



Safety instructions

VEGADIF DF65.UF*****Z/H/ P/F*****

Installation Control Diagram



Document ID: 42225



VEGA

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Please note:

These safety instructions are part of the documentation:

- VEGADIF 65
 - 36236 - 4 ... 20 mA
 - 36128 - 4 ... 20 mA/HART
 - 36129 - Profibus PA
 - 36130 - Foundation Fieldbus
 - 52217 - Certificate of Compliance FM 3044382

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1 Area of applicability

These safety instructions apply to differential pressure transmitters series VEGADIF DF65.UF*****Z/H/P/F***** according to FM Certificate of compliance No. 3044382 and for all instruments with the number of the safety instructions (42225) on the type label.

2 General information

The pressure measuring instruments VEGADIF DF65.UF*****Z/H/P/F***** are also used for differential pressure measurement in hazardous areas.

The measured products can also be combustible liquids, gases, mist or vapour.

VEGADIF DF65.UF*****Z/H/P/F***** consist of an electronics housing with integrated electronics module, a process fitting element and a sensor, the differential pressure measuring cell.

An indicating and adjustment module can be optionally mounted into VEGADIF DF65.UF*****Z/H/P/F*****.

If the VEGADIF DF65.UF*****Z/H/P/F***** are installed and operated in hazardous areas, the general hazardous location regulations as well as these safety instructions must be observed.

The operating instructions as well as the valid hazardous location mounting regulations and standards for electrical equipment must be observed.

The installation of explosion-endangered systems must always be carried out by qualified personnel.

Hazardous locations designation

Intrinsically safe CI I, Zn 0, AEx ia IIC

CI I, Div. 1, GR A, B, C, D

CI II, Div. 1, GR E, F, G

CI III

3 Technical data

Electrical data

The circuits of VEGADIF DF65.UF*****Z/H/P/F***** with integrated electronics module are intrinsically safe circuits. The connection of these intrinsically safe circuits is carried out on the terminals located in the electronics compartment.

VEGADIF DF65.UF*****Z/H/P/F*****

Power supply and signal circuit: (terminals 1[+], 2[-] in electronics compartment; with double chamber housing version in connection compartment)

In ignition protection type intrinsic safety Ex ia
For connection to a certified, intrinsically safe circuit.

Maximum values:

VEGADIF DF65.UF*****Z/H***** (Electronics
4 ... 20 mA, 4 ... 20 mA/HART)

- $U_i = 30 \text{ V}$
- $I_i = 131 \text{ mA}$
- $P_i = 983 \text{ mW}$

The effective internal capacitance is $C_i = 5 \text{ nF}$.

The effective internal inductance L_i is negligibly small.

VEGADIF DF65.UF****P/F**** (Electronics Profibus PA, Foundation Fieldbus)

- $U_i = 17.5 \text{ V}$
- $I_i = 500 \text{ mA}$
- $P_i = 5.5 \text{ W}$

The instrument is suitable for connection to a Fieldbus system according to the FISCO model (IEC 60079-27), e.g. Profibus PA.

or

- $U_i = 24 \text{ V}$
- $I_i = 250 \text{ mA}$
- $P_i = 1.2 \text{ W}$

The effective internal capacitance is $C_i = 5 \text{ nF}$.

The effective internal inductance is $L_i \leq 5 \mu\text{H}$.

In the version with fix mounted connection cable $L_i = 55 \mu\text{H/m}$, $C_{i \text{ wire/wire}} = 58 \text{ pF/m}$ and $C_{i \text{ wire/screen}} = 270 \text{ pF/m}$ must be taken into account.

Circuit between sensor unit and remote processing unit

In ignition protection type intrinsic safety Ex ia IIC

With VEGADIF DF65.UF****Z/H/P/F**** in the version with fix mounted cable on the sensor unit and external processing unit, the supplied cable between the processing unit and the sensor unit must not exceed a length of 47 m.

Circuit of the indicating and adjustment module: (spring contacts in the electronics compartment; with double chamber housing version also in the connection compartment)

In ignition protection type intrinsic safety Ex ia

Only for connection to the indicating and adjustment module PLICSCOM.

With the double chamber housing version, the indicating and adjustment module may be mounted either in the electronics compartment or in the connection compartment.

The intrinsically supply and signal circuit is galvanically separated from parts that can be grounded.

The metallic parts of the VEGADIF DF65.UF****Z/H/P/F**** are electrically connected with the earth terminals.

4 Application conditions

The max. permissible ambient temperatures depending on the temperature classes are specified in the following tables.

VEGADIF DF65.UF****Z/H**** (Electronics 4 ... 20 mA, 4 ... 20 mA/HART)

If the differential pressure transmitters are used in explosion hazardous areas, that requires apparatus of the category Div. 1/Zone 0 the permissible temperature range in the area of the electronics/at the measuring sensor dependent on the temperature class has to be taken from the following table:

Temperature class	Ambient temperature range (electronics) and medium temperature range (measuring sensor)
T6	-20 ... +39 °C

Temperature class	Ambient temperature range (electronics) and medium temperature range (measuring sensor)
T5	-20 ... +51 °C
T4, T3, T2, T1	-20 ... +60 °C

If the differential pressure transmitters are used in explosion hazardous areas, that require apparatus of the category Div 1/Zone 0 (measuring sensor) and Div. 1/Zone 1 (electronics), the permissible temperature range in the area of the electronics/at the measuring sensor dependent on the temperature class has to be taken from the following table:

Temperature class	Ambient temperature range (electronics, Div. 1/Zone 1)	Medium temperature range (measuring sensor, Div. 1/Zone 0)
T6	-40 ... +55 °C	-20 ... +60 °C
T5	-40 ... +70 °C	-20 ... +60 °C
T4, T3, T2, T1	-40 ... +70 °C	-20 ... +60 °C

If the measuring sensors of the differential pressure transmitters are operated at higher medium temperatures as listed in the a.m. table, measures have to be taken, that the danger of ignition caused by these hot surfaces is excluded. The max. permissible temperature at the electronics/housing must not exceed the values as mentioned in the a.m. table.

If the differential pressure transmitters are used in explosion hazardous areas that require apparatus of the category Div. 1/Zone 1, the permissible temperature range in the area of the electronics/at the measuring sensor dependent on the temperature class has to be taken from the following table:

Temperature class	Ambient temperature range (electronics)	Medium temperature range (measuring sensor)
T6	-40 ... +55 °C	-40 ... +77 °C
T5	-40 ... +70 °C	-40 ... +92 °C
T4, T3, T2, T1	-40 ... +70 °C	-40 ... +120 °C

If the measuring sensors of the differential pressure transmitters are operated at higher medium temperatures as listed in the a.m. table, measures have to be taken, that the danger of ignition caused by these hot surfaces is excluded. The max. permissible temperature at the electronics/housing must not exceed the values mentioned in the a.m. table.

VEGADIF DF65.UF****P/F**** (Electronics Profibus PA, Foundation Fieldbus)

If the differential pressure transmitters are used in explosion hazardous areas, that require apparatus of the category Div. 1/Zone 0 the permissible temperature range in the area of the electronics/at the measuring sensor dependent on the temperature class has to be taken from the following table

Temperature class	Ambient temperature range (electronics) and medium temperature range (measuring sensor)
T5	-20 ... +41 °C
T4, T3, T2, T1	-20 ... +60 °C

If the differential pressure transmitters are used in explosion hazardous areas, that require apparatus of the category Div 1/Zone 0 (measuring sensor) and Div. 1/Zone 1 (electronics), the permissible temperature range in the area of the electronics/at the measuring sensor dependent on the temperature class has to be taken from the following table:

Temperature class	Ambient temperature range (electronics, Div. 1/Zone 1)	Medium temperature range (measuring sensor, Div. 1/Zone 0)
T6	-40 ... +45 °C	-20 ... +60 °C

Temperature class	Ambient temperature range (electronics, Div. 1/Zone 1)	Medium temperature range (measuring sensor, Div. 1/Zone 0)
T5	-40 ... +60 °C	-20 ... +60 °C
T4, T3, T2, T1	-40 ... +70 °C	-20 ... +60 °C

If the measuring sensors of the differential pressure transmitters are operated at higher medium temperatures as listed in the a.m. table, measures have to be taken, that the danger of ignition caused by these hot surfaces is excluded. The max. permissible temperature at the electronics/housing must not exceed the values as mentioned in the a.m. table.

If the differential pressure transmitters are used in explosion hazardous areas that require apparatus of the category Div. 1/Zone 1, the permissible temperature range in the area of the electronics/at the measuring sensor dependent on the temperature class has to be taken from the following table:

Temperature class	Ambient temperature range (electronics)	Medium temperature range (measuring sensor)
T6	-40 ... +45 °C	-40 ... +77 °C
T5	-40 ... +60 °C	-40 ... +92 °C
T4, T3, T2, T1	-40 ... +70 °C	-40 ... +120 °C

If the measuring sensors of the differential pressure transmitters are operated at higher medium temperatures as listed in the a.m. table, measures have to be taken, that the danger of ignition caused by these hot surfaces is excluded. The max. permissible temperature at the electronics/housing must not exceed the values mentioned in the a.m. table.

The permissible operating temperatures and pressures are stated in the manufacturer information.

5 Protection against static electricity

The VEGADIF DF65.UF*****Z/H/P/F***** in versions with electrostatically chargeable plastic parts, such as e.g. plastic housing, metal housing with inspection window or connection cable with the separated version, have a caution label pointing out the safety measures that must be taken with regard to electrostatic charges during operation.



Caution: Plastic parts! Danger of static charge!

- Avoid friction
- No dry cleaning
- Do not mount in areas with flowing, non-conductive products

6 Grounding

VEGADIF DF65.UF*****Z/H/P/F***** must be electrostatically (transition resistance $\leq 1 \text{ M}\Omega$) grounded, e.g. via a ground connection terminal.

7 Impact and friction sparks

When used as zone 0 division 1 instruments, the VEGADIF DF65.UF*****Z/H/P/F***** 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.

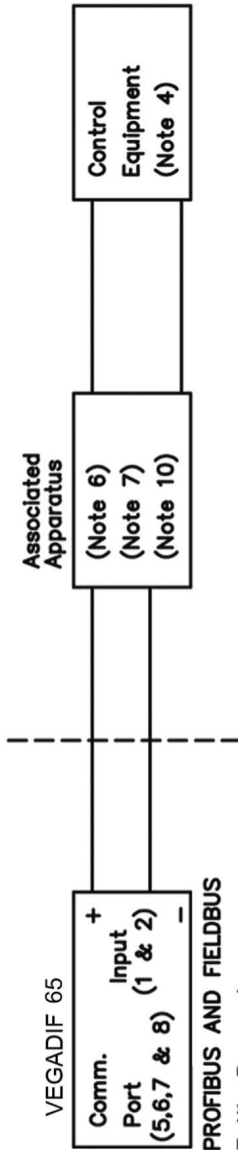
8 Material resistance

The VEGADIF DF65.UF*****Z/H/P/F***** must only be used in media against which the materials of the wetted parts are sufficiently resistant.

9 Notes

1. The Intrinsic Safety Entity concept allows the interconnection of two intrinsically safe devices FM Approved and CSA Certified when installed in Canada with entity parameters not specifically examined in combination as a system when: U_o or V_o or $V_t \leq V_{max.}$, I_o or I_{sc} or $I_t \leq I_{max.}$, C_a or $C_o \geq C_i + C_{cable}$, L_a or $L_o \geq L_i + L_{cable}$, $P_o \leq P_i$.
2. For Division 2 installations, the Associated Apparatus is not required to be FM Approved or CSA Certified when installed in Canada under Entity Concept if the VEGADIF 65 Series is installed in accordance with the National Electrical Code ® (ANSI/NFPA 70) or Canadian Electrical Code, CSA C22.1 Part 1 Appendix F, for division 2 wiring methods excluding Nonincendive field wiring.
3. Dust-tight conduit seal shall be used when installed in Class II and Class III environments.
4. Control equipment connected to the Associated Apparatus shall not use or generate more than 250 Vrms or Vdc.
5. Division 1 installations should be in accordance with ANSI/ISA RP12.06.01 "Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations" and the National Electrical ® (ANSI/NRPA 70) or Canadian Electrical Code.
6. For Division 1 installations, the configuration of associated Apparatus shall be FM Approved/CSA Certified under Entity Concept.
7. Associated Apparatus manufacturer's installation drawing shall be followed when installing this equipment.
8. The configuration of Field Device must be FM Approved/CSA Certified under Entity Concept.
9. The Field Device manufacturer's installation drawing shall be followed when installing this equipment.
10. The VEGADIF 65 Series are FM Approved/CSA Certified for Class I, Zone 0, application. If connecting [Ex ib]/[AEx ib] Associated Apparatus or Ex ib/AEx ib I.S. Field Device to the VEGADIF 65 Series, the above system is only suitable for Class I, Zone 1, and is not suitable for Class I, Zone 0 or Class I, Division 1, Hazardous (Classified) Locations.
11. No revision to drawing without prior Approval by FM Approvals and CSA International.
12. WARNING: Substitution of components may impair suitability for hazardous locations.
13. Barriers and instruments to carry same Agency Approval.
14. See manual for FISCO requirements.

10 Installation Diagram



Entity Parameters:
Input: $V_{max}=24V$, $I_{max}=250mA$, $P_i=1.2W$, $C_i=5nF^{**}$, $L_i=5\mu H^{**}$

HART

Entity Parameters:
Input: $V_{max}=30V$, $I_{max}=131mA$, $P_i=0.983W$, $C_i=0nF^{**}$, $L_i=5\mu H^{**}$

** For the version with fixed cable
 C_i' core/core = $58pF/m$
 C_i' core/screen = $270pF/m$
 $L_i = L_i'$ $55\mu H/m$
 must be taken into account

11 FISCO

The FISCO concept allows the interconnection of intrinsically safe apparatus to associated apparatus not specifically examined in such combination. The criterion for such interconnection is that the voltage (V_{max}), the current (I_{max}) and the power (P_i) which intrinsically safe apparatus can

received and remain intrinsically safe, considering faults, must be equal or greater than the voltage (U_o , V_o , V_t), the current (I_o , I_{sc} , I_t) and the power (P_o) which can be provided by the associated apparatus (supply unit). In addition, the maximum unprotected residual capacitance (C_i) and inductance (L_i) of each apparatus (other than the terminators) connected to the Fieldbus must be less than or equal to 5 nF and 10 μ H respectively. In each I.S. Fieldbus segment only one active source, normally the associated apparatus (power supply), is allowed to provide the necessary power for the Fieldbus system.

The associated apparatus (power supply) used to supply the bus shall either be resistive limited or have a trapezoidal or rectangular output characteristic. The maximum output voltage shall be not greater than 17.5 V or less than 14 V.

The maximum output current I_o for any type of power supply shall not exceed 380 mA and the maximum output power P_o shall not exceed 5.32 W.

maximum output power P_o shall not exceed 5.32 W. The power supply may be connected to earth. The apparatus certificate shall state that the power supply is suitable for use in a FISCO system.

All other equipment connected to the bus cable has to be passive, meaning that the apparatus is not allowed to provide energy to the system, except to a leakage current of 50 μ A for each connected device. Separately powered equipment needs a galvanic isolation to insure that the intrinsically safe Fieldbus circuit remains passive.

The cable used to interconnect the devices needs to have the parameters in the following range:

Loop resistance R' : 15 to 150 Ohm/km

Inductance per unit length L' : 0.4 to 1 mH/km

Capacitance per unit length C' : 80 to 200 nF/km

$C' = C' \text{ line/line} + 0.5 C' \text{ conductor/screen}$, if the bus system is balanced (e. g. floating or potential free); or

$C' = C' \text{ conductor/conductor} + C' \text{ conductor/screen}$, if the screen is connected to one pole of supply unit.

At each end of the main bus cable an approved infallible line termination with the following parameters is satisfactory. One of the allowed termination may be integral to the associated apparatus:

Infallible resistor $R = 90$ to 100 Ohms in series a capacitance $C = 2.2 \mu$ F

The power supply shall be located not more than 30 m from one end. Where the power supply is connected via a spur, then that spur is restricted to a length of 30 m. Maximum length of each trunk cable is 1 km.

The number of field devices in a FISCO system is up to 32.

Printing date:

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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.

Subject to change without prior notice

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