Safety instructions
VEGADIF 85

Flameproof enclosure "db / XP"
Two-wire 4 … 20 mA
Two-wire 4 … 20 mA/HART
Two-wire 4 … 20 mA/HART with SIL qualification
Two-wire Profibus PA
Two-wire Foundation Fieldbus
Four-wire Modbus

Document ID: 59123

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Supplementary documentation:

- Operating Instructions VEGADIF 85
- Certificate of Conformity CSA 19 CA70179056X (Document ID: 59124)
- SIL Safety Manual (Document ID: 54894)

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1 Area of applicability

These safety instructions apply to the VEGADIF 85 of type series:

- VEGADIF DF85(*).CE*****Z/H/A/U/P/F******
- VEGADIF DF85(*).CQ*****Z/H/A/U/P/F******

With the electronics versions:

- Z - Two-wire 4 … 20 mA
- H - Two-wire 4 … 20 mA/HART
- A - Two-wire 4 … 20 mA/HART with SIL qualification
- U - Four-wire Modbus (converter in second chamber)
- P - Two-wire Profibus PA
- F - Two-wire Foundation Fieldbus

According to Certificate of Conformity CSA 19 CA70179056X (certificate number on the type label) and for all instruments with safety instruction 59123.

The classification as well as the respective standards are stated in the Certificate of Conformity:

- CAN/CSA Std. C22.2 No. 60079-0:2011
- CAN/CSA Std. C22.2 No. 60079-1:2016
- CSA Std. C22.2 No. 30-M1986:1896, R2016
- ANSI/UL 60079-0:2013
- ANSI/UL 60079-1:2015
- FM 3615:2018

Type of protection marking:

- ClassI Div 1, Groups B, C, D, T6…T1
- Ex ia/db, db ia IIC T6…T1 Ga/Gb, Gb
- Class I, Zone 0/1, 1, AEx ia/db, db ia IIC T6…T1 Ga/Gb, Gb

2 Important specification in the type code

VEGADIF DF85(*).abe**hijklmn**

Position		Feature	Description
a	Scope	C	Canada
b	Approval	E	C-CSA-US (Ex db / XP) Ex ia/db, db ia IIC T6…T1 Ga/Gb, Gb Class I, Zone 0/1, 1, AEx ia/db, db ia IIC T6…T1 Ga/Gb, Gb ClassI Div 1, Groups B, C, D, T6…T1
		Q	C-CSA-US (Ex db / XP) Ex ia/db, db ia IIC T6…T1 Ga/Gb, Gb Class I, Zone 0/1, 1, AEx ia/db, db ia IIC T6…T1 Ga/Gb, Gb ClassI Div 1, Groups B, C, D, T6…T1 + Ship approval
e	Seal	A	FKM (ERIKS 514531)
		Z	EPDM (ERIKS 55914)
		*	Further sealings

Position		Feature	Description
h	Electronics	Z	Two-wire 4 … 20 mA
		H	Two-wire 4 … 20 mA/HART
		A	Two-wire 4 … 20 mA/HART with SIL qualification
		U	Four-wire Modbus
		P	Two-wire Profibus PA
		F	Two-wire Foundation Fieldbus
i	Supplementary electronics	X	without
		Z	Additional current output 4 … 20 mA
j	Housing	A	Aluminium - single chamber
		D	Aluminium - double chamber
		V	Stainless steel single chamber (precision casting)
		W	Stainless steel double chamber housing (precision casting)
		*	Further housings with special colour
k	Housing version / Protection	D	compact / IP66/IP68 (0,2 bar); NEMA 6P
l	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
m	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

In the following, all above mentioned versions are called VEGADIF 85. 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 VEGADIF 85 can be either used in explosive gas atmospheres.

4 General information

The VEGADIF 85 are used for monitoring or control of levels in hazardous areas, also when combustible liquids, gases, mist and vapours are present.

The VEGADIF 85 are suitable for applications in hazardous atmospheres of all combustible materials of explosion groups IIA, IIB and IIC.

The VEGADIF 85 are suitable for applications requiring EPL Ga/Gb or EPL Gb instruments.

The VEGADIF 85 in ignition protection type “XP” is suitable for applications in hazardous atmospheres of all combustible materials of Class I Groups B, C, D.

The VEGADIF 85 are suitable for applications requiring Division 1 or Division 2 instruments.

5 Application area

Division 1
The VEGADIF 85 are suitable for applications requiring Division 1 instruments.

EPL Ga/Gb instrument
The VEGADIF 85 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 VEGADIF 85 with the mechanical fixing element are installed in hazardous areas of zone 1 requiring EPL Gb instruments.

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

6 Special operating conditions

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

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

Impact and friction sparks
The VEGADIF 85 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.

When used in a separation wall (Ga/Gb instrument)
The separating wall (diaphragm) to the wetted area has a wall thickness of < 1 mm due to the function. During the use it must be ensured that influence of the diaphragm, i.e. due to aggressive media or mechanical danger can be excluded.

For versions with standard process fittings, the installation must be made in such a way that at least protection rating IP67 acc. to IEC/EN 60529 is reached on the process fittings and vent holes of the differential pressure measuring cell.

For versions with capillary connections:

The capillary connections are designed to be connected to a capillary with diaphragm seal. The filling holes are intended to bring in a fill fluid. To prevent a zone entrainment from Zone 0, the diaphragm seal or the diaphragm seal and capillary have to be suitably designed. The pressure transfer system has to be technically tight. The filling hole has to be tightly sealed.

The cable entries and blanking elements must be suitably certified and be compatible with the degree of protection (IP and Type rating) and explosion protection provided by enclosure, the applicable gas groups, and for operating temperature of -40 … +60 °C.

Wiring shall be in accordance with Class I, Division 1/Zone 1 wiring method per the Canadian Electrical Code (CEC) for installation in Canada and per National Electrical Code (NFPA 70) for installation within U.S.

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 Certificate of Conformity 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

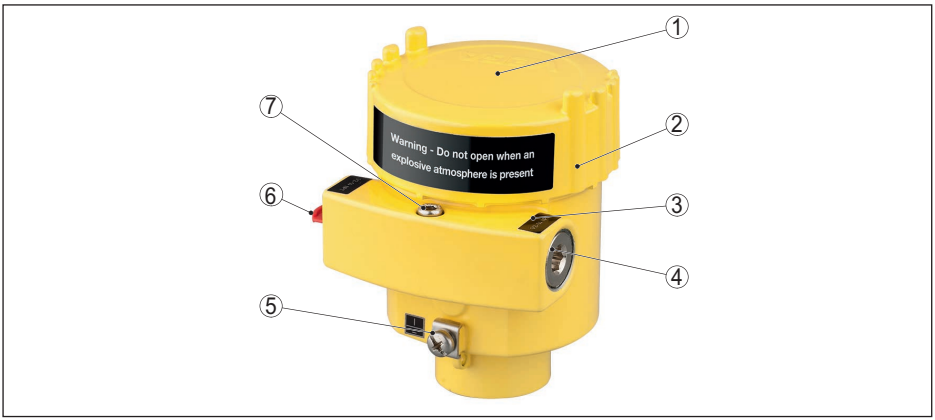
Cable and wire entries

- 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.
- The VEGADIF 85 must be connected via suitable cable gland or conduit systems that are in conformity with the requirements of the flame proofing and the IP protection and provided with a separate type approval certificate. When connecting VEGADIF 85 to conduit systems, a seal shall be installed within 50 mm of the enclosure.
- 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.
- Note type and size of the thread: A label with the respective thread name is in the area of the respective thread
- Threads must have no damages
- Cable entries and closing screws should be mounted correctly and according to the safety instructions of the manufacturer to ensure the specified ignition protection type and IP protection rating. When using certified or suitable cable glands, closing screws or plug connections, it is

absolutely necessary to note the corresponding certificates/documents. Supplied cable entries or closing screws meet these requirements.

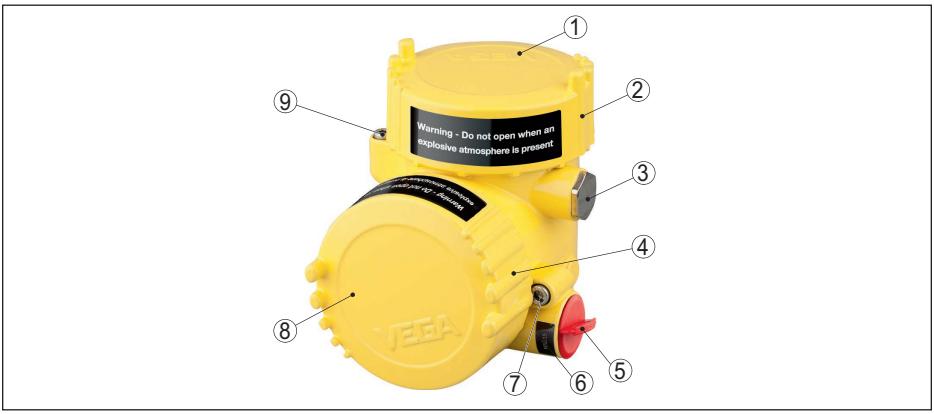
- Unused openings must be closed with plugs suitable for the ignition protection type and IP protection. Supplied plugs meet these requirements.
- Cable or wire entries resp. the closing screws must be tightly screwed into the housing
- The connection cables or pipeline sealing facilities must be suitable for the application conditions (e.g. temperature range) of the application
- With surface temperatures > 60 °C, the cables must be suitable for the higher application conditions
- The connection cable of VEGADIF 85 has to be wired fix and in such a way that damages can be excluded.

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*

Mounting

Keep in mind for instrument mounting

- Mechanical damage on the instrument must be avoided
- Mechanical friction must be avoided
- Vessel installations and probable flow must be taken into account
- 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 CSA/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 VEGADIF 85 being in contact with flammable media during operation must be included in the periodic overpressure test of the plant.

Flameproof enclosure "d"

- The terminals for connecting the operating voltage or signal circuits are integrated in the connection compartment with type of protection flameproof enclosure "d"
- The thread gaps between housing and cover as well as between threaded fitting and container are flameproof joints
- It is not allowed to repair the flameproof joints.
- Cable, wire entries and closing screws must be certified acc. to ignition protection type Flameproof enclosures "d". Cable, wire entries and closing screws of simple design must not be used.
- Separately certified cable and wire entries can determine the permissible ambient temperature range or the temperature classes
- Only one threaded adapter is allowed per thread, when using a closing screw, threaded adapters are not allowed

8 Safe operating mode

General operating conditions

- Do not operate the instrument outside the electrical, thermal and mechanical specifications of the manufacturer
- Use the instrument only in media against which the wetted parts are sufficiently resistant
- Note the relation between process temperature on the sensor/antenna and the permissible ambient temperature on the electronics housing. For permissible temperatures, see the respective temperature tables. See chapter "*Thermal data*".
- If necessary, a suitable overvoltage arrester can be connected in front of the VEGADIF 85
- For assessment and reduction of the explosion risk, valid standards such as for example ISO/EN 1127-1 must be taken into account
- 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

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

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 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:

- in the case of extremely flammable dusts with a minimum ignition energy (MIE) of less than 3 mJ, the device must not be used in areas where intensive electrostatic charging processes can be expected
- 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

11 Electrical data

VEGADIF DF85.*****Z/H/A/U/P/F******

Supply and signal circuit: VEGADIF DF85(*).*******Z/H/AXA/V**** Terminal 1[+], 2[-] in electronics compartment of the single chamber housing VEGADIF DF85(*).*******Z/H/AXD/W**** Terminal 1[+], 2[-] in connection compartment of the double chamber housing	U = 9.6 … 35 V DC U_m = 253 V AC
VEGADIF DF85(*).*******UXD/W**** **Supply and signal circuit I:** Terminal 1[+], 2[-] in connection compartment of the double chamber housing **Supply and signal circuit II:** Terminal MB[+], MB[-] in connection compartment of the double chamber housing **Supply and signal circuit III:** 6-pole mini-USB socket in the connection compartment of the double chamber housing	U = 8 … 32 V DC U_m = 253 V AC U = 5 V DC U_m = 253 V AC MODBUS telegram U = 5 V DC U_m = 253 V AC USB protocol

Supply and signal circuit: VEGADIF DF85(*).*******P/FXA/V**** Terminal 1[+], 2[-] in electronics compartment of the single chamber housing VEGADIF DF85(*).*******P/FXD/W**** Terminal 1[+], 2[-] in connection compartment of the double chamber housing	U = 9 … 32 V DC U_m = 253 V AC
VEGADIF DF85(*).*******H/AZD/W**** **Supply and signal circuit I:** Terminal 1[+], 2[-] in connection compartment of the double chamber housing **Supply and signal circuit II:** Terminal 17[+], 18[-] in connection compartment of the double chamber housing	 U = 9.6 … 35 V DC U_m = 253 V AC U = 9.6 … 35 V DC U_m = 253 V AC
Display and adjustment circuit: VEGADIF DF85(*).*******Z/H/A/P/F*A/V**** Terminals 5, 6, 7, 8 in electronics compartment of the single chamber housing VEGADIF DF85(*).*******Z/H/A/P/F*D/W**** Terminals 5, 6, 7, 8 in connection compartment of the double chamber housing	Only for connection to the associated VEGA display unit VEGADIS 81 according to CoC 2662675.
Display and adjustment circuit: Spring contacts in electronics compartment of the double chamber housing	Only for connection to the display and adjustment module PLICSCOM.

12 Thermal data

The following temperature tables are valid for all housing and electronics versions.

Temperature class	Ambient temperature (Ta) or medium temperature (Tp) on the sensor housing and the sensor
T6, T5	-40 … +55 °C
T4, T3, T2, T1	-40 … +60 °C

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