Safety instructions
CCOE approval
VEGADIS 82

Intrinsic safety

Document ID: 66466

Contents

Supplementary documentation:

- Operating Instructions VEGADIS 82
- Letter P530508/1, P530509/1 By Government of India (Document ID: 56294)

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1 Area of applicability

These safety instructions apply to the VEGADIS 82 of type series:

- DIS82(*).DC*******
- DIS82(*).DO*******

According to Letter P530508/1, P530509/1 By Government of India (certificate number on the type label) and for all instruments with safety instruction 66466.

The classification as well as the respective standards are stated in the above certificates:

- IEC 60079-0: 2017
- IEC 60079-11: 2011

Type of protection marking:

- Ex ia IIC T6 … T1 Ga
- Ex ia IIC T6 … T1 Gb

2 Important specification in the type code

VEGADIS 82 version DIS82(*).abcdefghi

Position		Feature	Description
a	Scope	D	India
b	Approval	C	Ex ia IIC T6 … T1 Ga, Gb
		O	Ex ia IIC T6 … T1 Ga, Gb + Ship approval (DNV GL, BV, RMROS)
c	Electronics	X	4 … 20 mA
		H	4 … 20 mA/HART
d	Housing	K	Plastic
		A	Aluminium
		V	Stainless steel (precision casting)
		H	Special colour, Aluminium
		S	for panel mounting (72 x 72 mm)
e	Protection rating	I	IP66/IP67; NEMA 4X
		N	IP66/IP68 (0.2 bar); NEMA 6P
		S	IP40; NEMA 1
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
		J	½ NPT / Cable gland PA black (ø5-9 mm)
		*	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
		F	for panel mounting
i	Certificates	X	No
		M	Yes

In the following, all above mentioned versions are called VEGADIS 82. 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 VEGADIS 82 is used for separate scaling, parameter adjustment and visualization of measured values in conjunction with 4 … 20 mA and HART sensors.

The VEGADIS 82 is looped into the intrinsically safe 4 … 20 mA circuit of the sensor.

The VEGADIS 82 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.

For applications requiring instruments of EPL Gb, the intrinsically safe power supply and signal circuit can correspond to protection class ia or ib. For connection to a circuit with protection class ib, the ignition protection type identification is Ex ib IIC T6 … T1.

If the VEGADIS 82 are installed and operated in hazardous areas, the general Ex installation regulations IEC 60079-14 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.

4 Application area

EPL Ga instrument
The VEGADIS 82 are installed in hazardous areas requiring EPL Ga instruments.

EPL Gb instrument
The VEGADIS 82 is installed in hazardous areas requiring EPL Gb instruments.

5 Specific conditions of use ("X" identification)

The following overview is listing all special properties of VEGADIS 82, 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
You can find the details in chapter " *Thermal data*" of these safety instructions.

Impact and friction sparks
The VEGADIS 82 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

6 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 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 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 > 70 °C, the cables must be suitable for the higher application conditions

7 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 82
- For assessment and reduction of the explosion risk, valid standards such as for example ISO/EN 1127-1 must be taken into account

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
- 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 82 und dem Sensor should be set up without grounding

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 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 such as e.g. according to EN 1127-1 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, e.g. according to the requirements of IEC/EN 60079-14.

11 Electrical data

DIS82.IC/O/HX****

Supply and signal circuit:	
Terminals 1, 2, 3, 4	In type of protection intrinsic safety Ex ia IIC.
	For connection to a certified, intrinsically safe circuit. ● $U_i \leq 30$ V DC ● $I_i \leq 131$ mA ● $P_i \leq 983$ mW (resistively limited) ● $P_i \leq 700$ mW (rectangular) ● C_i = negligibly small ● $L_i \leq 5$ 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 ≤ 700 mW rectangular	N/A
Effective internal capacitance C_i	negligibly small	N/A
Effective internal inductance L_i	5 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.
Max. outer inductance L_o	N/A	L_o value, according to the certified, intrinsically safe power supply reduced by 5 µH.
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, L_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	In type of protection 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 circuits of VEGADIS 82 are galvanically separated from ground.

DIS82.IC/O/HH****

Supply and signal circuit:	
Terminals 1, 2, 3, 4	In type of protection intrinsic safety Ex ia IIC.
	For connection to a certified, intrinsically safe circuit. ● $U_i \leq 30$ V DC ● $I_i \leq 131$ mA ● $P_i \leq 983$ mW (resistively limited) ● $P_i \leq 700$ mW (rectangular) ● $C_i \leq 3.5$ nF ● $L_i \leq 75$ 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 ≤ 700 mW rectangular	N/A
Effective internal 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 µH.
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, L_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	In type of protection intrinsic safety Ex ia IIC
	Maximum values: ● $U_o \leq 6$ V DC ● $I_o \leq 210$ mA ● $P_o \leq 315$ mW ● $C_o = 40$ µF ● $L_o = 0.75$ mH
	For connection to the display and adjustment module PLICSCOM.

The circuits of VEGADIS 82 are galvanically separated from ground.

12 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.

In the version DIS82.IC/O/HX**** with terminal blocks**

Permissible ambient temperatures depending on temperature class

EPL Ga instrument

Temperature class	Temperature on the electronics housing
T6	-40 … +28 °C
T5	-40 … +40 °C
T4, T3, T2, T1	-40 … +60 °C

The pressure of the explosive mixtures in applications requiring EPL Ga instruments must be between 0.8 … 1.1 bar. For the specified permitted ambient temperatures on the electronics housing, paragraph 6.4.2 of EN 1127-1 was taken into account. You can find the permissible operating temperatures without explosive atmosphere in the corresponding manufacture specifications, e.g. in the operating instructions.

EPL Gb instrument

Temperature class	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 the version DIS82.IC/O/HH***** with terminal blocks**

Permissible ambient temperatures depending on temperature class

EPL Ga instrument

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

The pressure of the explosive mixtures in applications requiring EPL Ga instruments must be between 0.8 … 1.1 bar. For the specified permitted ambient temperatures on the electronics housing, paragraph 6.4.2 of EN 1127-1 was taken into account. You can find the permissible operating temperatures without explosive atmosphere in the corresponding manufacture specifications, e.g. in the operating instructions.

EPL Gb instrument

Temperature class	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.

Confirmation

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

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