FOR LIQUIDS AND SOLIDS

NIVOSWITCH

VIBRATING FORK LEVEL SWITCHES

3 YEARS WARRANTY @ NIVELCO – WHERE ELSE?

NIVELCO

LEVEL SWITCHES

NIVOSWITCH VIBRATING FORK LEVEL SWITCHES

MAIN FEATURES

- *Compact and mini compact type*
- *Rod extension up to 3 meters (10 feet)*
- *Plastic (PFA) coated version (option)*
- *Polished vibrating part*
- *Switching performance does not depend on the change of liquid conductivity, dielectric constant, pressure and temperature*
- *Selectable sensitivity*
- *Relay or electronic output*
- *Hygienic versions with various process connections and 0.5 micron fine polishing (option)*
- *Medium temperature max. 130 °C (266 °F)*
- *Output test with optional test magnet*
- *Ex version*
- *IP67, IP65/IP68 protection*

APPLICATIONS

- *For liquids: min. 0.7 kg/dm³ (700 oz/ft³) density and max. 10⁴ mm²/s (0.1 ft²/s) viscosity, for solids: min. 0.01 kg/dm³ (10 oz/ft³) density*
- *For liquids / free-flowing, powdered solids, granules*
- *Food & beverages, animal feed, chemical-, oil industry*
- *For normal or hazardous, aggressive (acids, solvents) liquids*
- *Covers a large variety of level detection applications such as high/low fail safe limit switch or dry run protection, pump controls*

GENERAL DESCRIPTION

NIVOSWITCH vibrating fork level switches are suitable for level detection of liquids or granular, powdered solids. Units with parallel vibrating fork are suitable for liquids, units with non parallel vibrating fork are suitable for solids. Mounted on pipes, silos, tanks or hopper bins filling / emptying can be controlled using these devices just as well they can generate fail-safe alarms providing overfill- or dry run protection.

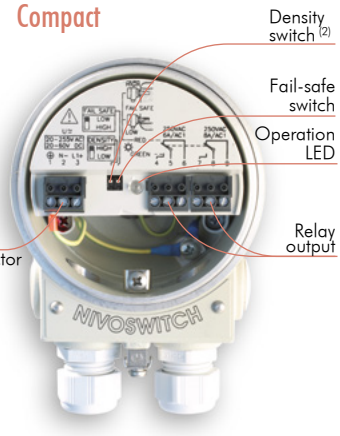
The operation principle is based on the electronic circuit exciting the fork probe making it vibrate. As the medium reaches and covers the fork its vibration changes, or stops. The fork will start vibrating again as the medium sets it free. The electronics senses the change of vibration and gives output signal after a selected delay.

Plastic coated version is recommended in aggressive mediums, highly polished version is recommended for abrasive mediums. The PNP/NPN transistor output versions can be connected directly to PLC, or relay unit. The **NIVOSWITCH** vibrating forks are able to solve switching tasks of highcurrent loads with the help of **UNICONT PKK** switching amplifiers. The **UNICONT PKK-312-8 Ex** intrinsically safe switching unit is designed to serve Ex rated vibrating forks.

WIRING

Mini compact (connector version)

Compact



(1) *Only for 3-wire DC versions*
(2) *Only for vibrating forks for solids*

TYPE SELECTION

Type selection is aided by this table for choosing the proper version to a given level switching task. Most essential aspect is the consistency (liquid or solid) of the measurement medium.

Application		Liquids		Solids	
Features		Mini compact	Compact	Mini compact	Compact
Metal housing		■	■	■	■
Plastic housing			■		■
Extension		■	■	■	■
Highly polished version		■	■		
Plastic coated fork		■	■		
1" process connection		■	■		
1 ½" process connection				■	■
Relay output			■		■
Electronic output		■		■	
Electrical connection	terminal		■		■
	DIN connector	■		■	
	M12 connector	■			
	Cable	■		■	
Intrinsically safe version		■			
Dust Ex version				■	■
Germanischer Lloyd			■		
Fail-safe setting (low-high level)		■ (1)	■	■ (1)	■
Function indication		■	■	■	■
Density selection				■	■
Output test magnet		■		■	

TECHNICAL DATA

Type	Mini compact		Compact	
	For liquids	For solids	For liquids	For solids
Insertion length	69-3000 mm (2.7 inch - 10 feet)	137-3000 mm (5.4 inch - 10 feet)	69-3000 mm (2.7 inch - 10 feet)	137-3000 mm (5.4 inch - 10 feet)
Material of wetted parts	1.4571 (316 Ti) or PFA coating	Stainless steel 1.4571 (316 Ti)	1.4571 (316 Ti) or PFA coating	Stainless steel 1.4571 (316 Ti)
Process connection	As per order codes			
Medium temperature	–40 °C … +130 °C (–40 °F … +266 °F)(see: temperature diagrams)			
Ambient temperature	–40 °C … +70 °C (-40 °F … +158 °F) (see: temperature diagrams) M12 connector: - 25 °C … + 70 °C (-13 °F … +158 °F)		–30 °C … +70 °C (-22 °F … +158 °F)	–40 °C … +70 °C (-40 °F … +158 °F)
Medium pressure	max. 4 MPa (40 bar g / 580 psi g) (see: pressure diagrams)			
Medium density	> 0.7 kg/dm³ (700 oz/ft³)	≥ 0.01 kg/dm³ (10 oz/ft³)	> 0.7 kg/dm³ (700 oz/ft³)	≥ 0.01 kg/dm³ (10 oz/ft³)
Medium viscosity	≤ 10000 mm²/s (cSt) (0.1 ft²/s)	–	≤ 10000 mm²/s (cSt) (0.1 ft²/s)	–
Power supply	2-wire DC: 15–29 V DC 2-wire AC: 20–255 V AC;	2-wire DC: 15–27 V DC 3-wire DC: 12–55 V DC	20–255 V AC or 20–60 V DC	
Power consumption	AC: depending on load; DC: < 0.6 W		AC: 1.2 – 17 VA; DC: < 3 W	
Housing material	Stainless steel 1.4571 (316 Ti)		Paint coated aluminium or plastic (PBT)	
Electrical connection	Connector, or 3 m (10 ft) cable [1] 2x 0.5mm² (AWG20) / 4x 0.75mm² (AWG18) / 5x 0.5mm² (AWG20)		2x M20 x 1.5 cable gland, for Ø 6 – 12 mm (0.25 ... 0.5 inch) cable, terminal, for 0.5 – 1.5 mm² (AWG20 ... AWG15) wire cross section	
Electrical protection	AC version: Class I.; DC version: Class III.		Class I.	
Ingress protection	DIN connector type: IP65; M12 con. type: IP67, cable type: IP68		IP67	
Mass	≈ 0.5 kg+1.2 kg/m (1.1 lb + 0.8 lb/ft) extension		≈ 1.3 kg + 1.2 kg/m (2.85 lb + 0.8 lb/ft) extension	

[1] available cable length: max. 30 m, in Ex version: max. 3 m

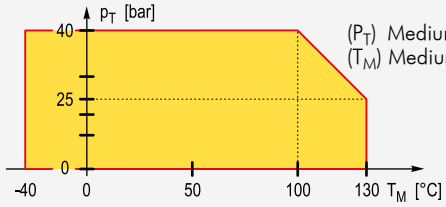
SPECIAL DATA FOR Ex CERTIFIED MODELS

Type	NIVOSWITCH		
Mini compact vibrating forks for liquids (2-wire DC version)	Stainless steel vibrating part	PFA coated vibrating part	
Ex marking	⟨Ex⟩ II 1 G Ex ia IIC T6…T4 Ga	⟨Ex⟩ II 1 G Ex ia IIB T6…T4 Ga	
Intrinsically safe data [2]	Ui=29 V, Li=100 mA, Pi=1,4W; Ci=7 nF, Li=0 mH		
Mini compact and compact vibrating forks for solids	Connector version (IP65) [3]	Cable version (IP68) [3]	Compact type (IP67) [4]
Ex marking	⟨Ex⟩ II 1/2 D IP 6X T160°C		

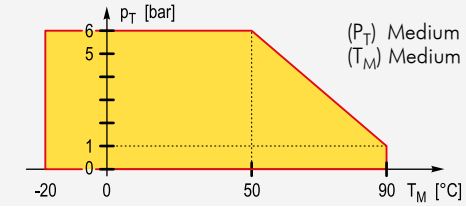
[2] intrinsically safe vibrating forks should be powered by Ex ia certified and approved devices
[3] only for 2-wire AC, or 3-wire DC version (4) only with aluminium housing

TEMPERATURE DATA

Medium pressure – Medium temperature



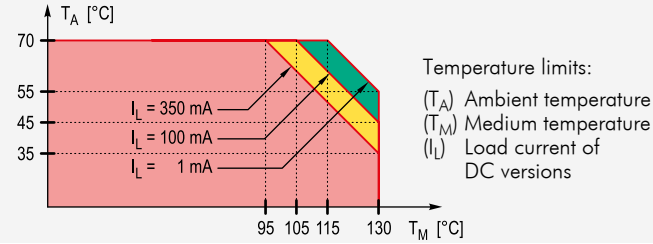
Medium pressure – Medium temperature PP flange version



Mini compact Ex types for liquids

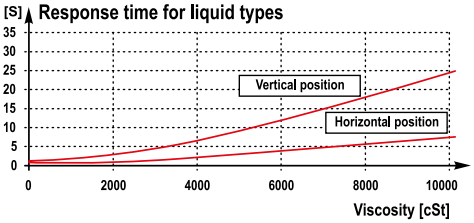
Temperature classes		T6		T5	T4
Max. ambient temperature		+70°C	+60°C	+60°C	+60°C
Min. ambient temperature	DIN con.	–40°C			
	M12 con.	–25°C			
Max. medium temperature		+70°C	+75°C	+95°C	+130°C

Mini – Compact version



OUTPUT DATA

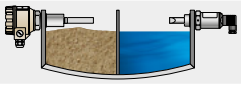
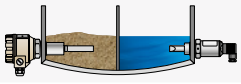
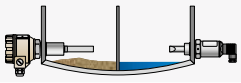
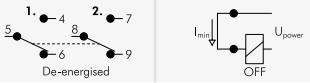
Compact type				
Output		For liquids	For solids	
Relay		1 or 2 pcs (SPDT) relays 250 V AC, 8 A, AC1 / 250 V AC, 6 A, AC1		
Response time	when immersed	≤ 0.5 sec		
	when free	≤ 1 sec [1]	≤ 1 sec – H density	3 sec – L density

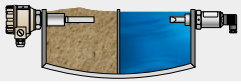
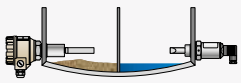


Mini compact type					
Type	Output		For liquids	For solids	
2-wire DC	DC current change		when immersed: 14 mA ± 1 mA		
			when free: 9 mA ± 1 mA		
2-wire AC	AC output for serial connection		Voltage drop (in switched-on state): < 10.5 V		
			Residual current (in switched-off state): < 6 mA		
	Current load	max. continuous	350 mA, AC 13	350 mA, AC 13; Ex version: 140 mA	
		min. continuous	10 mA / 255 V; 25 mA / 24 V		
		max. impulse	1.5 A / 40 msec		
3-wire DC	Transistor switch		NPN or PNP output can be realized with appropriate wiring		
	Voltage drop (in switched-on state)		< 4.5 V	< 1.8 V	
	Current load (max. continuous)		350 mA / Umax=55 V	350 mA / Umax=55 V; Ex version: 200 mA	
	Residual current (in switched-off state)		< 100 μA	< 10 μA	
	Response time	when immersed	0.5 sec		
		when free	< 1 sec [1]	≤ 1 sec – H density	< 3 sec – L density

[1] see viscosity diagram

OPERATION

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

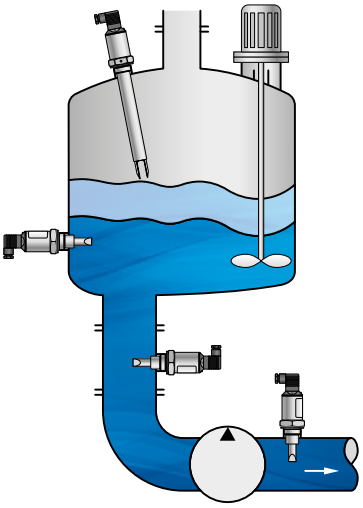
[2] Can be done with appropriate wiring in case of mini compact type with integrated cable

OPERATION MODE SWITCHES

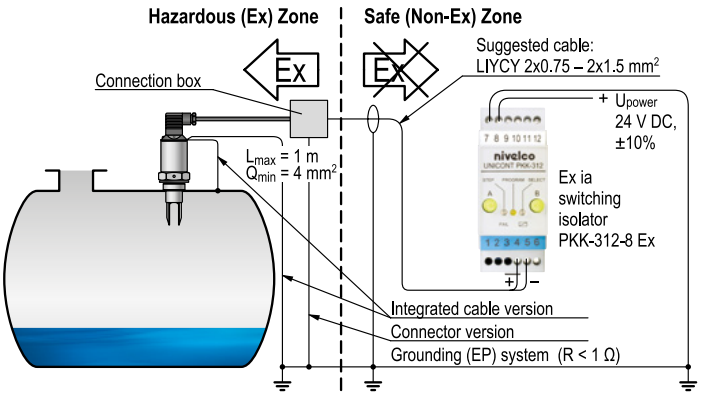
Compact Fail-Safe	
high low	Fail-safe alarm is indicated with de-energised relay or open state of the output

Compact Density	
high	Medium density ≥ 0.5 kg/dm³
low	Medium density < 0.5 kg/dm³

INSTALLATION



RECOMMENDED SET-UP VARIATION

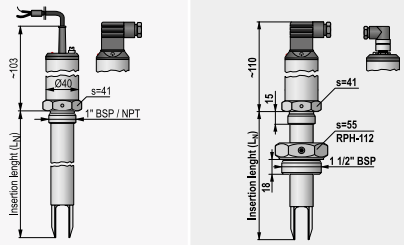


- Applied in low viscosity medium (no risk of subsidence remaining on the fork-tines) any of the mounting varieties shown is possible.
- Applied in higher viscosity medium (risk of subsidence remaining on the fork-tines) only vertical (top) mounting can be suggested.
- If applied as side mount, take care of the positioning mark (Mark "0")

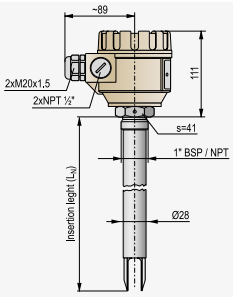
DIMENSIONS

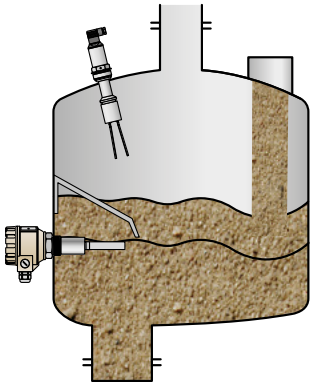
Vibrating forks for liquids

Mini compact



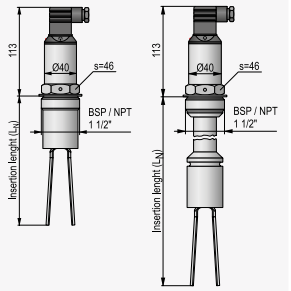
Compact



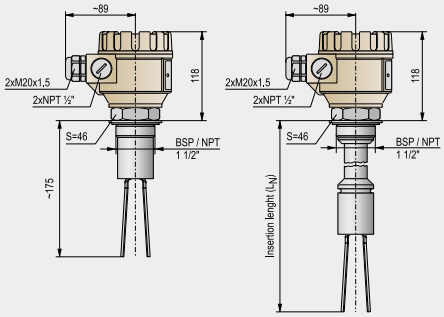


Vibrating forks for solids

Mini compact



Compact

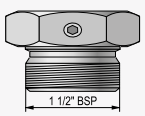


RPS-101
test magnet

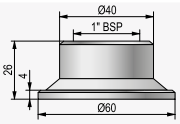
Flanges

- DIN, ANSI and JIS flanges Stainless steel, PP or plastic (PFA) coated stainless steel
- DN 40 and DN 50 pipe-coupling process connections (DIN 11851)
- 1 1/2" and 2" Triclamp process connections (ISO 2852)
- other hygienic (food-industry) process connections

Other process connection



Sliding sleeve



Weld-in socket

ACCESSORIES TO ORDER

Name		For vibrating forks	
		for liquids	for liquids with plastic coating
Weld-in socket	1" BSP	RPG – 101 – 0	–
Sliding sleeve for extended versions [1]	1 ½" BSP	RPH – 112 – 0	RPH – 122 – 0
	1 ½" NPT	RPN – 112 – 0	RPN – 122 – 0

[1] *For min. 300 mm insertion length and max. 6 bar medium pressure*

RPS-101-0 test magnet for mini compact versions

rc45s15a0607b

ORDER CODES (NOT ALL CODE VARIATION AVAILABLE)

NIVOSWITCH vibrating fork level switches for liquids

NIVOSWITCH R ■■–■■■–■ (1)

Type		Code
Mini compact	PFA coated fork	A (2)
	1.4571 fork	C
	1.4571 fork, highly polished	G
Compact (6)	PFA coated fork	D (2)
	1.4571 fork	F
	1.4571 fork, highly polished	J

Housing	Code
Metal	4
Plastic	5

Process conn.	Code
1" BSP	M
1" NPT	P
1 ½" TRICLAMP	T
2" TRICLAMP	R
DN40 pipe-coupling, DIN 11851	D
DN50 pipe-coupling, DIN 11851	E
DN 50 PN40, 1.4571	G (3,4)
2" ANSI RF600, 1.4571	B (3,4)
JIS 40K 50A, 1.4571	K (3,4)
DN50 PN40, PP	F (5)
2"ANSI RF150, PP	A (5)
JIS 10K 50A, PP	J (5)

Insertion length	Code	
69 mm	0	0
125 mm	0	1
200 mm	0	2
⋮	⋮	⋮
900 mm	0	9
1 m	1	0
⋮	⋮	⋮
3 m	3	0

Output / Ex			Code
Mini compact	DIN connector	2 wire AC	1
		3 wire DC	3
		2 wire DC	6
		2 wire DC/Ex	8
	M12 con.	2 wire DC	K
		2 wire DC/Ex	L
	Cable	3 wire DC	M
		2 wire AC	2 (6)
		3 wire DC	4 (6)
		2 wire DC	7 (6)
		2 wire DC/Ex	9
Com-pact		1 relay	0
		2 relay	A

(1) The order code of an Ex version should end in „Ex"
(2) Only with 1" BSP or flanged process connection
(3) Special versions with weld-in process connection are available to order. Flanges of the flanged models meet the requirements of DIN2501, DIN2526 Form C; ANSI B16.5 standards
(4) PFA coated forks have PFA coated flanges
(5) Max. 6 bar, –20°C … +90°C
(6) Maximal cable length: 30 m
(7) Not available in Ex version

NIVOSWITCH vibrating fork level switches for solids

NIVOSWITCH R ■■–■■■–■ (1)

Type	Code
Mini compact	L
Compact	R

Housing	Code
Plastic	2 (7)
Metal	3

Process conn.	Code
1 1/2" BSP	H
1 1/2" NPT	N
DN50 PN40, 1.4571	G (3)
2" ANSI RF600, 1.4571	B (3)
JIS 40K 50A, 1.4571	K (3)
DN50 PN16, PP	F (5)
2"ANSI RF150, PP	A (5)
JIS 10K 50A, PP	J (5)

Insertion length	Code	
137 mm	0	1
175 mm	0	2
300 mm	0	3
⋮	⋮	⋮
900 mm	0	9
1 m	1	0
⋮	⋮	⋮
3 m	3	0

Output / Ex			Code
Mini compact	Connector	2 wire AC	1
		3 wire DC	3
		2 wire DC	6
		2 wire AC/Ex	C
		3 wire DC/Ex	E
	Cable	2 wire AC	2 (6)
		3 wire DC	4 (6)
		2 wire DC	7 (6)
		2 wire AC/Ex	D (6)
		3 wire DC/Ex	F (6)
Compact		1 relay	0
		2 relay	A
		1 relay / Ex	B

ACCESSORIES TO ORDER

DIN rail mountable switching amplifiers unit 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 / Ex	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.

NIVELCO PROCESS CONTROL CO.
H-1043 BUDAPEST, DUGONICS U. 11.
TEL.: (36-1) 889-0100 ▪ FAX: (36-1) 889-0200
E-mail: sales@nivelco.com http://www.nivelco.com

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