

NIVOCONT R

VIBRATING ROD LEVEL SWITCHES

User Manual

10th edition



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Certificates		Reference document number
	BKI ATEX, Certificate No.: BKI16ATEX0005/1	rkh5021m060bh_09
	BKI IECEx, Certificate No.: IECEx BKI 13.0001X issue No.: 0	rkh5021m0600h_04

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Thank you for purchasing a NIVELCO product.

1. INTRODUCTION

The **NIVOCONT R** vibrating rod level switches are suitable for detecting both low and high levels of powders, granules, and bulk materials with a minimum medium density of 0.05 kg/dm³ (0.05 specific gravity of 0.05). These materials include cement, lime, sand, grain, feed, and sugar. Dust Ex versions are available for use in hazardous environments.

2. ORDER CODES (NOT ALL COMBINATIONS ARE AVAILABLE)

NIVOCONT **R** — — *

Version	Code
Standard version ⁽¹⁾	K
Standard version with fine-polished probe ⁽¹⁾	S
High-temperature version ⁽²⁾	H
High-temperature version with fine-polished probe ⁽²⁾	T

Housing	Code
Painted aluminum	5
Fiberglass-reinforced plastic (PBT) ⁽³⁾	6

Supply Voltage / Output / Certificates	Code
20...255 V AC/DC / SPDT relay	1
20...255 V AC/DC / SPST solid-state output	3
20...250 V AC or 20...50 V DC / SPDT relay / Ex ta/tb D	5

Process connection	Code		
	Extension		
	Standard	Rod	Cable
1½" BSP	H	R	K
1½" NPT	N	L	C
Process connection / extension connection	Custom		
1½" BSP / 1" BSP	E		
1½" NPT / 1" BSP	F		
1½" NPT / 1" NPT	G		

Probe length	Code			
	Extension			
	Standard	Rod	Cable	Custom
207 mm (8.15")	02	—	—	
0.3...3 m (1...9.84 ft)	—	03...30	—	
1...20 m (3.28...65.5 ft)	—	—	01...20	
0.2...2 m (0.65...6.5 ft)	—	—	—	02

*** For explosion-proof devices, the article number is followed by "Ex" on the data plate!**

⁽¹⁾ Up to +110 °C (+230 °F) ⁽²⁾ Up to +160 °C (+320 °F) only for standard and rod extended versions. ⁽³⁾ Ex version is not available.

2.1 Accessories

- User's manual
- Warranty card
- EU-Declaration of Conformity
- 2× plug-in type, 3-pole terminal block
- 1× 2 mm thick KLINGER OILIT sealing (only for 1½" BSP-threaded process connection)

3. TECHNICAL DATA

3.1 General data

Type		R□H-□□□-□, R□N-□□□-□	R□R-□□□-□, R□L-□□□-□	R□K-□□□-□, R□C-□□□-□	R□E-□□□-□, R□F-□□□-□
Insertion length		207 mm (8.15")	0.3...3 m (1...9.84 ft)	1...20 m (3.28...65.5 ft)	0.2...2 m (0.65...6.5 ft)
Material of wetted parts		1.4571 (316Ti equivalent)			1.4571 (316Ti equivalent)
Housing material		Painted aluminum casting (R-500 series); or fiberglass-reinforced plastic (PBT) (R-600 series)			
Process connection		R□H, R□R, R□K, R□E: 1½" BSP; R□N, R□L, R□C, R□F: 1½" NPT			
Process temperature (See temperature diagram)		-30...+110 °C (-22...+230 °F); high-temperature version ⁽²⁾ : -30...+160 °C (-22...+320 °F)		-30...+80 °C (-22...+176 °F)	-30...+110 °C (-22...+230 °F); high-temperature version ⁽³⁾ : -30...+160 °C (-22...+320 °F)
Ambient temperature (See temperature diagram)		-30...+60 °C (-22...+140 °F)			
Process pressure		max. 25 bar (2.5 MPa, 363 psi)		max. 6 bar (0.6 MPa, 88 psi)	See Chapter 7 ⁽³⁾
Medium density ⁽¹⁾		min. 0.05 kg/dm³ medium density (min. 0.05 specific gravity) (grain size max. 10 mm [0.4"])			
Response time (selectable)	Getting immersed	<1.8 sec or 5 ±1.5 sec			
	Getting free	<2 sec or 5 ±1.5 sec			
Supply voltage (universal)		Standard type: 20...255 V AC/DC			
Power consumption		≤2.5 VA / 2 W			
Electrical connections		2× M20x1.5 plastic cable glands for Ø6...12 mm (Ø0.25"...0.5") cable; 2× terminal blocks for max. 1.5 mm² (AWG16) wire cross section; 2× internally threaded ½" NPT connection for protective pipes.			
Ingress protection		Housing: IP67 (NEMA 6 equivalent)			See Chapter 7 ⁽³⁾
Electrical protection		Class I (must be grounded!)			
Weight	plastic housing	1.5 kg (3.3 lb)	1.5 kg +1.4 kg/m (3.3 lb + 1 lb/ft)	1.5 kg +0.6 kg/m (3.3 lb + 0.4 lb/ft)	1.5 kg (3.3 lb)
	aluminum housing	1.88 kg (4.15 lb)	1.88 kg +1.4 kg/m (4.15 lb + 1 lb/ft)	1.88 kg +0.6 kg/m (4.15 lb + 0.4 lb/ft)	1.88 kg (4.15 lb)

⁽¹⁾ Depends on friction and granular size of the medium.

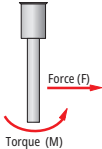
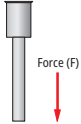
⁽²⁾ Only with metal housing.

⁽³⁾ Custom extended devices must be installed and mounted appropriately, which is the responsibility of the customer. Only the appropriate mounting ensures IP67 protection, up to 6 bar (0.6 MPa, 88 psi) maximum tank pressure, and Class I electrical protection.

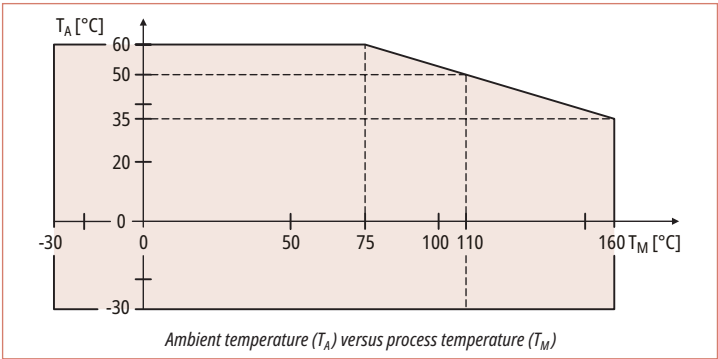
3.2 Output properties

Output	Relay	Solid-state
Output type	SPDT	SPST (electronic)
Output rating	250 V AC, 8 A, AC 1	50 V, 350 mA
Output protection	–	Overvoltage, overcurrent and overload
Voltage drop (switched on)	–	<2.7 V 350 mA
Residual current (switched off)	–	<10 µA

3.3 Loadability

	Standard	Rod-extended	Cable-extended
Type of load			
Force	max. 500 N (112.4 lbf)	–	max. 45 kN (10.1 lbf)
Torque	max. 100 Nm (885 in·lbf)	max. 100 Nm	–

3.4 Temperature diagram

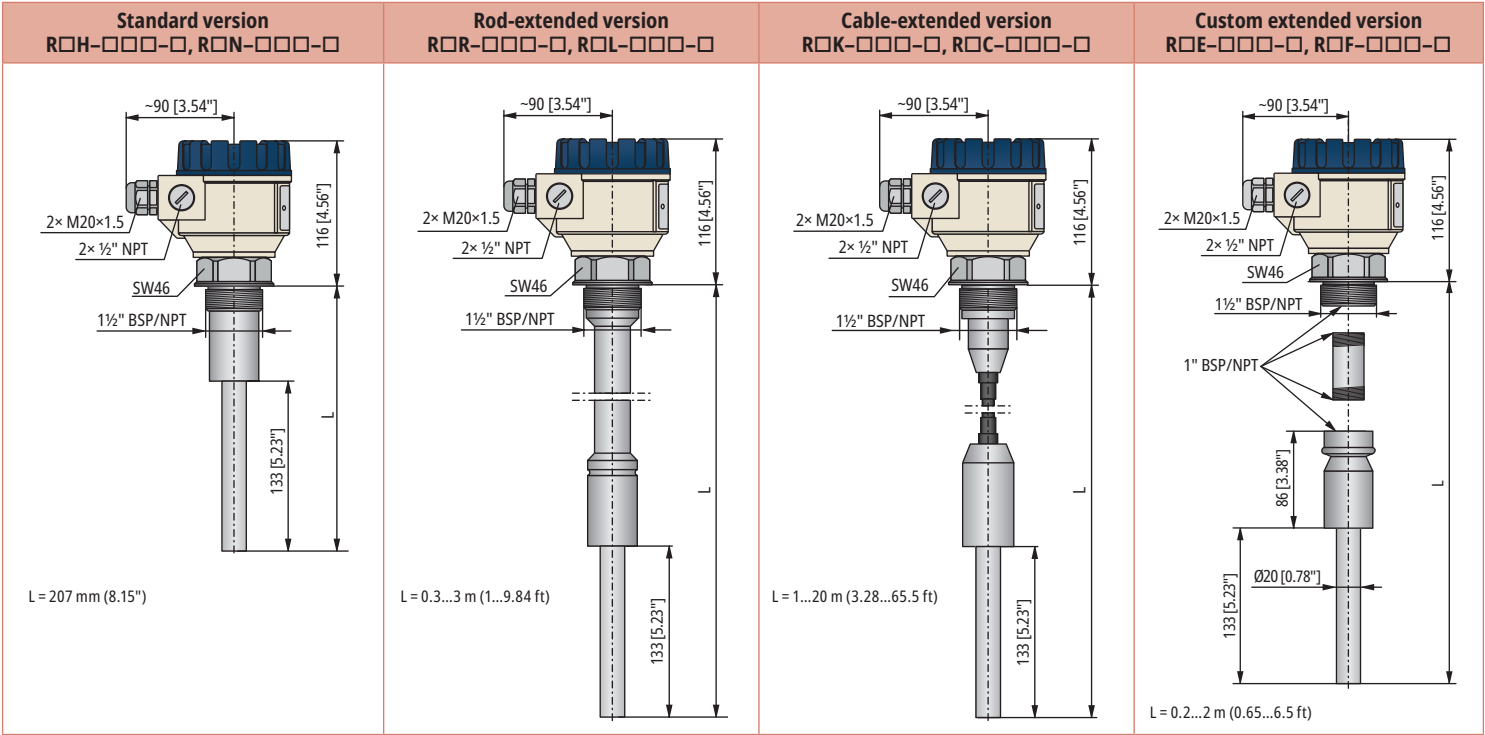


3.5 Mounting options

	Standard version		Rod-extended version	Cable-extended version
High-level switching	Top-mounted	Side-mounted ⁽¹⁾	Vertical mounting from the top	
Low-level switching	Side-mounted ⁽¹⁾			

⁽¹⁾ Protect the device against falling material by installing a baffle plate. The device must be installed with a slope greater than the slope angle for powdery materials.

3.6 Dimensions



3.7 Explosion Protection, Designation, Limit Values

3.7.1 ATEX protection by enclosure (Ex ta/tb) – ATEX Certificate No.: BKI16ATEX000/1

Type	RK□-5□□-5 Ex, RH□-5□□-5 Ex, RS□-5□□-5 Ex, RT□-5□□-5 Ex
Ex marking	Ⓔ II1/2 D Ex ta/tb IIIC T90 °C...T170 °C Da/Db
Supply voltage (universal)	20...250 V AC (50 / 60 Hz) or 20...50 V DC
Electrical connections	2× M20×1.5 cable glands with Ex ta IIIC protection type for Ø7...Ø12 mm (Ø0.276"...0.472") cable, 2× plug-in type terminal blocks for max. 1.5 mm² (AWG16) wire cross section, 2× internally threaded ½" NPT connection for protective pipes.

3.7.2 Temperature limit data for ATEX (Ex ta/tb) approved models

Thermal properties	Cable-extended version			Standard and rod-extended version				
	RK□-5□□-5 Ex RC□-5□□-5 Ex			RK□-5□□-5 Ex, RS□-5□□-5 Ex (except cable- or custom extended versions)				High-temperature
								RH□-5□□-5 Ex, RT□-5□□-5 Ex
Process temperature min.: -30 °C (-22 °F) ... max.. ⁽²⁾	+60 °C (+140 °F)	+70 °C (+158 °F)	+80 °C ⁽¹⁾ (+176 °F)	+60 °C (+140 °F)	+70 °C (+158 °F)	+95 °C (+203 °F)	+110 °C (+230 °F)	+160 °C (+320 °F)
Ambient temperature min.: -30 °C (-22 °F) ... max.. ⁽²⁾		+50 °C (+122 °F)	+60 °C (+140 °F)		+50 °C (+122 °F)	+60 °C (+140 °F)	+50 °C (+122 °F)	+35 °C (+95 °F)
Max. surface temperature of the process connection	+85 °C (+185 °F)		+95 °C (+203 °F)	+85 °C (+185 °F)		+95 °C (+203 °F)		+135 °C (+275 °F)
Max. surface temperature						+95 °C (+203 °F)	+110 °C (+230 °F)	+160 °C (+320 °F)
Temperature classes	T90°C		T100°C	T90°C		T100°C	T115°C	T170°C

⁽¹⁾ Process temperature for max. 1 hour: +95 °C (+203 °F).

⁽²⁾ To use the level switch at the maximum values of the corresponding thermal properties, the cable must also be able to withstand +90 °C (+194 °F) temperature continuously.

3.7.3 IECEx protection by enclosure (Da/Db) – IECEx Certificate No.: IECEx BKI 13.0001X

Type	RK□–5□□–5 Ex, RH□–5□□–5 Ex, RS□–5□□–5 Ex, RT□–5□□–5 Ex
Ex marking	Ex t IIIC T* Da/Db IP67 *(see Thermal Properties table)
Supply voltage (universal)	20...250 V AC (50 / 60 Hz) or 20...50 V DC
Electrical connections	2× M20×1.5 cable glands with Ex ta IIIC protection type for Ø7...Ø12 mm (Ø0.276" ...0.472") cable, 2× plug-in type terminal blocks for max. 1.5 mm² (AWG16) wire cross-section, Two internally threaded ½" NPT connection for protective pipes.

3.7.4 Temperature limit data for IECEx (Da/Db) approved models

Thermal Properties	Cable-extended version			Standard and rod-extended version				
	R□K–5□□–5 Ex R□C–5□□–5 Ex			R□K–5□□–5 Ex, RS□–5□□–5 Ex (except cable- or custom extended versions)				High-temperature
								RH□–5□□–5 Ex, RT□–5□□–5 Ex
Process temperature min.: –30 °C (–22 °F) ... max.: ⁽¹⁾	+60 °C (+140 °F)	+70 °C (+158 °F)	+80 °C ⁽²⁾ (+176 °F)	+60 °C (+140 °F)	+70 °C (+158 °F)	+95 °C (+203 °F)	+110 °C (+230 °F)	+160 °C (+320 °F)
Ambient temperature min.: –30 °C (–22 °F) ... max.: ⁽¹⁾		+50 °C (+122 °F)	+60 °C (+140 °F)		+50 °C (+122 °F)	+60 °C (+140 °F)	+50 °C (+122 °F)	+35 °C (+95 °F)
Max. surface temperature of the process connection	+85 °C (+185 °F)		+95 °C (+203 °F)	+85 °C (+185 °F)		+95 °C (+203 °F)		+135 °C (+275 °F)
Max. surface temperature						+95 °C (+203 °F)	+110 °C (+230 °F)	+160 °C (+320 °F)
Temperature classes	T90°C		T100°C	T90°C		T100°C	T115°C	T170°C

⁽¹⁾ To operate the level switch with the maximum values of the related thermal properties the applied cable should permanently withstand up to +90 °C (+194 °F) temperature.

⁽²⁾ Medium temperature for max. 1 hour: +95 °C (+203 °F).

3.8 Special conditions for safe use

- The enclosure must be not opened while it is energized!
- The IECEx certified apparatus may be used only in explosive dust atmospheres where the temperature class of the selected type of the apparatus does not exceed two-third parts of the minimum ignition temperature of the dust/air mixture.
- The IECEx certified equipment must be assembled with cable glands certified according to protection Ex t IIIC IP67, size M20×1.5.

In hazardous atmosphere environment the unit can be only powered on after properly closing the housing cover and fixing the screws of the safety locking bolt.

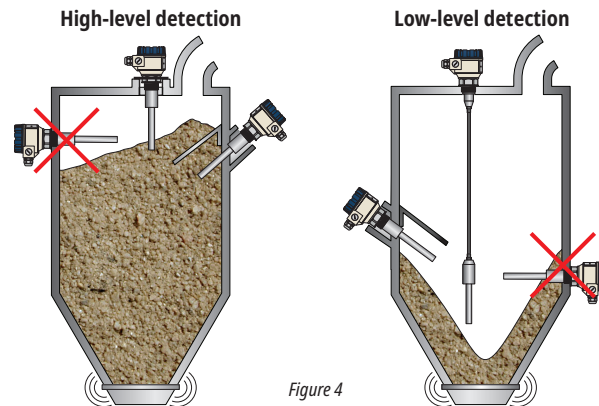


Figure 4

4. MOUNTING

It is recommended to test the switching function with a sample of the particular material prior to installing the device (see: Installation, Commissioning). The unit may not work with mediums that are within the specified density range but have very large grain size or have extremely little friction.

Screw the device in by its hexagon neck. After tightening the process connection, the housing can be rotated (max. 300°) to adjust the cable gland to the required position. It might be necessary to install the device at an offset level position relative to the switching level to take the caving or arching of the material in the silo into account (see Figure 4).

When detecting the level of powders, the device must be installed at an angle exceeding the repose angle (or, in the case of high-level detection, vertically), to prevent the forming of powder deposits on the vibrating rod that might substantially reduce the self-cleaning effect. Avoid mounting the rod in a recess (see Figure 5). In the case of tanks that are likely to be exposed to intense vibrations, the vibrations acting on the device must be dampened (e.g., vibration-damping inserts made of rubber have to be applied).

WARNING! Handle the device, especially the sensing probe, with great care. Any impact on the sensing probe may ruin its resonance system. In addition, a protective shield must be installed (see Figure 6) if the probe is exposed to falling material or excessive mechanical load.

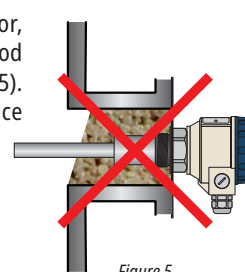


Figure 5

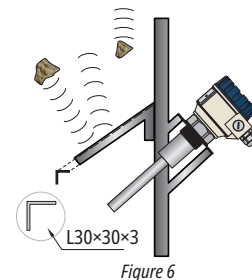


Figure 6

5. INSTALLATION, COMMISSIONING

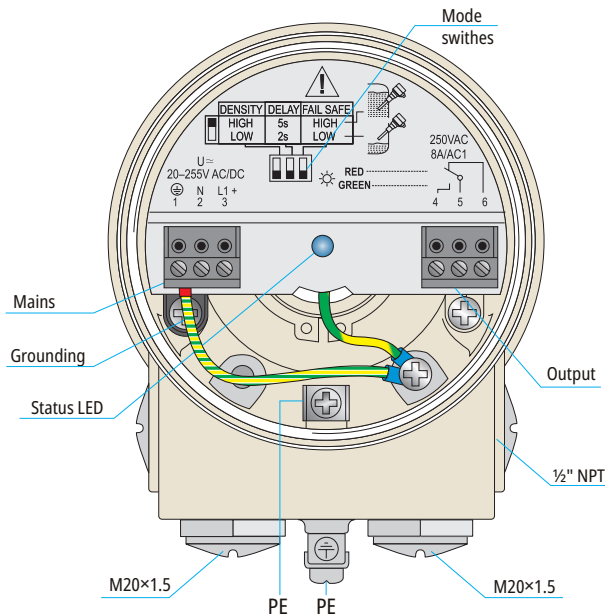


Figure 7

Remove the top cover of the housing to access the connection terminals and adjustment switches. The housing cover of Dust Ex instruments can only be opened after removing the safety locking bolt fastened with bolts. Do not remove the wire from terminal pin 1 (Figure 7) because it is an internal connection. Use the PE (Protective Earth) grounding screw to ground the unit.

After the device is installed and connected electrically, test if the device is ready for operation.

The status LED lights up when the device is switched on. The DENSITY switch must be set in accordance with the density of the material:

- LOW position, recommended for loose and light materials with **density** below 0.1 kg/dm^3 represents **small energy** and **amplitude** of vibration as well as great sensitivity of detection.
- HIGH position, recommended for (thick and heavy) materials with **density** over 0.1 kg/dm^3 represents vibration with **great energy** and amplitude and **small sensitivity** of detection.

The instrument may not switch correctly in mediums with density less than 0.05 kg/dm^3 or with very small internal friction. To obtain FAIL SAFE alarm, use the de-energized or open state of the output as an alarm, thus a power failure will also be considered as alarm (see 6.1 Operation diagram Table). The delay must be selected to comply with requirements of the process control technology the units are used for.

ATTENTION! The instrument may be damaged through the switches by electrostatic discharge (ESD), thus the precautions commonly used to avoid ESD must be applied.

6. WIRING

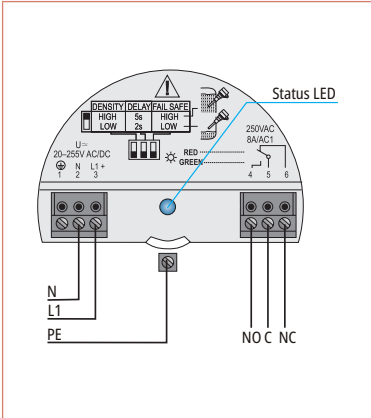


Figure 8
Wiring of relay output version

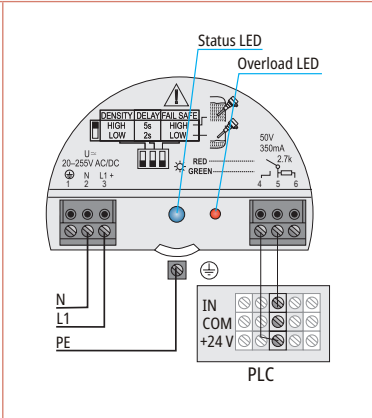


Figure 9
Wiring of optocoupled sink input to solid state output version supplied from AC line

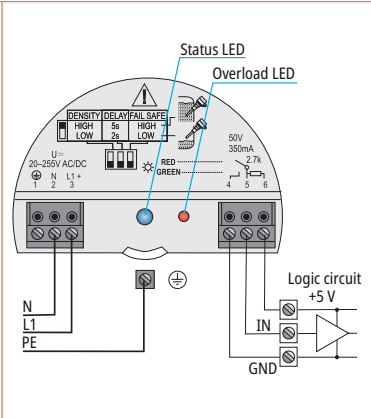


Figure 10
Wiring of a logical voltage input to a solid-state output version supplied from AC line

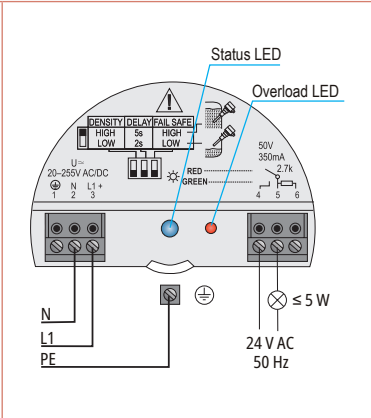


Figure 11
Wiring of a load to a solid-state output version supplied from AC line

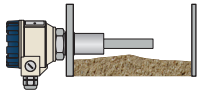
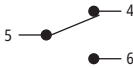
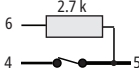
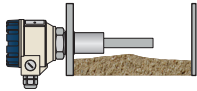
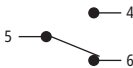
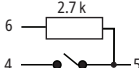
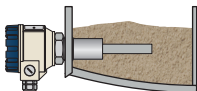
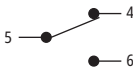
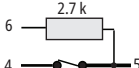
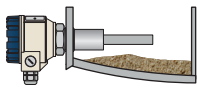
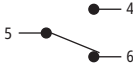
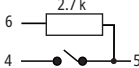
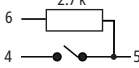
6.1 Mode switches

Density		
Selection is dependent on the density of the measured medium.		
	HIGH	process density is >0.1 kg/dm ³ (0.1 S.G.) or abrasive materials
	LOW	medium density is <0.1 kg/dm ³ (0.1 S.G.)

Delay		
Response time delay to be selected		
	5 s	The output does not change if the rod is blocked for a moment (e.g., by falling material).
	2 s	Fast switching

Fail-safe		
	HIGH fail-safe	A fail-safe alarm is indicated by a de-energized relay or an open solid-state output.
	LOW fail-safe	

6.2 Operation diagram

Power supply		Switching	Fail-safe mode	Status LED	Output	
					Relay	Electronic
ON	High-level	 Free	HIGH 	green	 Energized	 ON
		 Immersed	HIGH 	red	 De-energized	 OFF
	Low-level	 Immersed	LOW 	green	 Energized	 On
		 Free	LOW 	red	 De-energized	 OFF
OFF		-	HIGH / LOW	OFF	 De-energized	 OFF

7. MOUNTING THE CUSTOM EXTENDED VERSION



Attention! The device must not be installed with the temporary (plastic) extension pipe!

- Remove the temporary (plastic) extension pipe.
- Cut a 1" stainless steel (1.4571) extension pipe (not included) to the desired length.
- Cut a 20 mm (0.8") long 1" BSP thread on both ends of the pipe.
- Connect the wires of the lower and upper half correctly by color using the supplied cable set. The wires must be led through the pipe.
- Use the grounding screw terminal (see Figure 12.) to ground the extension pipe. Caution! Life protection ground, 25 A class ground connection must be used.
- Class I electrical protection.
- Smoothly and seamlessly lubricate the threads of the extension pipe with sealing-fixing adhesive. Use LOCTITE 620 retaining compound or an equivalent (not included) for this.
- Screw the threaded connections between the lower and upper units all the way up to their limits.



Only the correct mounting ensures the desired IP67 protection, a maximum tank pressure of 6 bar (0.6 MPa, 87 psi), and Class I electrical protection. The user must ensure compliance under their own responsibility.

The manufacturer disclaims liability for any damages or issues arising from nonconformity related to the above-described installations performed by the customer.

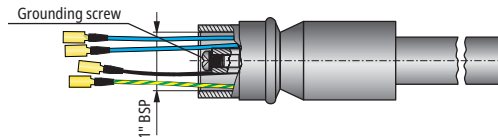


Figure 12

8. MAINTENANCE AND REPAIR

The device does not require regular maintenance. In some instances, however, the vibrating section may need to be cleaned from material deposits. **This must be carried out carefully.**

The warranty terms are detailed in the warranty card. For repairs, the user must clean and disinfect the device, neutralize any chemical residues, and complete the [Returned Equipment Handling Form](#), which is available for download on our website. On the form, the user must declare the defect, provide the reason for return, and confirm that the device is clean and free of hazardous substances.

9. STORAGE CONDITIONS

Ambient temperature: -35...+60 °C (-31...+140 °F)

Relative humidity: max. 98%

rkh502en25h10

November 2025

Information is accurate to the best of NIVELCO's knowledge.

We reserve the right to change specifications at any time