Safety instructions
VEGAPULS 61

Intrinsic safety
PTB 03 ATEX 2060 X
Two-wire 4 … 20 mA/HART
HW ≥ 2.0.0 - SW ≥ 4.0.0

CE 0044

Document ID: 37310

VEGA

Contents

Supplementary documentation:

- Operating Instructions VEGAPULS 61
- EU-type approval certificate PTB 03 ATEX 2060 X (Document ID: 37315)
- EU declaration of conformity (Document ID: 43634)

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37310-EN-200821

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

DE	Die vorliegenden Sicherheitshinweise sind im Download unter www.vega.com standardmäßig in den Sprachen deutsch, englisch, französisch und spanisch verfügbar. Weitere EU-Landessprachen stellt VEGA nach Anforderungen zur Verfügung.
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FR	Les présentes consignes de sécurité sont disponibles au téléchargement sous www.vega.com en standard en allemand, en anglais, en francais et en espagnol. VEGA met à disposition d'autres langues de l'Union Européenne selon les exigences.
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1 Area of applicability

These safety instructions apply to the radar sensor VEGAPULS 61 series VEGAPULS PS61(*).CX/A/M***D/H**** according to EU type approval certificate PTB 03 ATEX 2060 X (certificate number on the type label) and the number of the safety instruction (37310) on the type label.

The electronics module PS60HK is integrated in the VEGAPULS PS61(*).CX/A/M***H****.

The electronics module PS60HS is integrated in the VEGAPULS PS61(*).CX/A/M***D****.

2 General information

The level measuring instrument VEGAPULS PS61(*).CX/A/M***D/H**** is based on radar technology and is used to detect the distance between medium 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 medium surface to calculate the distance to the medium surface.

The VEGAPULS PS61(*).CX/A/M***D/H**** 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 PS61(*).CX/A/M***D/H**** 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 PS61(*).CX/A/M***D/H**** 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 PS61(*).CX/A/M***D/H**** 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 PS61(*).CX/A/M***D/H**** are installed in hazardous areas requiring an instrument of category 2G.

Ignition protection type:
II 1G, 1/2G, 2G Ex ia IIC T6 … T1 Ga, Ga/Gb, Gb

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3 Important specification in the type code

VEGAPULS PS61(*).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
c	Version / Material / Process temperature	A	with encapsulated horn antenna (ø 40 mm) / PVDF / -40 … +80 °C
		B	with plastic horn antenna (ø 80 mm) / PP / -40 … +80 °C
de	Process fitting / Material	**	Threaded connection, Clamp, 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	H	Two-wire 4 … 20 mA/HART
		D	Two-wire 4 … 20 mA/HART with increased sensitivity
g	Housing / Protection	K	Plastic single chamber / IP66/IP67
		A	Aluminium single chamber / IP66/IP68 (0.2 bar)
		H	Special colour Aluminium single chamber / IP66/IP68 (0.2 bar)
		3	Aluminium single chamber / IP66/IP68 (1 bar)
		D	Aluminium double chamber / IP66/IP68 (0.2 bar)
		S	Special colour Aluminium double chamber / IP66/IP68 (0.2 bar)
		Y	Aluminium double chamber / IP66/IP67 with M12 x 1 for VEGADIS 61/81
		V	Stainless steel single chamber (precision casting) / IP66/IP68 (0.2 bar)
		5	Stainless steel single chamber (precision casting) / IP66/IP68 (1 bar)
		8	Stainless steel single chamber (electropolished) / IP66/IP68 (0.2 bar)
		W	Stainless steel double chamber / IP66/IP68 (0.2 bar)
		Q	Stainless steel double chamber / IP66/IP67 with M12 x 1 for VEGADIS 61/81
		R	Plastic double chamber / IP66/IP67
		X	Plastic double chamber / IP66/IP67 with M12 x 1 for VEGADIS 61/81
h	Cable entry / Cable gland / Plug connection	M	M20 x 1.5 / with / without
		N	½ NPT / without / without
		*	One-digit alphanumerical code for further suitable fittings, cable entries and closing screws.

Position		Feature	Description
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, magnetic pen operation, battery
		S	laterally mounted; with Bluetooth, magnetic pen operation, battery
j	Additional equipment	X	without
		*	with equipment

In the following, all above mentioned versions are called VEGAPULS PS61(*).CX/A/M***D/H****. 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 "Ex-i" electronics compartment; with double chamber housing version in connection compartment)	In type of protection intrinsic safety Ex ia IIC Only for connection to a certified, intrinsically safe circuit. Maximum values: ● U_i = 30 V ● I_i = 131 mA ● P_i = 983 mW The effective internal capacitance C_i is negligibly small. Effective internal inductance $L_i \leq 5$ µH. In the version with fix mounted connection cable L_i = 0,55 µH/m, $C_{i\ wire/wire}$ = 58 pF/m and $C_{i\ wire/screen}$ = 270 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 PS61(*).CX/A/M***D/H**** and the external indicating unit VEGADIS 61/81 are fulfilled, provided that the total inductance and total capacitance of the connection cable between VEGAPULS PS61(*).CX/A/M***D/H**** and the external indicating unit VEGADIS 61/81 L_{cable} = 310 µH and C_{cable} = 2 µF are not exceeded. When using the delivered VEGA connection cable between VEGAPULS PS61(*).CX/A/M***D/H**** 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 ≥ 50 m. • L_i = 0.62 µH/m • $C_{i\ wire/wire}$ = 132 pF/m • $C_{i\ wire/screen}$ = 208 pF/m • $C_{i\ screen/screen}$ = 192 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 For connection to the display and adjustment module PLICSCOM resp. PLICSCOM(*).*B/W* (TÜV 15 ATEX 161127 U) 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 PS61(*).CX/A/M***D/H**** 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 PS61(*).CX/A/M***D/H**** 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 … +46 °C	-20 … +46 °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 PS61(*).CX/A/M***D/H**** 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 … +80 °C	-40 … +61 °C
T4, T3, T2, T1	-60 … +80 °C	-40 … +80 °C

If the VEGAPULS PS61(*).CX/A/M***D/H**** 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 PS61(*).CX/A/M***D/H**** in versions with electrostatically chargeable plastic parts, such as e.g. plastic housing, metal housing with inspection window or plastic antenna, have a caution 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 PS61(*).CX/A/M***D/H**** 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 PS61(*). CX/A/M***D/H****.

When used as category 1G or 1/2G instrument, as far as necessary analogue, a suitable overvoltage arrester must be connected in front as protection against voltage surges according to EN 60079-14.

8 Grounding

In order to avoid the danger of electrostatic charging of the metallic parts, the VEGAPULS PS61(*). CX/A/M***D/H**** must be electrostatically connected to the local potential equalisation (transfer resistance ≤ 1 MΩ), e.g. via the ground terminal, when used as category 1G or 1/2G instruments.

Metallic adapter flanges must be earthed, especially when installed on non-conductive plastic vessels or non-earthed vessels. Earthing can be realised with cable lug via the flange gland.

9 Impact and friction sparks

When used as category 1G instruments, the VEGAPULS PS61(*).CX/A/M***D/H**** 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 Non-grounded, metallic parts

The resistance between aluminium housing to metal measuring point identification plate is > 10^9 Ohm.

The capacitance of the metal measuring point identification plate was measured as follows:

Measurement loop identification label	Capacitance
45 x 23 mm (standard)	21 pF
100 x 30 mm	52 pF
73 x 47 mm	61 pF

11 Material resistance

For applications requiring instruments of category 1G or category 1/2G the VEGAPULS PS61(*). CX/A/M***D/H**** must only be used in products against which the wetted materials are sufficiently resistant.

12 Mounting with external display unit VEGADIS 61/81

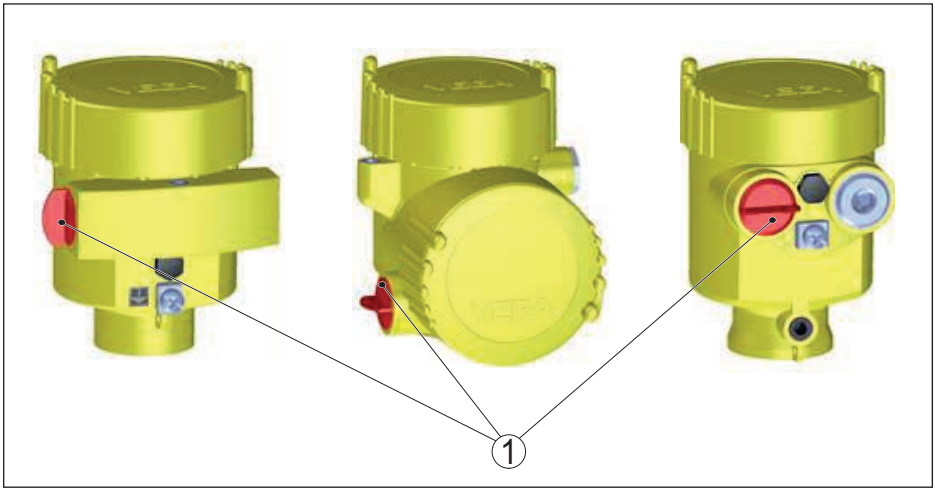
The intrinsically safe signal circuit between VEGAPULS PS61(*).CX/A/M***D/H**** and the external indicating unit VEGADIS 61/81 should be set up without grounding. The required insulation voltage is > 500 V AC. When using the VEGA connection cable included with the delivery, this requirement is fulfilled. If grounding of the cable screen is required, it must be carried out according to EN 60079-14.

13 Removing and replacing the red threaded/dust cover

When the VEGAPULS PS61(*).CX/A/M***D/H**** 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

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