

NIVOSWITCH R-200/R-300

VIBRATION FORK LEVEL SWITCHES



- ◆ **Electronic level switches for free flowing solids**
- ◆ **Output versions:**
 - 2-wire DC and AC
 - 3-wire PNP / NPN transistor
 - 1 or 2 SPDT power relay
- ◆ **Selectable Sensitivity**
- ◆ **Standard and extended models**
- ◆ **Universal power supply**
- ◆ **ATEX “Dust Ex” certified version**

ABOUT NIVOSWITCH

The NIVOSWITCH R-200/R-300 series vibrating switches can be used for level detection of bulk solids, primarily powders and light granules, in silos

The unit consists of the mechanical vibrating part, the process connection and the electronic housing.

The material of the vibrating part and the process connection is stainless steel. The vibrating part can be cast (parallel fork teeth) or welded (Straddle fork teeth). The electronic housing is either a steel cartridge, cast aluminium or plastic moulding.

Output versions:

- **Relay output version** in cast aluminium or plastic moulding housing
- **3-wire DC version** with transistor output in steel cartridge housing
- **2-wire AC version** with semiconductor output in steel cartridge housing
- **2-wire DC version** with current output in steel cartridge housing

INSTALLATION

For installation the device should simply be screwed in the stub welded on to the tank. It is suggested to install the fork vertically. Any other orientation can be allowed, but only for materials that easily slipping off the fork.

In the case of side mounting, the angle of repose should be considered. A protection plate against falling materials might be necessary at a distance far enough to avoid clogging, which could prevent correct functioning of the fork.

Since the output of the semiconductor version has only partial voltage over-surge protection, external protection is required.

The range of application is very wide. It can be used for high and low fail safe switching of tanks, monitoring of hopper's filled state or overfilling protection.

Highlights of **NIVOSWITCH** vibration forks:

- Fit and forget device, simple installation no need for maintenance
- Arbitrary mounting orientation
- Switching performance does not depend on the change of pressure, temperature or conductivity of the medium
- Switching sensitivity can be selected
- Extended probe up to 3 m
- Application for fail-safe alarm
- Malfunction of the unit will be indicated in fail-safe operation mode
- High or low fail safe function is field-programmable

TECHNICAL DATA

CYLINDER HOUSING, TRANSISTOR OUTPUT

TYPE		2-WIRE AC VERSION		3-WIRE DC VERSION	
		R□□-3□□-1/C	R□□-3□□-2/D	R□□-3□□-3/E	R□□-3□□-4/F
Insertion length		0,125 ... 3 m			
Process minimum density		0,05 kg/dm³		0,01 kg/dm³	
Temperature ranges	process	-40 °C ... +130 °C; PP Flange : -20°C ...+90°C			
	ambient	-40 °C ... +70 °C			
Process pressure (absolute)		max. 40 bar [4,0 MPa]; PP Flange: 6 bar; see diagram			
Process connection		According to order code			
Damping	Getting immersed	0,5 sec			
	Getting free	≤ 1 s – high density (H) adjustment (ρ ≥ 0,5 kg/dm³); ≤ 3 s – high density (L) adjustment (ρ < 0,5 kg/dm³)			
Material of wetted parts		Cast fork: DIN 1.4404; Welded fork: DIN 1.4571			
Switching of operation mode (L, H)		With wiring		With switch	With polarity
Density setting		Not possible (ρ ≥ 0,5 kg/dm³)		With switch	With polarity
Output		AC serial connection		NPN / PNP transistor switch by polarity change	galvanically isolated PNP / NPN transistor switch
Output protection		–		Reverse polarity, current over-surge, lasting short circuit	
Electric connection		Connector	3 m cable; 4 x 0,75 mm²; Max cable length: 30m	Connector	3 m cable; 5 x 0,5 mm²; Max cable length: 30m
State indication		Bi-coloured LED			
Power supply / power consumption		20 ... 255 V AC; 50/60 Hz / depending on load		12 ... 55 V DC / < 0,6 W	
Housing		1.4571, Ø40 steel tube + PA cover			
Ingress protection		IP 65	IP 68	IP 65	IP 68
ATEX approval		ATEX  II ½ D IP65 T160°C	ATEX  II ½ D IP68 T160°C	ATEX  II ½ D IP65 T160°C	ATEX  II ½ D IP68 T160°C
Functional test		Output state can be changed with test magnet			
Electric protection		Class I		Class III	

TYPE		MINI VERSION, 2-WIRE DC		STANDARD VERSION, RELAY OUTPUT	
		R□□-3□□-6	R□□-3□□-7	R□□-2□□-0/A/B	R□□-3□□-0/A/B
Insertion length		0,125 ... 3 m		0,125 ... 3 m	
Process minimum density		0,01 kg/dm³		0,01 kg/dm³	
Temperature ranges	Process	-40 °C ... +130 °C; PP Flange : -20°C ...+90°C		-40 °C ... +130 °C; PP Flange : -20°C ...+90°C	
	ambient	-30 °C ... +70 °C		-30 °C ... +70 °C	
Process pressure (absolute)		max. 40 bar [4,0 MPa]; PP Flange: 6 bar; see diagram		max. 40 bar [4,0 MPa]; PP Flange: 6 bar; see diagram	
Process connection		In accordance with the order code		In accordance with the order code	
Damping	Getting immersed	0,5 sec		0,5 sec	
	Getting free	≤ 1 s – high density (H) adjustment (ρ ≥ 0,5 kg/dm³) ≤ 3 s – high density (L) adjustment (ρ < 0,5 kg/dm³)		≤ 1 s – high density (H) adjustment (ρ ≥ 0,5 kg/dm³) ≤ 3 s – high density (L) adjustment (ρ < 0,5 kg/dm³)	
Material of wetted parts		Cast fork: DIN 1.4404; Welded fork: DIN 1.4571		Cast fork: DIN 1.4404; Welded fork: DIN 1.4571	
Selection of operation mode (L, H)		"L" or "H" fail-safe mode switch on recommended amplifier		Switch for selection of LOW or HIGH fail-safe mode	
Density setting		By polarity		Switch for selection of LOW or HIGH density	
Output		DC current change Fork Immersed: 9 ±1 mA; Fork Free: 14 ±1 mA		1 or 2 SPDT relays Relay 1: 250 V AC, 8 A, AC1 Relay 2: 250 V AC, 6A, AC1	
Output protection		-		-	
Electric connection		connector	3 m cable (2 x 0,5 mm²)	2 x M20x1,5 cable gland for Ø 6–12 mm cable; 2 x NPT 1/2" thread for cable protection tube; Terminal for wire of cross section: 0,25 ... 1,5 mm²	
State indication		Bi-coloured LED		Bi-coloured LED	
Power supply / power consumption		15 ... 27 V DC / < 0,5 W		20 ... 255 V AC / 1,2 ... 1,7 VA 20 ... 60 V DC / < 3 W	
Housing		1.4571, Ø40 steel tube + PA cover		PBT glass fibre reinforced plastic	Aluminium casting
Ingress protection		IP 65	IP 68	IP 67 (NEMA 6)	
ATEX approval		-		-	ATEX  II ½ D IP67 T160°C
Functional test		Output state can be changed with test magnet		-	
Ingress protection		Class III		Class I	

DIMENSIONS

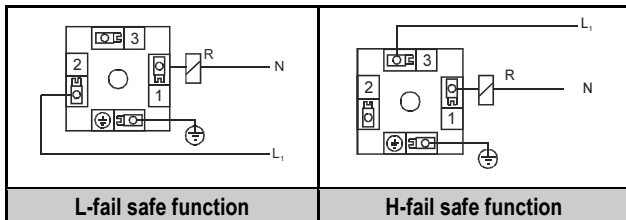
RC □ - 301 - 1 3 6 C E	RC □ - 3 □ □ - 2 4 7	RF □ - □ 01 - 0 A B	RF □ - □ □ □ - 0 A B
RLH - 301 - 1 3 6 C E	RLH - 301 - 2 4 7 D F	RRH - □ 01 - 0 A B	RRH - □ □ □ - 0 A B

WIRING

2-WIRE AC MODELS

Connector version

RC □ - 3 □ □ - 1

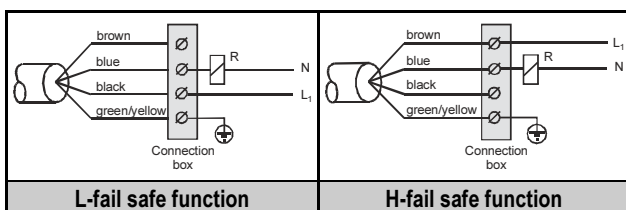


The connector enclosure can be turned by 90° so that the cable gland can be positioned in the required direction..

Integral cable version

RC □ - 3 □ □ - 2

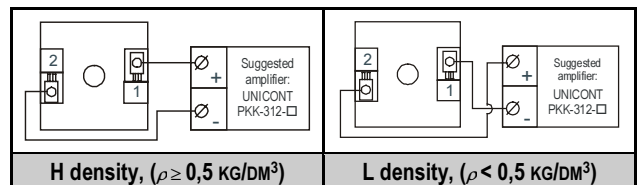
The integral cable consists of 4 wires. The connection cable can be 3-wired, however for fastening of all wires of the unit cable a 4-position cable terminal should be used.



2-WIRE DC MODELS

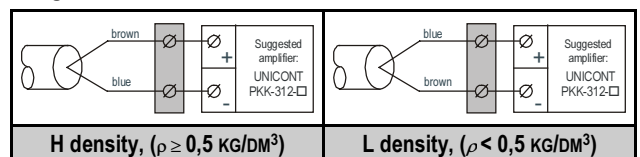
Connector version

RC □ - 3 □ □ - 6



Integral cable version

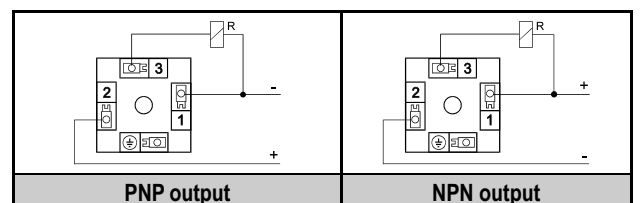
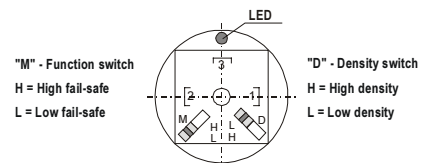
RC □ - 3 □ □ - 7



3-WIRE DC MODELS

Connector version

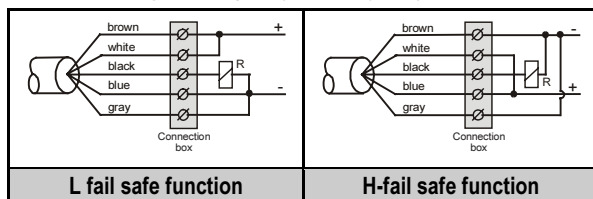
RC □ - 3 □ □ - 3



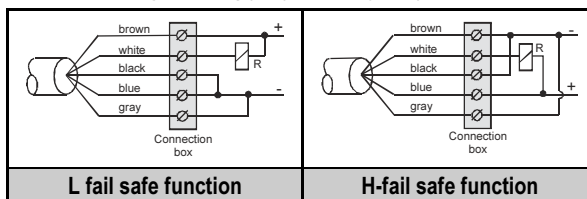
3-wire DC model connector version

R C □ - 3 □ □ - 4

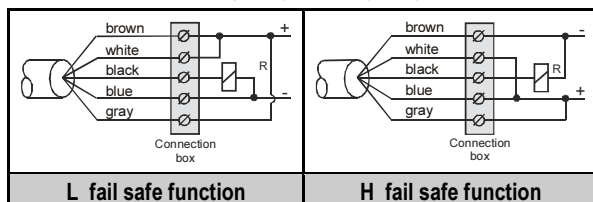
PNP output high density(H) ($\rho \geq 0,5 \text{ kg/dm}^3$),



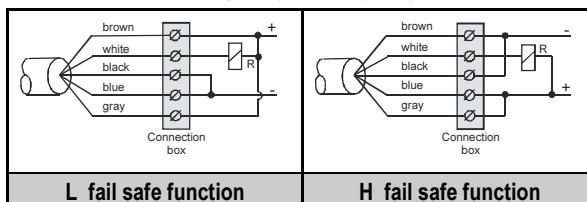
NPN output high density(H) ($\rho \geq 0,5 \text{ kg/dm}^3$)



PNP output low density (L) ($\rho < 0,5 \text{ kg/dm}^3$)

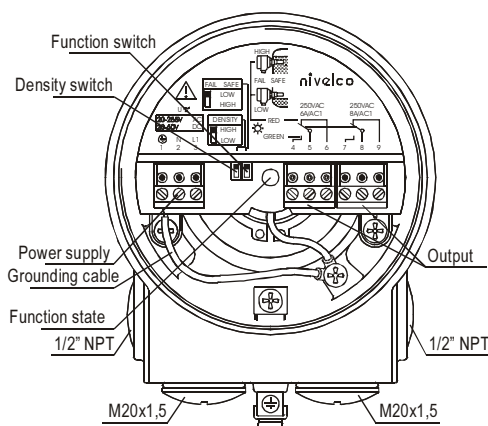


NPN output low density (L) ($\rho < 0,5 \text{ kg/dm}^3$)

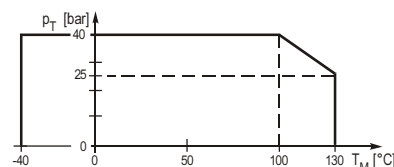


STANDARD MODELS

The cover should be removed before wiring using a cable of outer diameter $\varnothing 8 \dots 15 \text{ mm}$ and cross section of $0,75 \dots 2,5 \text{ mm}^2$. Depending on the cable arrangement the outer or internal grounding screw should be used for grounding. Mains voltage, SELV and AC or DC must not be fed into the same cable.

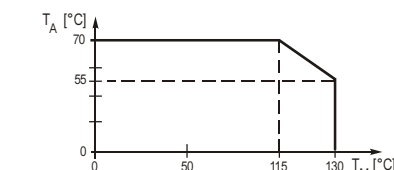


PRESSURE – TEMPERATURE DIAGRAM



Tank pressure (p_T) versus medium temperature (T_M)

TEMPERATURE – TEMPERATURE DIAGRAM



T_A ambient versus – T_M medium temperature

ORDER CODE (NOT ALL COMBINATION POSSIBLE)

NIVOSWITCH R □ □ - □ □ □ - □ EX*

TYPE	CODE	PROCESS CONNECTION	CODE	HOUSING	CODE	CODE	INSERTION LENGTH	CODE	OUTPUT / Ex	CODE	
Mini + cast fork	C	1" BSP	M	Plastic	2	0	0 m	0 – 0,1 m	0	1 SPDT Relay	0
Standard + cast fork	F	1½" BSP	H	Metallic	3	1	1 m	0,1 m	1	2-wire AC / connector.	1
Standard + welded fork	R	1" NPT	P			2	2 m	0,2 m	2	2-wire AC / cable	2
Mini + welded fork	L	1½" NPT	N			3	3 m	0,3 m	3	3-wire DC / connector.	3
		DN50, PN16, PP DIN	F					0,4 m	4	3-wire DC / cable	4
		DN50, PN40, 1.4571 DIN	G					0,5 m	5	2-wire DC / connector.	6
		2" ANSI RF150 PP	A					0,6 m	6	2-wire DC / cable	7
		2" ANSI RF600 1.4571	B					0,7 m	7	2 SPDT Relays	A
		JIS 10K 50A PP	J					0,8 m	8	1 SPDT Relay / Dust Ex	B
		JIS 40K 50A 1.4571	K					0,9 m	9	2-wire AC/ connector/ Dust Ex	C
		1½" TRI-CLAMP	T							2-wire. AC / cable / Dust Ex	D
		2" TRI-CLAMP	R							3-wire DC/ connector/ Dust Ex	E
		Pipe coupling DN40	D							3-wire. DC / cable / Dust Ex	F
		Pipe coupling DN50	E								

The order code of an Ex version should end in an "Ex"