Level measurement with radar

precise, safe and reliable, universal, flexible, maintenance free
**VEGA pulse radar**

In the so-called pulse technique, a microwave impulse of less than 1 ns (10⁻⁹ seconds) is generated and transmitted via an antenna to the object to be detected. Thanks to a scanning impulse (similar to a stroboscopic effect) the extremely short running times of these waves can be measured. More than 3.6 million transmitted pulses per second enable a precise measurement of the echo signals and hence very exact level measurements.

**FMCW radar**

FMCW radar operates with a continuous, frequency-modulated permanent signal. The running time measurement is made indirectly via the frequency determination. As each reflection is represented as a frequency line, an FFT analysis is necessary to determine the individual distances. Previously this technology could only be realised in four-wire technology due to the high power consumption.

With modern FMCW radar sensors, the transmission takes place briefly and the reflection spectrum is saved. Only after the transmission has ceased, does the level calculation take place; this saves energy, however slows down the measuring system considerably. For level measurement in huge tanks, FMCW radar, however, is a useful solution.

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**Advantages**

Radar sensors provide reliable services on all level measurement sectors. The sensors protect against overfilling and enable with the precise determination of the level an optimisation of the processes.

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**VEGA: The specialist for level measurement – Competence in service and consulting**

VEGA has specialised in level measurement since its founding in 1959. Since then, and by working closely with our customers, we have continued to produce solutions for almost all products and process conditions on the basis of practical measuring instruments and their constant further development.

We are now one of the world’s leading companies in level measurement, with successful products that set the standard in operational safety and reliability, accuracy and economy.

Willingness to innovate is one of the most significant factors of the VEGA philosophy which was the driving force behind the developments which culminated in the radar product range. VEGA radar sensors are at work today in the most diverse branches of industry: From gauge measurement in the water and sewage water industry to the level measurement of very toxic and aggressive products in the chemical industry.

We have made our know-how available to you: The book „Radar level measurement – the user’s guide“ has the correct answers to all questions concerning radar level measurement.
Over the past 10 years no other measuring principle has been subjected to such a rapid development as radar technology – and VEGA is market leader. From the very beginning the diverse use of radar technology in level measurement was evident. Its reliability and compact dimensions make eric® one of the most versatile level measuring instruments. Today a VEGA radar sensor is available for virtually all applications.

10 years eric®: Milestones on the road to success

1991
The first VEGA radar level measuring instrument VEGAPULS 64 was introduced to the market.

1994
The first radar instrument with rod antenna is presented by VEGA. Advantage: Small process fittings and high resistance.

1996
VEGAPULS 81, the first compact instrument in the market. No signal conditioning instrument necessary, temperatures up to 200°C are no problem.

1997
VEGAPULS series 50 is revolutionary on the radar market with the first intrinsically safe two-wire instruments (Ex ia approval).

2000
The new VEGAPULS series 40, the small erics®, complete this series. VEGA is world leader in radar level measurement.

2001
eric® celebrates a jubilee: The special edition 2001 appears. New: VEGAPULS 43 specifically for pharmaceutical, food processing and chemical industry.
**Radar**

Radar level measurement is precise, efficient, maintenance free, reliable and easy to install.

Practically all liquids, solids and semi solids can be detected with eric®, regardless of temperature and density fluctuations.

Radar sensors are easy to install and operate and need only one process fitting. They are particularly small and compact. This means comparatively low costs particularly where special materials are involved.

Generally it is not necessary to fill the vessel for adjustment purposes when putting eric® into operation. There is almost no mechanical or chemical wear, as there is no direct physical contact with the material. The hermetically sealed peripheral chambers on vessels make eric® especially interesting where highly toxic media are involved - for example, liquid containers, fuel depots, chemical depots and many more. Optimum process isolation is ensured even with liquid gases, such as chlorine and ammonia.

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**Very high degree of process reliability**

<table>
<thead>
<tr>
<th></th>
<th>Environmental influence</th>
<th>Vapour Mist</th>
<th>Product density</th>
<th>Turbulences</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Differential pressure</strong></td>
<td>Highly dependent (oil filled)</td>
<td>Dependent (gas column)</td>
<td>No influence</td>
<td>Highly dependent</td>
</tr>
<tr>
<td><strong>Displacers</strong></td>
<td>Dependent</td>
<td>Slightly dependent</td>
<td>No influence</td>
<td>Dependent</td>
</tr>
<tr>
<td><strong>Floats</strong></td>
<td>No influence</td>
<td>Slightly dependent</td>
<td>No influence</td>
<td>Dependent</td>
</tr>
<tr>
<td><strong>Radar</strong></td>
<td>No influence</td>
<td>Slightly dependent</td>
<td>No influence</td>
<td>No influence</td>
</tr>
</tbody>
</table>

**Cost of Ownership**

<table>
<thead>
<tr>
<th></th>
<th>Installation work</th>
<th>Maintenance work</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Differential pressure</strong></td>
<td>Two vessel apertures, pipework, isolating diaphragm with capillary line</td>
<td>Remove sensors, pressure test, reset to zero, membrane corrosion, dirt accumulation</td>
</tr>
<tr>
<td><strong>Displacers</strong></td>
<td>Bypass or standpipe required, large, heavy sensors</td>
<td>Pipework cleaning, sensor rinsing, corrosion of components in contact with the medium</td>
</tr>
<tr>
<td><strong>Floats</strong></td>
<td>Standpipe or guide-tube</td>
<td>Adjustment in an empty container, cleaning of the bypass</td>
</tr>
<tr>
<td><strong>Ultrasonic</strong></td>
<td>As for radar</td>
<td>As for radar</td>
</tr>
<tr>
<td><strong>Radar</strong></td>
<td>Only one aperture, installation from above, small mounting supports, no vessel filling necessary</td>
<td>Exchange without emptying the vessel, no re-adjustment, no longterm drift</td>
</tr>
</tbody>
</table>
Very hot products

Ex area

Solids

Liquid gases

Measurement methods

Differential pressure

Displacers

Floats

Ultrasonic

Radar

Only non-adhesive liquids

Limited use

Applicable

Important questions answered quickly

How safe is radar level measurement to people?

Average transmission output: Only 3.6 µW. In practice this low power is fully shielded in metal vessels. As a comparison: The transmission output of a mobile telephone is about 2 Watts!

Which legal approvals are necessary for operation of VEGA radar sensors?

All VEGA radar sensors have general radio approval. No individual approvals are required. For use in Ex-areas, the appropriate approvals (according to ATEX or PTB) are available for all sensors.

Within which temperature and pressure ranges can radar sensors be used?

Surrounding temperatures on housing:

-40°C up to +70°C.

Temperature range on flange:

-40°C up to +150°C.

For high-temperature radar:

-60°C up to +400°C.

Pressure: From vacuum up to 160 bar.

Which products can be measured with radar?

- Solids: Practically all above a DK value of 2.5
- Liquids and liquefied gases: Above a DK value of 1.5
Can cope with all process conditions

Encapsulated antenna in a cylindrical tank (VEGAPULS 41)

Encapsulated antenna in a sterile tank (VEGAPULS 43)

Standpipe in cylindrical tank (VEGAPULS 45)

Rubberized vessel with sulphuric acid
The advantage of the encapsulated antenna in plastic version is particularly obvious when measuring very aggressive products. No metal components detract from the sensor’s resistance to chemicals.

Vessel for the production of pharmaceutical products
Applications in the pharmaceutical industry have high demand to the cleaning of the sensors. Thanks to the TFM™ PTFE encapsulated antenna, the requirements according to FDA and 3A are fulfilled.

Measurement through plastic vessel (VEGAPULS 54)

Reaction vessel with small socket (VEGAPULS 44)

Plastic vessel with hydrofluoric acid
As microwaves can penetrate non-conductive materials, e.g. plastic, measurement through walls of plastic vessels is possible without any contact to the product. The general telecommunication approval means there are no problems involved with its implementation.

Process vessel with changing products
In existing process vessels, sockets with small dimensions are often only available for level measurement. Due to the high emitting frequency a good signal focussing and thus a reliable measurement is ensured even with small horn antennas.

Cylindrical tank with fuel
VEGAPULS 45 is ideal for this measurement. The standpipe integrated in the sensor generates an optimum signal focussing. Even products with bad reflection characteristics can be easily and reliably detected.
eric®'s extraordinary flexibility and wide variety of possible applications are represented in the overview with application examples. eric® provides the optimum solution for every task in the field of level measurement with radar.

**Standpipe measurement for liquid gas vessels (VEGAPULS 54)**

**Butane gas measurement in a spherical tank**
Due to the very low DK values of liquid gas, the measurement with radar is only possible in a standpipe. The signals are channelled within the standpipe and thus results in significantly greater reflected energy back to the receiver compared to a horn or rod antenna.

**Bypass tube of a distillation column (VEGAPULS 54)**

**Distillation column in the petrochemical industry**
As radar sensors can be very easily mounted on bypass tubes, existing sensors such as displacers or floats can easily be replaced. A variety of connection concepts allows continued use of existing wiring.

**Bulk tank with fuel**
The signal processing of bulk tank measurements is relatively simple as the large liquid surface produces strong echoes. In general, large antennas (e.g. 250 mm Ø) are used in order to achieve a high accuracy.

**Horn antenna in bulk tank plants (VEGAPULS 54)**

**Small storage vessels (VEGAPULS 42)**

**Profile determination with several sensors (VEGAPULS 54)**

**Level measurement in small vessels**
Thanks to the low min. distance in small process vessels, a sensor with high emitting frequency is particularly suitable. The vessel volume can be used completely, no blocking distance is caused.

**Clinker measurement in large silos**
In large silos with solids, there are different filling and emptying points. Higher accuracy is achieved by using several sensors detecting the profile. A special pulse code prevents interference with the individual sensors.
The suitable sensor for all applications
Comparison of VEGAPULS 40 and 50 series

VEGAPULS 40 sensors have a better signal focussing with higher antenna gain and fewer false echoes compared to VEGAPULS 50 sensors. The narrow emission cone minimizes false reflections from mechanical obstructions and vessel walls resulting in a very reliable measurement.

Thanks to the small dimensions and the high signal focussing, measurement even in small measuring tubes or in socket pieces with the horn antenna are possible.

Where previously antenna extensions were necessary for 6.3 GHz, it is now possible to use a 26 GHz radar and a standard antenna.

In addition, the very small antennas enable better use of the vessel volume as due to the very short impulses, a measurement up to the antenna edge is possible.

VEGAPULS 40 sensors offer also a higher accuracy than VEGAPULS 50 sensors.

On the other hand, a higher damping of the microwave signal due to foam and certain gas stratification must be expected with the higher operating frequency of VEGAPULS series 40. Better results can be achieved with VEGAPULS series 50 sensors.

In process vessels with very agitated surface, sensors with lower signal focussing are more ideal (VEGAPULS 50). But also VEGAPULS 40 can be used in such applications. In addition, certain averaging algorithms can be used to smooth the received signal and the influence of the agitated surface on the signal strength can be reduced.

VEGAPULS 40 radar sensors offer an extension and improvement of the already existing application areas for radar technology. They are an excellent supplement to the proven VEGAPULS 50 series. The traditional markets remain the same, however new applications are possible.

No compromise necessary for selection of the frequency. The optimum solution is available for all applications.

<table>
<thead>
<tr>
<th>Parameter comparison</th>
<th>VEGAPULS series 40</th>
<th>VEGAPULS series 50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emitting frequency</td>
<td>26 GHz</td>
<td>6.3 GHz</td>
</tr>
<tr>
<td>Pulse length</td>
<td>0.5 ns / 15 cm</td>
<td>0.8 ns / 25 cm</td>
</tr>
<tr>
<td>Attainable accuracy</td>
<td>± 3 mm</td>
<td>±10 mm</td>
</tr>
<tr>
<td>Beam angle with 4&quot; antenna</td>
<td>8°</td>
<td>30°</td>
</tr>
<tr>
<td>Smallest possible horn antenna for open field measurement</td>
<td>1/2&quot;</td>
<td>4&quot;</td>
</tr>
</tbody>
</table>
**Comparison of features**

<table>
<thead>
<tr>
<th>Features and applications</th>
<th>eric® VEGAPULS series 40</th>
<th>eric® VEGAPULS series 50</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Signal focussing</strong></td>
<td>Very good focussing</td>
<td>Wider beam angle</td>
</tr>
<tr>
<td><strong>Use of the complete vessel volume</strong></td>
<td>Very good, as measurement up to the antenna edge possible</td>
<td>Not always possible, as min. distance must be taken into consideration</td>
</tr>
<tr>
<td><strong>Mounting into small and narrow vessels</strong></td>
<td>Best suited by smallest antenna versions</td>
<td>Limited, as antenna has a relative big size and dead time must be taken into account</td>
</tr>
<tr>
<td><strong>Mounting into long process sockets</strong> (socket is longer than antenna)</td>
<td>Very good by high focussing</td>
<td>Not possible</td>
</tr>
<tr>
<td><strong>Measurement in standpipe or by-pass tube</strong></td>
<td>Very good, from a diameter of ¾”</td>
<td>Possible, from a diameter of DN 50 or 2”</td>
</tr>
<tr>
<td><strong>Signal damping in foams</strong></td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td><strong>Sensitivity against condensation and buildup on the antenna</strong></td>
<td>Slightly sensitive</td>
<td>Minimal sensitivity</td>
</tr>
</tbody>
</table>
### VEGAPULS 41

**Technical data**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>-40 up to +130°C</td>
</tr>
<tr>
<td>Pressure range</td>
<td>up to 3 bar</td>
</tr>
<tr>
<td>Process connection</td>
<td>G 1½” (NPT)</td>
</tr>
<tr>
<td>Antenna</td>
<td>TFM™ PTFE encapsulated horn antenna</td>
</tr>
<tr>
<td>Meas. range</td>
<td>up to 10 m</td>
</tr>
</tbody>
</table>

**Typical applications**

- small vessels with various liquids (hydrous products, alcohol, solvents)
- storage tanks, cylindrical tanks
- applications requiring a small blocking distance

### VEGAPULS 42

**Technical data**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>-40 up to +150°C</td>
</tr>
<tr>
<td>Pressure range</td>
<td>up to 40 bar</td>
</tr>
<tr>
<td>Process connection</td>
<td>G 1½” (NPT)</td>
</tr>
<tr>
<td>Antenna</td>
<td>stainless steel 1.4435, Hastelloy C22</td>
</tr>
<tr>
<td>Meas. range</td>
<td>up to 10 m</td>
</tr>
</tbody>
</table>

**Typical applications**

- small vessels with aggressive products
- storage tanks, cylindrical tanks
- applications requiring a small blocking distance
**VEGAPULS 43**

**Technical data**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature:</td>
<td>-40 up to +150°C</td>
</tr>
<tr>
<td>Pressure range:</td>
<td>up to 16 bar</td>
</tr>
<tr>
<td>Process connection:</td>
<td>flange from DN 50 or ANSI 2&quot;, hygienic connection</td>
</tr>
<tr>
<td>Antenna:</td>
<td>TFM™ PTFE encapsulated horn antenna</td>
</tr>
<tr>
<td>Meas. range:</td>
<td>up to 20 m</td>
</tr>
</tbody>
</table>

**Typical applications**

- small and hygienic vessels in the pharmaceutical and food processing industry
- aggressive products such as acids and solvents
- applications in enameled vessels
- level measurement in vessels with CIP and SIP cleaning

**VEGAPULS 44**

**Technical data**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature:</td>
<td>-40 up to +150°C</td>
</tr>
<tr>
<td>Pressure range:</td>
<td>up to 40 bar</td>
</tr>
<tr>
<td>Process connection:</td>
<td>DN 50, ANSI 2&quot;</td>
</tr>
<tr>
<td>Antenna:</td>
<td>stainless steel 1.4435, Hastelloy C22</td>
</tr>
<tr>
<td>Meas. range:</td>
<td>up to 20 m (… 35 m)</td>
</tr>
</tbody>
</table>

**Typical applications**

- storage and process vessels with solvents, alcohols and mixed products
- cylindrical tanks
- measurement in standpipes and bypass tubes
- applications with high accuracy requirements
**VEGAPULS 51**

**Technical data**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature:</td>
<td>-40 up to +120°C</td>
</tr>
<tr>
<td>Pressure range:</td>
<td>up to 16 bar</td>
</tr>
<tr>
<td>Process connection:</td>
<td>G 1 1/2&quot;, NPT 1 1/2&quot; PVDF or 1.4571</td>
</tr>
<tr>
<td>Antenna:</td>
<td>rod antenna of PP or PPS</td>
</tr>
<tr>
<td>Meas. range:</td>
<td>up to 20 m</td>
</tr>
</tbody>
</table>

**Typical applications**
- vessel with hydrous and slightly aggressive products
- products with slight foam on the surface
- large up to medium-size storage vessels

**VEGAPULS 52**

**Technical data**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature:</td>
<td>-40 up to +150°C</td>
</tr>
<tr>
<td>Pressure range:</td>
<td>up to 16 bar</td>
</tr>
<tr>
<td>Process connection:</td>
<td>G 1 1/2&quot;, NPT 1 1/2&quot; PVDF or 1.4571</td>
</tr>
<tr>
<td>Antenna:</td>
<td>rod antenna of PTFE</td>
</tr>
<tr>
<td>Meas. range:</td>
<td>up to 20 m</td>
</tr>
</tbody>
</table>

**Typical applications**
- vessels with aggressive liquids
- products with slight foam on the surface
- large up to medium-size storage vessels
### VEGAPULS 53

**Technical data**

<table>
<thead>
<tr>
<th>Temperature:</th>
<th>-40 up to +150°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure range:</td>
<td>up to 16 bar</td>
</tr>
<tr>
<td>Process connection:</td>
<td>from DN 50 or ANSI 2&quot;, PTFE plated</td>
</tr>
<tr>
<td>Antenna:</td>
<td>rod antenna of PTFE</td>
</tr>
<tr>
<td>Meas. range:</td>
<td>up to 20 m</td>
</tr>
</tbody>
</table>

**Typical applications**

- level measurement of aggressive products in reactors and storage vessels
- applications with slight foam on the product surface
- level measurement in plastic vessels and rubberised tanks

### VEGAPULS 54

**Technical data**

<table>
<thead>
<tr>
<th>Temperature:</th>
<th>-40 up to +150 (250) °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure range:</td>
<td>up to 40 bar</td>
</tr>
<tr>
<td>Process connection:</td>
<td>from DN 50 or ANSI 2&quot;, PTFE or ceramic in-coupling system</td>
</tr>
<tr>
<td>horn antenna:</td>
<td>stainless steel 1.4571, Hastelloy C22</td>
</tr>
<tr>
<td>Meas. range:</td>
<td>up to 20 m (... 35 m)</td>
</tr>
</tbody>
</table>

**Typical applications**

- process vessels with very agitated product surface and stirrers
- products with bad reflecting characteristics (solvents, fuels, mixed products, hydrocarbons)
- applications with high product temperatures, slight foam generation
eric®: Special applications are standard

**VEGAPULS 45**

**Technical data**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>-40 up to +150°C</td>
</tr>
<tr>
<td>Pressure range</td>
<td>max. 40 bar</td>
</tr>
<tr>
<td>Process connection</td>
<td>from DN 50 or ANSI 2&quot;, G 1½&quot;, NPT 1½&quot;</td>
</tr>
<tr>
<td>Antenna</td>
<td>stainless steel 1.4435, Hastelloy C22</td>
</tr>
<tr>
<td>Meas. range</td>
<td>up to 10 m</td>
</tr>
</tbody>
</table>

**Typical applications**

- measurement of products with bad reflection characteristics (liquid gas, solvents, fuel)
- vessel with complex installations (struts, heating spirals, stirrers)
- level measurement in existing standpipes or bypass tubes

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**VEGAPULS 54**

**Technical data**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>-40 up to +200°C</td>
</tr>
<tr>
<td>Pressure range</td>
<td>up to 16 bar</td>
</tr>
<tr>
<td>Process connection</td>
<td>DN 150/200 or ANSI 6&quot;/8&quot;</td>
</tr>
<tr>
<td>Antenna</td>
<td>enamelled with PTFE flange coating</td>
</tr>
<tr>
<td>Meas. range</td>
<td>up to 20 m</td>
</tr>
</tbody>
</table>

**Typical applications**

- level measurement in enamelled process and storage vessels
- aggressive products, demanding a very high chemical resistance of the sensors
- applications with slight foam generation and strongly agitated product surface
**Typical applications**
- level measurement in process vessels and storage tanks
- measurement in blast furnaces and with steel generation
- applications at very high temperatures and pressure, e.g. petrochemical and offshore industry

**VEGAPULS 56**  
**Technical data**

- Temperature: -60 up to +400°C
- Pressure range: up to 160 bar
- Process connect.: ≥ DN 50, ANSI 2"
- Antenna: stainless steel 1.4435, Hastelloy C22
- Meas. range: up to 20 m
Revolutionary two-wire technology

Why four-wire, if two are enough?

Only one two-wire cable is necessary for power supply as well as for the measuring signal, either analogue via the 4 ... 20 mA current signal or digital with e.g. Profibus-PA.

VEGA was the first to set world-wide standards by using two-wire technology in radar level measurement. This was revolutionary in level measurement technology. This was made possible by pulse-radar technology and the use of very efficient as well as current-saving microcomputer technology.

The increase of the receipt sensitivity against the emitted signal was the main aspect for the development of two-wire sensors.

Also with minimum power requirement (<60 mW) complex applications in process vessels can be reliably and precisely detected.

There is no functional difference between two-wire and four-wire VEGA radar sensors!

The previously required separate power supply and the relating expenditure (four-wire technology) is no longer necessary. Today, a VEGAPULS sensor in four-wire technology is only necessary if being used in existing systems without modification of the existing wiring.

Of course, both versions are also available for use in Ex areas. The two-wire version is possible either as intrinsically safe version „Ex ia” but also as explosion proof version „Ex d”. The four-wire technology is available as explosion proof version „Ex d”.

VEGA sensor systems and analysis: Adaptable to your requirements
eric® gives you the choice: Analogue or digital data transmission

**Analogue**
4 ... 20 mA in two-wire technology (loop-powered) for direct connection to PLC or Remote I/O. Or four-wire technology with active current output and separate power supply for supply voltages up to 250 V.

**Digital**
A digital output signal offers a degree of accuracy unattainable with an analogue one: Reliable signal transmission with no errors - up to the processing system. Interfering influences during transmission do not cause measurement errors. Measurement errors through analogue/digital conversion are impossible. Digital communication offers a wide range of alternatives for diagnosis and maintenance.

The reduced demands on engineering automatically result in cost-savings.

**HART®**
With the visualisation software VV (Visual VEGA) and a simple interface (VEGACONNECT), the enquiry, visualisation and archiving of measured values can be carried out with HART®.

If, in addition a standard modem is used, world-wide access is possible.

**Profibus PA, Foundation Fieldbus**
Profibus PA and Foundation Fieldbus technology enable the connection of various manufacturer-independent sensors and actuators to a standard two-wire bus system. The processing of the variables is centralised in the control system.

**VEGALOG and Profibus PA**
The VEGALOG processing system enables easy connection to standard field bus systems. Profibus PA two-wire technology ensures the digital connection to the process.

The system can be extended to give up to 255 measurement loops. The well thought-out and practice-related functions ensure ease of setup and adaption to the application. This makes even basic measurement technology such as level detection and 4 ... 20 mA communication possible controllers.

Connection to classic controls via different bus systems as well as the world-wide access via telephone is available.
Setup and adjustment of eric®: It’s your choice!

Adjustment directly on the sensor: MINICOM
MINICOM is a small 6 key adjustment module which can be either plugged directly into the sensor or the appropriate remote indication VEGADIS 50. With MINICOM all parameter data can be set very easily as the module can be adjusted without detailed instruction thanks to the clear text indication. And that’s not all. It provides perfect protection against unauthorised access. Because when you remove the module, the settings in the sensor remain and cannot be changed without MINICOM. Coupled with the VEGADIS 50 display, it can be operated comfortably from a distance of up to 25 m from the measurement loop.

Adjustment with HART® handheld or universal adjustment software
Radar sensors are HART® protocol-compatible and can be operated fully using a HART® handheld or with system operating software such as AMS, PDM or SmartVision. The standard menus of the HART® handhelds are used so that no company-specific software is necessary. Connection is quite simple too, because you either connect the HART® handheld to the connection sockets on the sensor or tap in anywhere along the 4 ... 20 mA output signal line.

Operation with VVO (VEGA Visual Operating) software
VEGA has developed VVO (VEGA Visual Operating) operating software for added comfort and ease of operation. It enables you to operate eric® radar sensors more easily than ever before because the software is strictly tailored to our natural powers of perception. Clearly structured visual images intuitively guide you through the operating procedures and parameter adjustment. Thus you can complete the most demanding measurement tasks in the shortest time possible. As a consequence the time necessary for putting a measurement layout into operation is drastically reduced while simultaneously increasing reliability and safety.

Connect wherever you want
The PC can be connected at any position in the system. Either with the interface adapter VEGACONNECT 3 directly to a sensor, the signal cable or the VEGAMET signal conditioning instrument. The connection to the VEGALOG processing system is made via standard cable.
The „remote parameter adjustment“ – worldwide
Remote parameter adjustment via the telephone network
Dispatch specialists to Brazil, time-consuming instructions to staff abroad, never know for sure if everything went as planned? VEGA can offer you an interesting alternative!
With the adjustment software VVO you can implement the described functions world-wide via the telephone network. Remote parameter adjustment absolutely easy and without loss of time. A VEGA service technician will be available on site within a few minutes and this by using a telephone modem.

Absolutely easy: the software
- Clear graphic images show you where you are at a glance
- Perfect results even with complicated vessel and product geometries: Echo curve analysis is the key
- Whether full or empty: The adjustment of the sensors can be carried out whatever the level
- You see exactly what the sensor sees
- Look up tables and tank calculation programs allow a volumeproportional current output.
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Austria
Australia
Brazil
Bulgaria
Chile
China (PRC)
Colombia
Croatia
Denmark
Egypt
Finland
France
Germany
Great Britain
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Hungary
India
Indonesia
Iran
Israel
Italy
Japan
Korea
Kuwait
Lithuania
Malaysia
New Zealand
Norway
Peru
Poland
Portugal
Romania
Russia
Sweden
Switzerland
USA / Canada / Mexico
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Slovenia
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Spain
Taiwan (ROC)
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Please refer to our homepage for more details www.vega.com