NIVOSWITCH

VIBRATING FORK LEVEL SWITCHES
FOR SOLIDS

3 YEARS WARRANTY

NIVELCO

dTSLevel®

REV. 01.25

dTSLevel – ELECTRÓNICA

NIVOSWITCH R–200/300 vibrating fork level switches with diverging vibrating fork are suitable for detecting the level of granular or powdered solids. Mounted on silos, bins it can control filling/emptying, also can generate fail-safe alarms providing overfill protection. The operation principle is based on that the electronic circuit excites a vibration in the fork probe. When the medium reaches and covers the fork, its vibration changes or stops. The fork will start vibrating freely again as the medium sets it free. The electronics senses the change of vibration and gives output signal after a selected delay.

The PNP/NPN transistor output versions can be connected directly to PLC, or relay unit. Certain types of **NIVOSWITCH** vibrating forks are able to solve switching tasks of high-current loads with the help of **UNICONT PKK** switching amplifiers.

FEATURES

- Compact and mini compact version
- Rod length up to 3 m (9.85 ft)
- Selectable sensitivity
- Relay or electronic output
- Switching performance does not depend on the change of liquid conductivity, dielectric constant, pressure and temperature
- Process temperature max. +130 °C (+266 °F)
- Output can be toggled by test magnet (optional)
- Ex variants
- IP67, IP65 / IP68

APPLICATIONS

- For solids: min. 0.01 kg/dm^3 density (S.G.)
- Level switching for powders, granules
- Chemical industry, food & beverages, paper mill and plastic industry
- For free-flowing, powdered solids, granules
- Covers a large variety of level detection, applications such as high/low fail-safe limit switch, overfill protection

CERTIFICATES

- ATEX (Ex ta/tb D)

VARIANTS

This table helps choose the proper version for a given level switching task. Most essential aspect is the consistency of the measurement medium.

		Solids	
Features		Mini compact (RC□/RL□–300)	Compact (RF□/RR□–200/300)
Metal housing		■	■
Plastic housing		–	■
Extension		■	■
1", 1½" process connection		■	■
Relay output		–	■
Electronic output		■	
Electrical connection	Terminal	–	■
	DIN connector	■	–
	Cable	■	–
Dust Ex version		–	■
Function setting *(low-high level)*		■(1)	■
Function indication		■	■
Density selection		■	■
Output test magnet		■	–

(1) Only for 3-wire DC versions

RPS–101–0
test magnet

RLH–302

RCM–301

RRH–301

TECHNICAL DATA

	Mini compact (RC□ / RL□–300)	Compact (RF□–200/300 / RR□–200/300)
Insertion length	137…3000 mm (5.4"…9.85 ft)	
Material of wetted parts	1.4571 stainless steel	
Process connection	As per order code	
Process temperature	–40…+130 °C (–40…+266 °F) (see temperature diagrams)	
Ambient temperature	–40…+70 °C (–40…+158 °F) (see temperature diagrams)	
Medium pressure	Up to 40 bar (580 psi) (see: pressure diagrams)	
Medium density	≥ 0.01 kg/dm³ (0.01 S.G.)	
Supply voltage	2-wire DC: 15…27 V DC 2-wire AC: 20…255 V AC; 3-wire DC: 12…55 V DC	20…255 V AC / 20…60 V DC
Power consumption	AC: depending on load; DC: < 0.6 W	< 3 W
Housing material	1.4571 stainless steel	Painted aluminum or plastic (PBT)
Electrical connection	DIN or M12 connector, or 3 m (9.84 ft) integrated cable[1] 2× 0.5 mm² / 4× 0.75 mm² / 5× 0.5 mm² (2× AWG20 / 4× AWG19 / 5× AWG20)	2× M20×1.5 plastic cable glands for Ø6…Ø12 mm (0.236"…0.472") cable, 2× terminal blocks for max. 2.5 mm² (AWG14) wire cross section, 2× internally threaded ½" NPT connection for protective pipes
Electrical protection	AC version: Class I, DC version: Class III	Class I
Ingress protection	DIN connector: IP65; M12 connector: IP67; cable: IP68	IP67
Weight	~0.5 kg (~1.1 lb) + 1.2 kg/m (1 lb/ft) extension	~1.3 kg (~2.85 lb) + 1.2 kg/m (1 lb/ft) extension

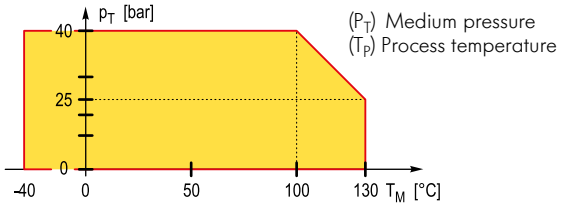
[1] Available cable length: max. 30 m

Ex INFORMATION

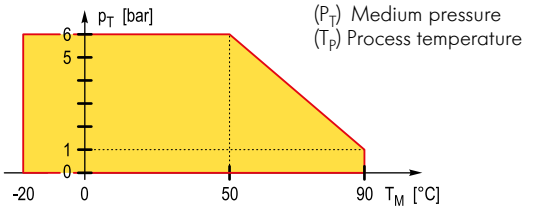
		Compact version, metal housing (RF□/RR□–300–B Ex)
Explosion protection		Dust-ex
Ex marking	ATEX	⟨Ex⟩ II 1/2 D Ex ta/tb IIIC T140 °C Da/Db
Supply voltage		20…250 V AC / 20…50 V DC
Electrical connection		2× M20×1.5 cable glands for Ø7…Ø12 (0.236"…0.472") mm cable
		Ex ta IIIC protection
		2× terminal blocks for max. 1.5 mm² (AWG16) wire cross section, 2× ½" NPT internal threads for cable protective pipes.

THERMAL PROPERTIES

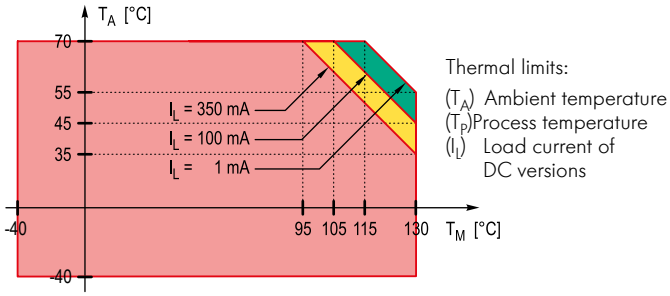
Medium pressure – Process temperature



Medium pressure – Process temperature PP flange version



Mini compact version

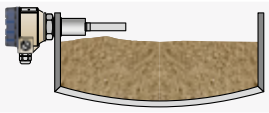
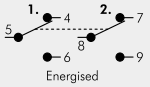
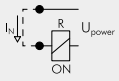
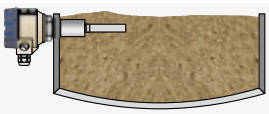
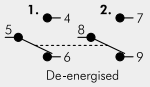
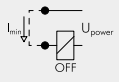
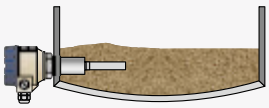
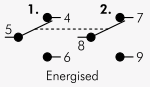
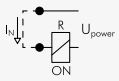
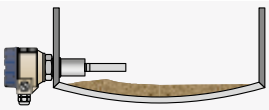
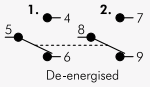
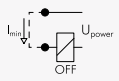
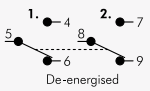
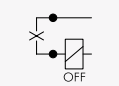


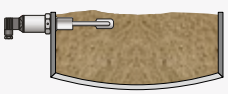
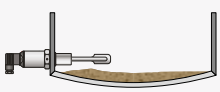
OUTPUT PROPERTIES

Output		Compact version: RF□-200/300 / RR□-200/300	
Relay		1 or 2 (SPDT) relays 250 V AC, 8 A, AC1 / 250 V AC, 6 A, AC1	
Response time	when immersed	≤ 0.5 s	
	when free	≤ 1 s – "H" density	3 s – "L" density

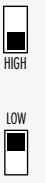
			Mini compact version	
Type	Output		RC□-300 / RL□-300	
2-wire DC	DC current change		When immersed: 14 mA ±1 mA	
			When free: 9 mA ±1 mA	
2-wire AC	AC output for serial connection		Voltage drop (in switched-on state): < 10.5 V	
			Residual current (in switched-off state): < 6 mA	
	Current load	max. continuous	350 mA, AC 13	
		min. continuous	10 mA / 255 V; 25 mA / 24 V	
		max. impulse	1.5 A / 40 ms	
3-wire DC	Transistor switch		NPN or PNP output can be realized with appropriate wiring	
	Voltage drop (in switched-on state)		< 1.8 V	
	Current load (max. continuous)		350 mA / U_{max} = 55 V	
	Residual current (in switched-off state)		< 10 µA	
	Response time	when immersed	0.5 s	
		when free	≤ 1 s – "H" density	< 3 s – "L" density

OPERATION

Compact and Mini compact version						
Power supply	Switching		Fail-Safe setting [2]	Status LED	Output	
					Relay	Electronic [3]
ON	High level					
						
	Low level					
						
OFF	–	–	High / Low			

2-wire DC version			
Power supply	Switching	Status LED	Output
ON			14 ±1 mA
			9 ±1 mA
OFF	Fork immersed, or fork is free		–

OPERATING MODE SWITCHES

Compact	
Fail-safe	
	Fail-safe alarm is indicated with de-energized relay or open state of the output

Compact	
Density	
	Medium density ≥ 0.5 kg/dm^3 Medium density < 0.5 kg/dm^3

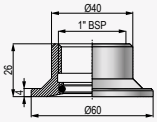
[2] In the case of the mini-compact version with integrated cable, it is determined by the appropriate wiring. [3] Only for 2-wire AC version.

Other process connections

- DIN, ANSI and JIS flanges stainless steel, PP or plastic (PFA) coated stainless steel
- DN40 and DN50 pipe-coupling process connections (DIN 11851)
- 1½" and 2" TriClamp process connections (ISO 2852)
- Other hygienic (food-industry) process connections

Accessories

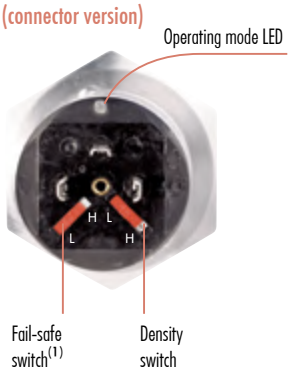
Sliding sleeve
RPH–112 / –122



Weld-in socket
RPG–101

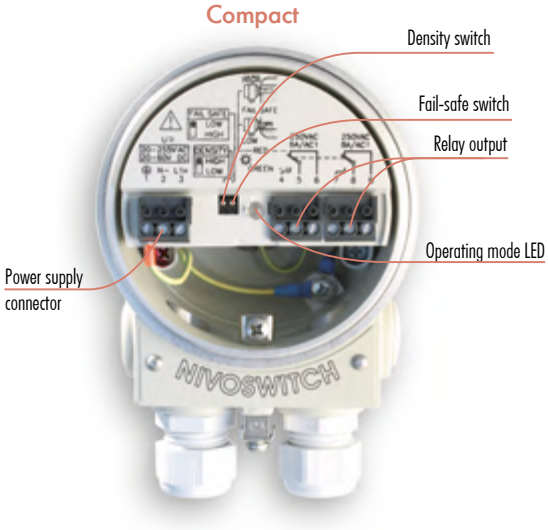
WIRING

Mini compact (connector version)

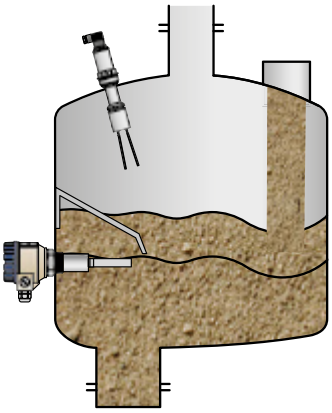


(1) Only for 3-wire DC versions

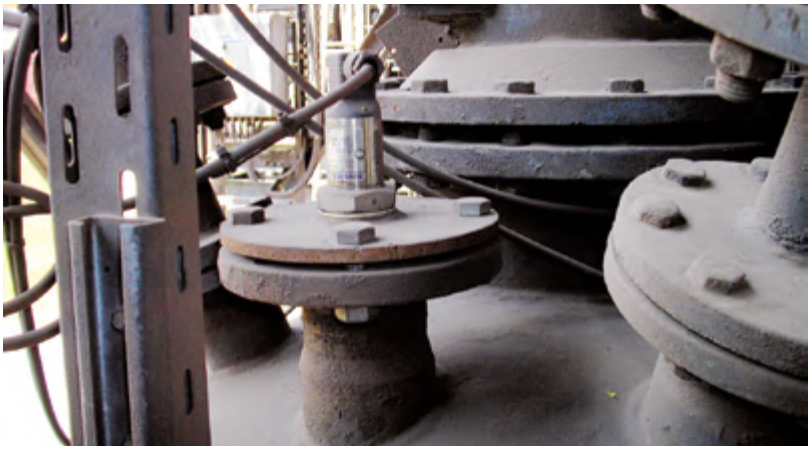
Compact



INSTALLATION

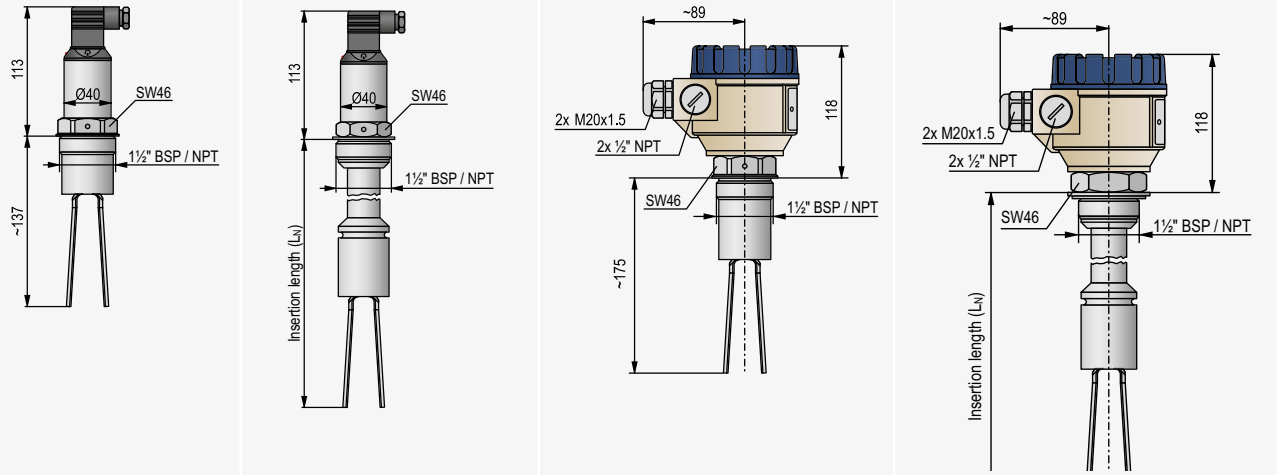


APPLICATIONS



DIMENSIONS

Mini compact		Compact	
Standard version	Extension rod version	Standard version	Extension rod version



ORDER CODES *(NOT ALL CODE VARIATION AVAILABLE)*

Vibrating fork level switches for solids

NIVOSWITCH R■■-■■■-■ (1)

Version	Code
Compact / casted fork	F
Compact / welded fork	R
Mini compact / casted fork	C
Mini compact / welded fork	L

Housing	Code
Plastic, PBT, fiberglass-reinforced	2 (2)
Painted aluminum	3

Process connection		Code
BSP	1"	M (3)
	1½"	H
NPT	1"	P (3)
	1½"	N
DN50 PN40, 1.4571 DIN		G (4)
2" ANSI RF600 1.4571		B (4)
JIS 40K 50A 1.4571		K (4)
DN50 PN16, PP DIN		F (5)
2" ANSI FF150 PP		A (5)
JIS 10K 50A PP		J (5)
Stainless steel flanges; welded		U (6)

Probe length	Code	
125 (4.9") / 137 mm (5.4")	0	1
200 (7.9") / 175 mm (6.85")	0	2
300 mm	0	3
⋮	⋮	⋮
900 mm (3 ft)	0	9
1 m (3.3 ft)	1	0
⋮	⋮	⋮
3 m (9.85 ft)	3	0

Output / Certificates			Code
Mini compact	DIN conn.	2-wire AC	1 (7)
		3-wire DC	3 (7)
		2-wire DC	6 (7)
	Cable	2-wire AC	2 (7,8)
		3-wire DC	4 (7,8)
		2-wire DC	7 (7,8)
Compact		1 relay	0 (9)
		2 relay	A (9)
		1 relay / Dust Ex ta/tb D	B (9)

(1) The order code of an Ex version product should end in "Ex". (2) Ex version not available. (3) Not available for the codes that starting with RR and RL. (4) Stainless steel flanges; flanges conform to: EN 1092-1 / ANSI B 16.5. (5) PP flanges (max. 6 bar [87 psi]; –20…+90 °C [–4 °F to +194 °F]) (6) MF□–□□□–H type flanges (available from size DN40) should be ordered separately. (7) Only available for the codes that starting with RC and RL. (8) Cable length maximum 30 m (98.5 ft). (9) Only available for the codes that starting with RF and RR.

ACCESSORIES

DIN rail mountable current controlled switch module recommended for NIVOSWITCH vibrating forks

UNICONT PKK–312–■ (1)

Power supply	Code
230 V AC	1
110 V AC	2
24 V AC	3

Power supply	Code
24 V AC/DC	4
24 V AC/DC / Ex	8

UNICONT PKK–312–8 Ex
Intrinsically safe remote switching unit dedicated to the Ex ia versions of the NIVOSWITCH vibrating forks.

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