

1. APPLICATION

NIVOSWITCH vibrating fork level switches are suitable for level detection of liquids. Mounted on pipes or tanks it controls filling/emptying, also can generate fail-safe alarms providing overflow- or dry run protection. The operating principle involves an electronic circuit that induces vibration in the fork probe. When the medium reaches and covers the fork, the vibration changes or stops. The fork will start vibrating freely again when the medium drops to a level where it no longer touches the prongs. The electronics senses the change in the vibration and sends out an output signal after a preset delay. The plastic-coated version is recommended for aggressive mediums, the highly polished version is recommended for abrasive mediums. The flameproof version allows using the device in Ex rated environments.

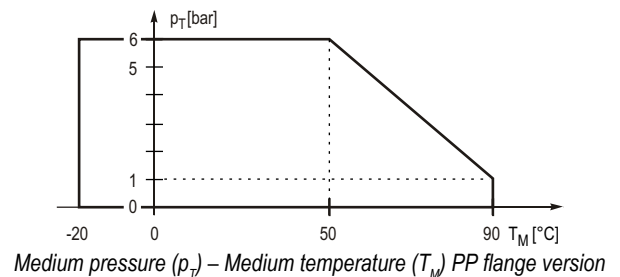
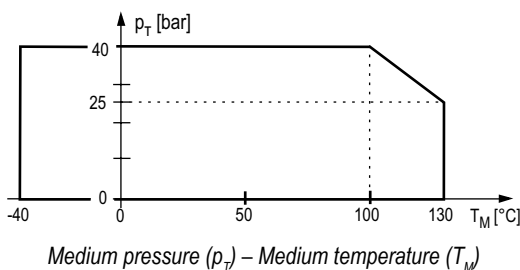
2. TECHNICAL DATA

2.1 GENERAL DATA

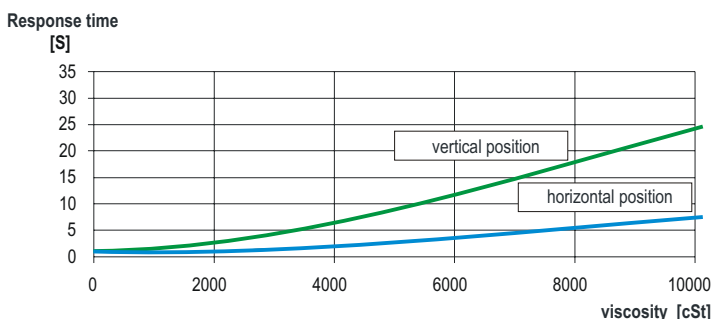
Type		RM□-4□□-□Ex, RN□-4□□-□Ex	RD□-4□□-□, RF□-4□□-□, RJ□-4□□-□	R□□-5□□
Material of wetted parts		1.4571 (316Ti)	1.4571(316Ti) / ECTFE / PFA-coating	
Process connection		As per order code		
Housing material		Powder-coated aluminum		Plastic, PBT, fiber-glass-reinforced
Temperature ranges	Medium	See: chapter 2.5.4	-40...+130 °C (-40...+266 °F); PP flange: -20...+90 °C (-4...+194 °F); *PFA-coated 1.4571 flange: -40...+120 °C (-40...+248 °F) (see: diagram 2.3)	
	Ambient		-40...+70 °C (-40...+158 °F)	-30...+70 °C (-22...+158 °F)
Medium pressure		Up to 40 bar (4 MPa, 580 psi) (see: 2.3 diagram)	Up to 40 bar (4 MPa, 580 psi) (with PP flange 6 bar [0.6 MPa, 87 psi]) (see: diagram 2.3)	
Insertion length		69...3000 mm (2.7"...10 feet), as per order code		
Medium density		≥0.7 kg/dm ³ (>0.7 S.G.)		
Medium viscosity		≤10000 mm ² /s (cSt) (see diagram)		
Response time	Getting immersed	≤0.5 sec		
	Getting free	≤1 sec (see: diagram 2.4)		
Operating mode indicator		Two-tone LED		
Operating mode selection		Switch for selecting HIGH or LOW fail-safe mode		
Output		1 or 2 SPDT relays Relay 1: 250 V AC, 8 A, AC1 / Relay 2: 250 V AC, 6 A, AC1		
Electrical connection		See: chapter 2.5.	2× M20x1.5 cable glands for Ø6...12 mm (Ø0.25"...0.5") cable; 2× internally threaded ½" NPT connection for protective pipes. Terminal blocks for max. 1.5 mm ² (AWG16) wire cross section	
Power supply		See: chapter 2.5.	20...255 V AC, 20...60 V DC	
Power consumption		<3 W		
Electrical protection		Class I		
Ingress protection		IP67		
Weight		2.1 kg + 1.2 kg/m (~4.62 lb + 1 lb/ft)	1.3 kg + 1.2 kg/m (~2.85 lb + 1 lb/ft)	0.95 kg + 1.2 kg/m (~2 lb + 1 lb/ft)

* The temperature difference between inner and outer surface of the ECTFE or PFA-coated flanges must not exceed +60 °C (+140 °F). If necessary, insulate outer surface of the flange.

2.3 PRESSURE – TEMPERATURE DIAGRAMS



2.4 RESPONSE TIME – MEDIUM VISCOSITY DIAGRAM



NIVOSWITCH

R-400, R-500
VIBRATING FORK LEVEL SWITCHES

USER'S MANUAL



Manufacturer:

NIVELCO

Process Control Co.

H-1043 Budapest, Dugonics u. 11.

Tel.: +36 1 889-0100 ■ Fax: 889-0200

E-mail: sales@nivelco.com ■ www.nivelco.com

2.2 ACCESSORIES

- User's manual
- Warranty Card
- EU-Declaration of Conformity
- 2× M20x1.5 plastic cable gland (only for non-explosion-proof models)
- 1× 2 mm thick KLINGER OILIT sealing (only for BSP-threaded process connection)
- 2× plug-in type, 3-pole terminal block (3× for models with 2 relays)

2.5 CERTIFICATES, EXPLOSION PROTECTION, Ex MARKINGS, Ex LIMIT DATA

2.5.1 DNV GL CERTIFICATE, NO. TAA000018W

2.5.2 ATEX CERTIFICATE, NO. BK116ATEX0031

RN□-4□□-NEx, RN□-4□□-PEx, RM□-4□□-NEx, RM□-4□□-PEx	
Ex marking (ATEX)	II 1/2 G Ex d IIB T6...T4 Ga/Gb
Power supply (universal)	20...250 V AC (50 / 60 Hz) or 20...36 V DC
Electrical connection	2× M20x1.5 Ex d IIC cable glands; 2× internally threaded 1/2" NPT connection for protective pipes. Terminal blocks for max. 1.5 mm ² (AWG16) wire cross section
Reference document number	rfm4000m0600h_04

2.5.3 IECEx CERTIFICATE NO. IECEx BK1 16.0002

RN□-4□□-□Ex, RM□-4□□-PEx	
Ex marking (IECEx)	Ex d IIB T6...T4 Ga/Gb -40 °C (-40 °F) ≤ T _{amb} ≤ +70 °C (+158 °F)
Power supply (universal)	20...250 V AC (50 / 60 Hz) or 20...36 V DC
Electrical connection	2× M20x1.5 Ex d IIC cable glands; 2× internally threaded 1/2" NPT connection for protective pipes. Terminal blocks for max. 1.5 mm ² (AWG16) wire cross section
Reference document number	rfm4000a0600h_04

2.5.4 Ex TEMPERATURE LIMIT DATA

Temperature data	RN□-4□□-NEx, RN□-4□□-PEx, RM□-4□□-NEx, RM□-4□□-PEx			
Medium 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 (+176 °F)	+95 °C (+203 °F)	+125 °C (+257 °F)
Highest surface temperature	+75 °C (+167 °F)	+80 °C (+176 °F)	+95 °C (+203 °F)	+130 °C (+266 °F)
Temperature class	T6		T5	T4

2.6 ORDER CODES (NOT ALL COMBINATIONS POSSIBLE!)

NIVOSWITCH R □ □ - □ □ □ - □ *

Type	Code	Process connection	Code	Housing	Code	Probe length	Code	Output / Ex	Code
PFA-coated	D	1" BSP	M	Aluminum (powder-coated)	4	Standard probe 69 mm	00	1× SPDT relay	0
1.4571	F	1 1/2" BSP	H	Plastic, PBT	5	probe 125 mm	01	2× SPDT relay	A
Highly polished	J	1" NPT	P			Extended probe 0.2...3 m	02...30	1× SPDT relay / Ex d	N**
Ex d housing + fork: 1.4571	N	1 1/2" NPT	N					2× SPDT relay / Ex d	P**
Ex d housing + fork highly polished	M	DIN DN50							
ECTFE-coated	V	PN16 PP flange	F						
		PN40 1.4571 flange	G						
		2" ANSI							
		PP flange	A						
		1.4571 flange	B						
		50A JIS							
		PP flange	J						
		1.4571 flange	K						
		1 1/2" TriClamp	T						
		2" TriClamp	R						
		DN40							
		Pipe coupling (DIN11851)	D						
		DN50							
		2" BSP	C						
		2" NPT	L						

*Ex versions are marked 'Ex' right after the type designation on the label.
**Only for RN and RM types

Components and accessories to order I.

NIVOSWITCH R P □ - 1 □ □ - 0

Type	Sliding sleeve	Code	Application	Code	Material	Code
Accessories	1 1/2" BSP	H	For normal version	1	A38	1
	1 1/2" NPT	N	For coated version	2	1.4571	2
	2" ANSI	A				
	2" BSP	B				
	2" NPT	C				
	DIN DN50	F				
	JIS 10K 50A	J				

NIVOSWITCH R P - 1 0 1 - 0

Type	Accessories	Code
Accessories	Weld-in socket 1" BSP	G
	Weld-in socket 1" NPT	K
	Magnetic test screwdriver	S

Material
1.4571

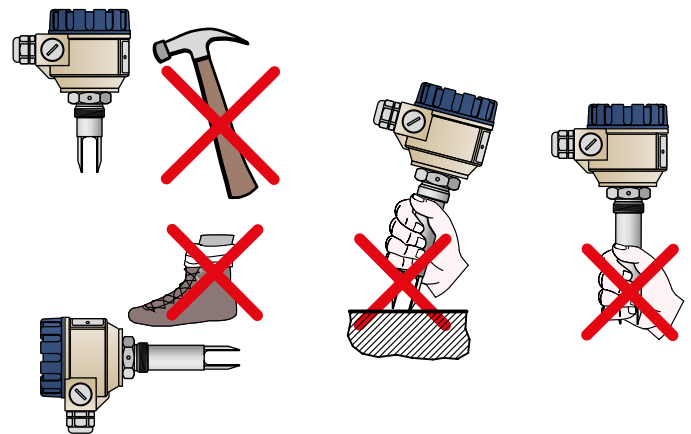
2.7 DIMENSIONS

Standard version										
R□M-□□0-□, R□P-□□0-□	R□M-□□1-□, R□P-□□1-□									
Extended version	Ex d housing version									
R□M-□□□-□, R□P-□□□-□	R□M-4□□-□Ex									
TriClamp version	Pipe coupling (DIN11851) version									
R□T-□□1-□, R□R-□□1-□	R□D-□□1-□, R□E-□□1-□									
	<p>DIN 11851</p> <table border="1"> <thead> <tr> <th>Size</th> <th>R□D</th> <th>R□E</th> </tr> </thead> <tbody> <tr> <td></td> <td>DN40</td> <td>DN50</td> </tr> <tr> <td>A</td> <td>RD 65x1/6</td> <td>RD 78x1/6</td> </tr> </tbody> </table>	Size	R□D	R□E		DN40	DN50	A	RD 65x1/6	RD 78x1/6
Size	R□D	R□E								
	DN40	DN50								
A	RD 65x1/6	RD 78x1/6								

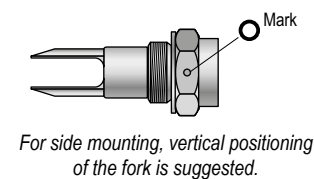
Flanged version	Version with sliding sleeve
RFF-□□1-□	RFM-□□□-□ + RPH-112-0

3. INSTALLATION

Protect the device from any mechanical damage.



To adjust the position of prongs use the marking on the hexagonal neck.

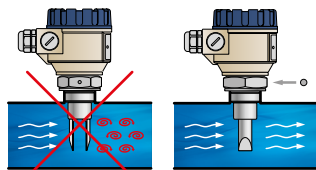


For a 1" BSP connection, the position of the prongs is irrelevant, use the sealing ring provided. If orientation of the fork is required (e.g., for piping, side mounting), seal with Teflon (PTFE) tape to help positioning the prongs.

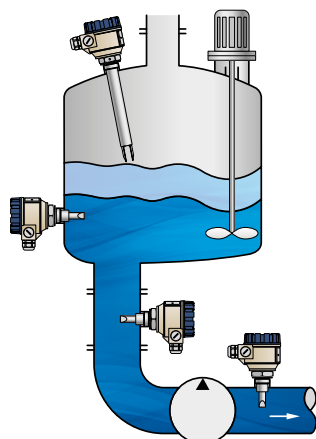
Do not use the housing to fasten the device!
When screwing the level switch into the tank, use the hex nut part of the device.

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

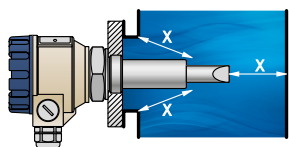
- Low-viscosity liquids (without risk of material remaining on the fork) any of the mounting positions shown on the right is possible.
- High-viscosity liquids (due to risk of material remaining on the fork) only vertical (top) mounting is recommended.



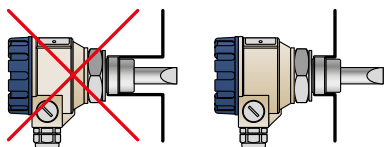
Mounting in pipe, the prongs must be parallel to the direction of flow



Installation Options

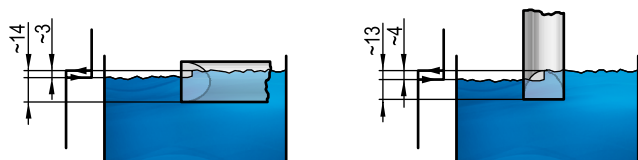


Critical distances ($x_{min} = 5 \text{ mm [0.2"]}$)



Mounting threaded versions

SWITCHING POINT, SWITCHING DIFFERENTIAL

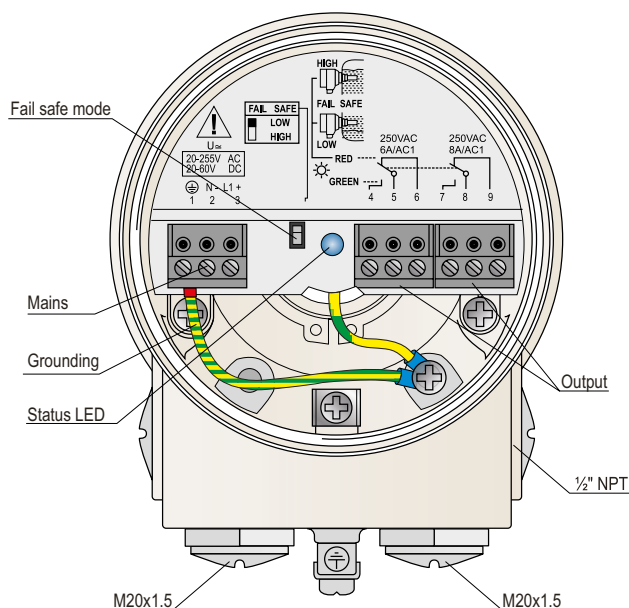


(Values are for water at +25 °C [+77 °F])

The switching point and the switching differential depends partly on the liquid's density and mounting position.

4. WIRING

Use Ø6...12 mm (Ø0.25"...0.5") outer diameter cables with max. 1.5 mm² (AWG16) wire cross section, and tighten the cable glands as well as the 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	Operation mode		Output
		Switch pos.	Status LED	
Yes	Immersed	HIGH	red	De-energized
		LOW	green	Energized
	Free	HIGH	green	Energized
		LOW	red	De-energized
No	Free or immersed	HIGH / LOW	Not lit	De-energized

The mode indicator is still visible in the top view of the cover after the cover is closed. After wiring and adjustment, check the seals and close the cover carefully!

6. SPECIAL CONDITIONS FOR SAFE USE

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

7. MAINTENANCE AND REPAIR

The device does not require regular maintenance. The warranty card contains the terms and conditions. Before returning the device for repairs, it must be cleaned thoroughly. The parts in contact with the medium may contain harmful substances; therefore, they must be decontaminated. Our official form ([Returned Equipment Handling Form](#)) must be filled and enclosed in the parcel. Download it from our website www.nivelco.com. The device must be sent back with a declaration of decontamination. A statement must be provided in the declaration that the decontamination process was successfully completed and that the device is clean from any hazardous substances.

8. STORAGE CONDITIONS

Ambient temperature: -40...+70 °C (-40...+158 °F)
Relative humidity: max. 98%