



## Safety instructions

### VEGAPULS 63

Intrinsic safety

PTB 03 ATEX 2089 X

Profibus PA

Foundation Fieldbus

HW  $\geq$  2.0.0 - SW  $\geq$  4.0.0



CE 0044



Document ID: 37993



**VEGA**

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Supplementary documentation:

- Operating Instructions VEGAPULS 63
- EU-type approval certificate PTB 03 ATEX 2089 X, Issue 01 (Document ID: 37990)
- EU declaration of conformity (Document ID: 43634)

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|    |   |
|----|---|
| DE | Sicherheitshinweise<br>für den Einsatz in explosionsgefährdeten Bereichen               |
| EN | Safety instructions<br>for the use in hazardous areas                                   |
| FR | Consignes de sécurité<br>pour une application en atmosphères explosibles                |
| IT | Normative di sicurezza<br>per l'impiego in luoghi con pericolo di esplosione            |
| ES | Instrucciones de seguridad<br>para el empleo en áreas con riesgo de explosión           |
| PT | Normas de segurança<br>para utilização em zonas sujeitas a explosão                     |
| NL | Veiligheidsaanwijzingen<br>voor gebruik op plaatsen waar ontploffingsgevaar kan heersen |
| SV | Säkerhetsanvisningar<br>för användning i explosionsfarliga områden                      |
| DA | Sikkerhedsforskrifter<br>til anvendelse i explosionsfarlig atmosfære                    |
| FI | Turvallisuusohjeet<br>räjähdysvaarallisissa tiloissa käyttöä varten                     |
| EL | Υποδείξεις ασφαλείας<br>για τη χρησιμοποίηση σε περιοχές που υπάρχει κίνδυνος έκρηξης   |

|    |  |
|----|--|
| DE | Die vorliegenden Sicherheitshinweise sind im Download unter <a href="http://www.vega.com">www.vega.com</a> standardmäßig in den Sprachen deutsch, englisch, französisch und spanisch verfügbar. Weitere EU-Landessprachen stellt VEGA nach Anforderungen zur Verfügung.        |
| EN | These safety instructions are available as a standard feature in the download area under <a href="http://www.vega.com">www.vega.com</a> in the languages German, English, French and Spanish. Further EU languages will be made available by VEGA upon request.                |
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## 1 Area of applicability

These safety instructions apply to the radar sensor VEGAPULS 63 series VEGAPULS PS63(\*).C\*\*\*\*P/K/F/L\*\*\*\* according to EU type approval certificate PTB 03 ATEX 2089 X, Issue 01 (certificate number on the type label) and the number of the safety instruction (37993) on the type label.

The electronics module PS60PAK is integrated in the VEGAPULS PS63(\*).C\*\*\*\*P\*\*\*\*.

The electronics module PS60PAS is integrated in the VEGAPULS PS63(\*).C\*\*\*\*K\*\*\*\*.

The electronics module PS60FFK is integrated in the VEGAPULS PS63(\*).C\*\*\*\*F\*\*\*\*.

The electronics module PS60FFS is integrated in the VEGAPULS PS63(\*).C\*\*\*\*L\*\*\*\*.

## 2 General information

The level measuring instrument VEGAPULS PS63(\*).C\*\*\*\*P/K/F/L\*\*\*\* is based on radar technology and is used to detect the distance between product surface and sensor by means of high frequency electromagnetic waves in the GHz range. The electronics uses the running time of the signals reflected by the product surface to calculate the distance to the product surface.

The VEGAPULS PS63(\*).C\*\*\*\*P/K/F/L\*\*\*\* consist of an electronics housing, a process connection element and a sensor (the antenna). As an option the display and adjustment module can also be integrated.

The measured products can also be combustible liquids, gases, mist or vapour.

The VEGAPULS PS63(\*).C\*\*\*\*P/K/F/L\*\*\*\* are suitable for use in hazardous atmospheres of all combustible materials of explosion group IIA, IIB and IIC for applications requiring instruments of category 1G, category 1/2G or category 2G.

If the VEGAPULS PS63(\*).C\*\*\*\*P/K/F/L\*\*\*\* are installed and operated in hazardous areas, the general Ex installation regulations EN 60079-14 as well as these safety instructions must be observed.

The operating instructions as well as the installation regulations or standards that apply for explosion protection of electrical systems must generally be observed.

The installation of explosion-endangered systems must always be carried out by qualified personnel.

### Category 1G instruments

The VEGAPULS PS63(\*).C\*\*\*\*P/K/F/L\*\*\*\* are installed in hazardous areas requiring an instrument of category 1G.

### Category 1/2G instruments

The electronics housing is installed in hazardous areas requiring instruments of category 2G. The process connection element is installed in the separating wall, which separates areas requiring instruments of category 2G or 1G. The antenna system with the mechanical fixing element is installed in hazardous areas requiring instruments of category 1G.

### Category 2G instruments

The VEGAPULS PS63(\*).C\*\*\*\*P/K/F/L\*\*\*\* are installed in hazardous areas requiring an instrument of category 2G.

### Ignition protection type:

II 1G, 1/2G, 2G Ex ia IIC T6 Ga, Ga/Gb, Gb

### 3 Important specification in the type code

#### VEGAPULS PS63(\*).abcdefghij

| Position |   | Feature | Description   |
|----------|---|---------|---|
| ab       | Approval  | CX      | ATEX II 1G, 1/2G, 2G Ex ia IIC T6   |
|          |   | CA      | ATEX II 1G, 1/2G, 2G Ex ia IIC T6 + WHG   |
|          |   | CM      | ATEX II 1G, 1/2G, 2G Ex ia IIC T6 + Ship approval   |
|          |   | CK      | ATEX II 1G, 1/2G, 2G Ex ia IIC + II 1D, 1/2D, 2D Ex t IIIC  |
| c        | Version / Material  | *       | with encapsulated horn antenna; One-digit alphanumeric variable for hygienically encapsulated horn antenna with different hygienically materials  |
| de       | Process fitting / Material  | **      | Clamp, slotted nut, flanges; two-digit alphanumeric code for metallic process fittings, industrial flanges according to ASME, BS, DIN, EN, GOST, HG/T, JIS and for other international, national or industrial standards, guidelines or standards with suitable pressure and temperature specifications |
| f        | Electronics   | P       | Two-wire Profibus PA  |
|          |   | K       | Two-wire Profibus PA with increased sensitivity   |
|          |   | F       | Two-wire Foundation Fieldbus  |
|          |   | L       | Two-wire Foundation Fieldbus with increased sensitivity   |
| g        | Housing / Protection  | K       | Plastic single chamber / IP 66/IP 67  |
|          |   | A       | Aluminium single chamber / IP 66/IP 68 (0.2 bar)  |
|          |   | H       | Special colour Aluminium single chamber / IP 66/IP 68 (0.2 bar)   |
|          |   | 3       | Aluminium single chamber / IP 66/IP 68 (1 bar)  |
|          |   | D       | Aluminium double chamber / IP 66/IP 68 (0.2 bar)  |
|          |   | S       | Special colour Aluminium double chamber / IP 66/IP 68 (0.2 bar)   |
|          |   | Y       | Aluminium double chamber / IP 66/IP 67 with M12 x 1 for VEGADIS 61/81   |
|          |   | V       | Stainless steel single chamber (precision casting) / IP 66/IP 68 (0.2 bar)  |
|          |   | 5       | Stainless steel single chamber (precision casting) / IP 66/IP 68 (1 bar)  |
|          |   | 8       | Stainless steel single chamber (electropolished) / IP 66/IP 68 (0.2 bar)  |
|          |   | Z       | Stainless steel single chamber (electropolished) / IP 66/IP 68 (0.2 bar) / IP 69K   |
|          |   | W       | Stainless steel double chamber / IP 66/IP 68 (0.2 bar)  |
|          |   | Q       | Stainless steel double chamber / IP 66/IP 67 with M12 x 1 for VEGADIS 61/81   |
|          |   | R       | Plastic double chamber / IP 66/IP 67  |
| X        | Plastic double chamber / IP 66/IP 67 with M12 x 1 for VEGADIS 61/81 |         |   |

| Position |  | Feature | Description  |
|----------|--|---------|--|
| h        | Cable entry / Cable gland, Plug connection | M       | M20 x 1.5 / without  |
|          |  | N       | ½ NPT / without  |
|          |  | *       | One-digit alphanumeric code for further suitable fittings, cable entries and closing screws. |
| i        | Display and adjustment module PLICSCOM     | X       | without  |
|          |  | A       | mounted  |
|          |  | F       | without; lid with inspection window  |
|          |  | B       | Laterally mounted  |
|          |  | K       | mounted; with Bluetooth, magnetic pen operation  |
|          |  | L       | laterally mounted; with Bluetooth, magnetic pen operation                                    |
|          |  | U       | mounted; with Bluetooth (US version), magnetic pen operation                                 |
|          |  | S       | laterally mounted; with Bluetooth (US version), magnetic pen operation                       |
| j        | Additional equipment                       | X       | without  |
|          |  | *       | with equipment   |

In the following, all above mentioned versions are called VEGAPULS PS63(\*).C\*\*\*\*P/K/F/L\*\*\*\*. If parts of these safety instructions refer only to certain versions, then these will be mentioned explicitly with their type code.

## 4 Technical data

### Electrical data

#### Type of protection intrinsic safety Ex i

Power supply and signal circuit: (terminals 1[+], 2[-] in electronics compartment or for the double chamber housing version in termination compartment)

In type of protection intrinsic safety Ex ia IIC

For connection to a certified, intrinsically safe circuit.

Maximum values:

- $U_i = 17.5 \text{ V}$
- $I_i = 500 \text{ mA}$
- $P_i = 5.5 \text{ W}$

$C_i$  negligibly small.

$L_i \leq 10 \mu\text{H}$ .

The instrument is suitable for connection to a Fieldbus system according to the FISCO model, e.g. Profibus PA or Foundation Fieldbus.

or

- $U_i = 24 \text{ V}$
- $I_i = 250 \text{ mA}$
- $P_i = 1.2 \text{ W}$

$C_i$  negligibly small.

$L_i \leq 10 \mu\text{H}$ .

In the version with fix mounted connection cable,  $L_i = L_{i \text{ cable}}' (0,55 \mu\text{H/m}) + 10 \mu\text{H}$ ,  $C_i = C_{i \text{ wire/wire}}' (159 \text{ pF/m}) + C_{i \text{ wire/screen}}' (270 \text{ pF/m})$  must be taken into account.

Indicating and adjustment circuit: (terminals 5, 6, 7, 8 in electronics compartment or plug connection; with double chamber housing version in the connection compartment)

In type of protection intrinsic safety Ex ia IIC

For connection to the intrinsically safe circuit of the associated external indicating unit VEGADIS 61/81 (PTB 02 ATEX 2136 X).

The rules for the interconnection of intrinsically safe circuits between VEGAPULS PS63(\*).C\*\*\*\*P/K/F/L\*\*\*\* and the external indicating unit VEGADIS 61/81 are fulfilled, provided that the total inductance and total capacitance of the connection cable between VEGAPULS PS63(\*).C\*\*\*\*P/K/F/L\*\*\*\* and the external indicating unit VEGADIS 61/81  $L_{\text{cable}} = 310 \mu\text{H}$  and  $C_{\text{cable}} = 2 \mu\text{F}$  are not exceeded.

When using the delivered VEGA connection cable between VEGAPULS PS63(\*).C\*\*\*\*P/K/F/L\*\*\*\* and the external indicating unit VEGADIS 61/81, the following listed cable inductances  $L_i$  and cable capacitances  $C_i$  must be taken into account with a cable length  $\geq 50 \text{ m}$ .

- $L_i = 0.62 \mu\text{H/m}$
- $C_{i \text{ wire/wire}}' = 132 \text{ pF/m}$
- $C_{i \text{ wire/screen}}' = 208 \text{ pF/m}$
- $C_{i \text{ screen/screen}}' = 192 \text{ pF/m}$

Circuit of the display and adjustment module: (spring contacts in the electronics compartment; with double chamber housing version also in the connection compartment)

In type of protection intrinsic safety Ex ia IIC

Only for connection to the display and adjustment module PLICSCOM or VEGACONNECT (PTB 07 ATEX 2013 X).

With the double chamber housing version, the display and adjustment module may be mounted either in the electronics compartment or in the termination compartment.

For applications requiring instruments of category 2G, the intrinsically safe power supply and signal circuit can correspond to protection class ia or ib. For connection to a circuit with protection class ib, the ignition protection type identification is Ex ib IIC T6.

For applications requiring instruments of category 1G or 1/2G, the intrinsically safe power supply and signal circuit must correspond to protection class ia.

For applications requiring instruments of category 1G or 1/2G the VEGAPULS PS63(\*).C\*\*\*\*P/K/F/L\*\*\*\* is preferably connected to appropriate equipment with galvanically isolated, intrinsically safe circuits.

The metal parts of the level measuring instruments on radar basis type VEGAPULS PS6\* are electrically connected to the earth terminals.

In the versions of the radar sensors VEGAPULS PS63(\*).C\*\*\*\*P/K/F/L\*\*\*\* the intrinsically safe circuits are electrically isolated from elements that may be earthed.

## 5 Application conditions

The max. permissible ambient temperatures depending on the temperature classes are specified in the following tables.

For assessment and reduction of the explosion risk, valid standards such as for example EN 1127-1 must be taken into account.

### Category 1G instruments

| Temperature class | Temperature on the antenna | Ambient temperature on the electronics |
|-------------------|----------------------------|--|
| T5                | -20 ... +42 °C             | -20 ... +42 °C                         |
| T4, T3, T2, T1    | -20 ... +60 °C             | -20 ... +60 °C                         |

For applications requiring instruments of category 1G the process pressure of the media must be between 0.8 ... 1.1 bar. The application conditions when operating in the absence of explosive mixtures can be found in the manufacturer information.

### Category 1/2G instruments

| Temperature class | Temperature on the antenna | Ambient temperature on the electronics |
|-------------------|----------------------------|--|
| T6                | -20 ... +60 °C             | -40 ... +46 °C                         |
| T5                | -20 ... +60 °C             | -40 ... +61 °C                         |
| T4, T3, T2, T1    | -20 ... +60 °C             | -40 ... +80 °C                         |

For applications requiring instruments of category 1G the process pressure of the media must be between 0.8 ... 1.1 bar. If the VEGAPULS PS63(\*).C\*\*\*\*P/K/F/L\*\*\*\* are operated at temperatures higher than those specified in the above table, please make sure by means of appropriate measures



that there is no danger of ignition from the hot surfaces. The max. permissible temperature on the electronics/housing should not exceed the values according to the above table.

Please make sure that the sensor also in case of failure does not generate heat itself. Responsibility for safe operation of the equipment, with respect to pressures/temperatures of the materials used, rests with the operator.

The prerequisites for operation in the absence of explosive mixtures can be found in the manufacturer specifications.

## Category 2G instruments

| Temperature class | Temperature on the antenna | Ambient temperature on the electronics |
|-------------------|----------------------------|--|
| T6                | -60 ... +80 °C             | -40 ... +46 °C                         |
| T5                | -60 ... +95 °C             | -40 ... +61 °C                         |
| T4                | -60 ... +130 °C            | -40 ... +80 °C                         |
| T3, T2, T1        | -60 ... +195 °C            | -40 ... +80 °C                         |

If the VEGAPULS PS63(\*).C\*\*\*\*P/K/F/L\*\*\*\* are operated at higher temperatures than those specified in the above table, please make sure by means of appropriate measures that there is no danger of ignition from hot surfaces. The max. permissible temperature on the electronics/housing must not exceed the values specified in the above table.

Please make sure that the sensor also in case of failure does not generate heat itself. Responsibility for safe operation of the equipment, with respect to pressures/temperatures of the materials used, rests with the operator.

The prerequisites for operation in the absence of explosive mixtures can be found in the manufacturer specifications.

## Category 2G instrument - low temperature version up to -170 °C

| Temperature class | Temperature on the antenna | Ambient temperature on the electronics |
|-------------------|----------------------------|--|
| T6                | -170 ... +80 °C            | -40 ... +46 °C                         |
| T5                | -170 ... +95 °C            | -40 ... +61 °C                         |
| T4                | -170 ... +130 °C           | -40 ... +80 °C                         |
| T3, T2, T1        | -170 ... +195 °C           | -40 ... +80 °C                         |

If the VEGAPULS PS63(\*).C\*\*\*\*P/K/F/L\*\*\*\* are operated at higher temperatures than those specified in the above table, please make sure by means of appropriate measures that there is no danger of ignition from hot surfaces. The max. permissible temperature on the electronics/housing must not exceed the values specified in the above table.

Please make sure that the sensor also in case of failure does not generate heat itself. Responsibility for safe operation of the equipment, with respect to pressures/temperatures of the materials used, rests with the operator.

The prerequisites for operation in the absence of explosive mixtures can be found in the manufacturer specifications.

## 6 Protection against static electricity

The VEGAPULS PS63(\*).C\*\*\*\*P/K/F/L\*\*\*\* in versions with electrostatically chargeable plastic parts, such as e.g. plastic housing, metal housing with inspection window or plastic antenna, have a cau-

tion label pointing out the safety measures that must be taken with regard to electrostatic charges during operation.

WARNING- POTENTIAL ELECTROSTATIC  
CHARGING HAZARD - SEE INSTRUCTIONS

Caution: Plastic parts! Danger of electrostatic charging!

- Avoid friction
- No dry cleaning
- Construction/Installation: The VEGAPULS PS63(\*).C\*\*\*\*P/K/F/L\*\*\*\* must be constructed/ installed in such a way that
  - electrostatic charges are ruled out during operation, maintenance and cleaning.
  - process-related electrostatic charges, e.g. by measuring media flowing past, are ruled out

## 7 Use of an overvoltage arrester

If necessary, a suitable overvoltage arrester can be connected in front of the VEGAPULS PS63(\*).C\*\*\*\*P/K/F/L\*\*\*\*.

When used as category 1G or 1/2G instrument, a suitable overvoltage arrester must be connected in between as protection against overvoltages, as far as required according to EN 60079-14.

## 8 Grounding

In order to avoid the danger of electrostatic charging of the metallic parts, the VEGAPULS PS63(\*).C\*\*\*\*P/K/F/L\*\*\*\* must be electrostatically connected to the local potential equalisation (transfer resistance  $\leq 1 \text{ M}\Omega$ ), e.g. via the ground terminal, when used as category 1G or 1/2G instruments.

## 9 Impact and friction sparks

When used as category 1G instruments, the VEGAPULS PS63(\*).C\*\*\*\*P/K/F/L\*\*\*\* in aluminium/ titanium versions must be mounted in such a way that sparks from impact and friction between aluminium/titanium and steel (except stainless steel, if the presence of rust particles can be excluded) cannot occur.

## 10 Material resistance

For applications requiring instruments of category 1G or category 1/2G the VEGAPULS PS63(\*).C\*\*\*\*P/K/F/L\*\*\*\* must only be used in products against which the wetted materials are sufficiently resistant.

## 11 Mounting with external display unit VEGADIS 61/81

The intrinsically safe signal circuit between VEGAPULS PS63(\*).C\*\*\*\*P/K/F/L\*\*\*\* and the external indicating unit VEGADIS 61/81 should be set up without grounding. The required insulation voltage is  $> 500 \text{ V AC}$ . When using the VEGA connection cable included with the delivery, this requirement is fulfilled. If grounding of the cable screen is required, it must be carried out according to EN 60079-14.

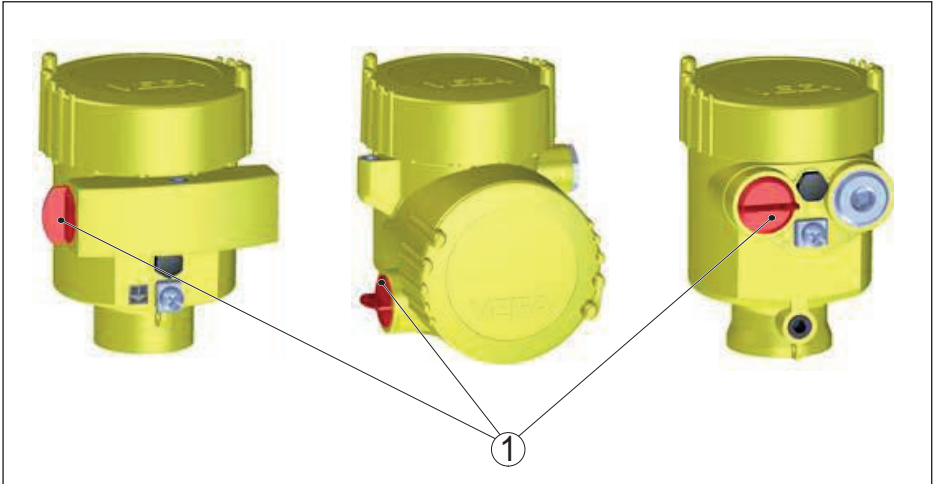
## 12 Removing and replacing the red threaded/dust cover

When the VEGAPULS PS63(\*).C\*\*\*\*P/K/F/L\*\*\*\* are delivered, depending on the version, the red threaded or dust protection caps must be removed before installing the device and the openings

must be sealed according to the requirements of the type of protection and the IP protection type specified on the type label.

When using certified i.e. suitable cable glands, sealing plugs or plug connectors, they must be mounted correctly and the respective certificates/documents must be observed.

The sealing plugs included in the delivery by VEGA meet the necessary requirements.



1 Red threaded or dust protection cap

Printing date:

# VEGA

All statements concerning scope of delivery, application, practical use and operating conditions of the sensors and processing systems correspond to the information available at the time of printing.

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VEGA Grieshaber KG  
Am Hohenstein 113  
77761 Schiltach  
Germany

Phone +49 7836 50-0  
Fax +49 7836 50-201  
E-mail: [info.de@vega.com](mailto:info.de@vega.com)  
[www.vega.com](http://www.vega.com)