

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, also can generate fail-safe alarms providing overflow- or dry run protection. The operation 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 or stops. 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 to use for aggressive mediums, the highly polished version is recommended to use for abrasive mediums. The PNP/NPN transistor output versions can be connected directly to PLC, or relay unit.

NIVOSWITCH vibrating forks are able to solve switching tasks of high-current loads with the help of **UNICONT PKK** switching amplifiers. **UNICONT PKK-312-8Ex** 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
- 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
- Medium temperature max. +130 °C
- Output can be toggled by test magnet
- Ex, DNV variants
- IP67, IP65/IP68

APPLICATIONS

- For liquids: min. 0.7 kg/dm³ density and max. 10⁴ mm²/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, overflow or dry-run protection, pump controls

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



RBM-401-3



RCM-401
cable version



RCM-402
with M12
connector



RCM-400
with DIN connector

VARIANTS

This table helps choose the proper version for a given level switching task. Most essential aspect is the consistency of the measurement medium.

		Liquids	
Features		Mini compact RC□-400	Compact RF□-400/500
Metal housing		■	■
Plastic housing			■
Extension		■	■
High-polished version		■	■
Plastic-coated fork		■	■
2" process connection		■	■
1", 1½" process connection		■	■
Relay output			■
Electronic output		■	
Electrical connection	Terminal		■
	DIN connector	■	
	M12 connector	■	
	Cable	■	
Intrinsic safety version		■	
Flameproof enclosure			■
DNV			■
Function setting (low-high level)		■ ⁽¹⁾	■
Function indication		■	■
Output test magnet		■	

⁽¹⁾ Only for 3-wire DC versions

TECHNICAL DATA

	Mini compact RC□-400	Compact RF□-400/500
Insertion length	69...3000 mm	
Material of wetted parts	1.4571 stainless steel or ECTFE/PFA-coating	
Process connection	As per order code	
Medium temperature	-40...+130 °C (see "Thermal properties"), for ECTFE-coated versions: -40...+120 °C	
Ambient temperature	-40...+70 °C (see temperature diagrams)	-30...+70 °C
	With M12 connector: -25...+70 °C	
Medium pressure	Up to 40 bar (4 MPa) (see pressure diagrams)	
Medium density	> 0.7 kg/dm ³	
Medium viscosity	≤ 10 000 mm ² /s (cSt)	
Power supply	2-wire DC: 15...29 V DC	20...255 V AC / 20...60 V DC
	2-wire AC: 20...255 V AC; 3-wire DC: 12...55 V DC	
Power consumption	AC: depending on load; DC: < 0.6 W	< 3 W
Housing material	1.4571 stainless steel	Powder-coated aluminum or plastic (PBT)
Electrical connection	DIN or M12 connector, or 3 m integrated cable ⁽¹⁾ 2× 0.5 mm ² / 4× 0.75 mm ² / 5× 0.5 mm ²	2× M20×1.5 plastic cable glands for Ø6...Ø12 mm cable, 2× terminal blocks for max. 2.5 mm ² wire cross section, Two 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	~1.3 kg + 1.2 kg/m extension

⁽¹⁾ Available cable length: max. 30 m

Ex INFORMATION

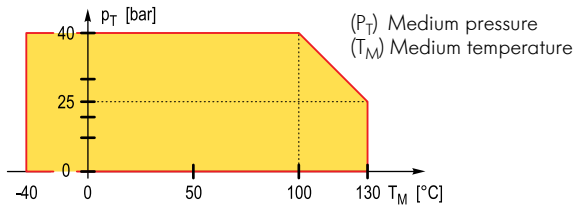
		Mini compact version		Compact version (metal housing)
		Connector type RC□-400-8Ex / LE _x	Cable type RC□-400-9Ex	RF□-400-NE _x / PE _x
Explosion protection		Intrinsically safe ⁽²⁾		Flame-proof housing
Ex marking	IEC Ex	-		Ex d IIB T6...T4 Ga/Gb, -40 °C ≤ T _{amb} ≤ +70 °C
	ATEX	 II 1G Ex ia IIB T6...T4 Ga  II 1G Ex ia IIC T6...T4 Ga		 II 1/2 G Ex d IIB T6...T4 Ga/Gb
Intrinsic safety limits		U _i = 29 V; I _i = 100 mA; P _i = 1.4 W; C _i = 7 nF; L _i = 0 mH	U _i = 29 V; I _i = 100 mA; P _i = 1.4 W; C _i = 15 nF; L _i = 0 mH	-
Power supply		15...29 V DC		20...250 V AC (50/60 Hz) / 20...36 V DC
Electrical connection		DIN connector or M12 connector	3 m integrated cable ⁽¹⁾	2× M20×1.5 cable glands for Ø7...Ø12 mm cable
				with Ex d IIC protection
				2× terminal blocks for max. 1.5 mm ² wire cross section, 2× ½" NPT internal threads for cable protective pipes.

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

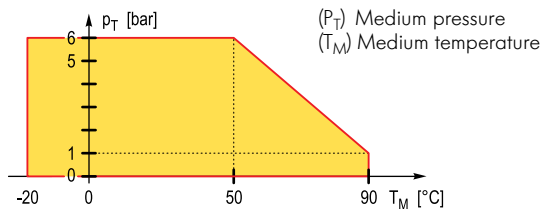
Temperature classes	T6		T5	T4
Mini compact version for liquids (Ex ia)				
Highest ambient temperature	+70 °C	+60 °C		
Highest medium temperature	+70 °C	+75 °C	+95 °C	+130 °C
Compact version with flameproof enclosure (Ex d)				
Medium temperature minimum: −40 °C; Maximum:	+70 °C	+80 °C	+95 °C	+130 °C
Ambient temperature minimum: −40 °C; Maximum:	+65 °C	+50 °C	+65 °C	+70 °C
Highest surface temperature of the process connection	+70 °C	+80 °C	+95 °C	+125 °C
Highest surface temperature	+75 °C			+130 °C

THERMAL PROPERTIES

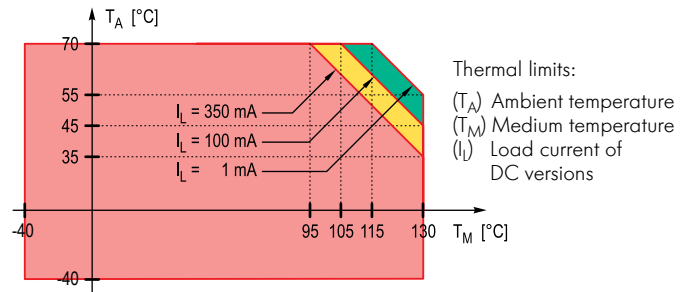
Medium pressure – Medium temperature



Medium pressure – Medium temperature PP flange version



Mini compact version



OUTPUT PROPERTIES

Compact type

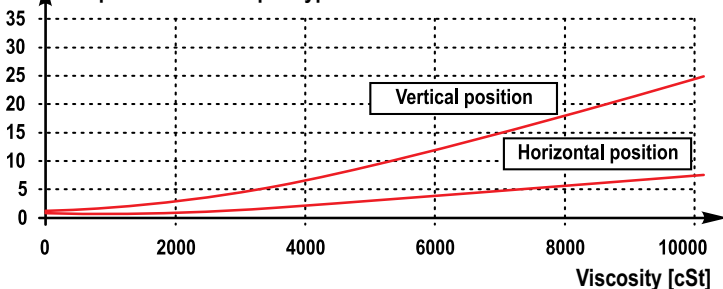
Output		R□, RV□, RJ□–400/500
Relay		1 or 2 (SPDT) relays 250 V AC, 8 A, AC1 / 250 V AC, 6 A, AC1
Response time	when immersed	≤ 0.5 s
	when free	≤ 1 s ⁽¹⁾

Mini compact type

Type	Output		RC□, RG□, RB□, RE□–400/500
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
		min. continuous	10 mA / 255 V; 25 mA / 24 V
		max. impulse	1.5 A / 40 ms
3-wire DC	Transistor switch		NPN or PNP output can be realized with appropriate wiring
	Voltage drop (in switched-on state)		< 4.5 V
	Current load (max. continuous)		350 mA / $U_{max} = 55 \text{ V}$
	Residual current (in switched-off state)		< 100 µA
	Response time	when immersed	0.5 s ⁽¹⁾ See viscosity diagram
		when free	< 1 s ⁽¹⁾

RESPONSE TIME DIAGRAM

[S] Response time for liquid types



OPERATION

Compact and Mini compact version						
Power supply	Switching		Fail-Safe setting ⁽²⁾	Status LED	Output	
					Relay	Electronic
ON	High level					
	Low level					
OFF	-	-	High / 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		-

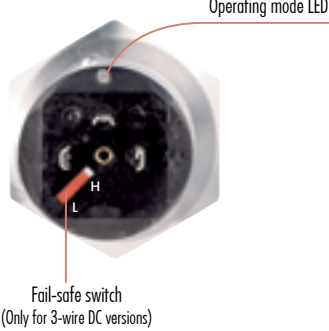
OPERATING MODE SWITCH

Compact	
Fail-safe	
	Fail-safe alarm is indicated with de-energized relay or open state of the output

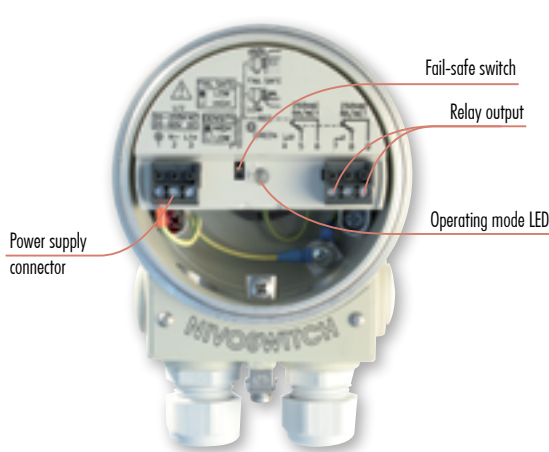
⁽²⁾ In the case of the mini-compact version with integrated cable, it is determined by the appropriate wiring.

WIRING

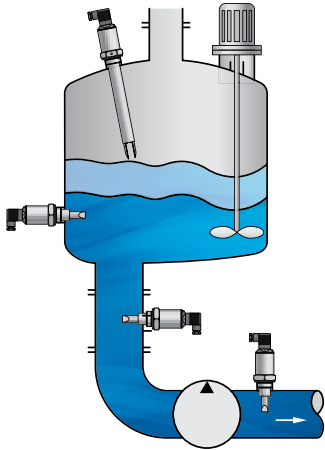
Mini compact (connector version)



Compact



INSTALLATION



NIVOSWITCH RF/RV/RJ-400/500 standard version

3 years

Compact vibrating fork level switch for liquids

Type

R ■ ■ ■ - ■ ■ ■ ■ - ■

0 0 69 mm
0 1 125 mm

Fork material

R ■ ■ ■ - ■ ■ ■ ■ - ■

F Stainless steel with tumble polish
V ECTFE-coated fork, PFA-coated extension (only 1" BSP (PVDF) or flange (PP or ECTFE-coated) process connection)
J High-polished stainless steel

Process connection

R ■ ■ ■ - ■ ■ ■ ■ - ■

M 1" BSP
P 1" NPT
T 1½" TriClamp (ISO 2852)
R 2" TriClamp (ISO 2852)
D DN40 Pipe coupling (DIN 11851)
E DN50 Pipe coupling (DIN 11851)

Stainless steel flanges; not welded unless specifically requested
Flanges conform to: EN 1092-1 / ANSI B 16.5

G DN50 PN40/25
B ANSI 2" RF 600/400 psi
K JIS 40K 50A

ECTFE-coated stainless steel flange
Flanges conform to: EN 1092-1 / ANSI B 16.5

G DN50 PN40/25
B ANSI 2" RF 600/400 psi
K JIS 40K 50A

PP flanges (max. 6 bar; from -20 °C to +90 °C)

F DN50 PN16
A ANSI 2" FF 150 psi
J JIS 10K 50A

Housing

R ■ ■ ■ - ■ ■ ■ ■ - ■

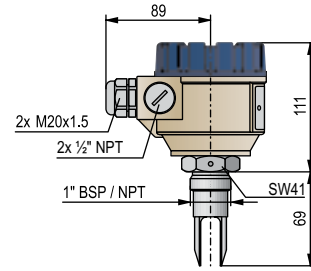
4 Aluminium (powder-coated)
5 Plastic, PBT, fiberglass-reinforced

Output

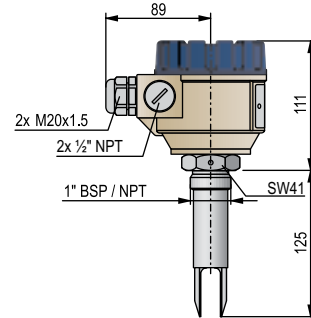
R ■ ■ ■ - ■ ■ ■ ■ - ■

0 1 SPDT relay: 250 V AC, 8 A
A 2 SPDT relay: 1x 250 V AC, 8 A and 1x 250 V AC, 6 A
G * 1 SPDT relay: 250 V AC, 8 A / GL
H * 2 SPDT relay: 1x 250 V AC, 8 A and 1x 250 V AC, 6 A / GL

* RF version only, 1" BSP / 1" NPT and stainless steel flanged version only, with GL certification.



RFM / RFP-400 / 500



RFM / RFP-401 / 501

NIVOSWITCH RF/RV/RJ-400/500 extension rod version

3 years

Compact vibrating fork level switch for liquids
with stainless steel extension rod probe up to 3 m

Fork material

R ☐ ☐ - ☐ ☐ ☐ - ☐

F	Stainless steel with tumble polishing
V	ECTFE-coated fork, PFA-coated extension (only 1" BSP (PVDF) or flange (PP or ECTFE-coated) process connection)
J	High-polished stainless steel

Process connection

R ☐ ☐ - ☐ ☐ ☐ - ☐

M	1" BSP
P	1" NPT
T	1½" TriClamp (ISO 2852)
R	2" TriClamp (ISO 2852)
D	DN40 Pipe coupling (DIN 11851)
E	DN50 Pipe coupling (DIN 11851)

Stainless steel flanges; not welded unless specifically ordered so
Flanges conform to: EN 1092-1 / ANSI B 16.5

G	DN50 PN40/25
B	ANSI 2" RF 600/400 psi
K	JIS 40K 50A

ECTFE-coated stainless steel flange

Flanges conform to: EN 1092-1 / ANSI B 16.5

G	DN50 PN40/25
B	ANSI 2" RF 600/400 psi
K	JIS 40K 50A

PP flanges (max. 6 bar; from -20 °C to +90 °C)

F	DN50 PN16
A	ANSI 2" FF 150 psi
J	JIS 10K 50A

Housing

R ☐ ☐ - ☐ ☐ ☐ - ☐

4	Aluminium (powder-coated)
5	Plastic, PBT, fiberglass-reinforced

Probe length

R ☐ ☐ - ☐ ☐ ☐ - ☐

For standard polished forks (RF)

0 2	0.2 m
n n	0.3...3 m; sold by the 0.1 m

For high-polished forks (RJ)

0 2	0.2 m
n n	0.3...3 m; sold by the 0.1 m

For ECTFE-coated stainless steel forks (RD, RV)

0 2	0.2 m
n n	0.3...3 m; sold by the 0.1 m

nn = 03...30 : 0,3...3 m

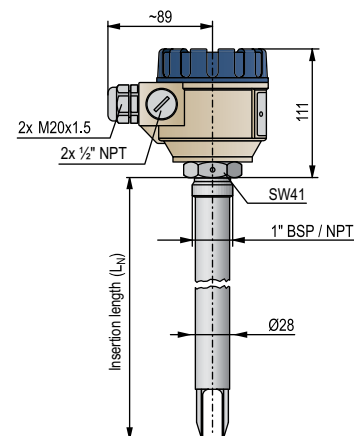
Output

R ☐ ☐ - ☐ ☐ ☐ - ☐

0	1 SPDT relay: 250 V AC, 8 A
A	2 SPDT relay: 1x 250 V AC, 8 A and 1x 250 V AC, 6 A
G *	1 SPDT relay: 250 V AC, 8 A / GL
H *	2 SPDT relay: 1x 250 V AC, 8 A and 1x 250 V AC, 6 A / GL

* RF version only, 1" BSP / 1" NPT and stainless steel flanged version only, max. 300 mm, with GL certification.

Non-standard probe lengths are available on request

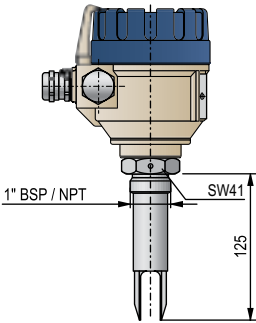


RFM / RFP-402 / 430
RFM / RFP-502 / 530

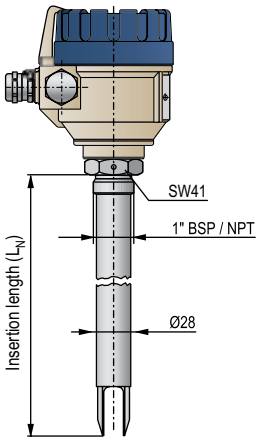
NIVOSWITCH RN/RM-400 standard or extension rod version 3 years

Compact vibrating fork level switch for liquids, standard probe length: 125 mm
or with stainless steel extension rod version up to 3 m

Fork material / Approval	
R ■ ■ ■ - 4 ■ ■ ■ - ■	
N	Tumble-polished stainless steel / Ex d G
M	High-polished stainless steel / Ex d G
Process connection	
R ■ ■ ■ - 4 ■ ■ ■ - ■	
M	1" BSP
P	1" NPT
H	1½" BSP
N	1½" NPT
C	2" BSP
L	2" NPT
Stainless steel flanges; not welded unless specifically requested Flanges conform to: EN 1092-1 / ANSI B 16.5	
G	DN50 PN40/25
B	ANSI 2" RF 600/300 psi
K	JIS 40K 50A
Housing	
R ■ ■ ■ - ■ ■ ■ ■ - ■	
4	Aluminium (powder-coated)
Probe length	
R ■ ■ ■ - 4 ■ ■ ■ - ■	
For standard polished forks (RN)	
0 1	Standard probe: 125 mm
n n	0.2...3 m; sold by the 0.1 m
For high-polished forks (RM)	
0 1	Standard probe: 125 mm
n n	0.2...3 m; sold by the 0.1 m
nn = 02...30 : 0,2...3 m	
Output	
R ■ ■ ■ - 4 ■ ■ ■ - ■	
N	1 SPDT relay: 250 V AC, 8 A
P	2 SPDT relay: 1x 250 V AC, 8 A and 1x 250 V AC, 6 A



RNM / RNP-401



RNM / RNP-402 / 430

NIVOSWITCH RC/RG/RB/RE-400 standard version**3 years**

Mini compact vibrating fork level switch for liquids

Type

R ■ ■ - 4 ■ ■ - ■

0 0	69 mm
0 1	125 mm

Fork material

R ■ ■ - 4 ■ ■ - ■

C	Tumble-polished stainless steel
G	High-polished stainless steel
B	ECTFE-coated fork, PFA-coated extension (only 1" BSP (PVDF) or flange (PP or ECTFE -coated) process connection)
E	Stainless steel without reed sensor (Ex version not available)

Process connection

R ■ ■ - 4 ■ ■ - ■

M	1" BSP
P	1" NPT
T	1½" TriClamp (ISO 2852)
R	2" TriClamp (ISO 2852)
D	DN40 Pipe coupling (DIN 11851)
E	DN50 Pipe coupling (DIN 11851)

Stainless steel flanges; not welded unless specifically requested
Flanges conform to: EN 1092-1 / ANSI B 16.5

G	DN50 PN40/25
B	ANSI 2" RF 600/400 psi
K	JIS 40K 50A

ECTFE-coated stainless steel flange

Flanges conform to: EN 1092-1 / ANSI B 16.5

G	DN50 PN40/25
B	ANSI 2" RF 600/400 psi
K	JIS 40K 50A

PP flanges (max. 6 bar; -20 °C to +90 °C), DIN PN16 / ANSI 150 psi

F	DN50 PN16
A	ANSI 2" FF 150 psi
J	JIS 10K 50A

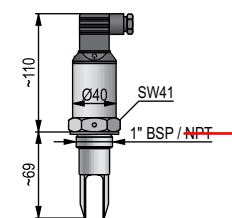
Output / Certificates

R ■ ■ - 4 ■ ■ - ■

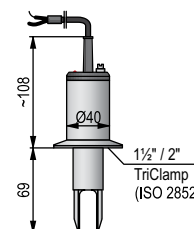
1	2-wire AC, DIN connector
2	2-wire AC, cable
3	3-wire DC, DIN connector
4	3-wire DC, cable
6	2-wire DC, DIN connector
7	2-wire DC, cable
8	2-wire DC, DIN connector / Ex ia G
9	2-wire DC, cable / Ex ia G
K	2-wire DC, M12 connector
L	2-wire DC, M12 connector / Ex ia G
M	3-wire DC, M12 connector

Cable

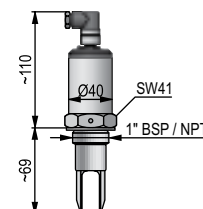
Maximum length 30 m; sold by the meter over the standard 3 m



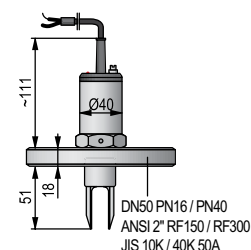
RCM / RCP-400



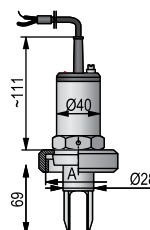
RCT / RCR-400



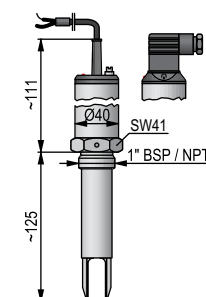
RCM / RCP-400



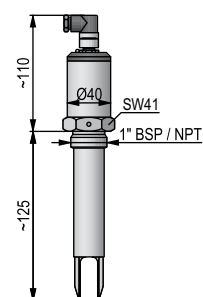
RCG-400



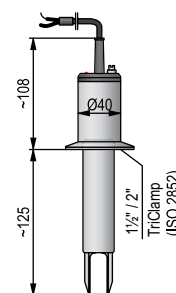
RCD-400



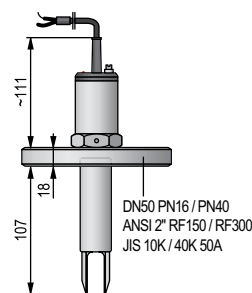
RCM / RCP-401



RCM / RCP-401



RCT / RCR-401



RCG / RCF-401

Type	RCD	RCE
Nominal size	DN40	DN50
A	RD 65 x 1/6	RD 78 x 1/6

NIV24

RCM-400-3

RCM-401-3

NIVOSWITCH RC/RG/RB/RE-400 extension rod version

3 years

Mini compact vibrating fork level switch for liquids
with stainless steel extension rod probe up to 3 m

Fork material

R ☐ ☐ - 4 ☐ ☐ - ☐

C	Tumble-polished stainless steel
G	High-polished stainless steel
B	ECTFE-coated fork, PFA-coated extension (only 1" BSP (PVDF) or flange (PP or ECTFE-coated) process connection)
E	Stainless steel without reed sensor (Ex version not available)

Process connection

R ☐ ☐ - 4 ☐ ☐ - ☐

M	1" BSP
P	1" NPT
T	1½" TriClamp (ISO 2852)
R	2" TriClamp (ISO 2852)
D	DN40 Pipe coupling (DIN 11851)
E	DN50 Pipe coupling (DIN 11851)

Stainless steel flanges; not welded unless specifically requested
Flanges conform to: EN 1092-1 / ANSI B 16.5

G	DN50 PN40/25
B	ANSI 2" RF 600/400 psi
K	JIS 40K 50A

ECTFE-coated stainless steel flange
Flanges conform to: EN 1092-1 / ANSI B 16.5

G	DN50 PN40/25
B	ANSI 2" RF 600/400 psi
K	JIS 40K 50A

PP flanges (max. 6 bar; -20 °C to +90 °C), DIN PN16 / ANSI 150 psi

F	DN50 PN16
A	ANSI 2" FF 150 psi
J	JIS 10K 50A

Probe length

R ☐ ☐ - 4 ☐ ☐ - ☐

For standard polished forks (RC, RE)

0 2	0.2 m
n n	0.3...3 m; sold by the 0.1 m

For high-polished forks (RG)

0 2	0.2 m
n n	0.3...3 m; sold by the 0.1 m

For ECTFE-coated stainless steel forks (RA, RB)

0 2	0.2 m
n n	0.3...3 m; sold by the 0.1 m

nn = 03...30 : 0,3...3 m

Output / Certificates

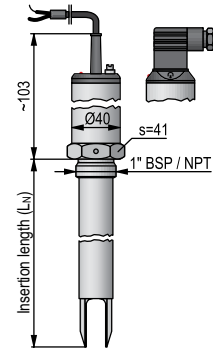
R ☐ ☐ - 4 ☐ ☐ - ☐

1	2-wire AC, DIN connector
2	2-wire AC, cable
3	3-wire DC, DIN connector
4	3-wire DC, cable
6	2-wire DC, DIN connector
7	2-wire DC, cable
8	2-wire DC, DIN connector / Ex ia G
9	2-wire DC, cable / Ex ia G
K	2-wire DC, M12 connector
L	2-wire DC, M12 connector / Ex ia G
M	3-wire DC, M12 connector

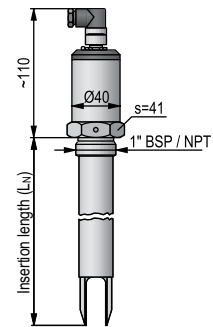
Cable

Maximum length 30 m; sold by the meter over the standard 3 m

R__-4__-9 Ex version comes with 3 m cable only



RCM / RCP-402 / 430



RCM / RCP-402 / 430