Product Information

Radar
Limit level measurement
VEGAMIP
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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

VEGAMIP is a microwave barrier for level detection.

The emitting unit transmits a focused microwave signal via horn antenna to the receiving unit on the opposite side. If there is medium between emitting and receiving unit, the signal is damped. This change is detected by the built-in electronics module and converted into a switching command.

Microwaves work contactlessly and can penetrate many non-conductive materials. Hence a measurement through plastic vessels or vessel walls is possible. A measurement with metal or concrete vessel is also possible through a glass, plastic or ceramic window.

It is designed for industrial use in all areas of process technology and can be used in bulk solids and liquids.

Typical applications are the output of an overfill and empty signal. With an operating distance of 100 m, VEGAMIP can be used, for example, in bulk solids silos with large diameters. Thanks to its simple and rugged measuring system, VEGAMIP is virtually unaffected by the process and the chemical and physical properties of the medium.

VEGAMIP can be also used for detection of vehicles and ships or for material recognition on conveyor belts.

It works even under extremely difficult conditions, such as different granulation sizes, contamination, extreme filling noise, high temperatures, strong dust generation or abrasive products.

![VEGAMIP with plastic housing](image)

Fig. 1: VEGAMIP with plastic housing

1 Emitting unit VEGAMIP T61
2 Receiving unit VEGAMIP R61 with control electronics
3 Housing cover
4 Housing with control electronics
5 Process fitting
# Type overview

<table>
<thead>
<tr>
<th>Media</th>
<th>Bulk solids and liquids</th>
<th>Bulk solids and liquids</th>
<th>Bulk solids and liquids with high temperatures</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Housing</strong></td>
<td>Plastic</td>
<td>Plastic</td>
<td>Aluminium</td>
</tr>
<tr>
<td></td>
<td>Aluminium</td>
<td>Aluminium</td>
<td>Stainless steel</td>
</tr>
<tr>
<td></td>
<td>Stainless steel</td>
<td>Stainless steel</td>
<td></td>
</tr>
<tr>
<td><strong>Process fitting</strong></td>
<td>G1(\frac{1}{2}) A, 1(\frac{1}{2})&quot; NPT</td>
<td>Flanges from DN 50 or 2&quot;</td>
<td>G2 A</td>
</tr>
<tr>
<td><strong>Material</strong></td>
<td>316L</td>
<td>PP</td>
<td>316L</td>
</tr>
<tr>
<td><strong>Process fitting</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Material</strong></td>
<td>FKM (Viton)</td>
<td>FKM (Viton)</td>
<td>Graphite</td>
</tr>
<tr>
<td><strong>Instrument seal</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Material</strong></td>
<td>PTFE</td>
<td>PP</td>
<td>Ceramic Al(_2)O(_3)</td>
</tr>
<tr>
<td><strong>Antenna cover</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Measuring range</strong></td>
<td>0.1 ... 100 m (0.33 ... 328 ft)</td>
<td>0.1 ... 100 m (0.33 ... 328 ft)</td>
<td>0.1 ... 100 m (0.33 ... 328 ft)</td>
</tr>
<tr>
<td><strong>Process temperature</strong></td>
<td>-40 ... +80 °C (-40 ... +176 °F)</td>
<td>-40 ... +80 °C (-40 ... +176 °F)</td>
<td>-40 ... +450 °C (-40 ... +842 °F)</td>
</tr>
<tr>
<td><strong>Ambient, storage and transport temperature</strong></td>
<td>-40 ... +80 °C (-40 ... +176 °F)</td>
<td>-40 ... +80 °C (-40 ... +176 °F)</td>
<td>-40 ... +80 °C (-40 ... +176 °F)</td>
</tr>
<tr>
<td><strong>Signal output</strong></td>
<td>Relay output</td>
<td>Relay output</td>
<td>Relay output</td>
</tr>
<tr>
<td><strong>Approvals</strong></td>
<td>ATEX</td>
<td>ATEX</td>
<td>ATEX</td>
</tr>
</tbody>
</table>
3 Device selection

Application areas
The microwave sensor VEGAMIP is mainly used in bulk solids applications. The measurement is insensitive to dust, contamination and buildup.

The VEGAMIP detects the limit level reliably independent of consistency and moisture content of the product and in applications with abrasive products and high temperatures.

The non-contact measuring principle is particularly suitable for the rough operating conditions in the mineral stone generation, coal and ore processing. Further applications are for example conveyor belts and high temperature applications in blast furnaces and waste incineration plants.

Similar to a light barrier, the microwave barrier can be also used for object monitoring.

Antenna versions

![Antenna versions](image)

1 Encapsulated horn antenna with PTFE cover
2 Plastic encapsulated antenna with PP cover
3 Horn antenna
4 VEGAMIP with angled antenna extension

High temperature applications
With high process temperatures exceeding 80 °C, you can use a mounting adapter for the emitting and receiving units. The mounting adapter can only be used with the encapsulated horn antenna with PTFE cover (G1 1/2 A).

There are two version with different lengths and temperature ranges.

- Mounting adapter 150 mm - Temperature range -40 … +250 °C
- Mounting adapter 300 mm - Temperature range -40 … +450 °C

![High temperature mounting adapter](image)

Adjustment, electronics
The signal output of VEGAMIP is a relay output.

All adjustment elements required for adjustment are located on the exchangeable electronics module.

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 Housing overview

<table>
<thead>
<tr>
<th>Material</th>
<th>Protection Rating</th>
<th>Version</th>
<th>Application Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plastic PBT</td>
<td>IP 66/IP 67</td>
<td>Single chamber</td>
<td>Industrial environment</td>
</tr>
<tr>
<td>Aluminium</td>
<td>IP 66/IP 67, IP 66/IP 68 (1 bar)</td>
<td>Single chamber</td>
<td>Industrial environment with increased mechanical wear</td>
</tr>
<tr>
<td>Stainless steel 316L</td>
<td>IP 66/IP 67</td>
<td>Single chamber electropolished</td>
<td>Aggressive environment, food processing, pharmaceutical</td>
</tr>
<tr>
<td></td>
<td>IP 66/IP 67, IP 66/IP 68 (1 bar)</td>
<td>Single chamber precision casting</td>
<td>Aggressive environment, strong mechanical wear</td>
</tr>
</tbody>
</table>
5 Mounting

Mounting position
The two sensors should be directed in to each other in a range of ±5°.

General rule: the bigger the antenna and the better it focusses, the more precise the orientation has to be.

If possible, install VEGAMIP in a position where a high signal damping by the medium is expected.

It is useful to select the mounting position in such a way that the instrument is in easy reach for mounting and connection as well as for adjustment. For this purpose, the housing can be rotated by 330° without any tools.

Mounting examples
The following illustrations show mounting examples and measurement setups.

Bulk solids vessel

![Fig. 6: Level detection in a bulk solids vessel](image)

The VEGAMIP can be mounted via an adapter flange or directly into the vessel wall. The measurement is robust and maintenance free and can be used independently of the product properties.

Conveyor belt

![Fig. 7: Material detection on a conveyor belt](image)

The VEGAMIP can detect reliably and independent of the ambient conditions the availability of product on the conveyor belt.

Object detection

![Fig. 8: Object detection on a truck loading facility](image)

The VEGAMIP can be also used for object or position detection. Ambient influences such as dust, fog, snow or rain do not disturb the measurement. Different mounting possibilities enable a simple mounting.

Backwater vessel

![Fig. 9: Level detection on a backwater vessel](image)

The VEGAMIP can detect the limit level through a suitable window of plastic, glass or ceramic, and that completely maintenance free and independent of process conditions in the vessel.
6 Electronics - VEGAMIP R61 - Relay output

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 re-
quired. The electronics is completely encapsulated to protect against
vibration and moisture.

The terminals for the voltage supply and the signal output are located on
the upper side of the electronics.

Voltage supply
The oscillator with relay output is designed in protection class 1. To main-
tain this protection class, it is absolutely necessary that the ground con-
ductor be connected to the internal ground terminal. Take note of the
general installation regulations. As a rule, connect VEGAMIP 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.

- Operating voltage
  - 20 … 253 V AC, 20 … 72 V DC

Connection cable
The instrument is connected with standard two-wire cable without screen.
If electromagnetic interference is expected which is above the test values
of EN 61326 for industrial areas, screened cable should be used.

Use 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.

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

Information:
The relays are always shown in non-operative condition.

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Fig. 10: Wiring plan receiving unit - VEGAMIP (receiver)

1 Relay output
2 Relay output
3 Voltage supply
7 Operation

7.1 Overview
The signal output of the limit switch is a relay output.

7.2 Operation
Receiving unit
All necessary settings can be carried out on the receiving unit of VEGA-MIP.

Fig. 12: Electronics module MPE50R receiver unit - Relay output

1. Mode switch for selecting the switching behaviour (min./max.)
2. Control lamp (LED) for indication of a fault (red)
3. Signal lamp (LED) for indication of the switching condition (yellow)
4. Control lamp (LED) for indication of the instrument function (green)
5. Connection terminals
6. Ground terminal
7. Key for adjustment of the sensitivity and the switching delay (→)
8. Key for adjustment of the sensitivity and the switching delay (←)
9. LED indicating board for indication of the receiving level (yellow)

Signal lamps (2, 3, 4)
There are three signal lamps (LED) on the electronics module
- Control lamp (red) for indication of a fault (2)
- Control lamp (yellow) for indication of the switching condition (3)
- Control lamp (green) for indication of the instrument function (4)

Mode adjustment (1)
With the mode adjustment (max./min.) you can change the switching condition of the relay. You can set the required mode (max. - max. detection or overflow protection, min. - min. detection or dry run protection).

Sensitivity adjustment (7, 8)
With these keys (7 and 8) you can adjust the switching point to the medium.

Depending on the process, the sensitivity of VEGAMIP adjusted more or less sensitive.

With the two keys, also a switching delay between 100 ms and 20 s can be adjusted.

LED indication strip - receiving level (9)
By means of the LED indicating board, you can see the actual receiving level during adjustment.
8 Dimensions

Plastic housing

Aluminium housing

Stainless steel housing

VEGAMIP

VEGAMIP - Mounting adapter (-40 … +450 °C)

VEGAMIP - Plastic encapsulated antenna with PP cover

VEGAMIP - Mounting adapter

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.

Fig. 13: VEGAMIP

1 Threaded version - encapsulated horn antenna with PTFE cover - G1½ A
2 Threaded version - encapsulated horn antenna with PTFE cover - 1½ NPT
You can find at www.vega.com

- operating instructions manuals
- specification sheet
- Software
- drawings
- certificates
- approvals
and much, much more

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