

NIVELCO PRODUCT INTRODUCTION

NIVOCONT R-500/R-600

VIBRATION ROD LEVEL SWITCHES

NEW!

TYPICAL APPLICATIONS

Plastic processing:

powders, pellets, granulates

Chemical industries:

powders, pills, crystals

Agriculture/Food industries:

grains, rice, cereals, feed, flour

Paper and Pulp industries:

crushed cellulose, shavings

Recycling:

paper cuts, ground plastic

Power generation:

fly ash, lime, carbon black

Mining and quarry:

coal, stone powder

Construction:

cement, sand, clay



- **Higher robustness and durability**

- **Various output versions:**

- **power relay with SPDT**
- **3-wire solid state output**

- **Plastic or aluminium housing**

Power supply: two ranges cover all requirements

- **ATEX 'Dust Ex' certificate ***

- **High temperature versions up to 160 °C**

- **Visible status indication**

GENERAL

Advantages such as robustness, self-cleaning for most mediums by vibration, pressure and corrosion resistance offered by vibration rods make them the optimal solution for single point level switching in free flowing solids. Correct installation promises a low-cost, reliable and long-life level detection in bins and silos containing bulk materials.

Applied to granular materials lump size must not exceed 10 mm. Only mediums with sufficient internal friction can be detected.

If applied as low level switch, utmost care should be taken to prevent damaging the probe by the pressure of the medium.

The vibration rod is a mechanical resonant system excited and kept in resonance by an electronic circuit. When covered by material the damping of the vibration will be detected by the electronic which, after a built in time delay initiate the switching of the output relay.

The electronics using highly reliable SMT components is completely potted, eliminating environmental impacts such as moisture, vibration etc.

MODEL SELECTION

Standard length

Used for high failsafe in bins or for hopper low failsafe.

Pipe extended

Can be used for both high or low failsafe. If used for low failsafe in mediums of great internal friction, consider that the moving medium may bend and damage the probe.

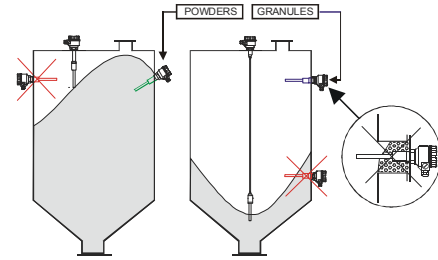
Cable extended

Usually used for both high or low failsafe. Can not be used with mediums of large granular size. Abrasive mediums may damage the cable.

INSTALLATION

- Determining mounting location the caving or arching of the material should be considered.
- Cable extended version for low-level alarm is suggested to mount above the outlet of the tank/silo.
- Side mounted device in powder applications should be installed with an inclination exceeding the angle of repose, to enable efficient self-cleaning of the rod.
- Avoid mounting device in a recess.
- Prior to the installation, it is advised to test the switching function of the unit on a sample quantity of material and to set "Density" switch according to the density of medium.
- Screw in the device by its hexagon neck. After screwing tight the process connection, the housing can be rotated (max. 300°), to adjust the cable glands to the required position.

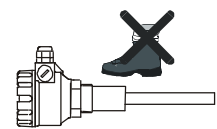
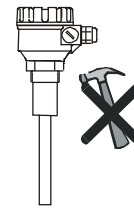
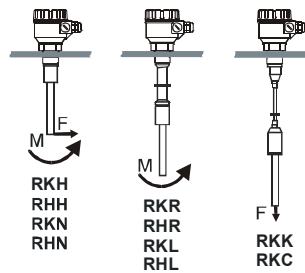
	High level	Low level*
Standard	Side mount	Side or bottom mount
Pipe extended	Top mount	Side or bottom mount
Cable extended	Top mount	Top mount



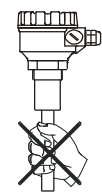
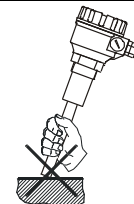
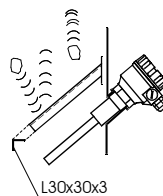
* The NIVOCONT is not suggested to be used for low level detection in high density materials

- Limits for bending or pulling force and torque should be considered.

Standard	Pipe extended	Cable extended
F = 500 N (M = 100 Nm)	—	F = 45 kN
	M = 100 Nm	—



- Handle the device with great care, especially the sensing probe. A larger impact on the sensing probe may ruin its resonance system.
- Probes exposed to falling material or mechanical loads should be protected.



SETTING UP TO THE PROCESS

Adjustment will be carried out by three switches by selecting (high/low) fail-safe mode, switching delay and density.

HIGH/LOW fail-safe mode (Switch C)

- De-energised status of the relay or open state of solid state output is preferred to be used for fail-safe alarm, thus a power breakdown will also be considered as alarm (see Operation diagram).

Time delay (Switch B)

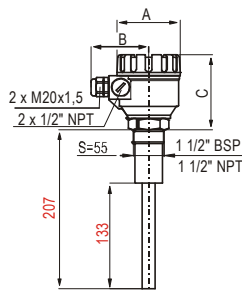
- Standard (switching delay: approx. 5 sec) or fast response (switching delay: approx. 2 sec) can be selected.

DENSITY (Sensitivity) adjustment (Switch A)

- LOW position, recommended for loose and light materials with **density** around and below 0.1 kg/dm³ represents **low 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/dm³ represents vibration with **high energy** and **amplitude** and **small sensitivity** of detection.

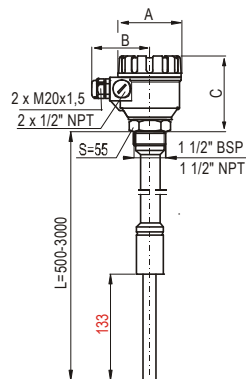
DIMENSIONS

Standard version

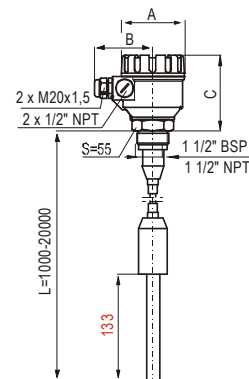


	A	B	C
R-500	100	89	120
R-600	93	89	118

Pipe extended version

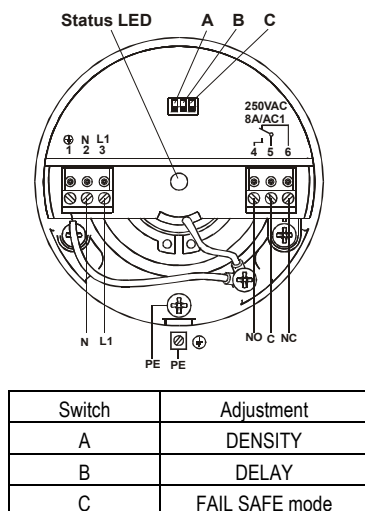


Cable extended version

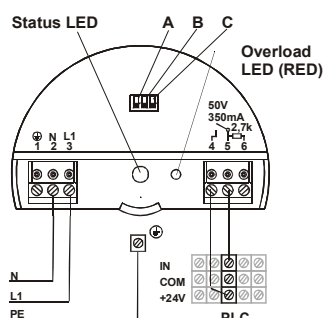


ELECTRICAL CONNECTION

Relay output version



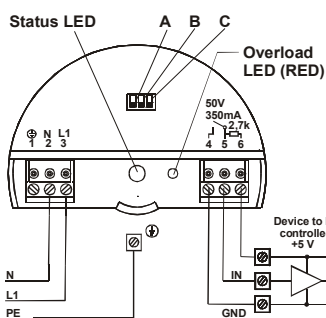
Solid state output version



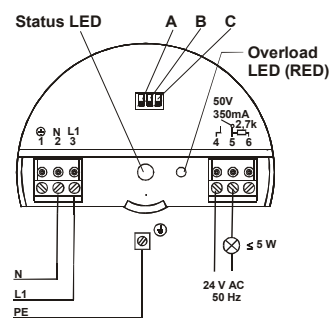
Electrical connection of a optocoupled sink input

Operation diagram

POWER	PROBE	FAIL-SAFE MODE	Status LED	RELAY	SOLID STATE OUTPUT
ON	Not vibrating (covered)	LOW	GREEN	5-4-6 ENERGISED	6-2.7k-5 ON
		HIGH	RED	5-4-6 DE-ENERGISED	6-2.7k-5 OFF
	Vibrating (free)	LOW	RED	5-4-6 DE-ENERGISED	6-2.7k-5 OFF
		HIGH	GREEN	5-4-6 ENERGISED	6-2.7k-5 ON
OFF	-	LOW vagy HIGH	NOT LIT	5-4-6 DE-ENERGISED	6-2.7k-5 OFF



Electrical connection of a logical voltage input



Electrical connection of a load

TECHNICAL DATA

General specification

TYPE		Standard	Pipe extended	Cable extended
		RKH, RKN, RHH, RHN	RKR, RKL, RHR, RHL RKE, RKF, RHE, RHF	RKK, RKC
Probe length		207 mm	0.3 ... 3 m	1 ... 20 m
Parts protruding into tank		1.4571 (SS316Ti)		Probe: 1.4571 (SS316Ti) Cable: PE coated
Housing material		Aluminium: Powder paint coated (R-500 series) Plastic: PBT fibre-glass reinforced, flame-retardant (R-600 series)		
Process connection		1 1/2" BSP or 1 1/2" NPT		
Temperature ranges see Derating diagram	Process	RK: -30 °C ... +110 °C (Ex: -20 °C ... +60 °C)	RH: -30 °C ... +160 °C	-25 °C ... +90 °C
	Ambient temp.	-30 °C ... +60 °C		
Max. pressure (absolute)		2.5 MPa (25 bar)		0.6 MPa (6 bar)
Minimum medium density**		0.05 kg/dm³ (max. granular size: 10 mm)		
Response time (selectable)	When covered	< 1.8 sec or 5 ±1.5 sec		
	When free	< 2 sec or 5 ±1.5 sec		
Supply voltage		16...40 V AC (50/60 Hz) or 19...55 V DC; 85 ... 265 V AC (50/60 Hz) or 120 ... 375 V DC		
Power consumption		≤ 2.5 VA / 1.2 W; ≤ 2.5 VA / 1.3 W		
Cable gland		2x M20x1.5 6...12 mm (Ex: 10...14 mm) cables		
Electrical connections		terminal, 1.5 mm² max. wire cross section		
Mechanical protection		IP 67		
Electrical protection		Class I. (to be grounded)		
Explosion proof protection mark		tD A20/21 IP65 T*		
Max. mechanical load on rod		F = 500 N M = 100 Nm	M = 100 Nm	F = 45 kN
Mass	plastic housing	1.5 kg	1.5 kg (+1.4 kg/m)	1.5 kg (+ 0.6 kg/m)
	aluminium housing	1.88 kg	1.88 kg (+1.4 kg/m)	1.88 kg (+ 0.6 kg/m)

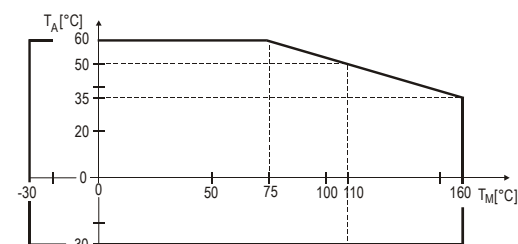
* See user manual

** may depend on friction and granular size of the medium

Output versions

TYPE	Relay	Solid state
	R□□-□□□-1	R□□-□□□-3
	R□□-□□□-2	R□□-□□□-4
	R□□-□□□-5	R□□-□□□-7
	R□□-□□□-6	R□□-□□□-8
Output	SPDT (potential free)	SPST (electronic/isolated)
Output rating	250 V AC, 8A, AC 1	350 mA/50V peak
Output protection	—	Overvoltage, overcurrent and overload protection
Voltage drop (switched of state)	—	< 1.7 V 350mA
Residual current (switched on state)	—	< 10 µA

Derating diagram



Ambient temperature (T_A) versus medium temperature (T_M)

ORDER CODE

STANDARD VERSION

NIVOCONT R □ □ - □ 0 2 - □

VERSION	CODE	PROCESS CONNECTION	CODE	HOUSING	CODE	SUPPLY / OUTPUT / Ex	CODE
Standard	K	1 ½" BSP	H	Alu. cast.	5	85-265 V AC / 120-375 V DC / relay	1
High temp.	H	1 ½" NPT	N	Plastic	6	16-40 V AC / 19-55 V DC / relay	2
						85-265 V AC / 120-375 V DC / solid state	3
						16-40 V AC / 19-55 V DC / solid state	4
						85-265 V AC / 120-375 V DC / relay / Ex	5
						16-40 V AC / 19-55 V DC / relay / Ex	6
						85-265 V AC / 120-375 V DC / solid state / Ex	7
						16-40 V AC / 19-55 V DC / solid state / Ex	8

PIPE EXTENDED VERSION

NIVOCONTR □ □ - □ □ □ - □

VERSION	CODE	PROCESS CONNECTION	CODE	HOUSING	CODE	LENGTH	CODE	SUPPLY / OUTPUT / Ex	CODE
Standard	K	1 ½" BSP	R	Alu. cast.	5	0.5 ... 3 m	05 ... 30	85-265 V AC / 120-375 V DC / relay	1
High temp.	H	1 ½" NPT	L	Plastic	6			16-40 V AC / 19-55 V DC / relay	2
								85-265 V AC / 120-375 V DC / solid state	3
								16-40 V AC / 19-55 V DC / solid state	4
								85-265 V AC / 120-375 V DC / relay / Ex	5
								16-40 V AC / 19-55 V DC / relay / Ex	6
								85-265 V AC / 120-375 V DC / solid state / Ex	7
								16-40 V AC / 19-55 V DC / solid state / Ex	8

CABLE EXTENDED VERSION

NIVOCONT R K □ - □ □ □ - □

PROCESS CONNECTION	CODE	HOUSING	CODE	LENGTH	CODE	SUPPLY / OUTPUT / Ex	CODE
1 ½" BSP	K	Alu. cast.	5	1 ... 30 m	1 ... 30	85-265 V AC / 120-375 V DC / relay	1
1 ½" NPT	C	Plastic	6			16-40 V AC / 19-55 V DC / relay	2
						85-265 V AC / 120-375 V DC / solid state	3
						16-40 V AC / 19-55 V DC / solid state	4
						85-265 V AC / 120-375 V DC / relay / Ex	5
						16-40 V AC / 19-55 V DC / relay / Ex	6
						85-265 V AC / 120-375 V DC / solid state / Ex	7
						16-40 V AC / 19-55 V DC / solid state / Ex	8