Switching Technology for Liquid and Solid Level Measurement

Point Level Measurement

Looking Forward

VEGA
Contents

Leadership in Level Switching 3
About Level Switching 4
plics® – Easy is Better 6
VEGAVIB 61, 62, and 63 – Measurement of Solids 8
VEGAWAVE 61, 62, and 63 – Measurement of Solids 10
VEGASWING 51, 61, and 63 – Measurement of Liquids 12
VEGASWING 66 – The Specialist 14
VEGACAP 62, 63, 64, 65, 66, and 67 – Measurement of Liquids and Solids 16
VEGAMIP T/R61 and R62 – Measurement of Liquids and Solids 18
VEGA offers a wide variety of application-specific solutions for measuring level. In addition to providing instrumentation for reliable continuous level tracking, VEGA produces numerous technologies designed for point level switching. Switches can detect the absence and presence of process materials, and provide critical overfill protection and discrete alarming in both liquid and solid applications. With such a broad range of switching capabilities, VEGA continues to lead the way in solving difficult and important measurements in the process industries.

Why Use Level Switching?

Point level switches are often used to prevent overfilling of tanks and silos. They also ensure that tanks do not run too low, possibly interrupting production. Switches can be inserted into pipes to indicate when a pipe is empty. This protects pumps from “running dry” and causing damage. Point level switches can be used independently or in conjunction with continuous level devices.

With no moving parts and easy to configure electronics, VEGA point level switches eliminate many of the measurement and maintenance issues associated with mechanical float systems.

Benefits of Switching Technologies

- Active self-monitoring of the vibrating fork system ensures safe and reliable function
- Various sensor types allow for accurate detection of liquids, powders, granules, and pellets
- Robust and resistant sensor coatings and insulation guarantee effective measurement in corrosive, viscous, or hot processes
- Non-contact switching technology opens up a variety of measurement possibilities, such as position monitoring and plugged chute detection
- Simple setup and adjustment of all technologies reduces setup time and costs
About Level Switching

Vibration—Solids
The VEGAVIB and VEGAWAVE continuously vibrate from energized piezoelectric crystals. When the solids cover the sensor, the vibration is dampened and prompts the electronics to trigger a switching command.

Vibration—Liquids
The VEGASWING detects a frequency change of the vibration when the vibrating fork at the end of the sensor is covered by the product. The VEGASWING then triggers the switch command.

Capacitive
The VEGACAP and vessel form the two electrodes of a capacitor. A capacitance change caused by a level change is processed by the integrated electronics and then converted into a switching signal.

Microwave Barrier
The VEGAMIP system consists of an emitter and a receiver. A signal is focused by an antenna emitted toward the receiver. Process material in the path of the rays attenuates the signal at the receiver and the change in energy. The VEGAMIP detects the change and then triggers the switch command.
Assurance with Redundant Systems

Every industry places its own very specific demands on measurement technology. VEGA offers a variety of physical measuring principles for point level detection. Point level detectors can be provided that are perfectly adapted to the properties of the medium as well as the individual process conditions at the measuring point.

Increased Information and Certainty

When only point level detection is required, a single instrument can be used to indicate a high or low level. As a series, switches are used to indicate the status of multiple points in a vessel. Adding switches provides more detailed information about the process to the user.

When point level switches are used in conjunction with a continuous level device, truly redundant systems can be developed. The point level switch acts independently from the continuous level device. The safest systems utilize a diversity of technology, which lowers the chance that a single process condition upset causes both sensors to read incorrectly.

Redundant Level System

1: High level point switch
2: Low level point switch
3: Continuous level instrument
The Right Instrument for Every Application

VEGA is committed to supplying instruments that work in all applications, not just those with ideal conditions. All new instruments are tested in extreme heat, dust, chemical, moisture, and cold environments before they are released. VEGA’s goal is to enable customers to achieve operational efficiency with every measured process.

Performance Guarantee

To demonstrate our commitment to specifying the right instrument for each application, VEGA Americas offers a Performance Guarantee — if our recommended solution does not perform exactly as expected, we’ll make it right.

24 Hour Support

The VEGA Field Service team is trained to provide telephone, email, or on-site customer service. Whether starting up, configuring, or troubleshooting the system, VEGA Field Service provides necessary steps to ensure the measuring device and its outputs run efficiently. Through service and training, VEGA supports all users throughout the life of the installed solutions.

plics® – Easy is Better

Instrument Platform plics®: Switching Technology Made to Order

Commercially available standard solutions for level measurement do not leave the user much leeway for truly optimal instrumentation. In contrast, the instrument platform plics® provides a variety of antenna styles, which are chosen based on application requirements. The plics platform allows for the most suitable combination of sensor, process fitting, electronics, and housing to be created. The result is an instrument that is highly reliable, economical, and user friendly. With sensors that offer reliable measurement using switching technology, and construction based on the of plics principle, VEGA continues to lead the way in solving difficult and important applications.
Indication

picaLED*
*Only available with relay electronics.
The switch status can be displayed in two colors: red-green or yellow-green.

Electronics

Level Switch:
Contactless, Relay, Two-Wire, Transistor, or NAMUR

Housing

Plastic
Stainless steel
Aluminium

Process Fitting

Thread
Flange
Sanitary

Antenna

Vibration
Vibration
Vibration

Capacitive
Microwave Barrier

Safety standards
Ship approvals
Explosion protection
Hygienic standards
VEGA VIB 61, 62, & 63
– Measurement of Solids

Reliable in Bulk Solids: VEGA VIB 61, 62, and 63
The vibrating rod of VEGA VIB is activated to vibrate via the piezo drive. The vibrating element of VEGA VIB is always free and operates reliably. Due to the simple cleanability, it fulfills all requirements for use in the food processing and pharmaceutical industry. Mounting and setup are very easy, an adjustment with medium is not necessary. The VEGA VIB is used as overfill protection and empty alarm in silos and bunkers, also in safety-relevant applications up to SIL2. Typical applications are bulk solids such as plastic granules, pellets, and non-adhesive powder products.

Grain Level Detection
In small silos that serve as temporary storage, a simple two-point control is frequently used for level control during filling. Two VEGA VIB 61 vibrating switches provide reliable detection of the limit levels. The rod prevents deposits from collecting and jamming the sensor, and enables installation near the emptying or filling points.

- Easy setup requires no additional adjustment
- Streamlined design enables easy cleaning

Plugged Nozzle Detection
For process tanks with automated infeed and continuous outflow systems, the VEGA VIB can be used for product presence indication. In addition, it can be used at the top to indicate a plugged nozzle and stop the feed system. The small process connection requires only minimal penetration into the vessel.

- “Plug and play” device for easy installation and setup
- Small process connections available

VEGA VIB 61
- Pressure range: -14.5 ... +232 psi (-1 ... +16 bar)
- Temperature range: -58 ... +482°F (-50 ... +250°C)
- Process connections include: thread from G1, 1” NPT, flange from DN 32, 1½”, hygienic fittings
- Output signal: Contactless, Relay, Transistor, Two-Wire, NAMUR
VEGAVIB 62

- Pressure range: -14.5 ... +87 psi (-1 ... +6 bar)
- Temperature range: -40 ... +302°F (-40 ... +150°C)
- Process connections include: thread from G1, 1” NPT, flange from DN 32, 1½”, hygienic fittings
- Output signal: Contactless, Relay, Transistor, Two-Wire, NAMUR
- Insertion length: up to 262 ft (80 m)

VEGAVIB 63

- Pressure range: -14.5 ... +232 psi (-1 ... +16 bar)
- Temperature range: -58 ... +482°F (-50 ... +250°C)
- Process connections include: thread from G1, 1” NPT, flange from DN 32, 1½”, hygienic fittings
- Output signal: Contactless, Relay, Transistor, Two-Wire, NAMUR
- Insertion length: up to 19 ft (6 m)

Vessels with Minimal Head Clearance
With tall vessels that have minimal head clearance, the VEGAVIB 62 with cable construction simplifies the installation. Even with lengths up to 260 feet, only 12” of space above the vessel is required to install.

- Lightweight instrument even with long length
- Easy shipment and installation with flexible cable

Detection of Solids Under Water
The detection of solids building up on the bottom of vessels is easily accomplished with the VEGAVIB. The VEGAVIB 63 can be “tuned” to operate under water and only switch when the probe contacts solids. Long insertion lengths with solid tube or flexible cable are available to meet any need.

- Can be configured to detect a level of solids accumulating under water
- Tube construction can extend the switch point up to 19 ft from the process connection
VEGAWAVE 61, 62, & 63
- Measurement of Solids

Great for Bulk Solids and Powders:
VEGAWAVE 61, 62, and 63

A tuning fork is used as the sensor element for the VEGAWAVE series. The advantages of this series are ruggedness as well as insensitivity to buildup. Therefore, it is the ideal sensor for powders and fine-grained products. Mounting and setup are very easy, an adjustment with medium is not necessary. The VEGAWAVE is used as overfill protection and empty alarm in silos and bunkers, also in safety relevant applications up to SIL2. Typical applications are products like flour, cement, and sand as well as fine-grained bulk solids such as plastic granules, grit, and Styrofoam.

VEGAWAVE 61

- Pressure range: -14.5 ... +362 psi (-1 ... +25 bar)
- Temperature range: -58 ... +482°F (-50 ... +250°C)
- Process connections include: thread G1½, 1½” NPT, flange from DN 50, 2”, hygienic fittings
- Output signal: Contactless, Relay, Transistor, Two-Wire, NAMUR

Fine-Grained Bulk Solids

The VEGAWAVE with vibrating fork assembly is perfect for the point level detection of fine solids. Used for overfill or dry-run protection, safety of the system can be ensured. With a large surface area, the vibrating forks can detect the presence of light products easily and reliably.

- Can detect products with density as low as 0.52 lbs/ft³
- Multiple output options available

Automated Shutoff Control

The VEGAWAVE 61’s compact design can be used to indicate that a vessel’s fill level has been reached and provide a signal to the system to close the fill port. Ruggedly built, it is able to stand up to harsh environments and reliably operate for many years.

- Reliable use in moving situations
- Rugged stainless steel forks can withstand harsh environments
VEGAWAVE 62

- Pressure range: -14.5 ... +87 psi (-1 ... +6 bar)
- Temperature range: -40 ... +302°F (-40 ... +150°C)
- Process connections include: thread G1½, 1½" NPT, flange from DN 50, 2", hygienic fittings
- Output signal: Contactless, Relay, Transistor, Two-Wire, NAMUR
- Insertion length: up to 262 ft (80 m)

VEGAWAVE 63

- Pressure range: -14.5 ... +362 psi (-1 ... +25 bar)
- Temperature range: -58 ... +482°F (-50 ... +250°C)
- Process connections include: thread G1½, 1" NPT, flange from DN 50, 2", hygienic fittings
- Output signal: Contactless, Relay, Transistor, Two-Wire, NAMUR
- Insertion length: up to 19 ft (6 m)

Lime Silo Overfill Protection

The VEGAWAVE 62 vibrating level switch provides overfill protection in lime silos. It requires no adjustment and provides reliable switching with various product characteristics. The VEGAWAVE 62 has no moving parts, and is maintenance-free throughout its entire life cycle.

- Product design meets SIL2 requirements for high operational reliability
- Independent switch point provides redundancy option

Vibration Tanks

Vessels where vibration is used to keep buildup from accumulating on the walls demands top mounted instruments. The VEGAWAVE 63 provides the solution with a user selectable length for the switching location. This rugged instrument stands up to external vibration and will reliably switch when the needed level is reached.

- Can be used in vessels that vibrate
- No moving parts to ensure maintenance free operation
Universal Switch in Liquids:

**VEGASWING 51, 61, and 63**

The VEGASWING is an active sensor. This means that the tuning fork is constantly evaluating the frequency of its vibration and if the frequency is out of range for any reason, the sensor will indicate the status by going into a fault condition.

### VEGASWING 51

- Pressure range: -14.5 ... +928 psi
  (-1 ... +64 bar)
- Temperature range: -40 ... +302°F
  (-50 ... +150°C)
- Process connections include: thread from G½, ½" NPT, hygienic fittings
- Output signal: Contactless, Transistor

---

**Chemical Processing Control**

When processing chemicals for use in applications downstream, continuous monitoring of dangerously high or low level conditions is important to the efficiency of the entire operation. The VEGASWING 51 with its transistor output can provide peace of mind. The small and compact instrument allows economic indication of overfill, underfill, and dry run pump protection in any vessel.

- Small, compact design
- Integrated lights for visible indication of operation
- Easy wiring for transistor output NPN or PNP

---

**Engine Drip Pan and Overflow Monitoring**

It is important to make sure that drip pans and overflow tanks do not leave their containment areas and create additional hazards. The VEGASWING 51’s temperature and pressure limits along with its compact design makes it a perfect choice for monitoring in these tight locations. The units integrated indication lights make visual checks quick and easy.

- Small process connections – ½" NPT
- Integrated lights for operating, switch, and fault conditions
VEGASWING 61

- Pressure range: -14.5 ... +1,450 psi (-1 ... +100 bar)
- Temperature range: -58 ... +482°F (-50 ... +250°C)
- Process connections include: thread from G¾, ¾" NPT, flange from DN 25, 1", hygienic fittings
- Output signal: Contactless, Relay, Transistor, Two-Wire, NAMUR

VEGASWING 63

- Pressure range: -14.5 ... +1,450 psi (-1 ... +100 bar)
- Temperature range: -58 ... +482°F (-50 ... +250°C)
- Process connections include: thread from G¾, ¾" NPT, flanges from DN 25, 1", hygienic fittings
- Output signal: Contactless, Relay, Transistor, Two-Wire, NAMUR
- Insertion length: up to 19 ft (6 m)

Pump Protection and Control

The VEGASWING 61 is recommended for use in a pipe as pump protection. The VEGASWING 61 monitors the absence and presence of liquid, which prevents the costs and downtime associated with pump cavitation.

- Small tuning fork installs directly into the pipe
- Sets up easily with no necessary adjustment

High Level Alarm in a Reactor

In reactor vessels, difficult process conditions such as high pressure, temperature, and viscosity exist. The VEGASWING 63 offers highly resistant material options to withstand corrosive products, delivering a reliable level switch point.

- Enamel coating option available for instrument protection from process conditions
- Non-moving parts reduces maintenance needs
- Active sensor monitors for fault conditions
Detection of Liquids in Extreme Environments: VEGASWING 66

The VEGASWING 66 level switch combines all the normal benefits of vibrating measurement technology with an unprecedented operating range. Even in applications with extreme conditions, the instrument brings significant cost savings in setup, commissioning, maintenance, and servicing. The product-independent switch point and extensive monitoring functions mean higher reliability for every application.

Reboiler Level in a Distillation Column

Correct reboiler operation is vital to effective distillation. It is extremely important that the level is continuously monitored and controlled. The high temperatures and changing conditions in the reboiler require a robust, adaptable, and reliable measurement technology.

- Ideal for point level measurement in liquids with extreme temperatures and pressures
- Detects the maximum permissible level of the liquid in the distillation column
- Reliably prevents overfilling, even with changing density

Ideal for cryogenic processes

VEGASWING 66 is the first vibrating level switch to provide a simple and reliable solution for point level detection at low process temperatures. Whether in liquid ethylene, natural gas (LNG), or even in nitrogen — the instrument dependably prevents filling above the maximum level.

- Universal application, as only a very low minimum product density is required
- Cost-optimized setup without medium

VEGASWING 66

- Pressure range: -14.5 ... +2,320 psi (-1 ... +160 bar)
- Temperature range: -321 ... +842°F (-196 ... +450°C)
- Process connections include: thread from G1, 1" NPT, flange from DN 40, 1½"
- Output signal: Relay (DPDT), Transistor PNP/NPN, Two-Wire 8/16 mA
- Tube extension: up to 10 ft (3 m)
Point Level Detection in a Heat Exchanger

Power plants need redundant overfill protection in the boilers. Utilizing two VEGASWING 66 sensors allows a SIL 3 safety installation to be achieved. A good overfill protection system must be able to survive the occurrence of hydraulic shock and abrupt pressure surges.

- Ideal for point level measurement in liquids with extreme temperatures and pressures
- Fits like a custom solution into existing power plant systems
- Reliably prevents overfilling and increases the safety margin, even with pressure surges

Water Drop Out in High Pressure Gas Line

With the highest temperature and pressure limit for a vibrating switch, the VEGASWING 66 is ideal for monitoring the water drop out of gas lines. The reliable response of the VEGASWING 66 can ensure that immediate indication is provided when the water collecting in the dropout needs to be drained.

- High pressure and temperature limits
- Switches on liquids only and medium independent

Technology highlight: Induction Drive and Second Line of Defense

At the heart of the sensor is the patented induction drive. It ensures a reliable harmonic oscillation frequency over the entire application range. For use in explosive, corrosive, or toxic media, the VEGASWING 66 can be equipped with an additional ceramic feedthrough as a Second Line of Defense.
Suitable for Conductive and Non-conductive Products:

**VEGACAP 62, 63, 64, 65, 66, and 67**

The capacitive technology of the VEGACAP provides reliable point level detection in many industries. The instruments withstand adhesive, conductive, and corrosive product properties in both liquid and solid applications. The VEGACAP has no special requirements for installation and mounting, and with numerous probe options, the proper VEGACAP device is able to be selected for each application.

**VEGACAP 62/**
- Pressure range: -14.5 ... +928 psi (-1 ... +64 bar)
- Temperature range: -58 ... +392°F (-50 ... +200°C)
- Process connections include: thread from G¾, ¾" NPT, flange from DN 25, 1"
- Output signal: Contactless, Relay, Transistor, Two-Wire
- Insertion length: up to 13 ft (4 m)

**VEGACAP 63/**
- Pressure range: -14.5 ... +928 psi (-1 ... +64 bar)
- Temperature range: -58 ... +392°F (-50 ... +200°C)
- Process connections include: thread from G¾, ¾" NPT, flange from DN 25, 1"
- Output signal: Contactless, Relay, Transistor, Two-Wire
- Insertion length: up to 19 ft (6 m)

**VEGACAP 64/**
- Pressure range: -14.5 ... +928 psi (-1 ... +64 bar)
- Temperature range: -58 ... +392°F (-50 ... +200°C)
- Process connections include: thread from G¾, ¾" NPT, flange from DN 25, 1"
- Output signal: Contactless, Relay, Transistor, Two-Wire
- Insertion length: up to 13 ft (4 m)

**VEGACAP 65/**
- Pressure range: -14.5 ... +928 psi (-1 ... +64 bar)
- Temperature range: -58 ... +392°F (-50 ... +200°C)
- Process connections include: thread from G1, 1" NPT, flange from DN 50, 2"
- Output signal: Contactless, Relay, Transistor, Two-Wire
- Insertion length: up to 105 ft (32 m)
Asphalt Level Measurement

The VEGACAP 64 used for overfill protection is the ideal complement to continuous level measurement. Asphalt’s viscous properties may cause buildup several inches thick on the electrode, but the VEGACAP 64 will not experience switching point displacement or faulty switching.

• Fully insulated rod resists adhesive product properties
• Easy instrument setup expedites startup

Clinker Silo

Tough instruments are important to withstand the conditions in the clinker silo. Capacitive technology, such as with the VEGACAP 65, is stable, wear-resistant, and easy to set up. Condensation and buildup do not impair its reliability, making it ideal for clinker silo measurement.

• Varying cable lengths allow specification to each application
• Wear-resistant properties reduce maintenance time and cost

VEGACAP 66

• Pressure range: -14.5 ... +580 psi
  (-1 ... +40 bar)
• Temperature range: -58 ... +302°F
  (-50 ... +150°C)
• Process connections include: thread from G1, 1” NPT, flange from DN 50, 2”
• Output signal: Contactless, Relay, Transistor, Two-Wire
• Insertion length: up to 105 ft (32 m)

VEGACAP 67

• Pressure range: -14.5 ... +232 psi
  (-1 ... +16 bar)
• Temperature range: -58 ... +752°F
  (-50 ... +400°C)
• Process connections include: thread from G1½, 1½” NPT, flange from DN 50, 2”
• Output signal: Contactless, Relay, Transistor, Two-Wire
• Insertion length: rod up to 19 ft (6 m), cable up to 105 ft (32 m)
Ideal for Non-intrusive Measurements:
VEGAMIP T61, R61, and R62

The VEGAMIP microwave barrier performs point level detection for liquid and solid process materials. The measurement technology is non-contact and produces a reliable switch point for a variety of applications. In addition to high- and low-level alarming, the VEGAMIP also detects plugged chutes, empty conditions on conveyors, and vehicle positioning at filling locations.

VEGAMIP T/R61

- Measuring range: up to 328 ft (100 m)
- Pressure range: -14.5 ... +58 psi (-1 ... +4 bar)
- Temperature range: -40 ... +176°F (-40 ... +80°C)
- Process connections include: thread G1½, 1½” NPT, flanges, clamp

Point Level Detection in Silos

The VEGAMIP acts as a reliable point level detection system in silos, bins, and tanks. The VEGAMIP offers several mounting options depending on the application. Microwaves penetrate plastic, so the VEGAMIP mounts externally for measurement through plastic vessels. For other vessel types, the VEGAMIP mounts directly on the silo wall or through a window.

- Microwave technology reliably detects both liquids and solids
- Sensitivity adjustment allows for measurement through dust and buildup
- Measurement through falling product enables detection of plugged chutes

Vehicle Positioning

When vehicle position is important for the safety of its occupants, the VEGAMIP is a reliable solution. With its microwave technology and adjustable sensitivity, the VEGAMIP needs no external flags or reflectors to be added to the vehicle to ensure exact position time after time. The long measuring range means that the instruments can be discreetly mounted so as not to obstruct the view.

- Adjustable sensitivity allows for varying mounting distances
- Reliable indication even with buildup

Ideal for Non-intrusive Measurements:
VEGAMIP R62

- Measuring range: up to 328 ft (100 m)
- Pressure range: -14.5 ... +58 psi (-1 ... +4 bar)
- Temperature range: -40 ... +176°F (-40 ... +80°C)
- Process connections include: thread G1½, 1½" NPT, flanges, clamp

Mounting Adapter for VEGAMIP

- Temperature range: -40 ... +842°F (-40 ... +450°C)
- Process connection: 2" NPT
- Adapter length: 5.9" (150 mm) or 11.8" (300 mm)

Conveyor Belt Monitoring
Microwave barrier technology is capable of detecting an empty belt condition. Feed monitoring is possible by mounting the VEGAMIP above and below the belt, between the belt's rollers.

- Various mounting configurations offer application flexibility
- Non-contact measurement is unaffected by product composition
- Remote instrument version enables mounting in limited access areas

High Temperature Plugged Chute Monitoring
When the process temperature is extremely high and a point level detection is required, the VEGAMIP offers an adapter to handle the heat. With a ceramic face plate, not only does it keep the heat from the instrument, it provides an abrasive barrier. Coupled with the variable time delay, the VEGAMIP will provide continual operation in extreme environments.

- The VEGAMIP can work with process temperatures up to 842°F
- Adapters available with G or NPT connections for direct chute mounting