Technologies, Solutions, and Applications

Ultrasonic for Level
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VEGA is proud to be the leading solutions provider of level measurement technology. When it comes to measuring the level of process and storage materials, the VEGASON 60 series of ultrasonic devices offers an ideal solution for liquid and bulk solids applications. With the most complete line of ultrasonic sensors on the market, VEGA sets a new standard in continuous level measurement.

**Advanced Design & Development**

VEGA has a strong tradition of product development and innovation. The flexibility of VEGA’s plics® technology provides a selection of reliable level measurement techniques, chosen based on application requirements. This platform for all VEGA-designed instruments is intended to make all measurement technologies easy to use.

The VEGASON series of ultrasonic sensors utilizes the latest processing technology and proven processing software to calculate an exact process level. Additionally, the PVDF transducer has an integrated temperature sensor that detects the vessel temperature and compensates its influence on the signal running time.

With sensors that offer reliable measurement using ultrasonic pulse technology, and construction based on the plics principle, VEGA continues to lead the way in solving difficult and important applications.

**Why Use Ultrasonic?**

The VEGASON 60 series of ultrasonic sensors offers a loop-powered solution for continuous level measurement of liquids and solids. Using ultrasonic technology, level in a vessel is determined by measuring the air space between the product and the sensor. The VEGASON offers reliable level measurement in standard applications at a low instrument cost.

**Certifications**

Ultrasonic instrumentation is designed for certification compliance with the following programs:

- ATEX Standard
- CSA
- FM Standard
- GOST-R Standard
- SIL2
- IECEx
- WHG
- ABS
Non-contact level measurement with ultrasonic technology is ideal for applications with uncomplicated process conditions. For an accurate measurement, the VEGASON compensates for change in temperature and filters out false echoes to determine the correct process level. The VEGASON does not require setup with empty and full vessel conditions.

**Transmission**

The sensor transmits energy in the form of sound waves. These waves are directed toward the surface of the process material.

**Reflection**

The product surface reflects the sound wave energy back to the sensor. The amount of energy that returns to the sensor depends on the properties of the process material. For liquids, these properties include process turbulence and foam. For solids, these properties include bulk density, particle size, and dust.

The transit time of the wave that returns to the transducer is measured and used to calculate the distance to the target.

**Summary**

Ultrasonic pulses from the sensor travel at the speed of sound. Emitted from high-performance piezoelectric crystals within the transducer, the speed of these pulses is a constant. The relationship of the time it takes for the pulse to travel to the product and back, versus the distance to the product, is linear and proportional. This allows for distance measurement, provided there is no change in the density of airspace.
# Models & Versions

## VEGASON 61

**Ultrasonic sensor for continuous level measurement**
- SIL2 qualified; standard version
- Output signals include 4 … 20 mA/HART, Profibus PA, or Foundation Fieldbus
- Process connections include 1½” NPT, plastic flanges

<table>
<thead>
<tr>
<th>Measuring Range</th>
<th>Liquids: 0.8 … 16.5 ft (0.25 … 5 m)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Solids: 0.8 … 6.5 ft (0.25 … 2 m)</td>
</tr>
<tr>
<td>Process Temperature</td>
<td>-40 … +176°F (-40 … +80°C)</td>
</tr>
<tr>
<td>Measuring Precision</td>
<td>± 10 mm</td>
</tr>
</tbody>
</table>

## VEGASON 62

**Ultrasonic sensor for continuous level measurement**
- SIL2 qualified; standard version
- Output signals include 4 … 20 mA/HART, Profibus PA, or Foundation Fieldbus
- Process connections include 2” NPT, plastic flanges

<table>
<thead>
<tr>
<th>Measuring Range</th>
<th>Liquids: 1.3 … 26.25 ft (0.4 … 8 m)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Solids: 1.3 … 11.5 ft (0.4 … 3.5 m)</td>
</tr>
<tr>
<td>Process Temperature</td>
<td>-40 … +176°F (-40 … +80°C)</td>
</tr>
<tr>
<td>Measuring Precision</td>
<td>± 10 mm</td>
</tr>
</tbody>
</table>

## VEGASON 63

**Ultrasonic sensor for continuous level measurement**
- SIL2 qualified; standard version
- Output signals include 4 … 20 mA/HART, Profibus PA, or Foundation Fieldbus
- Process connections include mounting strap, compression flange

<table>
<thead>
<tr>
<th>Measuring Range</th>
<th>Liquids: 2 … 49 ft (0.6 … 15 m)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Solids: 2 … 23 ft (0.6 … 7 m)</td>
</tr>
<tr>
<td>Process Temperature</td>
<td>-40 … +176°F (-40 … +80°C)</td>
</tr>
<tr>
<td>Measuring Precision</td>
<td>± 10 mm</td>
</tr>
</tbody>
</table>
Ultrasonic in the plics System

Indicating & Adjustment Module

Electronics

Housings

Process Fittings/ Sensors

PLICSCOM
VEGACONNECT

4 ... 20 mA/ HART
Profibus PA
Foundation Fieldbus

Plastic
Stainless Steel
Aluminum

Plastic
Stainless Steel
Aluminum

1½” NPT Threaded PVDF Transducer
2” NPT Threaded PVDF Transducer
PVDF Transducer
Trend-setting measurement technology evolves to meet the needs of people who use it. That is why we developed plics—the world’s first modular product system for instrumentation. The modularity allows for easy component selection to meet individual application requirements. Because every one of our sensors is custom built from plics, the system fulfills the requirements of any industry and its specific applications.

**Simpler Planning with plics**

The choice and combination of sensors, process fittings, electronics, and housings simplifies instrument selection and engineering. With plics, cost reduction starts right at the planning stage.

**Clear Advantages in Plant Construction**

Short delivery times, simple wiring, and fast setup and commissioning save the plant builder significant time and costs. The configuration, wiring, and setup of VEGA instruments are always the same, so a single experience with the process is repeated with any plics measuring principle and application at any time.

**Assistance for the User**

plics gives a convincing performance in daily use because of its high operational reliability, simplified servicing, and reduced spare part stocking through the use of many identical components. The consistency of technology and operation simplifies and accelerates work with different plics instruments.

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**plics Advantages for Ultrasonic**

As a plics sensor, VEGASON utilizes all the advantages of the modular system:

- Plastic, aluminum, or stainless steel housings for any application
- Standardized electrical connection concept
- Fast setup and commissioning with application-specific, menu-driven operation
- Reduces installation costs with simple process connection options
- Easy adjustment with local push button, PC-based, and HART handheld options
- 4...20 mA/HART, Foundation Fieldbus, or Profibus PA outputs
- Hazardous area approvals available
- Diagnostic and asset management features
A VEGASON ultrasonic transmitter provides reliable level measurement in standard liquids and bulk solids applications. The two-wire, loop-powered device produces level data without contacting the process material. With little maintenance requirement, the VEGASON is ideal for applications in a wide range of industries.

**Pump Well Level Measurement**
Non-contact measurement is the ideal solution for the level measurement of open flow channels. The VEGASON 61 accurately measures level and momentary flow without the risk of contamination. All common flume profiles, like Venturi, V-Notch, or weir, are preprogrammed into the sensor's software. Additionally, individual flume profiles can be programmed by easily entering index values.

- Integral temperature sensor compensates for the effect of temperature change
- Non-contact measurement does not affect the process

**Grey or Black Water Measurement**
The VEGASON 61’s non-contact measuring principle is ideal for tracking level of a ship’s grey or black water. The concentration and changing density do not affect the measurement, and the instrument’s encapsulated transducer is resistant to the potentially corrosive gases present in the tank. Installation is simple, with a 1½” NPT mounting boss being the only needed process connection.

- Non-contact measurement is unaffected by changing process density
- PVDF-encapsulated transducer resists potentially corrosive product properties
- Available approvals include American Bureau of Shipping
“The VEGASON is suitable for measurement of liquids in storage tanks or open basins as well as flow measurements in open flumes. The sensor is also suitable for detection of bulk solids.”

**Conveyor Detection**
In pulping applications, level measurement of the feed conveyor helps to ensure that the pulp or paper bales meet the height restriction. The accuracy of the VEGASON 62 provides a clear measurement of the feed conveyor’s material and protects the pulping equipment from improper feeding. The ultrasonic instrument also detects possible blockages, ensuring proper automation of the process.

- Non-contact measurement is unaffected by product properties
- Multiple adjustment methods make setup easy

**Profile Monitoring**
The VEGASON 63 ultrasonic transmitter provides an economical solution for profile monitoring of raw food material. The integrated electronics evaluate the distance to the product surface and thus the height/volume of the product on the conveyor belt. The transmitting power of the instruments is set to a level that is not influenced by various ambient conditions. The VEGASON 63 has a special mounting bracket that allows optimal positioning to suit the incline of the measured product.

- Two-wire technology reduces installation time and wiring costs
- Special mounting bracket positions the transmitter for the best possible measurement
“With VEGA technology, any user can set up a measuring point exactly as the system requires. Remote parameter adjustment with a control system is just as easy and flexible as setup at the sensor.”
PLICSCOM – Multi-Function Ability
The PLICSCOM indicating and adjustment module plugs into any plics® instrument on-demand. It functions as a measured value indicator on the instrument and as a local adjustment device. The structure of the adjustment menu is clearly organized and makes setup and commissioning easy. In addition, the status messages are displayed directly on the screen. When an instrument is exchanged, PLICSCOM ensures fast availability of the measuring point—all sensor data is saved by pressing a key on the PLICSCOM and later copied into the replacement sensor.

External Indicating and Adjustment
An external indicating and adjustment unit with integrated PLICSCOM can be connected to the sensor with a standard cable up to 25 meters long. It allows setup of the measuring point, even in difficult to access locations, and requires no external power.

PC Adjustment with VEGACONNECT
For increased setup versatility, the mobile VEGACONNECT easily connects VEGA instruments to any PC through the USB interface. The parameter adjustment of these instruments is accomplished by PACTware adjustment software and a DTM. VEGACONNECT also acts as a universal HART modem for sensors of other manufacturers.

Setup with a HART Handheld
A HART Handheld is an additional tool that enables on-site sensor parameter adjustment. To access the HART parameters of a sensor, it connects to the sensor cable through a minimum working resistance of 220 ohms.