LEVEL SWITCHES

NIVOSWITCH

VIBRATING FORK LEVEL SWITCHES FOR LIQUIDS



NIVOSWITCH R-400/500 vibrating fork level switches with parallel vibrating fork are suitable for detecting the level of liquids. Mounted on pipes, tanks it can control filling/emptying, can also generate fail-safe alarms providing overfill- or dry run protection. The operating 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. 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 plastic-coated version is recommended for use in aggressive media, the highly polished version is recommended for use in abrasive media. The PNP/NPN transistor output versions can be connected directly to a 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. UNICONT PKK-312-8 Ex is a recommended intrinsic safety switching unit designed for Ex rated vibrating forks.

FEATURES

- Compact and mini compact version
- Rod length up to 3 meters (10 ft)
- ECTFE/PFA-coated version
- Polished vibrating part
- Hygienic versions with various process connections and 0.5 micron fine polishing
- 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
- Ex, DNV variants
- IP67, IP65/IP68

APPLICATIONS

- Min. 0.7 kg/dm³ density (specific gravity) and max. 10^4 mm²/s (0.1 ft²/s) viscosity
- Food & beverages industry, water industry, chemical industry, 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, overfill or dry-run protection, pump controls

VARIANTS

This chart will help you select the correct version for a given level switching application. The most important consideration is the consistency of the medium.

		Liquids				
Features		Mini compact	Com	pact		
realities		RC□-400	RF□-400/500	RN□-400 Ex		
Metal housi	ng					
Plastic housi	ng	-		-		
Extension						
High-polishe	ed version					
Plastic-coate	ed fork			-		
2" process c	connection					
1", 1½" proc	ess connection					
Relay outpu	Relay output					
Electronic ou	utput		-	-		
	Terminal	-				
Electrical	DIN connector		-	-		
connection	M12 connector		-	-		
	Cable		-	-		
Intrinsic safe	ty version		-	-		
Flameproof	enclosure	-	-			
DNV		-		-		
Function setting (low-high level)		(1)	1.1			
Function indication						
Output test	magnet		-	-		
⁽¹⁾ Only for 3-wir	e DC versions					

CERTIFICATES

- ATEX (Ex ia G)
- ATEX (Ex d G)
- IEC Ex (Ex d G)
- UKCA Ex (Ex ia G)
- DNV (only for RF-400 compact types for liquids)



PKK-312-8Ex Ex ia power supply for Ex ia vibrating forks



RFM-500

RNM-402

RPS-101-0 test magnet











connector



RCM-400 with DIN connector



RBM-401-3

RCM-401 cable version

TECHNICAL DATA

	Mini compact	Compact				
	RC□-400	RF□ -400/500	RN□-400 Ex			
Insertion length		693000 mm (2.72"10 ft)				
Material of wetted parts	1.4571 stainless ste	eel or ECTFE/PFA-coating	1.4571			
Process connection		As per order code				
Process temperature	-40+130 °C [-40+266 °F] (see "Thermo	al properties"), for ECTFE-coated versions: -40+120 °	⊂ (−40+248 °F)			
Ambient temperature	-40+70 °C [-40+158 °F] (see temperature diagrams)	−30+70 °C (−22+158 °F)				
	With M12 connector: -25+70 °C (-13+158 °F)					
Medium pressure	Up to 40 be	ar [580 psi] (4 MPa) (see pressure diagrams)				
Medium density		> 0.7 kg/dm³ (>0.7 S.G.)				
Medium viscosity		≤ 10 000 mm²/s (cSt)				
	2-wire DC: 1529 V DC	20255 V AC / 2060 V DC				
Supply voltage	2-wire AC: 20255 V AC; 3-wire DC: 1255 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)	Painted aluminum			
Electrical connection	$ \begin{array}{l} {\rm DIN} \ / \ {\rm M12} \ {\rm connector}, \ {\rm or} \ 3 \ {\rm m} \ (10 \ {\rm ff}) \ {\rm integrated} \ {\rm cable}^{(1)} \\ 2 \times \ 0.5 \ {\rm mm}^2 \ ({\rm AWG20}) \ / \ 4 \times \ 0.75 \ {\rm mm}^2 \ ({\rm AWG19}) \\ \ / \ 5 \times \ 0.5 \ {\rm mm}^2 \ ({\rm AWG20}) \end{array} $	2× M20×1.5 plastic cable glands for Ø6Ø12 mm (0.236"0.472") cable, 2× terminal blocks for max. 2.5 mm ² (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 + 1.2 kg/m extension (~1.1 lb + 1 lb/ft extension)	~1.3 kg + 1.2 kg/m extension (~2.85 lb + 0.8 lb/ft extension) ~2.1 k e (~4.63 lb-				

 $^{\scriptscriptstyle (1)}$ Available cable length: up to 30 m (100 ft).

Ex INFORMATION

		Mini co	ompact version	Compact version (metal housing)		
		RC□−400−8 Ex / L Ex (connector type)	RC□-400-9 Ex (cable type)	RN□-400-N Ex, RN□-400-P Ex, RM□-400-N Ex, RM□-400-P Ex		
Explosion pro	otection	Intrinsically safe ⁽²⁾		Flame-proof housing		
Ex marking	IEC Ex		-	Ex d IIB T6T4 Ga/Gb, $-40 \text{ °C} \leq T_{amb} \leq +70 \text{ °C}$ (-40 °F $\leq T_{amb} \leq +158 \text{ °F}$)		
	ATEX	🐼 II 1G Ex ia IIB T6T4 C	Ga 🛛 🕼 II 1G Ex ia IIC T6T4 Ga			
Intrinsic safet	ty limits	$ \begin{array}{llllllllllllllllllllllllllllllllllll$		-		
Supply volta	ge	1529 V DC		20250 V AC (50/60 Hz) / 2036 V DC		
Electrical connection				2× M20×1.5 cable glands for Ø7Ø12 mm (0.275"0.472") cable		
		DIN connector or M12	3 m (10 ft) integrated cable ⁽¹⁾	with Ex d IIC protection		
		connector		2× terminal blocks for max. 1.5 mm ² (AWG16) wire cross section, 2× ½" NPT internal threads for cable protective pipes.		

⁽¹⁾ Available cable length: up to 30 m (100 ft). ⁽²⁾ Intrinsically safe vibrating forks must be powered by [Ex ia] certified devices, for example by UNICONT PKK-312-8 Ex.

Temperature classes	Т	6	T5	T4			
Mini compact version for liquids (Ex ia)							
Highest ambient temperature	+70 °C (+158 °F)		+60 °C (+140 °F)				
Highest process temperature	+70 °C (+158 °F)	+75 °C (+167 °F)	+95 °C (+203 °F)	+130 °C (+266 °F)			
Compact version with flameproof enclosure (Ex d)							
Process temperature minimum: -40 °C (-40 °F); Maximum:	+70 °C (+158 °F)	+80 °C (+176 °F)	+95 °C (+203 °F)	+130 °C (+266 °F)			
Ambient temperature minimum: -40 °C (-40 °F); Maximum:	+65 °C (+149 °F)	+50 °C (+122 °F)	+65 °C (+149 °F)	+70 °C (+158 °F)			
Highest surface temperature of the process connection	+70 °C (+158 °F)	+80 °C	+95 °C (+203 °F)	+125 °C (+257 °F)			
Highest surface temperature	+75 °C (+167 °F)	(+176 °F)	+95 C (+205 F)	+130 °C (+266 °F)			

THERMAL PROPERTIES

Medium pressure – Process temperature



Medium pressure - Process temperature PP flange version





OUTPUT PROPERTIES

		Compact type
Output		RF□, RV□, RJ□-400/500
Relay		1 or 2 (SPDT) relays 250 V AC, 8 A, AC1 / 250 V AC, 6 A, AC1
Response	when immersed	≤ 0.5 s
time	when free	$\leq 1 s^{(1)}$

			Mini compact type		
Туре	Output		RC□, RG□, RB□, RE□-400/500		
2-wire	DC current chan	20	When immersed: 14 mA ±1 mA		
DC		ge	When free: 9 mA ±1 mA		
	AC output for an	rial connection	Voltage drop (in switched-on state): < 10.5 V		
	AC output for serial connection		Residual current (in switched-off state): < 6 mA		
2-wire AC	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		
	Transistor switch		NPN or PNP output can be realized with appropriate wiring		
	Voltage drop (in switched-on state)		< 4.5 V		
3-wire	Current load (mo	x. continuous)	350 mA / U _{max} = 55 V		
DC	Residual current	(in switched-off state)	< 100 µA		
	Response	when immersed	0.5 s		
	time	when free	<] s ⁽¹⁾		

⁽¹⁾ See viscosity diagram

RESPONSE TIME DIAGRAM





OPERATION

Compact and Mini compact version								
Power supply		Switching	Fail-Safe	Status LED	Output			
		Switching	setting ⁽²⁾		Relay	Electronic		
	High level		HIGH	0	5 - 4 - 7 6 - 6 - 9 Energised			
ON	High		HIGH	0	1. 4 2. - 7 5 6 - 9 De-energised			
UN			LOW	0	1. 4 2. 7 5 6 6 9 Energised			
			LOW	0	1. 4 2. 7 5 8 6 9 De-energised			
OFF	-	-	High / Low	0	1. 4 2. - 7 5 6 - 9 De-energised	OFF		

2-wire DC version						
Power supply	Switching	Status LED	Output			
01		0	14 ±1 mA			
ON		0	9±1mA			
OFF	Fork immersed, or fork is free	\bigcirc	-			

 $^{(\!2\!)}$ In the case of the mini-compact version with integrated cable, it is determined by the appropriate wiring.

OPERATING MODE SWITCH



WIRING



DIMENSIONS

connections



ALW/AYS ON BOARD.

NIVOMAG | NIVOSWITCH | NIVOPOINT | PiloTREK | MicroTREK





DNV

SIL

5 YEARS WARRANTY

NIVELCO.COM



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.
- In case of a horizontal installation or a mounting into a tube, the position marking ("O") should be taken into account.







ORDER CODES (NOT ALL CODE VARIATION AVAILABLE)

_____(1)

Vibrating fork level switches for liquids

1	NVOSWITCH											
Foi	k material	Code	Process co	onnection	Code	Probe length	Co	de	Ou	tput	/ Ex	Code
	1.4571 fork	С		1"	М	69 mm (2.7")	0	0			2-wire AC	1 ⁽⁷⁾
pact	1.4571 fork, highly polished	G	BSP	11⁄2"	Н	125 mm (4.9")	0	1			3-wire DC	3(7)
Mini compact	ECTFE-coated fork	B ⁽²⁾		2"	С	200 mm (7.9")	0	2		DIN	2-wire DC	6(7)
Mi	1.4571, without	E ⁽³⁾	NPT	1" 1%"	P	•	•	•			2-wire DC / Ex ia	8(8)
	reed sensor 1.4571 fork	F ⁽³⁾	INIT	2"	L	•	:	:	ađ	÷	2-wire DC	K ⁽⁷⁾
	ECTFE coated fork	V ^(2,3)	1½" TriClo	ımp	T ⁽⁴⁾	900 mm (35.4")	0	9	Mini compact	12 conn.	2-wire DC / Ex ia	L ⁽⁸⁾
	1.4571 fork,	(3)	2" TriClarr	ıp	R ⁽⁴⁾	1 m (39.4")	1	0	Min	×	3-wire DC	M ⁽⁷⁾
Compact	highly polished	ed	Dairy pipe DIN 1185		D ⁽⁴⁾	•	•	•			2-wire AC	2(7, 13
ē	1.4571 fork / Ex d housing	Ν	Dairy pipe		F ⁽⁴⁾	•	:	:		ale	3-wire DC	4(7, 13
	Stainless steel, highly polished	м	DIN 1185		-	3 m (118")	3	0		3	2-wire DC	7 ^{(7, 13}
	/ Ex d housing	171	DN40 PN		S						2-wire DC / Ex ia	9 ^(8,9)
			DN50 PN		G						1 relay	0(10)
Но	using	Code		F600, 1.4571	В						2 relays	A ⁽¹⁰⁾
	nted aluminum	4	JIS 40K 50		K F ⁽⁴⁾				ţ	Ę	1 relay / Ex d	N ⁽¹¹⁾
Pla	stic	5 2" ANSI FF150, PP			A(5)				Compact		2 relays / Ex d	P ⁽¹¹⁾
i iu	3110	9	JIS 10K 50	- /	J(5)						1 relay / GL	G ⁽¹²⁾
				eel flanges;	U(6)						2 relays / GL	H ⁽¹²⁾

(1) The order code of an Ex version product should end in "Ex". (2) Only 1" BSP (PVDF) or flange (PP or ECTFE-coated) process connection. (3) Ex version not available.
(4) Only available for the codes that starting with RB, RC, RG, RF and RL. (5) Max. 6 bar (87 psi), -20...+90 °C (-4...+194°F). (6) MFT-_____-H type flanges (available form size DN40) should be ordered separately. (7) Only available for the codes that starting with RB, RC, RG. (8) Only available for the codes that starting with RB, RC, and RG. (9) Cable length up to 3 m (9.84 ft). (10) Not available for the codes that starting with RB, RC, RG. (11) Only available for the codes that starting with RN and RM.
(12) RF version only, 1" BSP / 1" NPT and stainless steel flanged version only, with GL certification

ACCESSORIES

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



		For vibrating forks	For coated vibrating forks
Weld-in socket (1" BSP)		RPG-101-0	-
for extended	11⁄2" BSP	RPH-112-0	RPH-122-0
	11/2" NPT	RPN-112-0	RPN-122-0
Test magnet for mini compact versions		RPS-	101–0

⁽¹⁴⁾ For minimum 300 mm (12") insertion length and up to 6 bar (87 psi) medium pressure.



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





rc45LQ23en01b // Specifications in metric & US units. NIVELCO reserves the right to change technical data without notice!

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