Limit level measurement of bulk solids

Vibration

VEGA VIB 61 - 63
VEGA WAVE 61 - 63

Product Information
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1 Description of the measuring principle

Measuring principle
VEGAVIB and VEGAWAVE are point level sensors based on the vibration principle. VEGAVIB is equipped with a vibrating rod as sensor element. VEGAWAVE has a tuning fork.

Both are designed for industrial use in all areas of process technology and are deployed mainly in bulk solids.

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

Typical applications are overfill and dry run protection systems. Due to the rugged vibration measuring system, the vibrating level switches remain virtually unaffected by chemical and physical properties of the bulk solid.

They also work when subjected to strong external vibrations or changing products.

Fault monitoring
The electronics module continuously monitors the following criteria:
- Correct vibrating frequency
- Line break to the piezo drive

If one of the stated malfunctions is detected or in case of power failure, the electronics takes on a defined switching condition, e.g. the relay deenergises (safe condition).

Solid detection in water
With instruments in the version for solid detection in water (option), the vibrating element is adjusted to the density of water. If submerged in water (density 1 g/cm³), the level switch signals "uncovered". Only if the vibrating element is also covered with solids (e.g. sand, sludge, etc.) will the sensor signal "covered".

VEGAVIB 61, 62, 63
Vibrating rod version
VEGAVIB series 60 level switches are available in standard, cable and tube versions and, thanks to the multitude of available process fittings, provide the ideal solution for any application. They are made completely of stainless steel, have all standard approvals and the vibrating rod can also be polished, e.g. for applications in the food processing industry.

VEGAVIB is virtually unaffected by product properties and thus does not have to be adjusted.

The level switches can be used in applications with process temperatures up to 250 °C (482 °F) and pressures up to 16 bar (232 psig).

You can detect bulk solids from 0.02 g/cm³ (0.0003 lbs/in³).

VEGAVIB profits from its rotation-symmetric design. No granules can stick to the rod sensor and the sensor must not be oriented when being mounted. The rod form can also be cleaned very easily.

VEGAVIB vibrating rods have smaller installation dimensions than the VEGAWAVE tuning fork; the process fittings of VEGAVIB are available in thread sizes from 1".

VEGAWAVE 61, 62, 63
Tuning fork version
VEGAWAVE series 60 level switches are available in standard, cable and tube version and, in combination with many different process fittings, provide a suitable instrument for any application. They are made completely of stainless steel and have all standard approvals.

VEGAWAVE is virtually unaffected by product properties and thus does not have to be adjusted.

The level switches can be used in applications with process temperatures up to 250 °C (482 °F) and pressures up to 25 bar (363 psig).

The tuning fork version is very rugged and insensitive to buildup. Nevertheless, VEGAWAVE can also detect very light solids from 0.008 g/cm³ (0.0003 lbs/in³).

1.1 Application examples

Plastics processing

![Fig. 1: Level detection in a silo storing plastic granules](image)

A large number of finished products are produced in the chemical industry as powder, granules or pellets. Plastic granules and powder are often stored in high, narrow silos which are filled pneumatically.
Vibrating level switches like VEGAVIB / VEGAWAVE have proven their worth for level detection of plastics. Even with very low bulk solid densities, e.g. down to 20 g/l, and continuously changing products, the instruments always deliver accurate results.

Advantages:
- Tuning fork implementable down to a density < 20 g/l (e.g. aerosiles)
- Product-independent switching point
- Setup without filling

Building materials industry

Cement or aggregates are placed in interim storage in multiple chamber silos. When the chambers are filled, huge quantities of dust are generated. Depending on the consistency of the aggregate, different material cones are formed and the product properties can change from filling to filling.

VEGAVIB 62 / VEGAWAVE 62 offer an additional protection against overfilling of silos with additives. The flexible suspension cable avoids mechanical load caused by movement of bulk solids. Filling is not necessary for setup. Since both instrument versions VEGAVIB / VEGAWAVE have virtually no moving parts, they are not subject to wear.

Advantages:
- Very rugged tuning fork
- High abrasion resistance
- Insensitive to buildup
- Setup without filling
# Type overview

<table>
<thead>
<tr>
<th>VEGAVIB 61</th>
<th>VEGAVIB 62</th>
<th>VEGAVIB 63</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Preferred application:</strong></td>
<td>Bulk solids</td>
<td>Bulk solids</td>
</tr>
<tr>
<td><strong>Length:</strong></td>
<td>-</td>
<td>0.3 … 80 m (0.984 … 262.47 ft)</td>
</tr>
<tr>
<td><strong>Process fitting:</strong></td>
<td>Thread G1 A, G1½ A, flanges</td>
<td>Thread G1 A, G1½ A, flanges</td>
</tr>
<tr>
<td><strong>Process temperature:</strong></td>
<td>-50 … +150 °C (-58 … +302 °F)</td>
<td>-20 … +80 °C (-4 … +176 °F)</td>
</tr>
<tr>
<td><strong>Process temperature with temperature adapter:</strong></td>
<td>-50 … +250 °C (-58 … +482 °F)</td>
<td>-</td>
</tr>
<tr>
<td><strong>Process pressure:</strong></td>
<td>-1 … 16 bar/-100 … 1600 kPa (-14.5 … 232 psig)</td>
<td>-1 … 6 bar/-100 … 600 kPa (-14.5 … 87 psig)</td>
</tr>
<tr>
<td><strong>Signal output:</strong></td>
<td>relay output, transistor output, contactless electronic switch, two-wire output</td>
<td>relay output, transistor output, contactless electronic switch, two-wire output</td>
</tr>
<tr>
<td><strong>Ruggedness:</strong></td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td><strong>Sensitivity:</strong></td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td><strong>Buildup:</strong></td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td><strong>Cleanability:</strong></td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td><strong>Installation length:</strong></td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td><strong>Orientation during installation:</strong></td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td><strong>Sticking solids:</strong></td>
<td>++</td>
<td>++</td>
</tr>
</tbody>
</table>
### VEGAWAVE 61
- **Preferred application:** Bulk solids
- **Length:** 0.3 … 80 m (0.984 … 262.47 ft)
- **Process fitting:** Thread G1½ A, flanges
- **Process temperature:** -50 … +150 °C (-58 … +302 °F)
- **Process temperature with temperature adapter:** -50 … +250 °C (-58 … +482 °F)
- **Process pressure:** -1 … 16 bar/-100 … 1600 kPa (-14.5 … 232 psig)
- **Signal output:** relay output, transistor output, contactless electronic switch, two-wire output
- **Ruggedness:** ++
- **Sensitivity:** ++
- **Buildup:** ++
- **Cleanability:** -
- **Installation length:** +
- **Orientation during installation:** -
- **Sticking solids:** -

### VEGAWAVE 62
- **Preferred application:** Bulk solids
- **Length:** 0.3 … 4 m (0.984 … 13.12 ft)
- **Process fitting:** Thread G1½ A, flanges
- **Process temperature:** -20 … +80 °C (-4 … +176 °F)
- **Process temperature with temperature adapter:** -50 … +150 °C (-58 … +302 °F)
- **Process pressure:** -1 … 6 bar/-100 … 600 kPa (-14.5 … 87 psig)
- **Signal output:** relay output, transistor output, contactless electronic switch, two-wire output
- **Ruggedness:** ++
- **Sensitivity:** ++
- **Buildup:** ++
- **Cleanability:** -
- **Installation length:** +
- **Orientation during installation:** -
- **Sticking solids:** -

### VEGAWAVE 63
- **Preferred application:** Bulk solids
- **Length:** 0.3 … 150 °C (-58 … +302 °F)
- **Process temperature with temperature adapter:** -50 … +250 °C (-58 … +482 °F)
- **Process pressure:** -1 … 16 bar/-100 … 1600 kPa (-14.5 … 232 psig)
- **Signal output:** relay output, transistor output, contactless electronic switch, two-wire output
- **Ruggedness:** ++
- **Sensitivity:** ++
- **Buildup:** ++
- **Cleanability:** -
- **Installation length:** +
- **Orientation during installation:** -
- **Sticking solids:** -
### Housing

<table>
<thead>
<tr>
<th>Material</th>
<th>Image</th>
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<tbody>
<tr>
<td>Plastic</td>
<td><img src="image1" alt="Plastic" /></td>
</tr>
<tr>
<td>Stainless steel</td>
<td><img src="image2" alt="Stainless steel" /></td>
</tr>
<tr>
<td>Aluminium</td>
<td><img src="image3" alt="Aluminium" /></td>
</tr>
<tr>
<td>Aluminium (double chamber)</td>
<td><img src="image4" alt="Aluminium" /></td>
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</table>

### Electronics

<table>
<thead>
<tr>
<th>Output Type</th>
<th>Image</th>
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</thead>
<tbody>
<tr>
<td>Relay output</td>
<td><img src="image5" alt="Relay output" /></td>
</tr>
<tr>
<td>Transistor output</td>
<td><img src="image6" alt="Transistor output" /></td>
</tr>
<tr>
<td>Contactless electronic switch</td>
<td><img src="image7" alt="Contactless electronic switch" /></td>
</tr>
<tr>
<td>Two-wire output</td>
<td><img src="image8" alt="Two-wire output" /></td>
</tr>
</tbody>
</table>

### Sensors

<table>
<thead>
<tr>
<th>Sensor Type</th>
<th>Image</th>
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<tbody>
<tr>
<td>Vibrating rod</td>
<td><img src="image9" alt="Vibrating rod" /></td>
</tr>
<tr>
<td>Tuning fork</td>
<td><img src="image10" alt="Tuning fork" /></td>
</tr>
</tbody>
</table>

### Approvals

<table>
<thead>
<tr>
<th>Approval Type</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas explosion protection</td>
<td><img src="image11" alt="Gas explosion protection" /></td>
</tr>
<tr>
<td>Dust-explosion protection</td>
<td><img src="image12" alt="Dust-explosion protection" /></td>
</tr>
</tbody>
</table>
3 Mounting instructions

Switching point
In general, VEGAVIB / VEGAWAVE can be installed in any position. The instrument only has to be mounted in such a way that the vibrating element is at the height of the desired switching point.

The only exception is vertical mounting of the tuning fork from below. In this position there is the danger of solid particles getting stuck between the fork tines.

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 to horizontal installation and use with adhesive products.

Filling opening
Install the instrument in such a way that the vibrating element does not protrude directly into the filling stream. Should such an installation location be necessary, mount a suitable baffle above or in front of the vibrating element, e.g. L80 x 8 DIN 1028 (see Fig. Part "a."). In abrasive solids, mounting according to fig. Part "b." has proven to be a good solution. The mound that forms in the concave baffle protects it from abrasion.

Horizonal mounting
To achieve a very precise switching point, you can install VEGA-VIB / VEGAWAVE horizontally. However, if the switching point can have a tolerance of a few centimeters, we recommend mounting VEGAVIB / VEGAWAVE approx. 20° inclined to the vessel bottom to avoid buildup.

Orient the tuning fork of VEGAWAVE so that the product cannot remain lying on the fork surface. There is a mark on the thread hexagon for aligning the fork. Make sure that the mark points upward.

Material cone
In silos containing solids, material cones can form which change the switching point. Please keep this in mind when installing the sensor in the vessel. We recommend selecting an installation location where the vibrating element detects an average value of the material cone.

The vibrating element must be mounted at a location that takes the arrangement of the filling and emptying apertures into account.

To compensate measurement errors caused by the material cone in cylindrical vessels, the sensor must be mounted at a distance of d/10 from the vessel wall.

Inflowing medium
If VEGAVIB / VEGAWAVE is mounted in the filling stream, unwanted false measurement signals can be generated. For this reason, mount VEGAVIB / VEGAWAVE at a position in the vessel where no disturbances, e.g. from filling openings, agitators, etc., can occur.
**Agitators**

Due to filling or extraction forces, 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 VEGAVIB / VEGAWAVE, checking if a VEGAVIB 61 or a VEGAWAVE 61 level switch couldn't be used instead, mounted on the side of the vessel in horizontal position.

Extreme vibration caused by the process or the equipment, e.g. by fluidization or beaters in the vessel, can cause the extension tube of VEGAVIB / VEGAWAVE 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.

![Ex]

This measure applies mainly to applications in Ex areas. Make sure that the tube is not subject to bending stress due to this measure.

If an installation from above is necessary, check if you can use a cable version.

Over a longer period of time, strong vibration can damage the instrument electronics. You can decouple the electronics from the process by using a remote (displaced) housing.

### Flows

To make sure the tuning fork of VEGAWAVE generates as little resistance as possible to product flow, mount the sensor so that the surfaces are parallel to the product movement.

![Fig. 7: Flow orientation of the tuning fork](image)

1. Marking with screwed version
2. Direction of flow

**Lock fitting**

For height adjustment, VEGAVIB / VEGAWAVE in tube version can be mounted with a lock fitting. This lock fitting is available for applications in unpressurized areas or as version for pressures up to 16 bar (232 psig).

**Baffle protection against falling rocks**

In applications such as grit chambers or settling basins for coarse sediments, the vibrating element must be protected against damage with a suitable baffle.
Fig. 8: Baffle for protection against mechanical damage

**Protective cover**
To protect the sensor against pollution and strong heat due to the sun, you can snap a weather protective cover onto the sensor housing.

Fig. 9: Weather protection cover in different versions
4 Electrical connection

4.1 Preparing the connection

Note safety instructions
Always keep in mind 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 with relay output VB60R/WE60R and contactless electronic switch VB60C/WE60C 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 VEGAVIB / VEGAWAVE 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.

Data for power supply is specified in chapter "Technical data".

Select connection cable
The instrument 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 gland.

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 VEGAVIB / VEGAWAVE.

Select connection cable for Ex applications
Take note of the corresponding installation regulations for Ex applications.

4.2 Wiring plan

Relay output
We recommend connecting VEGAVIB / VEGAWAVE 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.

Transistor output
We recommend connecting VEGAVIB / VEGAWAVE 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.
Contactless electronic switch
We recommend connecting VEGAVIB / VEGAWAVE 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-operational 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.

Two-wire output
We recommend connecting VEGAVIB / VEGAWAVE 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 VEGATOR signal conditioning instrument dto. Ex. The sensor is powered by the connected VEGATOR signal conditioning instrument. Further information is available in chapter "Technical data", "Ex-technical data" are available in the supplied "Safety information manual".

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

Take note of the operating instructions manual of the signal conditioning instrument. Suitable signal conditioning instruments are listed in chapter "Technical data".
5 Operation

5.1 Adjustment, general

![Adjustment elements electronics module e.g. relay output (VEGAVIB)](image)

1. Potentiometer for switching point adaptation
2. DIL switch for mode adjustment
3. Ground terminal
4. Connection terminals
5. LED display

Switching point adaptation (1)

VEGAVIB

With the potentiometer you can adapt the switching point of VEGAVIB to the solid. It is already preset and must only be modified in special cases.

By default, the potentiometer is set to the right position (0.05 ... 1 g/cm³ / 0.002 ... 0.036 lbs/in³). In very light solids, turn the potentiometer to the left stop (0.02 ... 0.1 g/cm³ / 0.0007 ... 0.0036 lbs/in³). This makes VEGAVIB more sensitive and allows it to detect light solids more reliably.

For very heavy solids leave the potentiometer in right position (> 0.3 g/cm³ / 0.011 lbs/in³). Hence, VEGAVIB is less sensitive and can shake off heavy solids by strong vibrations.

These values do not apply for instruments detecting solids in water. In such cases, the potentiometer is preset to complete right position and should not be changed.

VEGAWAVE

The VEGAWAVEs with tuning fork are preset to a product density of > 0.02 g/cm³ (0.0007 lbs/in³). In very light solids, turn the potentiometer to complete left position 0.008 ... 0.1 g/cm³ (0.0003 ... 0.0036 lbs/in³). By doing this, the tuning fork will be more sensitive and can detect very light solids, such as e.g. Aerosils more reliably.

Mode adjustment (2)

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

LED display (5)

Diode for indication of the switching status.

Simulation key (only with NAMUR and two-wire electronics)

The simulation key of the NAMUR electronics is lowered on the upper side of the electronics module. On the two-wire electronics, the simulation key is located on the signal conditioning instrument. 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 downstream connected instruments will be activated during operation. This allows you to check the correct function of the measuring system.
6 Technical data

General data
Material 316L corresponds to 1.4404 or 1.4435

VEGAVIB 61/VEGAWAVE 61
Materials, wetted parts
- Process fitting - thread 316L
- Process fitting - flange 316L
- Seal Klingsorsil C-4400
- Vibrating element - VEGAVIB 316L
- Vibrating element - VEGAWAVE 316L
- Extension tube (VEGAVIB 61): ø 29 mm (1.14 in) 316L
- Extension tube (VEGAWAVE 61): ø 43 mm (1.692 in) 316L

Materials, non-wetted parts
- Housing Plastic PBT (polyester), Alu die-casting powder-coated, 316L
- Seal between housing and housing cover NBR (stainless steel housing), silicone (Alu/plastic housing)
- Ground terminal 316T/316L

Weight
- VEGAVIB 61 - plastic housing 1150 g (40 oz)
- VEGAVIB 61 - Aluminium housing 1600 g (56 oz)
- VEGAVIB 61 - stainless steel housing 1950 g (69 oz)
- VEGAWAVE 61 - plastic housing 1500 g (53 oz)
- VEGAWAVE 61 - Aluminium housing 1950 g (69 oz)
- VEGAWAVE 61 - stainless steel housing 2300 g (81 oz)

Max. lateral load 400 N (90 lbf)

VEGAVIB 62/VEGAWAVE 62
Materials, wetted parts
- Process fitting - thread 316L
- Process fitting - flange 316L
- Seal CR, CSM
- Vibrating element - VEGAVIB 316L
- Vibrating element - VEGAWAVE 316L
- Suspension cable (-20 ... +80 °C/-4 ... +176 °F) PUR
- Suspension cable - optionally (-40 ... +150 °C/-40 ... +302 °F) FEP (not for solid detection in water)

Materials, non-wetted parts
- Housing Plastic PBT (polyester), Alu die-casting powder-coated, 316L
- Seal between housing and housing cover NBR (stainless steel housing), silicone (Alu/plastic housing)
- Ground terminal 316T/316L

Weight
- VEGAVIB 62 - plastic housing 1150 g (40 oz)
- VEGAVIB 62 - Aluminium housing 1600 g (56 oz)
- VEGAVIB 62 - stainless steel housing 1950 g (69 oz)
- VEGAWAVE 62 - plastic housing 1500 g (53 oz)
- VEGAWAVE 62 - Aluminium housing 1950 g (69 oz)
- VEGAWAVE 62 - stainless steel housing 2300 g (81 oz)
- Suspension cable 165 g/m (1.8 oz/ft)

Max. permissible tensile load 3000 N (675 lbs)

Sensor length 0.48 ... 80 m (1.575 ... 262.47 ft)

VEGAVIB 63/VEGAWAVE 63
Materials, wetted parts
- Process fitting - thread 316L
- Process fitting - flange 316L
- Seal Klingsorsil C-4400
- Vibrating element - VEGAVIB 316L
- Vibrating element - VEGAWAVE 316L
- Extension tube (VEGAVIB 63): ø 29 mm (1.14 in) 316L
- Extension tube (VEGAWAVE 63): ø 43 mm (1.692 in) 316L

Materials, non-wetted parts
- Housing Plastic PBT (polyester), Alu die-casting powder-coated, 316L
- Seal between housing and housing cover NBR (stainless steel housing), silicone (Alu/plastic housing)
- Ground terminal 316T/316L
Technical data

Weight
- VEGAVIB 63 - plastic housing 1150 g (40 oz)
- VEGAVIB 63 - Aluminium housing 1600 g (56 oz)
- VEGAVIB 63 - stainless steel housing 1950 g (69 oz)
- VEGAWAVE 63 - plastic housing 1500 g (53 oz)
- VEGAWAVE 63 - Aluminium housing 1950 g (69 oz)
- VEGAWAVE 63 - stainless steel housing 2300 g (81 oz)
- Extension tube (VEGAVIB 63): ø 29 mm (1.14 in) 1450 g/m (15.6 oz/ft)
- Extension tube (VEGAWAVE 63): ø 43 mm (1.692 in) 2000 g/m (21.5 oz/ft)

Sensor length 0.3 … 4 m (0.984 … 13.12 ft)

Max. lateral load
- VEGAVIB 63 140 Nm (103 lbf ft), 400 N (90 lbf)
- VEGAWAVE 63 290 Nm (214 lbf ft), 600 N (135 lbf)

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. 3 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 approx.
- When immersed 0.5 s
- When laid bare 1 s

Transistor output
Output floating transistor output, overload and permanently shortcircuit proof
Load current < 400 mA
Turn-on voltage < 55 V DC
Blocking current < 100 µA
Modes (adjustable) Min./Max.
Delay time approx.
- When immersed 0.5 s
- When laid bare 1 s

Contactless electronic switch
Output Contactless electronic switch
Modes (adjustable) Min./Max.
Delay time approx.
- When immersed 0.5 s
- When laid bare 1 s

Two-wire output
Output Two-wire output
Suitable signal conditioning instruments VEGATOR 536Ex, 537Ex, 636Ex
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 message < 2 mA
Modes (adjustable) Min./Max.
Delay time approx.
- When immersed: 0.5 s
- When laid bare: 1 s

NAMUR output
Output: Two-wire NAMUR output
Current consumption:
- Falling characteristics (max.): ≥ 2.2 mA uncovered/≤ 1 mA covered
- Rising characteristics (min.): ≤ 1 mA uncovered/≥ 2.2 mA covered
Fault message: ≤ 1 mA
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)
- Min.: rising characteristic curve (High current when immersed)
- Max.: falling characteristics (Low current when immersed)

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
VEGAVIB 61, 63/VEGAWAVE 61, 63
Measured value: Limit level of solids
Process pressure:
- VEGAVIB 61, 63: -1 … 16 bar/-100 … 1600 kPa (-14.5 … 232 psig) with PN 40
- VEGAWAVE 61, 63: -1 … 25 bar/-100 … 2500 kPa (-14.5 … 363 psig) with PN 40

![Fig. 17: Process pressure - Product temperature VEGAVIB 61, 63](image)

1. Product temperature
2. Process pressure

Process temperature VEGAVIB / VEGAWAVE of 316L:
-50 … +150 °C (-58 … +302 °F)

Process temperature (thread or flange temperature) with temperature adapter (option):
-50 … +250 °C (-58 … +482 °F)
Fig. 18: Ambient temperature - Product temperature

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

Product density
- VEGAVIB 61, 63
- VEGAWAVE 61, 63

Granular size
- VEGAVIB 61, 63
- VEGAWAVE 61, 63

VEGAVIB 62/VEGAWAVE 62

Measured value
Limit level of solids

Process pressure
-1 ... 6 bar/-100 ... 600 kPa (-14.5 ... 87 psig) with PN 40
-20 ... +80 °C (-4 ... +176 °F)

Process temperature VEGAVIB 62, VEGAWAVE 62 of 316L

Product density
- VEGAVIB 62
- VEGAWAVE 62

Granular size
- VEGAVIB 62
- VEGAWAVE 62

Electromechanical data

Cable entry/plug (dependent on the version)
- Single chamber housing

Spring-loaded terminals
for wire cross-section up to 1.5 mm² (AWG 16)

Adjustment elements

Electronics versions - relay, transistor output, contactless electronic switch
Mode switch
- Min.
- Max.

Min. detection or dry run protection
Max. detection or overflow protection

1) max. 20 mm (0.8 in) with product density < 0.05 g/cm³ (0.002 lbs/in³).

2) max. 20 mm (0.8 in) with product density < 0.05 g/cm³ (0.002 lbs/in³).
## Technical data

### Electronics version - two-wire output

**Mode switch**
- Min.归纳
- Max.归纳

<table>
<thead>
<tr>
<th>Vibrating element uncovered</th>
<th>16 mA ±1 mA</th>
<th>Vibrating element covered:</th>
<th>8 mA ±1 mA</th>
</tr>
</thead>
</table>

### Electronics version - NAMUR output

**Mode switch**
- Min.归纳
- Max.归纳

<table>
<thead>
<tr>
<th>Rising characteristic curve (High current when immersed)</th>
<th>Vibrating element uncovered:</th>
<th>8 mA ±1 mA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Falling characteristics (Low current when immersed)</td>
<td>Vibrating element covered:</td>
<td>16 mA ±1 mA</td>
</tr>
</tbody>
</table>

### 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

**Max. power consumption**
- 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)

**Load current**
- Min.
- Max.
- 10 mA
- 400 mA (at I > 300 mA the ambient temperature can be max. 60 °C/140 °F) max. 4 A up to 40 ms

#### Two-wire output

**Supply voltage**
- 10 … 36 V DC (via the VEGA signal conditioning instrument)

#### NAMUR output

**Supply voltage (standard characteristics)**

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

**Open-circuit voltage**
- U₀ approx. 8.2 V

**Shortcircuit current**
- Iₛ approx. 8.2 mA

### Electrical protective measures

#### Electronics versions - relay output, contactless electronic switch

**Protection**
- IP 66/IP 67

**Overvoltage category**
- III

**Protection class**
- I

#### Electronics versions - Transistor, two-wire, NAMUR output

**Protection**
- IP 66/IP 67

**Overvoltage category**
- III

**Protection class**
- II
Existing approvals or approvals applied for

<table>
<thead>
<tr>
<th>Approval Type</th>
<th>Standard/Mark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas and dust explosion protection</td>
<td>e.g. according to ATEX, FM, CSA, IEC</td>
</tr>
<tr>
<td>Functional safety</td>
<td>SIL 2 IEC 61508</td>
</tr>
<tr>
<td>Hygienic approval</td>
<td>3A, FDA</td>
</tr>
</tbody>
</table>

The available approvals can be selected via the configurator on www.vega.com.

Depending on the version, instruments with approvals can have different technical data. For these instruments, please note the corresponding approval documents. They can be downloaded in the download section on www.vega.com.

CE conformity

The instruments fulfill the legal requirements of the applicable EC guidelines. By attaching the CE mark, VEGA provides a confirmation of successful testing.
7 Dimensions

**Housing**

Fig. 19: Housing versions

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

**VEGAVIB 61**

Fig. 20: VEGAVIB 61 - threaded version G1

**VEGAVIB 62**

Fig. 22: VEGAVIB 62 - threaded version G1

Fig. 19: Housing versions

Technical data
Dimensions

Fig. 23: VEGAVIB 62 - threaded version G1½

VEGAVIB 63

Fig. 24: VEGAVIB 63 - threaded version G1

Vibration – Limit level measurement

21
Fig. 25: VEGAVIB 63 - threaded version G1½

VEGA 62

Fig. 26: VEGAWAVE 61 - threaded version G1½

Fig. 27: VEGAWAVE 62 - threaded version G1½

Dimensions

Vibration – Limit level measurement
VEGA WAVE 63

![Diagram of VEGA WAVE 63]

Fig. 28: VEGA WAVE 63 - threaded version G 1½

Temperature adapter

![Diagram of Temperature adapter]

Fig. 29: Temperature adapter (only for VEGAVIB 61, 63 and VEGA WAVE 61, 63)
8 Product code

VEGAVIB 61

Approval
UX FM/SC(CL) II,II,DIV,1,GP ABCD 1)
UF FM/SC(CL) II,II,DIV,1,GP ABCD 1)
UD FM/SC(CL) II,II,DIV,1,GP ABCD 1)
KD CF(SC)(CL) II,II,DIV,1,GP ABCD 1)

Version / Process temperature
A Standard / -50...150°C
B With adapter / -50...250°C
C Detection of solids in water / -50...150°C

Process fitting / Material
NC Thread 1/2NPT PN16 / 316L
NG Thread 1/2NPT PN16 / 316L
CT Tri-Clamp 1/2”1/316L, Ra <0,8µm
CO Tri-Clamp 1/2”1/316L, Ra <0,8µm
DA Flange 11/150® RF, ANSIB 16,5, 316L
HA Flange 11/150® RF, ANSIB 16,5, 316L
OA Flange 31/150® RF, ANSIB 16,5,316L
SA Flange 41/150® RF, ANSIB 16,5, 316L

Electronics
C Contactless electronic switch 20...253VAC/DC
R Relay (DPDT) 20...72VDC/20...253VAC(3A)
T Transistor (NPN/PNP) 10...55VDC
Z Two-wire 8/16 mA 10...36VDC

Housing / Protection
K Plastic / IP66/IP67
A Aluminium / IP66/IP67
V Stainless steel (precision casting) 316L / IP66/IP67
B Lateral cable outlet IP68, ext. housing plastic/IP66/67

Additional equipment
X Without

VEGAVIB 63

Approval
UX FM/SC(CL) II,II,DIV,1,GP ABCD 1)
UF FM/SC(CL) II,II,DIV,1,GP ABCD 1)
UD FM/SC(CL) II,II,DIV,1,GP ABCD 1)
KD CF(SC)(CL) II,II,DIV,1,GP ABCD 1)

Version / Process temperature
A Standard / -50...150°C
B With adapter / -50...250°C
C Detection of solids in water / -50...150°C

Process fitting / Material
NC Thread 1/2NPT PN16 / 316L
NG Thread 1/2NPT PN16 / 316L
CT Tri-Clamp 11/316L, Ra <0,8µm
CO Tri-Clamp 11/316L, Ra <0,8µm
DA Flange 11/150® RF, ANSIB 16,5, 316L
HA Flange 11/150® RF, ANSIB 16,5, 316L
OA Flange 31/150® RF, ANSIB 16,5,316L
SA Flange 41/150® RF, ANSIB 16,5, 316L

Electronics
C Contactless electronic switch 20...253VAC/DC
R Relay (DPDT) 20...72VDC/20...253VAC(3A)
T Transistor (NPN/PNP) 10...55VDC
Z Two-wire 8/16 mA 10...36VDC

Housing / Protection
K Plastic / IP66/IP67
A Aluminium / IP66/IP67
V Stainless steel (precision casting) 316L / IP66/IP67
B Lateral cable outlet IP68, ext. housing plastic/IP66/67

Additional equipment
X Without

VEGAWAVE 61

Approval
UX FM/SC(CL) II,II,DIV,1,GP ABCD 1)
UF FM/SC(CL) II,II,DIV,1,GP ABCD 1)
UD FM/SC(CL) II,II,DIV,1,GP ABCD 1)
KD CF(SC)(CL) II,II,DIV,1,GP ABCD 1)

Version / Process temperature
A Standard / -50...150°C
B With adapter / -50...250°C
C Detection of solids in water / -50...150°C

Process fitting / Material
NC Thread 1/2NPT PN16 / 316L
NG Thread 1/2NPT PN16 / 316L
CT Tri-Clamp 1/2”1/316L, Ra <0,8µm
CO Tri-Clamp 1/2”1/316L, Ra <0,8µm
DA Flange 11/150® RF, ANSIB 16,5, 316L
HA Flange 11/150® RF, ANSIB 16,5, 316L
OA Flange 31/150® RF, ANSIB 16,5,316L
SA Flange 41/150® RF, ANSIB 16,5, 316L

Electronics
C Contactless electronic switch 20...253VAC/DC
R Relay (DPDT) 20...72VDC/20...253VAC(3A)
T Transistor (NPN/PNP) 10...55VDC
Z Two-wire 8/16 mA 10...36VDC

Housing / Protection
K Plastic / IP66/IP67
A Aluminium / IP66/IP67
V Stainless steel (precision casting) 316L / IP66/IP67
B Lateral cable outlet IP68, ext. housing plastic/IP66/67

Additional equipment
X Without

1) Only with electronics “Z” or “N” 
2) Only with Housing / Protection “A” 

VEGAWAVE 62

Approval
UX FM/SC(CL) II,II,DIV,1,GP ABCD 1)
UF FM/SC(CL) II,II,DIV,1,GP ABCD 1)
UD FM/SC(CL) II,II,DIV,1,GP ABCD 1)
KD CF(SC)(CL) II,II,DIV,1,GP ABCD 1)

Version / Process temperature
A Standard / -20...80°C
B With adapter / -20...80°C
C Detection of solids in water / -20...80°C

Process fitting / Material
NC Thread 1/2NPT PN16 / 316L
NG Thread 1/2NPT PN16 / 316L
CT Tri-Clamp 1/2”1/316L, Ra <0,8µm
CO Tri-Clamp 1/2”1/316L, Ra <0,8µm
DA Flange 11/150® RF, ANSIB 16,5, 316L
HA Flange 11/150® RF, ANSIB 16,5, 316L
OA Flange 31/150® RF, ANSIB 16,5,316L
SA Flange 41/150® RF, ANSIB 16,5, 316L

Electronics
C Contactless electronic switch 20...253VAC/DC
R Relay (DPDT) 20...72VDC/20...253VAC(3A)
T Transistor (NPN/PNP) 10...55VDC
Z Two-wire 8/16 mA 10...36VDC

Housing / Protection
K Plastic / IP66/IP67
A Aluminium / IP66/IP67
V Stainless steel (precision casting) 316L / IP66/IP67
B Lateral cable outlet IP68, ext. housing plastic/IP66/67

Additional equipment
X Without

VEGAWAVE 63

Approval
UX FM/SC(CL) II,II,DIV,1,GP ABCD 1)
UF FM/SC(CL) II,II,DIV,1,GP ABCD 1)
UD FM/SC(CL) II,II,DIV,1,GP ABCD 1)
KD CF(SC)(CL) II,II,DIV,1,GP ABCD 1)

Version / Process temperature
A Standard / -50...150°C
B With adapter / -50...250°C
C Detection of solids in water / -50...150°C

Process fitting / Material
NC Thread 1/2NPT PN16 / 316L
NG Thread 1/2NPT PN16 / 316L
CT Tri-Clamp 1/2”1/316L, Ra <0,8µm
CO Tri-Clamp 1/2”1/316L, Ra <0,8µm
DA Flange 11/150® RF, ANSIB 16,5, 316L
HA Flange 11/150® RF, ANSIB 16,5, 316L
OA Flange 31/150® RF, ANSIB 16,5,316L
SA Flange 41/150® RF, ANSIB 16,5, 316L

Electronics
C Contactless electronic switch 20...253VAC/DC
R Relay (DPDT) 20...72VDC/20...253VAC(3A)
T Transistor (NPN/PNP) 10...55VDC
Z Two-wire 8/16 mA 10...36VDC

Housing / Protection
K Plastic / IP66/IP67
A Aluminium / IP66/IP67
V Stainless steel (precision casting) 316L / IP66/IP67
B Lateral cable outlet IP68, ext. housing plastic/IP66/67

Additional equipment
X Without

1) Only with electronics “Z” or “N” 
2) Only with Housing / Protection “A” 

24 Vibration – Limit level measurement
VEGAWAVE 62

Approval
UX FM/N(C)L DIV2.GP ABCD (DP)C/L I,III,DIV1.GP EF
UF FM/N(C)L III,III, DIV 1.GP ABCDEF 1)
KX CSA(N)C/L DIV 2.GP ABCD/DP/C/L I,III,DIV1.GP EF
KF CSA(N)C/L III,III, DIV 1.GP ABCDEF 2)

Version / Process temperature
T Standard / -20...80°C
C Detection of solids in water / -20...80°C

Process fitting / Material
ND Thread 1½NPT PN16 / 316L
HA Flange 2"150RF ANSI B16.5; 316L
IA Flange 3"300RF ANSI B16.5/316L
OA Flange 3"150RF ANSI B16.5/316L
PA Flange 3"300RF ANSI B16.5/316L
SA Flange 4"150RF ANSI B16.5/316L

Electronics
C Contactless electronic switch 20...253VAC/DC
R Relay (DPDT), 20...72VDC, 20...253VAC(3A)
T Transistor (NPN/PNP) 10...55VDC
Z Two-wire 8/16 mA, 10...16VDC
N NAMUR signal

Housing / Protection
K Plastic / IP66/IP67
A Aluminium / IP66/IP67
V Stainless steel (precision casting) 316L / IP66/IP67
T Cable outlet / IP 68, ext. housing plastic / IP66/67
B Lateral cable outlet IP68, ext. housing plastic/IP66/67

Additional equipment
N 1/2NPT / without
X Without

1) Only with electronics “Z” or “N”

VEGAWAVE 63

Approval
UX FM/N(C)L DIV2.GP ABCD (DP)C/L I,III,DIV1.GP EF
UF FM/N(C)L III,III, DIV 1.GP ABCDEF 1)
UD FM/X(C)L DIV 1.GP ABCD/DP/C/L I,III,DIV1.GP EF
KX CSA(N)C/L DIV 2.GP ABCD/DP/C/L I,III,DIV1.GP EF
KF CSA(N)C/L III,III, DIV 1.GP ABCDEF 2)
KD CSA/XP(C)L DIV 1.GP ABCD/DP/C/L I,III,DIV 1.GP EF 2)

Version / Process temperature
A Standard / -50...150°C
B With adapter / -50...250°C
C Detection of solids in water / -50...150°C

Process fitting / Material
ND Thread 1½NPT PN25 / 316L
HA Flange 2"150RF ANSI B16.5; 316L
IA Flange 3"300RF ANSI B16.5/316L
OA Flange 3"150RF ANSI B16.5/316L
PA Flange 3"300RF ANSI B16.5/316L
SA Flange 4"150RF ANSI B16.5/316L

Electronics
C Contactless electronic switch 20...253VAC/DC
R Relay (DPDT), 20...72VDC, 20...253VAC(3A)
T Transistor (NPN/PNP) 10...55VDC
Z Two-wire 8/16 mA, 10...36VDC
N NAMUR signal

Housing / Protection
K Plastic / IP66/IP67
A Aluminium / IP66/IP67
V Stainless steel (precision casting) 316L / IP66/IP67
T Cable outlet / IP 68, ext. housing plastic / IP66/67
B Lateral cable outlet IP68, ext. housing plastic/IP66/67

Additional equipment
N 1/2NPT / without
X Without

1) Only with electronics “Z” or “N”
2) Only with Housing / Protection “A”
You can find at www.ohmartvega.com
downloads of the following
• operating instructions manuals
• menu schematics
• software
• certificates
• approvals
and much, much more