

Level detection
in liquids

Vibration

VEGASWING 51
VEGASWING 61
VEGASWING 63



Product Information

VEGA

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Take note of safety instructions for Ex applications



Please note the Ex specific safety information 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 on intrinsically safe circuits. The permissible electrical values are stated in the certificate.

1 Description of the measuring principle

Measuring principle

VEGASWING is a level sensor with tuning fork for level detection.

It is designed for industrial use in all areas of process technology, preferably in liquids.

The vibrating element (tuning fork) is energized piezoelectrically and vibrates at its mechanical resonance frequency. The piezos are fixed mechanically and are hence not subject to temperature shock limitations. If the vibrating element is submerged in the product, the vibrating frequency changes. This change is detected by the integrated oscillator and converted into a switching command.

Typical applications are overfill and dry run protection. Thanks to its simple and robust measuring system, VEGASWING is virtually unaffected by the chemical and physical properties of the liquid.

It functions even when exposed to strong external vibration or changing products.

Fault monitoring

The electronics of VEGASWING continuously monitors the following criteria:

- strong corrosion or damage of the tuning fork
- loss of vibration
- Line break to the piezo drive

If one of the mentioned malfunctions is detected or in case of power failure, the electronics takes on a defined switching condition, e.g. the output transistor blocks (safe condition).

Function test

The recurring function test serves to check the safety function in order to detect possible, non-evident dangerous errors. The measuring system should hence be checked at regular intervals.

There are two different possibilities to carry out a function test:

VEGASWING 61, 63 with two-wire electronics in conjunction with a VEGATOR signal conditioning instrument.

- Test key on the VEGATOR signal conditioning instrument
- VEGASWING 61, 63 with two-wire electronics in conjunction with a VEGALOG processing system or a PLC.
- Brief interruption of the connection cable to the PLC

VEGASWING 51

The small level switch version has a tuning fork with 40 mm length, a small, compact stainless steel housing and is available in the electronics versions transistor output and contactless electronic switch.

VEGASWING 61, 63

VEGASWING series 60 level switches are instruments of the VEGA plics® series which are available in standard and tube version. plics® instruments offer suitable versions for all applications thanks to the many different process fittings, housings and electronics versions. They have all usual approvals and the tuning fork can be also polished, e.g. for applications in the food processing industry.

VEGASWING are virtually unaffected from product properties and must not be adjusted.

The level switches are used in applications with process temperatures up to 250 °C (482 °F) and pressures of up to 64 bar (928 psi).

They detect liquids from 0.5 ... 2.5 g/cm³ (0.018 ... 0.09 lbs/in³).

All electronics are qualified in the function overfill and dry run protection according to IEC 61508 and 61511 according to SIL2, in redundant version also in SIL3.

1.1 Application examples

Chemical industry - Solvents

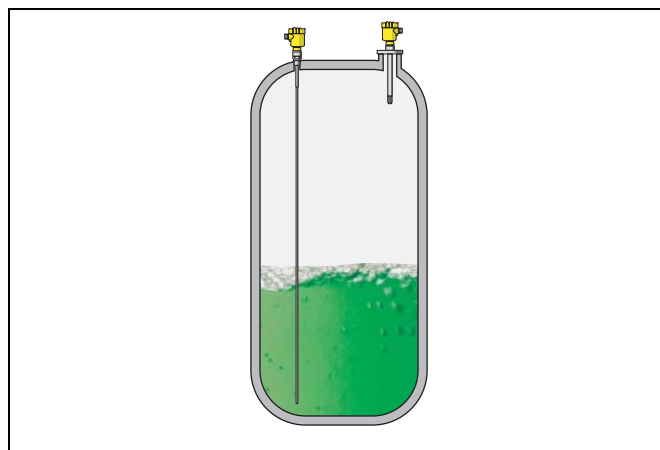


Fig. 1: Level detection in vessels with solvents

Apart from the continuous level measurement, level detection is an essential safety feature for storage tanks. Many modern sensors for continuous level measurement, however, are not approved as overfill protection system, but a second, physically different measuring system offers optimum safety and redundancy.

Thanks to the manifold application possibilities, VEGASWING vibrating level switches are ideal for all applications concerning stock-keeping of liquids. A number of electrical and mechanical versions ensures simple integration into existing processing system.

Advantages:

- Various electrical versions
- Product-independent
- Universal level detection for all liquids

Chemical industry - reactors

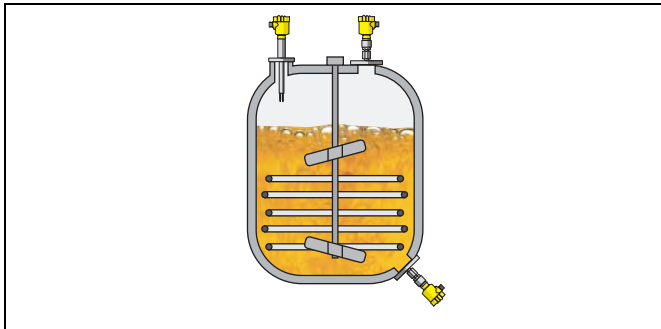


Fig. 2: Level detection in chemical reactors

Because they prevent overflowing or dry running of pumps, sensors for level detection are an important safety element in reactors. Due to their universal applicability, VEGASWING level switches are well suited for use in reaction vessels. Even high viscosities, temperatures up to 250 °C and pressure up to 64 bar do not impair their function.

To provide the required chemical resistance, high resistance materials and enamelled versions are available.

In toxic products, the VEGASWING version with metallic process separation ensures a high level of safety. To prevent product leakage even in case of corrosion on the tuning fork, a glass seal is also welded in. This guarantees optimum safety.

To provide optimal resistance to the measured medium, whatever its composition and corrosive properties may be, sensors made of 316L or Hastelloy, or sensors in plastic-coated and enamelled versions, are available.

Thanks to the manifold application possibilities, VEGASWING vibrating level switches are ideal for all applications concerning stock-keeping of liquids. A number of electrical and mechanical versions ensures simple integration into existing processing system.

Advantages:

- Various electrical versions
- Product-independent
- Completely gas-tight
- High reliability
- Universal level detection for all liquids

Water/Sewage water plants

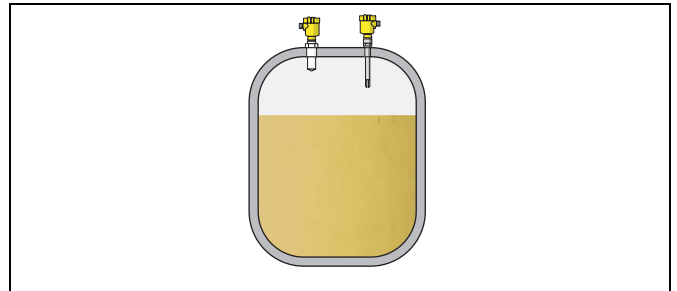


Fig. 3: Precipitants in sewage water processing

Chemicals are required for sewage water treatment. They are applied to promote chemical precipitation in the process. Phosphates and nitrates are sedimented and separated. In addition to lime water and ferric chloride, various acids and lyes are stored for use in digested sludge treatment and neutralisation.

These substances are subject to the regulations for water-endangering substances. In accordance with this, overflow protection systems must be mounted on storage tanks.

Because they prevent overflowing of vessels containing toxic products, sensors for level detection are an important safety element.

Due to their versatile nature, VEGASWING vibrating level switches are also well qualified for use with water-endangering substances. To provide optimal resistance to the measured medium, whatever its composition and corrosive properties may be, sensors made of 316L, Hastelloy, or sensors in plastic-coated or enamelled versions, are available.

Advantages:

- high reproducibility
- high resistance sensor materials such as PFA, ECTFE, Hastelloy C4, enamel

Pipelines

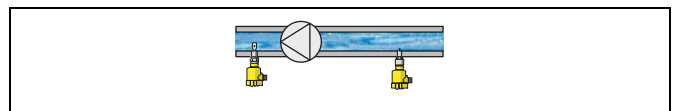


Fig. 4: Dry run protection in pipelines

Monitoring of levels is also important in pipelines, as dry running often causes damage or complete breakdown of the pumps.

The VEGASWING level switch is recommended as dry run protection system, e.g. for drinking water pumps. With a fork of only 40 mm length, this level switch functions reliably, even with small tube diameters.

Advantages:

- Universal level detection for all liquids
- Adjustment and maintenance-free

Food processing industry

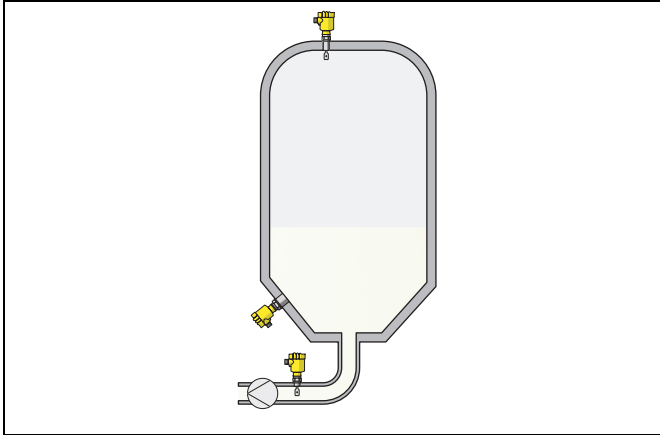


Fig. 5: Level detection and dry run protection in a tank storing milk

The processes in food processing tanks, such as e.g. for milk, place heavy demands on the installed measurement technology. High pressures and temperatures are generated during sterilization and cleaning of the tanks. The implemented level measuring instruments and level detectors must meet the requirements of the hygienic system. The innocuousness of all wetted materials must be proven and optimum cleanability must be ensured through hygienic technical design.

VEGASWING is installed for level detection and as dry run protection system. The tuning fork is highly polished for the use in sensitive foodstuffs such as milk.

Advantages:

- Universal level detection for all liquids
- high resistance sensor materials such as PFA, ECTFE, Hastelloy C4, enamel
- Adjustment and maintenance-free

2 Type overview

VEGASWING 51



VEGASWING 61



VEGASWING 63



Preferred application:	Liquids	Liquids	Liquids
Length:	-	-	80 ... 6000 mm (3 ... 236 in)
Process fitting:	Thread G $\frac{3}{4}$ A, G1 A	Thread G $\frac{3}{4}$ A, G1 A, flanges, hygienic fittings	Thread G $\frac{3}{4}$ A, G1 A, flanges, hygienic fittings
Process temperature:	-40 ... +100 °C (-40 ... +212 °F) -40 ... +150 °C (-40 ... +302 °F) with temperature adapter	-50 ... +150 °C (-58 ... +302 °F) -50 ... +250 °C (-58 ... +482 °F) with temperature adapter	-50 ... +150 °C (-58 ... +302 °F) -50 ... +250 °C (-58 ... +482 °F) with temperature adapter
Process pressure:	-1 ... 16 bar (-14.5 ... 232 psi)	-1 ... 64 bar (-14.5 ... 928 psi)	-1 ... 64 bar (-14.5 ... 928 psi)
Signal output:	transistor output, contactless electronic switch	Relay, transistor, two-wire, NAMUR output, contactless electronic switch	Relay, transistor, two-wire, NAMUR output, contactless electronic switch
Ruggedness:	+	+	+
Sensitivity:	+	++	++
Buildup:	++	+	+
Cleanability:	++	++	++
Installation length:	++	++	++

Housing



Plastic



Stainless steel



Aluminium



Aluminium (double chamber)

Electronics



Relay output



Transistor output



Contactless electronic switch



Two-wire output



NAMUR output

Sensors



Tuning fork

Approvals



Gas explosion protection

3 Mounting instructions

Switching point

In general, VEGASWING can be mounted in any position. The instrument must be mounted in such a way that the vibrating element is at the height of the requested switching point.

Socket

The vibrating element should protrude into the vessel to avoid buildup. For that reason, avoid using mounting bosses for flanges and screwed fittings. This applies particularly for horizontal installation and with adhesive products.

Agitators

Due to agitators, vibrations or similar, the level switch can be subjected to strong lateral forces. For this reason, do not use an overly long extension tube for VEGASWING 63, but check if you can mount a VEGASWING 51 or 61 level switch on the side of the vessel in horizontal position.

Extreme vibration caused by the process or the equipment, e.g. agitators or turbulence in the vessel, can cause the extension tube of VEGASWING to vibrate in resonance. This leads to increased stress on the upper weld joint. Should a longer tube version be necessary, you can provide a suitable support or guy directly above the vibrating element to secure the extension tube.



This measure applies particularly to applications in Ex areas. Make sure that the tube is not subjected to bending forces through this measure.

Inflowing medium

If VEGASWING is mounted in the filling stream, unwanted switching signals may be generated. Mount VEGASWING at a location in the vessel where no disturbing influence from e.g. filling openings, agitators etc. can occur.

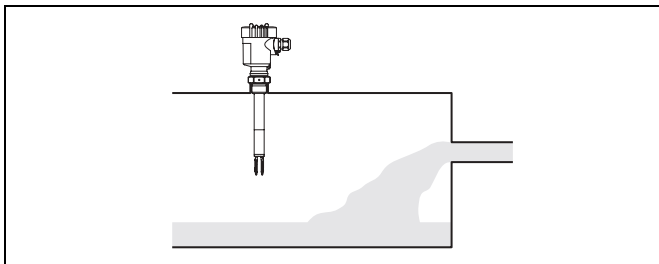


Fig. 6: Inflowing medium

Flows

To minimise flow resistance caused by the tuning fork, VEGASWING should be mounted in such a way that the surfaces of the blades are parallel to the product movement.

Lock fitting

VEGASWING in tube version can be mounted with a lock fitting for height adjustment. Take note of the pressure specifications of the lock fitting.

Keep in mind that the lock fitting must not be used with coated instrument versions.

Pressure/Vacuum

The process fitting must be sealed if there is gauge or low pressure in the vessel. Check if the seal material is resistant against the measured product and the process temperature.

4 Electrical connection

4.1 Preparing the connection

Note safety instructions

Generally note the following safety instructions:

- Connect only in the complete absence of line voltage

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

Connect the power supply according to the following diagrams. Oscillators SW60R and SW60C are designed in protection class 1. To maintain this protection class, it is absolutely necessary that the ground conductor be connected to the internal ground terminal. Take note of the general installation regulations. As a rule, connect VEGASWING to vessel ground (PA), or in case of plastic vessels, to the next ground potential. On the side of the housing there is a ground terminal between the cable entries. This connection serves to drain off electrostatic charges. In Ex applications, the installation regulations for hazardous areas must be given priority.

The data for power supply are stated in the "Technical data" in the "Supplement".

Selecting connection cable

VEGASWING is connected with standard cable with round cross-section. An outer cable diameter of 5 ... 9 mm (0.2 ... 0.35 in) ensures the seal effect of the cable entry.

If cable with a different diameter or wire cross section is used, exchange the seal or use an appropriate cable connection.



In hazardous areas, only use approved cable connections for VEGASWING.

Select connection cable for Ex applications



Take note of the corresponding installation regulations for Ex applications.

4.2 Wiring plan

Relay output

VEGASWING 61, 63

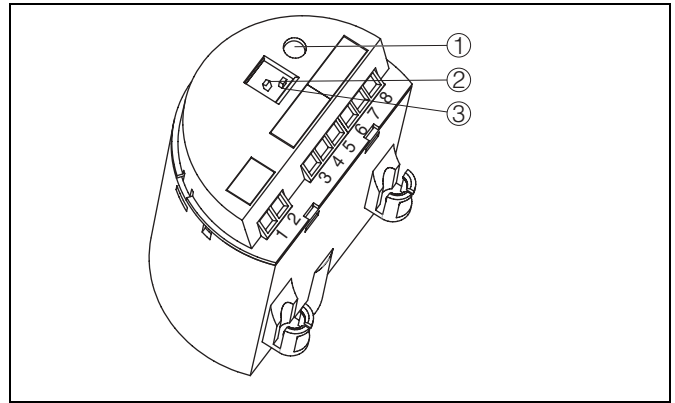


Fig. 7: VEGASWING 61, 63 - oscillator with relay output

- 1 Control lamp
- 2 DIL switch for mode adjustment
- 3 DIL switch for sensitivity adjustment

We recommend connecting VEGASWING in such a way that the switching circuit is open when there is a level signal, line break or failure (safe condition).

The relays are always shown in non-operative condition.

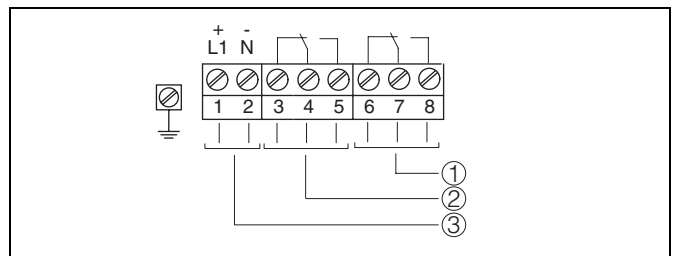


Fig. 8: VEGASWING 61, 63 - wiring plan - relay output

- 1 Relay output
- 2 Relay output
- 3 Voltage supply

Transistor output

We recommend connecting VEGASWING in such a way that the switching circuit is open when there is a level signal, line break or failure (safe condition).

The instrument is used to control relays, contactors, magnet valves, warning lights, horns as well as PLC inputs.

VEGASWING 61, 63

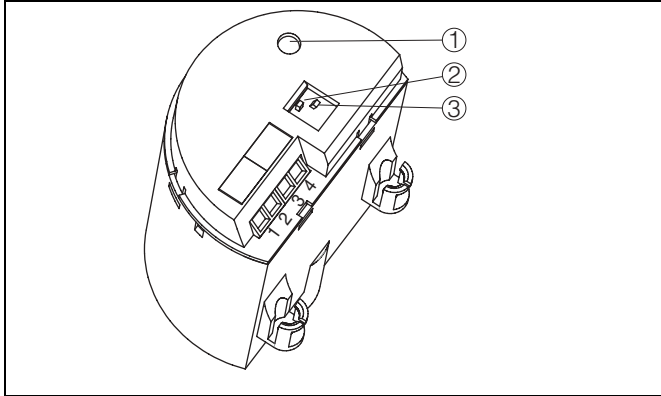


Fig. 9: VEGASWING 61, 63 - oscillator with transistor output

- 1 Control lamp
- 2 DIL switch for mode adjustment
- 3 DIL switch for sensitivity adjustment

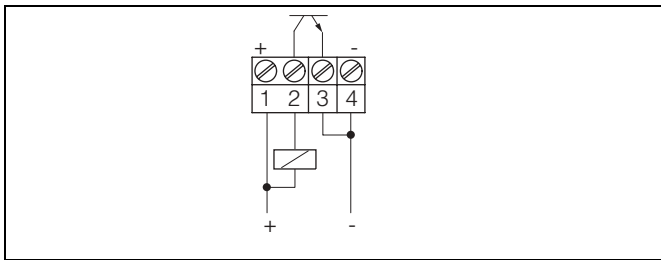


Fig. 10: VEGASWING 61, 63 - transistor output - NPN action

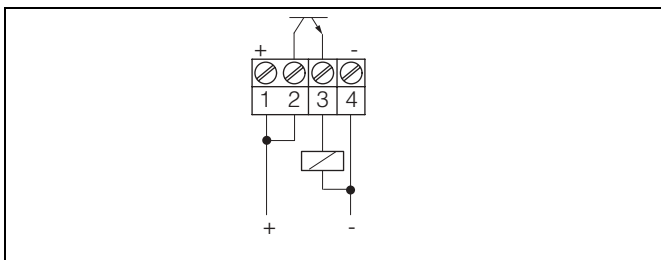


Fig. 11: VEGASWING 61, 63 - transistor output - PNP action

VEGASWING 51

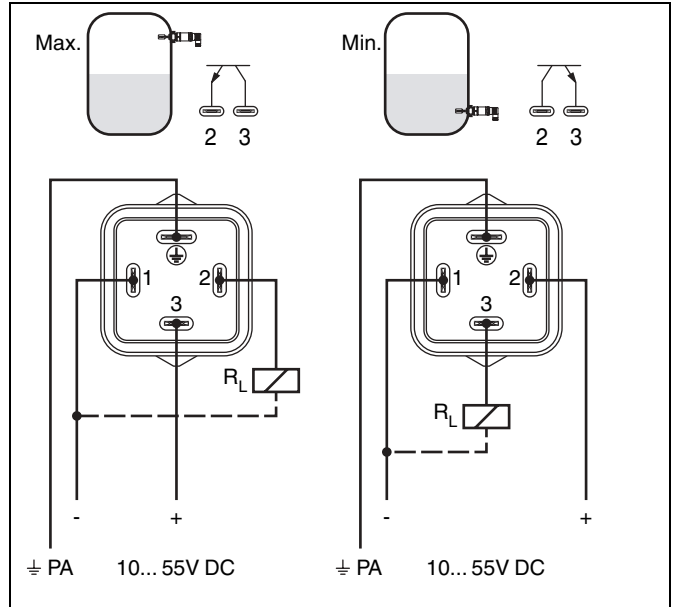


Fig. 12: VEGASWING 51 - transistor output with valve plug DIN 43650

- PA Potential equalisation
- RL Load resistance (contactor, relay, etc.)

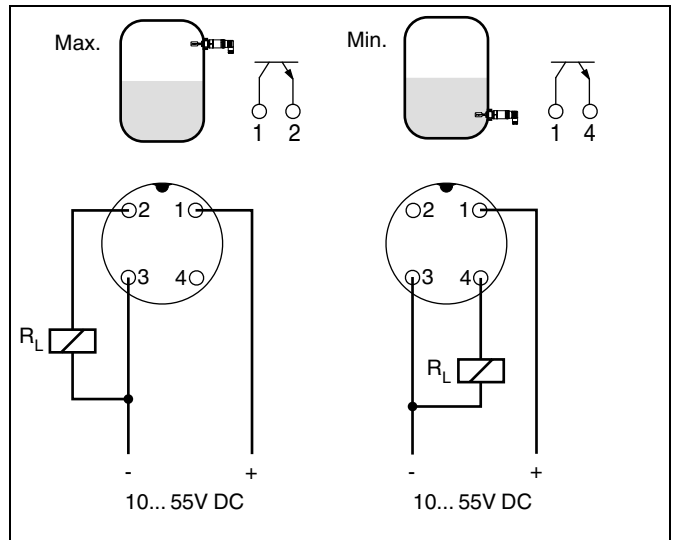


Fig. 13: VEGASWING 51 - transistor output with M12x1 plug connection (housing)

- 1 Brown
- 2 White
- 3 Blue
- 4 Black
- RL Load resistor (contactor, relay etc.)

Contactless electronic switch

We recommend connecting VEGASWING in such a way that the switching circuit is open when there is a level signal, line break or failure (safe condition).

The contactless electronic switch is always shown in non-operative condition.

The instrument is used for direct control of relays, contactors, magnet valves, warning lights, horns etc. It must not be operated without an intermediately connected load, because the electronics would be destroyed if connected directly to the mains. It is not suitable for connection to low voltage PLC inputs.

Domestic current is temporarily lowered below 1 mA after switching off the load so that contactors, whose holding current is lower than the constant domestic current of the electronics, are reliably switched off.

When VEGASWING is used as part of an overfill protection system according to WHG, also note the regulations of the general type approval.

VEGASWING 61, 63

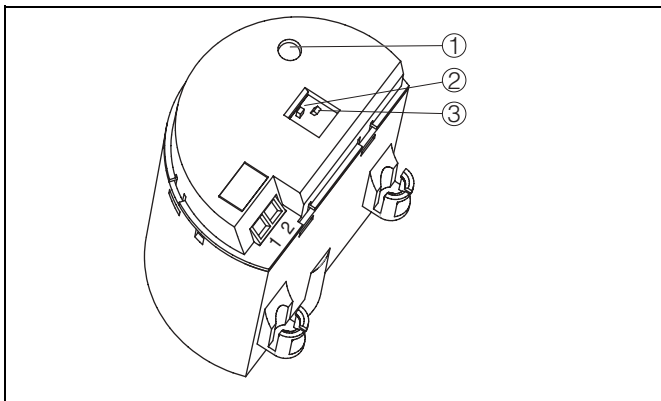


Fig. 14: VEGASWING 61, 63 - oscillator with contactless electronic switch

- 1 Control lamp
- 2 DIL switch for mode adjustment
- 3 DIL switch for sensitivity adjustment

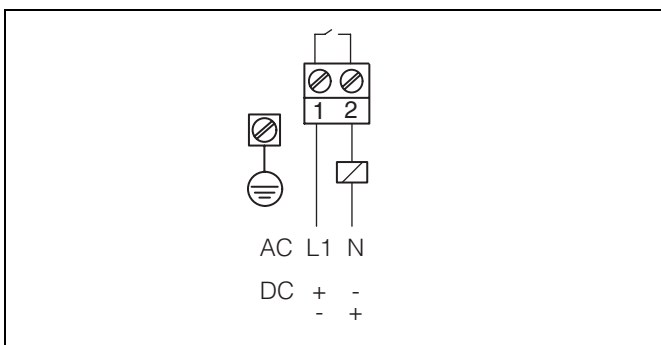


Fig. 15: VEGASWING 61, 63 - wiring plan - output, contactless electronic switch

VEGASWING 51

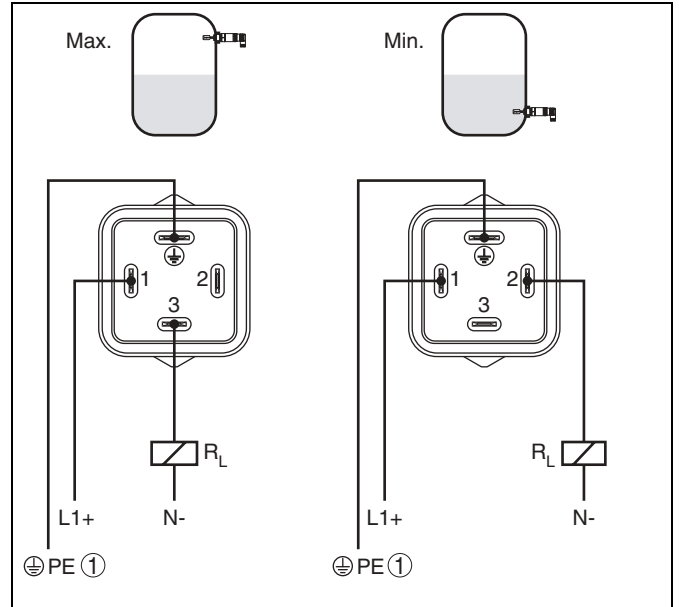


Fig. 16: VEGASWING 51 - contactless electronics switch with valve plug DIN 43650

- 1 Protection earth

Two-wire output

VEGASWING 61, 63

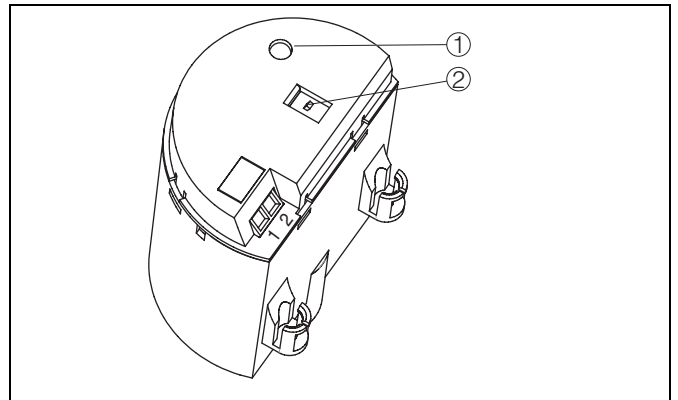


Fig. 17: VEGASWING 61, 63 - oscillator with two-wire electronics

- 1 Control lamp
- 2 DIL switch for sensitivity adjustment

We recommend connecting VEGASWING in such a way that the switching circuit is open when there is a level signal, line break or failure (safe condition).

For connection to a signal conditioning instrument also Ex. Power supply via the connected signal conditioning instrument. For further information see chapter "Technical data" in the "Supplement".

The wiring example is applicable for all suitable signal conditioning instruments.

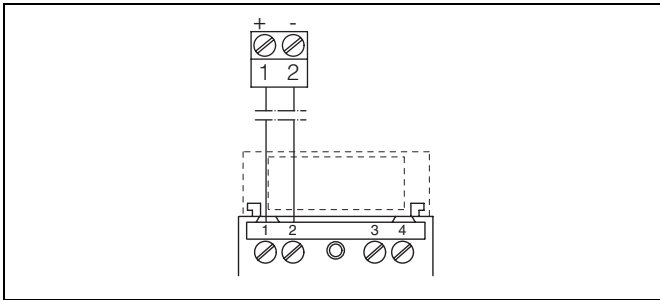


Fig. 18: VEGASWING 61, 63 - wiring plan - two-wire output

NAMUR output

VEGASWING 61, 63

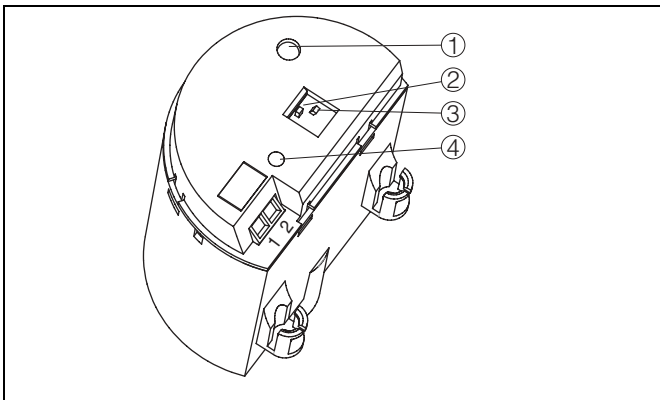


Fig. 19: VEGASWING 61, 63 - oscillator with NAMUR electronics

- 1 Control lamp
- 2 DIL switch for characteristics reversal
- 3 DIL switch for sensitivity adjustment
- 4 Simulation key

For connection of the amplifier according to NAMUR (IEC 60947-5-6, EN 50227). You find further information in the "Technical data" in the "Supplement".

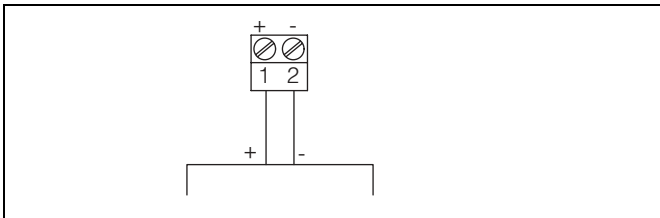


Fig. 20: Wiring plan - NAMUR output

5 Operation

5.1 Adjustment, general

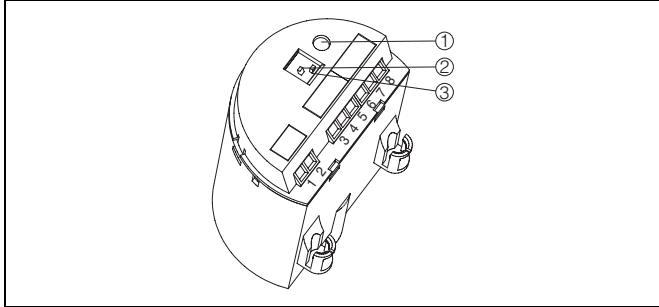


Fig. 21: Adjustment elements electronics module, e.g. VEGASWING 61, 63 relay output (SW60R)

- 1 Signal lamp (LED)
- 2 DIL switch for mode adjustment
- 3 DIL switch for sensitivity adjustment

Switching point adaptation

VEGASWING 61, 63

With this DIL switch (2) you can set the switching point to liquids with a density between 0.5 and 0.7 g/cm³ (0.018 and 0.025 lbs/in³). In the basic adjustment, liquids with a density >0.7 g/cm³ (0.025 lbs/in³) can be detected.

For products with lower density, you have to set the switch to >0.5 g/cm³ (0.018 lbs/in³).

The information about the position of the switching point relates to the medium water - density value 1 g/cm³ (0.036 lbs/in³). With mediums of differing density, the switching point shifts in the direction of the fork end, depending on the density and manner of installation.

VEGASWING 51

Products with a density >0.7 ... 2.5 g/cm³ (0.025 ... 0.09 lbs/in³) can be detected. This setting cannot be modified.

The switching status of VEGASWING can be checked when the housing is closed (signal lamp, illuminated ring below the plug).

VEGASWING has an integrated test switch which can be activated magnetically. To test the instrument, you have to hold the test magnet (accessory) to the magnet symbol on the instrument housing.

The test magnet changes the current switching condition of the instrument. You can check the change on the signal lamp. Please note that the connected instruments are activated during the test.

Mode adjustment

VEGASWING 61, 63

With the mode adjustment (min./max.) you can change the switching condition of the output. You can set the required mode (A/max. - max. detection or overflow protection, B/min. - min. detection or dry run protection).

VEGASWING 51

With the correct polarity of the supply voltage, the switching condition can be defined (max. detection/min. detection). With the

transistor output version, PNP or NPN action can be reached by different connection of the consumer (load).

Signal lamp (LED)

VEGASWING 61, 63

Diode for indication of the switching status (with plastic housing visible from outside).

VEGASWING 51

The switching status of VEGASWING is visible from outside (control lamp, signalling refractor below the plug).

Simulation key

VEGASWING 61, 63 with NAMUR electronics

The simulation key is located in a recess on the upper side of the oscillator. Push the simulation key with a suitable object (screwdriver, pen, etc.).

When the key is pushed, a line break between sensor and processing unit is simulated. The signal lamp on the sensor extinguishes. The measuring system must signal a fault and take on a safe condition when the key is pushed.

Keep in mind that the connected instruments will be activated during operation. This allows you to check the correct function of the measuring system.

Characteristics reversal

VEGASWING 61, 63 with NAMUR electronics

The characteristics of the NAMUR electronics can be reversed with the DIL switch. You can choose between falling characteristic curve (switch position max.) and rising characteristic curve (switch position min.). You can thus have the desired current outputted.

Modes

- min. - rising characteristic curve (High current when immersed)
 - max. - falling characteristics (Low current when immersed)
- The NAMUR output can be switched to falling or rising characteristics.

For applications according to WHG, the DIL switch must be set to position max.

6 Technical data

General data

Material 316L corresponds to 1.4404 or 1.4435

VEGASWING 51

Materials, wetted parts

- Process fitting - thread
- Process seal
- vibrating element

316L
Klengersil C-4400
316L

Materials, non-wetted parts

- Housing

316L and plastic PEI

Weight

250 g (9 oz)

Process fittings

- Thread
- hygienic fittings

G $\frac{3}{4}$ A, $\frac{3}{4}$ NPT, G1 A, 1 NPT
Bolting DN 25 PN 40, bolting DN 40 PN 40, Tri-Clamp 1", Tri-Clamp 1 $\frac{1}{2}$ ",
SMS

Surface quality

- Standard
- hygienic version

R_a approx. 3.2 μ m (1.26⁻⁴ in)
R_a <0.8 μ m (3.15⁻⁵ in)

VEGASWING 61, 63

Materials, wetted parts

- Process fitting - thread
- Process fitting - flange

316L, Hastelloy C4 (2.4610)
316L, 316L with Hastelloy C4 coating, steel enamelled, 316L with ECTFE
coating, 316L with PFA coating
Klengersil C-4400
316L/Hastelloy C4 (2.4610)
316L Hastelloy C4 (2.4610), Hastelloy C4 (2.4610) enamelled, 316L with
ECTFE coating, 316L with PFA coating

- Process seal

- Tuning fork

- Extension tube \varnothing 21.3 mm (0.84 in)

Sensor length VEGASWING 61

- Length VEGASWING 61
- switching point as VEGASWING 81 or 81A

See "*Supplement - Dimensions*"
Length +51 mm (+2 in)

Sensor length VEGASWING 63

- 316L, Hastelloy C4 (2.4610)
- Hastelloy C4 (2.4610) enamelled
- 316L, ECTFE coated
- 316L, PFA coated

80 ... 6000 mm (3 ... 236 in)
80 ... 1500 mm (3 ... 59 in)
80 ... 3000 mm (3 ... 118 in)
80 ... 3000 mm (3 ... 118 in)

Materials, non-wetted parts

- Housing
- Seal ring between housing and housing cover
- waveguide in the housing cover
- Ground terminal
- Temperature adapter (optional)
- Gas-tight leadthrough (optional)

Plastic PBT (Polyester), Alu die-casting powder-coated, 316L
NBR (stainless steel housing), silicone (Alu/plastic housing)
PMMA (e.g. Makrolon)
316L
316L
316L/glass

Weights

- Plastic housing
- Aluminium housing
- Stainless steel housing
- Tube extension VEGASWING 63

760 g (27 oz)
1170 g (41 oz)
1530 g (54 oz)
approx. 110 g/m (1.2 oz/ft)

Surface quality

- Standard
- hygienic version (3A)
- hygienic version

R_a approx. 3.2 μ m (1.26⁻⁴ in)
R_a <0,8 μ m (3.15⁻⁵ in)
R_a <0,3 μ m (1.18⁻⁵ in)

Process fittings

- Thread
- Flanges
- hygienic fittings

G $\frac{3}{4}$ A, $\frac{3}{4}$ NPT, G1 A, 1 NPT
DIN from DN 25, ANSI from 1"
Bolting DN 40 PN 40, Tri-Clamp 1", Tri-Clamp 1 $\frac{1}{2}$ " PN 10, conus DN 25
PN 40, Tuchenhagen Varivent DN 50 PN 10

Coatings

- ECTFE
- PFA
- Enamel
- High voltage test (enamel)

approx. 0.5 ... 0.8 mm (0.02 ... 0.03 in)
approx. 0.3 ... 0.5 mm (0.01 ... 0.02 in)
approx. 0.8 mm (0.03 in)
max. 5 KV

Gas-tight leadthrough (optional)	
– leakage rate	<10 ⁻⁶ mbar l/s
– Pressure resistance	PN 64
– hygienic fittings	Bolting DN 40 PN 40, Tri-Clamp 1", Tri-Clamp 1½" PN 10, conus DN 25 PN 40, Tuchenhagen Varivent DN 50 PN 10

Output variable

Relay output

Output	relay output (DPDT), 2 floating spdts
Turn-on voltage	
– min.	10 mV
– max.	253 V AC, 253 V DC
Switching current	
– min.	10 µA
– max.	5 A AC, 1 A DC
Breaking capacity	
– max.	1250 VA, 50 W
Contact material (relay contacts)	AgCdO and Au plated
Modes (adjustable)	min./max.
Delay time	
– when immersed	approx. 0.5 s
– when laid bare	approx. 1 s

Transistor output

Output	floating transistor output, overload and permanently shortcircuit proof
Load current	
– VEGASWING 51	max. 250 mA
– VEGASWING 61, 63	max. 400 mA
Voltage loss	max. 1 V
Turn-on voltage	max. 55 V DC
Blocking current	<10 µA
Modes (adjustable)	min./max.
Delay time	
– when immersed	approx. 0.5 s
– when laid bare	approx. 1 s

Contactless electronic switch

Output	Contactless electronic switch
Modes (adjustable)	min./max.
Delay time	
– when immersed	approx. 0.5 s
– when laid bare	approx. 1 s

Two-wire output

Output	Two-wire output
Suitable signal conditioning instruments	VEGATOR 536 Ex, 537 Ex, 636 Ex
Output signal	
– Mode min.	Vibrating element uncovered: 16 mA ±1 mA, vibrating element covered: 8 mA ±1 mA
– Mode max.	Vibrating element uncovered: 8 mA ±1 mA, vibrating element covered: 16 mA ±1 mA
– Fault signal	<2 mA
Modes (adjustable)	min./max. (changeover with the signal conditioning instrument)
Delay time	
– when immersed	approx. 0.5 s
– when laid bare	approx. 1 s

NAMUR output

Output	Two-wire NAMUR output
Current consumption	
– falling characteristics	≥2,2 mA unbedeckt/≤1,0 mA bedeckt
– rising characteristics	≤1,0 mA unbedeckt/≥2,2 mA bedeckt
– Fault signal	≤1,0 mA

30115-EN-061114

Necessary processing system	NAMUR processing system according to IEC 60947-5-6 (EN 50227/ DIN 19234)
Modes (NAMUR output adjustable to falling or rising characteristics)	rising characteristics (High current when immersed)
– min.	falling characteristics (Low current when immersed)
– max.	

Measuring accuracy

Hysteresis	approx. 2 mm (0.08 in) with vertical installation
Integration time	approx. 500 ms
Frequency	approx. 1200 Hz

Ambient conditions

Ambient temperature on the housing	-40 ... +70 °C (-40 ... +158 °F)
Storage and transport temperature	-40 ... +80 °C (-40 ... +176 °F)

Process conditions

VEGASWING 51

Parameter	Limit level of liquids
Process pressure	-1 ... 64 bar/-100 ... 6400 kPa (-14.5 ... 938 psi)
Process temperature	
– Standard	-40 ... +100 °C (-40 ... +212 °F)
– High temperature version (optional)	-40 ... +150 °C (-40 ... +302 °F)
Temperature shock	no limitation
Viscosity - dynamic	0.1 ... 10,000 mPa s (requirement: with density 1)
Density	>0.7 g/cm ³ (0.025 lbs/in ³)

VEGASWING 61, 63

Parameter	Limit level of liquids
Process pressure	-1 ... 64 bar/-100 ... 6400 kPa (-14.5 ... 938 psi)
Process temperature	
– VEGASWING of 316L/Hastelloy C4 (2.4610)	-50 ... +150 °C (-58 ... +302 °F)
Process temperature with temperature adapter (optional)	
– VEGASWING of 316L/Hastelloy C4 (2.4610)	-50 ... +250 °C (-58 ... +482 °F)
– VEGASWING enamelled	-50 ... +200 °C (-58 ... +392 °F)
– VEGASWING with ECTFE coating	-50 ... +150 °C (-58 ... +302 °F)
– VEGASWING with PFA coating	-50 ... +150 °C (-58 ... +302 °F)

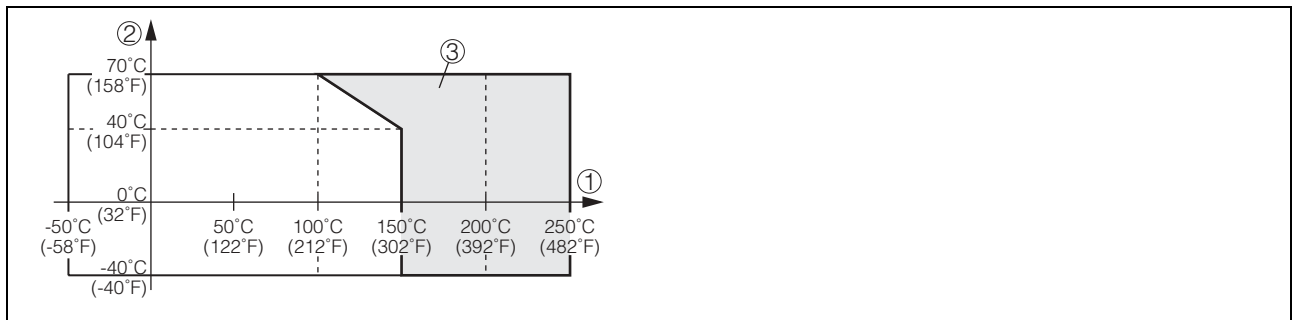


Fig. 22: Ambient temperature - Product temperature

- 1 Product temperature
- 2 Ambient temperature
- 3 Temperature range with temperature adapter

Temperature shock	no limitation
Viscosity - dynamic	0.1 ... 10,000 mPa s (requirement: with density 1)
Density	0.7 ... 2.5 g/cm ³ (0.025 ... 0.09 lbs/in ³); 0.5 ... 2.5 g/cm ³ (0.018 ... 0.09 lbs/in ³) by switching over

Electromechanical data

VEGASWING 51

Plug

– Plug connection

- 1x plug M12x1

or:

- 1x plug DIN 43650

Screwed terminals

for wire cross-section up to 1.5 mm²

VEGASWING 61, 63

Cable entry/plug (dependent on the version)

– Single chamber housing

- 1x cable entry M20x1.5 (cable-ø5 ... 9 mm), 1x blind stopper M20x1.5; attached 1x cable entry M20x1.5

or:

- 1x cable entry ½ NPT, 1x blind stopper ½ NPT, 1x cable entry ½ NPT

or:

- 1x plug (M12x1, DIN 43650, Harting HAN7, Amphenol-Tuchel), 1x blind stopper M20x1.5

Screwed terminals

for wire cross-section up to 1.5 mm²

Adjustment elements

VEGASWING 51

Control lamp

Illuminated lens for indication of the switching condition

Mode adjustment

min./max. changeover by electrical connection

VEGASWING 61, 63

Control lamp

Control lamp (LED) for indication of the switching status

Density switch (electronics versions: relay, transistor, two-wire output, contactless electronic switch)

– 0.5 0.5 ... 2.5 g/cm³ (0.018 ... 0.9 oz/in³)

– 0.7 0.7 ... 2.5 g/cm³ (0.025 ... 0.9 oz/in³)

Mode switch (electronics versions: relay, transistor output, contactless electronic switch)

– A Max. detection or overflow protection

– B Min. detection or dry run protection

Characteristics reversal (electronics version: NAMUR output)

– max. falling characteristics (Low current when immersed)

– min. rising characteristics (High current when immersed)

Voltage supply

Relay output

Supply voltage

20 ... 253 V AC, 50/60 Hz, 20 ... 72 V DC (at U >60 V DC, the ambient temperature can be max. 50 °C/122 °F)

Power consumption

1 ... 8 VA (AC), approx. 1.3 W (DC)

Transistor output

Supply voltage

10 ... 55 V DC

Power consumption

max. 0.5 W

Contactless electronic switch

Supply voltage

20 ... 253 V AC, 50/60 Hz, 20 ... 253 V DC

Domestic current requirement

approx. 3 mA (via load circuit)

Two-wire output

Supply voltage

10 ... 36 V DC (via the VEGA signal conditioning instrument)

NAMUR output

Supply voltage (standard characteristics)

for connection to amplifier according to NAMUR IEC 60947-5-6, approx. 8.2 V

Open-circuit voltage

U₀ approx. 8.2 V

Shortcircuit current

I₀ approx. 8.2 mA

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Electrical protective measures
VEGASWING 51

Protection	
– Valve plug	IP 65
– Valve plug, IDC method of termination	IP 67
– M12x1 plug connection (only with transistor output)	IP 66/IP 67
Overvoltage category	III
Protection class	
– Transistor output	II
– Contactless electronic switch	I

VEGASWING 61, 63

Protection	IP 66/IP 67
Overvoltage category	III
Protection class	
– Transistor, two-wire, NAMUR output	II
– relay output, contactless electronic switch	I

Approvals¹⁾**VEGASWING 51**

Overfill protection according to WHG

Ship approvals

VEGASWING 61, 63

Overfill protection according to WHG

ATEX

- ATEX II 1G, 1/2G, 2G EEx ia IIC T6
- ATEX II 1/2G, 2G EEx d IIC T6
- ATEX II 1/2D IP6X T
- ATEX II 3G EEx nL IIC T6

IEC

- IEC Ex ia IIC T6

FM

- FM Zone 0 Division 1 - intrinsic safe
- FM Zone 0 Division 1 - explosion safe
- FM Zone 2 Division 2

Ship approvals

CE conformity**VEGASWING 51**

EMVG (89/336/EWG) Emission EN 61326: 1997 (class B), susceptibility EN 61326: 1997/A1: 1998

NSR (73/23/EWG)

EN 61010-1: 2001

VEGASWING 61, 63

EMVG (89/336/EWG) Emission EN 61326/A1: 1998 (class B), susceptibility EN 61326: 1997/A1: 1998

NSR (73/23/EWG)

EN 61010-1: 1993

SIL conformity

VEGASWING fulfills the requirements of functional safety according to IEC 61508. You can find further information in the "Safety Manual VEGASWING".

¹⁾ Deviating data in Ex applications: see separate safety instructions.

7 Dimensions

VEGASWING 51

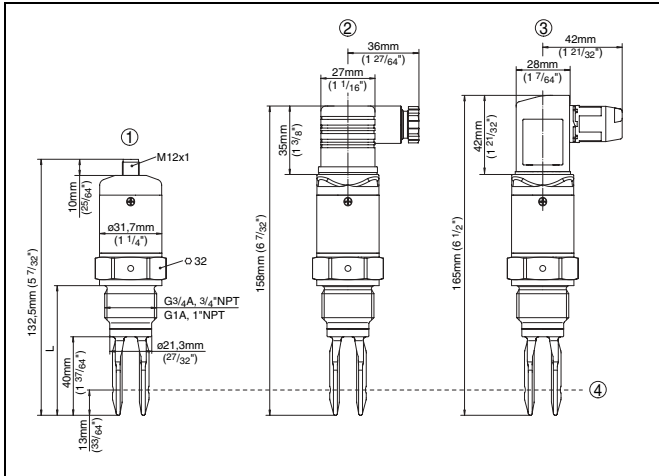


Fig. 23: VEGASWING 51 in standard version

- 1 Thread G $\frac{3}{4}$ A, G1 A, $\frac{3}{4}$ NPT or 1 NPT (M12x1)²⁾³⁾
- 2 Thread G $\frac{3}{4}$ A, G1 A, $\frac{3}{4}$ NPT or 1 NPT (valve plug DIN 43650)
- 3 Thread G $\frac{3}{4}$ A, G1 A, $\frac{3}{4}$ NPT or 1 NPT (valve plug DIN 43650 with IDC method of termination)
- 4 Switching point
- L Length with G $\frac{3}{4}$ A, $\frac{3}{4}$ NPT: 66 mm (2.6 in)
- L Length with G1 A, 1 NPT: 69 mm (2.7 in)
- L Length with switching point as VEGASWING 71 or 81 = L + 48 mm (1.9 in)

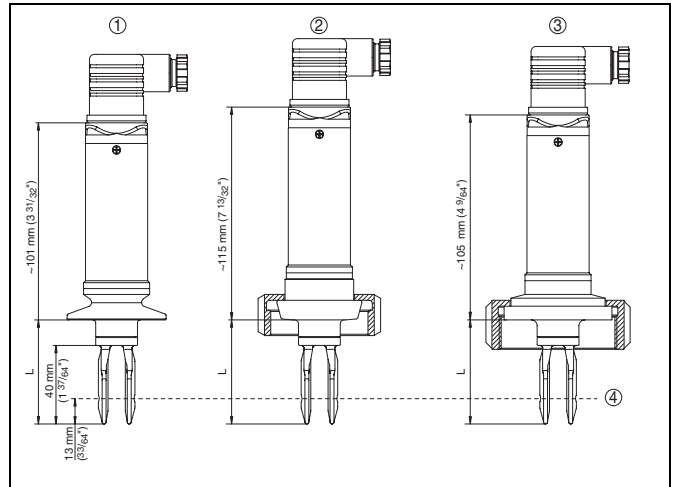


Fig. 25: VEGASWING in hygienic versions

- 1 Tri-Clamp (valve plug DIN 43650)
- 2 Bolting (valve plug DIN 43650)
- 3 SMS 1145 (valve plug DIN 43650)
- 4 Switching point
- L Length with Tri-Clamp: 53 mm (2.1 in)
- L Length with bolting: 53 mm (2.1 in)
- L Length with SMS 1145: 53 mm (2.1 in)

Housing VEGASWING 61, 63

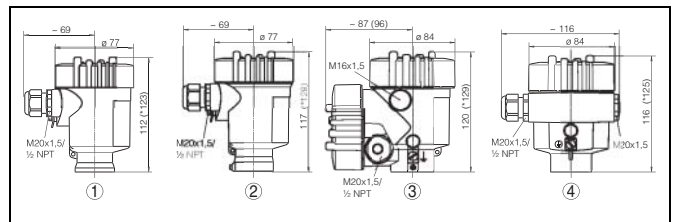


Fig. 26: Housing versions

- 1 Plastic housing
- 2 Stainless steel housing
- 3 Aluminium double chamber housing
- 4 Aluminium housing

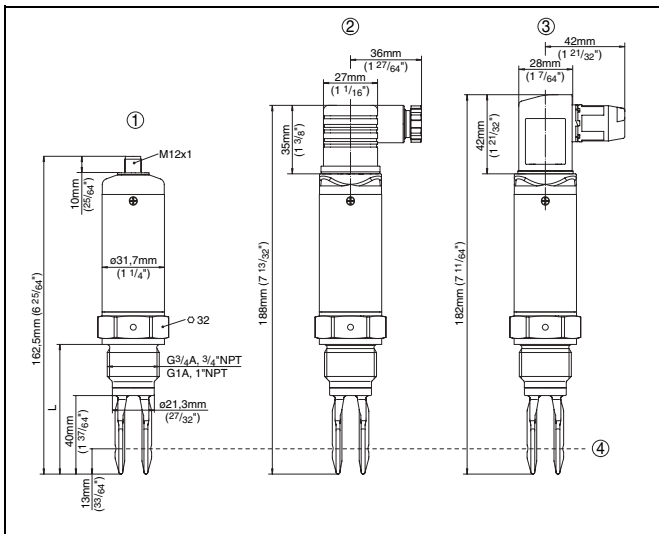


Fig. 24: VEGASWING 51 in high temperature version (optional)

- 1 Thread G $\frac{3}{4}$ A, G1 A, $\frac{3}{4}$ NPT or 1 NPT (M12x1)⁴⁾⁵⁾
- 2 Thread G $\frac{3}{4}$ A, G1 A, $\frac{3}{4}$ NPT or 1 NPT (valve plug DIN 43650)
- 3 Thread G $\frac{3}{4}$ A, G1 A, $\frac{3}{4}$ NPT or 1 NPT (valve plug DIN 43650 with IDC method of termination)
- 4 Switching point
- L Length with G $\frac{3}{4}$ A, $\frac{3}{4}$ NPT: 66 mm (2.6 in)
- L Length with G1 A, 1 NPT: 69 mm (2.7 in)
- L Length with switching point as VEGASWING 71 or 81 = L + 48 mm (1.9 in)

2) Keep in mind that the total length is extended by the plug connection.
 3) M12x1 plug connector not with version contactless electronic switch.
 4) Keep in mind that the total length is extended by the plug connection.
 5) M12x1 plug connector not with version contactless electronic switch.

VEGASWING 61

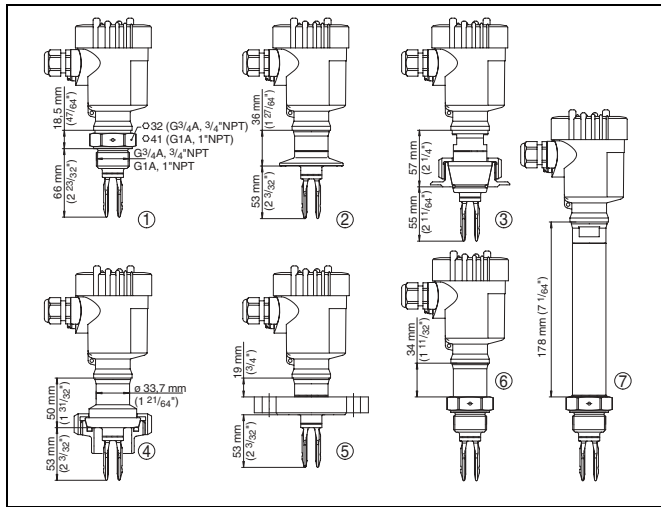


Fig. 27: VEGASWING 61

- 1 Thread
- 2 Tri-Clamp
- 3 Cone DN 25
- 4 Bolting DN 40
- 5 Flange
- 6 Gas-tight leadthrough
- 7 Temperature adapter

Temperature adapter - VEGASWING 61, 63

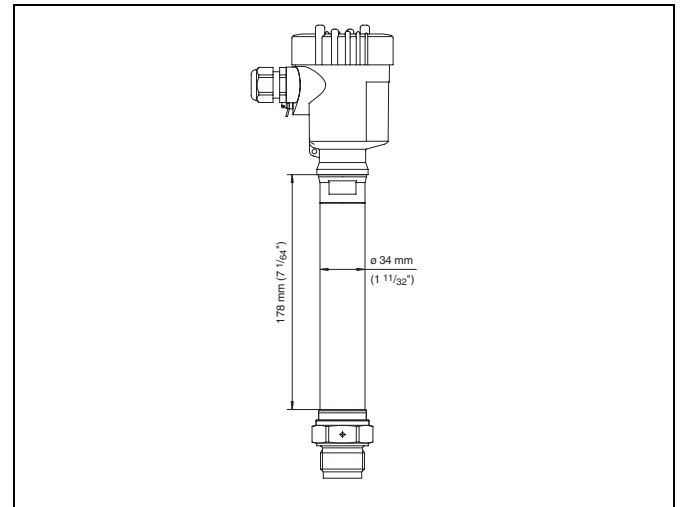


Fig. 29: Temperature adapter

VEGASWING 63

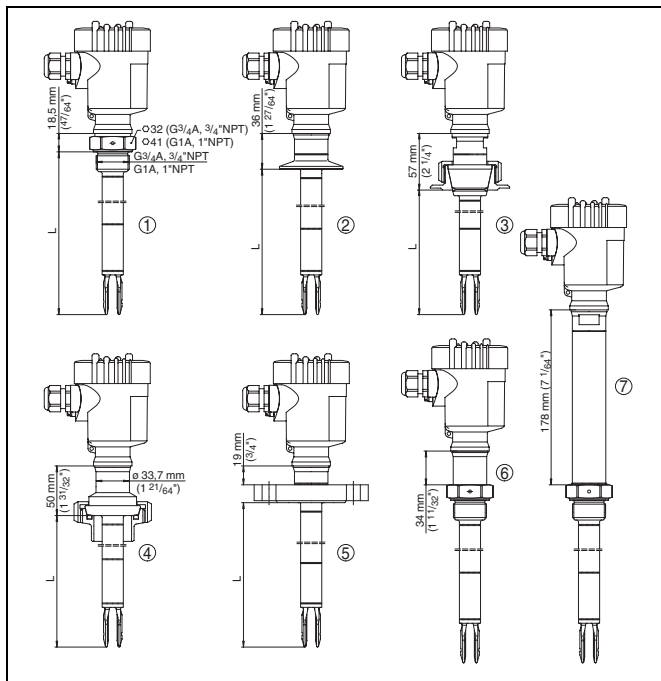


Fig. 28: VEGASWING 63

- 1 Thread
- 2 Tri-Clamp
- 3 Cone DN 25
- 4 Bolting DN 40
- 5 Flange
- 6 Gas-tight leadthrough
- 7 Temperature adapter
- L = Sensor length, see "Technical data"

8 Product code

VEGASWING 51

Approval
XX without
XM Ship approval
XA Overfill protection acc. to WHG

Version / Process temperature
S Standard / -40...100°C
T extended / -40...150°C
H hygienic applications / -40...150°C

Process connection / Material
GB Thread G¾A PN64 / 316L
NB Thread ¾NPT PN64 / 316L
GA Thread G1A PN64 / 316L
NA Thread 1NPT PN64 / 316L
CL Tri-Clamp 1" PN16 / 316L Ra<0.8µm
CN Tri-Clamp 2" PN16 / 316L Ra<0.8µm
RL Bolting DN25PN40 DIN11851 / 316L Ra<0.8µm
RM Bolting DN40PN40 DIN11851 / 316L Ra<0.8µm
RN Bolting DN50PN25 DIN11851 / 316L Ra<0.8µm

Electronics
C Contactless electronic switch 20...250 V AC/DC
T Transistor output PNP 10...55 V DC

Housing
P 316L

Electrical connection / Protection
M M12x1 / IP67¹⁾
V acc. to DIN 43650 incl. plug / IP 65
Q acc. to DIN 43650 incl. plug with QuickOn connect./ IP65

Switching point
L as SWING71A

SG51. | | | | | | | | |

¹⁾ Not in conjunction with Electronics "C"

VEGASWING 61

Approval
XX without
XA Overfill protection acc. to WHG
CA ATEX II 1G, 1/2G, 2G EEx ia IIC T6 + WHG¹⁾
DA ATEX II 1/2G, 2G EEx d IIC T6 + WHG²⁾
CM ATEX II 1G, 1/2G, 2G EEx ia IIC T6 + ship approval
DM ATEX II 1/2G, 2G EEx d IIC T6 + ship approval²⁾
XM Ship approval
CU FM Zone 0 Division 1 intrinsically safe¹⁾
DU FM Zone 0 Division 1 explosion proof²⁾
XU FM Zone 2 Division 2

Process connection / Material
GBV Thread G¾A PN64 / 316L
NBV Thread ¾NPT PN64 / 316L
GAV Thread G1A PN64 / 316L
NAV Thread 1NPT PN64 / 316L
CCN Tri-Clamp 1" PN16 / 316L Ra<0.3µm
CCP Tri-Clamp 1" PN16 / 316L Ra<0.8µm
CAN Tri-Clamp 2" PN16/316L Ra<0.3µm
CAP Tri-Clamp 2" PN16 / 316L Ra<0.8µm
RAN Bolting DN40PN40 DIN11851 / 316L Ra<0.3µm
RAP Bolting DN40PN40 DIN11851 / 316L Ra<0.8µm
FPV Flange DN25PN40 Form C, DIN 2501 / 316L
FPH Flange DN25PN40 Form C, DIN 2501 / ECTFE³⁾
FPE Flange DN25PN40 Form C, DIN 2501 / enamelled³⁾
FEV Flange DN50PN40 Form C, DIN 2501 / 316L
FEH Flange DN50PN40 Form C, DIN 2501 / ECTFE³⁾
FEF Flange DN50PN40 Form C, DIN 2501 / PFA³⁾
FES Flange DN50PN40 Form B1, EN 1092-1/enamelled³⁾
APV Flange 1" 150lb ANSI B16.5 / 316L
APH Flange 1" 150lb RF, ANSI B16.5 / ECTFE³⁾
APE Flange 1" 150lb RF, ANSI B16.5 / enamelled³⁾
ACV Flange 2" 150lb RF, ANSI B16.5 / 316L
ACH Flange 2" 150lb RF, ANSI B16.5 / ECTFE³⁾
ACE Flange 2" 150lb RF, ANSI B16.5 / enamelled³⁾

Adapter / Process temperature
X without / -50...150°C
T with / -50...250°C
G with gas-tight bushing / -50...150°C
D with gas-tight bushing / -50...250°C

Housing / Cable entry
P Plastic IP66/67 / M20x1.5
M Aluminium IP66/IP67 / M20x1.5
U Aluminium IP66/IP67 / ¾NPT
V Stainless steel 316L IP66/67 / M20x1.5

Electronics
C Contactless electronic switch 20...250VAC/DC
R Double relay (DPDT) 20...72VDC/20...250VAC (5A)
T Floating transistor (NPN/PNP) 10...55VDC
Z Two-wire for connection to VEGATOR (12...36 VDC)
N NAMUR signal acc. to IEC 60947-5-6

Switching point
X Standard
L as SWING81 or 81A

SWING61. | | | | | | | | |

¹⁾ Only in conjunction with Electronics "Z" and "N"
²⁾ Only in conjunction with Housing / Cable entry "U"
³⁾ Delivery time: more than 5 working days

VEGASWING 63

Approval				
XX	without			
XA	Overfill protection acc. to WHG			
CA	ATEX II 1G, 1/2G, 2G EEx ia IIC T6 + WHG ¹⁾			
DA	ATEX II 1/2G; 2G EEx d IIC T6 + WHG ²⁾			
CM	ATEX II 1G, 1/2G, 2G EEx ia IIC T6 + ship approval			
DM	ATEX II 1/2G EEx d IIC T6 + ship approval ²⁾			
XM	Ship approval			
CU	FM Zone 0 Division 1 intrinsically safe ¹⁾			
DU	FM Zone 0 Division 1 explosion proof ²⁾			
XU	FM Zone 2 Division 2			
Process connection / Material				
GBV	Thread G¾A PN64 / 316L			
NBV	Thread ¾NPT PN64 / 316L			
GAV	Thread G1A PN64 / 316L			
NAV	Thread 1NPT PN64 / 316L			
CCN	Tri-Clamp 1" PN16 / 316L Ra<0.3µm			
CCP	Tri-Clamp 1" PN16 / 316L Ra<0.8µm			
CAN	Tri-Clamp 2" PN16/316L Ra<0.3µm			
CAP	Tri-Clamp 2" PN16 / 316L Ra<0.8µm			
RAN	Bolting DN40PN40 DIN11851 / 316L Ra<0.3µm			
RAP	Bolting DN40PN40 DIN11851 / 316L Ra<0.8µm			
FPV	Flange DN25PN40 Form C, DIN 2501 / 316L			
FPH	Flange DN25PN40 Form C, DIN 2501 / ECTFE ³⁾			
FPE	Flange DN25PN40 Form C, DIN 2501 / enamelled ³⁾			
FEV	Flange DN50PN40 Form C, DIN 2501 / 316L			
FEH	Flange DN50PN40 Form C, DIN 2501 / ECTFE ³⁾			
FEF	Flange DN50PN40 Form C, DIN 2501 / PFA ³⁾			
FES	Flange DN50PN40 Form B1, EN 1092-1/enamelled ³⁾			
APV	Flange 1" 150lb ANSI B16.5 / 316L			
APH	Flange 1" 150lb RF, ANSI B16.5 / ECTFE ³⁾			
APE	Flange 1" 150lb RF, ANSI B16.5 / enamelled ³⁾			
ACV	Flange 2" 150lb RF, ANSI B16.5 / 316L			
ACH	Flange 2" 150lb RF, ANSI B16.5 / ECTFE ³⁾			
ACE	Flange 2" 150lb RF, ANSI B16.5 / enamelled ³⁾			
Adapter / Process temperature				
X	without / -50...150°C			
T	with / -50...250°C			
G	with gas-tight bushing / -50...150°C			
D	with gas-tight bushing / -50...250°C			
Housing / Cable entry				
P	Plastic IP66/67 / M20x1.5			
M	Aluminium IP66/IP67 / M20x1.5			
U	Aluminium IP66/IP67 / ½NPT			
V	Stainless steel 316L IP66/67 / M20x1.5			
Electronics				
C	Contactless electronic switch 20...250VAC/DC			
R	Double relay (DPDT) 20...72VDC/20...250VAC (5A)			
T	Floating transistor (NPN/PNP) 10...55VDC			
Z	Two-wire for connection to VEGATOR (12...36 VDC)			
N	NAMUR signal acc. to IEC 60947-5-6			
SWING63.				

¹⁾ Only in conjunction with Electronics "Z" and "N"
²⁾ Only in conjunction with Housing / Cable entry "U"; L max. = 3000 mm
³⁾ Delivery time: more than 5 working days



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