



Safety instructions

VEGATRENN 141, 142

Installation in non-Ex area
with output intrinsic safety "i"



Document ID: 64571



VEGA

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Supplementary documentation:

- Operating Instructions VEGATRENN 141, 142
- Certificate of Compliance cULus E490658 (Document ID: 64572)

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1 Area of applicability

These safety instructions apply to the devices:

- VEGATRENN 141
- VEGATRENN 142

In accordance with the Certificate of Compliance cULus E490658, as associated equipment (certificate number on type plate) and for all devices with safety instruction 64571.

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

Type of protection marking:

- Associated Apparatus for use in Unclassified locations
- providing IS circuits for use in Hazardous Location
- CI I, Grps A, B, C, D, CI II, Grps E, F, G, CI III
- CI I Zone 0 Grp IIC, Zone 20 Grp IIIC
- [AEx ia Ga] IIC, [AEx ia Da] IIIC
- [Ex ia Ga] IIC X, [Ex ia Da] IIIC X

2 Device configuration/-properties

The detailed device configurations can be retrieved using the serial number search on our homepage.

Move to "www.vega.com" and enter in the search field the serial number of your instrument.

Alternatively, you can find all via your smartphone:

- Download the VEGA Tools app from the "*Apple App Store*", "*Google Play Store*" or "*Baidu Store*"
- Scan the DataMatrix code on the type label of the instrument or
- Enter the serial number manually in the app

3 General information

The single and double channel separators VEGATRENN 141, 142 are used for galvanic separation, intrinsically safe power supply as well as signal transmission of Ex approved 4 ... 20 mA sensors in hazardous areas.

The separators are ideal in conjunction with signal conditioning instruments, e.g. PLC, having no own Ex-approval and have to allow bidirectional HART transmission.

The instruments are used for separation of intrinsically safe and non-intrinsically safe circuits and intrinsically safe supply of field sensors.

The VEGATRENN 141, 142 are active separators, detecting the intrinsically safe current of a sensor in Ex area and making it available to a non-intrinsically safe, passive output.

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-protected systems must always be carried out by qualified personnel.

4 Application area, use in gas and dust atmospheres (zones and divisions)

Associated apparatus

The VEGATRENN 141, 142 may be installed and operated outside of hazardous areas as associated equipment.

5 Special operating conditions

The following overview is listing all special properties of VEGATRENN 141, 142, which make a labelling with the symbol "X" behind the certificate number necessary.

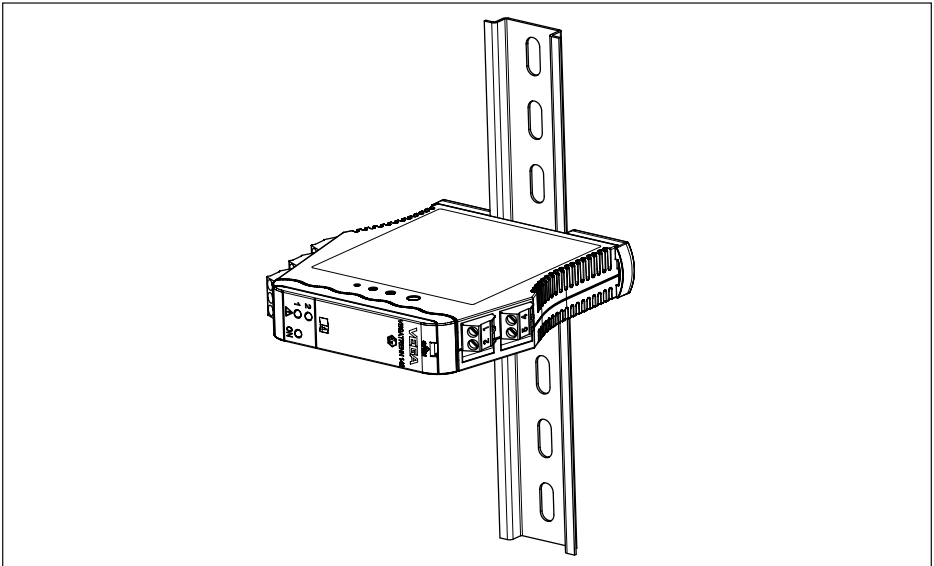
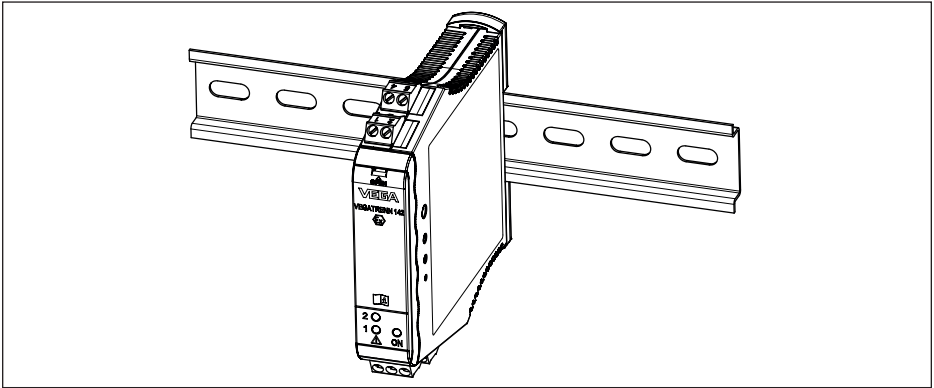
Ambient temperature

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

The installer must ensure that the rated ambient temperature range of the device is not exceeded when it is installed in a housing together with other devices and that adequate separation is provided around the device.

Mounting options

The VEGATRENN 141, 142 must be mounted horizontally or vertically on a wall mounting rail (DIN rail).



6 Safe operating mode

General operating conditions

- Do not operate the instrument outside the electrical, thermal and mechanical specifications of the manufacturer

Connection conditions

- The connection cable of VEGATRENN 141, 142 has to be wired fix and in such a way that damages can be excluded
- If the temperature at the entry parts exceeds 60 °C, temperature-resistant connection cables must be used

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 ANSI/ISA RP12.06.01 „Installation of Intrinsically Safe Systems for Hazardous (Classifies) Locations“ and the National Electrical Code® (ANSI/NFPA 70) or Canadian Electrical Code
- 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.

Mounting

Keep in mind for instrument mounting

- Mechanical damage on the instrument must be avoided
- Mechanical friction must be avoided

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"

- Observe the valid regulations for connection of intrinsically safe circuits, e.g. proof of intrinsic safety in accordance with ANSI/ISA RP12.06.01 „Installation of Intrinsically Safe Systems for Hazardous (Classifies) Locations“ and the National Electrical Code® (ANSI/NFPA 70) or Canadian Electrical Code.
- The instrument is only suitable for connection to certified, intrinsically safe instruments
- If the intrinsically safe circuit is led into dust-explosive areas of zone 20, 21 or Div 1, Div 2, please make sure that the instruments connected to these circuits meet the requirements of the device protection level (EPL) Da, Db or Div 1, Div 2 and are certified respectively

8 Electrical data

VEGATRENN 141, 142

Non-intrinsically safe circuit

Supply circuit:	VEGATRENN 141
Terminals 16[+, L], 17[-, N]	$U = 24 \dots 65 \text{ V DC } (-15 \dots +10 \%)$ $P = 3 \text{ W}$ $U = 24 \dots 230 \text{ V AC } (-15 \dots +10 \%), 50/60 \text{ Hz}$ $P = 15 \text{ VA}$ $U_m = 253 \text{ V AC}$

Supply circuit:	VEGATRENN 142
Terminals 16[+, L], 17[-, N]	$U = 24 \dots 31 \text{ V DC } (-15 \dots +10 \%)$ $P = 5 \text{ W}$ $U_m = 253 \text{ V AC}$

Current output circuit:	
$I_{out 1}$, terminals 10, 11, 12[-] In addition only VEGATRENN 142: $I_{out 2}$, terminals 13, 14, 15[-]	$I = 4 \dots 20 \text{ mA/HART aktiv}$ $U \leq 16.5 \text{ V DC}$ Load $\leq 600 \text{ Ohm}$ (without integrated HART resistor) $U_m = 253 \text{ V AC}$

Intrinsically safe circuit

Supply and signal circuit:	
4 ... 20 mA sensor 1: Terminals 1[+], 2[-] In addition only VEGATRENN 142:	In type of protection intrinsic safety Ex ia IIC, IIB/IIIC.
4 ... 20 mA sensor 2: Terminals 4[+], 5[-]	For connection to a certified, intrinsically safe circuit. $U_o/V_{oc} \leq 26.3 \text{ V DC}$ $I_o/I_{sc} \leq 100 \text{ mA}$ $P_o \leq 658 \text{ mW}$
	Characteristics: linear
	$C_i = 1.2 \text{ nF}$ L_i negligibly small
	The maximum values given in the table can be used as concentrated capacitances and concentrated inductances. The values for IIC and IIB are also permissible for dust explosive areas.

Ex ia	IIC, Gp A, B		IIB, Gp C or IIIC, Gp E, F, G		IIA, Gp D
Permissible external inductance L_o/L_a	0.2 mH	1 mH	0.2 mH	2 mH	10 mH
Permissible external capacitance C_o/C_a	95.8 nF	54.8 nF	618.8 nF	328.8 nF	508.8 nF
Permissible outer L_o/R_o -ratio	-	-	216 $\mu\text{H}/\text{Ohm}$	216 $\mu\text{H}/\text{Ohm}$	433 $\mu\text{H}/\text{Ohm}$

The intrinsically safe circuits of VEGATRENN 141, 142 are galvanically separated from ground.

The intrinsically safe circuits of the VEGATRENN 141, 142 are reliably separated from the non-intrinsically safe circuit up to a peak value of 375 V.

The maximum voltage on the non-intrinsically safe circuits must not exceed 253 Vrms in the event of a fault.

9 Mechanical data

The following mechanical data are valid for all housing and electronics versions.

Mechanical data	
Protection (IEC/EN 60529)	IP20
Connection cross-section:	0.25 ... 2.5 mm ²
Overvoltage category	II
Pollution degree	2

10 Thermal data

Permissible ambient temperatures

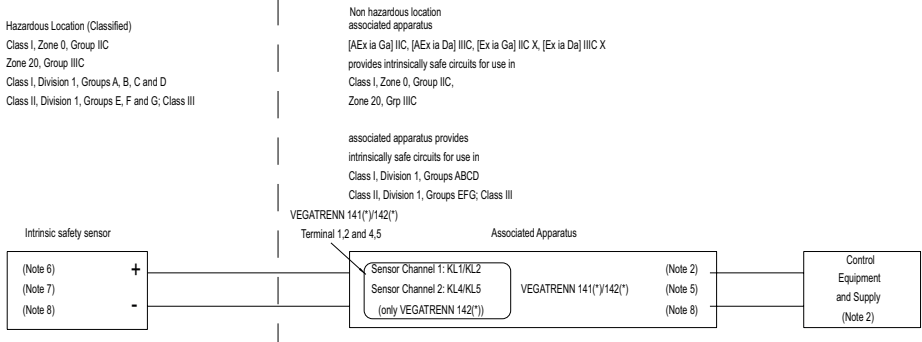
Permissible ambient temperature at the installation location of an instrument	Ambient temperature (Ta)
As associated equipment	-20 ... +60 °C (-4 ... +140 °F)

11 Installation

VEGATRENN 141, 142 as associated equipment must be mounted and operated outside hazardous areas.

If the intrinsically safe circuit is led into dust-explosive areas of zone 20, 21 or Class II Div 1, Div 2, please make sure that the instruments connected to these circuits meet the requirements of the device protection level (EPL) Da, Db or Div 1, Div 2 and are certified respectively.

12 Control drawing VEGATRENN 141(*), VEGATRENN 142(*)



VEGATRENN 141(*), VEGATRENN 142(*)

Terminal connection cross-section:	0.25 ... 2.5 mm ²
Terminal torque:	0.4 ... 0.5 Nm
Ambient temperature range:	-20 ... +60 °C

Supply circuit:	VEGATRENN 141
Terminals 16[+, L], 17[-, N]	U = 24 ... 65 V DC (-15 ... +10 %) P = 3 W U = 24 ... 230 V AC (-15 ... +10 %), 50/60 Hz P = 15 VA U _m = 253 V AC

Supply circuit:	VEGATRENN 142
Terminals 16[+, L], 17[-, N]	U = 24 ... 31 V DC (-15 ... +10 %) P = 5 W U _m = 253 V AC

Current output circuit:	
I _{out 1} , terminals 10, 11, 12[-] In addition only VEGATRENN 142: I _{out 2} , terminals 13, 14, 15[-]	I = 4 ... 20 mA/HART aktiv U ≤ 16.5 V DC Load ≤ 600 Ohm (without integrated HART resistor) U _m = 253 V AC

Supply and signal circuit:	
4 ... 20 mA sensor 1: Terminals 1[+], 2[-] In addition only VEGATRENN 142:	In type of protection intrinsic safety Ex ia IIC, IIB/IIIC.
4 ... 20 mA sensor 2: Terminals 4[+], 5[-]	For connection to a certified, intrinsically safe circuit. $U_o/V_{oc} \leq 26.3 \text{ V DC}$ $I_o/I_{sc} \leq 100 \text{ mA}$ $P_o \leq 658 \text{ mW}$
	Characteristics: linear
	$C_i = 1.2 \text{ nF}$ L_i negligibly small
	The maximum values given in the table can be used as concentrated capacitances and concentrated inductances. The values for IIC and IIB are also permissible for dust explosive areas.

The maximum values of L_o/L_a , C_o/C_a from the table apply, when circuits are connected.

With combined inductances and capacitances considered as concentrated reactances.

Ex ia	IIC, Gp A, B		IIB, Gp C or IIIC, Gp E, F, G		IIA, Gp D
Permissible external inductance L_o/L_a	0.2 mH	1 mH	0.2 mH	2 mH	10 mH
Permissible external capacitance C_o/C_a	95.8 nF	54.8 nF	618.8 nF	328.8 nF	508.8 nF
Permissible outer L_o/R_o -ratio	-	-	216 $\mu\text{H}/\text{Ohm}$	216 $\mu\text{H}/\text{Ohm}$	433 $\mu\text{H}/\text{Ohm}$

The values of the following table are the maximum values acc. UL60079-11 Annex A and can be used up to the permissible limits as distributed reactances.

For installations in which both the C_i and L_i of the intrinsically safe apparatus exceeds 1 % of the C_a (or C_o) and L_a (or L_o) parameters of the associated apparatus (excluding the cable), then 50 % of C_a (or C_o) and L_a (or L_o) parameters are applicable and shall not be exceeded. The reduced capacitance shall not be greater than 1 μF for Groups C and/or D, and 600 nF for Groups A and B. Alternatively refer to the table for combined inductances and capacitances above.

Ex ia	IIC, Grp A, B	IIB, Grp C or IIIC, Grp E, F, G	IIA, Grp D
Max. permissible external inductance L_o/L_a	3.55 mH	14.22 mH	28.44 mH
Max. permissible external capacitance C_o/C_a	95.8 nF	738.8 nF	2508.8 nF

Notes:

- The Intrinsic Safety Entity concept allows the interconnection of two intrinsically safe devices, cULus certified 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 $L_o \geq L_i + L_{cable}$
- Control equipment connected to the Associated Apparatus shall not use or generate more than 250 Vrms or Vdc with respect to earth.
- Installation shall be in accordance with ANSI/ISA-RP12.06.01 "Intrinsic Safety Wiring Methods for Hazardous (Classified) Locations Instrumentation" and the Canadian Electrical Code for Canada or the National Electrical Code for the US or other local codes, as applicable.
- Capacitance and inductance of the field wiring from the intrinsically safe equipment to the barrier

shall be calculated and has to be included in the system calculations. Cable capacitance (C_{cable}) plus intrinsically safe equipment capacitance (C_i) must be less than the marked capacitance (C_a) shown on any barrier used. The same applies for inductance (L_c , L_i and L_a , respectively). Where the cable capacitance and inductance per foot are not known, the following values shall be used for two or three core cables: $C_{\text{cable}} = 60 \text{ pF/ft}$, $L_{\text{cable}} = 0.2 \text{ uH/ft}$.

5. Associated apparatus must be installed in an enclosure suitable for the application in accordance with the National Electrical Code (ANSI/NFPA 70) for installation in the US, the Canadian Electrical Code for installations in Canada, or other local codes, as applicable.

6. The configuration of Field device must be cULus/FM/CSA listed under Entity Concept

7. Field sensors/device manufacturer's installation drawing shall be followed when installing this equipment

8. No revision to drawing without prior Approval by UL.

9. The installer must ensure that the rated ambient temperature range of the equipment is not exceeded when installed in an enclosure with other equipment and that sufficient separation is provided around the device.

10. The installation orientation of the device must be in accordance with the instructions.

11. Live maintenance is not permitted.

Printing date:

VEGA

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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