



Product Information

Differential pressure

Pressure measurement

VEGADIF 65

VEGA

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Take note of safety instructions for Ex applications



Please note the Ex specific safety information which you can find on our homepage www.vega.com » Downloads » Approvals and which come with every instrument. In hazardous areas you should take note of the corresponding regulations, conformity and type approval certificates of the sensors and power supply units. The sensors must only be operated on intrinsically safe circuits. The permissible electrical values are stated in the certificate.

1 Measuring principle

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

The differential pressure-dependent change of the bridge voltage is measured, further processed and converted into a corresponding output signal.

The configuration of the measuring cells differs depending on the measuring range:

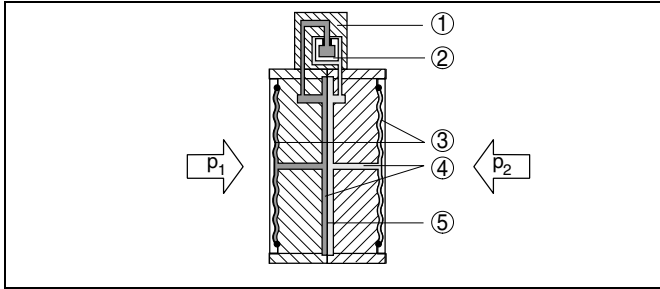


Fig. 1: Measuring cells 10 mbar and 30 mbar - p_1 and p_2 process pressures

- 1 Measuring element
- 2 Silicone diaphragm
- 3 Separating diaphragm
- 4 Filling oil
- 5 Integrated overvoltage arrester

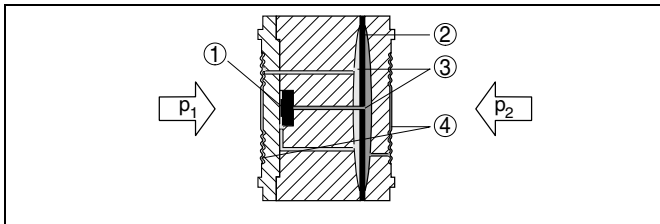


Fig. 2: Measuring cells from 100 mbar - p_1 and p_2 process pressures

- 1 Measuring element
- 2 Overload diaphragm/Middle diaphragm
- 3 Filling oil
- 4 Separating diaphragm

2 Type overview

VEGADIF 65



VEGADIF 65 with chemical seal CSS



VEGADIF 65 with chemical seal CSB



Measuring cell	Piezoresistive	Piezoresistive	Piezoresistive
Diaphragm	Metal	Metal	Metal
Media	Gases, vapours and liquids	gases, vapours and liquids, also aggressive ones, at high temperatures	gases, vapours and liquids, also aggressive ones, at high temperatures
Process fitting	NPT 1/4-18 nach IEC 61518	Plus side: <ul style="list-style-type: none"> • Flanges from DN 50 or 2" • Flanges with extension from DN 50 or 2" Minus side: <ul style="list-style-type: none"> • NPT 1/4-18 nach IEC 61518 	Plus and minus side: <ul style="list-style-type: none"> • Flanges from DN 32 or 2" • Flanges with extension from DN 40 or 2" • Hygienic fittings from DN 32
Material Process fitting	C22.8, 316L, Hastelloy C 276	316L	316L
Diaphragm material	316L, Hastelloy C276, Monel, Tantalum, Rhodium/Gold on 316L	316L, Hastelloy C276, Tantalum, PTFE foil on 316L	316L, Hastelloy C276, Tantal, PTFE foil on 316L, Inconell 600
Measuring cell seal	FKM, PTFE, NBR, copper	-	-
Isolating liquid	Silicone oil	Silicone oil, high temperature oil, halocarbon oil, med. white oil	Silicone oil, high temperature oil, halocarbon oil, med. white oil
Measuring range	0.01 ... 40 bar (0.145 ... 580.2 psig)	0.1 ... 40 bar (1.45 ... 580.2 psig)	0.1 ... 40 bar (1.45 ... 580.2 psig)
Smallest adjustable span	0.25 mbar (0.036 psig)	1 mbar (0.015 psig)	1 mbar (0.015 psig)
Process temperature	-40 ... +85 °C (-40 ... +185 °F)	-40 ... +400 °C (-40 ... +752 °F)	-40 ... +400 °C (-40 ... +752 °F)
Ambient, storage and transport temperature	-40 ... +80 °C (-40 ... +176 °F)	-40 ... +80 °C (-40 ... +176 °F)	-40 ... +80 °C (-40 ... +176 °F)
Deviation	±0.075 %	±0.075 % (±0.05 %) of the set span + influence of the chemical seal	±0.075 % (±0.05 %) of the set span + influence of the chemical seal
Signal output	<ul style="list-style-type: none"> • 4 ... 20 mA • 4 ... 20 mA/HART • Profibus PA • Foundation Fieldbus 	<ul style="list-style-type: none"> • 4 ... 20 mA • 4 ... 20 mA/HART • Profibus PA • Foundation Fieldbus 	<ul style="list-style-type: none"> • 4 ... 20 mA • 4 ... 20 mA/HART • Profibus PA • Foundation Fieldbus
Indication/Adjustment	<ul style="list-style-type: none"> • PLICSCOM • PACTware • VEGADIS 61 	<ul style="list-style-type: none"> • PLICSCOM • PACTware • VEGADIS 61 	<ul style="list-style-type: none"> • PLICSCOM • PACTware • VEGADIS 61
Approvals	<ul style="list-style-type: none"> • ATEX • IEC • Gost-R 	<ul style="list-style-type: none"> • ATEX • IEC • Gost-R 	<ul style="list-style-type: none"> • ATEX • IEC • Gost-R

3 Device selection

Application areas

The differential pressure transmitter VEGADIF 65 is used for various applications such as differential pressure measurements of filters and pumps as well as level measurements in pressurized vessels. Through the precise measuring cell grading and low deviation flow, density and interface measurements can be realised.

The differential pressure transmitter VEGADIF 65 is suitable for all gases, vapours and liquids where product-resistant sensors are required. For extremely moist areas, IP 68 versions are available.

Differential pressure measurement

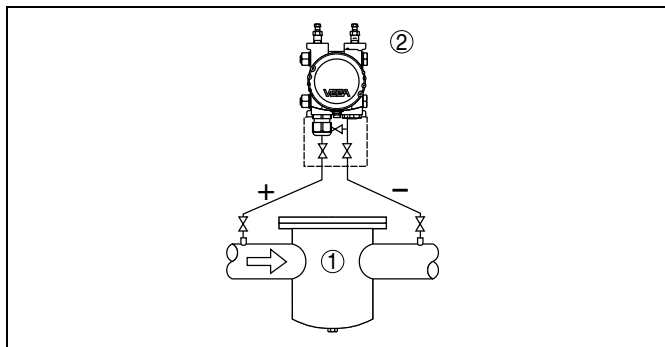


Fig. 3: Differential pressure measurement with VEGADIF 65

- 1 Filter
- 2 VEGADIF 65

Level measurement

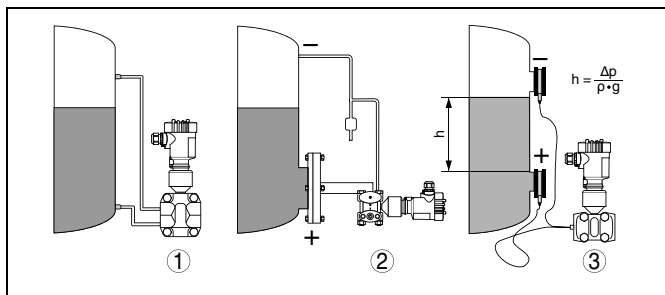


Fig. 5: Level measurement with VEGADIF 65. Δp = differential pressure, ρ = density of the medium, g = acceleration of gravity

- 1 Basic version with effective pressure lines
- 2 Version with flange isolating diaphragm
- 3 Version with capillaries and cell isolating diaphragms

Flow measurement

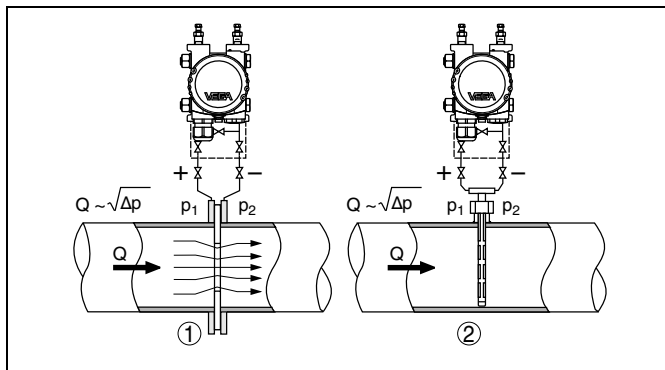


Fig. 7: Flow measurement with VEGADIF 65 and DP flow element, Q = flow, Δp = differential pressure, $\Delta p = p_1 - p_2$

- 1 Orifice
- 2 Pitot tube

Density measurement

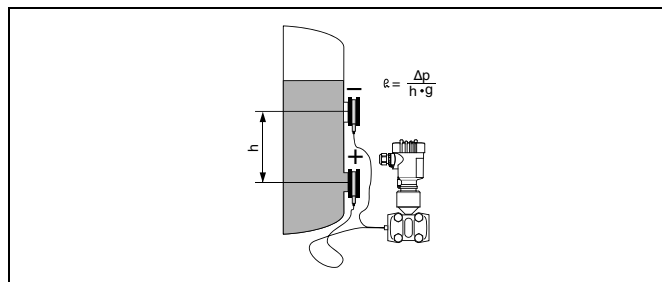


Fig. 9: Density measurement with VEGADIF 65, h = defined mounting distance, Δp = differential pressure, ρ = density of the medium, g = acceleration of gravity

- 1 VEGADIF 65

Interface measurement

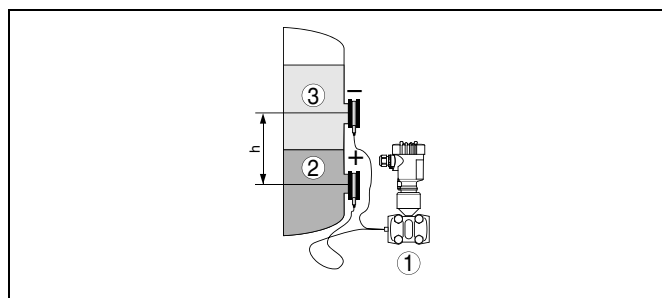


Fig. 11: Interface measurement with VEGADIF 65

- 1 VEGADIF 65
- 2 Liquid with highest density
- 3 Liquid with lowest density

Configuration basic version

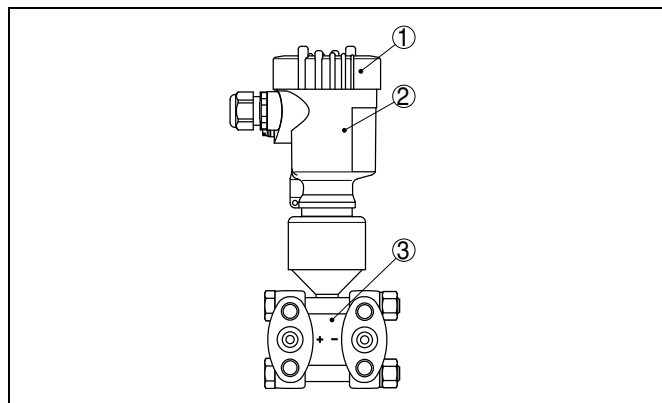


Fig. 13: VEGADIF 65 in basic version

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

Configuration with chemical seal single side CSS

The chemical seal CSS consists of the components: separating diaphragm, process fitting as well as connection piece with transmission line (capillaries). The components are fully welded to each other and to the associated differential pressure transmitter and represent a hermetically sealed system.

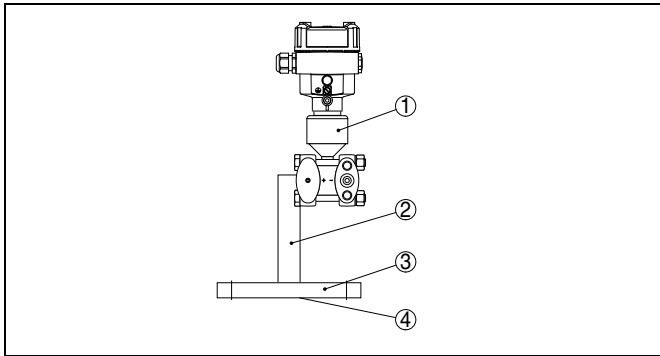


Fig. 15: VEGADIF 65 with chemical seal CSS

- 1 VEGADIF 65
- 2 Process fitting
- 3 Transmission line (capillaries)
- 4 Separating diaphragm

Configuration of a chemical seal both side CSB

The chemical seal CSB consists of the components: separating diaphragm, process fitting as well as transmission lines (capillaries). The components are fully welded to each other and to the associated differential pressure transmitter and represent a hermetically sealed system.

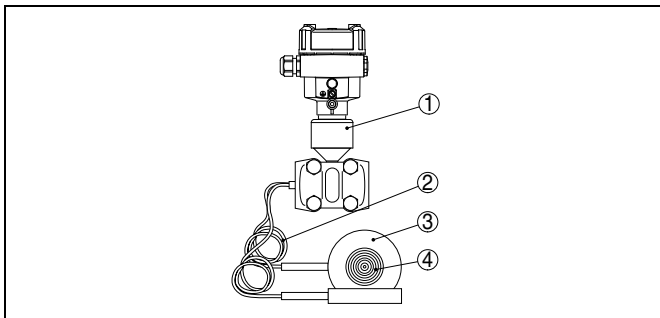


Fig. 17: VEGADIF 65 with chemical seal CSB

- 1 VEGADIF 65
- 2 Transmission line (capillaries)
- 3 Process fitting
- 4 Separating diaphragm



In the download section under www.vega.com/downloads you'll find free operating instructions, product information, brochures, approval documents, instrument drawings and much, much more.



4 Selection criteria




		VEGADIF 65	VEGADIF 65 with chemical seal CSS	VEGADIF 65 with chemical seal CSB
Front-flush version		–	●	●
Isolating diaphragm		–	●	●
Application	Level measurement	O	●	●
	Differential pressure measurement	●	–	●
	Flow measurement	●	–	–
	Density measurement	–	–	●
	Interface measurement	–	–	●
Max. process temperature	120 °C (248 °F)	●	●	●
	400 °C (752 °F)	–	●	●
Hygienic process fittings		–	●	●
Measuring ranges 10 mbar/30 mbar		●	–	–
Measuring ranges from 100 mbar		●	●	●
Use in industry-specific applications	Chemical	–	●	●
	Power generation	●	●	●
	Paper	●	●	●
	Environment and recycling industry	●	–	●
	Water and waste water industry	●	–	–



Fig. 19: Abbreviation: ● = Yes; O = Yes, with liquid, non-solidifying as well as gaseous products; – = No

5 Housing overview

Plastic PBT		
Protection rating	IP 66/IP 67	IP 66/IP 67
Version	Single chamber	Double chamber
Application area	Industrial environment	Industrial environment

Aluminium		
Protection rating	IP 66/IP 67, IP 66/IP 68 (1 bar)	IP 66/IP 67, IP 66/IP 68 (1 bar)
Version	Single chamber	Double chamber
Application area	Industrial environment with increased mechanical wear	Industrial environment with increased mechanical wear

Stainless steel 316L			
Protection rating	IP 66/IP 67	IP 66/IP 67, IP 66/IP 68 (1 bar)	IP 66/IP 67, IP 66/IP 68 (1 bar)
Version	Single chamber electropolished	Single chamber precision casting	Double chamber precision casting
Application area	Aggressive environment, food processing, pharmaceutical	Aggressive environment, strong mechanical wear	Aggressive environment, strong mechanical wear

Separate version		
Material	Stainless steel 316L	plastic PBT
Protection rating	IP 68 (25 bar)	IP 65
Function	Transmitter	External electronics
Application area	Extremely moist environment	Industrial environment

6 Mounting

Mounting position

The instrument function in any installation position. But the installation position can influence the measurement, depending on the measuring system. This can be compensated by a position correction.

It is useful to select an installation position you can easily reach for mounting and connecting as well as later retrofitting of an indicating and adjustment module. For this purpose, the housing can be rotated by 330° without the use of any tools. You can also install the indicating and adjustment module in four different positions (each displaced by 90°).

Mounting examples

The following illustrations show mounting examples and measurement setups.

Reaction vessel

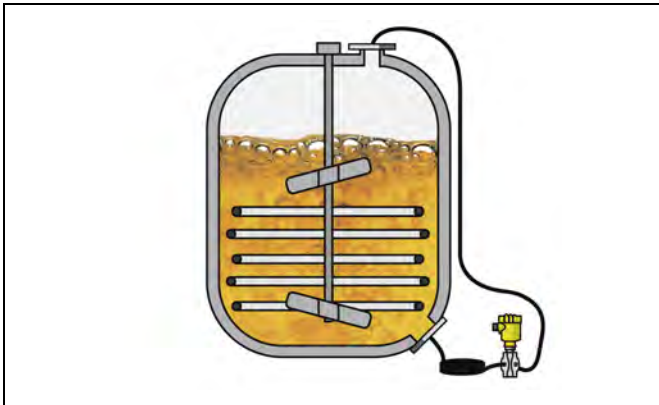


Fig. 20: Level measurement in reaction vessel with VEGADIF 65

VEGADIF 65 can be also used under high temperatures. The instrument measures the hydrostatic pressure of the liquid column in a reaction vessel independently of foam on the product surface. Its advantages are the high resistance diaphragm materials and the low oil volume of the chemical seal. The temperature influence of the chemical seal is thus kept low.

Boiler

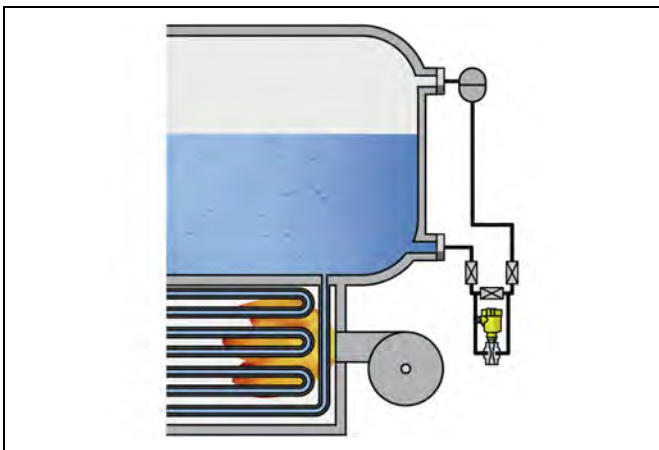


Fig. 22: Level measurement in a boiler with VEGADIF 65

VEGADIF 65 can be also used with high temperatures and pressures. The instrument measures the hydrostatic pressure of the liquid column in a boiler independent of the static pressure in the vessel.

Pump

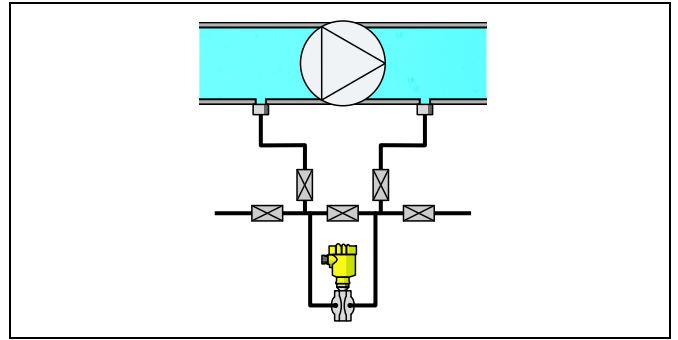


Fig. 24: Differential pressure measurement on a pump

The VEGADIF 65 can be also used for measurement of the difference between pump input and output. The instrument measures this pressure difference independent from the static pressure.

7 Electronics - 4 ... 20 mA - two-wire

Configuration of the electronics

The pluggable electronics is mounted in the electronics compartment of the instrument and can be exchanged by the user when servicing is required. The electronics is completely encapsulated to protect against vibration and moisture.

The terminals for voltage supply as well as the plug with I²C interface for parameter adjustment are located on the upper side of the electronics. With the double chamber housing, these connection elements are located in the separate connection compartment.

Voltage supply

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

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

- Operating voltage
 - 12 ... 36 V DC
- Permissible residual ripple
 - $U_{pp} < 1 \text{ V}$ (< 100 Hz)
 - $U_{pp} < 10 \text{ mV}$ (100 ... 10 kHz)

Connection cable

The sensors are connected with standard cable without screen. An outer cable diameter of 5 ... 9 mm ensures the seal effect of the cable entry.

If electromagnetic interference is expected which is above the test values of EN 61326 for industrial areas, screened cable should be used.

Cable screening and grounding

If screened cable is necessary, 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).

Connection single chamber housing

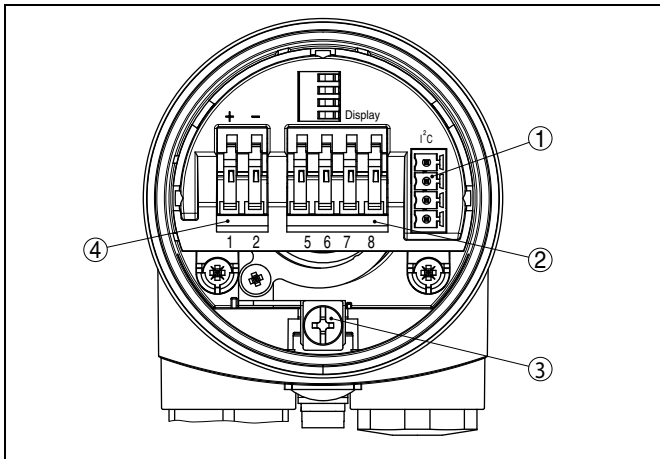


Fig. 25: Electronics and connection department with single chamber housing

- 1 Plug connector for VEGACONNECT (I²C interface)
- 2 Spring-loaded terminals for connection of the external indication VEGADIS 61
- 3 Ground terminal for connection of the cable screen
- 4 Spring-loaded terminals for voltage supply

Connection double chamber housing

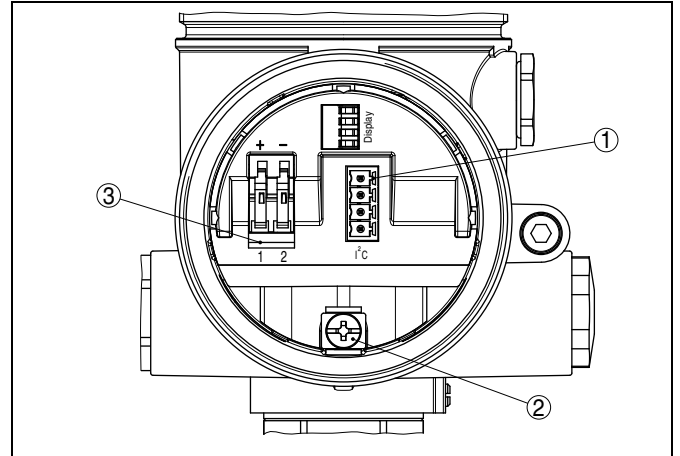


Fig. 26: Connection compartment, double chamber housing

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

8 Electronics - 4 ... 20 mA/HART - two-wire

Configuration of the electronics

The pluggable electronics is mounted in the electronics compartment of the instrument and can be exchanged by the user when servicing is required. The electronics is completely encapsulated to protect against vibration and moisture.

The terminals for voltage supply as well as the plug with I²C interface for parameter adjustment are located on the upper side of the electronics. With the double chamber housing, these connection elements are located in the separate connection compartment.

Voltage supply

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

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

- Operating voltage
 - 12 ... 36 V DC
- Permissible residual ripple
 - $U_{pp} < 1 \text{ V}$ (< 100 Hz)
 - $U_{pp} < 10 \text{ mV}$ (100 ... 10 kHz)

Connection cable

The sensors are connected with standard cable without screen. An outer cable diameter of 5 ... 9 mm ensures the seal effect of the cable entry.

If electromagnetic interference is expected which is above the test values of EN 61326 for industrial areas, screened cable should be used. In HART multidrop mode the use of screened cable is generally recommended.

Cable screening and grounding

If screened cable is necessary, 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).

Connection single chamber housing

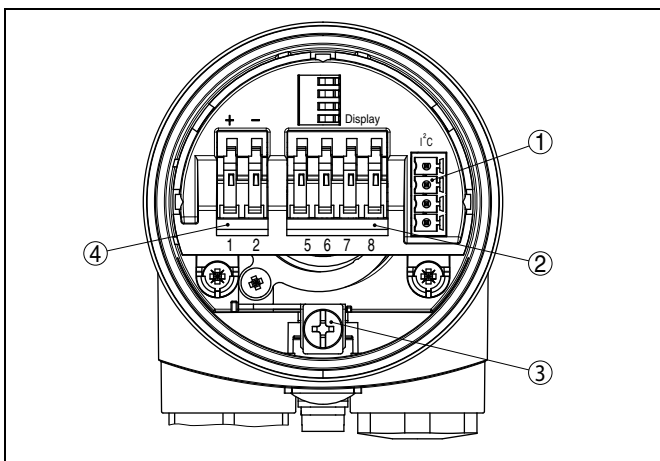


Fig. 27: Electronics and connection department with single chamber housing

- 1 Plug connector for VEGACONNECT (I²C interface)
- 2 Spring-loaded terminals for connection of the external indication VEGADIS 61
- 3 Ground terminal for connection of the cable screen
- 4 Spring-loaded terminals for voltage supply

Connection double chamber housing

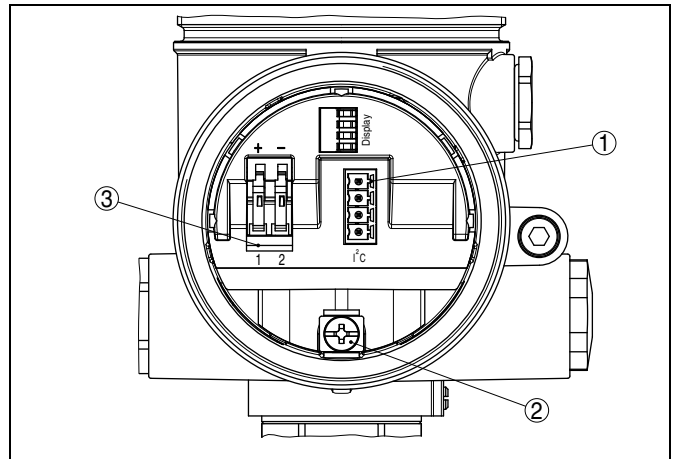


Fig. 28: Connection compartment, double chamber housing

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

9 Electronics - Profibus PA

Configuration of the electronics

The pluggable electronics is mounted in the electronics compartment of the instrument and can be exchanged by the user when servicing is required. The electronics is completely encapsulated to protect against vibration and moisture.

The terminals for voltage supply as well as the plug with I²C interface for parameter adjustment are located on the upper side of the electronics. With the double chamber housing, these connection elements are located in the separate connection compartment.

Voltage supply

Power supply via the H1 Fieldbus cable.

- Operating voltage
 - 9 ... 32 V DC
- Max. number of sensors with DP/PA segment coupler
 - 32
- Max. number of sensors with VEGALOG 571 EP input card
 - 10

Connection cable

Connection is made with screened cable according to Profibus specification. A cable diameter of 5 ... 9 mm ensures the seal effect of the cable gland.

Make sure that the entire installation is carried out according to the Profibus specification. In particular, make sure that the termination of the bus is done with appropriate terminating resistors.

Cable screening and grounding

In systems with potential equalisation, connect the cable screen directly to ground potential at the power supply unit, in the connection box and at the sensor. The screen in the sensor must be connected directly to the internal ground terminal. The ground terminal outside on the housing must be connected to the potential equalisation (low impedance).

In systems without potential equalisation, connect the cable screen directly to ground potential at the power supply unit and at the sensor. In the connection box or T-distributor, the screen of the short stub to the sensor must not be connected to ground potential or to another cable screen. The cable screens to the power supply unit and to the next distributor must be connected to each other and also connected to ground potential 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.

Connection single chamber housing

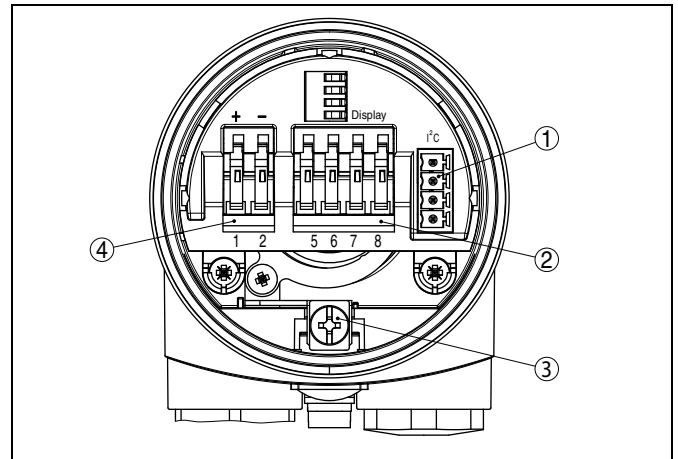


Fig. 29: Electronics and connection department with single chamber housing

- 1 Plug connector for VEGACONNECT (I²C interface)
- 2 Spring-loaded terminals for connection of the external indication VEGADIS 61
- 3 Ground terminal for connection of the cable screen
- 4 Spring-loaded terminals for voltage supply

Connection double chamber housing

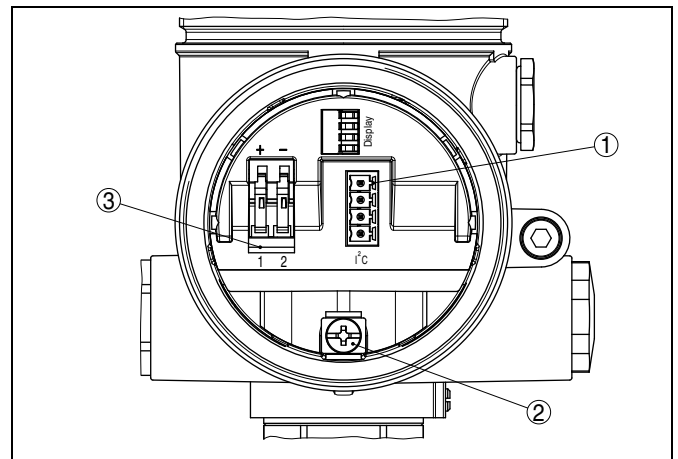


Fig. 30: Connection compartment, double chamber housing

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

10 Electronics - Foundation Fieldbus

Configuration of the electronics

The pluggable electronics is mounted in the electronics compartment of the instrument and can be exchanged by the user when servicing is required. The electronics is completely encapsulated to protect against vibration and moisture.

The terminals for voltage supply as well as the plug with I²C interface for parameter adjustment are located on the upper side of the electronics. With the double chamber housing, these connection elements are located in the separate connection compartment.

Voltage supply

Power supply via the H1 Fieldbus cable.

- Operating voltage
 - 9 ... 32 V DC
- max. number of sensors
 - 32

Connection cable

Connection is made with screened cable according to Fieldbus specification. A cable diameter of 5 ... 9 mm ensures the seal effect of the cable gland.

Make sure that the entire installation is carried out according to the Fieldbus specification. In particular, make sure that the termination of the bus is done with appropriate terminating resistors.

Cable screening and grounding

In systems with potential equalisation, connect the cable screen directly to ground potential at the power supply unit, in the connection box and at the sensor. The screen in the sensor must be connected directly to the internal ground terminal. The ground terminal outside on the housing must be connected to the potential equalisation (low impedance).

In systems without potential equalisation, connect the cable screen directly to ground potential at the power supply unit and at the sensor. In the connection box or T-distributor, the screen of the short stub to the sensor must not be connected to ground potential or to another cable screen. The cable screens to the power supply unit and to the next distributor must be connected to each other and also connected to ground potential 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.

Connection single chamber housing

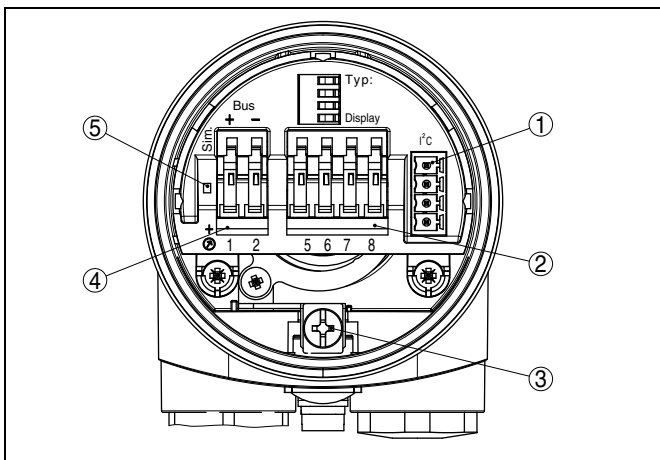


Fig. 31: Electronics and connection department with single chamber housing

- 1 Plug connector for VEGACONNECT (I²C interface)
- 2 Spring-loaded terminals for connection of the external indication VEGADIS 61
- 3 Ground terminal for connection of the cable screen
- 4 Spring-loaded terminals for Foundation Fieldbus connection
- 5 Simulation switch ("on" = mode for simulation release)

Connection double chamber housing

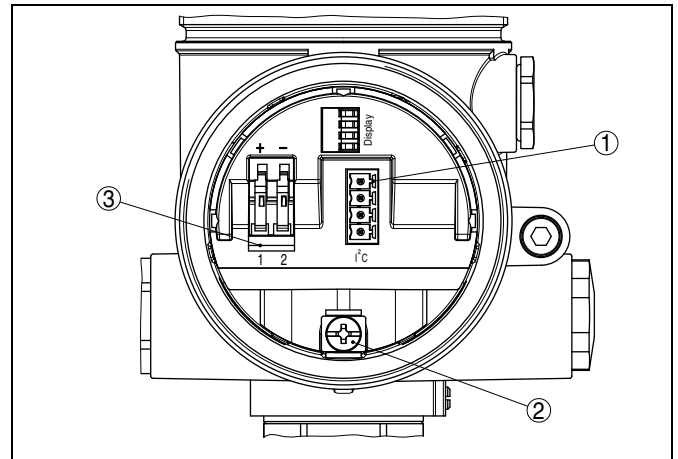


Fig. 32: Connection compartment, double chamber housing

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

11 Operation

11.1 Overview

The sensors can be adjusted with the following adjustment media:

- with indicating and adjustment module
- an adjustment software according to FDT/DTM standard, e.g. PACTware and PC

and, depending on the signal output, also with:

- A HART handheld (4 ... 20 mA/HART)
- The adjustment program AMS (4 ... 20 mA/HART and Foundation Fieldbus)
- The adjustment program PDM (Profibus PA)
- A configuration tool (Foundation Fieldbus)

The entered parameters are generally saved in the sensor, optionally also in the indicating and adjustment module or in the adjustment program.

11.2 Indicating and adjustment module PLICSCOM

The pluggable indicating and adjustment module is used for measured value indication, operation and diagnosis. It is equipped with an illuminated full dot matrix as well as four keys for adjustment.



Fig. 33: Indicating and adjustment module PLICSCOM

The indicating and adjustment module is integrated in the respective sensor housing or in the external indicating and adjustment unit. After mounting, the sensor as well as the indicating and adjustment module are splash-proof even without housing cover.

11.3 PACTware/DTM

As an alternative to the indicating and adjustment module, the sensor can also be configured via a Windows PC. For this purpose, the configuration software PACTware and a suitable instrument driver (DTM) according to the FDT standard are required. The actual PACTware version as well as all available DTMs are compiled in a DTM Collection. Furthermore the DTMs can be integrated in other frame applications according to the FDT standard.

All device DTMs are available as a free-of-charge standard version and as a full version that must be purchased. In the standard version, all functions for complete setup are already included. An assistant for simple project configuration simplifies the adjustment considerably. Saving/printing the project as well as import/export functions are also part of the standard version.

In the full version there is also an extended print function for complete project documentation as well as a save function for measured value and echo curves. In addition, there is a tank calculation program as well as a multiviewer for display and analysis of the saved measured value and echo curves.

Connection of the PC via VEGACONNECT

The interface converter VEGACONNECT is required for connection of the PC. On the computer side, the connection is made via USB interface. The VEGACONNECT is placed instead of the indicating and adjustment module to the sensor, the connection to the sensor is made automatically. As

an alternative the connection via the HART signal can be carried out on any position of the signal cable with 4 ... 20 mA/HART sensors.

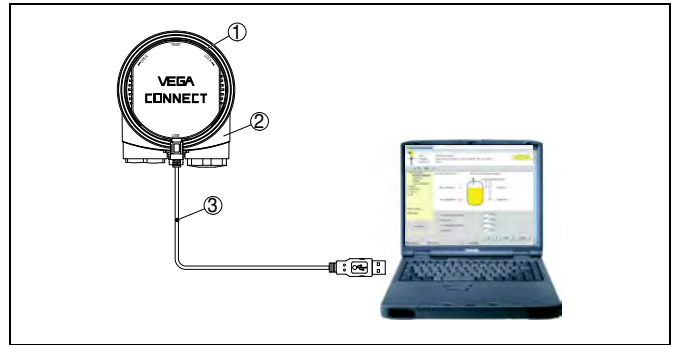


Fig. 34: Connection via VEGACONNECT and USB

- 1 VEGACONNECT
- 2 plics® sensor
- 3 USB cable to the PC

Necessary components:

- VEGADIF 65
- PC with PACTware and suitable DTM
- VEGACONNECT
- Voltage supply/Processing system

11.4 Adjustment with other adjustment programs

PDM

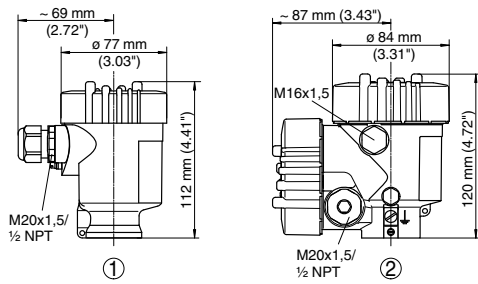
For VEGA Profibus PA sensors, instrument descriptions for the adjustment program PDM are available as EDD. The instrument descriptions are already implemented in the current version of PDM. For older versions of PDM, a free-of-charge download is available via Internet.

AMS

For VEGA Foundation Fieldbus sensors, instrument descriptions for the adjustment program AMS™ are available as DD. The instrument descriptions are already implemented in the current version of AMS™. For older versions of AMS™, a free-of-charge download is available via Internet.

12 Dimensions

Plastic housing



- 1 Single chamber housing
- 2 Double chamber housing

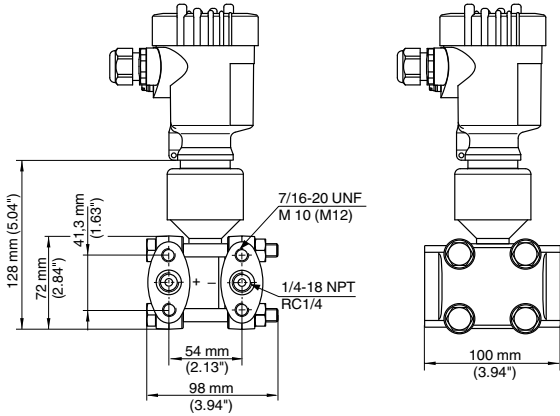
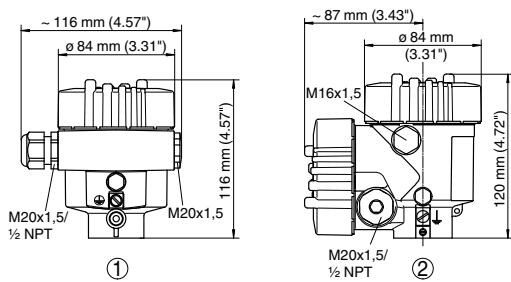


Fig. 37: VEGADIF 65 - measuring cells from 100 mbar

Aluminium housing



- 1 Single chamber housing
- 2 Double chamber housing

VEGADIF 65 - oval flange lateral ventilation

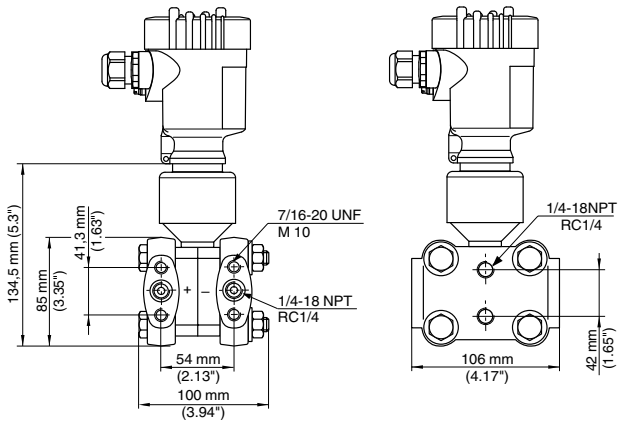
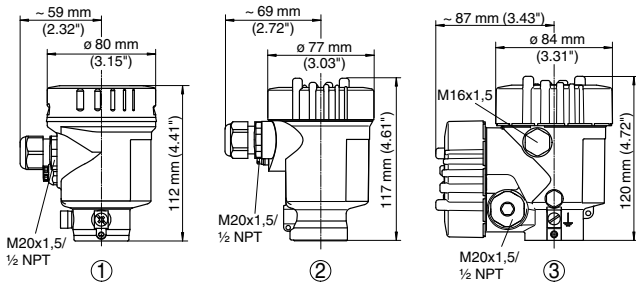


Fig. 39: VEGADIF 65 - measuring cells 10 and 30 mbar

Stainless steel housing



- 1 Single chamber housing electropolished
- 2 Single chamber housing precision casting
- 2 Double chamber housing precision casting

VEGADIF 65 - oval flange standard

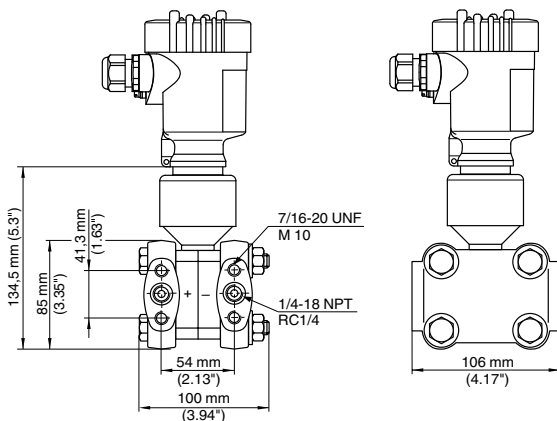


Fig. 35: VEGADIF 65 - measuring cells 10 and 30 mbar

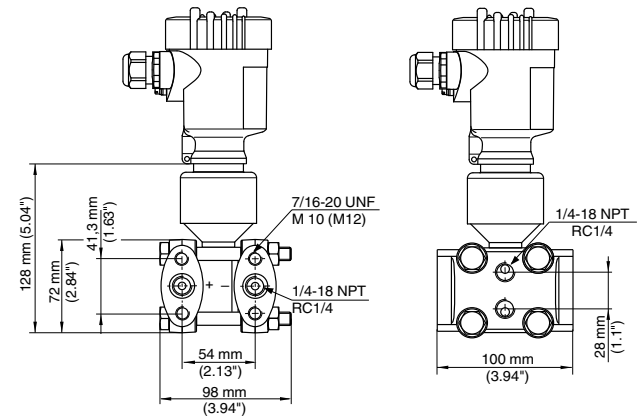


Fig. 41: VEGADIF 65 - measuring cells from 100 mbar

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VEGADIF 65 - prepared for mounting chemical seal CSB

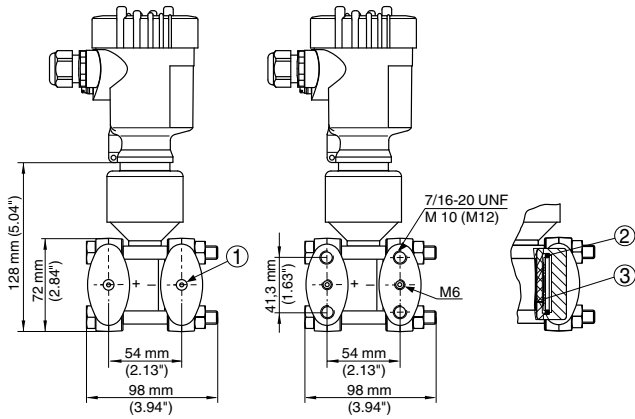


Fig. 43: left: Process fitting VEGADIF 65 prepared for chemical seal assembly. right: Position of the copper ring seal

- 1 Isolating diaphragm connection
- 2 Copper ring seal
- 3 Cup diaphragm

The listed drawings are only an excerpt of the available process fittings. You can find further drawings on our homepage www.vega.com » Downloads » Drawings.



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