



# Safety Instructions

## VEGASON SN6\*.UF

FM16US0400X

Installation control diagram

GE 2158, GE 2308



Document ID: 30468



# VEGA



## CERTIFICATE OF CONFORMITY

1. **HAZARDOUS (CLASSIFIED) LOCATION ELECTRICAL EQUIPMENT PER US REQUIREMENTS**

- 2. **Certificate No:** FM16US0400X
- 3. **Equipment:** VEGASON Models 61 & 62 Series  
**(Type Reference and Name)** Ultrasonic Level Transmitters
- 4. **Name of Listing Company:** VEGA Grieshaber KG
- 5. **Address of Listing Company:** Am Hohenstein 113  
Schiltach, D-77761  
Germany

6. The examination and test results are recorded in confidential report number:

3020088 dated 23<sup>rd</sup> December 2004

7. FM Approvals LLC, certifies that the equipment described has been found to comply with the following Approval standards and other documents:

FM Class 3600:2011, FM Class 3610:2010, FM Class 3611:2004, FM Class 3616:2011,  
FM Class 3810:2005, ANSI/ISA 60079-0:2009, ANSI/ISA 60079-11:2009, ANSI/ISA 61010-1:2004,  
ANSI/NEMA 250:1991, ANSI/IEC 60529:2004

- 8. If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to specific conditions of use specified in the schedule to this certificate.
- 9. This certificate relates to the design, examination and testing of the products specified herein. The FM Approvals surveillance audit program has further determined that the manufacturing processes and quality control procedures in place are satisfactory to manufacture the product as examined, tested and Approved.

**Certificate issued by:**



J. E. Marquedant  
Manager, Electrical Systems

19 April 2017  
Date

To verify the availability of the Approved product, please refer to [www.approvalguide.com](http://www.approvalguide.com)

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F 347 (Mar 16)

Page 1 of 5

**SCHEDULE**

US Certificate Of Conformity No: FM16US0400X

## 10. Equipment Ratings:

## I. VEGASON IS (Div 1) Version

Intrinsically Safe Apparatus for use in Class I, Division 1 or 2, Groups A, B, C & D, Class II, Division 1 or 2, Groups E, F & G, Class III, Division 1 or 2, in accordance with manufacturer's Control Drawing; Intrinsically Safe Apparatus AEx ia for use in Class I, Zone 0, Zone 1, or Zone 2, Group IIC, in accordance with manufacturer's Control Drawing; Intrinsically Safe Apparatus with Fieldbus Intrinsically Safe Concept Wiring for use in Class I, Division 1 or 2, Groups A, B, C & D, Class II, Division 1 or 2, Groups E, F & G, Class III, Division 1 or 2, in accordance with manufacturer's Control Drawing; Intrinsically Safe Apparatus AEx ia with Fieldbus Intrinsically Safe Concept Wiring for use in Class I, Zone 0, Zone 1, or Zone 2, Group IIC, in accordance with manufacturer's Control Drawing; Nonincendive Apparatus for use in Class I, Division 2, Groups A, B, C & D, Class II, Division 2, Groups F & G, Class III, Division 1 or 2; Nonincendive for use in Class I, Zone 2, Group IIC hazardous (classified) locations, Type 4X/6P and IP66

## II. VEGASON DIP &amp; NI (Div 1 &amp; 2) Version

Dust Ignitionproof Apparatus for use in Class II, Division 1 or 2, Groups E, F & G; Class III, Division 1 or 2; Nonincendive Apparatus for use in Class I, Division 2, Groups A, B, C & D, Class II, Division 2, Groups F & G, Class III, Division 1 or 2; Nonincendive for use in Class I, Zone 2, Group IIC hazardous (classified) locations, Type 4X/6P and IP66

## 11. The marking of the equipment shall include:

## I. VEGASON IS (Div 1) Version

IS CL I,II,III DIV 1 GP ABCDEFG CL I Zone 0 AEx ia IIC (T4 @ 80°C, T5 @ 80°C or T6 @ 70°C)\*\*  
Intrinsically Safe per Dwg GE2158 Entity  
FISCO\*\*\* Field Device per Dwg GE2308  
Type 4X/6P\*, IP66

## II. VEGASON DIP &amp; NI (Div 1 &amp; 2) Version

CL II,III DIV 1 GP EFG Ta = -40°C to 80°C  
CL I Zone 2\*\*\*\* AEx nA IIC (T4 @ 80°C, T5 @ 80°C or T6 @ 70°C)\*\*  
CL I DIV 2\*\*\*\* GP ABCD  
CL II,III DIV 2\*\*\*\* GP FG  
Type 4X/6P\*, IP66

\* Enclosure Type 6P rating is available only for Housing options K and V

\*\* For Indicator Control Module (PLICSCOM) options A or B, T5 at Ta = 80 °C; for option X, T6 at Ta = 70 °C

\*\*\* FISCO certification available only for Electronics options F or P

\*\*\*\* Non-Incendive for Class I Div 2 and Zone 2 is available only for "Indicator Control Module (PLICSCOM)" model codes A, B, and X

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F 347 (Mar 16)

Page 2 of 5

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**12. Description of Equipment:**

**General** - The VEGASON 61 and 62 Series Ultrasonic Level Transmitters are used for non-contact and continuous distance measurement. The VEGASON utilizes ultrasonic technology to measure level. It emits a signal from its ultrasonic sensor to the targeted process medium to be measured, and the reflected signal bounces off the process medium and is received and processed by the VEGASON, then output as an electrical signal proportional to the level measured. The VEGASON is designed to measure solids as well as liquids and also has an optional LCD display that is integrally mounted.

Adjustments can be made with an optional PLICSCOM internal display. The PLICSCOM connects inside the VEGASON into a spring connector moulded into the top of the communication/signal processing assembly specifically designated for the PLICSCOM. Access to the PLICSCOM requires the enclosure to be opened.

**Construction** - The circuitry for the VEGASON is contained on a multiple printed circuit board that is mounted and encapsulated into two plastic shells, one for the communication and signal processing and another for the sensor assembly. The communication/signal processing shell is mounted inside an enclosure and the sensor shell mounts to the outside bottom. There are four variations of the enclosure for the VEGASON series, one polycarbonate, one Stainless Steel, and two Aluminum versions. Both versions of the Aluminum enclosure provide two cover options, one with a window for the PLICSCOM internal display, and the standard cover without a window. The standard single chamber Aluminum enclosure contains a single cover on the top of the enclosure. The double chamber version of the enclosure is a double compartment housing with two thread-on covers, a solid and a windowed. The electronics enclosure is mounted directly to the sensing element. This enclosure has a tool secured access cover. The enclosure are supplied with two conduit openings that are either 1/2 NPT or M20 for field wiring purposes.

**Ratings** - The VEGASON communicates with conventional 4...20 mA current loop, HART, Fieldbus and Profibus. The 4...20 mA / HART version operates at 36 VDC. The Fieldbus and Profibus versions operate on a supply of 26 VDC. Refer to GE2158 and GE2308 for IS Entity and FISCO parameters, respectively.

I. VEGASON IS (Div 1) Version

**SN 6a.Ubcdefgh, Level Measuring Equipment.**

- a = Configuration: 1, 2, 1Y or 2Y
- b = Agency Approval: F
- c = Version: A
- d = Two character code representing process connection (ASME, DIN, G, LA, NPT or TRI-CLAMP), material process connection, material transducer and pressure ratings
- e = Electronics: F, H or P
- f = Housing Type: A, D, K or V
- g = Cable Entry: M or N
- h = Indicator Control Module (PLICSCOM): A, B or X

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F 347 (Mar 16)

Page 3 of 5

30468-EN-170427

**SCHEDULE**

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## II. VEGASON DIP &amp; NI (Div 1 &amp; 2) Version

**SN 6a.Ubcdefgh, Level Measuring Equipment.**

a = Configuration: 1, 2, 1Y or 2Y

b = Agency Approval: X

c = Version: A

d = Two character code representing process connection (ASME, DIN, G, LA, NPT or TRI-CLAMP), material process connection, material transducer and pressure ratings

e = Electronics: F, H or P

f = Housing Type: A, D, K or V

g = Cable Entry: M or N

h = Indicator Control Module (PLICSCOM): X, A, B, K, U, L, S or F

13. **Specific Conditions of Use:**

## I. VEGASON IS (Div 1) Version

1. Potential Electrostatic Charging Hazard – The enclosure is constructed from plastic. To prevent the risk of electrostatic sparking the plastic surface should only be cleaned with a damp cloth.
2. Enclosures containing Aluminum constitute a potential risk of ignition by impact or friction. Care must be taken into account during installation and use to prevent impact or friction.

## II. VEGASON DIP &amp; NI (Div 1 &amp; 2) Version

1. Potential Electrostatic Charging Hazard – The enclosure is constructed from plastic. To prevent the risk of electrostatic sparking the plastic surface should only be cleaned with a damp cloth.

14. **Test and Assessment Procedure and Conditions:**

This Certificate has been issued in accordance with FM Approvals US Certification Requirements.

15. **Schedule Drawings**

A copy of the technical documentation has been kept by FM Approvals.

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F 347 (Mar 16)

Page 4 of 5



**SCHEDULE**



US Certificate Of Conformity No: FM16US0400X

**16. Certificate History**

Details of the supplements to this certificate are described below:

Date	Description
23 <sup>rd</sup> December 2004	Original Issue.
19 <sup>th</sup> April 2017	<p><b>Supplement 9:</b>                      Report Reference: - RR208970 dated 19<sup>th</sup> April 2017                      Description of the Change: Drawing and model code listing changes to incorporate additional "Indicator Control Module (PLICSCOM)" display electronics options K, U, L, S, and F for non-IS/NI versions. FM Class 3616:2011 standard is added per evaluation satisfactorily conducted for Projects 3045925 and 3054428.                      Temperature ratings were clarified on labels. Changes do not affect safety nor types of protection.</p>

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F 347 (Mar 16)

Page 5 of 5

Unclassified Location

Hazardous (Classified) Location  
 Class I, Zone 0, Group IIC  
 Class I, Division 1 and 2, Groups A, B, C, and D  
 Class II, Division 1, Groups E, F, and G  
 Class II, Division 2, Groups F, and G  
 Class III  
 T4 @ 80°C WITH PLICSCOM  
 T6 @ 70°C OR T5 @ 80°C WITHOUT PLICSCOM  
 (Note 3)



Comm. Port	
Voc=7.5V, Isc=221mA, Po=415mW	
Groups	Inductance La (mH)
IIC/A,B	0.7
IIIB/C,E	3.0
IIA/D,F,G	5.7
	Capacitance Ca (uF)
	11.1
	174
	1000

HART

Entity Parameters: Input: Vmax=36V, Imax=131mA,  
 Pi=0.667W, Ci=0nF, Li=0mH  
 PROFIBUS AND FIELDBUS

Entity Parameters: Input: Vmax=26.6V, Imax=363mA,  
 Pi=1.7W, Ci=0nF, Li=0mH

FISCO Field Device

Input Parameters: U: =17.5V, I: =500mA, Pi=5.5W



Notes:

- 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  $V_{oc}$  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  $L_o \geq L_i + L_{cable}$ ,  $P_o \leq P_i$ .
- 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 VEGASON 60 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.
- 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 installations should be in accordance with ANSI/ISA RP12.06.01 "Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations" and the National Electrical Code®(ANSI/NFPA 70) or Canadian Electrical Code.
- For Division 1 installations, the configuration of associated Apparatus shall be FM Approved/CSA Certified under Entity Concept.
- Associated Apparatus manufacturer's installation drawing shall be followed when installing this equipment.
- The configuration of Field Device must be FM Approved/CSA Certified under Entity Concept.
- The Field Device manufacturer's installation drawing shall be followed when installing this equipment.
- The VEGASON 60 Series are FM Approved/CSA Certified for Class I, Zone 0, applications. If connecting AEx[ib] Associated Apparatus or AEx ib I.S. Field Device to the VEGASON 60 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.
- No revision to drawing without prior Approval by FM Approvals and CSA International.
- Barriers and Instruments to carry same Agency Approval.
- See manual for FISCO requirements.

ECO NUMBER	SYM	REVISION	BY	check
1		CHGD. T RATINGS.	T.R.B. 08/21/05	K.G. 09/27/05
2		ADDED NOTE 12	GES 11/03/04	K.G. 11/03/04
3		FISCO PARAMS & NOTE 13	GES 01/02/07	K.G. 01/02/07

MADE FROM GE2021

OHMART B7M NUMBER	VE207442
DRAWING NUMBER	GE2158
<b>OHMART VEGA</b>	4241 Allendorf Drive Cincinnati, Ohio 45209 USA
<b>INSTALLATION CONTROL DIAGRAM:</b>	
VEGASON 60	
FM/CSA DIVISION 1 INSTRUMENTS	
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T.R.B. 11/03/04	K.G. 11/03/04
B-GE2158	

**FISCO rules**

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 receive and remain intrinsically safe, considering faults, must be equal or greater than the voltage ( $U_o, V_{oc}, V_t$ ), 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  $\mu$ H respectively.

In each I.S. Fieldbus segment only one active source, normally the associated apparatus, is allowed to provide the necessary power for the Fieldbus system. The allowed voltage ( $U_o, V_{oc}, V_t$ ) of the associated apparatus used to supply the bus must be limited to the range of 14V d.c. to 24V d.c. 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  $\mu$ 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 comply with the following parameters:

Loop resistance  $R_l$ : 15 ... 150  $\Omega$ /KM

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

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

$C' = C' \text{ line/line} + 0.5 C' \text{ line/screen}$ , if both lines are floating

or

$C' = C' \text{ line/line} + C' \text{ line/screen}$ , if the screen is connected to one line

Length of spur Cable: max. 30m

Length of trunk cable: max. 1Km

Length of splice: max. 1m

**Terminators**

At each end of the trunk cable an approved line terminator with the following parameters is suitable:

$R = 90 \dots 100 \Omega$

$C = 0 \dots 2.2 \mu\text{F}$

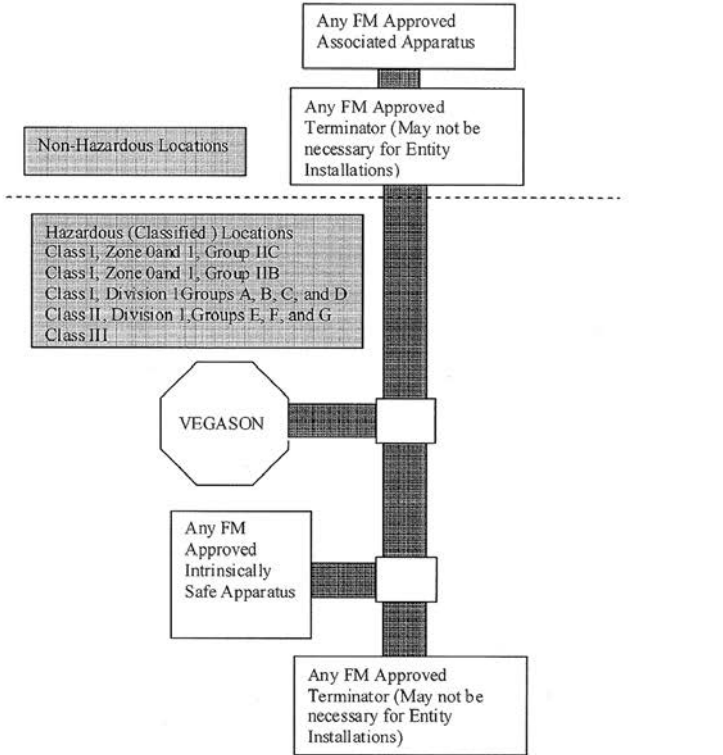
**System evaluation**

The number of passive devices like transmitters, actuators, connected to a single bus segment is not limited due to I.S. reasons. Furthermore, if the above rules are respected, the inductance and capacitance of the cable need not to be considered and will not impair the intrinsic safety of the installation.

**Installation Notes For FISCO and Entity Concepts:**

- The Intrinsic Safety Entity concept allows the interconnection of FM Approved 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  $C_o \geq 3C_i + 3C_{cable}$ ,  
For inductance use either  $L_a$  or  $L_o \geq 3L_i + 3L_{cable}$  or  $L_o/R_o \leq (L_a/R_a \text{ or } L_o/R_o)$  and  $L_i/R_i \leq (L_a/R_a \text{ or } L_o/R_o)$
- The Intrinsic Safety FISCO concept allows the interconnection of FM Approved Intrinsically safe devices with FISCO 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  $I_t \leq I_{max}$ ,  $P_o \leq P_i$ .
- Dust-tight conduit seals must be used when installed in Class II and Class III environments.
- Control equipment connected to the Associated Apparatus must not use or generate more than 250  $V_{rms}$  or  $V_{dc}$ .
- Installation should be in accordance with ANSI/ISA RP12.6 (except chapter 5 for FISCO Installations)  
"Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations" and the National Electrical Code® (ANSI/NFPA 70) Sections 504 and 505.
- The configuration of associated Apparatus must be Factory Mutual Research Approved under the associated concept.
- Associated Apparatus manufacturer's installation drawing must be followed when installing this equipment
- The (Product Name) Series are Approved for Class I, Zone 0, applications. If connecting AEx[ib] associated Apparatus or AEx ib I.S. Apparatus to the (Product Name) Series the I.S. circuit is only suitable for Class I, Zone 1, or Class I, Zone 2, and is not suitable for Class I, Zone 0 or Class I, Division 1, Hazardous (Classified) Locations".
- No revision to drawing without prior Factory Mutual Research Approval.
- Simple Apparatus is defined as a device that does not generate more than 1.5V, 0.1A or 25mW.

Concept	Groups	Vmax (V)	I <sub>max</sub> (mA)	P <sub>max</sub> (W)	C <sub>i</sub> (nF)	L <sub>i</sub> (μH)
Entity	IIC/ ABCDEFGF	24	250	1.2	0	5
FISCO	IIC/ ABCDEFGF	17.5	500	5.5		
FISCO	IIB/ CDEFG	17.5	500	5.5		



OHMART B/M NUMBER	—
OHMART IDENTIFICATION NUMBER	GE2308
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<b>VEGASON</b> FISCO and Entity Rules	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES:	
INCHES: FRACTION - ±1/16	METRIC: mm - ±1
DECIMAL: .XX - ±0.01	.X - ±0.3
.XXX - ±0.005	.XX - ±0.13
.XXXX - ±0.0005	.XXX - ±0.013
FEATURE POSITION: CAST OR WELD ± 1/8" ANGLES ± 1/2"	
FILLET SIZE: CAST OR WELD ±15% OF STATED SIZE	
FILLETS AND RADI WILL BE 1/32" UNLESS NOTED	
SURFACE FINISH 125/ BREAK ALL SHARP EDGES	
MATERIAL	PAINT USAGE
MATERIAL PL.#	MADE FROM
FINISH	—

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