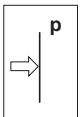


Operating Instructions VEGABAR 17



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1 About this document

1.1 Function

This operating instructions manual has all the information you need for quick setup and safe operation of VEGABAR 17. Please read this manual before you start setup.

1.2 Target group

This operating instructions manual is directed to trained personnel. The contents of this manual should be made available to these personnel and put into practice by them.

1.3 Symbolism used



Information, tip, note

This symbol indicates helpful additional information.



Caution, warning, danger

This symbol informs you of a dangerous situation that could occur. Ignoring this cautionary note can impair the person and/or the instrument.



Ex applications

This symbol indicates special instructions for Ex applications.



List

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



Action

This arrow indicates a single action.

1 **Sequence**

Numbers set in front indicate successive steps in a procedure.

2 For your safety

2.1 Authorised personnel

All operations described in this operating instructions manual must be carried out only by trained, specialised personnel authorised by the operator. For safety and warranty reasons, any internal work on the instruments must be carried out only by personnel authorised by the manufacturer.

2.2 Appropriate use

VEGABAR 17 is a pressure transmitter for measurement of gauge pressure, absolute pressure and vacuum.

2.3 Warning about misuse

Inappropriate or incorrect use of the instrument can give rise to application-specific hazards, e.g. vessel overfill or damage to system components through incorrect mounting or adjustment.

2.4 General safety instructions

VEGABAR 17 is a high-tech instrument requiring the strict observance of standard regulations and guidelines. The user must take note of the safety instructions in this operating instructions manual, the country-specific installation standards (e.g. the VDE regulations in Germany) as well as all prevailing safety regulations and accident prevention rules.

2.5 CE conformity

VEGABAR 17 is in CE conformity with EMC (89/336/EWG). Conformity has been judged acc. to the following standards:

- EMC EN 61326, Emission class A and B

Furthermore VEGABAR 17 is subject to the pressure device directive (97/23/EG), module H:

- Instruments with max. permissible pressures exceeding 200 bar need the CE marking
- Instruments with max. permissible pressures less than 200 bar do not need a CE marking

2.6 Safety information for Ex areas

Please note the Ex-specific safety information for installation and operation in Ex areas. These safety instructions are part of the operating instructions manual and come with the Ex-approved instruments.

2.7 Safety instructions for oxygen applications

For instruments in oxygen applications the special instructions in chapters "*Storage and transport*" as well as "*Mounting*" must be noted. Furthermore the valid regulations, implementation instructions and memorandums of the BG (professional assoc.) must be noted.

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 acc. to DIN EN ISO 14001.

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

- Chapter "*Storage and transport*"
- Chapter "*Disposal*"

3 Product description

3.1 Configuration

Scope of delivery

The scope of delivery encompasses:

- VEGABAR 17 process pressure transmitter
- Depending on the version with plug connector, connection cable or housing
- Documentation
 - this operating instructions manual
 - Ex-specific safety instructions (with Ex versions) and, if necessary, further certificates

3.2 Principle of operation

Area of application

VEGABAR 17 is a pressure transmitter for measurement of gauge pressure, absolute pressure or vacuum. Measured products are gases, vapours and liquids. The front flush versions are also suitable for use in viscous or contaminated products.

Physical principle

The process pressure acts via the stainless steel diaphragm to the sensor element¹⁾. A resistance change is caused which is converted into a respective output signal and outputted as measured value.

Power supply

Two-wire electronics 4 ... 20 mA for power supply and measured value transmission on the same cable.

3.3 Adjustment

VEGABAR 17 has no adjustment options. However, two potentiometers are integrated for the recalibration of zero and span.

¹⁾ For meas. ranges up to 16 bar: piezoresistive sensor element with internal transmission liquid, for meas. ranges from 25 bar: strain gauge (DMS) sensor element on the rear of the stainless steel diaphragm (dry).

3.4 Storage and transport

Packaging

Your instrument was protected by packaging during transport. Its capacity to handle normal loads during transport is assured by a test acc. to DIN 55439.

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

Instruments for oxygen applications are welded in PE foil and provided with a label "Oxygen! Use no Oil". Remove this foil just before mounting the instrument!

Storage and transport temperature

- Storage and transport temperature see "*Supplement – Technical data – Ambient conditions*"
- Relative humidity 20 ... 85 %

4 Mounting

4.1 General instructions

Wetted materials

Check, if the wetted materials such as seal, process fitting etc. are suitable for process conditions such as product, temperature etc.

Diaphragm protection



Caution:

After removing the diaphragm protection, the diaphragm must not be impressed.

Oxygen applications



Danger:

Instruments for oxygen applications should be unpacked just before mounting. After removing the protective cover of the process fitting, the label "O₂" will be visible on the process fitting. Penetration of oil, grease and dirt should be avoided. Danger of explosion!

4.2 Mounting information

Installation position

VEGABAR 17 functions in any installation position²⁾. It is mounted acc. to the same regulations like a manometer (DIN EN 839-2).



Information:

We recommend using lock fittings, measuring instrument holders and siphons from the VEGA accessory range.

4.3 Mounting procedure

Welding the socket

To mount VEGABAR 17, a welded socket is necessary. Use components from the line of VEGA mounting accessories:

- Welded socket G1B front flush, max. 150°C (302°F), article no. 2.27868

²⁾ If necessary, position correction see "Setup procedure".

- Welded socket G1B front flush O-ring, article no. 2.27867
 - Welded socket G $\frac{1}{2}$ B, article no. 27866
- Note the applicable welding standards (segment welding procedure) when welding the socket.

Sealing/Screwing in

Use the suitable O-ring seal for the following process fittings:

- G1B front flush, max. 150°C (302°F):
 - Seal dimension 21.82x3.53
 - Additional seal ring behind the thread, seal dimension 29.7x35.7x2
- G1B front flush O-ring:
 - Seal dimension 26x2
 - Additional seal ring behind the thread, seal dimension 29.7x35.7x2
- G $\frac{1}{2}$ B front flush O-ring:
 - Seal dimension 15x2
 - Additional seal ring behind the thread, seal dimension 18.5x23.7x1.5

- or -

With the following process fittings, seal the thread with teflon, hemp or a similar seal material:

- Process fitting $\frac{1}{2}$ NPT
 - Process fitting $\frac{1}{4}$ NPT
- Screw VEGABAR 17 into the welded socket. Tighten the hexagon screw on the process fitting with SW 27 (spanner width 27 mm) (with G $\frac{1}{4}$ or G $\frac{1}{2}$) or SW 41 (spanner width 41 mm) (with G1B): Torque max. 50 Nm



Fig. 1: Mounting VEGABAR 17

5 Connecting to power supply

5.1 Preparing the connection

Note safety instructions

Always observe the following safety instructions:

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



Tip:

We recommend VEGA overvoltage arrester ÜSB 62-36G.X.

Take note of safety instructions for Ex applications



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

Select power supply

The supply voltage and the current signal are carried on the same two-wire connection cable.

Provide a reliable separation of the supply circuit from the mains circuits acc. to DIN VDE 0106 part 101.

The VEGA power supply units VEGATRENN 149AEx, VEGASTAB 690, VEGADIS 371 as well as all VEGA-METs meet this requirement. If one of these instruments is used, protection class III is ensured for VEGABAR 17.

Bear in mind the following factors regarding supply voltage:

- the reduction of the output voltage of the power supply unit under nominal load (with a sensor current of 20.5 mA or 22 mA in case of fault signal)
- the influence of additional instruments in the circuit (see load values in Technical data)

Select connection cable

VEGABAR 17 is connected with standard, unscreened two-wire cable. An outer cable diameter of 5 ... 9 mm ensures the seal effect of the cable entry. If electro-magnetic interference is expected, we recommend the use of screened cable.

Cable screening and grounding

Connect the cable screen on both ends to ground potential.

If potential equalisation currents are expected, the connection on the evaluation side must be made via a ceramic capacitor (e.g. 1 nF, 1500 V). The low frequency potential equalisation currents are thus suppressed, but the protective effect against high frequency interference signals remains.

Select connection cable for Ex applications



Take note of the corresponding installation regulations for Ex applications.

5.2 Connection procedure

Connection via plug connector acc. to DIN 43650A

Proceed as follows:

- 1 Loosen the screw on the rear of the plug connector
- 2 Remove the plug connector and seal from VEGA-BAR 17
- 3 Lift the plug insert out of the plug housing

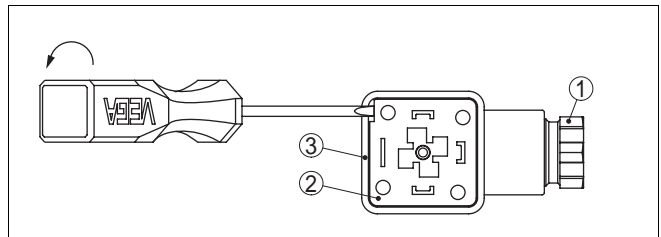


Fig. 2: Loosen the plug insert

- 1 Cable entry
- 2 Plug insert
- 3 Plug housing
- 4 Remove approx. 5 cm of the cable mantle, strip approx. 1 cm insulation
- 5 Insert the cable through the cable entry into the plug housing
- 6 Connect the wire ends to the screw terminals acc. to the wiring plan

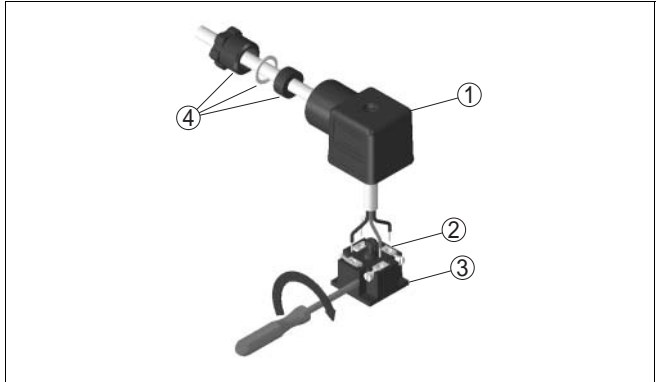


Fig. 3: Connection to the screw terminals

- 1 Cable entry
- 2 Plug housing
- 3 Plug insert
- 4 Plug seal

- 7 Snap the plug insert into the plug housing and insert the sensor seal
- 8 Plug the plug insert with seal to VEGABAR 17 and tighten the screw

The electrical connection is finished.

5.3 Wiring plans

Plug connector acc. to DIN 43650A

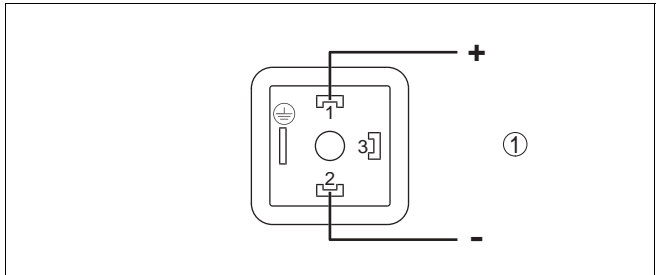


Fig. 4: Wiring plan plug connector acc. to DIN 43650A, view from the bottom side of the plug

- 1 Power supply and signal output

**Circular plug connector
M12x1**

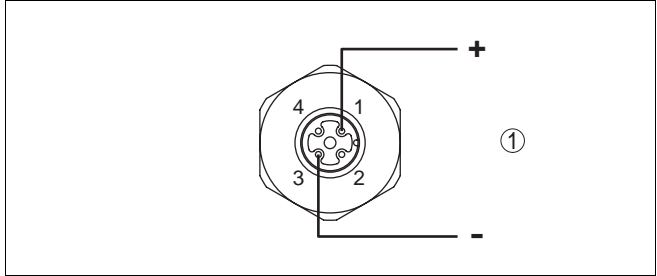


Fig. 5: Wiring plan circular plug connector M12x1

- 1 Power supply and signal output

Cable outlet

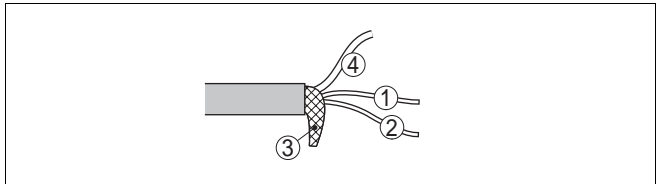


Fig. 6: Wiring plan cable outlet³⁾

- 1 br (+) power supply and signal output
- 2 gn (-) power supply and signal output
- 3 Cable screen
- 4 Breather capillaries

Terminal housing

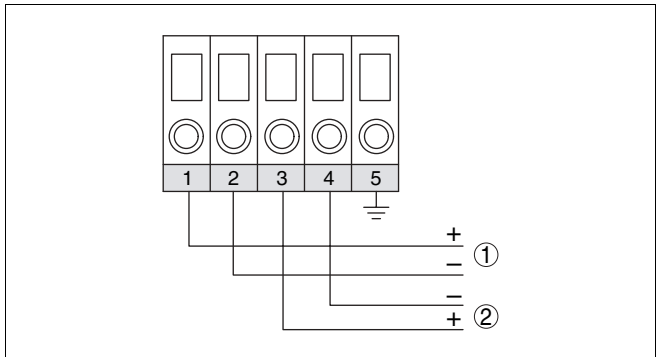


Fig. 7: Wiring plan, terminal housing

- 1 To power supply or processing system
- 2 Control instrument (4 ... 20 mA measurement)

³⁾ The cables bl, ge, sw, ws are not connected.

6 Set up

6.1 General

After mounting and electrical connection, VEGABAR 17 is ready for operation.

→ Switch on power supply

VEGABAR 17 delivers a current of 4 ... 20 mA acc. to the actual process pressure.

Further settings are not necessary.

6.2 Recalibration

Zero and span can be readjusted via potentiometer.

Recommended recalibration cycle: 1 year.

Proceed as follows:

- 1 In closed status, unscrew the handle ring and open the instrument

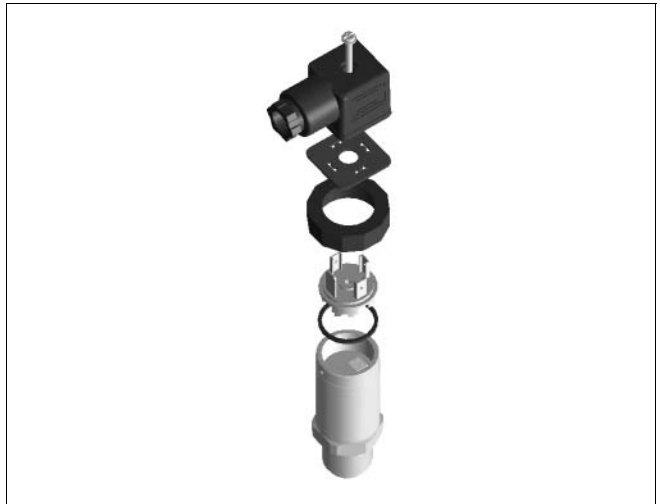


Fig. 8: Open the instrument

- 2 Adjust zero in unpressurized condition

**Angle and circular plug
connector, cable outlet**

- 3 Adjust span with sufficiently correct⁴⁾ reference pressure
- 4 Check zero

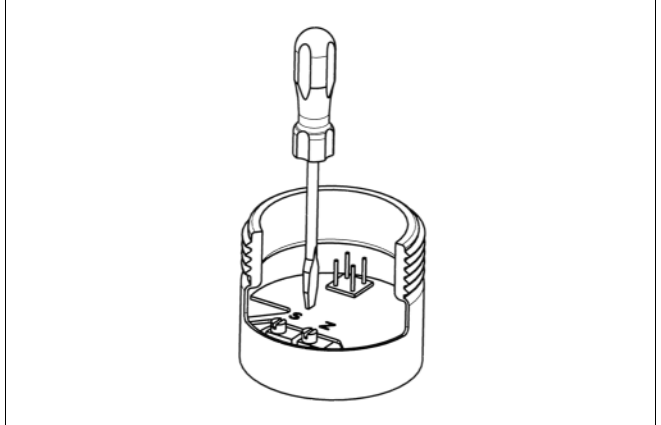


Fig. 9: Adjustment zero and span

Z zero

S span

- 5 Close the instrument and tighten the handle ring

Terminal housing

Proceed as follows:

- 1 Screw on the housing cover in connected status

⁴⁾ At least 3x as exact as the pressure transmitter.



Fig. 10: Adjustment zero and span

Z zero

S span

- 2 Adjust zero in unpressurized condition
- 3 Adjust span with sufficiently exact⁵⁾ reference pressure
- 4 Check zero
- 5 Screw the housing cover back on

⁵⁾ At least 3x as exact as the pressure transmitter.

7 Maintenance and fault rectification

7.1 Maintenance

When used as directed in normal operation, VEGABAR 17 is completely maintenance-free.

7.2 Fault rectification

Causes of failure

VEGABAR 17 offers maximum reliability. Nevertheless failures can occur during operation. Possible causes can be e.g.:

- Sensor
- Process
- Power supply
- Signal processing.

Fault rectification

The first measure is checking the output signal. In many cases the reasons can be determined and faults rectified.

24 hour service hotline

Should these measures not be successful, please call in urgent cases the VEGA service hotline under the phone number **+49 1805 858550**.

The hotline is available to you 7 days a week round-the-clock. Since we offer this service world-wide, the support is only available in the English language. The service is free of charge, only the standard telephone costs will be charged.

Checking the 4 ... 20 mA signal

? No 4 ... 20 mA signal

- Wrong connection to power supply
 - Check connection acc. to chapter "*Connection procedure*" and correct, if necessary, acc. to chapter "*Wiring plans*"
- No power supply
 - check cables for line break, repair, if necessary

- supply voltage too low or load resistance too high
→ check and adapt, if necessary
- ? Steady output signal with pressure change
 - electronics module or measuring cell defective
→ exchange instrument or return it for repair



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

7.3 Instrument repair

If it is necessary to repair VEGABAR 17 please proceed as follows:

You can download a return form (23 KB) from our homepage www.vega.com under: "*Services – Downloads – Forms and Certificates – Repair form*".

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

- Print and fill out one form per instrument
- Clean the instrument and pack it damage-proof
- Attach the completed form and possibly also a safety data sheet to the instrument.
- Send the instrument to the respective address of your agency. In Germany to the VEGA headquarters in Schiltach.

8 Dismounting

8.1 Dismounting procedure

**Warning:**

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

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

8.2 Disposal

VEGABAR 17 consists of materials which can be recycled by specialised recycling companies. We have purposely designed the electronic modules to be easily separable. Mark the instrument as scrap and dispose of it according to government regulations (electronic scrap ordinance, ...).

Materials: see "*Technical data*"

If you cannot dispose of the instrument properly, please contact us about disposal methods or return.

9 Supplement

9.1 Technical data

General data

Materials, wetted parts

- | | |
|--------------------------------------|---------------------|
| – Process fitting | 316Ti |
| – Diaphragm | 316Ti |
| – Diaphragm with front flush version | 316Ti, Hastelloy C4 |
| – Seal ring, O-ring | Viton, EPDM, NBR |

Materials, non-wetted parts

- | | |
|--------------------------------|--|
| – Internal transmission liquid | synthetic oil ⁶⁾ , Halocarbon oil ⁷⁾ |
| – Housing | 316Ti |
| – Terminal housing | 316Ti |
| – Ground terminal | 316Ti |
| – Plug | PA |
| – Cable entry | PA, 316Ti |
| – Plug seal | silicone |
| – Connection cable | PUR |

Weight

- | | |
|---|------------------------------------|
| – Version with plug connector, cable outlet | approx. 0.2 kg (approx. 0.44 lbs) |
| – Version with terminal housing | approx. 0.35 kg (approx. 0.77 lbs) |

⁶⁾ For meas. ranges up to 16 bar, FDA-listed for food processing industry. For meas. ranges from 25 bar dry meas. cell.

⁷⁾ Generally for oxygen applications, not with vacuum meas. ranges, not with absolute meas. range <1 bar_{abs.}.

Output variable

Output signal	4 ... 20 mA
Zero and span adjustable via potentiometer	±10 %
Adjustment time	
– standard	≤1 ms
– Product temperature <-30°C, meas. range 0 ... 5 bar	≤10 ms
– Product temperature <-30°C, front flange 1/4" NPT	≤10 ms
Permissible load	
– with 11 V	0 Ohm
– with 30 V	950 Ohm

Input variable

Nominal range	Overload resistance	Vacuum resistance
Gauge pressure		
-0.1...0 bar/-10...0 kPa	1 bar/100 kPa	-1 bar/-100 kPa
-0.16...0 bar/-16...0 kPa	1.5 bar/150 kPa	-1 bar/-100 kPa
-0.25...0 bar/-25...0 kPa	2 bar/200 kPa	-1 bar/-100 kPa
-0.4...0 bar/-40...0 kPa	2 bar/200 kPa	-1 bar/-100 kPa
-0.6...0 bar/-60...0 kPa	4 bar/400 kPa	-1 bar/-100 kPa
-1.0...0 bar/-100...0 kPa	5 bar/500 kPa	-1 bar/-100 kPa
0...0.1 bar/0...10 kPa	1 bar/100 kPa	0 bar/0 kPa
0...0.16 bar/0...16 kPa	1.5 bar/150 kPa	0 bar/0 kPa
0...0.25 bar/0...25 kPa	2 bar/200 kPa	0 bar/0 kPa
0...0.4 bar/0...40 kPa	2 bar/200 kPa	0 bar/0 kPa
0...0.6 bar/0...60 kPa	4 bar/400 kPa	0 bar/0 kPa
0...1 bar/0...100 kPa	5 bar/500 kPa	0 bar/0 kPa
0...1.6 bar/0...160 kPa	10 bar/1.000 kPa	0 bar/0 kPa
0...2.5 bar/0...250 kPa	10 bar/1.000 kPa	0 bar/0 kPa
0...4 bar/0...40 kPa	17 bar/1.700 kPa	0 bar/0 kPa
0...6 bar/0...600 kPa	35 bar/3.500 kPa	0 bar/0 kPa
0...10 bar/0...1 MPa	35 bar/3.5 MPa	0 bar/0 kPa

Nominal range	Overload resistance	Vacuum resistance
0...16 bar/0...1.6 MPa	80 bar/8 MPa	0 bar/0 kPa
0...25 bar/0...2.5 MPa	50 bar/5 MPa	0 bar/0 kPa
0...40 bar/0...4 MPa	80 bar/8 MPa	0 bar/0 kPa
0...60 bar/0...6 MPa	120 bar/12 MPa	0 bar/0 kPa
0...100 bar/0...10 MPa	200 bar/20 MPa	0 bar/0 kPa
0...160 bar/0...16 MPa	320 bar/32 MPa	0 bar/0 kPa
0...250 bar/0...25 MPa	500 bar/50 MPa	0 bar/0 kPa
0...400 bar/0...40 MPa	800 bar/80 MPa	0 bar/0 kPa
0...600 bar/0...60 MPa	1,200 bar/120 MPa	0 bar/0 kPa
Absolute pressure		
0...0.25 bar/0...25 kPa	2 bar/200 kPa	
0...0.4 bar/0...40 kPa	2 bar/200 kPa	
0...0.6 bar/0...60 kPa	4 bar/400 kPa	
0...1 bar/0...100 kPa	5 bar/500 kPa	
0...1.6 bar/0...160 kPa	10 bar/1.000 kPa	
0...2.5 bar/0...250 kPa	10 bar/1.000 kPa	
0...4 bar/0...400 kPa	17 bar/1.700 kPa	
0...6 bar/0...600 kPa	35 bar/3.500 kPa	
0...10 bar/0...1 MPa	35 bar/3.500 kPa	
0...16 bar/0...1.6 MPa	80 bar/8 MPa	

Deviation in characteristics

Deviation in characteristics ⁸⁾	<=0.5 %
Reproducibility	<=0.05 %

Influence of the ambient temperature⁹⁾

Average temperature coefficient of the zero signal¹⁰⁾

- ⁸⁾ Relating to the adjusted span, incl. linearity, hysteresis and reproducibility
- ⁹⁾ Relating to the adjusted span, incl. hysteresis and reproducibility.
- ¹⁰⁾ In the compensated temperature range of 0 ... 80°C (176°F), reference temperature 20°C (68°F).

– standard	<0.2 %/10 K
– Meas. ranges 0 ... 0.1 and 0 ... 0.16 bar	<0.4 %/10 K
Average temperature coefficient of the span	<0.2 %/10 K

Long-term stability (similar to DIN 16086, DINV 19259-1 and IEC 60770-1)

Long-term drift of the zero signal ¹¹⁾	<0.2 %/1 year
---	---------------

Ambient conditions

Ambient temperature

– standard	-20 ... +80°C (-4 ... +176°F)
------------	-------------------------------

Storage and transport temperature	-40 ... +100°C (-40 ... +212°F)
-----------------------------------	---------------------------------

Process conditions

Product temperature

– standard	-30 ... +100°C (-22 ... +212°F)
– extended	-40 ... +125°C (-40 ... +257°F)
– with cooling element	-20 ... +150°C (-4 ... +302°F)
– EEx ia version	-20 ... +80°C (-4 ... +176°F)
– Version for oxygen applications	-30 ... +60°C (-22 ... +140°F)

Calibration position

upright, diaphragm points downward

Shock resistance

600 g acc. to IEC 60068-2-27 (mechanical shock)

Vibration resistance

10 g acc. to IEC 60068-2-6 (vibration with resonance)

Electromechanical data

Plug connector

4-pole acc. to DIN 43560A

Circular plug connector

4-pole M12x1

Cable outlet

1.5 m; 3 m; 5 m; 10 m; cable with inner ventilation

Spring-loaded terminals

for wire cross sections up to 2.5 mm²

¹¹⁾ Under reference conditions, relating to the adjusted span.

Power supply

Power supply	11 ... 30 V DC
--------------	----------------

Electrical protective measures

Protection¹²⁾

- | | |
|-------------------------|--------------|
| – with plug connector | IP 65 |
| – with cable outlet | IP 67, IP 68 |
| – with terminal housing | IP 67 |

Other protective measures	Reverse battery, overvoltage and short-circuit protection
---------------------------	---

Approvals¹³⁾

ATEX	ATEX II 1/2G EEx ia IIC T6; ATEX II 2G EEx ia IIC T6; ATEX II 1/2G, 2G EEx ia IIC T6; ATEX II 1/2G, 2G EEx ia IIC T6 + ATEX II 1/2D IP 6X T + M1
Ship approval	GL

¹²⁾ Acc. to EN 60529/IEC 529.

¹³⁾ Deviating data with Ex applications: see separate safety instructions.

9.2 Dimensions

VEGABAR 17, standard housing

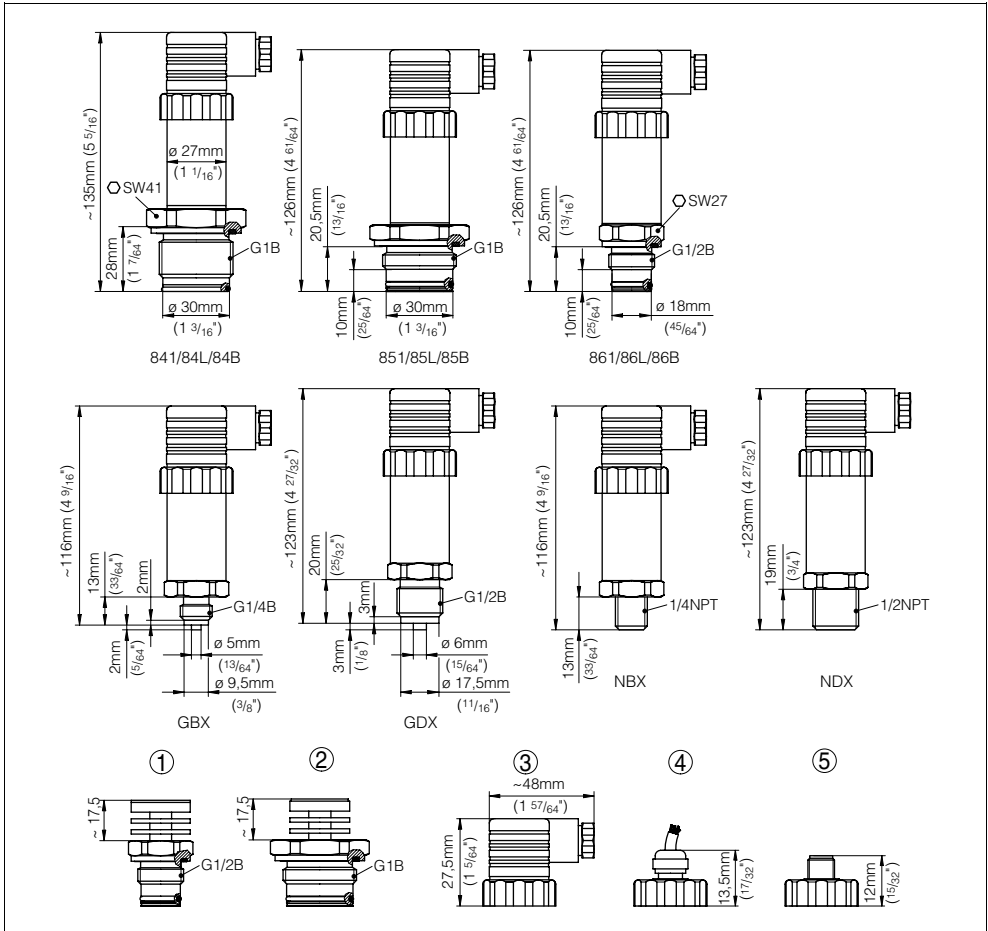


Fig. 11: VEGABAR 17, dimensions with * in brackets are valid for Ex versions

- 1 Cooling element G1/2B
- 2 Cooling element G1B
- 3 Plug acc. to DIN 43650A
- 4 Cable outlet
- 5 Plug M12x1

VEGABAR 17, terminal housing

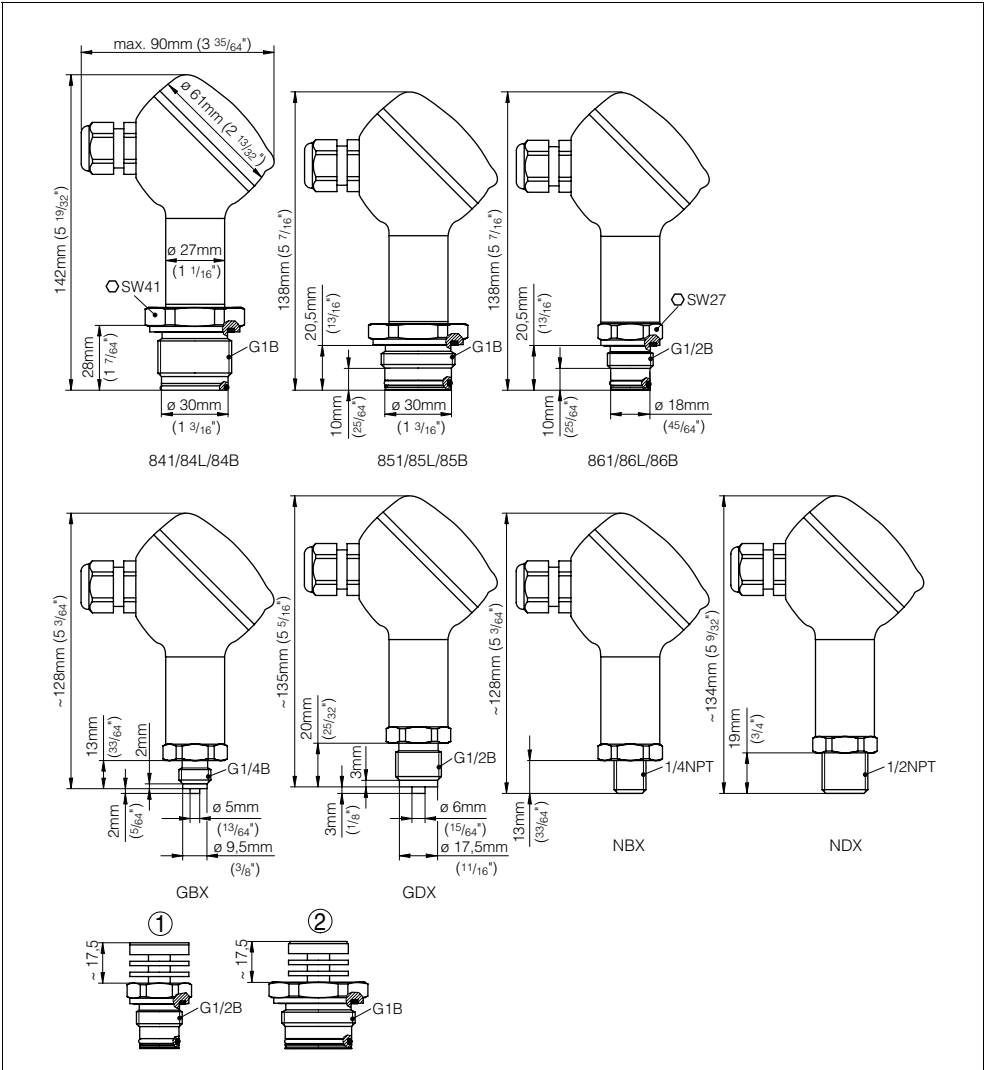


Fig. 12: VEGABAR 17, terminal housing

1 Cooling element G1/2B

2 Cooling element G1B

9.3 Declarations of conformity

CE declaration of conformity

CE

Konformitätserklärung

Declaration of conformity
Déclaration de conformité

VEGA

VEGA Grieshaber KG
Am Hohenstein 113
77761 Schiltach

erklärt in alleiniger Verantwortung, daß das Produkt / declare under
our sole responsibility that our product / déclare sous sa seule
responsabilité que le produit

VEGABAR 17

auf das sich diese Erklärung bezieht, mit den folgenden Normen
übereinstimmt / to which this declaration relates is in conformity
with the following standards / auquel se réfère cette déclaration
est conforme aux normes

EN 61326 :2002

gemäß den Bestimmungen der Richtlinien / following the provision
of Directives / conformément aux dispositions des Directives

97/23/EG, Anhang I¹⁾ / Annex I¹⁾, Annexe I¹⁾
89/336/EWG²⁾

¹⁾ PS > 200 bar: Modul A / Modul A / Module A
²⁾ 3/4-Leiter: mit geschirmter Leitung
²⁾ 3/4-wire: with shielded cable
²⁾ 3/4-fils: avec câble blindé

Schiltach, 06.10.2003 *ppa J. Fehrenbach*

Josef Fehrenbach
Entwicklungsleitung

Fig. 13: CE declaration of conformity



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www.vega.com



All statements concerning scope of delivery, application, practical use and operating conditions of the sensors and processing systems correspond to the information available at the time of printing.