NIVOSWITCH

Vibrating fork level switches
Series:
R-400 / R-500

USER'S MANUAL

1. OPERATION

The **NIVOSWITCH** is a mechanical resonance system; excited, and kept in resonance by an electronic circuitry. The process medium, when reaching the tines of vibration fork, modifies the vibration. This variation is sensed by an electronic circuit, which, on the elapse of the delay time, actuates the output circuit. The unit has SPDT relay output. A virtual DPDT relay feature is achieved through an optional second relay.

2. TECHNICAL DATA

Model		R-400	R-500
Wetted parts		St.st. 1.4571 (X 6 CrNiMoTi 17122) or ECTFE (Halar®) coated st.st.	
Process connection		According to the order code	
Housing material		Aluminium: Powder paint coated	Plastic: PBT fibre-glass reinforced, flame-retardant (DuPont®)
Temperature ranges	Medium	-40 °C to +130 °C - PP flange: -20 °C to +90 °C ECTFE coated st.st. flange: -40 °C to +120 °C, for Derating see diagrams	
	Ambient	-30 °C to +70 °C	
Maximum pressure		40 bar / - PP flange: 6 bar, for Derating see diagrams	
Probe length		69 to 3000 mm	
Minimum medium density	Liquids	≥ 0.7 kg/dm³	
	Solids*	≥ 0.05 kg/dm³	
Maximum liquid viscosity		≤ 10000 mm²/s (cSt)	
Response time	When immersed	≤ 0.5 sec	
	When free	≤1 sec at high density setting (≥ 0.5 kg/dm³)	
		≤ 2 sec at low density setting (< 0.5 kg/dm³)	
Operation mode indicator		Bi-colour LED	
High/low adjustment		Switch selectable	
Densityy adjustment		Switch selectable	
Output		Up to 2 SPDT relays Relay1: 250 V AC, 8 A, AC 1 Relay 2: 250 V AC, 6A, AC 1	
Electric connections		2 x Pg16 for ∅ 8 to 15 mm cables (0.75 to 2.5 mm² wire cross section)	
Supply voltage		20 ... 255 V AC and 20 ... 60 V DC	
Consumption		AC: 1.2 … 17 VA ; DC: < 3 W	
Electrical protection		Class I.	
Ingress protection		IP 67 (NEMA 6)	
Weight		1.3 kg + 1.2 kg/m	0.95 kg + 1.2 kg/m

* *Please note, that the temperature difference the between inner and outer surface of ECTFE coated flanges must not exceed 60 °C. If necessary, insulate outer surface of flange.*

CE

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2.1 ACESSORIES

1 x User's manual
1 x Warranty Card
2 x Pg 16 cable gland
1 x sealing 2 mm thick made of KLINGER OILIT (for BSP 1" process connection only)
2 pcs. Plug-in type, 3-pole terminal block
(2 pcs. Plug-in type, 3-pole terminal block in case of 2 relay output)

2.2 ORDER CODE

NIVOSWITCH R □ □ - □ □ □ - □

Fork	Code
ECTFE coated	D
Standard	F

Connections	Code
1" BSP thread	M
1" NPT thread	P
DIN DN50PN40 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

Housing	Code
Alu.cast	4
Plastic	5

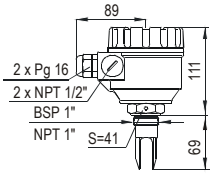
Length	Code
Short (69 mm)*	00
Standard (125 mm)	01
0.2 to 3 m	02…30

Output	Code
1 Relay	0
2 Relay	A

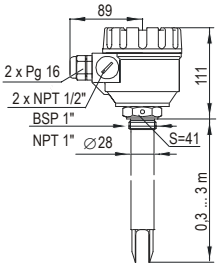
* The short versions are not applicable for solids

2.3 DIMENSIONS

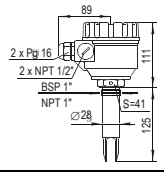
Short model



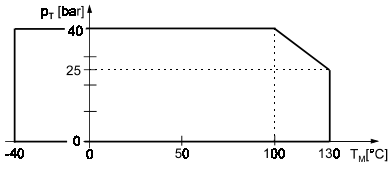
Pipe extended model



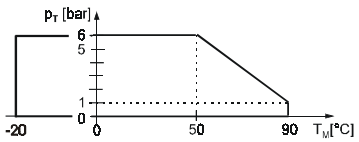
Standard model



2.4 Derating DIAGRAMS

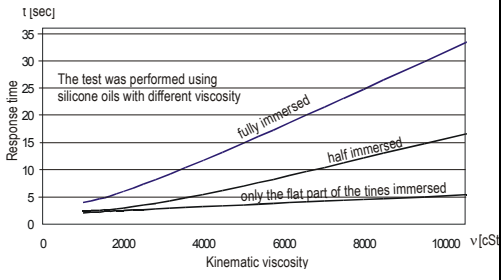


for all models (except PP flanged)



for models with Polypropylene flange

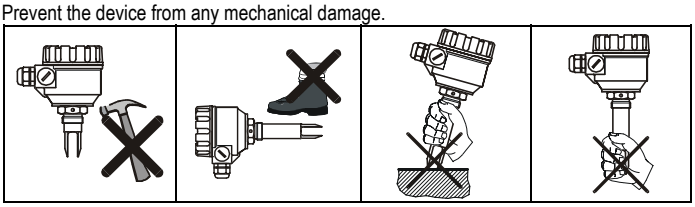
2.5 RESPONSE TIME - MEDIUM VISCOSITY



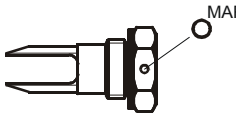
Response time (when getting free) versus medium viscosity

3. INSTALLATION

Prevent the device from any mechanical damage.



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



- Use a TEFLON (PTFE) tape to aid the positioning of the fork-tine.
- If the fork-tine position is irrelevant, use the provided sealing ring

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

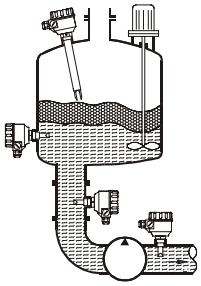
After screwing tight the device, the housing can be rotated (max. 300°), to adjust the cable outlets to the required position.

Installation on liquids

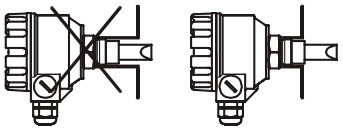
In applications on liquids with

- 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.

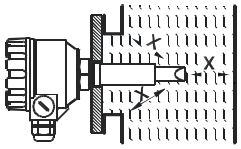
In applications with side mounting take care of the positioning mark.



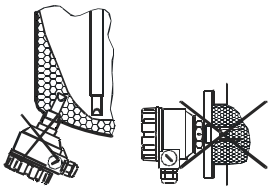
Installation Options



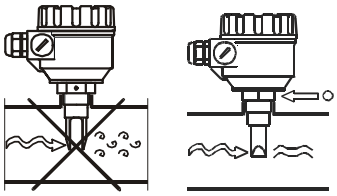
Mounting threaded versions



Critical distances (x_{min}= 5 mm)



Mountings to be avoided in case of highly viscous liquids



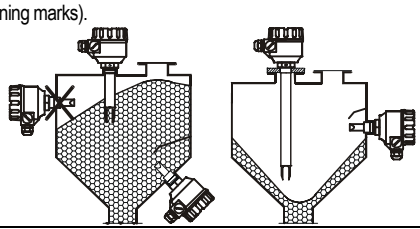
Mounting in pipe fork-tines must be parallel to the direction of flow

Installation on light, free flowing solids*

Vertical (top) mounting is the recommended mounting position. Side mounting is recommended only where the fork-tines are easily freed from the process medium (ex.: through gravity). In case of side mounting, the NIVOSWITCH must be mounted with the fork-tines standing vertically (look for the positioning marks).

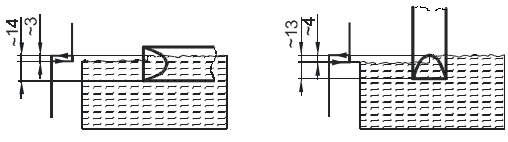
The short versions are not applicable for solids

When determining the mounting location, take into account the caving or arching of the material in the tank. It might be necessary to install the device at an offset level position relative to the switching level actually required



Protect the probe from downfalling material !
Fork-tines should not be exposed to mechanical load.

SWITCHING POINT, SWITCH DIFFERENTIAL



(Values are for water at 25 °C)

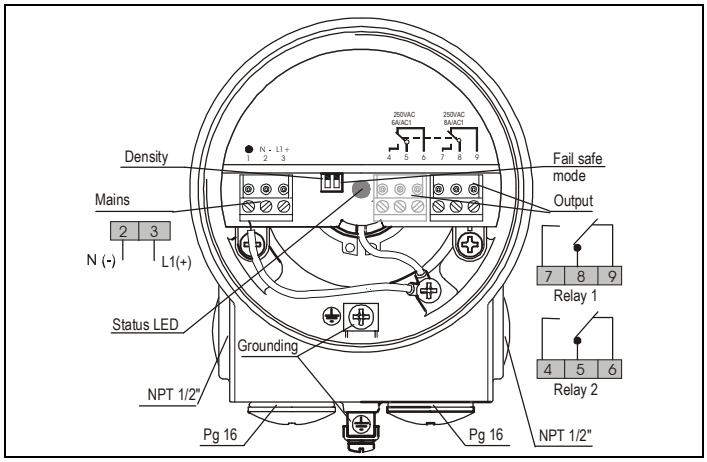
Liquids: switching point as well as the switch differential slightly depends on liquid density and mounting position.

Solids: switching point as well as the switch differential slightly depends on material features and mounting position

4. ELECTRICAL CONNECTIONS

Use 8 ... 15 mm outer diameter circular cables, and tighten cable glands as well as housing cover after installation, to ensure an IP67 sealing.

For grounding the unit, either use the grounding screw terminal on the outside of the housing or use the internal grounding screw terminal. AC with DC, or low voltage with line cables must not be led in a common duct.



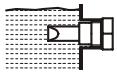
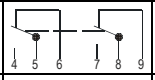
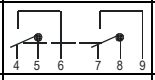
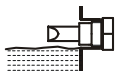
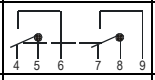
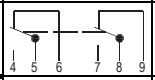
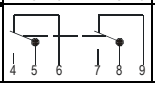
5. ADJUSTMENT

Suggested DENSITY switch settings are listed in the table below.

Liquids		HIGH
Free flowing solids		LOW ρ < 0,5 kg/dm³
		HIGH $\rho \geq$ 0,5 kg/dm³

Before installing the unit, it is advisable to try operation on a small sample of the product. Do not set a lower density than necessary, since because of greater sensitivity this may result in indicating even small residues of material adhering to the probe.

OPERATING DIAGRAM

Power supply	Fork	Fail safe mode	Status LED	Output	
Yes	 Immersed	HIGH	RED		De-energised
		LOW	GREEN		Energised
	 Free	HIGH	GREEN		Energised
		LOW	RED		De-energised
No	Free or immersed	HIGH or LOW	NOT LIT		De-energised

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: -25 to +60 °C

Relative humidity: max. 98%

8. WARRANTY

We provide a warranty for the period of 1 (one) year.
All repairs under guarantee are performed in the Manufacturer's premises; the costs of dismantling, reinstalling or transport are borne by the Customer.
Claims for guarantee are not valid in respect of failures due to abnormal usage, breakage, disaster, or incompetent installation or usage.

rfm4000a0600h_02
September, 2001
We reserve the right to change technical specifications without notice.