



Safety instructions

VEGADIS 82

Intrinsically Safe/Securite Intrinseque

CSA16CA70048296X



Document ID: 51924



VEGA

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Supplementary documentation:

- Operating Instructions VEGADIS 82
- Certificate of Compliance CSA16CA70048296X (Document ID: 51925)

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1 Area of applicability

These safety instructions apply to the display and adjustment unit VEGADIS DIS82.CC/O***** according to the Certificate of Compliance CSA16CA70048296X (certificate number on the type label) and to all instruments with the number of the safety instruction (51924) on the type label.

These safety instructions are the object of the VEGADIS DIS82(*).CC***** in intrinsic safety ignition protection type "Ex ia". These safety instructions are also only valid for the intrinsic safety ignition protection type "Ex ia" for the versions VEGADIS DIS82.CO***** which are certified both with the intrinsic safety ignition protection type "Ex ia" with the characteristic "C" and also for other safety requirements or with a ship building certificate with the characteristic "O".

2 General information

The VEGADIS 82 is used for separate scaling, parameter adjustment and visualization of measured values in conjunction with 4 ... 20 mA/HART sensors.

The VEGADIS DIS82.CC/O***** is looped into the intrinsically safe 4 ... 20 mA/HART circuit of the sensor.

The VEGADIS DIS82.CC/O***** is suitable for use in hazardous areas of all combustible materials of explosion group IIA, IIB and IIC, for applications requiring EPL-Ga or EPL-Gb instruments. The atmospheres can also be combustible gases, mists or vapours.

The VEGADIS DIS82.CC/O***** are suitable for use in hazardous atmospheres of all combustible materials of explosion groups A, B, C, D, E, F, G for applications requiring Class I, Division 1 instruments or of explosion groups IIC, IIB or IIA for applications requiring Class I, Zone 0, 1 AEx ia IIC T6, Ga, Gb instruments. If the VEGADIS DIS82.CC/O***** is installed and operated in hazardous areas, the general Ex installation regulations as well as these safety instructions must be observed.

The operating instructions as well as the installation regulations or standards that apply for explosion protection of electrical systems must generally be observed.

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

The equipment is not intended to be used as personal protective equipment. To prevent injury, read the manual before use.

Operating temperature range

-40 ... +60 °C

Safety Markings

Intrinsically Safe/Securite Intrinseque

Class I Division 1, 2 Group ABCD

Class II Division 1, Group EFG, Class III

Ex ia IIC T6 ... T1 Ga, Gb

Class I Zone 0, 1 A Ex ia IIC T6 ... T1 Ga, Gb

3 Technical data

VEGADIS DIS82.CC/OX*****

Power supply and signal circuit: (terminals 1, 2, 3, 4)

In ignition protection type intrinsic safety Ex ia IIC

For connection to an intrinsically safe circuit.

Maximum values:

- $U_i \leq 30 \text{ V DC}$
- $I_i \leq 131 \text{ mA}$
- $P_i \leq 983 \text{ mW}$ (resistively limited)
- $P_i \leq 700 \text{ mW}$ (rectangular)
- $C_i = \text{negligibly small}$
- $L_i \leq 5 \mu\text{H}$

Terminals KL1(+), KL2(-) for connection to passive 4 ... 20 mA sensors with intrinsic safety ignition protection type "i".

Terminals KL3(+), KL4(-) for connection to a voltage supply with intrinsic safety ignition protection type "i".

Supply and signal circuit		
Parameter	Connection power supply Terminals KL3 (+), KL4 (-)	Connection sensor Terminals KL1 (+), KL2 (-)
Voltage U_i (DC)	$\leq 30 \text{ V}$	N/A
Current intensity I_i	$\leq 131 \text{ mA}$	N/A
Power P_i	$\leq 983 \text{ mW}$ (resistively limited) $P_i \leq 700 \text{ mW}$ (rectangular)	N/A
Inner effective capacitance C_i	negligibly small	N/A
Inner effective inductance L_i	$5 \mu\text{H}$	N/A
Voltage U_o (DC)	N/A	U_o value according to the certified, intrinsically safe power supply
Current intensity I_o	N/A	I_o value, according to the certified, intrinsically safe power supply.
Power P_o	N/A	P_o value, according to the certified, intrinsically safe power supply.
Max. outer capacitance C_o	N/A	C_o value, according to the certified, intrinsically safe power supply.
Max. outer inductance L_o	N/A	L_o value, according to the certified, intrinsically safe power supply reduced by $5 \mu\text{H}$
Characteristics	resistively limited, rectangular	Identical with the certified, intrinsically safe power supply

N/A not applicable.

The sensor circuit on terminals 1 and 2 is used for connection of passive 4 ... 20 mA sensors in intrinsic safety ignition protection type "i".

The sensor circuit on terminals 1 and 2 is also used for connection to a passive 4 ... 20 mA measurement input which can contain safety-technical, low output data. The sum of the safety-technical output data of the measurement input and power supply (U_o-sum, I_o-sum, P_o-sum) must not exceed the safety-technical input data of VEGADIS 82 (U_i, I_i, P_i).

The output parameters of the intrinsically safe circuits are identical with the output parameters of the connected power supply.

For the determination of the max. permissible external capacitance (C_o) and inductance (L_o), the values of the internal capacitance (C_i) and inductance (L_i) must be taken into account.

Circuit for connection of the display and adjustment module: (spring contacts in the connection compartment) Ignition protection type intrinsic safety Ex ia IIC
Maximum values:

- U_o ≤ 6 V DC
- I_o ≤ 210 mA
- P_o ≤ 315 mW
- C_o = 40 μF
- L_o = 0.75 mH

For connection to the display and adjustment module PLICSCOM.

The intrinsically safe circuit is electrically separated from parts which can be grounded.

VEGADIS DIS82.CC/OH*****

Power supply and signal circuit: (terminals 1, 2, 3, 4)

In ignition protection type intrinsic safety Ex ia IIC
For connection to an intrinsically safe circuit.

Maximum values:

- U_i ≤ 30 V DC
- I_i ≤ 131 mA
- P_i ≤ 983 mW (resistively limited)
- P_i ≤ 700 mW (rectangular)
- C_i ≤ 3.5 nF
- L_i ≤ 75 μH

Terminals KL1(+), KL2(-) for connection to passive 4 ... 20 mA sensors with intrinsic safety ignition protection type "i".

Terminals KL3(+), KL4(-) for connection to a voltage supply with intrinsic safety ignition protection type "i".

Supply and signal circuit		
Parameter	Connection power supply Terminals KL3 (+), KL4 (-)	Connection sensor Terminals KL1 (+), KL2 (-)
Voltage U _i (DC)	≤ 30 V	N/A
Current intensity I _i	≤ 131 mA	N/A
Power P _i	≤ 983 mW (resistively limited) P _i ≤ 700 mW (rectangular)	N/A
Inner effective capacitance C _i	3.5 nF	N/A
Inner effective inductance L _i	75 μH	N/A

Voltage U_o (DC)	N/A	U_o value according to the certified, intrinsically safe power supply
Current intensity I_o	N/A	I_o value, according to the certified, intrinsically safe power supply.
Power P_o	N/A	P_o value, according to the certified, intrinsically safe power supply.
Max. outer capacitance C_o	N/A	C_o value, according to the certified, intrinsically safe power supply reduced by 3.5 nF.
Max. outer inductance L_o	N/A	L_o value, according to the certified, intrinsically safe power supply reduced by 75 μ H.
Characteristics	resistively limited, rectangular	Identical with the certified, intrinsically safe power supply

N/A not applicable.

The sensor circuit on terminals 1 and 2 is used for connection of passive 4 ... 20 mA/HART sensors in intrinsic safety ignition protection type "i".

The sensor circuit on terminals 1 and 2 is also used for connection to a passive 4 ... 20 mA/HART measurement input which can contain safety-technical, low output data. The sum of the safety-technical output data of the measurement input and power supply (U_o -sum, I_o -sum, P_o -sum) must not exceed the safety-technical input data of VEGADIS 82 (U_i , I_i , P_i).

The output parameters of the intrinsically safe circuits are identical with the output parameters of the connected power supply.

For the determination of the max. permissible external capacitance (C_o) and inductance (L_o), the values of the internal capacitance (C_i) and inductance (L_i) must be taken into account.

Circuit for connection of the display and adjustment module: (spring contacts in the connection compartment)

Ignition protection type intrinsic safety Ex ia IIC

Maximum values:

- $U_o \leq 6$ V DC
- $I_o \leq 210$ mA
- $P_o \leq 315$ mW
- $C_o = 40$ μ F
- $L_o = 0.75$ mH

For connection to the display and adjustment module PLICSCOM.

The intrinsically safe circuit is electrically separated from parts which can be grounded.

4 Application conditions

In version VEGADIS DIS82.CC/OX***** with terminal blocks

Permissible ambient temperatures depending on temperature class

Class I Zone 0 Ga applications, Class I, Division 1 applications

Temperature class	Permissible temperature on the electronics housing
T6	-40 ... +28 °C
T5	-40 ... +40 °C

Temperature class	Permissible temperature on the electronics housing
T4, T3, T2, T1	-40 ... +60 °C

The pressure of explosive mixtures must be between 0.8 ... 1.1 bar in applications requiring EPL-Ga instruments. The permissible operating temperatures without hazardous atmosphere are specified in the respective manufacturer information, for example the operating instructions.

Class I Zone 1 Gb applications

Temperature class	Permissible temperature on the electronics housing
T6	-40 ... +45 °C
T5, T4, T3, T2, T1	-40 ... +60 °C

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

In version VEGADIS DIS82.CC/OH***** with terminal blocks

Permissible ambient temperatures depending on temperature class

Class I Zone 0 Ga applications, Class I, Division 1 applications

Temperature class	Permissible temperature on the electronics housing
T6	-40 ... +25 °C
T5	-40 ... +37 °C
T4, T3, T2, T1	-40 ... +60 °C

The pressure of explosive mixtures must be between 0.8 ... 1.1 bar in applications requiring EPL-Ga instruments. The permissible operating temperatures without hazardous atmosphere are specified in the respective manufacturer information, for example the operating instructions.

Class I Zone 1 Gb applications

Temperature class	Permissible temperature on the electronics housing
T6	-40 ... +42 °C
T5	-40 ... +57 °C
T4, T3, T2, T1	-40 ... +60 °C

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

5 Protection against static electricity

The VEGADIS DIS82.CC/O***** in the version with chargeable plastic parts, such as e.g. plastic housing, metal housing with inspection window, are provided with a caution label referring to the safety measures that must be taken in case electrostatic charging occurs during operation.

WARNING -- Potential electrostatic charging hazard -- See instructions

AVERTISSEMENT -- Danger potentiel de charges électrostatiques -- Voir instructions

Caution: Plastic parts! Danger of electrostatic charging!

- Avoid friction
- No dry cleaning
- Construction/Installation: The VEGADIS DIS82.CC/O***** must be constructed/installed in such a way that
 - electrostatic charges are ruled out during operation, maintenance and cleaning.
 - process-related electrostatic charges, e.g. by measuring media flowing past, are ruled out

6 Installation/construction

There is no potential equalization required on the complete run of the intrinsically safe circuit between VEGADIS DIS82.CC/O***** and the sensor(s), appropriate instrument. The isolation voltage of the intrinsically safe circuits is > 500 V AC.

7 Grounding/Potential equalization

In order to avoid the danger of electrostatic charging of the metallic parts, the VEGADIS DIS82.CC/O***** must be electrostatically connected to the local potential equalisation (transfer resistance $\leq 1 \text{ M}\Omega$), e.g. via the ground terminal.

The external/internal ground connection terminal on the housing of the VEGADIS DIS82.CC/O/H/X***** must have a low impedance connection to the potential equalization.

8 Impact and friction sparks

The VEGADIS DIS82.CC/O***** 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.

9 Material resistance

The instrument should only be used in media against which the wetted parts are sufficiently resistant.

10 Use of an overvoltage arrester

If necessary, a suitable overvoltage arrester can be connected in front of the VEGADIS DIS82.CC/O*****.

When used as EPL-Ga instrument, as far as necessary analogue, a suitable overvoltage arrester must be connected in front as protection against voltage surges.

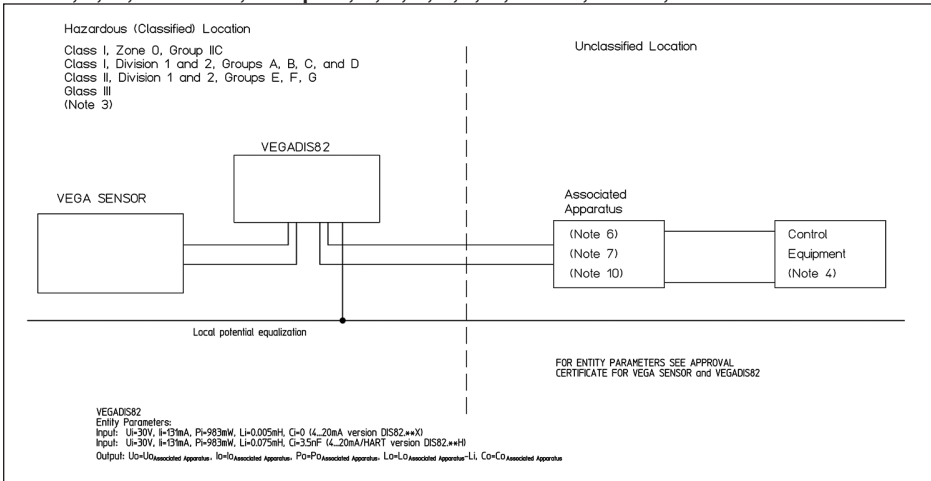
11 Installation, maintenance and inspection

- Intrinsically Safe Apparatus can be a source of ignition if internal spacings are shorted or connections opened
- Although intrinsically safe circuits are inherently low energy, they may still present a shock hazard because of the operating voltage
- Refer to manufacturer's written instructions before working on associated apparatus

- Inspection should be performed periodically to ensure that intrinsic safety has not been compromised. Inspections should include reviewing for unauthorized modifications, corrosion, accidental damage, change of flammable materials, and the effects of aging
- User replaceable parts of an intrinsically safe system should not be replaced with other than the manufacturer's direct equivalent
- Maintenance work may be performed on energized apparatus in hazardous areas subject to the conditions as follows:
 - Disconnection of, and removal or replacement of, items of electrical apparatus and cabling if such action will not result in shorting of different intrinsically safe circuits
 - Adjustment of any control that is necessary for the calibration of the electrical apparatus or system
 - Only test instruments specified in the written instructions should be used
 - Performance of other maintenance activities specifically permitted by the relevant control drawing and instruction manual
- Maintenance of Associated Apparatus and parts of intrinsically safe circuits located in unclassified areas should be restricted to that described in a way such that electrical apparatus or parts of circuits remain interconnected with parts of intrinsically safe systems located in hazardous areas. Safety barrier ground connections should not be removed without first disconnecting the hazardous-area circuits.
- Other maintenance work on Associated Apparatus or parts of an intrinsically safe circuit mounted in an unclassified area should be performed only if the electrical apparatus or part of a circuit is disconnected from the part of the circuit located in a hazardous area
- The location classification and the suitability of the intrinsically safe system for that classification should be verified. This includes verifying that the class, group, and temperature ratings of both the Intrinsically Safe Apparatus and the Associated Apparatus agree with the actual classification of the location.
- Prior to energizing, an intrinsically safe system should be inspected to ensure the following:
 - Installation is in compliance with the documentation
 - Intrinsically safe circuits are properly separated from non-intrinsically safe circuits
 - Cable shields are grounded in accordance with the installation documentation
 - Modifications have been authorized
 - Cables and wiring are not damaged
 - Bonding and grounding connections are tight
 - Bonding and grounding hardware is not corroded
 - Resistance of any grounding conductor, including termination resistance from shunt-type-Associated Apparatus to the grounding electrode does not exceed one ohm
 - Protection has not been defeated by bypassing; and
 - Check for signs of corrosion on the equipment and connections
- All deficiencies should be corrected

12 Installation Control Diagram VEGADIS DIS82.CC/O*****

Class I, II, III, Division 1, Groups A, B, C, D, E, F, G; Class I, Zone 1, AEx ia IIC



NOTES:

- The Intrinsic Safety Entity concept allows the interconnection of two CSA certified Intrinsically safe devices with entity parameters not specifically examined in combination as a system when: U_0 or V_{oc} or $V_t < V_{max}$, I_0 or I_{sc} or $I_t < I_{max}$, C_a or $C_o > C_i + C_{cable}$, L_a or $L_o > L_i + L_{cable}$, $P_o < P_i$.
- For Division 2 installation, the Associated Apparatus is not required to be CSA Certified under Entity Concept if the VEGADIS DIS82.CC/O***** is installed in accordance with the Canadian Electrical Code, CSA C22.1 Part 1 Appendix F for Division 2 wiring methods excluding Nonin-cendive field wiring
- Dust-tight conduit seal shall be used when installed in Class II and Class III environments
- Control equipment connected to the Associated Apparatus shall not use or generate more than 250 Vrms or Vdc
- Division 1 installation should be in accordance with ANSI/ISA RP12.06.01 "Installation of Intrinsi-cally Safe Systems for Hazardous (Classified) Locations", NEC section 500 and the Canadian Electrical Code, CSA C22.1 Part 1
- The configuration of associated Apparatus shall be CSA certified under Entity Concept
- Associated Apparatus manufacturer's installation drawing shall be followed when installing this equipment
- The configuration of Field Device shall be CSA certified under Entity Concept
- The Field Device manufacturer's installation drawing shall be followed when installing this equip-ment
- VEGA Sensor is CSA certified for Class I, Zone 0 and Division 1 applications. If connecting AEx[ib] Associated Apparatus or AEx ib I.S. Field Device to VEGADIS DIS82.CC/O***** the I.S. circuit is only suitable for Class I, Zone 1, and is not suitable for Class I, Zone 0 or Class I, Divi-sion 1. Hazardous (Classified) Locations
- No revision to drawing without prior Agency Approval
- Warning: Substitution of components may impair suitability for hazardous locations
- The regulations for the interconnection of intrinsically safe circuits between VEGADIS DIS82.CC/O***** and the Associated Apparatus are complied with if the total inductance and total

capacity of the connection cable between VEGADIS DIS82.CC/O***** and the barrier La or Lo $\geq Li + L_{\text{cable}}$ and Ca or Co $\geq Ci + C_{\text{cable}}$ are not exceeded

- If the Electrical parameters are unknown, the following values may be used: $C_{\text{cable}} = 60 \text{ pF/ft}$
 $L_{\text{cable}} = 0.30 \text{ uH/ft}$

13 Cautionary notes, warnings and markings

Hazardous location notes

- Wiring methods must conform to all local and national codes governing the installation, and wiring must be rated for at least +10 °C above the highest expected ambient temperature.
- Where the protection type allows and depends on wiring glands, the glands must be certified for the type of protection required and area classification identified on the equipment or system nameplate.
- The internal grounding terminal shall be used as the primary equipment grounding means and the external grounding terminal is only for a supplemental (secondary) bonding connection where local authorities permit or require such a connection.
- Approved seals against ingress of water or dust are required and the NPT or metric thread fittings must be sealed with tape or thread sealant in order to meet the highest level of ingress protection
- When the equipment is supplied with plastic dust plugs in the conduit/cable gland entries; it is the end-user's responsibility to provide cable glands, adaptors and/or blanking plugs suitable for the environment in which the equipment is installed. When installed in a hazardous (classified) location, the cable glands, adaptors and/or blanking plugs shall additionally be suitable for the hazardous (classified) location, the product certification, and acceptable to the local authority having jurisdiction for the installation
- The end-user must consult the manufacturer for repair disclaimers, and only certified parts, supplied by the manufacturer are permitted. No substitutions with nonmanufacturer supplied parts are permitted.
- Tampering and replacement with non-factory components may adversely affect the safe use of the system
- Care must be taken during installation to avoid impacts or friction that could create an ignition source
- Use copper, copper-clad aluminum or aluminum conductors only
- If the devices are connected to a redundant power supply (two separate power supplies), both must meet this requirement
- Substitution of components may impair intrinsic safety
- Explosion hazard, do not disconnect while circuit is live unless area is known to be non-hazardous
- Explosion hazard, substitution of components may impair suitability for Class I, Division 2

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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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VEGA Grieshaber KG
Am Hohenstein 113
77761 Schiltach
Germany

Phone +49 7836 50-0
Fax +49 7836 50-201
E-mail: info.de@vega.com
www.vega.com