

Vibro level indicator

Level limit switches for bulk goods

VF1.

Appliance information

Rhombus vibration rod
robust single rod - compact and versatile

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MOLLET accurate point level

ATEX option

B1 **Dust**  II 1/2D Ex ta/tb IIIC T95 °C Da/Db

ATEX option

B3 **Dust**  II 1/3D Ex ta/tc IIIC T95 °C Da/Dc

ATEX option

B11 **Gas+**  II 1/2G Ex ia IIB T4 Ga
Dust  II 1/2D Ex ia IIIC TX Da

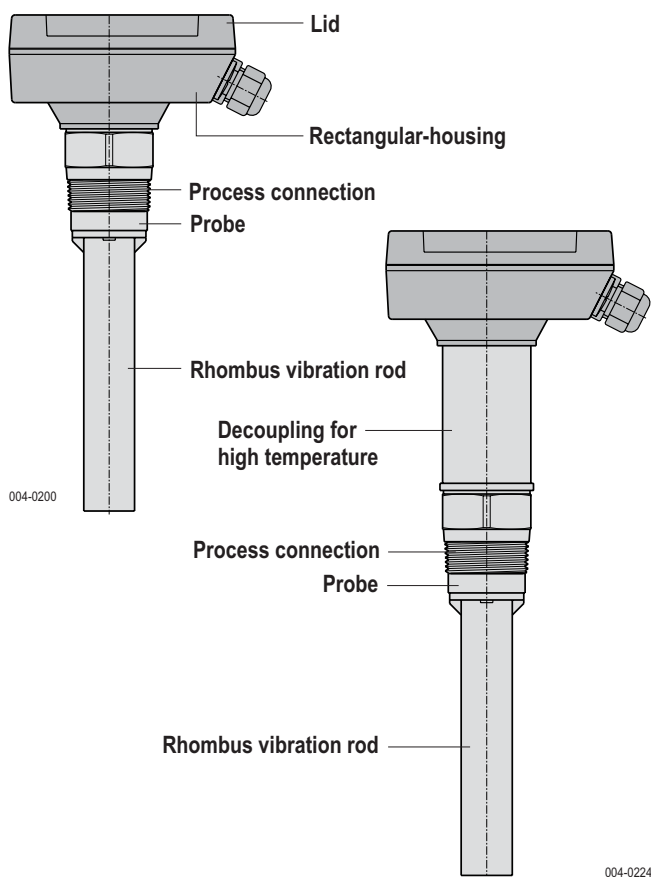
Application (intended use)

The **MOLOSvibro** of the **VF1.** series is intended for the use as
level limit switch
in **silos and vessels.**

For all bulk solids with a minimum density of
0.01 t/m³.

For application in **all industry sectors.**

Bauweise



Characteristics

- Very robust vibration rod in Rhombus shape
- High sensitivity for bulk solids with a minimum density of 10 g/l
- Interface measurement possible
- Patented, braced membrane
- No digging free within the bulk solids due to small vibration amplitude
- Adjustable sensitivity in three setting adjustments:
A for light, **B** for normal and **C** for sticking bulk solids
- High level and low level alarm selectable

Function

- Oscillation of the Rhombus vibration rod with a resonance frequency of approx. 285 Hz is stimulated by the electronic.
- As soon as the vibration rod has been covered by bulk solids, the oscillation will be damped.
- The electronic detects the damping and switches the relay signal.
- If the filling level sinks below the vibration rod, the rod starts vibrating with its resonance frequency again and the relay switches back.

Technical data

Material	Rectangular-housing Process connection and probe Rhombus vibration rod Suspension cable sheath	Aluminium, RAL7001 Stainless steel 1.4301 / 304 Stainless steel 1.4301 / 304 Polyurethane
Process connection	R3	R1½ EN 10226 or N3 1½" NPT
Ambient temperature	with separate housing	-40 °C ... +70 °C -40 °C ... +80 °C
Process temperature	VF12, VF13 VF15	-40 °C ... +80 °C -40 °C ... +70 °C
VF12, VF13 high temperature	E1 E2 E3	-40 °C ... +150 °C -40 °C ... +200 °C -40 °C ... +250 °C
Process pressure		-0.95 bar ... 10 bar
Minimum density of bulk solids		0.01 kg/l (t/m ³)
Response delay	for damping for start oscillation	1 second 2 to 5 seconds
Cable entry		Gland 2xM20x1,5
Type of protection	with separate rectangular-housing	IP66/IP67 acc. DIN EN 60529 IP65 acc. DIN EN 60529
Maintenance		none
Maximum load for the end of the vibration rod		1000 N vertical (V) 250 N horizontal (H)
Maximum tensile force at suspension cable of type VF15		2000 N
Installation position	VF12, VF13 VF15	any vertical

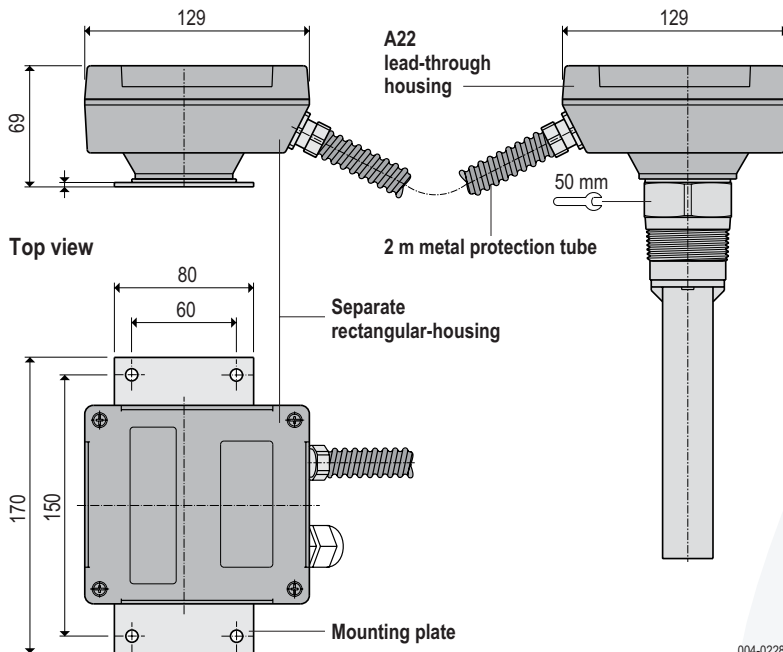
Electrical data

Supply voltage	C8	20 ... 250 V AC / DC	Supply
Power consumption		≤ 3 VA / 3 W	
Signal relay		two potential free change-over contacts	
Capacity of contact		8 A / 250 V AC 192 / 72 W at 24 / 48 V DC	
Supply voltage	C5	24 V DC ±10%	Supply
Power consumption		≤ 1 W (without load)	
Signal output		potential free NPN / PNP	
Capacity of contact		maximum 20 W switching capacity maximum 350 mA constant current	

Dimensions

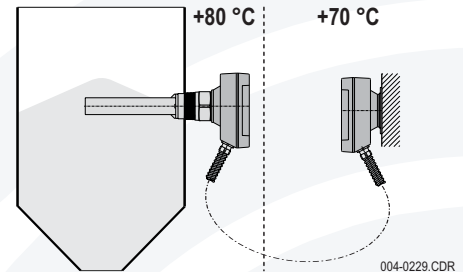
A22 Separate rectangular-housing

Front and side views



004-0228

With the separate rectangular-housing the electronic will be mounted remote from the probe.



Application

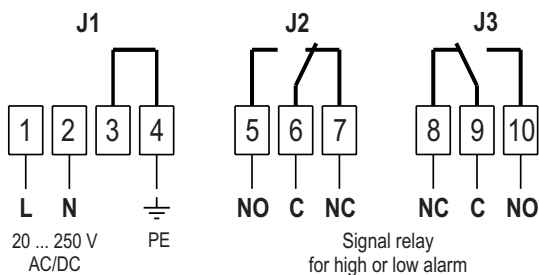
- In vessels with heavy vibrations
- Process temperatures of 150 °C to 250 °C only in combination with lead-through housing in high-temperature design
- Ambient temperatures up to +80 °C in close proximity to the container wall.

Separate rectangular-housing combinable with:
A22 lead-through housing at the probe

Metal protection tube with 2 m length.
Different length on request.

Electrical connection

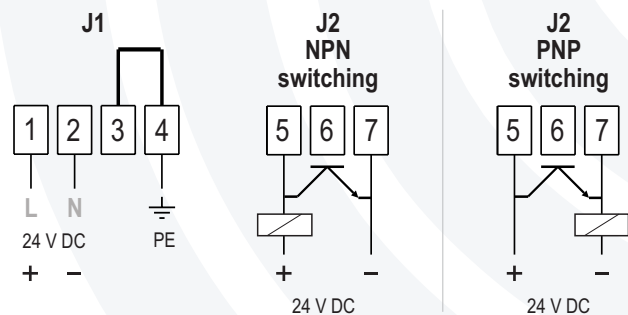
Wide range electronic C8 (not available with GasEx option B11)



004-0210.CDR

Electrical connection

DC voltage electronic C5 (not available with GasEx option B11)



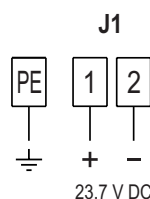
Terminals for signal output (transistor)
- Terminal 6 not used -

Electrical data

Supply voltage U_i	23.7 V DC from VF-VEC8-B22
I_i	167 mA
P_i	958 mW
L_i	negligible
C_i	negligible

Electrical connection

Two wire electronic C5i (only available with GasEx option B11)



Supply only with supply and evaluation device VF-VEC8-B22 for GasEx.

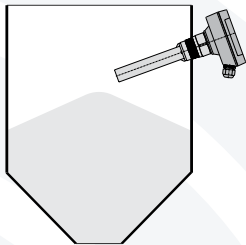
Current consumption

High alarm FH	Vibration rod oscillates freely	8 mA
	Vibration rod covered	16 mA
Low alarm FL	Vibration rod covered	8 mA
	Vibration rod oscillates freely	16 mA

High alarm sensor FH (factory setting)

MOLOSvibro level indicator of the VF1. series are configured for **high level alarm** in the factory setting. The function can be changed with a jumper on the electronic board. The switching status is indicated by a LED on the electronic board, like it is explained below.

Free status - Vibration rod oscillates freely



Electronic type

LED display

C8



LED on

C5



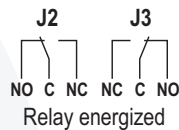
LED on

C5i



LED off

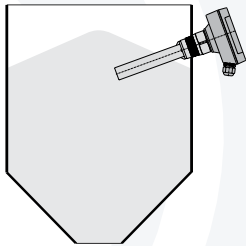
Switching status



Transistor conductive

8 mA
Current output

High alarm - vibration rod covered with bulk solids



Electronic type

LED display

C8



LED blinking

C5



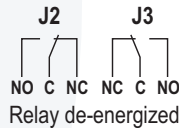
LED blinking

C5i



LED on

Switching status



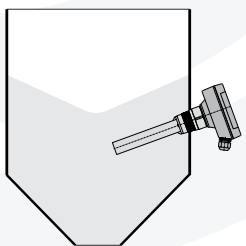
Transistor blocks

16 mA
Current output

Low alarm sensor FL (jumper repositioned)

MOLOSvibro level indicator of the VF1. series can be used for **low level alarm** with a changed factory setting. The function can be changed with a jumper on the electronic board. The switching status is indicated by a LED on the electronic board, like it is explained below.

Covered status - Vibration rod covered with bulk solids



Electronic type

LED display

C8



LED on

C5



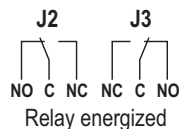
LED on

C5i



LED off

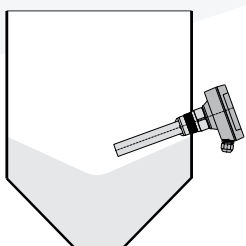
Switching status



Transistor conductive

8 mA
Current output

Leeralarm - Vibration rod oscillates freely



Electronic type

LED display

C8



LED blinking

C5



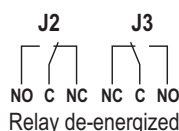
LED blinking

C5i



LED on

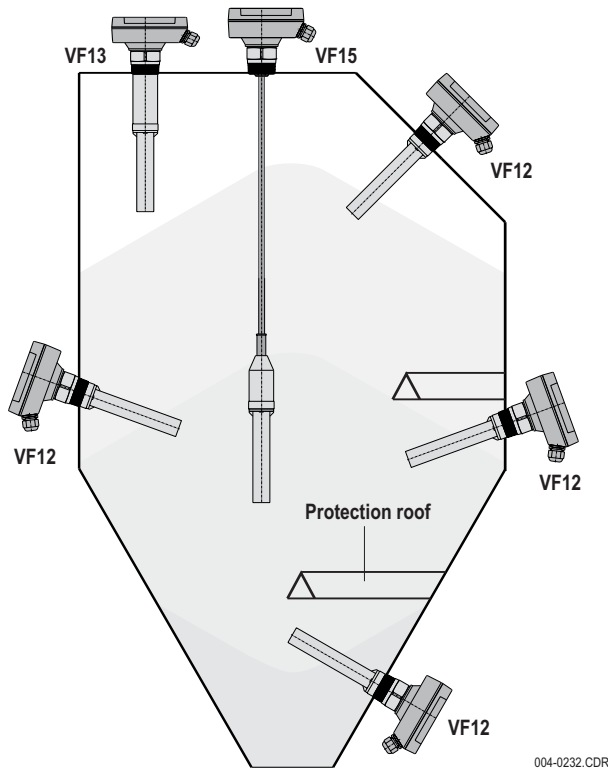
Switching status



Transistor blocks

16 mA
Current output

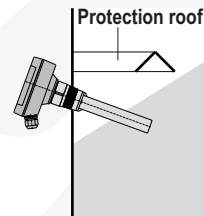
Possibilities for installation



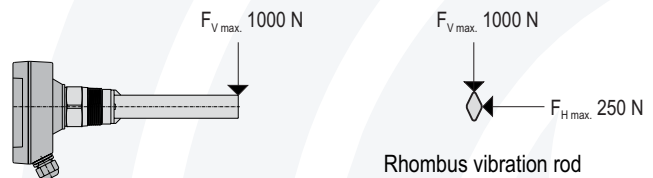
Protection against heavy load

If needed, a protection roof or a stable deflector has to be installed inside the container, in order to protect the probe and the rod against impinging bulk solids.

Between protection roof and the probe has to be enough space that bulk solids could penetrate but not jam.

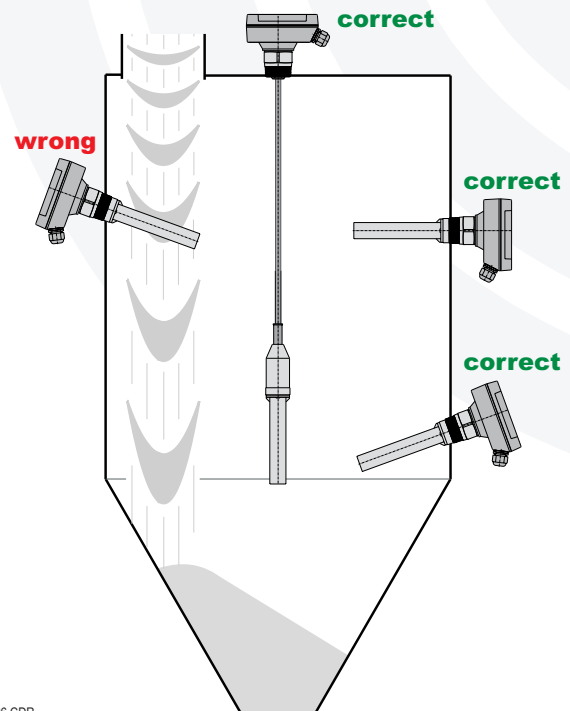
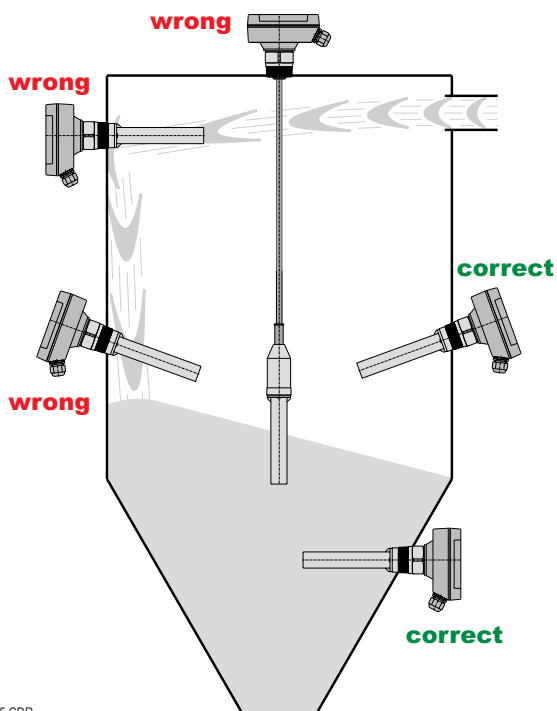


Maximum load for vibration rod



Protection against bulk solids crashing down upon the rod

Level indicators must not be affected by flying bulk goods particles e.g. from injection pies, filling pipes or down pipes. Therefore the bulk solids stream should be directed or redirected accordingly, or the level indicator should be placed so that bulk solids cannot impact directly onto the probe and vibration rod.

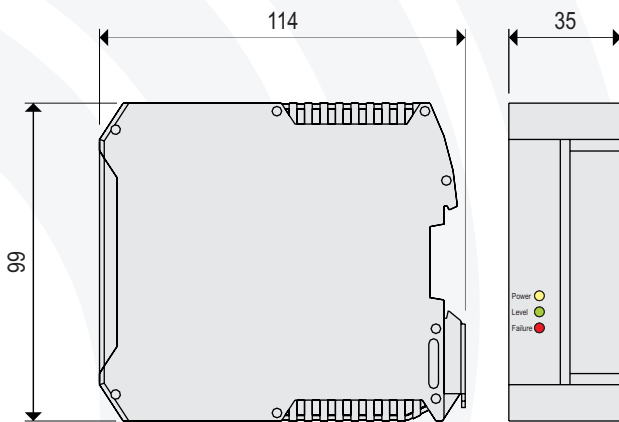


Application (intended use)

The supply and evaluation device type **VF-VEC8-B22** is intended for the use as power supply for **MOLOSvibro** level indicators that are used in potentially explosive gas atmospheres.

It detects and evaluates the damping of the vibration rod, switches the signal relay and diagnoses a short circuit or broken cable at the connection to the probe and switches the failure relay.

Dimensions



004-0240.CDR

Technical data

Material	Housing	Polyamid, light gray	
Ambient temperature		-20 °C ... +60 °C	T_a
Supply voltage		20 ... 250 V AC/DC	Supply
Power consumption		≤ 3 VA	
Connection to sensor	Ex i		
	Supply voltage	≤ 23.7 V DC	
	Connection cable light grey	2-wire, maximum 35 Ω per wire	
	Switching threshold	13 mA	
Signal relay (potential free)		change-over contact (SPDT)	
Error relay (potential free)		change-over contact	
Capacity of contact	AC	6 A / 250 V	
	DC	≤ 6 A at 24 V / 0,5 A at 48 V	
	DC	minimum 24 V / 100 mA	
Connection clamps		maximum 2.5 mm ²	
Type of protection		IP20 acc. DIN EN 60529	IP
Ignition protection type		⊕ II (1) G [Ex ia Ga] IIB	
		⊕ II (1) D [Ex ia Da] IIIC	
LED display	Power yellow	Power supply available	
	Level green	Filling level (high / low)	
	Failure red	Error (short circuit / broken cable)	
Maintenance		none	
Installation		Top hat rail assembly (35 mm)	
Installation position		any	

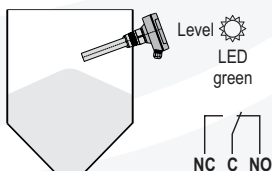
High and low alarm sensor

The signal relay of the supply and evaluation device **VF-VEC8-B22** has a separate switching logic, that is demonstrated below. The function can be changed with a jumper on the two wire electronic board **C5i** installed in the **MOLOSvibro** sensor housing.

High alarm sensor FH (factory setting)

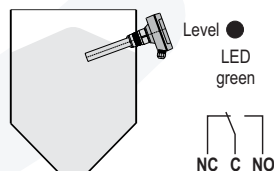
Free status

Vibration rod oscillates freely



High alarm

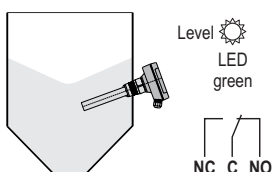
Vibration rod covered with bulk solids



Low alarm sensor FL (jumper repositioned)

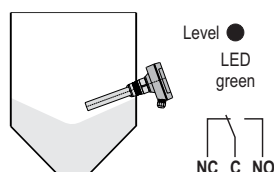
Covered status

Vibration rod covered with bulk solids

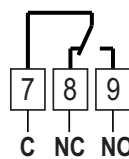


Low alarm

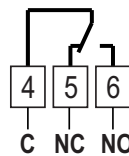
Vibration rod oscillates freely



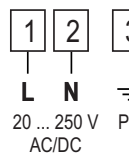
Electrical connection



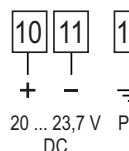
Signal relay for high and low alarm



Error relay for short circuit and broken cable
 OK = Relay energized Connection C-NO
 Failure = Relay de-energized Connection C-NC



Supply voltage
 Wide range electronic C8



Connection to sensor **MOLOSvibro Typ C5i**
 Two wire electronic Ex i (intrinsically safe)
 Blue clamps

Subject to modification

