Product Information

Radar
Limit level measurement
VEGAMIP

VEGA

Contents

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.

Radar – Limit level measurement

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 conditons, such as different granulation sizes, contamination, extreme filling noise, high temperatures, strong dust generation or abrasive products.
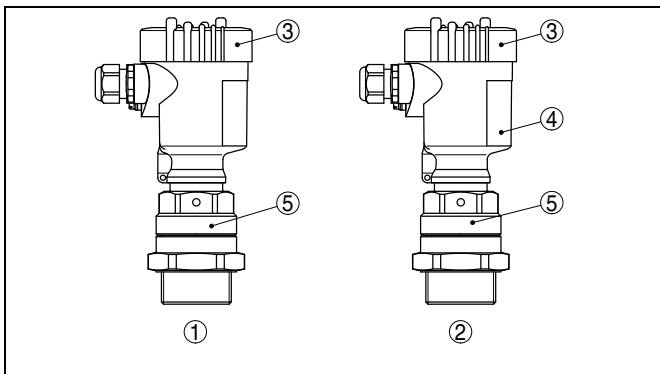

Fig. 1: VEGAMIP with plastic housing

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

2   Type overview

	VEGAMIP 61 **Encapsulated horn antenna with PTFE cover**	**VEGAMIP 61** **Plastic encapsulated antenna with PP cover**	**VEGAMIP 61** **Encapsulated horn antenna with high temperature mounting adapter**
Media	Bulk solids and liquids	Bulk solids and liquids	Bulk solids and liquids with high temperatures
Housing	• Plastic • Aluminium • Stainless steel	• Plastic • Aluminium • Stainless steel	• Aluminium • Stainless steel
Process fitting	G1½ A, 1½" NPT	Flanges from DN 50 or 2"	G2 A
Material Process fitting	316L	PP	316L
Material Instrument seal	FKM (Viton)	FKM (Viton)	Graphite
Material Antenna cover	PTFE	PP	Ceramic Al_2O_3
Measuring range	0.1 … 100 m (0.33 … 328 ft)	0.1 … 100 m (0.33 … 328 ft)	0.1 … 100 m (0.33 … 328 ft)
Process temperature	-40 … +80 °C (-40 … +176 °F)	-40 … +80 °C (-40 … +176 °F)	-40 … +450 °C (-40 … +842 °F)
Ambient, storage and transport temperature	-40 … +80 °C (-40 … +176 °F)	-40 … +80 °C (-40 … +176 °F)	-40 … +80 °C (-40 … +176 °F)
Signal output	Relay output	Relay output	Relay output
Approvals	ATEX	ATEX	ATEX

Radar – Limit level measurement

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 wast incineration plants.

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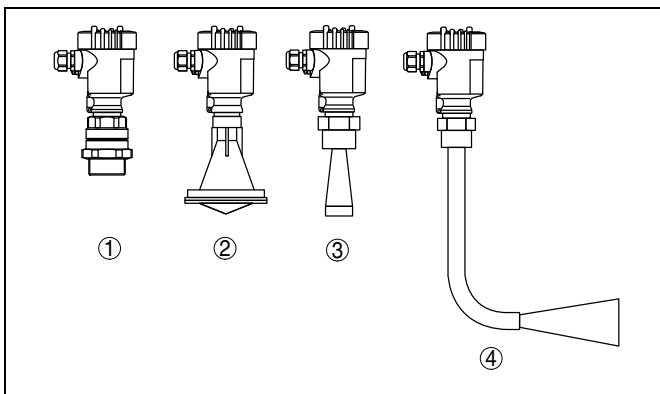
Antenna versions

Fig. 3: Antenna versions

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 (G1½ A).

There are two version with different lengths and temperature ranges.

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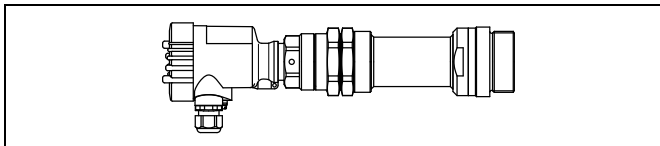● Mounting adapter 300 mm - Temperature range -40 … +450 °C

Fig. 4: VEGAMIP with high temperature mounting adapter

Adjustment, electronics

The signal output of VEGAMIP is a relay output.

All adjustment elements required for adjustment alre 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

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

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

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

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.
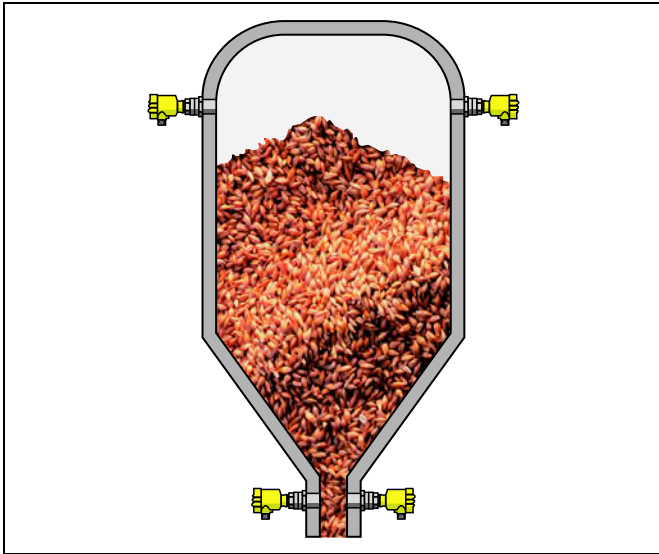
Bulk solids vessel

Fig. 6: Level detection in a bulk solids vessel

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.
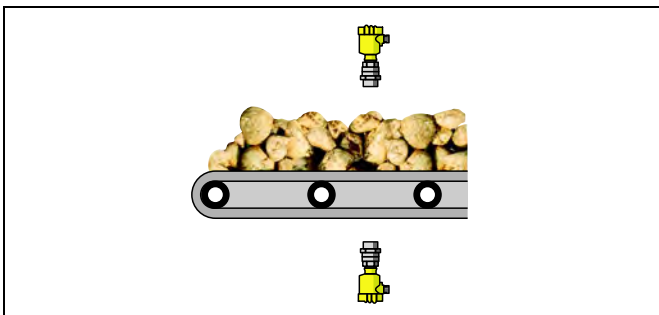
Conveyor belt

Fig. 7: Material detection on a conveyor belt

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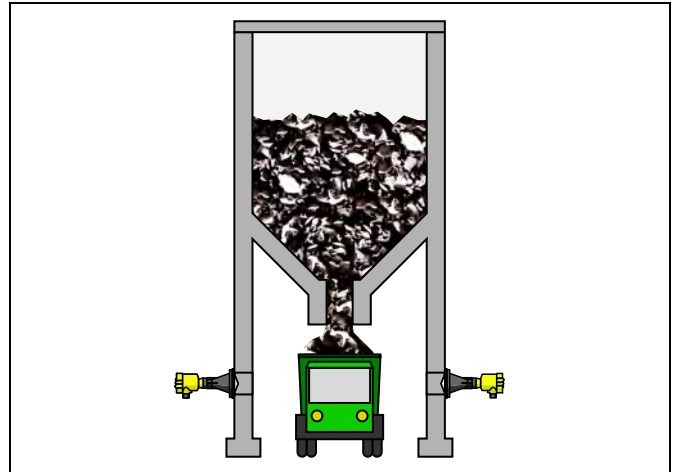
Object detection

Fig. 8: Object detection on a truck loading facility

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.
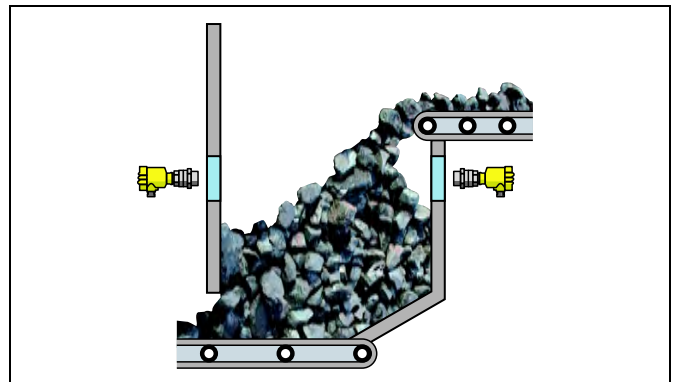
Backwater vessel

Fig. 9: Level detection on a backwater vessel

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 required. 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 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 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).

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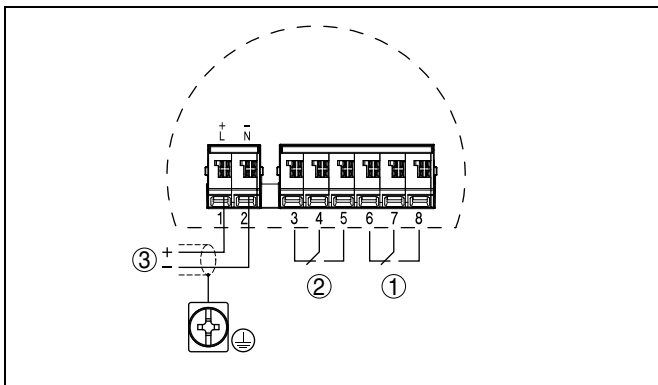The relays are always shown in non-operative condition.

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

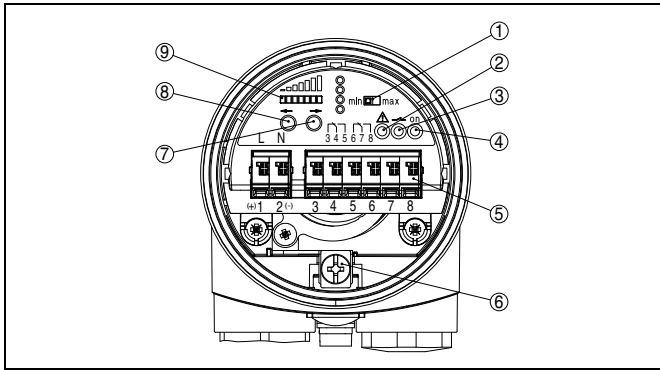All necessary settings can be carried out on the receiving unit of VEGA-MIP.

Fig. 12: Electronics module MPE60R 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.

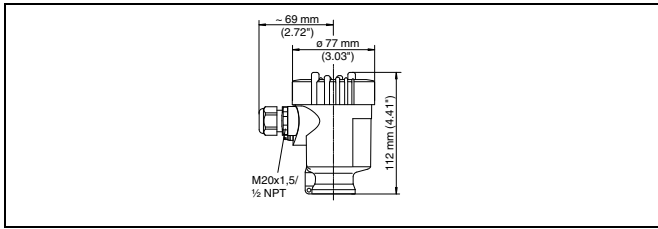Depending on the process, the sensitivity of VEGAMIP adjusted more or less sensitive.

With the two keys, also a switching delay between 100 ms and 20 s can be adjusted.
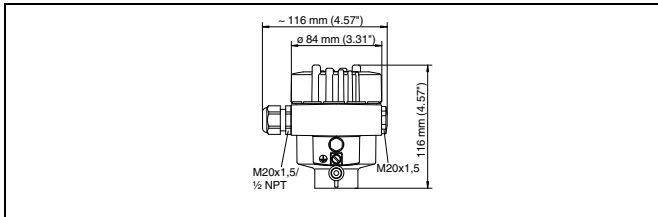
LED indication strip - receiving level (9)

By means of the LED indicating board, you can see the actual receiving level during adjustment.
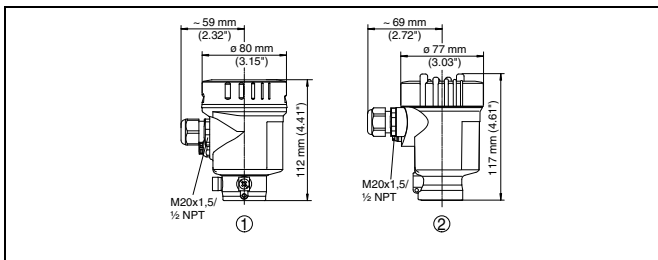
8   Dimensions

Plastic housing

~ 69 mm (2.72")
ø 77 mm (3.03")
112 mm (4.41")
M20x1,5/ ½ NPT

Aluminium housing

~ 116 mm (4.57")
ø 84 mm (3.31")
116 mm (4.57")
M20x1,5/ ½ NPT
M20x1,5

Stainless steel housing

~ 59 mm (2.32")
ø 80 mm (3.15")
112 mm (4.41")
M20x1,5/ ½ NPT

~ 69 mm (2.72")
ø 77 mm (3.03")
117 mm (4.61")
M20x1,5/ ½ NPT

1   *Single chamber housing electropolished*
2   *Single chamber housing precision casting*

VEGAMIP

SW 46 mm (1.42")
SW 60 mm (1.42")
G1½ A
83 mm (3.27")
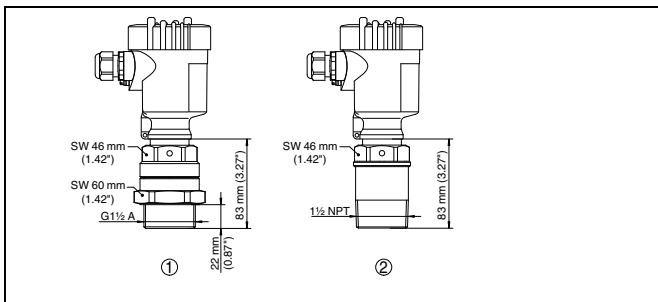22 mm (0.87")
①

SW 46 mm (1.42")
1½ NPT
83 mm (3.27")
②

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*

VEGAMIP

③
170 mm / 300 mm (6.69") / (11.81")
SW 46 mm (1.42")
SW 60 mm (1.42")
G1½ A
83 mm (3.27")
22 mm (0.87")
①
④
19 mm (0.75")
98 mm (3.86")
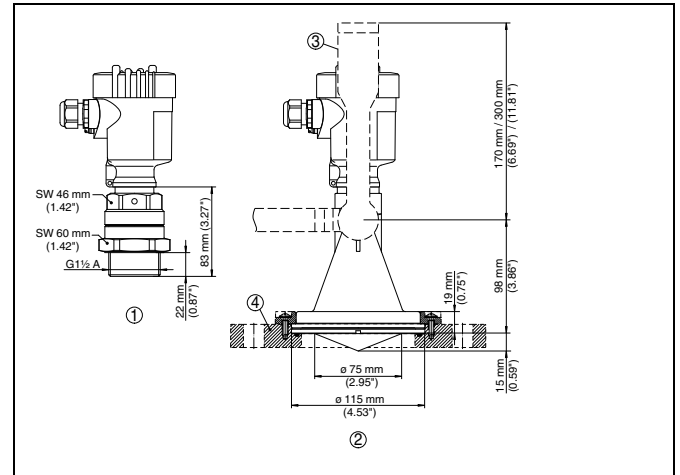15 mm (0.59")
ø 75 mm (2.95")
ø 115 mm (4.53")
②

Fig. 15: VEGAMIP

1   *Threaded version - encapsulated horn antenna with PTFE cover - G1½ A*
2   *Plastic encapsulated antenna with PP cover*
3   *Mounting strap*
4   *Adapter flange*

VEGAMIP - Mounting adapter (-40 … +450 °C)
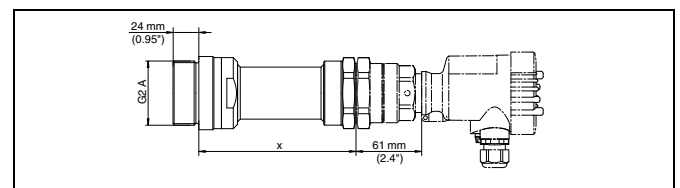
24 mm (0.95")
G2 A
x
61 mm (2.4")

Fig. 17: Mounting adapter with ceramic cover for VEGAMIP - threaded version with PTFE cover

x   *150 mm (5.9 in) or 300 mm (11.8 in)*

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

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