

Thank you for choosing a NIVELCO instrument.
We are sure that you will be satisfied with it throughout its use!

NIVOSWITCH

VIBRATING FORK LEVEL SWITCHES
 SERIES: R-400 / R-500

USER'S MANUAL

1. APPLICATION

The NIVOSWITCH vibrating forks are for detection of level and flow of liquids. Using them as high or low fail safe switch overflowing of tanks and dry run of pumps can be prevented.

2. TECHNICAL DATA

MODEL	RN□-4□□-□ RM□-4□□-□	RD□-4□□-□ RF□-4□□-□ RJ□-4□□-□	R□□-5□□
Wetted parts	1.4571 (316Ti)	1.4571 (316Ti) or PFA coated st.st.	
Process connection	According to the order code		
Housing material	Aluminium: Powder paint coated		Plastic: reinforced fibre-glass, PBT
Temperature ranges	Medium	-40 °C to +130 °C See: 2.5 Derating Diagrams	-40 °C to +130 °C PP flange: -20 °C to +90 °C PFA coated 1.4571 flange: -40 °C to +120 °C, See: 2.5 Derating Diagrams
	Ambient	-40 °C to +70 °C (see Section 2.7)	-30 °C to +70 °C
Maximum pressure	40 bar (580 psi) See: 2.5 Derating Diagrams	40 bar (with PP flange: 6 bar) See: 2.5 Derating Diagrams	
Probe length	69 mm (2.7 inch) to 3000 mm (10 feet)		
Minimum medium density	≥ 0.7 kg/dm ³		
Maximum medium viscosity	≤ 10000 mm ² /s (cSt)		
Response time	Getting immersed	≤ 0.5 sec	
	Getting free	≤ 1 sec; See: 2.6 Response Time Diagram	
Operation mode indicator	Bi-colour LED		
Operation mode selection	Switch for selection of HIGH or LOW fail safe mode		
Output	1 or 2 SPDT relays		
	Relay 1: 250 VAC, 8 A, AC 1 Relay 2: 250 VAC, 6A, AC 1		
Electric connections	M20 x 1.5 cable gland Ex d IIC or NPT 1/2" conduit entry (see: Section 2.3)	M20 x 1.5 cable gland; ∅6 to 12 mm cables or NPT 1/2" conduit entry	
	plug-in type terminal blocks for 0.75 to 1.5 mm ² wire cross section		
Supply voltage	20 ... 250 VAC or 20 ... 36 VDC	20 ... 255 VAC or 20 ... 60 VDC	
Consumption	< 3 W		
Electrical protection	Class I.		
Ex protection mark	FM	Cl. I Div. 1, Grp C & D, T4 ... T6 (see Section 2.3)	
	ATEX	⊕ II 1/2 G Ex d IIB T6 ... T4 Ga/Gb	
	IECEx	Ex d IIB T6 ... T4 Ga/Gb -40 °C ≤ Tamb ≤ +70 °C (see: table 2.7)	
Ingress protection	IP67		
Weight	2.1 kg+1.2 kg/m	1.3 kg+1.2 kg/m	0.95 kg+1.2 kg/m

WARNING! Temperature difference between inner and outer surface of the PFA coated flanges must not exceed 60 °C. If necessary, insulate outer surface of the flange.

NIVELCO



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2.1 ACCESSORIES

- User's manual
- Warranty Card
- Declaration of Conformity
- Sealing 2 mm thick made of KLINGER OILIT (for BSP threaded process connection only)
- Plug-in type, 3-pole terminal block (2 pcs for standard and 3 pcs for models with 2 relays)
- Cable gland M20 x 1.5 (2 pcs) (only for non explosion-proof models)

2.2 ORDER CODE

NIVOSWITCH R □ □ - □ □ □ - □ *

TYPE	CODE	PROCESS CONNECTION	CODE	HOUSING	CODE	LENGTH	CODE	OUTPUT / EX	CODE
PFA coated	D	1" BSP thread	M	Alu. cast	4	Short (69 mm)	00	1 Relay	0
Standard	F	1" NPT thread	P	Plastic	5	Standard (125 mm)	01	2 Relays	A
Highly polished	J	1 1/2" BSP thread	H			0.2 to 3 m	02...30	1 Relay / haz.loc (Ex) rated	N**
XP (Ex d) enclosure	N	1 1/2" NPT thread	N					2 Relays / haz.loc (Ex) rated	P**
XP (Ex d) enclosure + polished fork	M	2" BSP thread	C						
		2" NPT thread	L						
		DIN DN50 PN40 st.st flange	G						
		2" ANSI st.st. flange	B						
		50A JIS st.st flange	K						
		DIN DN50 PN16 PP flange	F						
		2" ANSI PP flange	A						
		50A JIS PP flange	J						

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

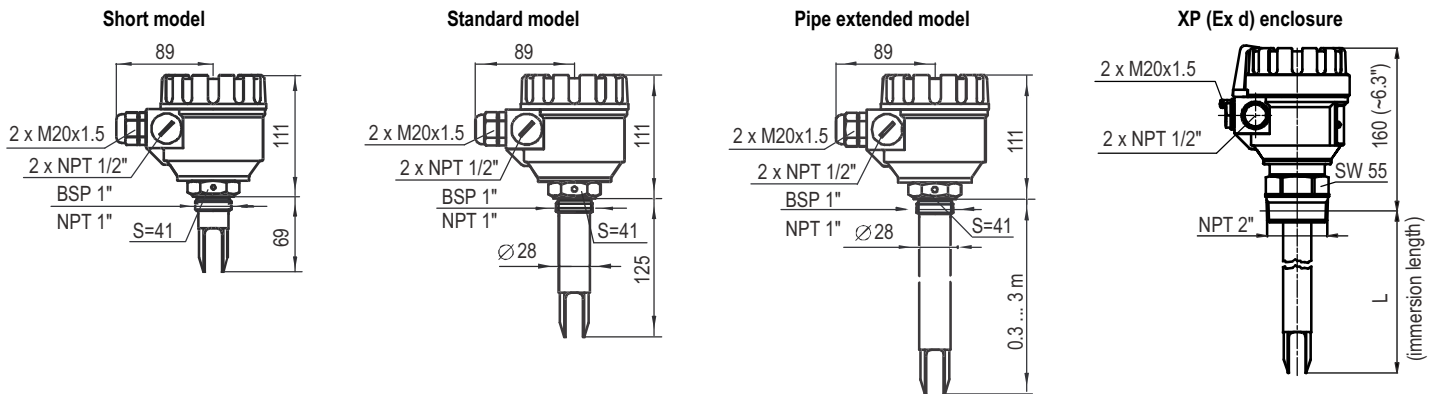
** Only in combination with RN or RM types (see: Section 2.3)

2.3 SPECIAL DATA AND CONDITIONS FOR SAFE USE OF FM CERTIFIED MODELS (US & CANADA):

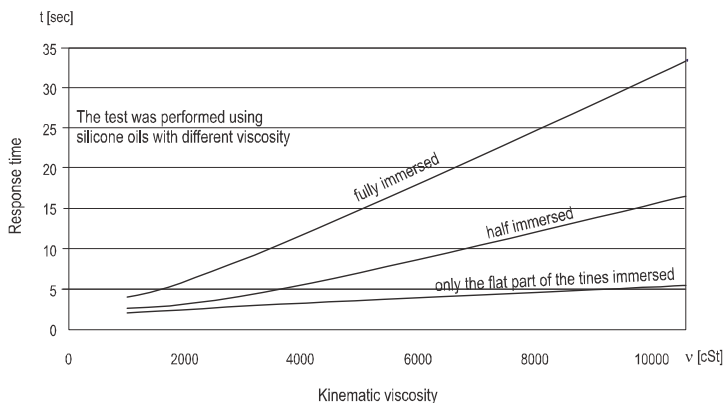
TYPE		RN□-4□□-N, RN□-4□□-P, RM□-4□□-N, RM□-4□□-P
Ex proof marking	US & Canada	Class I, Division 1, Gas Groups C & D, T4 ... T6
Applied standards	US	FM Class 3600 (Edt. 2011), FM Class 3615 (Edt. 2006), FM Class 3810 (Edt. 2005), ANSI/ISA 1010-1 (82.02.01) (Edt. 2004), ANSI/IEC 60529 (Edt. 2004)
	Canada	C22.2 No. 0.4 (Edt. 2013), C22.2 No. 0.5 (Edt. 2012), C22.2 No. 94 (Edt. 2011), C22.2 No. 61010-1 (Edt. 2012), CSA-C22.2 No. 60529 (Edt. 2015)
Electrical connection	NPT 1/2" conduit entry or M20x1.5 certified cable gland (not included), plug-in type terminal blocks for 0.75 to 1.5 mm ² (16 to 18 AWG) wire cross section	

- To prevent ignition, the cover may not be opened while the electrical circuits are alive or if explosive atmosphere is present. To block accidental opening of the threatened cover, the securing clamp must always be installed when the device is located in hazardous location.
- Aluminium housing of the unit should be connected to the equipotential (grounding) system.
- The device may not be set up and installed, unless a qualified NPT 1/2" threaded cable entry or suitably rated and qualified closing plug is fixed to the place of the plastic closing cap with proper sealing. The metal plug may only be removed if suitably rated cable glands or conduit entries are used.
- For field connections, use cable rated 20 °C greater than Maximum Ambient Temperature and seal all threaded entries at enclosure with suitably rated sealing components.
- To ensure watertight integrity, the cover must be fully tightened to the base and all conduit connections must be properly tightened and sealed.
- Regarding information on the dimensions of flameproof joints, please contact the Manufacturer.
- Installations in the US shall comply with the relevant requirements of the National Electrical Code® (ANSI/NFPA-70 (NEC®)). Installations in Canada shall comply with the relevant requirements of the Canadian Electrical Code (CSA C22.1).
- For installation in environment with Maximum Ambient Temperature above +50 °C refer to Section 2.7. TEMPERATURE CLASSES AND TEMPERATURE LIMITS

2.4 DIMENSIONS

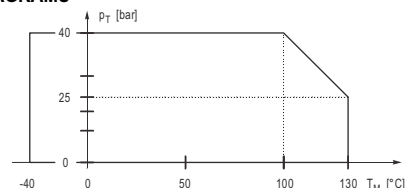


2.6 RESPONSE TIME - MEDIUM VISCOSITY

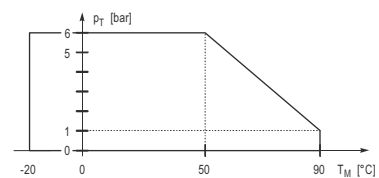


Response time (when getting free) versus medium viscosity

2.5 DERATING DIAGRAMS



for all models (except PP flanged)



for models with Polypropylene flange

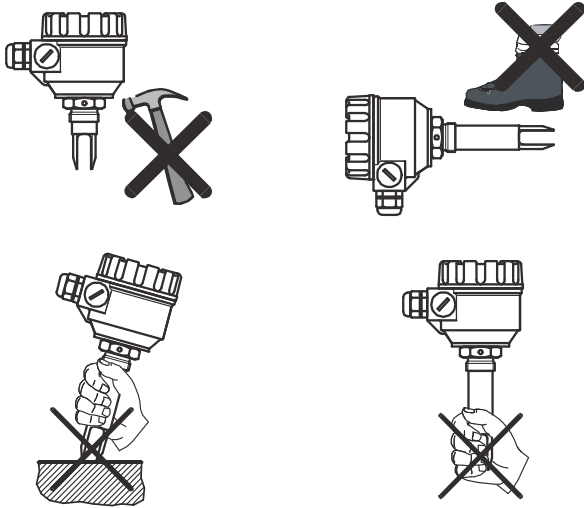
2.7 TEMPERATURE CLASSES AND TEMPERATURE LIMITS

For installation in potentially explosive environment, the maximal allowed ambient temperatures over the medium temperatures and the temperature classes are listed in the following table:

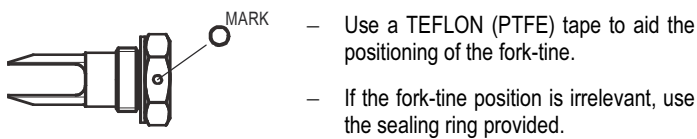
TEMPERATURE LIMITS	RN□-4□□-□Ex		RM□-4□□-□Ex	
Maximum process temperature: min.: -40°C...max.:	+70 °C	+80 °C	+95 °C	+130 °C
Maximum ambient temperature: min.: -40°C...max.:	+65 °C	+50 °C	+65 °C	+70 °C
Maximum temperature of process connection	+70 °C	+80 °C	+95 °C	+125 °C
Maximum surface temperature	+75 °C	+80 °C	+95 °C	+130 °C
Temperature class	T6		T5	T4

3. INSTALLATION

Prevent the unit from being damaged!



For positioning the fork-tines, use the marking on the hexagonal neck.



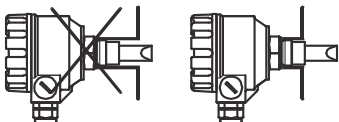
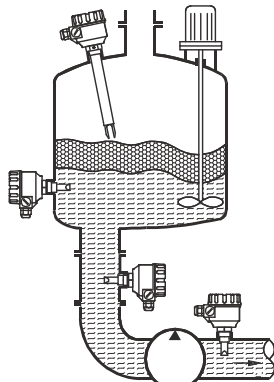
Do not use housing, to screw the unit into the process connection. Do it by means of the sw = 41 mm hexagonal neck.

After screwing tight the device, the housing can be rotated by hand (max. 300°), to adjust the cable outlets to the required position.

In applications to liquids with

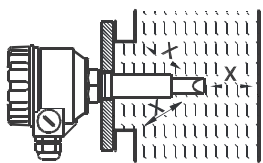
- low viscosity (without risk of material remaining on the fork-tines) any of the mounting shown beside is possible,
- high viscosity (due to risk of material remaining on the fork-tines) only vertical (top) mounting can be suggested.

In applications with side mounting vertical positioning of the tines is recommended.

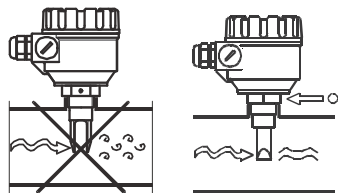


Mounting threaded versions

Installation Options

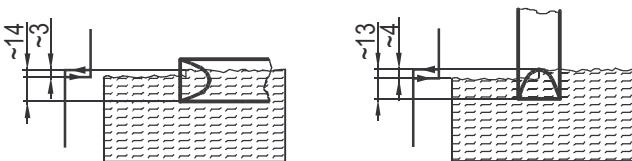


Critical distances ($x_{min} = 5 \text{ mm}$)



Mounting in pipe fork-tines must be parallel to the direction of flow

SWITCHING POINT, SWITCH DIFFERENTIAL



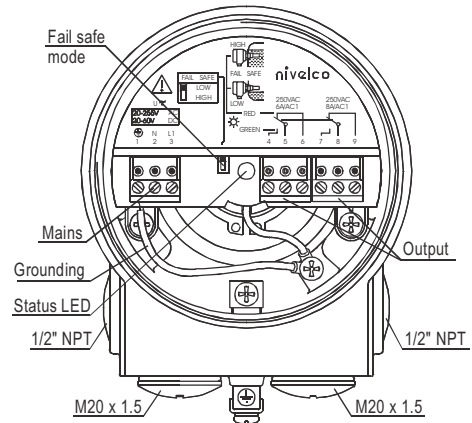
(Values are for water at 25 °C)

Switching point as well as the switch differential slightly depends on liquid density and mounting position.

4. WIRING

Use 6 ... 12 mm outer diameter cables, and tighten cable glands as well as housing cover after installation, to ensure an IP67 sealing.

Use outside or inside grounding screw terminal for grounding the unit. Common cables must not be used for AC and DC voltage, as well as for low and mains voltage.



5. ADJUSTMENT

Power supply	Fork	Switch pos.	Operation mode		Output	
			Fail safe	Status LED		
Yes	Immersed	High	HIGH	RED	4 5 6 7 8 9	De-energised
		Low	LOW	GREEN	4 5 6 7 8 9	Energised
	Free	High	HIGH	GREEN	4 5 6 7 8 9	Energised
		Low	LOW	RED	4 5 6 7 8 9	De-energised
No	Free or immersed	HIGH or LOW	NOT LIT	4 5 6 7 8 9	De-energised	

5.1 SPECIAL CONDITIONS FOR SAFE USE

To prevent ignition, the cover may not be opened while the electrical circuits are alive or if explosive atmosphere is present! Devices should be grounded by connecting their grounding screws to the equipotential system. The unit can be only powered on after properly closing the housing cover and fixing the screws of the safety locking clamp.

6. MAINTENANCE

The NIVOSWITCH does not require maintenance on a regular basis. In some instances, however, the vibrating section may need to be cleaned from the deposited material. This must be carried out carefully.

7. STORAGE CONDITIONS

Ambient temperature: -40 °C to +70 °C

Relative humidity: max. 98%

8. WARRANTY

All NIVELCO products are warranted to be free from defects according to the Warranty Sheet, within three (3) years from the date of purchase.

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NIVELCO reserves the right to change technical specifications without notice.