Safety instructions
VEGAPULS 69

Non-Incendive
4 … 20 mA/HART - two-wire
4 … 20 mA/HART - four-wire
Modbus
Profibus PA
Foundation Fieldbus

Document ID: 57979

Contents

Supplementary documentation:

- Operating Instructions VEGAPULS 69
- Quick setup guide VEGAPULS 69
- Certificate of Conformity CSA 15CA70025164 (Document ID: 51033)

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1 Area of applicability

These safety instructions apply to the VEGAPULS 69 of type series:

- VEGAPULS PS69(*).CA****H/B/I/P/F/U******(*)(*)

With the electronics versions:

- H - Two-wire 4 … 20 mA/HART
- B - Four-wire 4 … 20 mA/HART; 90 … 250 V AC; 50/60 Hz
- I - Four-wire 4 … 20 mA/HART; 9.6 … 48 V DC; 20 … 42 V AC; 50/60 Hz
- P - Profibus PA
- F - Foundation Fieldbus
- U - Modbus

According to Certificate of Conformity CSA 15CA70025164 (certificate number on the type label) and for all instruments with safety instruction 57979.

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

Ignition protection label:

- Class I, DIV 2, Groups A, B, C, D, T6 … T1; Class II, DIV 2, Groups F, G, T* °C; Class III

T*: for Class II Groups F, G and Class III see "*Thermal data*" document 51032

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

2 Important specification in the type code

VEGAPULS 69(*).abcdefghijklm(*)(*)

Position		Feature	Description
a	Scope	C	CSA / Canada
		V	Combination (ATEX, IECEx, FM, CSA)
b	Approval	A	Class I, DIV 2, Groups A, B, C, D, T6/T4 … T1; Class II, DIV 2, Groups F, G, T* °C; Class III (T6 … T1 for electronics H/U/P/F, T4 … T1 for electronics B/I)
c	Version / Material	B	Plastic horn antenna / PP
		C	Metal-jacketed lens antenna with rinsing connection / PEEK
		U	Thread with integrated horn antenna / PEEK
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
f	Seal / Process temperature	A	FKM (SHS FPM 70C3 GLT) and PEEK / -40 … +130 °C
		B	FKM (SHS FPM 70C3 GLT) and PEEK / -40 … +200 °C
		C	PP / -40 … +80 °C
		D	FKM (SHS FPM 70C3 GLT) and PP / -40 … +80 °C
		E	EPDM (COG AP310) and PP / -40 … +80 °C
		F	EPDM (COG AP302) and PEEK / -40 … +130 °C
		*	Other comparable seal suitable for the application including the process temperature to be taken into account

Position		Feature	Description
g	Electronics	H	Two-wire, 4 … 20 mA/HART, U = 12 … 35 V DC
		B	Four-wire, 4 … 20 mA/HART, U = 90 … 253 V AC; 50/60 Hz
		I	Four-wire, 4 … 20 mA/HART, U = 9.6 … 48 V DC; 20 … 42 V AC
		P	Two-wire Profibus PA, 9 … 32 V DC
		F	Two-wire Foundation Fieldbus, 9 … 32 V DC
		U	Four-wire Modbus, 8 … 30 V DC
h	Supplementary electronics	X	without
		Z	Additional current output 4 … 20 mA
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
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
		R	Reflux valve for rinsing connection
		V	Purging connection with reflux valve (only for antenna type B)
m	Certificates	X	No
		M	Yes

In the following, all above mentioned versions are called VEGAPULS 69. If parts of these safety instructions refer only to certain versions, then these will be mentioned explicitly with their type code.

3 General information

The VEGAPULS 69 in ignition protection type non-incendive (NI) 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 69 consist of an electronics housing, a process connection element and a sensor or an antenna.

The VEGAPULS 69 are suitable for applications in hazardous atmospheres of all combustible materials of Class I Groups A, B, C, D, Class II Groups F, G and Class III.

The VEGAPULS 69 are suitable for applications requiring Division 2 instruments.

4 Application area

Division 2 instrument
The VEGAPULS 69 with the mechanical fixing element are installed in hazardous areas of division 2.

5 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 69 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.

6 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 on the cover sheet. 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 VEGAPULS 69 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.

For division 2 devices the following process pressures are applicable depending on the antenna version:

VEGAPULS PS69	Version	Process pressure
Plastic horn antenna	PS69(*).CAB***H/B/I/P/F/U******(*)(*)	-1 … +2 bar
Thread with integrated horn antenna	PS69(*).CAU***H/B/I/P/F/U******(*)(*)	-1 … +20 bar
Metal-jacketed lens antenna with rinsing connection	PS69(*).CAC***H/B/I/P/F/U******(*)(*)	-1 … +3 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 version with ball valve it must be ensured that before separating the flange connection, the valve must be closed.

Connection conditions
- Unused openings must be covered. 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 69 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 69 must be integrated in the local potential equalization of the hazardous areas (contact resistor ≤ 1 MΩ)
- 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 69

7 Important information for mounting and maintenance

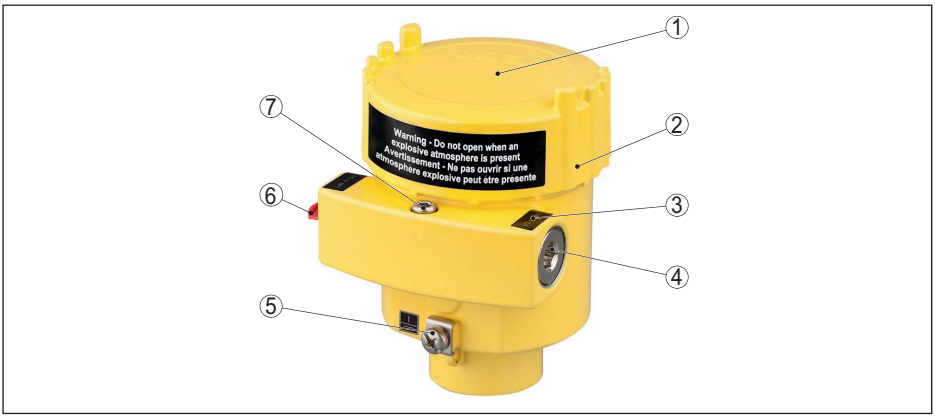
General instructions
The following requirements must be fulfilled for mounting, electrical installation, setup and maintenance of the instrument:
- The staff must be qualified according the respective tasks
- The staff must be trained in explosion protection
- The staff must be familiar with the respectively 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
- Close the housing lid (s) up to the stop before starting operating, to ensure the IP protection rating specified on the type label
- 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

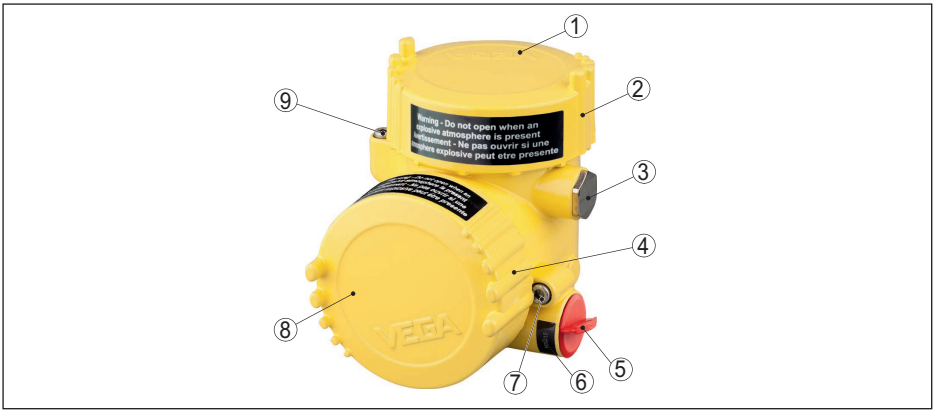
AVERTISSEMENT -- NE PAS OUVRIR SI UNE ATMOSPHÈRE EXPLOSIVE PEUT ÊTRE PRÉSENTE

Single chamber housing



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



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*

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 69 being in contact with flammable media during operation must be included in the periodic overpressure test of the plant.

8 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

9 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

10 Electrical data

The electrical data listed in the following are valid for:

VEGAPULS PS69(*).CA**H/P/F/B/I/U******(*)(*)**

VEGAPULS PS69(*).CA**HZ*****(*)(*)**

If then the VEGAPULS 69 is mentioned, it is valid for the above listed versions of VEGAPULS 69.

The VEGAPULS PS69(*).*A****H/P/F/U******(*)(*) 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:	
VEGAPULS PS69(*).*A****H******(*)(*) 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

VEGAPULS PS69(*).*A****HZ*****(*)(*) Supply and signal circuit 1: Terminals 1[+], 2[-] and Supply and signal circuit 2: Terminals 7[+], 8[-]	U = 12 … 35 V DC
Terminals 1, 2, 7, 8 in connection compartment	

Supply and signal circuit:	
VEGAPULS PS69(*).*A****P/F******(*)(*) Terminals 1[+], 2[-] in electronics compartment of the single chamber housing or Terminals 1[+], 2[-] in terminal compartment of the double chamber housing	U = 9 … 32 V DC

VEGAPULS PS69(*).*A**B******(*)(*)**	
Supply circuit: Terminals 1[+], 2[-]	U = 90 … 250 V AC, 50/60 Hz
Signal circuit: Terminals 5[+], 7[-], 4 … 20 mA with superimposed HART signal	
Passive signal circuit: Terminals 6[+], 7[-], 4 … 20 mA with superimposed HART signal	
Terminals 1, 2, 7, 8 in connection compartment	

VEGAPULS PS69(*).*A****I******(*)(*)	
Supply circuit: Terminals 1[+], 2[-]	U = 20 … 42 V AC, 50/60 Hz U = 9.6 … 48 V DC
Signal circuit: Terminals 5[+], 7[-], 4 … 20 mA with superimposed HART signal	
Passive signal circuit: Terminals 6[+], 7[-], 4 … 20 mA with superimposed HART signal	
Terminals 1, 2, 7, 8 in connection compartment	

VEGAPULS PS69(*).*A****U******(*)(*)	
Supply circuit: Terminals 1[+], 2[-]	U = 8 … 30 V DC
Modbus signal: Terminals 3[D0+], 4[D1-]	U_{max} = 5 V with Modbus signal (telegram)
Terminals 5[IS GND]	Function ground when installing according to CSA (Canadian Standards Association)
USB connection: (6-pole mini USB socket)	U_{max} with USB signal (USB protocol)
Terminals 1, 2, 3, 4, 5, USB in connection compartment	

Display and adjustment circuit:	
VEGAPULS PS69(*).*A****H/P/F******(*)(*) 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".
VEGAPULS PS69(*).*A****H/P/F/B/I/U******(*)(*) 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 69 are galvanically separated from ground.

The metallic parts of VEGAPULS 69 accessible from outside are electrically connected with the earth terminals.

11 Thermal data

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

The temperature classes of the different VEGAPULS 69 versions are 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-class - VEGAPULS 69 for process temperatures up to +80 °C
The following temperature tables are valid for:

VEGAPULS PS69(*).B**C/D/EH/U/P/FX/Z*****(*)(*)**

Aluminium enclosure, models: A, H, D, S

T-Class	Process temperature range permitted at the antenna in Division 2	Ambient temperature range permitted at the electronics enslosure in Division 2
T6	-40 … +80 °C	-40 … +40 °C
T5	-40 … +80 °C	-40 … +58 °C
T4 … T1	-40 … +80 °C	-40 … +80 °C

Stainless steel precision casting enclosure, models: V, W

T-Class	Process temperature range permitted at the antenna in Division 2	Ambient temperature range permitted at the electronics enslosure in Division 2
T6	-40 … +80 °C	-40 … +39 °C
T5	-40 … +80 °C	-40 … +57 °C
T4 … T1	-40 … +80 °C	-40 … +80 °C

The following temperature tables are valid for:

VEGAPULS PS69(*).B**C/D/EB/IX*****(*)(*)**

T-Class	Process temperature range permitted at the antenna in Division 2	Ambient temperature range permitted at the electronics enslosure in Division 2
T4 … T1	-40 … +80 °C	-40 … +80 °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.

T-class - VEGAPULS 69 for process temperatures up to +130 °C
The following temperature tables are valid for:

VEGAPULS PS69(*).T/U**A/FH/U/P/FX/Z*****(*)(*)**

VEGAPULS PS69(*).C**A/FH/U/P/FX/Z*****(*)(*)**

Aluminium enclosure, models: A, H, D, S

T-Class	Process temperature range permitted at the antenna in Division 2	Ambient temperature range permitted at the electronics enslosure in Division 2
T6	-40 … +80 °C	-40 … +36 °C
T5	-40 … +95 °C	-40 … +51 °C
T4 … T1	-40 … +130 °C	-40 … +65 °C

Stainless steel precision casting enclosure, models: V, W

T-Class	Process temperature range permitted at the antenna in Division 2	Ambient temperature range permitted at the electronics enslosure in Division 2
T6	-40 … +80 °C	-40 … +35 °C
T5	-40 … +95 °C	-40 … +50 °C
T4 … T1	-40 … +130 °C	-40 … +57 °C

The following temperature tables are valid for:

VEGAPULS PS69(*).T/U**A/FB/IX*****(*)(*)**

VEGAPULS PS69(*).C**A/FB/IX*****(*)(*)**

T-Class	Process temperature range permitted at the antenna in Division 2	Ambient temperature range permitted at the electronics enslosure in Division 2
T4 … T1	-40 … +130 °C	-40 … +57 °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.

T-class - VEGAPULS 69 for process temperatures up to +195 °C

The following temperature tables are valid for:

VEGAPULS PS69(*).T/U**B/H/SH/U/P/FX/Z*****(*)(*)**

VEGAPULS PS69(*).C**BH/U/P/FX/Z*****(*)(*)**

Aluminium enclosure, models: A, H, D, S

T-Class	Process temperature range permitted at the antenna in Division 2	Ambient temperature range permitted at the electronics enslosure in Division 2
T6	-40 … +80 °C	-40 … +41 °C
T5	-40 … +95 °C	-40 … +56 °C
T4	-40 … +130 °C	-40 … +72 °C
T3 … T1	-40 … +195 °C	-40 … +63 °C

Stainless steel precision casting enclosure, models: V, W

T-Class	Process temperature range permitted at the antenna in Division 2	Ambient temperature range permitted at the electronics enslosure in Division 2
T6	-40 … +80 °C	-40 … +41 °C
T5	-40 … +95 °C	-40 … +56 °C
T4	-40 … +130 °C	-40 … +69 °C
T3 … T1	-40 … +195 °C	-40 … +56 °C

The following temperature tables are valid for:

VEGAPULS PS69(*).T/U**B/H/SB/IX*****(*)(*)**

VEGAPULS PS69(*).C**BB/IX*****(*)(*)**

T-Class	Process temperature range permitted at the antenna in Division 2	Ambient temperature range permitted at the electronics enslosure in Division 2
T4	-40 … +130 °C	-40 … +69 °C

T-Class	Process temperature range permitted at the antenna in Division 2	Ambient temperature range permitted at the electronics enslosure in Division 2
T3 … T1	-40 … +195 °C	-40 … +56 °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.

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VEGA Grieshaber KG
Am Hohenstein 113
77761 Schiltach
Germany

Phone +49 7836 50-0
E-mail: info.de@vega.com
www.vega.com