



Safety instructions
CCOE approval
VEGAPULS 64

Flameproof enclosure "d"
Two-wire 4 ... 20 mA/HART



Document ID: 62497



VEGA

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Supplementary documentation:

- Operating Instructions VEGAPULS 64
- Quick setup guide VEGAPULS 64
- Letter P427747/1 By Government of India (Document ID: 62498)

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1 Area of applicability

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

- VEGAPULS PS64(*).DE****H*****(*) (*)
- VEGAPULS PS64(*).DQ****H*****(*) (*)
- VEGAPULS PS64(*).DZ****H*****(*) (*)

With the electronics versions:

- H - Two-wire 4 ... 20 mA/HART

According to Letter P427747/1 By Government of India (certificate number on the type label) and for all instruments with safety instruction 62497.

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

- EN 60079-0: 2012 + A11: 2013
- EN 60079-1: 2014
- EN 60079-26: 2015

Type of protection marking:

- Ex db IIC T6 ... T1 Ga/Gb, Gb

2 Important specification in the type code

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

Position		Feature	Description
a	Scope	D	India
b	Approval	E	Ex db IIC T6...T1 Ga/Gb, Gb
		Q	Ex db IIC T6...T1 Ga/Gb, Gb + Ship approval (DNV GL, ABS)
		Z	Ex db IIC T6...T1 Ga/Gb, Gb + Overfill protection (WHG, VLAREM)
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 70.10-02) / -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 (A+P 70.10-02) / -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, U = 12 ... 35 V DC
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)

Position		Feature	Description
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
		O	M20 x 1.5 / Cable gland brass nickel-plated (ø 6 ... 12 mm), Ex db + Ex ta
		6	M20 x 1.5 / Cable gland brass nickel-plated (ø 9 ... 13 mm), for shielded cable, Ex db + Ex ta
		8	½ NPT / Cable gland brass nickel-plated (ø 9 ... 13 mm), for shielded cable, Ex db + Ex ta
		P	½ NPT / Cable gland brass nickel-plated (ø 6 ... 12 mm), Ex db + Ex ta
		*	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
		V	Purging connection with reflux valve (only for antenna type B)
		1	Antenna system DD-lacquered
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 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 category 1/2G (EPL Ga/Gb) or 2G (EPL Gb) instruments.







4 Application area

Category 1/2G (EPL Ga/Gb instruments)

The VEGAPULS 64 with mechanical fixing element are installed in hazardous areas of zone 1 requiring instruments of category 2G (EPL Gb). The mechanical fixing element, process connection element is installed in the separating wall, which separates areas requiring instruments of category 2G (EPL Gb) or 1G (EPL Ga). The sensor measuring system is installed in hazardous areas of zone 0 requiring instruments of category 1G (EPL Ga).

Category 2G (EPL Gb instruments)

The VEGAPULS 64 with the mechanical fixing element are installed in hazardous areas of zone 1 requiring category 2G (EPL Gb) instruments.

VEGA Instrument	3G (EPL Gc)	2G (EPL Gb)	1/2G (EPL Ga/Gb)
Ex Zone 2 			
Ex Zone 1 			
Ex Zone 0 			

5 Specific conditions of use ("X" identification)

The following overview is listing all special properties of VEGAPULS 64, which make a labelling with the symbol "X" behind the certificate number necessary.

Electrostatic charging (ESD)

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

Ambient temperature

The ambient temperature range stipulated in EN 60079-0 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 measuring point identification plate is $> 10^9$ Ohm.

The capacitance of the metal measuring point identification plate was measured with 15 pF.

Flameproof joint

The thread gaps between housing and cover as well as between threaded fitting and container are

flameproof joints. A repair on the flameproof joints is not permitted.

6 Additional instructions for safe operation

- 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 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, sparking 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***H*****(*)(*) with instrument category 1 must be only carried out with process pressures between 0.8 and 1.1 bar.

For device category 2 the following process pressures are applicable depending on the antenna version:

VEGAPULS PS64	Version	Process pressure
Plastic horn antenna	PS64(*)..DED***H*****(*)(*)	-1 ... +2 bar
Thread with integrated horn antenna	PS64(*)..DEU***H*****(*)(*)	-1 ... +20 bar
Flange with encapsulated antenna system	PS64(*)..DEG***H*****(*)(*)	-1 ... +25 bar
Hygienic fitting with encapsulated antenna system	PS64(*)..DEI***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

- The VEGAPULS 64 must be connected via suitable cable gland or conduit systems that are in conformity with the requirements of IEC/EN 60079-1 paragr. 13.1 and 13.2 and provided with a separate type approval certificate. when connecting the VEGAPULS 64 to conduit systems, the corresponding sealing facility must be connected directly to the housing. Unused openings must

be covered according to IEC 60079-1 section 11.9. Keep the type and size of the threads in mind: A warning label with the respective thread name is in the area of the respective thread

- Unused openings must be covered according to IEC/EN 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 or closing screws suitable for the respective ignition protection type and IP protection.
- The connection cables of VEGAPULS 64 must be connected in a housing meeting the requirements of the accepted ignition protection type according to IEC/EN 60079-0, section 1, if the connection is located in the hazardous area
- 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 70 °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 $\leq 1 \text{ M}\Omega$)
- 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

- 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



- 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 Connection 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

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 IEC/EN 60079-14
- 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 EU type 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
- Use only approved spare parts
- 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.
- Vessel installations and probable flow must be taken into account

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 and the protection rating must be in conformity to IEC/EN 60529.
- 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.

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, e.g. acc. to IEC/EN 60079-14

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 or alternative special lacquering
- Plastic housing, plastic housing parts
- 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 (measuring point identification plate)

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

10 Electrical data

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

Supply and signal circuit:	
Terminals 1[+], 2[-] in electronics compartment of the single chamber housing or Terminals 1[+], 2[-] in connection 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 connection compartment of the double chamber housing	For connection to the circuit of the passive display unit VEGADIS 81 in ignition protection type flameproof enclosure "d" (BVS 13 ATEX E 054)
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 to 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.

11 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/(m²K) 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*****(*) (*)

Category 1/2G (EPL Ga/Gb instruments)

T-class	Permissible process temperature range on the sensor/antenna in zone 0	Permissible ambient temperature range on the housing in zone 1
T6 ... T1	-20 ... +60 °C	-40 ... +54 °C

Category 2G (EPL Gb instruments)

T-class	Permissible process temperature range on the sensor/antenna in zone 1	Permissible ambient temperature range on the housing in zone 1
T6 ... T1	-40 ... +80 °C	-40 ... +74 °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*****(*) (*)

Category 1/2G (EPL Ga/Gb instruments)

T-class	Permissible process temperature range on the sensor/antenna in zone 0	Permissible ambient temperature range on the housing in zone 1
T6 ... T1	-15/-20 ... +60 °C	-50/-60 ... +53 °C

Note:

- With VEGAPULS PS64(*).**U**RH*****(*) (*) and VEGAPULS PS64(*).**I**TH*****(*) (*) the min. process temperature of -15 °C must not be decreased. For all other VEGAPULS 64 type the min. process temperature of -20 °C must not be decreased.
- If the housing has a lid with inspection window, then the ambient temperature on the housing must not fall below -50 °C

Category 2G (EPL Gb instruments)

T-class	Permissible process temperature range on the sensor/antenna in zone 1	Permissible ambient temperature range on the housing in zone 1
T6	X ... +80 °C	-50/-60 ... +73 °C
T5	X ... +95 °C	-50/-60 ... +70 °C
T4 ... T1	X ... +130 °C	-50/-60 ... +47 °C

Note:

- If the housing has a lid with inspection window, then the ambient temperature on the housing must not fall below -50 °C

The min. permissible process temperatures marked in the above tables with "X °C", depend on the seal material used. The dependence results of the below type codes:

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*****(*)(*)

Category 1/2G (EPL Ga/Gb instruments)

T-class	Permissible process temperature range on the sensor/antenna in zone 0	Permissible ambient temperature range on the housing in zone 1
T6 ... T1	-15/-20 ... +60 °C	-50/-60 ... +55 °C

Note:

- With VEGAPULS PS64(*).**U**SH*****(*)(*) the min. process temperature of -15 °C must not be decreased. For all other VEGAPULS 64 types the min. process temperature of -20 °C must not be decreased.
- If the housing has a lid with inspection window, then the ambient temperature on the housing must not fall below -50 °C

Category 2G (EPL Gb instruments)

T-class	Permissible process temperature range on the sensor/antenna in zone 1	Permissible ambient temperature range on the housing in zone 1
T6	X ... +80 °C	-50/-60 ... +75 °C
T5	X ... +95 °C	-50/-60 ... +77 °C
T4	X ... +130 °C	-50/-60 ... +70 °C
T3 ... T1	X ... +195 °C	-50/-60 ... +57 °C

Note:

- If the housing has a lid with inspection window, then the ambient temperature on the housing must not fall below -50 °C

The min. permissible process temperatures marked in the above tables with "X °C", depend on the seal material used. The dependence results of the below type codes:

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*****(*)(*)

Category 2G (EPL Gb instruments)

T-class	Permissible process temperature range on the sensor/antenna in zone 1	Permissible ambient temperature range on the housing in zone 1
T6	-196 ... +80 °C	-20 ... +75 °C
T5	-196 ... +95 °C	-20 ... +77 °C
T4	-196 ... +130 °C	-20 ... +70 °C
T3 ... T1	-196 ... +195 °C	-20 ... +57 °C

Confirmation

Hereby the company VEGA Grieshaber KG declares that the approved CCOE devices have been manufactured in accordance with the ATEX approval mentioned in the attached CCOE certificate.

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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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