NIVOCONT R

VIBRATING ROD LEVEL SWITCHES
FOR SOLIDS

5 YEARS WARRANTY

NIVELCO

LEVEL SWITCHES

GENERAL DESCRIPTION

The **NIVOCONT R** series of vibrating rod level switches are robust instruments designed for low and high level indication of granules and powders with a minimum of 0.05 kg/dm^3 density. Mounted on tanks, silos or hopper bins it can control filling / emptying, or give fail-safe alarm signals. The highly polished version is recommended to use for abrasive mediums.

The operation principle is based on that the electronic circuit excites a vibration in the rod probe. When the medium reaches and covers the rod, its vibration stops, when the medium leaves the rod it returns to vibrate freely. The electronics senses the change of vibration and gives output signal after a selected delay.

MAIN FEATURES

- Extension up to 20 m (65.5 feet)
- Adjustable sensitivity
- Max. medium temperature: +160 °C (320 °F)
- Universal supply voltage
- Dust explosion protection
- Fine polished probe
- IP67 protection

APPLICATIONS

- Powders, pellets, granulates
- Grains
- Ground products
- Stone-powder, chippings
- Cement, sand, gravel
- Coal, slag
- Bulk solid materials

CERTIFICATIONS

- ATEX (Dust Ex)
- IEC (Dust Ex)

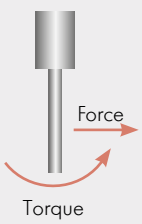
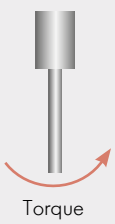
RKL-500-5Ex

RKR-500 / 600

RKK-500 / 600

TYPE SELECTION

Position of the switching point (high, low) and the mounting (side, top) determines the selection of the appropriate type.

Version		Standard	Rod extended	Cable extended
High limit switch		Side mounted	Top mounted	Top mounted
Low limit switch				
Loadability				
Max. load	Force	500 N	–	45 kN
	Torque	100 Nm	100 Nm	–

TECHNICAL DATA

Version		Standard	Rod extended	Cable extended
Insertion length		207 mm (8.15 inch)	0.3 – 3 m (1 – 10 feet)	1 – 20 m (3.3 – 65.5 feet)
Material of wetted parts		1.4571 (316Ti) stainless steel		Vibrating part: 1.4571 (316Ti); cable: PE cover
Process connection		1½" BSP; 1½" NPT as per order code		
Output		See: output data		
Medium temperature range		Standard: -30 °C … +110 °C (-22 °F … +230 °F); High temp. version: -30 °C … +160 °C (-22 °F … +320 °F)		-30 °C … +80 °C (-22 °F … +176 °F)
		Ex version: see temperature data		
Medium pressure		Max. 2.5 MPa (25 bar [363 psi])		Max. 0.6 MPa (6 bar [Max. 87 psi])
Max. load	Force	500 N	–	45 kN
	Torque	100 Nm	100 Nm	–
Medium density[1]		Minimum 0.05 kg/dm^3 (0.05 S.G.) (granular size 10 mm [0.4 inch])		
Response time (selectable)		< 2 sec or 5 sec ±1.5 sec		
Power supply		20 – 255 V AC/DC, Ex: 20 – 250 V AC, 20 – 50 V DC		
Power consumption		≤ 2.5 VA / 2 W		
Housing material		Paint coated aluminium or plastic (PBT)		
Electrical connection		2x M20x1.5 plastic cable glands, for Ø6 – 12 mm (Ø0.25 – 0.5 inch) cable + 2x NPT ½" internal thread for cable protective pipe 2 pcs. terminal blocks for 0.5 – 1.5 mm^2 (AWG16) wire cross section		
Electrical protection		Class I		
Ingress protection		IP67		
Mass	Metal housing	1.88 kg (4.15 lbs)	1.88 kg + 1.4 kg/m (4.15 lbs + 1 lbs/ft)	1.88 kg + 0.6 kg/m (4.15 lbs + 0.4 lbs/ft)
	Plastic housing	1.5 kg (3.3 lbs)	1.5 kg + 1.4 kg/m (3.3 lbs + 1 lbs/ft)	1.5 kg + 0.6 kg/m (3.3 lbs + 0.4 lbs/ft)

[1] Depends on the internal friction and the granular size of the medium

OUTPUT DATA

Type	Relay	Electronic
Output type and rating	SPDT 250 V AC, 8 A, AC1	SPST 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

SPECIAL DATA FOR Ex CERTIFIED MODELS

Type		R□□-5□□-5Ex
Protection type		Dust Ex
Ex marking[2]	ATEX	Ⓔx II 1/2 D Ex ta/tb IIIC T90 °C…T170 °C Da/Db
	IEC Ex[3]	Ex t IIIC T* Da/Db IP67 *(see Temperature data table)
Electrical connection		2 pcs. M20x1.5 cable glands with Ex ta IIIC protection type, 2 pcs. plug-in type terminal blocks for max. 1.5 mm^2 wire cross section

[2] Only with metal housing

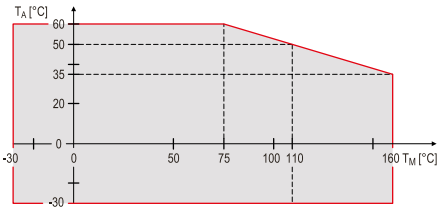
[3] Need of IEC is to be specified with order

TEMPERATURE DATA

Temperature limit values for Ex versions

Temperature data	Cable extended			Standard and rod extended				High temp.
Medium temp. (Tm)[4] Min.: -30 °C (-22 °F)	+60 °C (+140 °F)	+70 °C (+158 °F)	+80 °C (+176 °F)[5]	+60 °C (+140 °F)	+70 °C (+158 °F)	+95 °C (+203 °F)	+110 °C (+230 °F)	+160 °C (+320 °F)
Ambient temp. (Ta)[4] Min.: -30 °C	+60 °C (+140 °F)	+50 °C (+122 °F)	+60 °C (+140 °F)	+60 °C (+140 °F)	+50 °C (+122 °F)	+60 °C (+140 °F)	+50 °C (+122 °F)	+35 °C (+203 °F)
Max. surface temp. of process connection	+85 °C (+185 °F)		+95 °C (+203 °F)	+85 °C (+185 °F)		+95 °C (+203 °F)		+135 °C (+275 °F)
Max. surface temp.						+95 °C (+203 °F)	+110 °C (+230 °F)	+160 °C (+320 °F)
Temp. classes	**T90°C**		**T100°C**	**T90°C**		**T100°C**	**T115°C**	**T170°C**

Temperature diagram



Ambient temperature (T_A) versus Medium temperature (T_M)

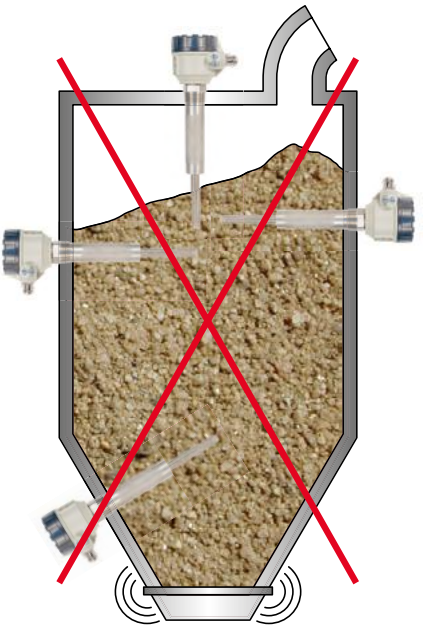
[4] To operate the level switch with the maximum values of the related temperature data the applied cable should permanently withstand up to +90 °C (+194 °F) temperature.

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

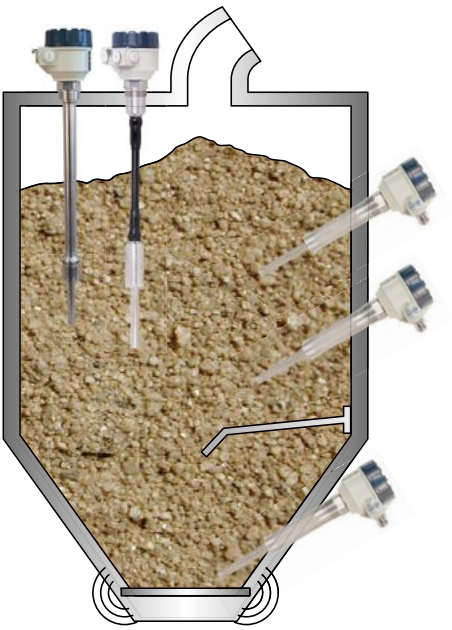
INSTALLATION

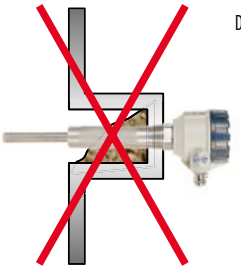
The probe should be protected against strong material inflow by appropriate selection of the mounting position or by using an overhead protective shield. When the instrument is mounted on the side of the tank, coning or arching of the material should be taken into consideration. In dusty mediums the inclination of the side mounted probe should be greater than the angle of repose to ensure self cleaning and avoid deposition of material on the vibration rod switches. Avoid mounting the unit close to the filling entry or near to medium accumulation.

Incorrect

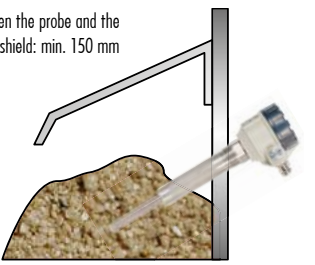


Correct





Distance between the probe and the protective shield: min. 150 mm

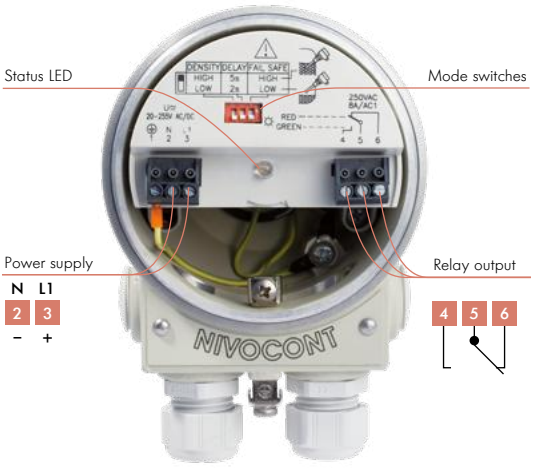


Incorrect

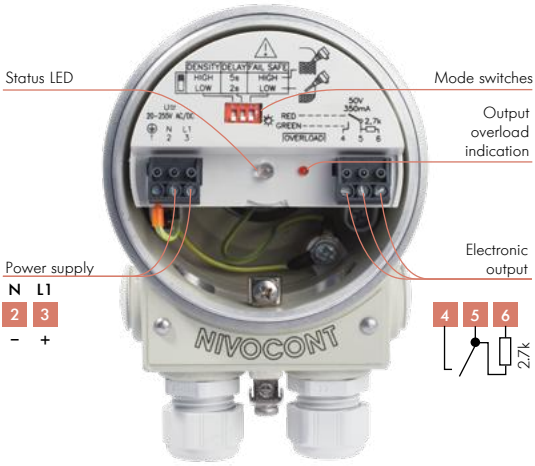
Correct

WIRING

Relay output



Electronic output



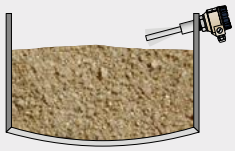
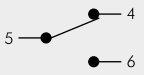
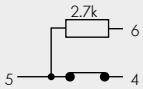
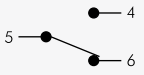
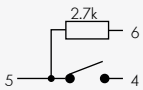
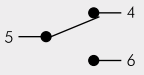
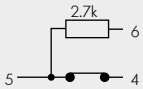
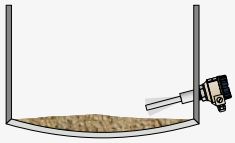
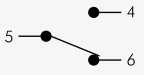
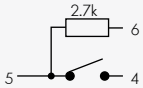
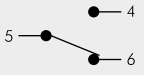
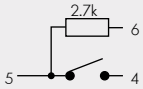
MODE SWITCHES

Density	
To be selected depending on the density of the measured medium	
High	medium density is >0.1kg/dm^3 or abrasive materials
Low	medium density is <0.1 kg/dm^3

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

Fail-Safe		
High	High Fail-safe	Fail-safe alarm is indicated with de-energised relay or open state of the solid state output.
Low	Low Fail-safe	

OPERATION

Power supply	Switching		Fail-Safe kapcsoló	Status LED	Output	
					Relay	Electronic
ON	High level		High		 Energised	 ON
			High		 De-energised	 OFF
	Low level		Low		 Energised	 ON
			Low		 De-energised	 OFF
OFF	–	–	High or Low		 De-energised	 OFF

ORDER CODES (NOT ALL CODE VERSIONS ARE AVAILABLE)

NIVOCONT R vibrating rod level switches

NIVOCONT R ■■-■■■-■ (1)

Version	Code
Standard	K
Standard polished	S
High temperature	H(2)
High temperature polished	T(2)

Housing	Code
Metal	5
Plastic	6(3)

Process connection / Extension		Code
1½" BSP	Standard version	H
	Pipe extended	R
	Cable extended	K
1½" NPT	Standard version	N
	Pipe extended	L
	Cable extended	C

Insertion length		Code
Standard	207 mm (8.14")	02
Pipe extension	300 mm (1 ft)	03
	400 mm (1.31 ft)	04
	⋮	⋮
	1000 mm (3.28 ft)	10
	1100 mm (3.6 ft)	11
	⋮	⋮
	3000 mm (9.8 ft)	30
Cable extension	1 m (3.28 ft)	01
	2 m (6.56 ft)	02
	⋮	⋮
	20 m (65.61 ft)	20

Power supply / Output / Ex	Code
20 – 255 V AC/DC / Relay	1
20 – 255 V AC/DC / electronic	3
20 – 250 V AC 20 – 50 V DC / Relay / Ex	5

(1) *The order code of an Ex version should end in „Ex"*
(2) *Only for Standard and Pipe extended versions*
(3) *Not available in Ex version*

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