Safety instructions
VEGAPULS 64

Explosionproof and Flameproof enclosure

4 … 20 mA/HART - two-wire

Document ID: 53838

Contents

Supplementary documentation:

- Operating Instructions VEGAPULS 64
- Quick setup guide VEGAPULS 64
- Certificate of Conformity CSA 15CA70025164 (Document ID: 51033)

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1 Area of applicability

These safety instructions apply to the VEGAPULS 64 of type series:

- VEGAPULS PS64(*).CE****H******(*)(*)
- VEGAPULS PS64(*).CQ****H******(*)(*)
- VEGAPULS PS64(*).VE****H******(*)(*)
- VEGAPULS PS64(*).VQ****H******(*)(*)

With the electronics versions:

- H - Two-wire 4 … 20 mA/HART

According to Certificate of Conformity CSA 15CA70025164 (certificate number on the type label) and for all instruments with safety instruction 53838.

The classification as well as the respective standards are stated in the approval certificate:

Ignition protection label:

- Class I, DIV 1, Groups B, C, D, T6 … T1; Class II, DIV 1, Groups E, F, G, T* °C; Class III
- Ex db IIC T6 … T1 Ga/Gb, Gb
- Class I, Zone 0/1, 1 AEx db IIC T6 … T1 Ga/Gb, Gb

T*: for Class II Groups E, F, G and Class III see "*Thermal data*" document 57952

T6 … T1: for Class I see "*Thermal data*" within this document

2 Important specification in the type code

VEGAPULS PS64(*).abcdefghijklm(*)(*)

Position		Feature	Description
a	a - Scope	C	CSA / Canada
		V	Combination (ATEX, IECEx, FM, CSA)
b	Approval	E	Class I, DIV 1, Groups B, C, D, T6 … T1; Class II, DIV 1, Groups E, F, G, T* °C; Class III Ex db IIC T6 … T1 Ga/Gb, Gb Class I, Zone 0/1, 1 AEx db IIC T6 … T1 Ga/Gb, Gb
		Q	Class I, DIV 1, Groups B, C, D, T6 … T1; Class II, DIV 1, Groups E, F, G, T* °C; Class III Ex db IIC T6 … T1 Ga/Gb, Gb Class I, Zone 0/1, 1 AEx db IIC T6 … T1 Ga/Gb, Gb + Ship approval (DNV GL, ABS)
c	Antenna version / Second Line of Defense	D	Plastic horn antenna / with
		U	Thread with integrated horn antenna / with
		G	Flange with encapsulated antenna system / with
		I	Hygienic fitting with encapsulated antenna system / with
de	Process fitting / Material	**	One or two-digit alphanumerical code for gas-tight threaded connections, pipe connections and industrial flanges acc. to ASME, BS, DIN, EN, GOST, HG/T, JIS, other international, national or industrial standards, regulations or standards with pressure specifications

Position		Feature	Description
f	Material / Seal / Process temperature	A	PEEK / FKM (SHS FPM 70C3 GLT) / -40 … +130 °C
		B	PEEK / FKM (SHS FPM 70C3 GLT) / -40 … +200 °C
		G	PEEK / FKM (Kalrez 6375) / -20 … +130 °C
		H	PEEK / FKM (Kalrez 6375) / -20 … +200 °C
		F	PEEK / EPDM (A+P 75.5/KW75F) / -40 … +130 °C
		R	PEEK / FFKM (Kalrez 6230) / -15 … +130 °C
		S	PEEK / FFKM (Kalrez 6230) / -15 … +200 °C
		T	PTFE / FFKM (Kalrez 6230) / -15 … +130 °C
		U	PTFE / FKM (75,5/VA75F) / -20 … +130 °C
		V	PTFE / EPDM (75,5/KW75F) / -20 … +130 °C
		I	PTFE / PTFE / -60 … +130 °C
		J	PTFE / PTFE / -60 … +200 °C
		W	PTFE / PTFE / -196 … +200 °C
		K	PTFE (8 mm) / PTFE / -60 … +130 °C
		L	PTFE (8 mm) / PTFE / -60 … +200 °C
		Y	PTFE (8 mm) / PTFE / -196 … +200 °C
		P	PFA (8 mm) / PFA / -60 … +130 °C
		Q	PFA (8 mm) / PFA / -60 … +200 °C
		C	PP / PP / -40 … +80 °C
		D	PP / FKM (SHS FPM 70C3 GLT) / -40 … +80 °C
		E	PP / EPDM (COG AP310) / -40 … +80 °C
g	Electronics	H	Two-wire, 4 … 20 mA/HART
h	Supplementary electronics	X	without
i	Housing / Protection	A	Aluminium / IP 66/IP 68 (0.2 bar)
		H	Special colour Aluminium / IP 66/IP 68 (0.2 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)
		V	Stainless steel (precision casting) 316L / IP 66/IP 68 (0.2 bar)
		W	Stainless steel double chamber / IP 66/IP 68 (0.2 bar)
j	Cable entry / Connection	D	M20 x 1.5 / Blind plug
		1	M20 x 1.5 / without
		N	½ NPT / Blind plug
		Q	½ NPT / without
		*	Other cable glands or fittings approved for the ignition protection type

Position		Feature	Description
k	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
l	Additional equipment	X	without
		V	Purging connection with reflux valve (only for antenna type B)
		1	Antenna system DD-lacquered
		2	with bracket and lid (Canrig)
m	Certificates	X	No
		M	Yes

In the following, all above mentioned versions are called VEGAPULS 64. If parts of these safety instructions refer only to certain versions, then these will be mentioned explicitly with their type code.

3 Different ignition protection types

The VEGAPULS 64 can be either used in explosive dust atmospheres or in explosive gas atmospheres.

If VEGAPULS 64 is installed in a dust atmosphere, then the safety instructions 57952 must be noted.

4 General information

The VEGAPULS 64 in ignition protection type flameproof enclosure "d" are used for detection of 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 64 consist of an electronics housing, a process connection element and a sensor or an antenna.

The VEGAPULS 64 are suitable for applications in hazardous atmospheres of all combustible materials of explosion groups IIA, IIB and IIC.

The VEGAPULS 64 are suitable for applications requiring EPL Ga/Gb or EPL Gb instruments.

The VEGAPULS 64 in ignition protection type “XP” and "DIP" are suitable for applications in hazardous atmospheres of all combustible materials of Class I Groups B, C, D, Class II Groups E, F, G and Class III.

The VEGAPULS 64 are suitable for applications requiring Division 1 or Division 2 instruments.

5 Application area

EPL Ga/Gb instrument

The VEGAPULS 64 with mechanical fixing element are installed in hazardous areas of zone 1 requiring EPL Gb instruments. The mechanical fixing element, process connection element is installed in the separating wall, which separates areas requiring EPL Gb or EPL Ga instruments. The sensor

measuring system is installed in hazardous areas of zone 0 requiring EPL Ga instruments.

EPL Gb instrument
The VEGAPULS 64 with the mechanical fixing element are installed in hazardous areas of zone 1 requiring EPL Gb instruments.

VEGA Instrument	EPL Gc	EPL Gb	EPL Ga/Gb
Ex Zone 2 			
Ex Zone 1 			
Ex Zone 0 			

DIVISION
The VEGAPULS 64 are suitable for applications requiring Division 1 or Division 2 instruments.

6 Specific conditions of use

The following overview is listing the specific conditions of use.

Electrostatic charging (ESD)
You can find the details in chapter "*Electrostatic charging (ESD)*" of these safety instructions.

Ambient temperature
The ambient temperature range can be limited.

You can find the details in chapter "*Thermal data*" of these safety instructions.

Impact and friction sparks
The VEGAPULS 64 in light metal versions (e.g. aluminium, titanium, zircon) must be mounted in such a way that sparks from impact and friction between light metals and steel (except stainless steel, if the presence of rust particles can be excluded) cannot occur.

Non-grounded, metallic parts
Resistance between aluminium housing to metal measurement loop labels is > 10^9 Ohm.

The capacitance of the metal measurement loop label was measured with 15 pF.

See chapter "*Electrostatic charging (ESD)*" for precaution.

Flameproof joint
The thread gaps between housing and cover as well as the threaded cable/conduit entry are flameproof joints. A repair on the flameproof joints is not permitted.

7 Additional instructions for safe operation

- The 3/8" NPT threaded port of the Dual-Chamber housing shall not be used as a field wiring conduit entry and has to be closed at all times with a suitable plug.
- Components for installation and connection not included in the approval documents are only permitted if these correspond technically to the latest standard mentioned in the approval. They must be suitable for the application conditions and have a separate certificate. The special conditions of the components must be noted and if necessary, the components must be integrated in the type test. This applies also to the components already mentioned in the technical description.
- The operator must ensure that the medium temperature in the EPL Ga range within the process vessel is not higher than 80 % of the self-ignition temperature of the concerned medium (in °C) and does not exceed the max. permissible flange temperature depending on the temperature class. The parts of the level measuring instrument which during operation are in contact with flammable products, must be integrated in the periodic overpressure test of the plant.
- If parts of the VEGAPULS 64 within the EPL Ga area are in contact with the medium and made of a material with an electrical conductivity of less than 10-8 S/m, a min. conductivity of the measured substance of at least 10-8 S/m must be ensured to avoid danger caused by electrostatic charge. If this is not possible, the level measuring instrument must not be used if there are strong charge-generating processes exist, such as e.g. automatic friction and separating processing, sparkling electrons etc. Particularly the antenna of the level measuring instrument must not be mounted in the pneumatic flow rate.
- The VEGAPULS 64 must be installed in such a way that sensor (antenna) does not touch the vessel wall. Especially the inner tank structure, the flow conditions in the tank and the antenna length must be taken into account.
- The installation of the antenna of VEGAPULS PS64(*).*E/Q****H******(*)(*) with EPL Ga must be only carried out with process pressures between 0.8 and 1.1 bar.

For devices with EPL Gb the following process pressures are applicable depending on the antenna version:

VEGAPULS PS64	Version	Process pressure
Plastic horn antenna	PS64(*).*E/QD***H******(*)(*)	-1 … +2 bar
Thread with integrated horn antenna	PS64(*).*E/QU***H******(*)(*)	-1 … +20 bar
Flange with encapsulated antenna system	PS64(*).*E/QG***H******(*)(*)	-1 … +25 bar
Hygienic fitting with encapsulated antenna system	PS64(*).*E/QI***H******(*)(*)	-1 … +16 bar

- For process pressures outside the standard atmospheric conditions of 80 kPa (0.8 bar) to 110 kPa (1.1 bar) additional requirements can be valid.
- In the constructive version of the rinsing connection it must be ensured that when using in the EPL Ga/Gb area, protection IP 67 is ensured at the connection to the reflux valve. After removal of the reflux valve, the opening must be closed with a suitable plug screw in order to maintain protection IP 67.
- In the version with ball valve it must be ensured that before separating the flange connection, the valve must be closed.

General operating conditions

- Unused openings must be covered according to IEC 60079-1 section 11.9. The red thread or/dust covers screwed in when the instruments are shipped (depending on the version) must be removed before setup and replaced by cable entries, conduit or closing screws suitable for the respective ignition protection type and IP protection.

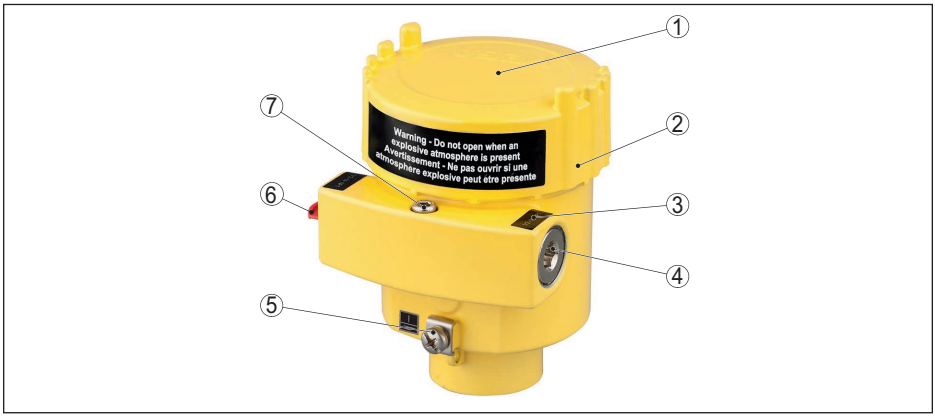
- The connection cable of VEGAPULS 64 has to be wired fix and in such a way that damages can be excluded
- If the temperature at the inlet components exceeds 60 °C, temperature-resistant connection cables must be used
- The VEGAPULS 64 must be integrated in the local potential equalization of the hazardous areas (contact resistor ≤ 1 MΩ)
- Lids must not be opened if there is a hazardous atmosphere. The housing lids are marked with the warning label:

WARNING -- DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE IS PRESENT

AVERTISSEMENT -- NE PAS OUVRIR SI UNE ATMOSPHÈRE EXPLOSIVE PEUT ÊTRE PRÉSENTE

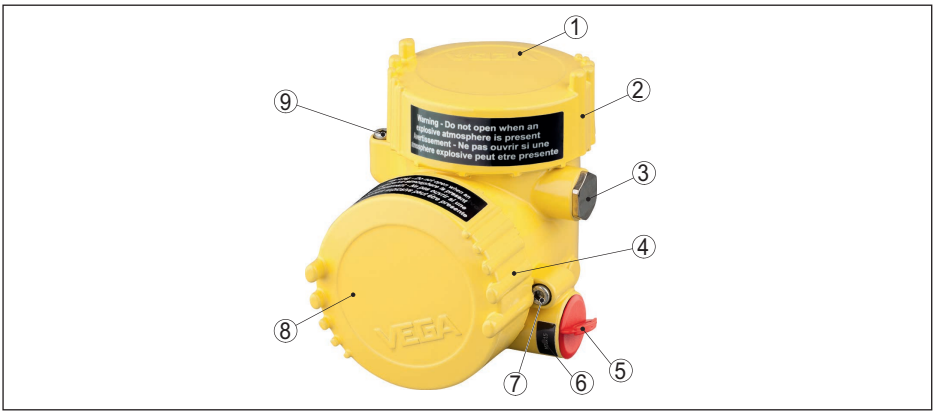
- Use the instrument only in media against which the wetted parts are sufficiently resistant
- If necessary, a suitable overvoltage arrester can be connected in front of the VEGAPULS 64

Single chamber housing "Ex d"



1 *Lid, optionally with inspection window*
2 *Electronics compartment*
3 *Label: Thread type*
4 *Screw plug*
5 *External ground terminal*
6 *Red threaded or dust protection cap*
Transport protection, replace with installation
7 *Locking screws of the lid for lid locking*

Double chamber housing "Ex d"



1 *Lid, optionally with inspection window*
2 *Electronics compartment*
3 *Screw plug*
4 *Terminal compartment*
5 *Transport protection, replace with installation Red threaded or dust protection cap*
6 *Label: Thread type*
7 *Locking screws of the lid for lid locking*
8 *Lid, optionally with inspection window*
9 *Locking screws of the lid for lid locking*

8 Important information for mounting and maintenance

General instructions

The following requirements must be fulfilled for mounting, electrical installation, setup and maintenance of the instrument:

- The staff must be qualified according the respective tasks
- The staff must be trained in explosion protection
- The staff must be familiar with the respectively valid regulations, e.g. planning and installation acc. to CEC or NEC
- Make sure when working on the instrument (mounting, installation, maintenance) that there is no explosive atmosphere present, the supply circuits should be voltage-free, if possible.
- The instrument has to be mounted according to the manufacturer specifications, the approval certificate and the valid regulations and standards
- Modifications on the instrument can influence the explosion protection and hence the safety
- Modifications must only be carried out by employees authorized by VEGA company

Mounting

Keep in mind for instrument mounting

- Mechanical damage on the instrument must be avoided
- Mechanical friction must be avoided
- Process connections separating two areas of different Ex-zones must comply to valid regulations and standards
- Close the housing lid (s) up to the stop before starting operating, to ensure the IP protection rating specified on the type label

- Protect the lid against unauthorized opening by unscrewing the locking screw up to the stop. With double chamber housing, you have to protect both lids.

Maintenance

To ensure the functionality of the device, periodic visual inspection is recommended for:

- Secure mounting
- No mechanical damages or corrosion
- Worn or otherwise damaged cables
- The potential equalization terminal must be secured against loosening
- Correct and clearly marked cable connections

The parts of the VEGAPULS 64 being in contact with flammable media during operation must be included in the periodic overpressure test of the plant.

9 Potential equalization/Grounding

- Integrate the instruments into the local potential equalisation, e.g. via the internal or external earth terminal
- The potential equalization terminal must be secured against loosening and twisting
- If grounding of the cable screening is necessary, this must be carried out acc. to the valid standards and regulations

10 Electrostatic charging (ESD)

In case of instrument versions with electrostatically chargeable plastic parts, the danger of electrostatic charging and discharging must be taken into account!

The following parts can charge and discharge:

- Lacquered housing version
- Metal housing with inspection window
- Plastic process fittings
- Plastic-coated process fittings and/or plastic-coated sensors
- Connection cable for separate versions
- Type label
- Isolated metallic labels (measurement loop identification label)

Take note in case of danger of electrostatic charges:

- Avoid friction on the surfaces
- Do not dry clean the surfaces

The instruments must be mounted/installed in such a way that the following can be ruled out:

- electrostatic charges during operation, maintenance and cleaning.
- process-related electrostatic charges, e.g. by measuring media flowing past

The warning label indicates danger:

WARNING -- POTENTIAL ELECTROSTATIC CHARGING HAZARD -- SEE INSTRUCTIONS

AVERTISSEMENT -- DANGER POTENTIEL DE CHARGES ÉLECTROSTATIQUES -- VOIR INSTRUCTIONS

11 Electrical data

VEGAPULS PS64(*).*E/Q**H******(*)(*)**

The VEGAPULS 64 must be supplied by a Class 2 or Limited Energy Source in accordance with CSA 61010-1-12 or ISA 61010-1, Third Edition.

Supply and signal circuit:	
Terminals 1[+], 2[-] in electronics compartment of the single chamber housing or Terminals 1[+], 2[-] in terminal compartment of the double chamber housing	U = 12 … 35 V DC

Display and adjustment circuit:	
Terminals 5, 6, 7, 8 in electronics compartment of the single chamber housing or Terminals 5, 6, 7, 8 in terminal compartment of the double chamber housing	For connection to the circuit of the passive indicating unit VEGADIS 81 in ignition protection type flameproof enclosure "d".
Spring contacts in the electronics compartment of the single chamber housing or spring contacts in the connection compartment of the double chamber housing	Only for connection of the corresponding display and adjustment module PLICSCOM.

The circuits of VEGAPULS 64 are galvanically separated from ground.

The metallic parts of VEGAPULS 64 accessible from outside are electrically connected with the earth terminals.

12 Thermal data

The permissible operating temperatures without explosion-endangered atmosphere are mentioned in the respective manufacturer instructions, e.g. operating instructions manuals.

The division of the temperature classes in different VEGAPULS 64 versions is specified in form of tables.

Furthermore it must be observed that the tables for instruments with a permissible process temperature of up to +195 °C with an isolation (heat conductance of 0.05 W/(m*K) with 2 cm thick insulation) were determined. Two layers of insulation material with a thickness of 2 cm each were attached from the tank surface with the mentioned heat conductance.

Instruments for process temperatures of max. +80 °C or +130 °C were not isolated for determination of the tables.

T-classes - VEGAPULS 64 for process temperatures up to +80 °C

The following temperature tables are valid for:

VEGAPULS PS64(*).D**C/D/EH******(*)(*)**

T-class	**Process temperature range permitted at the antenna in Zone 0 (EPL Ga) or in Division 1**	**Ambient temperature range permitted at the electronics enclosure in Zone 1 (EPL Gb) or in Division 1**
T6 … T1	-40 … +80 °C	-40 … +60 °C

T-classes - VEGAPULS 64 for process temperatures up to +130 °C

The following temperature tables are valid for:

VEGAPULS PS64(*).U**A/G/F/RH******(*)(*)**

VEGAPULS PS64(*).G**I/K/PH******(*)(*)**

VEGAPULS PS64(*).I**T/U/VH******(*)(*)**

VEGAPULS PS64(*).I**IH******(*)(*)**

T-class	Process temperature range permitted at the antenna in Zone 0 (EPL Ga) or in Division 1	Ambient temperature range permitted at the electronics enclosure in Zone 1 (EPL Gb) or in Division 1
T6	X … +80 °C	-50 … +60 °C
T5	X … +95 °C	-50 … +60 °C
T4 … T1	X … +130 °C	-50 … +47 °C

For process temperatures lower than the given maximum in above tables, higher ambient temperatures at the enclosure can be permitted. For details consult VEGA.

The minimal permitted process temperature, in the table above indicated by “X °C”, is depending on the sealing material used. The applicable minimum process temperature can be taken from below model code:

VEGAPULS PS64(*).**U**A/FH******(*)(*); X = -40 °C

VEGAPULS PS64(*).**U**GH******(*)(*); X = -20 °C

VEGAPULS PS64(*).**U**RH******(*)(*); X = -15 °C

VEGAPULS PS64(*).**G**I/K/PH******(*)(*); X = -60 °C

VEGAPULS PS64(*).**I**TH******(*)(*); X = -15 °C

VEGAPULS PS64(*).**I**U/VH******(*)(*); X = -20 °C

VEGAPULS PS64(*).**I**IH******(*)(*); X = -60 °C

T-classes - VEGAPULS 64 for process temperatures up to +195 °C

The following temperature tables are valid for:

VEGAPULS PS64(*).U**B/H/SH******(*)(*)**

VEGAPULS PS64(*).G**J/W/L/Y/QH******(*)(*)**

VEGAPULS PS64(*).I**JH******(*)(*)**

T-class	Process temperature range permitted at the antenna in Zone 0 (EPL Ga) or in Division 1	Ambient temperature range permitted at the electronics enclosure in Zone 1 (EPL Gb) or in Division 1
T6	X … +80 °C	-50 … +60 °C
T5	X … +95 °C	-50 … +60 °C
T4	X … +130 °C	-50 … +60 °C
T3 … T1	X … +195 °C	-50 … +57 °C

The minimal permitted process temperature, in the table above indicated by “X °C”, is depending on the sealing material used. The applicable minimum process temperature can be taken from below model code:

VEGAPULS PS64(*).**U**BH******(*)(*); X = -40 °C

VEGAPULS PS64(*).**U**HH******(*)(*); X = -20 °C

VEGAPULS PS64(*).**U**SH******(*)(*); X = -15 °C

VEGAPULS PS64(*).**G**J/L/QH******(*)(*); X = -60 °C

VEGAPULS PS64(*).**I**JH******(*)(*); X = -60 °C

T-classes - VEGAPULS 64 for process temperatures down to -196 °C
The following temperature tables are valid for:

VEGAPULS PS64(*).G**W/YH******(*)(*)**

T-class	Process temperature range permitted at the antenna in Zone 0 (EPL Ga) or in Division 1	Ambient temperature range permitted at the electronics enclosure in Zone 1 (EPL Gb) or in Division 1
T6	-196 … +80 °C	-20 … +60 °C
T5	-196 … +95 °C	-20 … +60 °C
T4	-196 … +130 °C	-20 … +60 °C
T3 … T1	-196 … +195 °C	-20 … +57 °C

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