick setup guide VEGABAR 38
  - Ex-specific "Safety instructions" (with Ex versions)
  - Radio approvals (versions with Bluetooth)
  - If necessary, further certificates

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

Scope of this operating instructions

This operating instructions manual applies to the following instrument versions:

- Hardware version from 1.0.0
- Software version from 1.3.0
Constituent parts

Fig. 1: Components of VEGABAR 38
1 Process fitting
2 Electronics housing
3 Ventilation/pressure compensation
4 Plug connector
5 LED illuminated ring
6 Display/adjustment unit

Type label

The type label contains the most important data for identification and use of the instrument.
3 Product description

Fig. 2: Layout of the type label (example)
1 Order/Serial number
2 Field for approvals
3 Technical data
4 Assignment
5 Bluetooth access code
6 QR code for device documentation

Documents and software
Move to "www.vega.com" and enter in the search field the serial number of your instrument.
There you can find the following information about the instrument:
- Order data
- Documentation
- Software
Alternatively, you can find all via your smartphone:
- Scan the QR-code on the type label of the device or
- Enter serial number manually in the VEGA Tools app (available free of charge in the respective stores)

3.2 Principle of operation
Application area
VEGABAR 38 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.
Depending on the process fitting and measurement setup, measured products can be also viscous or contain abrasive substances.

Measured variables
The VEGABAR 38 is suitable for the measurement of the following process variables:
- Process pressure
• Level

![Image of process pressure measurement VEGABAR 38]

Fig. 3: Process pressure measurement VEGABAR 38

**Measuring system pressure**

The sensor element is the Mini-CERTEC® measuring cell with robust ceramic diaphragm. The process pressure deflects the ceramic diaphragm and causes a capacitance change in the measuring cell. This capacitance change is converted into an electrical signal and outputted as measured value via the output signal.

![Image of configuration of the Mini-CERTEC® measuring cell]

Fig. 4: Configuration of the Mini-CERTEC® measuring cell
1 Process diaphragm
2 Glass joint
3 Base element

**Measuring system temperature**

A temperature sensor in the electronics of the Mini-CERTEC® measuring cell measures the current process temperature. The temperature value is output via Bluetooth or the indication.

**Pressure types**

**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.

**Recessed installation**

The recessed installation is particularly suitable for applications with gases, vapours and clear liquids. The measuring cell seals are positioned laterally as well as in front.
**Front flush installation**

The front-flush installation is particularly suitable for applications with viscous or abrasive media and for buildup.

![Fig. 5: Recessed installation of the measuring cell (example: manometer connection G½)](image)

1. Measuring cell
2. Lateral measuring cell seal
3. Front measuring cell seal
4. Diaphragm
5. Process fitting

**Front-flush installation in hygienic fitting**

The front-flush, hygienic installation of the measuring cell is particularly suitable for food applications. The front seal is installed gap-free.

![Fig. 6: Front-flush installation of the measuring cell (example: thread G1½)](image)

1. Measuring cell
2. Lateral measuring cell seal
3. Front measuring cell seal
4. Process fitting
5. Diaphragm

![Fig. 7: Hygienic installation of the measuring cell (example: Clamp 2")](image)

1. Measuring cell
2. Lateral measuring cell seal
3. Process fitting
4. Front measuring cell seal
5. Diaphragm
### 3.3 Adjustment

**Local adjustment**

The integrated display and adjustment unit is used for on-site adjustment of VEGABAR 38.

**Note:**

The housing with display and adjustment unit can be rotated 330° for optimum readability and operability without tools.

**Wireless adjustment**

Devices with integrated Bluetooth module can be adjusted wirelessly via standard adjustment tools:

- Smartphone/tablet (iOS or Android operating system)
- PC/notebook (Windows operating system)

![Fig. 8: Wireless connection to standard operating devices with integrated Bluetooth LE](image)

1. Sensor
2. Smartphone/Tablet
3. PC/Notebook

### 3.4 Packaging, transport and storage

**Packaging**

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

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

**Transport**

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

**Transport inspection**

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

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

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

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

Storage and transport temperature

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

3.5 Accessories

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

Welded sockets and adapters

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

Threaded adapters enable simple adaptation of devices with standard threaded fittings, e.g. to process-side hygiene connections.

Mounting accessories

The suitable mounting accessories for VEGABAR 38 includes siphons, blocking valves and measuring instrument holders.
4 Mounting

4.1 General instructions

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

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

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.

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
- When mounting horizontally, rotate the housing so that the cable gland or plug connector point downward
Mounting

VEGABAR 38 • Two-wire 4 … 20 mA

Mounting

- 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.

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

Ventilation and pressure compensation

Ventilation and pressure compensation for VEGABAR 38 are provided by an air-permeable, moisture-blocking filter element.

**Note:**
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.

![Fig. 9: Position of the filter element](image)

1 Filter element

For effective ventilation, the filter element must always be free of buildup.

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.

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.
4.2 Process pressure measurement

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.

In vapours

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

- Connect via a siphon
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.

**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.
4.3 Level measurement

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. 14: Measurement setup for level measurement
5 Connecting to power supply

5.1 Preparing the connection

Safety instructions
Always keep in mind the following safety instructions:

- Carry out electrical connection by trained, qualified personnel authorised by the plant operator
- If overvoltage surges are expected, overvoltage arresters should be installed

Warning:
Only connect or disconnect in de-energized state.

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

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

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

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

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

Connection cable
Use cable with round cross section. Depending on the plug connection, you have to select the outer diameter of the cable respectively so that the seal effect of the cable gland is ensured.

Depending on the connection method or signal output, the device is connected with standard two, three or four-wire cable without shielding.

5.2 Connection procedure

M12 x 1 plug
This plug connection requires a complete confectioned cable with counter plug.

Plug according to ISO 4400
Proceed as follows:
1. Loosen the screw on the rear of the plug connector
2. Remove the plug connector and seal from VEGABAR 38
3. Remove the plug insert from the plug housing
5 Connecting to power supply

4. Remove approx. 5 cm of the cable mantle, strip approx. 1 cm insulation from the individual wires
5. Lead the cable through the cable gland into the plug housing
6. Connect the wire ends to the screw terminals according to the wiring plan

7. Snap the plug insert into the plug housing and insert the sensor seal
8. Plug the plug insert with seal to VEGABAR 38 and tighten the screw

The electrical connection is finished.

ISO 4400 plug with hinged cover

Proceed as follows:
1. Loosen the screw in the cover of the plug connector
2. Open the cover and remove it
3. Press the plug insert downwards
4. Loosen the screws of the strain relief and cable entry
5 Connecting to power supply

Fig. 17: Loosen the plug insert
1 Plug insert
2 Strain relief
3 Cable gland
4 Plug housing

5. Remove approx. 5 cm of the cable mantle, strip approx. 1 cm insulation from the individual wires
6. Lead the cable through the cable gland into the plug housing
7. Connect the wire ends to the screw terminals according to the wiring plan

Fig. 18: Connection to the screw terminals
1 Cable gland
2 Cover
3 Plug housing
4 Plug insert
5 Plug seal

8. Snap the plug insert into the plug housing and insert the sensor seal

Information:
Note the correct arrangement, see illustration
9. Tighten the screws on the strain relief and cable entry
10. Hook in the cover and push onto the plug connection, tighten cover screw
11. Plug the plug insert with seal to VEGABAR 38 and tighten the screw
The electrical connection is finished.

For this plug version you can use standard cable with round wire cross-section. The inner conductors do not have to be stripped. The plug connects the conductors automatically when screwing in. Cable diameter 5.5 … 8 mm, protection IP67.

Fig. 19: Connection, valve plug ISO 4400 with IDC crimping technology

1 Compression nut
2 Cable
3 Seal ring
4 Terminal insert
5 Plug housing

5.3 Wiring plan - Two-wire 4 … 20 mA

Fig. 20: Wiring plan - two-wire 4 … 20 mA - plug according to ISO 4400

<table>
<thead>
<tr>
<th>Contact, plug connector</th>
<th>Function/Polarity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Voltage supply, signal output/+</td>
</tr>
<tr>
<td>2</td>
<td>Voltage supply, signal output/-</td>
</tr>
<tr>
<td>3</td>
<td>Free</td>
</tr>
<tr>
<td></td>
<td>Electrically connected with metal housing</td>
</tr>
</tbody>
</table>

Plug according to ISO 4400 with IDC method of termination

Plug according to ISO 4400
5.4 Switch-on phase

After switching on, the device first carries out a self-check:

- Internal check of the electronics
- The output signal jumps to the set fault current

The current measured value is then output on the signal cable.
6 Access protection

6.1 Bluetooth radio interface
Devices with a Bluetooth radio interface are protected against unwanted access from outside. This means that only authorized persons can receive measured and status values and change device settings via this interface.

**Bluetooth access code**
A Bluetooth access code is required to establish Bluetooth communication via the adjustment tool (smartphone/tablet/notebook). This code must be entered once when Bluetooth communication is established for the first time in the adjustment tool. It is then stored in the adjustment tool and does not have to be entered again.

The Bluetooth access code is individual for each device. It is printed on the device housing and is also supplied with the device in the information sheet "PINs and Codes". It can be changed by the user after the first connection has been established. If the Bluetooth access code has not been entered correctly, a new entry can only be made after a waiting period has elapsed. The waiting time increases with each additional incorrect entry.

**Emergency Bluetooth unlock code**
The emergency Bluetooth access code enables Bluetooth communication to be established in the event that the Bluetooth access code is no longer known. It can't be changed. The emergency Bluetooth access code can be found in information sheet "Access protection". If this document is lost, the emergency Bluetooth access code can be retrieved from your personal contact person after legitimation.

The storage and transmission of Bluetooth access codes is always encrypted (SHA 256 algorithm).

6.2 Protection of the parameterization
The settings (parameters) of the device can be protected against unwanted changes. The parameter protection is deactivated on delivery, all settings can be made.

**Device code**
To protect the parameterization, the device can be locked by the user with the aid of a freely selectable device code. The settings (parameters) can then only be read out, but not changed. The device code is also stored in the adjustment tool. However, unlike the Bluetooth access code, it must be re-entered for each unlock. When using the adjustment app or DTM, the stored device code is then suggested to the user for unlocking.

**Emergency device code**
The emergency device code allows unlocking the device in case the device code is no longer known. It can't be changed. The emergency device code can also be found on the supplied information sheet "Access protection". If this document is lost, the emergency device code can be retrieved from your personal contact person after legitimation.

The storage and transmission of the device codes is always encrypted (SHA 256 algorithm).
6.3 Storing the codes in myVEGA

If the user has a "myVEGA" account, then the Bluetooth access code as well as the device code are additionally stored in his account under "PINs and Codes". This greatly simplifies the use of additional adjustment tools, as all Bluetooth access and device codes are automatically synchronized when connected to the "myVEGA" account.
7 Set up with the integrated display and adjustment unit

7.1 Adjustment system

The instrument is operated via the three keys of the integrated display and adjustment unit. The respective menu items are shown on the LC display. You can find the function of the individual keys in the below overview.

Certain settings are only possible to a limited extent or not possible with the integrated display and adjustment unit. For these settings, we recommend using the adjustment app or PACTware with corresponding DTM.

---

**Function**

**Display and adjustment elements**

![Integrated display and adjustment unit](image)

*Fig. 22: Integrated display and adjustment unit*

Key functions

<table>
<thead>
<tr>
<th>Key</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>[•]</td>
<td>Entry to the menu level</td>
</tr>
<tr>
<td></td>
<td>Jump to selected menu item</td>
</tr>
<tr>
<td></td>
<td>Edit parameter</td>
</tr>
<tr>
<td></td>
<td>Select editing position</td>
</tr>
<tr>
<td></td>
<td>Save value</td>
</tr>
<tr>
<td>[+/-]</td>
<td>Switching between the individual measured value windows</td>
</tr>
<tr>
<td></td>
<td>Navigation in the menu items, forwards</td>
</tr>
<tr>
<td></td>
<td>Change parameter values upwards</td>
</tr>
<tr>
<td>[+]</td>
<td>Switching between the individual measured value windows</td>
</tr>
<tr>
<td></td>
<td>Navigation in the menu items, backwards</td>
</tr>
<tr>
<td></td>
<td>Change parameter values downwards</td>
</tr>
<tr>
<td>[-]</td>
<td>Switching between the individual measured value windows</td>
</tr>
<tr>
<td></td>
<td>Navigation in the menu items, backwards</td>
</tr>
<tr>
<td></td>
<td>Change parameter values downwards</td>
</tr>
<tr>
<td>[+/-]</td>
<td>Jump to next higher menu</td>
</tr>
<tr>
<td></td>
<td>Interrupt input</td>
</tr>
</tbody>
</table>

---
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. Simultaneous pressing of the [+] and [-] keys causes a return to the measured value indication. Approx. 60 minutes after the last pressing of a key, an automatic reset to measured value indication is triggered. Any values not confirmed with [O] will not be saved.

### 7.2 Measured value and menu item display

Measured value images are displayed according to the following presentation:

![Fig. 23: Indication of measured value with additional displays](image)

1. Measured value as bargraph
2. Measured value as digital value with unit
3. Measuring cell temperature
4. Sensor-TAG

The menu items are displayed according to the following diagram:

![Fig. 24: Display menu item](image)

1. Menu item code acc. to VDMA 24574-1
2. Actual parameter value
3. Menu item name
7.3 Parameter adjustment

7.3.1 Main menu

Selection language

With the first setup, the instrument offers you a selection of the menu languages. The selection you are making here can be changed any time under "Extended functions", "Menu language".

Zero

The menu item Zero (initial value) defines the pressure value at the output current 4 mA.

Information:
The zero adjustment has no influence on the value of the span adjustment.

Menu item code:
• ZEO

Parameter:
• Pressure value

Span

The menu item Span (final value) defines the pressure value at the output current 20 mA.

Menu item code:
• SPN

Parameter:
• Pressure value

Extended functions, diagnosis

These menu items allow access to the menu areas "Extended functions" or "Diagnosis".
Menu item code:
- EF
- DIA

### 7.3.2 Extended functions

**Reaction when malfunction occurs**

In this menu item you define the behaviour of the current output in the event of failures.

Menu item code:
- FER

Parameter:
- \( \leq 3.6 \text{ mA} \)
- \( \geq 21 \text{ mA} \)

**Damping**

To damp process-dependent measured value fluctuations, set an integration time in this menu item.

Due to the set damping, the 4 … 20 mA output as well as the switching output react in case of a sudden increased of the measured variable with a time-delayed slope curve.

Menu item code:
- DAM

Parameter:
- Time value

**Offset correction**

The installation position of the device can shift the measured value minimally (offset). The offset correction compensates this measured value shift. The measured value that should currently be displayed is entered (manual offset correction). With relative pressure transmitters, an automatic offset to 0.0000 bar can alternatively be carried out.

**Note:**

With automatic offset correction, the current measured value must not be influenced by product coverage or static pressure.
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.

Menu item code:
- OFS

Parameter:
- Pressure value

Accept value

In this menu item (live adjustment) you can accept the current measured value as the value for the 4 mA adjustment (LRV) or the 20 mA adjustment (URV). \(^1\)

Menu item code:
- LRV
- URV

Parameter:
- Pressure value

Display lighting

In this menu item you switch the background lighting for the display off or on.

Menu item code:
- DIS

Parameter
- On
- Off

Note:
When the background lighting is on, the 360° status display is deactivated or vice versa.

Pressure unit

In this menu item the adjustment unit of the device is defined. The selection made determines the displayed unit in the menu items "Zero/Span" and "Offset correction" as well as "Accept value".

\(^1\) LRV: Lower Range Value, URV: Upper Range Value
Set up with the integrated display and adjustment unit

**UNI**

Unit, pressure

Menu item code:
- UNI

The following units are available: mbar, bar, psi, kPa, MPa, inHg, mmHg, mmH₂O, inH₂O

**Unit temperature**

In this menu item the temperature unit of the device is defined. The selection made determines the unit for the measuring cell temperature shown on the display.

Menu item code:
- TMP

Parameter:
- °C
- °F

**Menu language**

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

Menu item code:
- German, English, French, Spanish, Portuguese, Italian, Dutch, Russian, Chinese, Turkish

**Bluetooth access code**

In this menu item, you can change the factory-preset Bluetooth access code to your personal Bluetooth access code.

Note:
The individual preset Bluetooth access code of the device can be found on the supplied information sheet "PINS and Codes". If this is changed by the user and is no longer available, access is only possible via the emergency Bluetooth unlock code on the information sheet "Emergency unlock codes" also supplied.

Menu item code:
- BT
Protection of the parameterization

In this menu item you safeguard the sensor parameters by entering a 6-digit device code against unauthorized or unintentional modifications.

With protected parameter adjustment, the individual menu items can be selected and displayed, however the parameters can no longer be modified.

The sensor operation can also be enabled in any menu item by entering the device code. The parameter adjustment remains open until you return to the measured value display. This takes place automatically after 60 min.

Menu item code:
- COD

Parameter:
- Numerical value

Note:
The factory set device code is "000000". If this is changed by the user and is no longer available, access is only possible via the emergency device unlock code on the information sheet "Emergency unlock codes" also supplied.

Note:
With protected parameter adjustment, adjustment via the VEGA Tools app as well as PACTware/DTM and other systems is also blocked.

Reset

During a reset, parameter settings made by the user are reset to the values of the basic setting or the delivery status (see chapter "Menu overview") 2).

Menu item code:
- RES

Parameter:
- Basic settings

2) Language and Bluetooth access code are not reset.
7 Set up with the integrated display and adjustment unit

- **Delivery status**

**Basic settings**: Resets the parameter settings to the default values of the respective device. The order-related settings are not transferred to the current parameters after this reset.

**Delivery status**: Resets the parameter settings to the delivery status.

**Information**: The current status of the access protection, the Bluetooth access code and the device code are not reset.

### 7.3.3 Diagnostics

**Status**

In this menu item, the device status is displayed.

![STA OK](image)

Menu item code:

- STA

In the event of an error, the error code, e.g. F017, and an error description, e.g. "Adjustment span too small" are displayed.

**Parameter modification counter**

This menu item displays the number of parameter changes made.

![PCO Counter](image)

Menu item code:

- PCO

**Peak value indicator**

In this menu item, the min. and max. values for pressure, measuring cell temperature and electronics temperature are displayed.

![LO HI](image)

Menu item code:

- LO

---

3) Parameter delivery status only available with a parameter adjustment that deviates from the basic settings, e.g. customer-specific adjustment
Information:
To reset the pointer function, the VEGA Tools app or PACTware/DTM is required.

Sensor information
This menu item displays the hardware and software status as well as the serial number of the device.
Menu item code:
- INF
Parameter:
- HW
- SW
- SN

Extended functions - Simulation
In this menu item you simulate switching states of the transistor outputs or current values of the 4 … 20 mA output. This allows the signal path to be tested, e.g. via downstream display instruments or the input card of the control system. The simulation values are: Pressure, current, switching status.
Menu item code:
- SIM
Parameter:
- Numerical value
- Open
- Closed

Note:
Without manual deactivation, the sensor terminates the simulation automatically after 60 minutes.
8 Setup with smartphone/tablet (Bluetooth)

8.1 Preparations
Make sure that your smartphone/tablet meets the following system requirements:

- Operating system: iOS 8 or newer
- Operating system: Android 5.1 or newer
- Bluetooth 4.0 LE or newer

Download the VEGA Tools app from the "Apple App Store", "Google Play Store" or "Baidu Store" to your smartphone or tablet.

8.2 Connecting
Start the adjustment app and select the function "Setup". The smartphone/tablet searches automatically for Bluetooth-capable instruments in the area.

The message "Connecting ..." is displayed. The devices found are listed and the search is automatically continued.

Select the requested instrument in the device list.
As soon as the Bluetooth connection to a device is established, the LED display of the device in question flashes blue 4 times.

Authenticate
When establishing the connection for the first time, the operating tool and the sensor must authenticate each other. After the first correct authentication, each subsequent connection is made without a new authentication query.

Enter Bluetooth access code
For authentication, enter the 6-digit Bluetooth access code in the next menu window. You can find the code on the outside of the device housing and on the information sheet "Pins and Codes" in the device packaging.

For the very first connection, the adjustment unit and the sensor must authenticate each other.

Enter the 6 digit Bluetooth access code of your Bluetooth instrument.

Note:
If an incorrect code is entered, the code can only be entered again after a delay time. This time gets longer after each incorrect entry.

The message "Waiting for authentication" is displayed on the smartphone/tablet.

Connected
After connection, the sensor adjustment menu is displayed on the respective adjustment tool.
If the Bluetooth connection is interrupted, e.g. due to a too large distance between the two devices, this is displayed on the adjustment tool. The message disappears when the connection is restored.

**Change device code**

Parameter adjustment of the device is only possible if the parameter protection is deactivated. When delivered, parameter protection is deactivated by default and can be activated at any time.

It is recommended to enter a personal 6-digit device code. To do this, go to menu "Extended functions", "Access protection", menu item "Protection of the parameter adjustment".

**8.3 Sensor parameter adjustment**

The sensor adjustment menu is divided into two halves:

On the left you'll find the navigation section with the menus "Setup", "Display", "Diagnosis" and others.

The selected menu item, recognisable by the colour change, is displayed in the right half.

![Figure 26: Example of an app view - Setup measured values](image)

Fig. 26: Example of an app view - Setup measured values
9 Setup with PC/notebook (Bluetooth)

9.1 Preparations

Make sure that your PC/notebook meets the following system requirements:

- Operating system Windows 10
- DTM Collection 10/2020 or newer
- Bluetooth 4.0 LE or newer

Activate the Bluetooth connection via the project assistant.

**Note:**
Older systems do not always have an integrated Bluetooth LE. In these cases, a Bluetooth USB adapter is required. Activate the Bluetooth USB adapter using the Project Wizard.

After activating the integrated Bluetooth or the Bluetooth USB adapter, devices with Bluetooth are found and created in the project tree.

9.2 Connecting

Select the requested device for the online parameter adjustment in the project tree.

As soon as the Bluetooth connection to a device is established, the LED display of the device in question flashes blue 4 times.

Authenticate

When establishing the connection for the first time, the operating tool and the device must authenticate each other. After the first correct authentication, each subsequent connection is made without a new authentication query.

Enter Bluetooth access code

For authentication, enter in the next menu window the 6-digit Bluetooth access code:

*Fig. 27: Enter Bluetooth access code*
You can find the code on the outside of the device housing and on the information sheet "PINs and Codes" in the device packaging.

**Note:**
If an incorrect code is entered, the code can only be entered again after a delay time. This time gets longer after each incorrect entry.

The message "Waiting for authentication" is displayed on the PC/notebook.

**Connected**
After connection, the device DTM appears.

If the connection is interrupted, e.g. due to a too large distance between device and adjustment tool, this is displayed on the adjustment tool. The message disappears when the connection is restored.

**Change device code**
Parameter adjustment of the device is only possible if the parameter protection is deactivated. When delivered, parameter protection is deactivated by default and can be activated at any time.

It is recommended to enter a personal 6-digit device code. To do this, go to menu "Extended functions", "Access protection", menu item "Protection of the parameter adjustment".

### 9.3 Parameter adjustment
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.

![Fig. 28: Example of a DTM view - Adjustment current output](image)
# 10 Menu overview

## 10.1 Display and adjustment unit (on site)

<table>
<thead>
<tr>
<th>Menu item</th>
<th>Measured value window 1</th>
<th>Measured value window 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measured value indication</td>
<td>Pressure</td>
<td>Pressure, measuring cell temperature, sensor TAG</td>
</tr>
</tbody>
</table>

### Main menu

<table>
<thead>
<tr>
<th>Menu item</th>
<th>Code acc. to VDMA 24574-1</th>
<th>Basic settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zero 4 mA</td>
<td>ZEO</td>
<td>Measuring range begin</td>
</tr>
<tr>
<td>Span 20 mA</td>
<td>SPN</td>
<td>Measuring range end</td>
</tr>
<tr>
<td>Extended functions</td>
<td>EF</td>
<td>-</td>
</tr>
<tr>
<td>Diagnostics</td>
<td>DIA</td>
<td>-</td>
</tr>
</tbody>
</table>

### Extended functions

<table>
<thead>
<tr>
<th>Menu item</th>
<th>Code acc. to VDMA 24574-1</th>
<th>Basic settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Damping</td>
<td>DAM</td>
<td>1 s</td>
</tr>
<tr>
<td>Offset correction</td>
<td>OFS</td>
<td>-</td>
</tr>
<tr>
<td>Reaction when malfunctions occur</td>
<td>FER</td>
<td>$\leq 3.6$ mA</td>
</tr>
<tr>
<td>Accept value 4 mA</td>
<td>LRV</td>
<td>-</td>
</tr>
<tr>
<td>Accept value 20 mA</td>
<td>URV</td>
<td>-</td>
</tr>
<tr>
<td>Display lighting</td>
<td>DIS</td>
<td>On</td>
</tr>
<tr>
<td>Pressure unit</td>
<td>UNI</td>
<td>mbar</td>
</tr>
<tr>
<td>Unit temperature</td>
<td>TMP</td>
<td>$^\circ$C</td>
</tr>
<tr>
<td>Menu language</td>
<td>LG</td>
<td>English</td>
</tr>
<tr>
<td>Bluetooth access code</td>
<td>BT</td>
<td>On</td>
</tr>
<tr>
<td>Protection of the parameterization</td>
<td>COD</td>
<td>Off</td>
</tr>
<tr>
<td>Reset</td>
<td>RES</td>
<td>-</td>
</tr>
</tbody>
</table>

### Diagnostics

<table>
<thead>
<tr>
<th>Menu item</th>
<th>Code acc. to VDMA 24574-1</th>
<th>Delivery status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status</td>
<td>STA</td>
<td>-</td>
</tr>
<tr>
<td>Parameter modification counter</td>
<td>PCO</td>
<td>-</td>
</tr>
<tr>
<td>Min. value pointer function</td>
<td>LO</td>
<td>Last values</td>
</tr>
<tr>
<td>Max. value pointer function</td>
<td>HI</td>
<td>-</td>
</tr>
<tr>
<td>Sensor information</td>
<td>INF, HW, SW</td>
<td>-</td>
</tr>
</tbody>
</table>
### 10 Menu overview

<table>
<thead>
<tr>
<th>Menu item</th>
<th>Code acc. to VDMA 24574-1</th>
<th>Delivery status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simulation</td>
<td>SIM</td>
<td>-</td>
</tr>
</tbody>
</table>

#### 10.2 VEGA Tools app and DTM (Bluetooth)

**Start image (app)**

<table>
<thead>
<tr>
<th>Menu item</th>
<th>Device information</th>
<th>Actual measured values</th>
<th>Device status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start image</td>
<td>Device name, software version, serial number</td>
<td>Pressure, output current, measuring cell temperature, electronics temperature, sensor TAG</td>
<td>OK, error indication</td>
</tr>
</tbody>
</table>

**Main menu**

<table>
<thead>
<tr>
<th>Menu item</th>
<th>Parameter (code acc. to VDMA 24574-1)</th>
<th>Editing section</th>
<th>Basic setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement loop name</td>
<td>Measurement loop name</td>
<td>19 alphanumeric characters / special characters</td>
<td>Sensor</td>
</tr>
<tr>
<td>Current output</td>
<td>Zero 4 mA (ZEO)</td>
<td>Measuring range begin … measuring range end</td>
<td>Measuring range begin</td>
</tr>
<tr>
<td></td>
<td>Span 20 mA (SPN)</td>
<td>Measuring range begin … measuring range end</td>
<td>Measuring range end</td>
</tr>
<tr>
<td>Reaction in case of fault (FER)</td>
<td>≤ 3.6 mA, ≥ 21 mA</td>
<td>≤ 3.6 mA</td>
<td></td>
</tr>
<tr>
<td>360° status display (free signalling)</td>
<td>Brightness (LED)</td>
<td>0 %, 10 %, 20 … 100 %</td>
<td>100 %</td>
</tr>
<tr>
<td></td>
<td>Signalling</td>
<td>Acc. to NAMUR NE 107, free signalling</td>
<td>Switching output</td>
</tr>
<tr>
<td></td>
<td>Fault</td>
<td>Red, yellow …, individual colour selection, no signalling</td>
<td>Yellow</td>
</tr>
<tr>
<td></td>
<td>Flashing</td>
<td>Yes, no</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Operating states</td>
<td>Operating states 1, 2, 3, 4, 5</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Upper limit</td>
<td>Measuring range begin … measuring range end</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Colour selection</td>
<td>Red, yellow …, individual colour selection, no signalling</td>
<td>Yellow</td>
</tr>
<tr>
<td></td>
<td>Flashing</td>
<td>Yes, no</td>
<td>No</td>
</tr>
</tbody>
</table>

**Extended functions**

<table>
<thead>
<tr>
<th>Menu item</th>
<th>Parameter (code acc. to VDMA 24574-1)</th>
<th>Editing section</th>
<th>Basic setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Damping</td>
<td>Damping (DAM)</td>
<td>0 … 9.0 s</td>
<td>0 s</td>
</tr>
<tr>
<td></td>
<td>Activate thermo-shock suppression</td>
<td>Yes, no</td>
<td>No</td>
</tr>
<tr>
<td>Offset correction</td>
<td>Offset correction (OFS)</td>
<td>Execute, automatic correction</td>
<td>0.000 bar</td>
</tr>
</tbody>
</table>

---

4) When the 360° status display is switched on, the display lighting is deactivated or vice versa.
<table>
<thead>
<tr>
<th>Menu item</th>
<th>Parameter (code acc. to VDMA 24574-1)</th>
<th>Editing section</th>
<th>Basic setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjustment with medium</td>
<td>Apply min. pressure on the sensor</td>
<td>Accept 4 mA (LRV)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Apply max. pressure on the sensor</td>
<td>Accept 20 mA (URV)</td>
<td></td>
</tr>
<tr>
<td>Indication</td>
<td>Lighting (DIS) 5)</td>
<td>On</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Menu language (LG)</td>
<td>German</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Presentation</td>
<td>Measured value indication 1, measured value indication 2</td>
<td>Measured value indication 1</td>
</tr>
<tr>
<td>Units</td>
<td>Pressure unit (UNI)</td>
<td>mbar, bar, Pa, kPa, MPa, psi, mmH2O, mmHg, inH2O, inHg</td>
<td>bar</td>
</tr>
<tr>
<td></td>
<td>Temperature (TMP)</td>
<td>°C, °F</td>
<td>°C</td>
</tr>
<tr>
<td>Access protection</td>
<td>Bluetooth access code</td>
<td>Device-specific access code</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Protection of the parameterization</td>
<td>Deactivated</td>
<td></td>
</tr>
<tr>
<td>Reset</td>
<td>Reset</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

### Diagnostics

<table>
<thead>
<tr>
<th>Menu item</th>
<th>Parameter</th>
<th>Indication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status</td>
<td>Device status, parameter change counter</td>
<td>Actual values</td>
</tr>
<tr>
<td>Peak value indicator</td>
<td>Process pressure, measuring cell temperature, electronics temperature</td>
<td>Actual values, min. values, max. values</td>
</tr>
<tr>
<td>Measured values</td>
<td>Measured values, output, additional measured values</td>
<td>Actual values pressure, current output, electronics temperature, measuring cell temperature</td>
</tr>
<tr>
<td>Measured value memory (DTM)</td>
<td>Trend curve</td>
<td>Last values</td>
</tr>
<tr>
<td>Simulation</td>
<td>Pressure, current output</td>
<td>Simulated values</td>
</tr>
<tr>
<td>Sensor information</td>
<td></td>
<td>Device name, serial number, hardware version, software version, factory calibration date, Device Revision, measuring range begin, measuring range end</td>
</tr>
<tr>
<td>Sensor features (DTM)</td>
<td>Sensor characteristics</td>
<td>Features of the instrument version</td>
</tr>
</tbody>
</table>

5) When the display lighting is on, the 360° status display is deactivated or vice versa.
11 Diagnostics and servicing

11.1 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

11.2 Rectify faults

Reaction when malfunction occurs

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

Causes of malfunction

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

- Sensor
- Process
- Voltage supply
- Signal processing

Fault rectification

The first measures 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.

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.

11.3 Diagnosis, fault messages

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:

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

11.4 Status messages according to NE 107

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. 29: Pictographs of the status messages

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

Failure: Due to a malfunction in the instrument, a fault message 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.

<table>
<thead>
<tr>
<th>Code</th>
<th>Text message</th>
<th>Cause</th>
<th>Rectification</th>
</tr>
</thead>
<tbody>
<tr>
<td>F013</td>
<td>no measured value available</td>
<td>Hardware error in the area of the measuring cell</td>
<td>Send instrument for repair</td>
</tr>
<tr>
<td>F017</td>
<td>Adjustment span too small</td>
<td>Adjustment not within specification</td>
<td>Change adjustment</td>
</tr>
<tr>
<td>F036</td>
<td>no operable sensor software</td>
<td>Failed or interrupted software update</td>
<td>Repeat software update</td>
</tr>
<tr>
<td>F080</td>
<td>General software error</td>
<td>General software error</td>
<td>Restart</td>
</tr>
<tr>
<td>F110</td>
<td>Switching points too close together</td>
<td>Selected switching points too close together</td>
<td>Increase the distance between the switching points</td>
</tr>
<tr>
<td>F111</td>
<td>Switching points interchanged</td>
<td>Switching point 1 is smaller than switching point 2</td>
<td>Select switching point 1 to greater than switching point 2</td>
</tr>
<tr>
<td>F260</td>
<td>Error in the calibration</td>
<td>Checksum error in the calibration values</td>
<td>Send instrument for repair</td>
</tr>
<tr>
<td>F261</td>
<td>Error in the instrument settings</td>
<td>Checksum error in the configuration values</td>
<td>Carry out a reset</td>
</tr>
</tbody>
</table>

Function check

<table>
<thead>
<tr>
<th>Code</th>
<th>Text message</th>
<th>Cause</th>
<th>Rectification</th>
</tr>
</thead>
<tbody>
<tr>
<td>C700</td>
<td>Simulation active</td>
<td>A simulation is active</td>
<td>Finish simulation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Wait for the automatic end after 60 mins.</td>
</tr>
</tbody>
</table>
11.5 Software update

The device software is updated via Bluetooth.

The following components are required:

- Instrument
- Voltage supply
- PC/notebook with PACTware/DTM and Bluetooth USB adapter
- 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.

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 on our homepage.

11.6 How to proceed if a repair is necessary

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

In case of repair, proceed as follows:

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

12.1 Dismounting steps

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

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

12.2 Disposal
The device is made of recyclable materials. For this reason, it should be disposed of by a specialist recycling company. Observe the applicable national regulations.
13 Certificates and approvals

13.1 Radio licenses

Bluetooth
The Bluetooth radio module in the device has been tested and approved according to the current edition of the applicable country-specific norms or standards.

The confirmations as well as regulations for use can be found in the document "Radio licenses" supplied or on our homepage.

13.2 Approvals for Ex areas

Approved versions for use in hazardous areas are available or in preparation for the device series.

You can find the relevant documents on our homepage.

13.3 Approvals as overfill protection

Approved versions for use as part of an overfill protection system are available or in preparation for this device series.

The corresponding approvals can be found on our homepage.

13.4 Food and pharmaceutical certificates

Versions for use in the food and pharmaceutical industries are available or in preparation.

The corresponding certificates can be found on our homepage.

13.5 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.

13.6 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.

13.7 Environment management system
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 chapters "Packaging, transport and storage", "Disposal" of these operating instructions.
14 Supplement

14.1 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 parts

<table>
<thead>
<tr>
<th>Component</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process fitting</td>
<td>316L, PVDF, Duplex steel (1.4462)</td>
</tr>
<tr>
<td>Diaphragm</td>
<td>Sapphire-ceramic® (&gt; 99.9 % Al₂O₃ ceramic)</td>
</tr>
<tr>
<td>Measuring cell seal</td>
<td>FKM (VP2/A), EPDM (A+P 70.10-02), FFKM (Perlast G74S)</td>
</tr>
</tbody>
</table>

Seal for process fitting (in the scope of delivery)
- Thread G½ (EN 837), thread G½ inside G¼ (ISO 228-1), thread G½ inside 11.4 mm (ISO 228-1), thread M20 x 1.5 (EN 837), thread G1½ (DIN 3852-A)
- Further thread versions  Klinger sil C-4400
- Seal for process fitting  Depending on the configuration

Materials for applications in foodstuffs

Surface quality, hygienic fittings, typ.
- Process fitting          Rₐ < 0.76 µm
- Ceramic diaphragm        Rₐ < 0.5 µm

Materials, non-wetted parts

<table>
<thead>
<tr>
<th>Component</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electronics housing</td>
<td>316L und PBT/PC</td>
</tr>
<tr>
<td>Illuminated ring</td>
<td>PC</td>
</tr>
<tr>
<td>M12 x 1 plug connector</td>
<td>PBT/PC</td>
</tr>
<tr>
<td>- Contact support</td>
<td></td>
</tr>
<tr>
<td>- Contacts</td>
<td>CuZn, nickel layer and 0.8 µm gold-plated</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 0.25 kg (0.55 lbs)</td>
</tr>
</tbody>
</table>

Torques

Max. torque for process fitting (examples)
- Clamp                      5/10 Nm (3.688/7.376 lbf ft)
- Thread G1 (DIN 3852-E) PEEK, G1½ (DIN 3852-A-B) PEEK 10 Nm (7.376 lbf ft)
- Varivent                   20 Nm (14.75 lbf ft)
- Thread G½ (ISO 228-1), G¾ (DIN 3852-E), M30 x 1.5, Ingold, NPT connections 30 Nm (22.13 lbf ft)
Input variable

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. 6)

Nominal measuring ranges and overload capability in bar/kPa

<table>
<thead>
<tr>
<th>Nominal range</th>
<th>Overload capacity, max. pressure</th>
<th>Overload capacity, min. pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gauge pressure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 … +0.1 bar/0 … +10 kPa</td>
<td>+15 bar/+1500 kPa</td>
<td>-0.2 bar/-20 kPa</td>
</tr>
<tr>
<td>0 … +0.4 bar/0 … +40 kPa</td>
<td>+30 bar/+3000 kPa</td>
<td>-0.8 bar/-80 kPa</td>
</tr>
<tr>
<td>0 … +1 bar/0 … +100 kPa</td>
<td>+35 bar/+3500 kPa</td>
<td>-1 bar/-100 kPa</td>
</tr>
<tr>
<td>0 … +2.5 bar/0 … +250 kPa</td>
<td>+50 bar/+5000 kPa</td>
<td>-1 bar/-100 kPa</td>
</tr>
<tr>
<td>0 … +5 bar/0 … +500 kPa</td>
<td>+65 bar/+6500 kPa</td>
<td>-1 bar/-100 kPa</td>
</tr>
<tr>
<td>0 … +10 bar/0 … +1000 kPa</td>
<td>+90 bar/+9000 kPa</td>
<td>-1 bar/-100 kPa</td>
</tr>
<tr>
<td>0 … +25 bar/0 … +2500 kPa</td>
<td>+130 bar/+13000 kPa</td>
<td>-1 bar/-100 kPa</td>
</tr>
<tr>
<td>0 … +60 bar/0 … +6000 kPa</td>
<td>+200 bar/+20000 kPa</td>
<td>-1 bar/-100 kPa</td>
</tr>
<tr>
<td>-0.05 … +0.05 bar/-5 … +5 kPa</td>
<td>+15 bar/+1500 kPa</td>
<td>-0.2 bar/-20 kPa</td>
</tr>
<tr>
<td>-0.2 … +0.2 bar/-20 … +20 kPa</td>
<td>+20 bar/+2000 kPa</td>
<td>-0.4 bar/-40 kPa</td>
</tr>
<tr>
<td>-0.5 … +0.5 bar/-50 … +50 kPa</td>
<td>+35 bar/+3500 kPa</td>
<td>-1 bar/-100 kPa</td>
</tr>
<tr>
<td>-1 … 0 bar/-100 … 0 kPa</td>
<td>+35 bar/+3500 kPa</td>
<td>-1 bar/-100 kPa</td>
</tr>
<tr>
<td>-1 … +1.5 bar/-100 … +150 kPa</td>
<td>+40 bar/+4000 kPa</td>
<td>-1 bar/-100 kPa</td>
</tr>
<tr>
<td>Absolute pressure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 … 0.1 bar/0 … 10 kPa</td>
<td>15 bar/1500 kPa</td>
<td>0 bar abs.</td>
</tr>
<tr>
<td>0 … 1 bar/0 … 100 kPa</td>
<td>35 bar/3500 kPa</td>
<td>0 bar abs.</td>
</tr>
<tr>
<td>0 … 2.5 bar/0 … 250 kPa</td>
<td>50 bar/5000 kPa</td>
<td>0 bar abs.</td>
</tr>
<tr>
<td>0 … +5 bar/0 … +500 kPa</td>
<td>65 bar/+6500 kPa</td>
<td>0 bar abs.</td>
</tr>
<tr>
<td>0 … 10 bar/0 … 1000 kPa</td>
<td>90 bar/9000 kPa</td>
<td>0 bar abs.</td>
</tr>
<tr>
<td>0 … 25 bar/0 … 2500 kPa</td>
<td>+130 bar/+13000 kPa</td>
<td>0 bar abs.</td>
</tr>
<tr>
<td>0 … 60 bar/0 … 6000 kPa</td>
<td>+200 bar/+20000 kPa</td>
<td>0 bar abs.</td>
</tr>
</tbody>
</table>

6) Data on overload capability apply for reference temperature.
### Nominal measuring ranges and overload capacity in psi

<table>
<thead>
<tr>
<th>Nominal range</th>
<th>Overload capacity, max. pressure</th>
<th>Overload capacity, min. pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gauge pressure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 ... +1.5 psig</td>
<td>+225 psig</td>
<td>-3 psig</td>
</tr>
<tr>
<td>0 ... +5 psig</td>
<td>+435 psig</td>
<td>-12 psig</td>
</tr>
<tr>
<td>0 ... +15 psig</td>
<td>+525 psig</td>
<td>-14.51 psig</td>
</tr>
<tr>
<td>0 ... +30 psig</td>
<td>+725 psig</td>
<td>-14.51 psig</td>
</tr>
<tr>
<td>0 ... +75 psig</td>
<td>+950 psig</td>
<td>-14.51 psig</td>
</tr>
<tr>
<td>0 ... +150 psig</td>
<td>+1300 psig</td>
<td>-14.51 psig</td>
</tr>
<tr>
<td>0 ... +300 psig</td>
<td>+1900 psig</td>
<td>-14.51 psig</td>
</tr>
<tr>
<td>0 ... +900 psig</td>
<td>+2900 psig</td>
<td>-14.51 psig</td>
</tr>
<tr>
<td>-0.7 ... +0.7 psig</td>
<td>+225 psig</td>
<td>-3 psig</td>
</tr>
<tr>
<td>-3 ... +3 psig</td>
<td>+290 psig</td>
<td>-6 psig</td>
</tr>
<tr>
<td>-7 ... +7 psig</td>
<td>+525 psig</td>
<td>-14.51 psig</td>
</tr>
<tr>
<td>-14.5 ... 0 psig</td>
<td>+525 psig</td>
<td>-14.51 psig</td>
</tr>
<tr>
<td>-14.5 ... +20 psig</td>
<td>+580 psig</td>
<td>-14.51 psig</td>
</tr>
<tr>
<td>Absolute pressure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 ... 15 psi</td>
<td>525 psi</td>
<td>0 psi</td>
</tr>
<tr>
<td>0 ... 30 psi</td>
<td>600 psi</td>
<td>0 psi</td>
</tr>
<tr>
<td>0 ... +75 psi</td>
<td>975 psi</td>
<td>0 psi</td>
</tr>
<tr>
<td>0 ... 150 psi</td>
<td>1350 psi</td>
<td>0 psi</td>
</tr>
<tr>
<td>0 ... 300 psi</td>
<td>1500 psi</td>
<td>0 psi</td>
</tr>
<tr>
<td>0 ... 900 psi</td>
<td>+2900 psi</td>
<td>0 psi</td>
</tr>
</tbody>
</table>

### Adjustment ranges

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

Zero/Span adjustment:
- Zero: -20 ... +95 %
- Span: -120 ... +120 %

Maximum permissible Turn Down: Unlimited (recommended 20 : 1)

### Switch-on phase

Start-up time with operating voltage $U_b$ ≤ 2 s
Starting current for run-up time ≤ 3.6 mA

### Output variable - two-wire 4 ... 20 mA

<table>
<thead>
<tr>
<th>Output signal</th>
<th>4 ... 20 mA - passive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection technology</td>
<td>Two-wire</td>
</tr>
<tr>
<td>Range of the output signal</td>
<td>3.8 ... 20.5 mA</td>
</tr>
<tr>
<td>Signal resolution</td>
<td>5 µA</td>
</tr>
</tbody>
</table>
Fault signal, current output (adjustable) \( \leq 3.6 \text{ mA}, \geq 21 \text{ mA}, \text{ last measured value} \)

Max. output current \( 21.5 \text{ mA} \)

Load See load resistance under Power supply

Transferred measured value Pressure

### Dynamic behaviour output

Dynamic characteristics - Current output

![Fig. 30: Behaviour the current output in case of sudden change of the process variable. \( t_T \): dead time; \( t_A \): rise time; \( t_S \): jump response time](image)

<table>
<thead>
<tr>
<th>Size</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dead time</td>
<td>( \leq 2 \text{ ms} )</td>
</tr>
<tr>
<td>Rise time (10 … 90 %)</td>
<td>( \leq 4 \text{ ms} )</td>
</tr>
<tr>
<td>Step response time (i: 0 s, 10 … 90 %)</td>
<td>( \leq 6 \text{ ms} )</td>
</tr>
</tbody>
</table>

Damping (63 % of the input variable) \( 0 \ldots 9 \text{ s, adjustable} \)

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

Reference conditions according to DIN EN 61298-1

- Temperature \(+15 \ldots +25 \degree \text{C} (+59 \ldots +77 \degree \text{F})\)
- Relative humidity \(45 \ldots 75 \%\)
- Air pressure \(860 \ldots 1060 \text{ mbar/86 \ldots 106 kPa (12.5 \ldots 15.4 psig)}\)

Determination of characteristics Limit point adjustment according to IEC 61298-2

Characteristic curve Linear

Reference installation position upright, diaphragm points downward

Influence of the installation position \( < 0.2 \text{ mbar/20 Pa (0.003 psig)} \)

### Deviation (according to IEC 60770)

Applies to the 4 … 20 mA current output and refers to the adjusted span. Turn down (TD) is the relation nominal measuring range/adjusted span.
### Accuracy class

<table>
<thead>
<tr>
<th>Non-linearity, hysteresis and repeatability with TD 1 : 1 up to 5 : 1</th>
<th>Non-linearity, hysteresis and repeatability with 5 : 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.3 %</td>
<td>&lt; 0.3 %</td>
</tr>
<tr>
<td></td>
<td>&lt; 0.06 % x TD</td>
</tr>
</tbody>
</table>

### Influence of the medium or ambient temperature

Average temperature coefficient of the zero signal
- In the compensated temperature range \(^7\) < 0.15 %/10 K
- Outside the compensated temperature range typ. 0.3 %/10 K

Fig. 31: Temperature error with TD 1 : 1

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

Specifications refer to the set span. Turn down (TD) is the ratio: nominal measuring range/set span.

<table>
<thead>
<tr>
<th>Time period</th>
<th>Long-term drift zero signal and output span</th>
</tr>
</thead>
<tbody>
<tr>
<td>One year</td>
<td>&lt; 0.1 % x TD</td>
</tr>
<tr>
<td>Two years</td>
<td>&lt; 0.15 % x TD</td>
</tr>
<tr>
<td>Five years</td>
<td>&lt; 0.2 % x TD</td>
</tr>
<tr>
<td>Ten years</td>
<td>&lt; 0.4 % x TD</td>
</tr>
</tbody>
</table>

### Ambient conditions

- Ambient temperature device: -40 ... +80 °C (-40 ... 176 °F)
- Ambient temperature display: -25 ... +80 °C (-13 ... 176 °F)
- Storage and transport temperature \(^8\): -40 ... +80 °C (-40 ... 176 °F)

### Mechanical environmental conditions

- Vibrations (oscillations): Classe 4M8 acc. to IEC 60271-3-4 (5 g at 4 ... 200 Hz)
- Impacts (mechanical shock): Class 6M4 acc. to IEC 60271-3-6 (50 g, 2.3 ms)

\(^7\) 0 ... +100 °C (+32 ... +212 °F)
\(^8\) Relative humidity 20 ... 85 %
Impact resistance
- Plug according to ISO 4400
  - IK07 acc. to IEC 62262
- M12 x 1 plug
  - IK06 acc. to IEC 62262

Process conditions

### Process temperature

<table>
<thead>
<tr>
<th>Measuring cell seal</th>
<th>Process temperature</th>
<th>Process temperature with process fitting PVDF</th>
</tr>
</thead>
<tbody>
<tr>
<td>FKM VP2/A</td>
<td>-20 … +130 °C (-4 … +266 °F)</td>
<td></td>
</tr>
<tr>
<td>EPDM A+P 70.10-02</td>
<td>-40 … +130 °C (-40 … +266 °F)</td>
<td>-20 … +80 °C (-4 … +176 °F) 9)</td>
</tr>
<tr>
<td>FFKM Perlast G74S</td>
<td>-15 … +130 °C (+5 … +266 °F)</td>
<td></td>
</tr>
</tbody>
</table>

**Temperature derating**

![Temperature derating VEGABAR 38](image1)

1. Process temperature
2. Ambient temperature

![Temperature derating VEGABAR 38, with activated Bluetooth communication](image2)

1. Process temperature
2. Ambient temperature

**SIP process temperature**

Device configuration suitable for vapour, i.e. measuring cell seal EPDM or FFKM (Perlast G74S), previous CIP cleaning up to max. +80 °C (+176 °F): 10)

- SIP process temperature with vapour stratification up to
  - 15 minutes
  - +150 °C (+302 °F)

9) Process pressures > 5 bar: 20 … +60 °C (-4 … +140 °F)
10) SIP = Sterilization in place
11) CIP = Cleaning in place
### Process pressure

Permissible process pressure

<table>
<thead>
<tr>
<th>Time</th>
<th>Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 minutes</td>
<td>+140 °C (+284 °F)</td>
</tr>
<tr>
<td>1 hour</td>
<td>+135 °C (+275 °F)</td>
</tr>
</tbody>
</table>

### Indication

Measured value and menu display

- Graphic-capable LC display, with digital and quasianalogue indication

- Max. indicating range: -99999 … 99999

Status indication: LED illuminated ring (green-yellow-red)

### Adjustment

Adjustment elements: 3 x keys for menu adjustment

PC/Notebook: PACTware/DTM

Smartphone/Tablet: Adjustment app

### Measuring cell temperature

Range: -40 … +130 °C (-40 … +266 °F)

Resolution: < 0.2 K

Deviation: ±3 K

Output of the temperature values via Display and adjustment unit, Bluetooth, IO-Link

### Bluetooth interface

Bluetooth standard: Bluetooth 5.0 (downward compatible to Bluetooth 4.0 LE)

Frequency: 2.402 … 2.480 GHz

Max. emitted power: +2.2 dBm

Max. number of participants: 1

Effective range typ.: 25 m (82 ft)

### Electromechanical data

Angled plug connector

- Version: 4-pin according to ISO 4400

- Cable gland: M16 x 1.5 (for cable diameter 4.5 … 7 mm)

- Screw terminals for cable cross-section up to: 1.5 mm² (AWG 15)

Angle plug connector with flap lid

- Version: 4-pin according to ISO 4400

- Cable gland: M20 x 1.5 (for cable diameter 8 … 14 mm)

---

12) MWP: Maximum Working Pressure
13) Depending on the instrument version
14) Depending on the local conditions
- Screw terminals for cable cross-section  up to 1.5 mm² (AWG 15)

Angled plug connector with IDC method of termination
- Version  4-pin according to ISO 4400
- Wire cross-section  0.5 … 1 mm² (AWG 20 … AWG 17)
- Strand diameter  > 0.1 mm
- Wire diameter  1.6 … 2 mm
- Outer cable diameter  5.5 … 8 mm
- Connection frequency (on the same cross-section)  10 x

Round plug connector  4-pole with M12 x 1 screw connection

**Voltage supply**
- Operating voltage $U_B$  12 … 35 V DC
- Operating voltage $U_B^{15)}$  15 … 35 V DC
- Reverse voltage protection  Integrated

Permissible residual ripple
- for $U_h$ 12 V DC (12 V < $U_B$ < 18 V)  $\leq 0.7\ V_{eff} \ (16\ ... \ 400\ Hz)$
- for $U_h$ 24 V DC (18 V < $U_B$ < 35 V)  $\leq 1.0\ V_{eff} \ (16\ ... \ 400\ Hz)$

Load resistor
- Calculation  \(\frac{(U_B - U_{min})}{0.022\ A}\)
- Example - for $U_B$= 24 V DC  \(\frac{(24\ V - 12\ V)}{0.022\ A} = 545\ \Omega\)

**Electrical protective measures**
- Potential separation  Electronics potential free up to 500 V AC
- Protection rating

<table>
<thead>
<tr>
<th>Connection technology</th>
<th>Protection according to EN 60529/IEC 529</th>
<th>Protection according to NEMA/UL 50E</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12 x 1 plug</td>
<td>IP66/IP67</td>
<td>Type 6P</td>
</tr>
<tr>
<td>Plug according to ISO 4400</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ISO 4400 plug with hinged cover</td>
<td>IP65</td>
<td>Type 4X</td>
</tr>
<tr>
<td>Plug according to ISO 4400 with IDC method of termination</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Altitude above sea level  5000 m (16404 ft)
- Protection class  III
- Pollution degree  4

---

15) Illuminated display and adjustment unit or activated 360° status display
14.2 Dimensions

Connection technology

Fig. 34: Connection technology VEGABAR 38

1 M12 x 1 plug connector
2 Plug connector according to ISO 4400
3 Plug connector according to ISO 4400 with hinged cover
Fig. 35: VEGABAR 38, threaded fitting not front-flush

DU Thread G½ (EN 837), manometer connection
C2 Thread M20 x 1.5 (EN 837), manometer connection
CS Thread G½, inside G¼ A (ISO 228-1), Duplex (1.4462)
LF Thread ½ NPT, inside ½ NPT (ASME B1.20.1)
TI Thread ¼ NPT (ASME B1.20.1)
TJ Thread G¼ (ISO 228-1)
VEGABAR 38, threaded fitting front-flush

Fig. 36: VEGABAR 38, threaded fitting front-flush

9L  Thread G½ (DIN 3852-A)
N9  Thread G¾ (DIN 3852-E)
C5  Thread G1 (ISO 228-1)
DA  Thread G1½ (DIN 3852-A)
C9  Thread 1½ NPT (ASME B1.20.1)
8C  Thread G1½ (DIN 3852-E), PEEK
VEGABAR 38, threaded fitting front-flush with cone/extension

Fig. 37: VEGABAR 38, cone/extension fitting

DH  Thread G1 (ISO 228-1), cone 40°
LX  Thread G1 (ISO 228-1), hygienic design
AL  Thread M30 x 1.5 (DIN 13)
VEGABAR 38, hygienic fitting

Fig. 38: VEGABAR 38, hygienic fitting
AR Clamp 2" PN 40 ø 64 mm (DIN 32676, ISO 2852)
FB SMS DN 51 PN 6
E7 Ingold connection PN 10
FR Varivent N50-40 PN 25
EZ Collar socket DN 40 PN 40 (DIN 11851)
E2 Collar socket DN 40 PN 40 (DIN 11864-1, Form A)
14.3 Industrial property rights

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


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


进一步信息请参见网站<www.vega.com>。

14.4 Licensing information for open source software

Open source software components are also used in this device. A documentation of these components with the respective license type, the associated license texts, copyright notes and disclaimers can be found on our homepage.

14.5 Trademark

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