

Level measurement
Hydrostatic

VEGAWELL 72



Product Information

VEGA

Contents

1 Description of the measuring principle	3
2 Type overview	4
3 Mounting information	5
4 Electrical connection	
4.1 General requirements	8
4.2 Power supply	8
4.3 Connection cable	8
4.4 Cable screening and grounding	8
4.5 Wiring plans	9
5 Adjustment	
5.1 Overview	11
5.2 Adjustment with VEGADIS 12	11
5.3 Adjustment with PACTware™	12
6 Technical data	13
7 Dimensions	17
8 Product code	18

Take note of safety instructions for Ex areas



Please note the Ex specific safety information for installation and operation in Ex areas which you will find on our homepage www.vega.com/services/downloads and which come with the appropriate instrument. In hazardous areas you should take note of the appropriate regulations, conformity and type approval certificates of the sensors and power supply units. The sensors must only be operated in intrinsically safe circuits. The permissible electrical values are stated in the certificate.

1 Description of the measuring principle

Measuring principle

VEGAWELL 72 pressure transmitters operate acc. to the hydrostatic meas. principle. The meas. principle functions independent of the dielectric properties of the product and is not influenced by foam generation.

The actual sensor element in VEGAWELL 72 is the dry, ceramic-capacitive CERTEC[®] measuring cell. The base element and diaphragm are made of high purity sapphire-ceramic[®].

The hydrostatic pressure of the medium causes a capacitance change in the measuring cell via the diaphragm. This capacitance change is converted into an appropriate output signal.

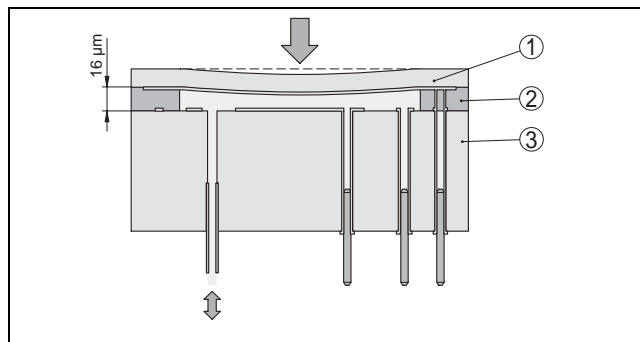


Fig. 1: Configuration of the CERTEC[®] measuring cell with VEGAWELL 72

- 1 Diaphragm
- 2 Glass solder connection
- 3 Base element

The advantages of the CERTEC[®] measuring cell are:

- very high overload resistance
- no hysteresis
- excellent long-term stability
- completely flush installation
- good corrosion resistance
- very good abrasion resistance.

Wide application range

VEGAWELL 72 is suitable for level measurement in deep wells and ballast tanks as well as for gauge measurement in open flumes. Typical products are drinking water and waste water, even when they contain abrasive substances. 4 ... 20 mA and 4 ... 20 mA/HART are available as signal outputs.

2 Type overview

VEGAWELL 72



Measuring cell:	CERTEC®
Products:	drinking water and waste water
Process fitting:	straining clamp, screwed fitting, thread
Material process fitting:	1.4301, 316 L (stainless steel 1.4435), PVDF, PA
Material, suspension cable:	PE, PUR, FEP
Material transmitter:	316 L (stainless steel 1.4435), PE-coating
Diameter transmitter:	32 mm
Measuring range:	0 ... 0.1 bar up to 0 ... 25 bar
Process temperature:	-40 ... +80°C (-40 ... +176°F)
Deviation in characteristics:	< 0.25 %, < 0.1 %
Signal output:	4 ... 20 mA, 4 ... 20 mA/ HART
Remote adjustment/indication:	VEGADIS 12 (4 ... 20 mA/ HART)

3 Mounting information

Installation location

The following illustration shows a mounting example for VEGAWELL 72. The VEGA price list offers the suitable mounting angle under chapter Accessory. The usual mounting configurations can thus be realised quickly and efficiently.



Fig. 2: Version with closing screw in a shaft

VEGAWELL 72 must be mounted in a calm zone or in a suitable protective tube. This avoids lateral movements of the transmitter and a falsification of the measured value.



Note:

As an alternative to fastening the transmitter, the measuring instrument holder from the line of VEGA mounting accessories, article no. BARMONT.B is recommended.

The suspension cable contains beside the electrical and supporting cables also a capillary for atmospheric pressure compensation. All versions can be shortened on site.

The electronics of VEGAWELL 72 is completely integrated in the transmitter. The cable end can be therefore lead directly to a dry connection compartment. The pressure compensation is carried out via the filter element of the capillaries.



Note:

For connection of VEGAWELL 72 – 4 ... 20 mA, a pressure compensation housing VEGABOX 01 is recommended.

For connection of VEGAWELL 72 – 4 ... 20 mA/HART, the adjustment/indication VEGADIS 12 is recommended.

Both connection units are provided with a high-quality ventilation filter and terminals. A protective cover is available for outdoor mounting.

Mounting versions

The following illustrations show the different mounting versions depending on the instrument type and version.

Mounting with straining clamp

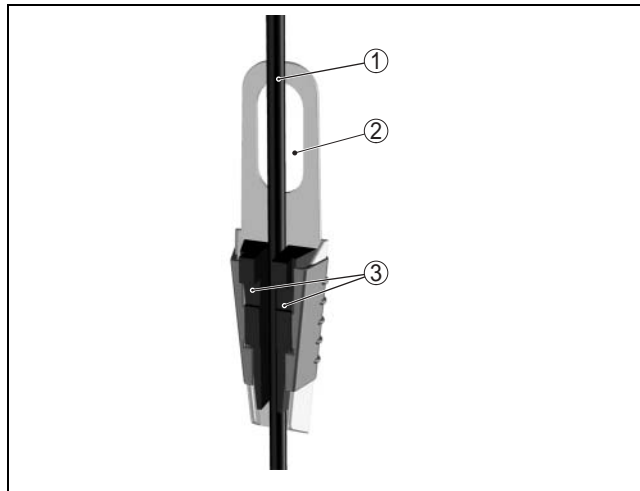


Fig. 3: Straining clamp

- 1 Suspension cable
- 2 Suspension opening
- 3 Clamping jaws

Mounting with screwed connection

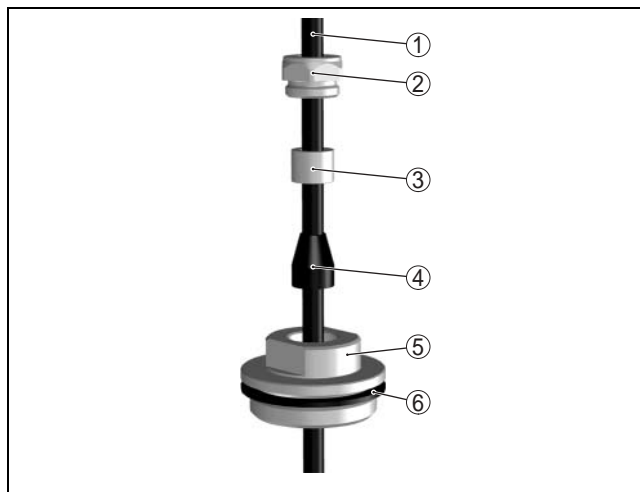


Fig. 4: Screwed connection

- 1 Suspension cable
- 2 Seal screw
- 3 Cone sleeve
- 4 Seal cone
- 5 Screwed connection
- 6 Seal ring

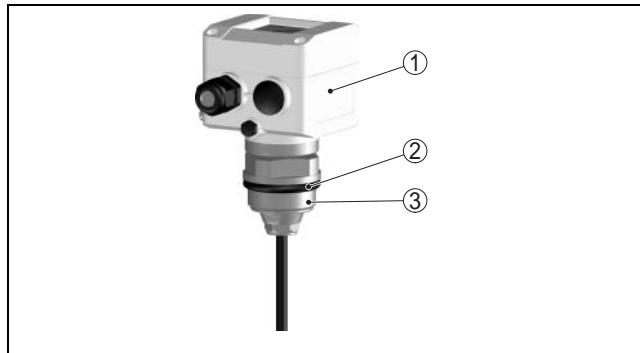
**Mounting with housing
and thread**

Fig. 5: Plastic housing with socket G1½A

- 1 Housing
- 2 Seal
- 3 Thread

4 Electrical connection

4.1 General requirements

The power supply range can differ depending on the instrument version. You will find detailed information in the Technical data.

Take note of country-specific installation standards (e.g. the VDE regulations in Germany) as well as all prevailing safety regulations and accident prevention rules.



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

4.2 Power supply

Power supply and current signal are carried over the same two-wire connection cable. The requirements on the power supply are stated in the Technical data of this Product Information manual.

The VEGA power supply units VEGATRENN 149AEx, VEGASTAB 690, VEGADIS 371 as well as the VEGAMET signal conditioning instruments are suitable for power supply. When one of these instruments is used, a reliable separation of the supply circuit from the mains circuits acc. to DIN VDE 0106 part 101 is ensured for VEGABAR.

4.3 Connection cable

An outer cable diameter of 5 ... 9 mm ensures the seal effect of the cable entry. If electromagnetic interference is expected, we recommend the use of screened cable for the signal lines.

The sensors are connected with standard two-wire cable without screen.



In Ex applications, the corresponding installation regulations must be noted for the connection cable.

4.4 Cable screening and grounding

The cable screen must be connected 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).

General

4.5 Wiring plans

Direct connection

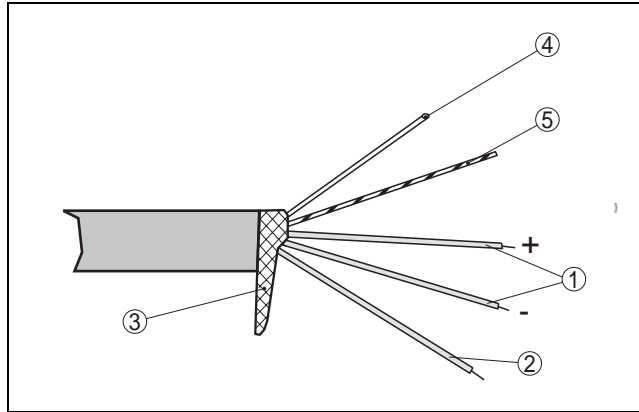


Fig. 6: Wire assignment, suspension cable

- 1 br (+) and bl (-): Power supply and signal output
- 2 ye with 4 ... 20 mA free; use with 4 ... 20 mA/HART for VEGADIS 12, otherwise connect to minus
- 3 Screen
- 4 Breather capillaries
- 5 Suspension cable

Connection via plastic housing

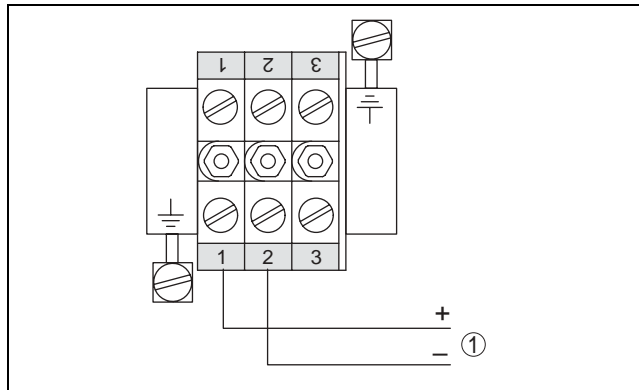


Fig. 7: Terminal assignment, plastic housing

- 1 Power supply and signal output

Connection via VEGA-BOX 01

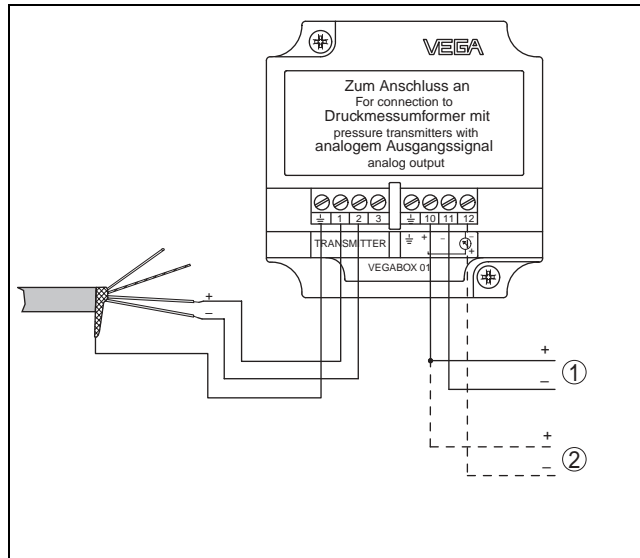


Fig. 8: Terminal assignment VEGABOX 01

- 1 Power supply and signal output
- 2 Control instrument (4 ... 20 mA measurement)

Connection via VEGA-DIS 12

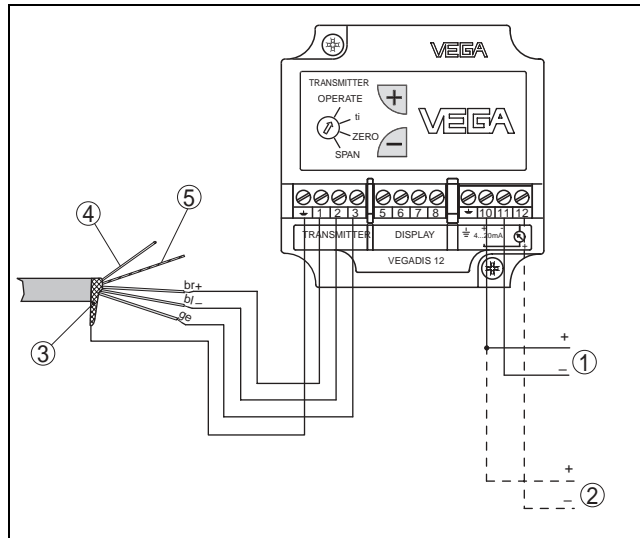


Fig. 9: Terminal assignment, VEGADIS 12

- 1 Power supply and signal output
- 2 Control instrument (4 ... 20 mA measurement)

5 Adjustment

5.1 Overview

4 ... 20 mA /HART

VEGAWELL 72 – 4 ... 20 mA/HART can be adjusted with the following adjustment media:

- Indication/Adjustment VEGADIS 12
- an adjustment software acc. to FDT/DTM standard, e.g. PACTware™ and PC
- HART handheld.

4 ... 20 mA

VEGAWELL 72 – 4 ... 20 mA has no adjustment options.

5.2 Adjustment with VEGADIS 12

VEGADIS 12

VEGADIS 12 is connected directly to the connection or suspension cable of VEGA-WELL 72 - 4 ... 20 mA/HART. It is looped into the supply and signal circuits and requires no separate auxiliary energy.

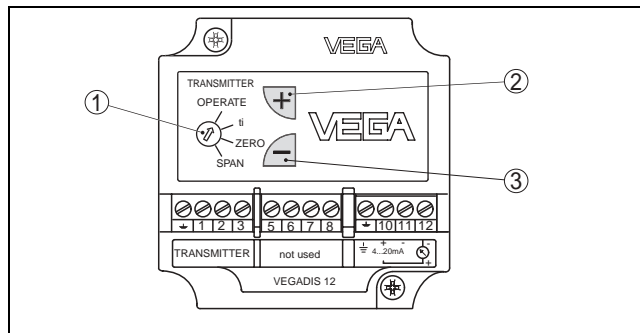


Fig. 10: Adjustment elements of VEGADIS 12

- 1 Rotary switch: choose the requested function
- 2 [+] key change the value
- 3 [-] key change the value

5.3 Adjustment with PACTware™

Connecting the PC to the signal cable

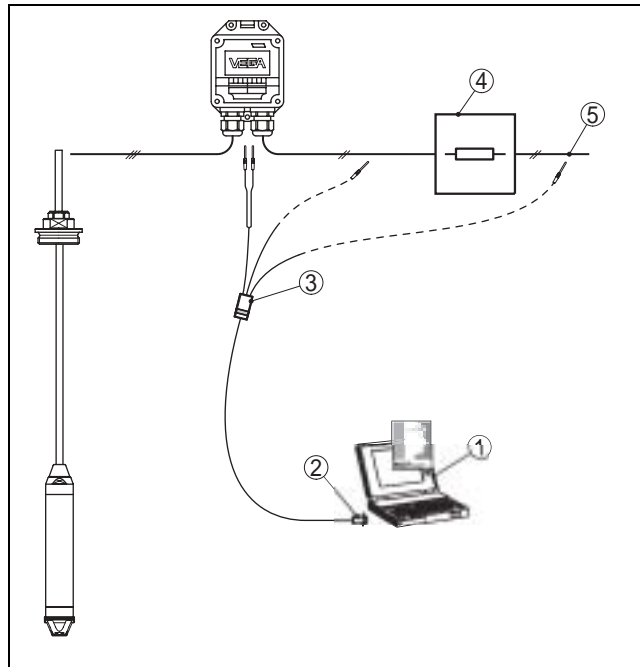


Fig. 11: Connection of the PC to VEGADIS 12 or the communication resistor

- 1 PC with PACTware™
- 2 RS232 connection
- 3 VEGACONNECT 3
- 4 Communication resistor 250 Ohm
- 5 Power supply unit

Necessary components:

- VEGABAR
- PC with PACTware™ and suitable VEGA-DTM
- VEGACONNECT 3 with HART adapter cable
- HART resistance approx. 250 Ohm
- power supply unit



Note:

With power supply units with integrated HART resistance (internal resistance approx. 250 Ohm), an additional external resistance is not necessary (e.g. VEGATRENN 149A, VEGADIS 371, VEGAMET 381/624/625, VEGASCAN 693). In such cases, VEGACONNECT 3 can be connected in parallel to the 4 ... 20 mA cable.

6 Technical data

General data

Materials, wetted parts	316L (stainless steel 1.4435), PVDF
– transmitter	PE plastic coating
– transmitter protection (optional)	sapphire-ceramic® (99.9 % oxideceramic Al ₂ O ₃)
– diaphragm	PE (KTW-approved), PUR, FEP
– suspension cable	316 L (stainless steel 1.4435)
– connection tube, process fitting	Viton (FDA and KTW-approved), Kalrez, EPDM
– meas. cell seal	PA
– Protective cover for transmitter	
Weights	
– transmitter	approx. 0.7 kg (approx. 1.5 lbs)
– suspension cable	approx. 0.1 kg/m (0.07 lbs/ft)
– connection tube	approx. 1.5 kg/m (1.1 lbs/ft)
– straining clamp	approx. 0.2 kg (0.4 lbs)
– screwed connection	approx. 0.4 kg (0.8 lbs)

Output variable

Output signal	4 ... 20 mA/HART
Resolution	6 µA
Fault signal	22 mA, 3.6 mA adjustable
Current limitation without failure	20.5 mA
Load	see load diagram in Power supply
Integration time	0 ... 999 s, adjustable
Fulfilled Namur recommendation	NE 43

Input variable

Parameter	Level
Measuring ranges	see product code
Turn down	
– recommended	1 : 10
– max.	1 : 30

Accuracy (similar to DIN EN 60770-1)

Reference conditions acc. to DIN EN 61298-1	
– temperature	18 ... 30°C (64.4 ... 86°F)
– relative humidity	45 ... 75 %
– pressure	860 ... 1060 mbar (86 ... 106 kPa/12.5 ... 15.4 psi)
Determination of characteristics	limit point adjustment acc. to DIN 16086
Characteristics	linear

Deviation in characteristics¹⁾²⁾

Deviation in characteristics < 0.25 %	
– Turn down 1 : 1	< 0.25 %
– Turn down up to 1 : 5	< 0.3 %
– Turn down up to 1 : 10	< 0.4 %
Deviation in characteristics < 0.1 %	
– Turn down 1 : 1	< 0.1 %
– Turn down up to 1 : 5	< 0.1 %
– Turn down up to 1 : 10	< 0.15 %

Influence of the ambient temperature

Average temperature coefficient of the zero signal ³⁾ , accuracy class 0.1	
– Turn down 1 : 1	0.05 %/10 K
– Turn down up to 1 : 5 ⁴⁾	0.1 %/10 K
– Turn down up to 1 : 10 ⁵⁾	0.15 %/10 K

Long-term stability

Long-term drift of the zero signal ^{6) 7)}	< 0.1 %/2 years
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Ambient conditions

Ambient temperature	
– suspension cable PE	-40 ... +60°C (-40 ... +140°F)
– suspension cable PUR, FEP	-40 ... +85°C (-40 ... +185°F)
Storage and transport temperature	-20 ... +100°C (-4 ... +212°F)

Process conditions

Common data	Calibration position	upright, diaphragm points downward
	Influence of the installation position	< 0.2 mbar/20 PA (< 0.003 psi)
	Vibration resistance	mechanical vibrations with 4 g and 5 ... 100 Hz ⁸⁾
Product temperature	Suspension cable/Seal meas. cell/Seal suspension cable	
	– PE/Viton/Viton	-20 ... +60°C (-4 ... +140°F)
	– PUR/Viton/Viton	-20 ... +80°C (-4 ... +176°F)
	– FEP/Kalrez/FEP	-10 ... +80°C (14 ... +176°F)
	Transmitter PVDF	-20 ... +60°C (-4 ... +140°F)

¹⁾ Relating to the nominal range, incl. hysteresis and repeatability, determined acc. to the limit point method.
²⁾ Deviation in characteristics < 0.1 % as well as Turn down 1 : 5 and 1 : 10 only with version 4 ... 20 mA/HART
³⁾ In the compensated temperature range of 0 ... 80°C (176°F), reference temperature 20°C (68°F).
⁴⁾ Only with version 4 ... 20 mA/HART.
⁵⁾ Only with version 4 ... 20 mA/HART.
⁶⁾ Similar to DIN 16086, DINV 19259-1 and IEC 60770-1.
⁷⁾ Acc. to IEC 60770-1, relating to the nominal range.
⁸⁾ Tested acc. to the regulations of German Lloyd, GL directive 2.

Connection tube/Seal meas. cell	
– 316 L (stainless steel 1.4435)/Viton	-20 ... +80°C (-4 ... +176°F)
– 316 L (stainless steel 1.4435)/Kalrez	-10 ... +80°C (14 ... +176°F)
– 316 L (stainless steel 1.4435)/EPDM	-20 ... +80°C (14 ... +176°F)

Electromechanical data

Suspension cable	
– wire cross section	0.5 mm ²
– wire resistance	< 0.036 Ohm/m
– tensile load	> 1.200 N
– max. length	550 m (1804 ft)
– min. bending radius	25 mm (at 25°C/77°F)
– diameter	approx. 8 mm
plastic housing	1 x cable entry M20x1.5 (cable-ø 5 ... 9 mm), 1 x blind stopper M20x1.5
Screw terminals	for wire cross section up to 2.5 mm ² , screen up to 4 mm ²

Power supply

Supply voltage	
– non-Ex instrument	12 ... 36 V DC
– EEx ia instrument	12 ... 29 V DC
Permissible residual ripple	
– < 100 Hz	U _{ss} < 1 V
– 100 Hz ... 10 kHz	U _{ss} < 10 mV
Load	see diagram

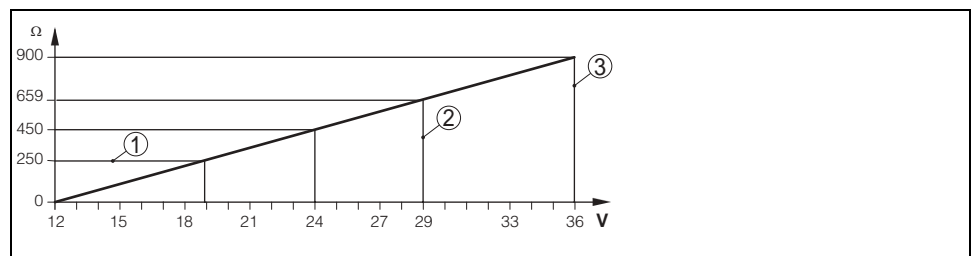


Fig. 12: Voltage diagram

- 1 HART load
- 2 Voltage limit Ex instrument
- 3 Voltage limit non-Ex instrument

Electrical protective measures

Protection	
– transmitter	IP 68 (25 bar)
– Plastic housing	IP 65
– VEGADIS 12	IP 65
Oversoltage category	III
Protection class	III

Approvals^{9) 10)}

ATEX	ATEX II 2G EEx ia IIC T6
IEC	IEC Ex ia IIC T6,
Ship approvals	GL, LRS, ABS, CCS, RINA
Others	WHG

CE conformity

EMC (89/336/EWG)	Emission EN 61326: 1997/A1: 1998 (class B), Susceptibility EN 61326: 1997/A1: 1998
NSR (73/23/EWG)	EN 61010-1: 1993

Environmental instructions

VEGA environment management system ¹¹⁾	certified acc. to DIN EN ISO 14001
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⁹⁾ Deviating data with Ex applications: see separate safety instructions.

¹⁰⁾ You will find detailed information under www.vega.com.

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7 Dimensions

VEGAWELL 72

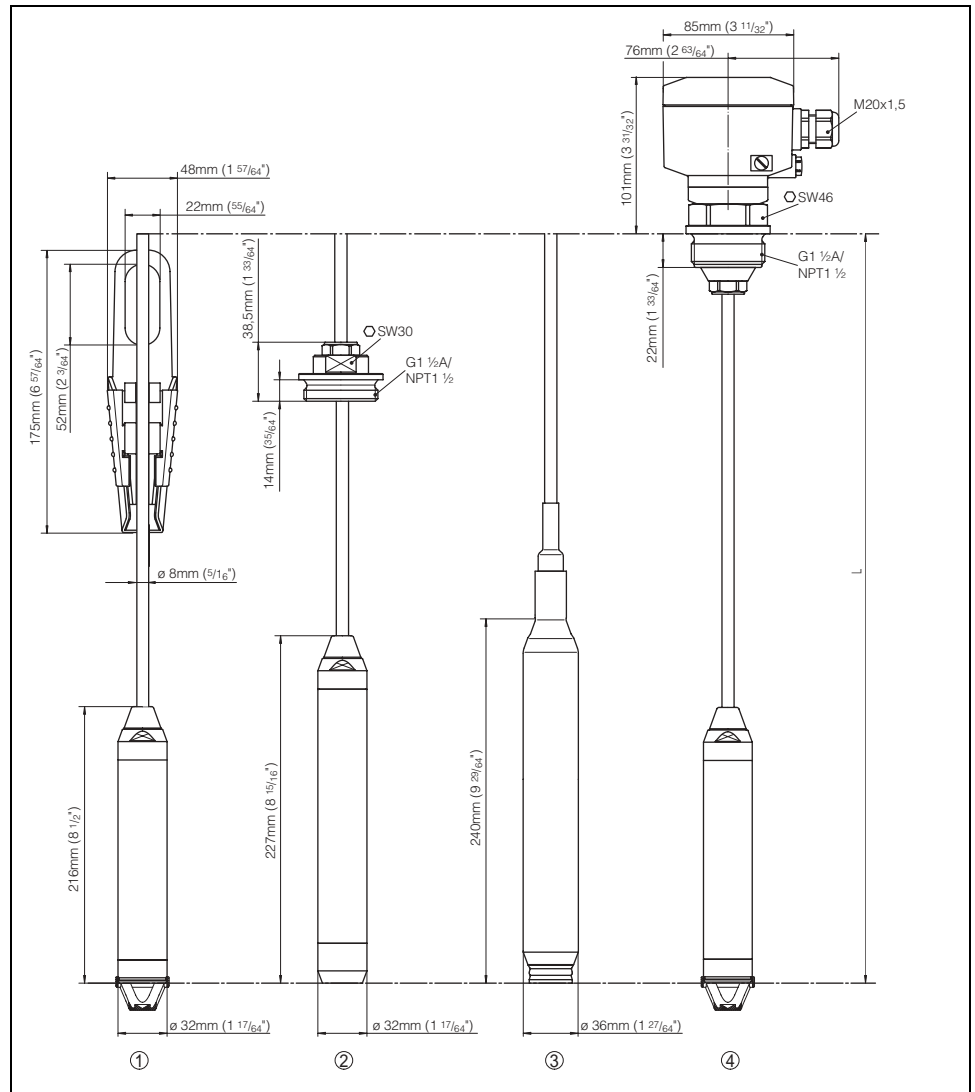


Fig. 13: VEGAWELL 72

- 1 with straining clamp
- 2 with screwed connection, unassembled G1½A (1½ NPT)
- 3 with PE plastic coating
- 4 with thread G1½A (1½ NPT) and plastic housing



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