Safety instructions
VEGADIS 81

Intrinsic safety "i", "IS"

Document ID: 48924

Contents

Supplementary documentation:

- Operating Instructions VEGADIS 81
- Certificate of Conformity CSA14CA2662675 (Document ID: 48925)
- SIL Safety Manual (Document ID: 50224)

Editing status: 2021-02-23

48924-EN-220222

1 Area of applicability

These safety instructions apply to the VEGADIS 81 of type series:

- DIS81(*).CC*******
- DIS81(*).CO*******

According to Certificate of Conformity CSA14CA2662675 (certificate number on the type label) and for all instruments with safety instruction 48924.

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

- INTRINSICALLY SAFE/SECURITE INTRINSEQUE
- Ex ia IIC T6 … T1 Ga or Gb
- Class I, Zone 0 or 1 A/Ex ia IIC T6 … T1 Ga or Gb, Ta = 60 °C
- Class I, Division 1, Groups A, B, C, D T6 … T1; Class II, Division 1, Groups E, F, G T85 °C; Class III
- T6 … T1: for Class I see " *Technical data*" in this document

2 Important specification in the type code

VEGADIS DIS81(*).abcdefghi

Position		Feature	Description
a	Scope	C	CSA / Canada
b	Approval	C	Class I, Div1, Groups A, B, C, D; Class II, Div 1, Groups E, F, G; Class III; Class I, Zn 0,1 A/Ex ia IIC T6 Ga, Gb
		O	Class I, Div1, Groups A, B, C, D; Class II, Div 1, Groups E, F, G; Class III; Class I, Zn 0,1 A/Ex ia IIC T6 Ga, Gb + Ship approval (DNV GL, BV, RMROS)
c	Electronics	I	Digital (I^2C communication)
d	Housing	A	Aluminium
		V	Stainless steel (precision casting)
		H	Special colour, Aluminium
e	Protection rating	I	IP66/IP67; NEMA 4X
		N	IP66/IP68 (0.2 bar); NEMA 6P
f	Cable entry / Connection	D	M20 x 1.5 / Blind plug
		N	½ NPT / Blind plug
		M	M20 x 1.5 / Cable gland PA black (ø5-9 mm), standard
		*	further cable glands, blind plugs, cable leadthroughs, plug connectors, Conduit system
g	Display and adjustment module PLICSCOM	X	without
		A	mounted
		F	without; lid with inspection window
		K	mounted; with Bluetooth, magnetic pen operation

Position		Feature	Description
h	Mounting type	A	for wall mounting with Aluminium or stainless steel housing
		C	for carrier rail and wall mounting with plastic housing
		D	for carrier rail with Aluminium or stainless steel housing
		E	for tube mounting (29 … 60 mm) incl. mounting material
i	Certificates	X	No
		M	Yes

In the following, all above mentioned versions are called VEGADIS 81. 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 VEGADIS 81 can be either used in explosive dust atmospheres or in explosive gas atmospheres.

If VEGADIS 81 is installed in a dust atmosphere, then the safety instructions 62523 must be noted.

4 General information

The VEGADIS 81 in ignition protection type "Intrinsic safety Ex i, IS" is used for spatially separated scaling, parameter adjustment and visualisation of measured values in conjunction with ignition protection type " *Intrinsic safety Ex i, IS*" certified VEGA sensors.

The VEGADIS 81 and the VEGA sensors communicate via a bus signal.

The VEGADIS 81 are suitable for applications in hazardous atmospheres of all combustible materials of explosion groups IIA, IIB and IIC.

The VEGADIS 81 are suitable for applications requiring EPL Ga or EPL Gb instruments.

The VEGADIS 81 are suitable for applications in hazardous atmospheres of all combustible materials of Class I Groups A, B, C, D, Class II Groups E, F, G and Class III.

The VEGADIS 81 are suitable for applications for Division 1, Division 2.

5 Application area

EPL Ga instrument
The VEGADIS 81 with the mechanical fixing element are installed in hazardous areas of zone 0 requiring EPL Ga instruments.

EPL Gb instrument
The VEGADIS 81 with the mechanical fixing element are installed in hazardous areas of zone 1 requiring EPL Gb instruments.

Division 1, 2 instruments
The VEGADIS 81 with the mechanical fixing element are installed in hazardous areas of Division 1 and Division 2.

6 Special operating conditions

The following overview lists all special features of VEGADIS 81.

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 VEGADIS 81 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
The 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 as follows:

Measurement loop identification label	Capacitance
45 x 23 mm (standard)	21 pF
100 x 30 mm	52 pF
73 x 47 mm	61 pF

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, therefore repairs are not permitted to be conducted by the end user
- 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
- Close the housing lid (s) up to the stop before starting operating, to ensure the IP protection rating specified on the type label

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
- No loose connections of the line connections, equipotential bonding connections
- Correct and clearly marked cable connections

Intrinsic safety "i"
- Valid regulations for connection of intrinsically safe circuits, e.g. proof of intrinsic safety according to IEC/EN 60079-14 must be observed
- The instrument is only suitable for connection to certified, intrinsically safe instruments
- When connecting a circuit with protection level Ex ib, the device, the sensor meas. system of the device must no more be used in hazardous areas of zone 0.
- When connecting an intrinsically safe instruments with classification mark Ex ia to a circuit with protection level Ex ib, then the classification mark of the instrument changes to Ex ib. After the use as instrument with Ex ib power supply, the instrument must no more be used in circuits with protection level Ex ia
- When connecting an intrinsically safe instrument to an non-intrinsically safe circuit, the instrument must be no longer used in intrinsically safe circuits
- With surface temperatures > 60 °C, the cables must be suitable for the higher application conditions (≥ 90 °C)

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 VEGADIS 81

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 CEC or NEC
- The intrinsically safe input and the intrinsically safe output circuits are ground-free. The voltage resistance against ground is min. 500 Veff.
- The supply and signal circuit zwischen dem VEGADIS 81 und dem Sensor should be set up without grounding

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

- 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 on the type label indicates danger:

- WARNING - POTENTIAL ELECTROSTATIC CHARGING HAZARD – SEE INSTRUCTIONS
- AVERTISSEMENT – DANGER POTENTIEL DE CHARGES ELECTROSTATIQUES – VOIR INSTRUCTION

11 Instructions for zone 0 applications

In hazardous areas, the instrument should only be operated under atmospheric conditions:

- Temperature: -20 … +60 °C.
- Pressure: 80 … 110 kPa (0.8 … 1.1 bar)
- Air with normal oxygen content, normally 21 %

If no explosive mixtures or additional application conditions are certified resp. supplementary measures have been taken, then the instruments can be also operated according to the manufacturer specification outside atmospheric conditions.

If there is a risk of dangerous potential differences inside zone 0, then suitable measures for circuits in zone 0 must be taken.

12 Electrical data

VEGADIS DIS81(*).CC/O

Supply and signal circuit:	
Terminals 5, 6, 7, 8	In type of protection intrinsic safety Ex ia IIC.
	For connection to a certified, intrinsically safe circuit. $U_i \leq 6$ V $P_i \leq 332$ mW
	Characteristics: Linear
	C_i negligibly small L_i negligibly small
	For connection to the indicating and adjustment circuit, terminal 5, 6, 7, 8 of the certified VEGA sensors with separate certifications.
	The permissible L_o and C_o values of the connection cable between VEGADIS 81 and the connected sensor are mentioned in the Certificate of Conformity.

Display and adjustment circuit:	
Spring contacts in the connection compartment	In type of protection intrinsic safety Ex ia IIC
	Only for connection to the display and adjustment module PLICSCOM.

The circuits of VEGADIS 81 are galvanically separated from ground.

The metallic parts of VEGADIS 81 are electrically connected with the earth terminals.

13 Thermal data

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

The relationship between the permissible ambient temperature for the electronics housing depending on the area of application and the maximum surface temperatures, temperature classes, can be seen in the following tables.

Division 1/EPL Ga instruments

Temperature class	Ambient temperature (Ta)
T6	-20 … +46 °C
T5, T4, T3, T2, T1	-20 … +60 °C

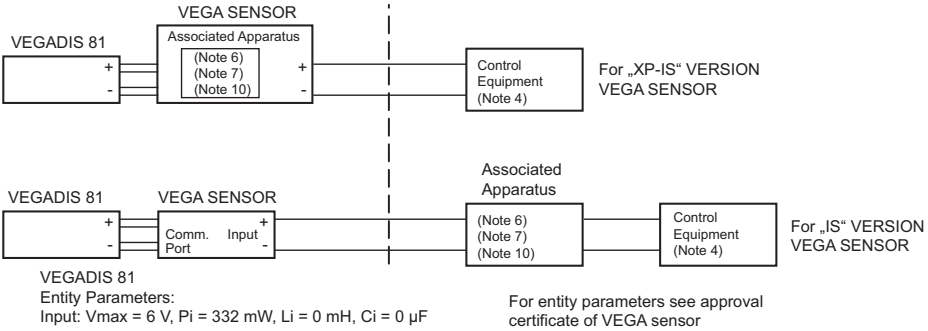
The application conditions during operation without explosion-endangered atmosphere are mentioned in the respective manufacturer instructions, e.g. operating instructions manuals.

Division 1/EPL Gb instruments

Temperature class	Ambient temperature (Ta)
T6	-40 … +46 °C
T5	-40 … +61 °C
T4, T3, T2, T1	-40 … +80 °C

The application conditions during operation without explosion-endangered atmosphere are mentioned in the respective manufacturer instructions, e.g. operating instructions manuals.

14 Installation Diagram GE3338



Comm. Port: Voc = 6 V, Isc = 221.2 mA, Po = 331.7 mW		
Groups	Capacitance Ca (uF)	Inductance La (mH)
IIC / A, B	1.4	1.0
IIB / C or IIIC / E, F, G	8.3	2.0
IIA / D	12	2.0

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_O or V_{OC} or $V_t \leq V_{max}$

I_O or I_{SC} or $I_t \leq I_{max}$

$P_O \leq P_i$

C_a or $C_O \geq C_i + C_{cable}$

L_a or $L_O \geq L_i + L_{cable}$

For Division 2 installations, the Associated Appartus is required to be CSA Certified under Entity Concept if the VEGA-Sensor is installed in accordance with the Canadian Electrial Code, CSA C22.1 Part 1 Appendix F, for division 2 wiring methods excluding Nonincendive field wiring.

Dust-tight conduit seal shall be used when installed in Class II and Class III enviroments.

Control equipment connected to the Associated apparatus shall not use or generate more than 250 Vrms or Vdc.

Division 1 installations should be in accordance with ANSI/ISA RP12.06.01 "Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations" and the Canadian Electrical Code.

The configuration of associated apparatus shall be CSA Certified under Entity Concept.

Associated Apparatus manufacurer'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 equipment.

VEGA Sensor is CSA certified for Class I, Zone 0, applications. If connecting AEx [ib] Associated Apparatus or AEx ib I.S. Field Device to the VEGA Sensor the I.S circuit 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.

No revision to dawing without prior Agency Approval.

WARNING: Substitution of components may impair suitability for hazardous locations.

If the Electrical parameters are unknown, the following values may be used:

C_{cable} = 60 pF/ft (200 pF/m)

L_{cable} = 0.20 µH/ft (0.66 µH/m)

Printing date:

48924-EN-220222

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