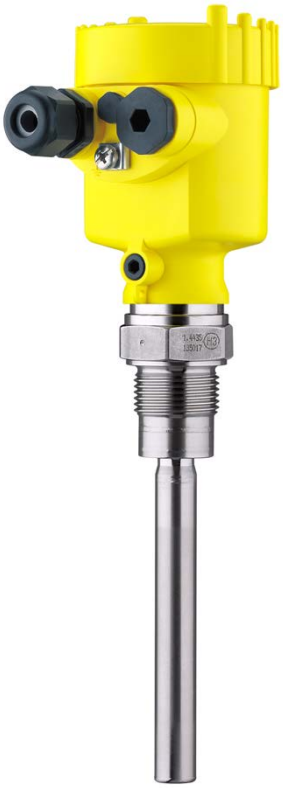
Safety Instructions
VEGAVIB 61, 62, 63
VEGAWAVE 61, 62, 63

Intrinsically Safe
Explosionproof
Nonincendive
FM17US0244X



Document ID: 57215

Editing status: 2017-12-15

CERTIFICATE OF CONFORMITY

FM Approvals
Member of the FM Global Group

1. **HAZARDOUS (CLASSIFIED) LOCATION ELECTRICAL EQUIPMENT PER US REQUIREMENTS**
2. **Certificate No:** **FM17US0244X**
3. **Equipment: (Type Reference and Name)** **VEGAVIB/VEGAWAVE 60 Series, Vibrating Level Switch**
4. **Name of Listing Company:** **VEGA Grieshaber KG**
5. **Address of Listing Company:** **Am Hohenstein 113**
   D-77761 Schiltach, Baden-Wuerttemberg
   Germany
6. The examination and test results are recorded in confidential report number:

   3021896 dated 22nd April 2005

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 3615:2006, FM Class 3616:2011, FM Class 3810:2005, ANSI/IEC 60529:2004, ANSI/ISA-60079-0:2009, ANSI/ISA-60079-11:2009, ANSI/ISA-61010-1:2004, NEMA 250:2003

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
VP, Manager, Electrical Systems

14 September 2017
Date

To verify the availability of the Approved product, please refer to www.approvalguide.com

THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE

FM Approvals LLC. 1151 Boston-Providence Turnpike, Norwood, MA 02062 USA
T: +1 (1) 781 762 4300 F: +1 (1) 781 762 9375 E-mail: information@fmapprovals.com www.fmapprovals.com

F 347 (Mar 16)

Page 1 of 17

SCHEDULE

to US Certificate Of Conformity No: FM17US0244X

10. **Equipment Ratings:**

In type of protection intrinsically safe apparatus with intrinsically safe process connections, the vibrating level switch (VEGAVIB/VEGAWAVE 60 Series) equipment is certified to the following classification(s).

Intrinsically safe apparatus for use in Class I, Division 1, Groups A, B, C and D, Class II, Division 1, Groups E, F and G, Class III, Division 1, with intrinsically safe process connections suitable for use in Class I, Division 1, Groups A, B, C and D, Class II, Division 1, Groups E, F and G, Class III, Division 1, in accordance with manufacturer's Control Drawing; equipment protection by intrinsic safety AEx ia for use in Class I, Zone 0, Group IIC, with intrinsically safe process connections "ia" suitable for use in Class I, Zone 0, Group IIC, in accordance with manufacturer's Control Drawing, hazardous (classified) locations; and ordinary (unclassified) locations with an ambient temperature rating of -40 ºC to +80 ºC, indoor and outdoor (Type 4X, 6P; IP66) environments.

In types of protection explosionproof with intrinsically safe process connections and explosionproof enclosure and dust-ignitionproof with intrinsically safe process connections and dust-tight enclosure, the vibrating level switch (VEGAVIB/VEGAWAVE 60 Series) equipment is certified to the following classification(s).

Explosionproof equipment for use in Class I, Division 1, Groups A, B, C and D, with intrinsically safe process connections suitable for use in Class I, Division 1, Groups A, B, C and D, in accordance with manufacturer's Control Drawing; dust-ignitionproof equipment for use in Class II, Division 1, Groups E, F and G, Class III, Division 1, with intrinsically safe process connections suitable for use in Class II, Division 1, Groups E, F and G, Class III, Division 1, in accordance with manufacturer's Control Drawing, hazardous (classified) locations; and ordinary (unclassified) locations with an ambient temperature rating of -40 ºC to +80 ºC, indoor and outdoor (Type 4X, 6P; IP66) environments.

In types of protection nonincendive dust-protected enclosure equipment, the vibrating level switch (VEGAVIB/VEGAWAVE 60 Series) equipment is certified to the following classification(s).

Nonincendive equipment for use in Class I, Division 2, Groups A, B, C and D, with non-flammable process connections suitable for use in Class I, Division 2, Groups A, B, C and D; nonincendive dust-protected enclosure equipment for use in Class II, Division 2, Groups E, F and G, Class III, Division 2, with non-flammable process connections suitable for use in Class II, Division 2, Groups E, F and G, Class III, Division 2, hazardous (classified) locations; and ordinary (unclassified) locations with an ambient temperature rating of -40 ºC to +80 ºC, indoor and outdoor (Type 4X, 6P; IP66) environments.

FM Approvals LLC. 1151 Boston-Providence Turnpike, Norwood, MA 02062 USA
T: +1 (1) 781 762 4300 F: +1 (1) 781 762 9375 E-mail: information@fmapprovals.com www.fmapprovals.com

SCHEDULE

FM Approvals
Member of the FM Global Group

to US Certificate Of Conformity No: FM17US0244X

11. The marking of the equipment shall include:

In type of protection intrinsically safe apparatus with intrinsically safe process connections, the vibrating level switch (VEGAVIB/VEGAWAVE 60 Series) equipment is labelled with the following marking(s).

VEGAVIB VB6.*F*...* or VEGAWAVE WE6*.*F*...**

Intrinsically Safe
Class I, Division 1, Groups A, B, C, D T6 at Tamb.= +70 ºC, T5 at Tamb.= +80 ºC
Class II, Division 1, Groups E, F, G T6 at Tamb.= +70 ºC, T5 at Tamb.= +80 ºC
Class III, Division 1 T6 at Tamb.= +70 ºC, T5 at Tamb.= +80 ºC
Class I, Zone 0, AEx ia IIC T6 at Tamb.= +70 ºC, T5 at Tamb.= +80 ºC Ga
Ta = -40 ºC to +80 ºC
Temperature -process: See manual and approval documents
Installation per Dwg. GE3842; Type 4X/6P; IP66
WARNING – POTENTIAL ELECTROSTATIC CHARGING HAZARD – SEE INSTRUCTIONS

In types of protection explosionproof with intrinsically safe process connections and explosionproof enclosure and dust-ignitionproof with intrinsically safe process connections and dust-tight enclosure, the vibrating level switch (VEGAVIB/VEGAWAVE 60 Series) equipment is labelled with the following marking(s).

VEGAVIB VB6.*D*...* or VEGAWAVE WE6*.*D*...**

Explosionproof
Class I, Division 1, Groups A, B, C, D T6 at Tamb.= +70 ºC, T5 at Tamb.= +80 ºC
Class II, Division 1, Groups E, F, G T6 at Tamb.= +70 ºC, T5 at Tamb.= +80 ºC
Class III, Division 1 T6 at Tamb.= +70 ºC, T5 at Tamb.= +80 ºC
Ta = -40 ºC to +80 ºC
Temperature -process: See manual and approval documents
Type 4X; IP66
SEAL ALL CONDUITS WITHIN 18 INCHES
WARNING – DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE IS PRESENT
WARNING – TO REDUCE THE RISK OF IGNITION OF HAZARDOUS ATMOSPHERES, DO NOT REMOVE COVER WHILE CIRCUITS ARE LIVE
WARNING – POTENTIAL ELECTROSTATIC CHARGING HAZARD – SEE INSTRUCTIONS

FM Approvals LLC. 1151 Boston-Providence Turnpike, Norwood, MA 02062 USA
T: +1 (1) 781 762 4300 F: +1 (1) 781 762 9375 E-mail: information@fmapprovals.com www.fmapprovals.com

SCHEDULE

to US Certificate Of Conformity No: FM17US0244X

In types of protection nonincendive dust-protected enclosure equipment, the vibrating level switch (VEGAVIB/VEGAWAVE 60 Series) equipment is labelled with the following marking(s).

VEGAVIB VB6.*X*...* or VEGAWAVE WE6*.*X*...**

Nonincendive
Class I, Division 2, Groups A, B, C, D T6 at Tamb.= +70 ºC, T5 at Tamb.= +80 ºC
Class II, Division 2, Groups E, F, G T6 at Tamb.= +70 ºC, T5 at Tamb.= +80 ºC
Class III, Division 2 T6 at Tamb.= +70 ºC, T5 at Tamb.= +80 ºC
Ta = -40 ºC to +80 ºC
Temperature -process: See manual and approval documents
Type 4X/6P; IP66
WARNING – SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR DIVISION 2
WARNING – EXPLOSION HAZARD – DO NOT DISCONNECT EQUIPMENT WHEN A FLAMMABLE OR COMBUSTIBLE ATMOSPHERE IS PRESENT
WARNING – POTENTIAL ELECTROSTATIC CHARGING HAZARD – SEE INSTRUCTIONS

12. **Description of Equipment:**

General – The VEGAVIB/VEGAWAVE 60 Series Vibrating Level Switch is designed for industrial and hazardous (classified) location applications. It is intended to be used as a universal vibrating level switch in all granulated and bulk solids, and is suitable for applications with process temperatures up to +250 ºC and high process pressures up to 16 MPa (2,320 psig). In compact version, with or without tube extension, it detects the accuracy of the limit level. The vibrating rod or tuning fork is energized by a piezo drive to vibrate at its resonance frequency of approximately 1400 Hz. The piezos are fixed mechanically and not subject to temperature shock limitations. The frequency changes when the vibrating rod or tuning fork is submerged in the process medium. If the medium covers the vibrating rod or tuning fork, the amplitude is damped. This change is detected by the integrated electronics module and converted into a switching command. The instrument can be used in vessels, silos and bunkers containing bulk solids, such as plastic granules, pellets and non-adhesive media, as an empty or full detector. The vibrating level switch offers a wide array of process temperatures and process pressure ranges.

The VEGAVIB 61 is a compact vibrating level switch with vibrating rod designed for granular and coarse-grained bulk solids of density greater than 0.02 g/cm³ (0.0007 lbs/in³) between -50 ºC to +250 ºC and process pressure between -1 to +16 bar (-100 to +1.6 MPa). The VEGAVIB 61 detects when the minimum or maximum level is reached. The smooth surface of the vibrating rod, without corners and edges, avoids jamming of the bulk solid and is easy to clean.

The VEGAVIB 62 is a suspension cable extended vibrating level switch with vibrating rod designed for granular and coarse-grained bulk solids of density greater than 0.02 g/cm³ (0.0007 lbs/in³) between -40 ºC to +150 ºC and process pressure between -1 to +6 bar (-100 to +600 kPa). The suspension cable ranges up to 80 m. The VEGAVIB 62 detects when the minimum or maximum level is reached. The smooth surface of the vibrating rod, without corners and edges, avoids jamming of the bulk solid and is easy to clean.

The VEGAVIB 63 is a tube extended vibrating level switch with vibrating rod designed for granular and coarse-grained bulk solids of density greater than 0.02 g/cm³ (0.0007 lbs/in³) between -50 ºC to +250 ºC and process pressure between -1 to +16 bar (-100 to +1.6 MPa). The extension tube ranges up to 6 m. The VEGAVIB 63 detects when the minimum or maximum level is reached. The smooth surface of the vibrating rod, without corners and edges, avoids jamming of the bulk solid and is easy to clean.

SCHEDULE

FM Approvals
Member of the FM Global Group

to US Certificate Of Conformity No: FM17US0244X

The VEGAWAVE 61 is a compact vibrating level switch with tuning fork designed for powders and fine-grained bulk solids of density greater than 0.008 g/cm³ (0.0003 lbs/in³) between -50 ºC to +250 ºC and process pressure between -1 to +25 bar (-100 to +2.5 MPa). The VEGAWAVE 61 detects when the minimum or maximum level is reached. The smooth surface of the tuning fork avoids jamming of the bulk solid and is easy to clean.

The VEGAWAVE 62 is a suspension cable extended vibrating level switch with tuning fork designed for powders and fine-grained bulk solids of density greater than 0.008 g/cm³ (0.0003 lbs/in³) between -40 ºC to +150 ºC and process pressure between -1 to +6 bar (-100 to +600 kPa). The suspension cable ranges up to 80 m. The VEGAWAVE 62 detects when the minimum or maximum level is reached. The smooth surface of the tuning fork avoids jamming of the bulk solid and is easy to clean.

The VEGAWAVE 63 is a tube extended vibrating level switch with tuning fork designed for powders and fine-grained bulk solids of density greater than 0.008 g/cm³ (0.0003 lbs/in³) between -50 ºC to +250 ºC and process pressure between -1 to +25 bar (-100 to +2.5 MPa). The extension tube ranges up to 6 m. The VEGAWAVE 63 detects when the minimum or maximum level is reached. The smooth surface of the tuning fork avoids jamming of the bulk solid and is easy to clean.

Construction – The compact version of the vibrating level switch is constructed from one of four different single chamber enclosure versions, each of which is permanently attached directly to the vibrating level sensor element.

The single chamber enclosure versions is comprised of aluminum with metric or NPT threaded hubs and a threaded mating cover with or without an inspection display window; or plastic with metric or NPT threaded hubs and a threaded mating cover with or without an inspection display window; or stainless steel casting with metric or NPT threaded hubs and a threaded mating cover with or without an inspection display window; or stainless steel electropolished with metric threaded hubs and a threaded mating cover with or without an inspection display window.

The base chassis of the aluminum and stainless steel casting enclosures includes a lid lock for the single chamber enclosure version. Only the single chamber aluminum enclosure with an integral cover locking screw and optional tempered glass viewing window is of suitable construction for explosionproof type of protection.

For the various enclosure designs by unscrewing the enclosure cover, the connection terminals to the signal and supply circuit are accessible. Visible is the green light-emitting diode and red light-emitting diode control lamp indicator to display different switching status conditions. Furthermore, there are holes to contact the parameterization bushing of the electronics inserts mounted on digital part behind the cover. There are two M20 x 1.5 metric or 1/2 inch NPT cable entries in the bottom of the enclosure; one of which is sealed with a certified cable gland, where permitted, or rigid conduit, and the other is sealed with a certified blanking plug. Each of the single chamber enclosures is equipped with an internal and external earthing terminal. The signal and supply circuits are electrically isolated from elements that may be earthed, while the metal elements of the vibrating level switch are electrically connected to earth terminals.

The electronics assembly of the vibrating level switch is constructed from one of five designs. The VEGAVIB/VEGAWAVE VB6*-C or WE6*-C indicates the electronics version for the contactless electronic switch (20-250 VAC/VDC) design (and additional SIL qualification, not FM verified) switches. The VEGAVIB/VEGAWAVE VB6*-N or WE6*-N indicates the electronics version for NAMUR signal design (and additional SIL qualification, not FM verified) switches. The VEGAVIB/VEGAWAVE VB6*-R or WE6*-R indicates the electronics version for the relay (2 x SPDT; 20-72 VDC, 20-250 VAC, 3 A) design switches. The VEGAVIB/VEGAWAVE VB6*-T or WE6*-T indicates the electronics version for the transistor (NPN/PNP; 20-55 VDC) design switches. The VEGAVIB/VEGAWAVE VB6*-Z or WE6*-Z indicates the electronics version for the 2 wire (4-20 mA) design switches.

FM Approvals LLC. 1151 Boston-Providence Turnpike, Norwood, MA 02062 USA
T: +1 (1) 781 762 4300 F: +1 (1) 781 762 9375 E-mail: information@fmapprovals.com www.fmapprovals.com

SCHEDULE

FM Approvals
Member of the FM Global Group

to US Certificate Of Conformity No: FM17US0244X

For more specifics concerning construction and description details of the vibrating level switch, reference the manufacturer's sales literature and specification sheets.

Ratings – The equipment is certified to the following ratings.

The ambient operating temperature range is -40 ºC to +80 ºC in type of protection intrinsically safe apparatus with intrinsically safe process connections, explosionproof with intrinsically safe process connections and explosionproof enclosure, dust-ignitionproof with intrinsically safe process connections and dust-tight enclosure, and nonincendive dust-protected enclosure equipment, each when properly mounted and installed.

The process temperature range of the media is -50 ºC to +250 ºC, each depending on the process fitting, with a maximum working pressure range of -0.1 to 1.6 MPa (-14.5 to 232 psig) within a maximum measuring range of 80 m.

The equipment is marked for appliance Protection Class I for electronics option contactless electronic switch and relay output, and Protection Class II for electronics option NAMUR signal, transistor (NPN/PNP) and 2 wire (4-20 mA), each designated for installation transient overvoltages up to levels of Overvoltage Category III, and environmentally classified as Pollution Degree 2.

In type of protection intrinsically safe apparatus with intrinsically safe process connections, the barrier protected vibrating level switch (VEGAVIB/VEGAWAVE 60 Series with built-in electronics insert VB6*-N or WE6*-N) equipment is connected to a certified intrinsically safe linear circuit with the following maximum entity parameter values.

Power Supply and Signal Circuit (Terminals 1, 2), single chamber enclosure version are:
V_{max} (U_i) = 20 VDC, I_{max} (I_i) = 103 mA, $C_i \approx 0$, $L_i < 5$ µH, P_i = 516 mW

If the connection cable is supplied by the manufacturer, the complete inductance and capacitance of the connection cable between VB6*-N or WE6*-N and the vibrating rod or tuning fork does not exceed the following values:
L_i·cable = 0.55 µH/m, C_i·wire/wire = 58 pF/m, C_i·wire/shield = 270 pF/m

The intrinsically safe circuits are electrically separated from parts which can be grounded, and metal parts of the VEGAVIB/VEGAWAVE are electrically connected to the ground terminals.

In type of protection intrinsically safe apparatus with intrinsically safe process connections, the barrier protected vibrating level switch (VEGAVIB/VEGAWAVE 60 Series with built-in electronics insert VB6*-Z or WE6*-Z) equipment is connected to a certified intrinsically safe linear circuit with the following maximum entity parameter values.

Power Supply and Signal Circuit (Terminals 1, 2), single chamber enclosure version are:
V_{max} (U_i) = 30 VDC, I_{max} (I_i) = 131 mA, $C_i \approx 0$, $L_i \approx 0$, P_i = 983 mW
P_i = 720 mW at Tamb.= +60 ºC, P_i = 640 mW at Tamb.= +70 ºC, P_i = 420 mW at Tamb.= +80 ºC

If the connection cable is supplied by the manufacturer, the complete inductance and capacitance of the connection cable between VB6*-Z or WE6*-Z and the vibrating rod or tuning fork does not exceed the following values:
L_i·cable = 0.55 µH/m, C_i·wire/wire = 58 pF/m, C_i·wire/shield = 270 pF/m

The intrinsically safe circuits are electrically separated from parts which can be grounded, and metal parts of the VEGAVIB/VEGAWAVE are electrically connected to the ground terminals.

FM Approvals LLC. 1151 Boston-Providence Turnpike, Norwood, MA 02062 USA
T: +1 (1) 781 762 4300 F: +1 (1) 781 762 9375 E-mail: information@fmapprovals.com www.fmapprovals.com

SCHEDULE

FM Approvals
Member of the FM Global Group

to US Certificate Of Conformity No: FM17US0244X

In types of protection explosionproof with intrinsically safe process connections and explosionproof enclosure, dust-ignitionproof with intrinsically safe process connections and dust-tight enclosure, and nonincendive dust-protected enclosure equipment, the vibrating level switch (VEGAVIB/VEGAWAVE 60 Series with built-in electronics insert VB6*-C or WE6*-C) equipment is connected to limited output Class 2 circuits and power source with the following nominal external supply values.

Power Supply and Signal Circuit (Terminals 1, 2) are:
*V*max (*Ui*) = 20-253 VAC, 50/60 Hz, *Pi* = 3 VA maximum
*V*max (*Ui*) = 20-253 VDC, *Pi* = 1 W maximum
Um = 253 V maximum

Output:
Contactless electronic switch

Load Current, Transistor Output (NPN/PNP) (Terminals 2, 3) is:
*I*max (*I*-Load) = 10-400 mA

In types of protection explosionproof with intrinsically safe process connections and explosionproof enclosure, dust-ignitionproof with intrinsically safe process connections and dust-tight enclosure, and nonincendive dust-protected enclosure equipment, the vibrating level switch (VEGAVIB/VEGAWAVE 60 Series with built-in electronics insert VB6*-N or WE6*-N) equipment is connected to an amplifier with the following external supply values.

Power Supply and Signal Circuit (Terminals 1, 2) are:
*V*max (*Ui*) = 4-12.5 VDC
Um = 253 V maximum

Manufacturer's suggested nominal operating voltage according to NAMUR IEC 60947-5-6 (Terminals 1, 2) are:
*V*nom (*U*nom) = 8.2 VDC
*I*nom (*I*nom) = 8.2 mA

In types of protection explosionproof with intrinsically safe process connections and explosionproof enclosure, dust-ignitionproof with intrinsically safe process connections and dust-tight enclosure, and nonincendive dust-protected enclosure equipment, the vibrating level switch (VEGAVIB/VEGAWAVE 60 Series with built-in electronics insert VB6*-R or WE6*-R) equipment is connected to limited output Class 2 circuits and power source with the following nominal external supply values.

Power Supply and Signal Circuit (Terminals 1, 2) are:
*V*max (*Ui*) = 20-253 VAC, 50/60 Hz, *Pi* = 8 VA maximum
*V*max (*Ui*) = 20-72 VDC, *Pi* = 1.6 W maximum
Um = 253 V maximum

Relay Circuit 1; Circuit 2 (Terminals 3, 4, 5; 6, 7, 8) is:
*V*max (*U*-Load) = 253 VAC, 50/60 Hz, *I*max (*I*-Load) = 3 A, *Pi* (*P*-Load) = 500 VA
*V*max (*U*-Load) = 253 VDC, *I*max (*I*-Load) = 1 A, *Pi* (*P*-Load) = 41 W

FM Approvals LLC. 1151 Boston-Providence Turnpike, Norwood, MA 02062 USA
T: +1 (1) 781 762 4300 F: +1 (1) 781 762 9375 E-mail: information@fmapprovals.com www.fmapprovals.com

SCHEDULE

FM Approvals
Member of the FM Global Group

to US Certificate Of Conformity No: FM17US0244X

In types of protection explosionproof with intrinsically safe process connections and explosionproof enclosure, dust-ignitionproof with intrinsically safe process connections and dust-tight enclosure, and nonincendive dust-protected enclosure equipment, the vibrating level switch (VEGAVIB/VEGAWAVE 60 Series with built-in electronics insert VB6*-T or WE6*-T) equipment is connected to limited output Class 2 circuits and power source with the following nominal external supply values.

Power Supply and Signal Circuit (Terminals 1, 4) are:
*V*max (*Ui*) = 10-55 VDC, *Pi* = 0.5 W maximum
Um = 253 V maximum

Load Current, Floating Transistor Output (NPN/PNP) (Terminals 2, 3) is:
*I*max (*I*-Load) = 10-400 mA

In types of protection explosionproof with intrinsically safe process connections and explosionproof enclosure, dust-ignitionproof with intrinsically safe process connections and dust-tight enclosure, and nonincendive dust-protected enclosure equipment, the vibrating level switch (VEGAVIB/VEGAWAVE 60 Series with built-in electronics insert VB6*-Z or WE6*-Z) equipment is connected to limited output Class 2 circuits and power source with the following nominal external supply values.

Power Supply and Signal Circuit (Terminals 1, 2) via the signaling conditioning instrument are:
*V*max (*Ui*) = 10-36 VDC
Um = 253 V maximum

Model Codes – The equipment is identified with the following model code structure.

In type of protection intrinsically safe apparatus with intrinsically safe process connections, the vibrating level switch (VEGAVIB/VEGAWAVE 60 Series) equipment is designated with the following model code(s).

VEGAVIB VB61.abcdefg, Vibrating Level Switch.

Reference Control Drawing No. GE3842 for Entity Parameter values

a = Geographical Designation: U
b = Agency Approval: F
c = Version: A, B, C, E, F or G
d = Process Connection/Fitting: Two digit alphanumeric variable for connections, which represents a ASME, DIN, G, LA, NPT or TRI-CLAMP industry type flange, with pressure ratings and any type which comply with an international or national standard
e = Electronics: N or Z
f = Housing Type: 3, 5, 8, A, K or V
g = Cable Entry: M or N

Safety Integrity Level (SIL) 2 conformity not FM verified

* Reference Safety Instructions No. 29268 and 31215 manual for maximum permissible ambient temperature and temperature class alignment tables up to T-process = +250 ºC

FM Approvals LLC. 1151 Boston-Providence Turnpike, Norwood, MA 02062 USA
T: +1 (1) 781 762 4300 F: +1 (1) 781 762 9375 E-mail: information@fmapprovals.com www.fmapprovals.com

SCHEDULE

to US Certificate Of Conformity No: FM17US0244X

VEGAWAVE WE61.abcdefg, Vibrating Level Switch.

Reference Control Drawing No. GE3842 for Entity Parameter values

a = Geographical Designation: U
b = Agency Approval: F
c = Version: A, B, C, D, E or F
d = Process Connection/Fitting: Two digit alphanumeric variable for connections, which represents a ASME, DIN, G, LA, NPT or TRI-CLAMP industry type flange, with pressure ratings and any type which comply with an international or national standard
e = Electronics: N or Z
f = Housing Type: 3, 5, 8, A, K or V
g = Cable Entry: M or N

Safety Integrity Level (SIL) 2 conformity not FM verified

* Reference Safety Instructions No. 32249 and 32250 manual for maximum permissible ambient temperature and temperature class alignment tables up to T·process = +250 ºC

VEGAVIB VB62.abcdefg, Vibrating Level Switch.

Reference Control Drawing No. GE3842 for Entity Parameter values

a = Geographical Designation: U
b = Agency Approval: F
c = Version: C, E, H, K, L, M, N or T
d = Process Connection/Fitting: Two digit alphanumeric variable for connections, which represents a ASME, DIN, G, LA, NPT or TRI-CLAMP industry type flange, with pressure ratings and any type which comply with an international or national standard
e = Electronics: N or Z
f = Housing Type: 3, 5, 8, A, K or V
g = Cable Entry: M or N

Safety Integrity Level (SIL) 2 conformity not FM verified

* Reference Safety Instructions No. 29274 and 31216 manual for maximum permissible ambient temperature and temperature class alignment tables up to T·process = +150 ºC

FM Approvals LLC. 1151 Boston-Providence Turnpike, Norwood, MA 02062 USA
T: +1 (1) 781 762 4300 F: +1 (1) 781 762 9375 E-mail: information@fmapprovals.com www.fmapprovals.com

SCHEDULE

to US Certificate Of Conformity No: FM17US0244X

VEGAWAVE WE62.abcdefg, Vibrating Level Switch.

Reference Control Drawing No. GE3842 for Entity Parameter values

a = Geographical Designation: U
b = Agency Approval: F
c = Version: C, E, H, K, L, M, N or T
d = Process Connection/Fitting: Two digit alphanumeric variable for connections, which represents a ASME, DIN, G, LA, NPT or TRI-CLAMP industry type flange, with pressure ratings and any type which comply with an international or national standard
e = Electronics: N or Z
f = Housing Type: 3, 5, 8, A, K or V
g = Cable Entry: M or N

Safety Integrity Level (SIL) 2 conformity not FM verified

* Reference Safety Instructions No. 32254 and 32255 manual for maximum permissible ambient temperature and temperature class alignment tables up to T·process = +150 ºC

VEGAVIB VB63.abcdefg, Vibrating Level Switch.

Reference Control Drawing No. GE3842 for Entity Parameter values

a = Geographical Designation: U
b = Agency Approval: F
c = Version: A, B, C, E, F or G
d = Process Connection/Fitting: Two digit alphanumeric variable for connections, which represents a ASME, DIN, G, LA, NPT or TRI-CLAMP industry type flange, with pressure ratings and any type which comply with an international or national standard
e = Electronics: N or Z
f = Housing Type: 3, 5, 8, A, K or V
g = Cable Entry: M or N

Safety Integrity Level (SIL) 2 conformity not FM verified

* Reference Safety Instructions No. 29280 and 31217 manual for maximum permissible ambient temperature and temperature class alignment tables up to T·process = +250 ºC

FM Approvals LLC. 1151 Boston-Providence Turnpike, Norwood, MA 02062 USA
T: +1 (1) 781 762 4300 F: +1 (1) 781 762 9375 E-mail: information@fmapprovals.com www.fmapprovals.com

SCHEDULE

FM Approvals
Member of the FM Global Group

to US Certificate Of Conformity No: FM17US0244X

VEGAWAVE WE63.abcdefg, Vibrating Level Switch.

Reference Control Drawing No. GE3842 for Entity Parameter values

a = Geographical Designation: U
b = Agency Approval: F
c = Version: A, B, C, D, E or F
d = Process Connection/Fitting: Two digit alphanumeric variable for connections, which represents a ASME, DIN, G, LA, NPT or TRI-CLAMP industry type flange, with pressure ratings and any type which comply with an international or national standard
e = Electronics: N or Z
f = Housing Type: 3, 5, 8, A, K or V
g = Cable Entry: M or N

Safety Integrity Level (SIL) 2 conformity not FM verified

* Reference Safety Instructions No. 32259 and 32260 manual for maximum permissible ambient temperature and temperature class alignment tables up to T·process = +250 °C

In types of protection explosionproof with intrinsically safe process connections and explosionproof enclosure and dust-ignitionproof with intrinsically safe process connections and dust-tight enclosure, the vibrating level switch (VEGAVIB/VEGAWAVE 60 Series) equipment is designated with the following model code(s).

VEGAVIB VB61.abcdefg, Vibrating Level Switch.

a = Geographical Designation: U
b = Agency Approval: D
c = Version: A, B, C, E, F or G
d = Process Connection/Fitting: Two digit alphanumeric variable for connections, which represents a ASME, DIN, G, LA, NPT or TRI-CLAMP industry type flange, with pressure ratings and any type which comply with an international or national standard
e = Electronics: C, N, R, T or Z
f = Housing Type: A
g = Cable Entry: M or N

Safety Integrity Level (SIL) 2 conformity not FM verified

* Reference Safety Instructions No. 29265, 29266, 29267, 29268, and 31215 manual for maximum permissible ambient temperature and temperature class alignment tables up to T·process = +250 °C

FM Approvals LLC. 1151 Boston-Providence Turnpike, Norwood, MA 02062 USA
T: +1 (1) 781 762 4300 F: +1 (1) 781 762 9375 E-mail: information@fmapprovals.com www.fmapprovals.com

SCHEDULE

to US Certificate Of Conformity No: FM17US0244X

VEGAWAVE WE61.abcdefg, Vibrating Level Switch.

a = Geographical Designation: U
b = Agency Approval: D
c = Version: A, B, C, D, E or F
d = Process Connection/Fitting: Two digit alphanumeric variable for connections, which represents a ASME, DIN, G, LA, NPT or TRI-CLAMP industry type flange, with pressure ratings and any type which comply with an international or national standard
e = Electronics: C, N, R, T or Z
f = Housing Type: A
g = Cable Entry: M or N

Safety Integrity Level (SIL) 2 conformity not FM verified

* Reference Safety Instructions No. 32246, 32247, 32248, 32249, and 32250, manual for maximum permissible ambient temperature and temperature class alignment tables up to T·process = +250 ºC

VEGAVIB VB63.abcdefg, Vibrating Level Switch.

a = Geographical Designation: U
b = Agency Approval: D
c = Version: A, B, C, E, F or G
d = Process Connection/Fitting: Two digit alphanumeric variable for connections, which represents a ASME, DIN, G, LA, NPT or TRI-CLAMP industry type flange, with pressure ratings and any type which comply with an international or national standard
e = Electronics: C, N, R, T or Z
f = Housing Type: A
g = Cable Entry: M or N

Safety Integrity Level (SIL) 2 conformity not FM verified

* Reference Safety Instructions No. 29277, 29278, 29279, 29280, and 31217 manual for maximum permissible ambient temperature and temperature class alignment tables up to T·process = +250 ºC

VEGAWAVE WE63.abcdefg, Vibrating Level Switch.

a = Geographical Designation: U
b = Agency Approval: D
c = Version: A, B, C, D, E or F
d = Process Connection/Fitting: Two digit alphanumeric variable for connections, which represents a ASME, DIN, G, LA, NPT or TRI-CLAMP industry type flange, with pressure ratings and any type which comply with an international or national standard
e = Electronics: C, N, R, T or Z
f = Housing Type: A
g = Cable Entry: M or N

Safety Integrity Level (SIL) 2 conformity not FM verified

* Reference Safety Instructions No. 32256, 32257, 32258, 32259, and 32260 manual for maximum permissible ambient temperature and temperature class alignment tables up to T·process = +250 ºC

FM Approvals LLC. 1151 Boston-Providence Turnpike, Norwood, MA 02062 USA
T: +1 (1) 781 762 4300 F: +1 (1) 781 762 9375 E-mail: information@fmapprovals.com www.fmapprovals.com

SCHEDULE

FM Approvals
Member of the FM Global Group

to US Certificate Of Conformity No: FM17US0244X

In type of protection nonincendive dust-protected enclosure equipment, the vibrating level switch (VEGAVIB/VEGAWAVE 60 Series) equipment is designated with the following model code(s).

VEGAVIB VB61.abcdefg, Vibrating Level Switch.

a = Geographical Designation: U
b = Agency Approval: X
c = Version: A, B, C, E, F or G
d = Process Connection/Fitting: Two digit alphanumeric variable for connections, which represents a ASME, DIN, G, LA, NPT or TRI-CLAMP industry type flange, with pressure ratings and any type which comply with an international or national standard
e = Electronics: C, N, R, T or Z
f = Housing Type: 3, 5, 8, A or V
g = Cable Entry: M or N

Safety Integrity Level (SIL) 2 conformity not FM verified

* Reference Safety Instructions No. 29265, 29266, 29267, 29268, and 31215 manual for maximum permissible ambient temperature and temperature class alignment tables up to T·process = +250 ºC

VEGAWAVE WE61.abcdefg, Vibrating Level Switch.

a = Geographical Designation: U
b = Agency Approval: X
c = Version: A, B, C, D, E or F
d = Process Connection/Fitting: Two digit alphanumeric variable for connections, which represents a ASME, DIN, G, LA, NPT or TRI-CLAMP industry type flange, with pressure ratings and any type which comply with an international or national standard
e = Electronics: C, N, R, T or Z
f = Housing Type: 3, 5, 8, A or V
g = Cable Entry: M or N

Safety Integrity Level (SIL) 2 conformity not FM verified

* Reference Safety Instructions No. 32246, 32247, 32248, 32249, and 32250 manual for maximum permissible ambient temperature and temperature class alignment tables up to T·process = +250 ºC

FM Approvals LLC. 1151 Boston-Providence Turnpike, Norwood, MA 02062 USA
T: +1 (1) 781 762 4300 F: +1 (1) 781 762 9375 E-mail: information@fmapprovals.com www.fmapprovals.com

SCHEDULE

to US Certificate Of Conformity No: FM17US0244X

VEGAVIB VB62.abcdefg, Vibrating Level Switch.

a = Geographical Designation: U
b = Agency Approval: X
c = Version: C, E, H, K, L, M, N or T
d = Process Connection/Fitting: Two digit alphanumeric variable for connections, which represents a ASME, DIN, G, LA, NPT or TRI-CLAMP industry type flange, with pressure ratings and any type which comply with an international or national standard
e = Electronics: C, N, R, T or Z
f = Housing Type: 3, 5, 8, A or V
g = Cable Entry: M or N

Safety Integrity Level (SIL) 2 conformity not FM verified

* Reference Safety Instructions No. 29271, 29272, 29273, 29274, and 31216 manual for maximum permissible ambient temperature and temperature class alignment tables up to T·process = +150 ºC

VEGAWAVE WE62.abcdefg, Vibrating Level Switch.

a = Geographical Designation: U
b = Agency Approval: X
c = Version: C, E, H, K, L, M, N or T
d = Process Connection/Fitting: Two digit alphanumeric variable for connections, which represents a ASME, DIN, G, LA, NPT or TRI-CLAMP industry type flange, with pressure ratings and any type which comply with an international or national standard
e = Electronics: C, N, R, T or Z
f = Housing Type: 3, 5, 8, A or V
g = Cable Entry: M or N

Safety Integrity Level (SIL) 2 conformity not FM verified

* Reference Safety Instructions No. 32251, 32252, 32253, 32254, and 32255 manual for maximum permissible ambient temperature and temperature class alignment tables up to T·process = +150 ºC

VEGAVIB VB63.abcdefg, Vibrating Level Switch.

a = Geographical Designation: U
b = Agency Approval: X
c = Version: A, B, C, E, F or G
d = Process Connection/Fitting: Two digit alphanumeric variable for connections, which represents a ASME, DIN, G, LA, NPT or TRI-CLAMP industry type flange, with pressure ratings and any type which comply with an international or national standard
e = Electronics: C, N, R, T or Z
f = Housing Type: 3, 5, 8, A or V
g = Cable Entry: M or N

Safety Integrity Level (SIL) 2 conformity not FM verified

* Reference Safety Instructions No. 29277, 29278, 29279, 29280, and 31217 manual for maximum permissible ambient temperature and temperature class alignment tables up to T·process = +250 ºC

FM Approvals LLC. 1151 Boston-Providence Turnpike, Norwood, MA 02062 USA
T: +1 (1) 781 762 4300 F: +1 (1) 781 762 9375 E-mail: information@fmapprovals.com www.fmapprovals.com

SCHEDULE

to US Certificate Of Conformity No: FM17US0244X

VEGAWAVE WE63.abcdefg, Vibrating Level Switch.

a = Geographical Designation: U
b = Agency Approval: X
c = Version: A, B, C, D, E or F
d = Process Connection/Fitting: Two digit alphanumeric variable for connections, which represents a ASME, DIN, G, LA, NPT or TRI-CLAMP industry type flange, with pressure ratings and any type which comply with an international or national standard
e = Electronics: C, N, R, T or Z
f = Housing Type: 3, 5, 8, A or V
g = Cable Entry: M or N

Safety Integrity Level (SIL) 2 conformity not FM verified

* Reference Safety Instructions No. 32256, 32257, 32258, 32259, and 32260 manual for maximum permissible ambient temperature and temperature class alignment tables up to T·process = +250 ºC

13. **Specific Conditions of Use:**

In type of protection intrinsically safe apparatus with intrinsically safe process connections, the vibrating level switch (VEGAVIB/VEGAWAVE 60 Series) equipment is designated with the following specific conditions of use.

1. For Division 1 and Zone 0 Approvals, the process pressure sensors are suitable for process connections to Class I, Division 1, Groups A, B, C and D, Class II, Division 1, Groups E, F and G, Class III, Division 1 and Class I, Zone 0, Group IIC, hazardous (classified) locations.
2. Environmental rating type 6P is available only for Housing option type "3", type "5", type "8" and type "V" only.
3. Maximum permissible working pressure is 16 bar (232 psig).
4. Potential Electrostatic Charging Hazard – To prevent the risk of electrostatic sparking, the non-metallic surface should only be cleaned with a damp cloth.
5. 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.
6. The vibrating level switch shall be installed in such a way that contact between the measuring sensor and the tank wall will be excluded with sufficient safety, considering the tank installations and the flow conditions inside the tank.
7. The maximum permitted ambient temperature of the vibrating level switch is +80 ºC. To avoid the effects of process temperatures and other thermal effects, care shall be taken to ensure the surrounding ambient temperature and the ambient temperature inside the equipment enclosure does not exceed +80 ºC. Adherence to the manufacturer's installation manual must be followed for fulfillment of this requirement.

FM Approvals LLC. 1151 Boston-Providence Turnpike, Norwood, MA 02062 USA
T: +1 (1) 781 762 4300 F: +1 (1) 781 762 9375 E-mail: information@fmapprovals.com www.fmapprovals.com

SCHEDULE

to US Certificate Of Conformity No: FM17US0244X

In types of protection explosionproof with intrinsically safe process connections and explosionproof enclosure and dust-ignitionproof with intrinsically safe process connections and dust-tight enclosure, the vibrating level switch (VEGAVIB/VEGAWAVE 60 Series) equipment is designated with the following specific conditions of use.

1. For Division 1 Approvals, the process pressure sensors are suitable for process connections to Class I, Division 1, Groups A, B, C and D, Class II, Division 1, Groups E, F and G, Class III, Division 1, hazardous (classified) locations.
2. Maximum permissible working pressure is 16 bar (232 psig).
3. Potential Electrostatic Charging Hazard – To prevent the risk of electrostatic sparking, the non-metallic surface should only be cleaned with a damp cloth.
4. 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.
5. The vibrating level switch shall be installed in such a way that contact between the measuring sensor and the tank wall will be excluded with sufficient safety, considering the tank installations and the flow conditions inside the tank.
6. The maximum permitted ambient temperature of the vibrating level switch is +80 °C. To avoid the effects of process temperatures and other thermal effects, care shall be taken to ensure the surrounding ambient temperature and the ambient temperature inside the equipment enclosure does not exceed +80 °C. Adherence to the manufacturer's installation manual must be followed for fulfillment of this requirement.

In types of protection nonincendive dust-protected enclosure equipment, the vibrating level switch (VEGAVIB/VEGAWAVE 60 Series) equipment is designated with the following specific conditions of use.

1. For Division 2 Approvals, the process pressure sensors are suitable for non-flammable process connections to Class I, Division 2, Groups A, B, C and D, Class II, Division 2, Groups E, F and G, Class III, Division 2, hazardous (classified) locations.
2. Environmental rating type 6P is available only for Housing option type "3", type "5", type "8" and type "V" only.
3. Maximum permissible working pressure is 16 bar (232 psig).
4. Potential Electrostatic Charging Hazard – To prevent the risk of electrostatic sparking, the non-metallic surface should only be cleaned with a damp cloth.
5. 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.
6. The vibrating level switch shall be installed in such a way that contact between the measuring sensor and the tank wall will be excluded with sufficient safety, considering the tank installations and the flow conditions inside the tank.
7. The maximum permitted ambient temperature of the vibrating level switch is +80 °C. To avoid the effects of process temperatures and other thermal effects, care shall be taken to ensure the surrounding ambient temperature and the ambient temperature inside the equipment enclosure does not exceed +80 °C. Adherence to the manufacturer's installation manual must be followed for fulfillment of this requirement.

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.

FM Approvals LLC. 1151 Boston-Providence Turnpike, Norwood, MA 02062 USA
T: +1 (1) 781 762 4300 F: +1 (1) 781 762 9375 E-mail: information@fmapprovals.com www.fmapprovals.com

SCHEDULE

FM Approvals
Member of the FM Global Group

to US Certificate Of Conformity No: FM17US0244X

16. **Certificate History:**

Details of the supplements to this certificate are described below:

Date	Description
22nd April 2005	Original Issue.
27th September 2006	Supplement 1: Report Reference: 3026644, dated 27th September 2006. Description of the Change: Addition of explosionproof enclosure protection option for VEGAVIB 61, 63, 65, 67. Assembly documents and model code updates – the actual change is made to the entire certificate and the full document is issued to the holder.
2nd November 2006	Supplement 2: Report Reference: 3028301, dated 2nd November 2006. Description of the Change: Addition of VEGAWAVE 61, 62, 63. Assembly documents and model code updates – the actual change is made to the entire certificate and the full document is issued to the holder.
5th February 2009	Supplement 3: Report Reference: 3031022, dated 5th February 2009. Description of the Change: Addition of stainless steel enclosures for VEGAVIB 61, 62, 63, 65, 66, 67, and VEGAWAVE 61, 62, 63. Assembly documents and model code updates – the actual change is made to the entire certificate and the full document is issued to the holder.
13th April 2011	Supplement 4: Report Reference: 3041557, dated 13th April 2011. Description of the Change: Re-Certification of VEGAVIB 61, 62, 63, 65, 66, 67, and VEGAWAVE 61, 62, 63 to FM Class 3610:2010. Assembly documents and model codes confirmed – the actual change is made to the entire certificate and the full document is issued to the holder.
14th September 2017	Supplement 5: Report Reference: RR210360, dated 14th September 2017. Description of the Change: Consolidation of <FM>us Certificates of Conformity (3021896, 3026644, 3028301). Model code updates – the actual change is made to the entire certificate and the full document is issued to the holder.

FM Approvals LLC. 1151 Boston-Providence Turnpike, Norwood, MA 02062 USA
T: +1 (1) 781 762 4300 F: +1 (1) 781 762 9375 E-mail: information@fmapprovals.com www.fmapprovals.com

Hazardous (Classified) Location

Class I, Zone 0, 0/1, 1 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
T6 @ 70°C T5 @ 80°C
(Note 3)

Unclassified Location

NTP2-Z

Entity Parameters:

Input: Vmax=30V, Imax=131mA, Ci=0, Li=0
Pi=983mW

Pi (W)	Ta (°C)
0,72	60°C
0,64	70°C
0,42	80°C

NAMUR

Entity Parameters:

Input: Vmax=20V (See Note 13), Imax=103mA, Ci=0, Li<5µH
Pi=516mW

NOTES:

1. The Intrinsic Safety Entity concept allows the interconnection of two Intrinsically safe devices FM Approved and CSA certified entity parameters not specifically examined in combination as a system when: Uo or Voc or Vt ≤ Vmax, Io or Isc or It ≤ Imax, Ca or Co ≥ Ci + Ccable, La or Lo ≥ Li + Lcable, Po ≤ Pi.
2. For Division 2 installations, the Associated Apparatus is not required to be FM or CSA Certified approved under Entity Concept if the VEGAVIB 60 / VEGAWAVE: 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.
3. Dust-tight conduit seal shall be used when installed in Class II and Class III environments.
4. Control equipment connected to the Associated Apparatus shall not use or generate more than 250 Vrms or Vdc.
5. Divison 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.
6. For Division 1 installations, the configuration of associated Apparatus shall be FM Approved / CSA Certified under Entity Concept.
7. Associated Apparatus manufacturer's installation drawing shall be followed when installing this equipment.
8. The configuration of Field Device must be FM Approved / CSA certified under Entity Concept
9. The Field device manufacturer's installation drawing shall be followed when installing this equipment.
10. The VEGAVIB 60 / VEGAWAVE. 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 VEGAVIB 60 / VEGAWAVE 60 Series 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.
11. No revision to drawing without prior Approval by FM Approvals and CSA International.
12. Barriers and Instruments to carry same Agency Approval
13. Normal Operation for Namur Electronics is 4-12.5 VDC, Manufacturer's Suggested Operating Voltage is 8.2 VDC Nominal.

Passmaß/tol.dimens. | Abmaß/allowance | Freimaßtoleranz general tolerance
Werkstoff / Material
gezeichnet drawn 09.06.2017 moreiros
freigegeben checked 12.06.2017 dieteleu
Maßstab Scale 1:1
Originalformat size of origin A3
Blatt / Sheet 1 von of 1
VEGA Grieshaber KG Postfach 1142 77757 Schiltach Germany
Änderung / revision
Benennung: Installation control diagram VEGAWAVE / VEGAVIB 6•. Div.1
Description: Installation control diagram VEGAWAVE / VEGAVIB 6•. Div.1
Art.Nr. / Art.No. GE3842
Zchngs.-Nr. / Drawing No. GE3842
Änd.-Zust. / Rev. –
Var.Fam.: | Var.Fam.2:
Teil öhnl. / sim. part | Ersatz f./replacement f.
Arb.Anw. / work.instr.

Printing date:

57215-EN-171215

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