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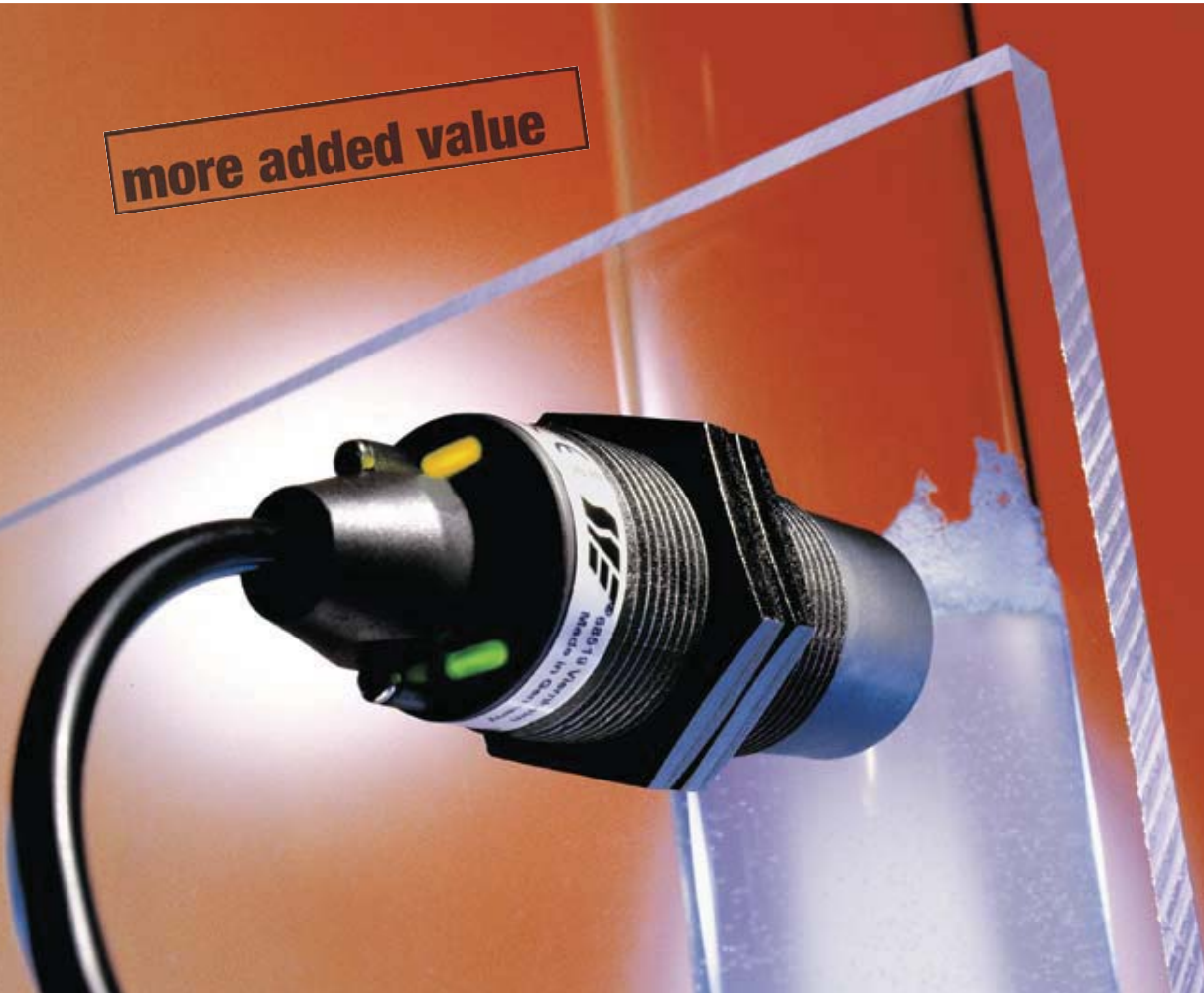
SIESENSORIK

Capacitive Sensors

... new possibilities in object detection and level sensing



more added value



Overview



Capacitive Mini-sensors, SK

- Housings in V2A/PTFE from Ø 4 mm
- Flat disk form from Ø 18 mm by only 2.5 mm high
- Sensing distance adjustable on the amplifier
- Variety of processing electronics available



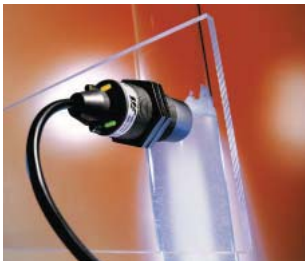
Capacitive sensors for object detection, SK1-B

- Housings made of metal or plastic
- Compact sizes with potentiometer starting at Ø 6.5 mm
- Disc sizes up to Ø 50 mm
- Sensing distance up to 25 mm
- Flush mounting
- Connecting lead or plug connector



Capacitive sensors for level sensing, SK1-NB

- Housings M12 and larger in metal, plastic and PTFE
- Cable, connector and terminal versions available
- Operating temperature up to 125 °C at 10 bar pressure rating
- Dependable switching for granules, powders and liquids



Sensors for level sensing

Capacitive smartLEVEL sensors, FSA

- For aqueous media
- No adjustment in standard application
- Self-compensating
- Through glass or plastic
- Flush and non-flush versions



Sensors for level sensing

Capacitive microBOX sensors

- As sensors for object detection of in smartLEVEL technology
- Compact housing design
- Variety of mounting options
- Mounting bracket included
- Polypropylene housing
- 3-D cable exit

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Sensors for level sensing

Series SK1 0700/0750

- Model with output stage from Ø-M12
- Sensing distance adjustable
- Non-flush mountable
- Connecting lead, plug connector, terminal connection
- Housing plastic, metal, PTFE



DIN EN ISO 9001:2000
QA 05 100 1050

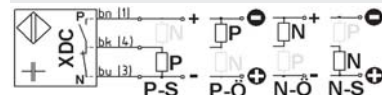
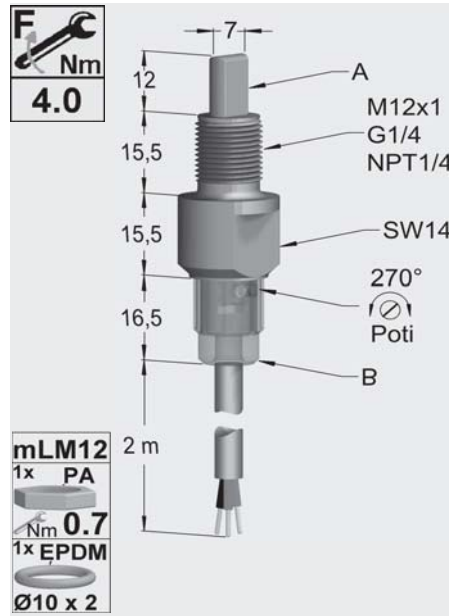
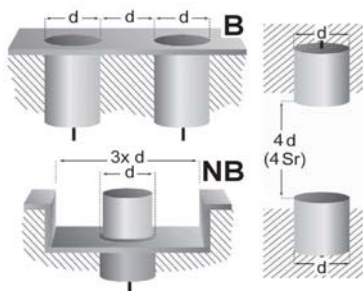


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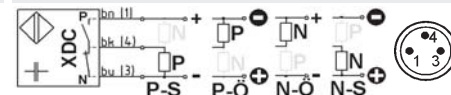
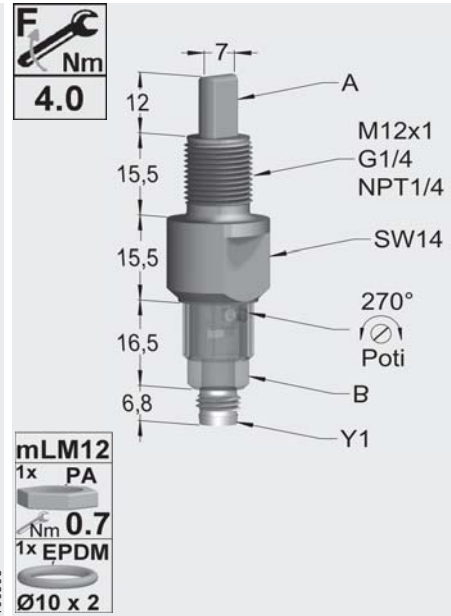
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Type code (abstract)

- SK sensor capacitive, w/o amplifier
- SKF sensor cap., w/o amplifier, flexible
- SK1 sensor capacitive, self-contained
- SV(D) sensor amplifier (dynamic)
- SNG sensor power pack
- HT### high temperature use
- TM pulse modulation technique (High noise immune)
- ## / FS(A) max sensing distance / Fill-level switch (adaptive)
- M30 model and/or dimension
- P output stage PNP, NPN, X (switchable)
- B mounting B=flush NB=non-flush
- S S=N.O. Ö=N.C. X=function switchable
- (C)PTFE Housing material, e.g. PTFE CPTFE=complete PTFE
- 1M2-Y2 cable & connector: Y# = connector 1M2 = 1.2m cable length



Typ / Type
 SK1-FS-MLM12-XDC-PSU
 SK1-FS-MLG1/4-XDC-PSU
 SK1-FS-MLNPT1/4-XDC-PSU



Typ / Type
 SK1-FS-MLM12-XDC-PSU-Y1
 SK1-FS-MLG1/4-XDC-PSU-Y1
 SK1-FS-MLNPT1/4-XDC-PSU-Y1

Mounting [flush / nonflush]	[B / NB]	NB	NB
Operating distance	Sn [mm]	FS	FS
Hysteresis	H [%SR]		
Frequency of operating cycles	f [Hz]	5	5
Repeat accuracy	R [%SR]		
Operating temperature range	Ta [C°]	-10... 70	-10... 70
Temperature drift [range]	[%SR]		
Protection class		A : IP 68 / 10bar; B : IP 69K	A : IP 68 / 10bar; B : IP 69K
Rated insulation voltage	Ui [V]	75 d. c.	75 d. c.
Material of housing		PSU	PSU
Utilisation category		DC13	DC13
Connection		2m / 3x 0,34mm ² PUR	Z10; Z11
Supply voltage range UB	Ub [V]	10... 35	10... 35
No-load supply current	Iomax. [mA]	20	20
Minimum operational current	Imin [mA]	-	-
Operational current	Ie [mA]	50 / 50 XDC	50 / 50 XDC
Off-state current	Ir [mA]	-	-
Voltage drop	Ud @ Ie [V]	3	3
Time delay before availability	tv [ms]	< 300	< 300
Indicator [UB / Output]		• / •	• / •
Short circuit- overload-protection		• / •	• / •
Reverse polarity protection		!	!
Conformity	EMC EEC-direct.	IEC 60947-5-2 : 2004	IEC 60947-5-2 : 2004
EMC		IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.5-0.8 Mhz.	IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.5-0.8 Mhz.
Associated equipment			
Additional functionality			
Application			

microLEVEL

F
Nm
4.0

7
12
15,5
15,5
16,5
6,8

A
SW14
M12x1
G1/4
NPT1/4
270°
Poti
B
Y1

mLM12
1x PA
Nm **0.7**
1x EPDM
Ø10 x 2

XDC P N P-S P-O N-O N-S

100308

Typ / Type
 SK1-FS-MLRM12-XDC-PSU-Y1
 SK1-FS-MLRG1/4-XDC-PSU-Y1
 SK1-FS-MLRNPT1/4-XDC-PSU-Y1

NB
FS
5
-10... 70
A : IP 68 / 10bar; B : IP 64
75 d. c.
PSU
DC13
Z10; Z11
10... 35
20
-
50 / 50 XDC
-
3
< 300
•/•
•/•
!
IEC 60947-5-2 : 2004

IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.5-0.8 Mhz.

application notes

Standard Level Sensors
 can detect solids like sand, granules and pellets as well as all nonconductive liquids.

Mounting
Standard through hole mounting can be done using the enclosed nut. It is not required but recommended while mounted in a female thread. Sealing can be done using an O-ring or flat type gasket. We recommend to close the pot access hole by the use of the circular clip.

100308

A liquid limit switch of any length can be realized by the use of a **reverse mount sensor**. Sealing can be done using an O-ring or flat type gasket.

microLEVEL with protective mounting well available in thread size M18 or G 1/2" (see catalog section 13). Probe end fully surrounded by protective cover.

1..8

M12

M12x1
10
4
50
2 m

A
B
Sw17
C
Poti
LED

2x PA

Nm **0.7**

P N PA

100308

Typ / Type
 SK1-8-M12-PNBS-PVC
 SK1-8-M12-PNBO-PVC
 SK1-8-M12-NNBS-PVC
 SK1-8-M12-NNBO-PVC

NB
1... 8
15
100
2
-30... 60
15 [-5... 55]
IP 65
75 d. c.
A. PVC; B: PVC; C: PVC
DC13
2m / 3x 0,14mm ² PUR
12... 35
10
-
200
-
0,8
- / •
• / •
•
IEC 60947-5-2 : 2000

IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.45-2,9 Mhz. SNG-###AC...

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1..6



M12

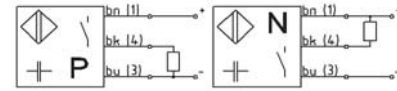
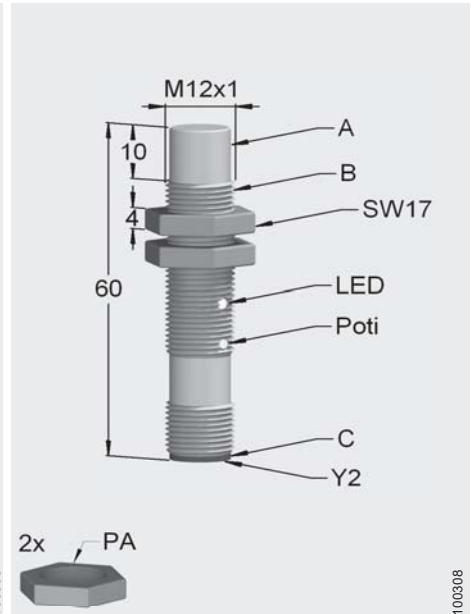
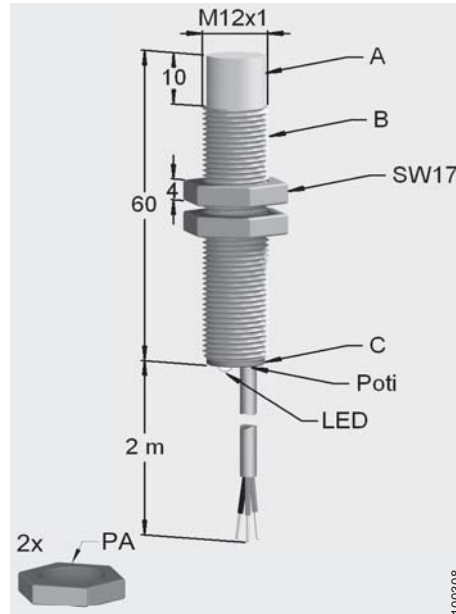
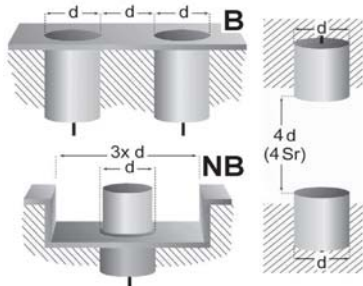
1..8



M12

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- ## / FS(A) max sensing distance / Fill-level switch (adaptive)
- M30 model and/or dimension
- P output stage PNP, NPN, X (switchable)
- B mounting B=flush NB=non-flush
- S S=N.O. Ö=N.C. X=function switchable
- (C)PTFE Housing material, e.g. PTFE CPTFE=complete PTFE
- 1M2-Y2 cable & connector: Y# = connector 1M2 = 1.2m cable length



Typ / Type
 SK1-TM-6-M12/60-PNBS-PVC
 SK1-TM-6-M12/60-PNBO-PVC
 SK1-TM-6-M12/60-NNBS-PVC
 SK1-TM-6-M12/60-NNBO-PVC

Typ / Type
 SK1-8-M12-PNBS-PVC-Y2
 SK1-8-M12-PNBO-PVC-Y2
 SK1-8-M12-NNBS-PVC-Y2
 SK1-8-M12-NNBO-PVC-Y2

Mounting [flush / nonflush]	[B / NB]	NB	NB
Operating distance	Sn [mm]	1.. 6	1.. 8
Hysteresis	H [%SR]	15	15
Frequency of operating cycles	f [Hz]	25	100
Repeat accuracy	R [%SR]	2	2
Operating temperature range	Ta [C°]	-30... 60	-30... 60
Temperature drift [range]	[%SR]	15 [-5... 55]	15 [-5... 55]
Protection class		IP 65	IP 65
Rated insulation voltage	Ui [V]	75 d. c.	75 d. c.
Material of housing		A: PVC; B: PVC; C: PVC	A: PVC; B: PVC; C: PA
Utilisation category		DC13	DC13
Connection		2m / 3x 0,14mm ² PUR	Z20; Z21
Supply voltage range UB	Ub [V]	13... 35	12... 35
No-load supply current	Iomax. [mA]	15	10
Minimum operational current	I _m [mA]		
Operational current	I _e [mA]	200	200
Off-state current	I _r [mA]		
Voltage drop	U _d @ I _e [V]	0,8	0,8
Time delay before availability	t _v [ms]		
Indicator [UB / Output]		- / •	- / •
Short circuit- overload-protection		• / •	• / •
Reverse polarity protection		•	•
Conformity	EMC EEC-direct.	IEC 60947-5-2 : 2004	IEC 60947-5-2 : 2004

EMC

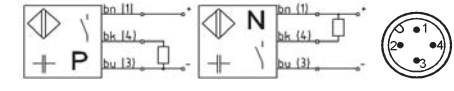
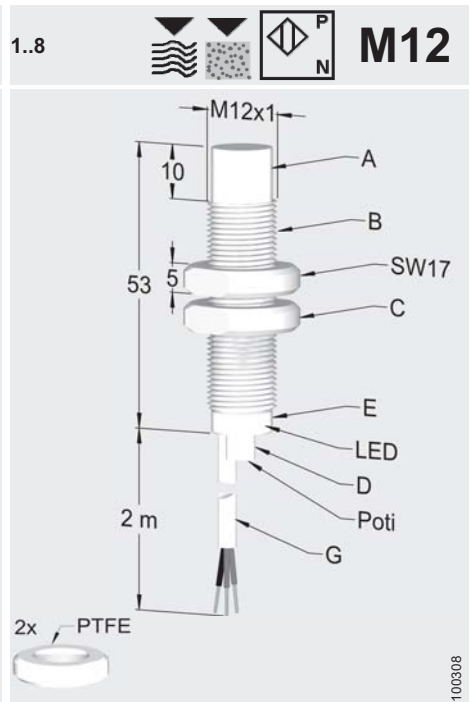
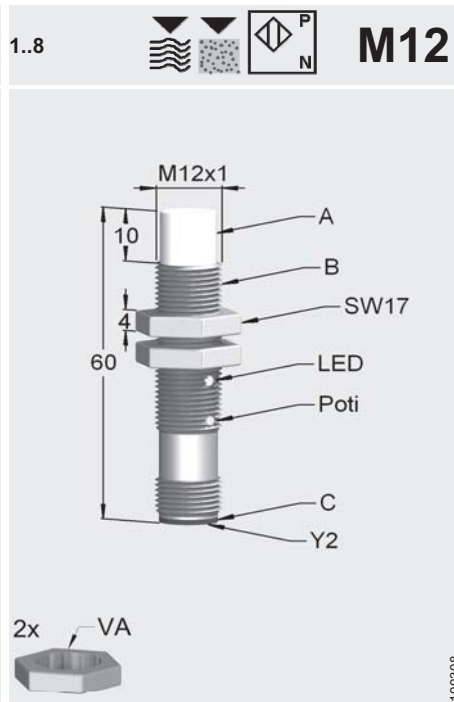
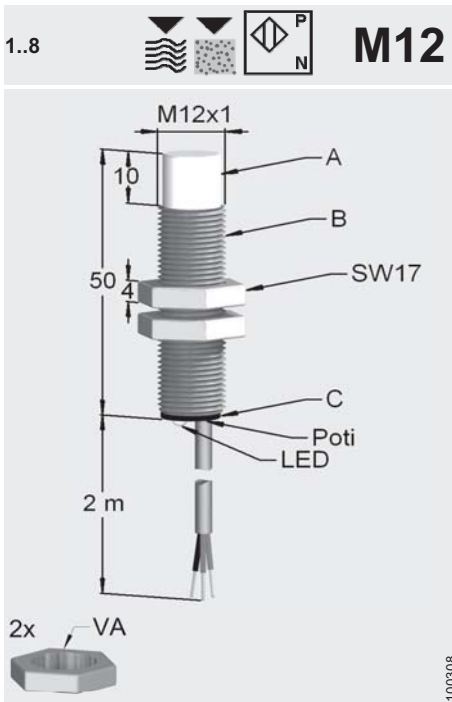
IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.25-1,8 Mhz. SNG-###AC...

Associated equipment
Additional functionality

SNG-###AC...

Application





Typ / Type
 SK1-8-M12-PNBS-VA/PTFE
 SK1-8-M12-PNBO-VA/PTFE
 SK1-8-M12-NNBS-VA/PTFE
 SK1-8-M12-NNBO-VA/PTFE

Typ / Type
 SK1-8-M12-PNBS-VA/PTFE-Y2
 SK1-8-M12-PNBO-VA/PTFE-Y2
 SK1-8-M12-NNBS-VA/PTFE-Y2
 SK1-8-M12-NNBO-VA/PTFE-Y2

Typ / Type
 SK1-8-M12-PNBS-CPTFE
 SK1-8-M12-PNBO-CPTFE
 SK1-8-M12-NNBS-CPTFE
 SK1-8-M12-NNBO-CPTFE

NB
1... 8
15
100
2
-30... 70
15 [-5... 55]
IP 65
75 d. c.
A: PTFE; B: VA; C: POM
DC13
2m / 3x 0,14mm ² PUR
12... 35
10
200
0,8
- / •
• / •
•

NB
1... 8
15
100
2
-30... 70
15 [-5... 55]
IP 65
75 d. c.
A: PTFE; B: VA; C: PA
DC13
Z20; Z21
12... 35
10
200
0,8
- / •
• / •
•

NB
1... 8
15
100
2
-30... 70
15 [-5... 55]
IP 65
75 d. c.
A - G: PTFE
DC13
2m / 3x 0,2mm ² PTFE
12... 35
10
200
0,8
- / •
• / •
•

IEC 60947-5-2 : 2004

IEC 60947-5-2 : 2004

IEC 60947-5-2 : 2004

IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.6-2 Mhz. SNG-###AC...

IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.5-1.7 Mhz. SNG-###AC...

IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.2-1.9 Mhz. SNG-###AC...



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1..6



M12

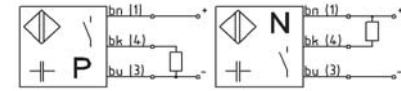
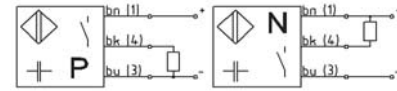
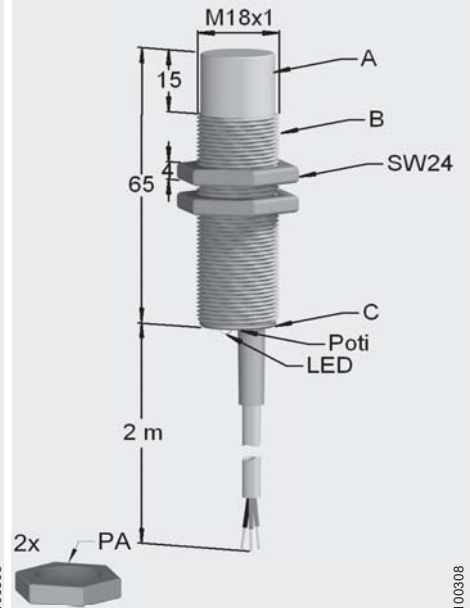
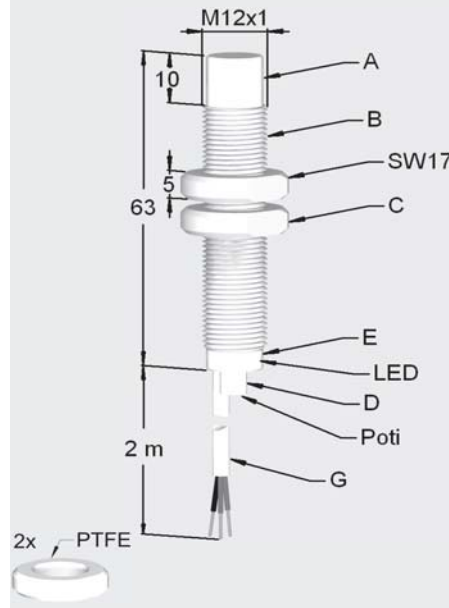
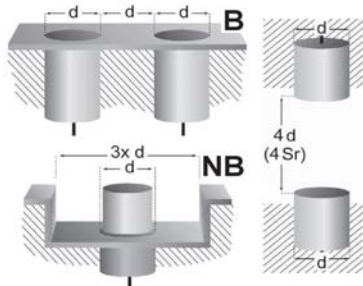
2..15



M18

Type code (abstract)

- SK sensor capacitive, w/o amplifier
- SKF sensor cap., w/o amplifier, flexible
- SK1 sensor capacitive, self-contained
- SV(D) sensor amplifier (dynamic)
- SNG sensor power pack
- HT### high temperature use
- TM pulse modulation technique (High noise immune)
- ## / FS(A) max sensing distance / Fill-level switch (adaptive)
- M30 model and/or dimension
- P output stage PNP, NPN, X (switchable)
- B mounting B=flush NB=non-flush
- S S=N.O. Ö=N.C. X=function switchable
- (C)PTFE Housing material, e.g. PTFE CPTFE=complete PTFE
- 1M2-Y2 cable & connector: Y# = connector 1M2 = 1.2m cable length



Typ / Type
 SK1-TM-6-M12/63-PNBS-CPTFE
 SK1-TM-6-M12/63-PNBO-CPTFE
 SK1-TM-6-M12/63-NNBS-CPTFE
 SK1-TM-6-M12/63-NNBO-CPTFE

Typ / Type
 SK1-15-M18-PNBS-PVC
 SK1-15-M18-PNBO-PVC
 SK1-15-M18-NNBS-PVC
 SK1-15-M18-NNBO-PVC

Mounting [flush / nonflush]	[B / NB]		NB		NB
Operating distance	Sn [mm]		1... 6		2... 15
Hysteresis	H [%SR]		15		15
Frequency of operating cycles	f [Hz]		25		100
Repeat accuracy	R [%SR]		2		2
Operating temperature range	Ta [C°]		-30... 60		-30... 60
Temperature drift [range]	[%SR]		15 [-5... 55]		15 [-5... 55]
Protection class			IP 65		IP 67
Rated insulation voltage	Ui [V]		75 d. c.		75 d. c.
Material of housing			A -G: PTFE		A: PVC; B: PVC; C: PBT
Utilisation category			DC13		DC13
Connection			2m / 3x 0,2mm ² PTFE		2m / 3x 0,25mm ² PVC
Supply voltage range UB	Ub [V]		12... 35		10... 35
No-load supply current	Iomax. [mA]		10		10
Minimum operational current	I _m [mA]				
Operational current	I _e [mA]		200		300
Off-state current	I _r [mA]				
Voltage drop	U _d @ I _e [V]		0,8		1,5
Time delay before availability	t _v [ms]				
Indicator [UB / Output]			- / •	LED int.	- / •
Short circuit- overload-protection			• / •		• / •
Reverse polarity protection			•		•
Conformity	EMC EEC-direct.		IEC 60947-5-2 : 2004	CE	IEC 60947-5-2 : 2004

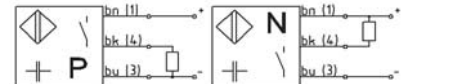
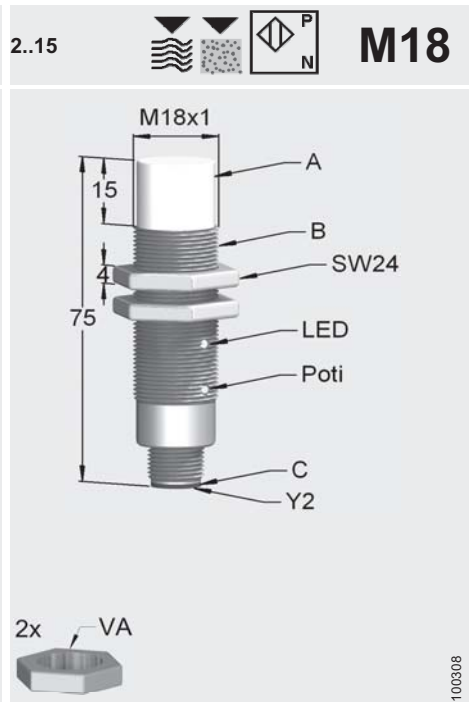
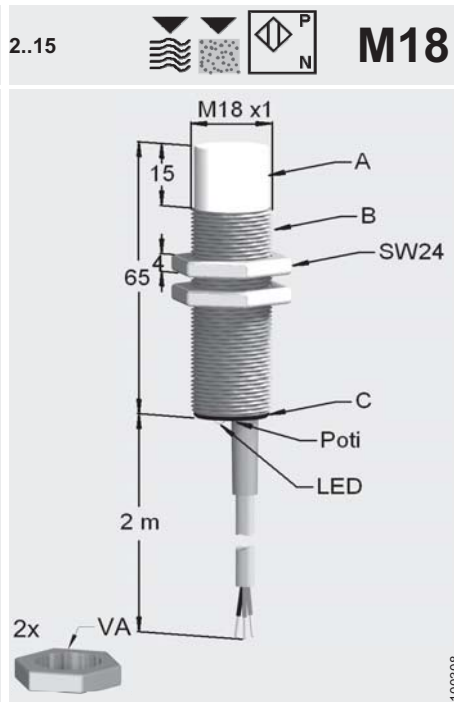
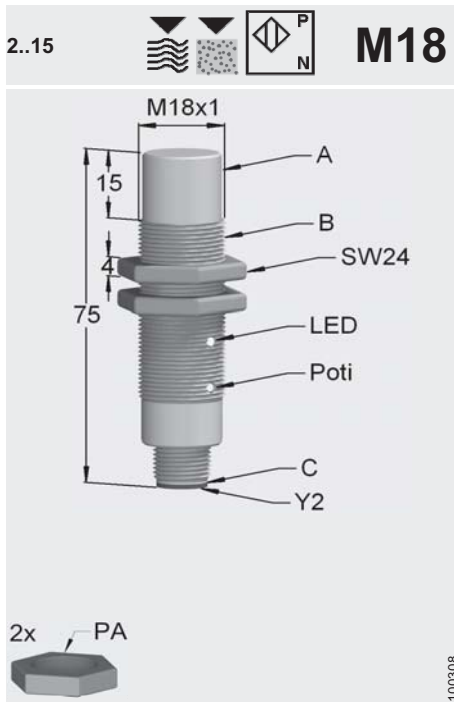
EMC

IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.6-5 Mhz.

Associated equipment SNG-###AC...
 Additional functionality

Application





Typ / Type
 SK1-15-M18-PNBS-PVC-Y2
 SK1-15-M18-PNBO-PVC-Y2
 SK1-15-M18-NNBS-PVC-Y2
 SK1-15-M18-NNBO-PVC-Y2

Typ / Type
 SK1-15-M18-PNBS-VA/PTFE
 SK1-15-M18-PNBO-VA/PTFE
 SK1-15-M18-NNBS-VA/PTFE
 SK1-15-M18-NNBO-VA/PTFE

Typ / Type
 SK1-15-M18-PNBS-VA/PTFE-Y2
 SK1-15-M18-PNBO-VA/PTFE-Y2
 SK1-15-M18-NNBS-VA/PTFE-Y2
 SK1-15-M18-NNBO-VA/PTFE-Y2

NB
2... 15
15
100
2
-30... 60
15 [-5... 55]
IP 67
75 d. c.
A: PVC B: PVC; C: PA
DC13
Z20; Z21
10... 35
10
300
1,5
- / •
• / •
•

NB
2... 15
15
100
2
-30... 70
15 [-5... 55]
IP 67
75 d. c.
A: PTFE; B: VA; C: POM
DC13
2m / 3x 0,25mm ² PVC
10... 35
10
300
1,5
- / •
• / •
•

NB
2... 15
15
100
2
-30... 70
15 [-5... 55]
IP 67
75 d. c.
A: PTFE; B: VA; C: PA
DC13
Z20; Z21
10... 35
10
300
1,5
- / •
• / •
•

IEC 60947-5-2 : 2004

IEC 60947-5-2 : 2004

IEC 60947-5-2 : 2004

IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.6-5 Mhz. SNG-###AC...

IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.5-0.8 Mhz. SNG-###AC...

IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.5-0.8 Mhz. SNG-###AC...

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2...15



M18

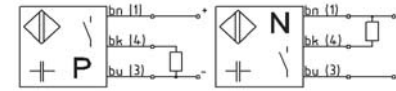
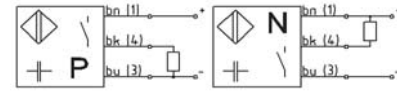
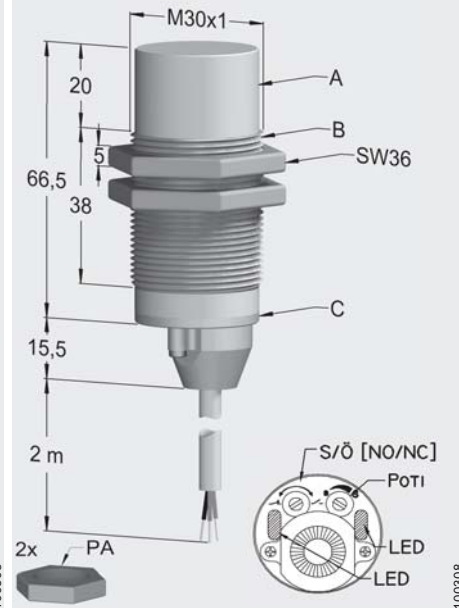
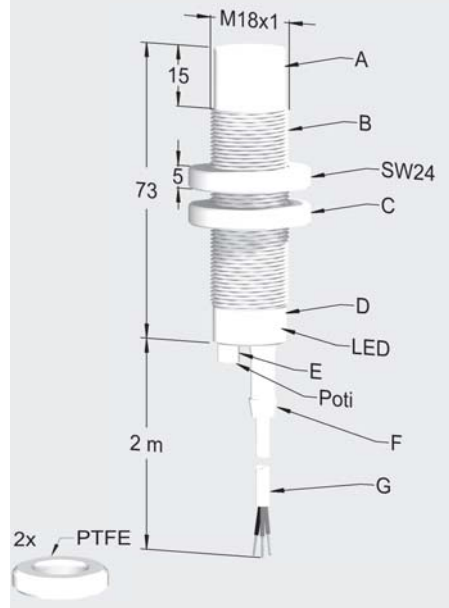
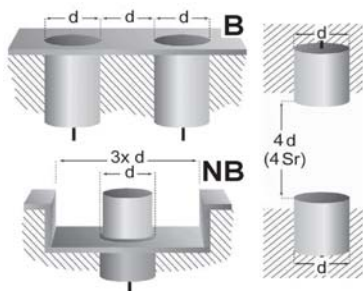
1...30



M30

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- ## / FS(A) max sensing distance / Fill-level switch (adaptive)
- M30 model and/or dimension
- P output stage PNP, NPN, X (switchable)
- B mounting B=flush NB=non-flush
- S S=N.O. Ö=N.C. X=function switchable
- (C)PTFE Housing material, e.g. PTFE CPTFE=complete PTFE
- 1M2-Y2 cable & connector: Y# = connector 1M2 = 1.2m cable length



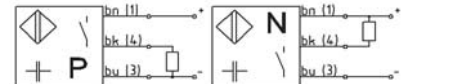
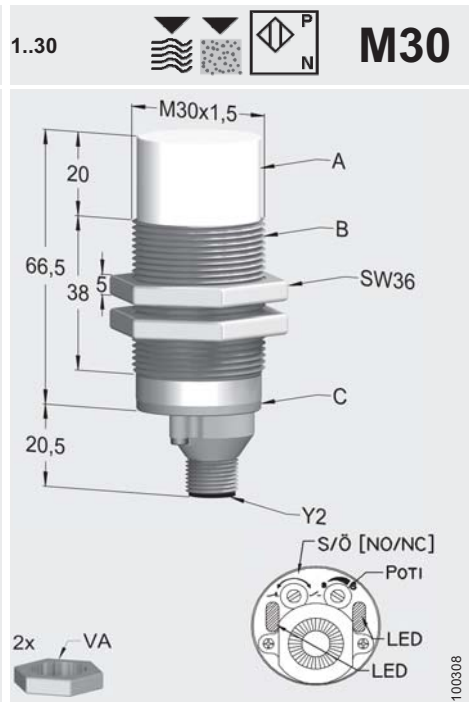
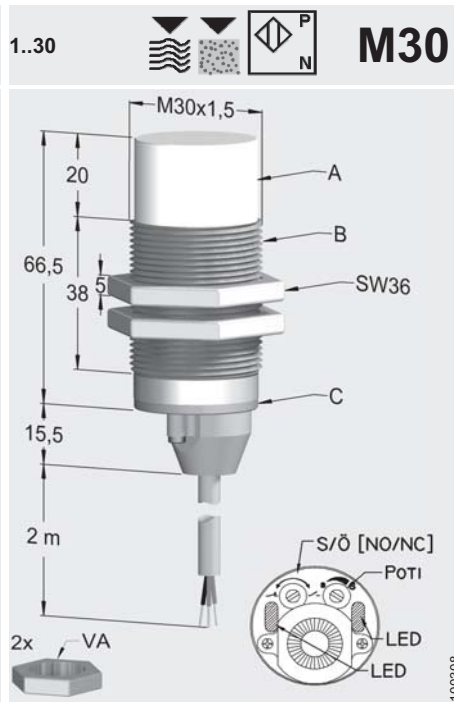
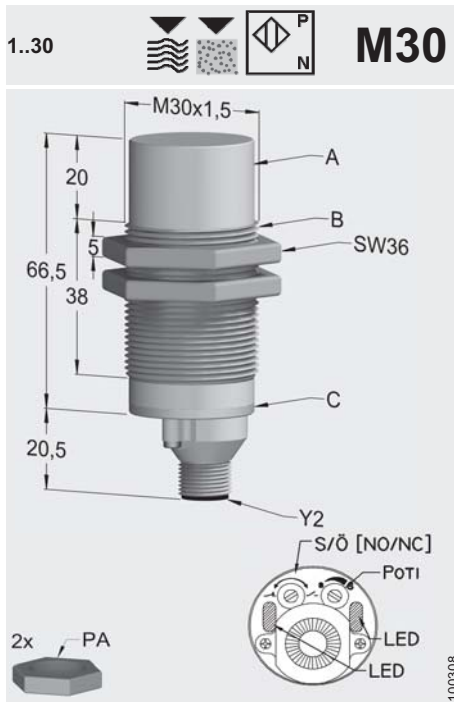
Typ / Type
 SK1-15-M18-PNBX-CPTFE
 SK1-15-M18-PNBO-CPTFE
 SK1-15-M18-NNBS-CPTFE
 SK1-15-M18-NNBO-CPTFE

Typ / Type
 SK1-30-M30-PNBX-PBT
 SK1-30-M30-NNBX-PBT

Mounting [flush / nonflush]	[B / NB]		NB
Operating distance	Sn [mm]	2... 15	1... 30
Hysteresis	H [%SR]	15	15
Frequency of operating cycles	f [Hz]	100	100
Repeat accuracy	R [%SR]	2	5
Operating temperature range	Ta [C°]	-30... 70	-30... 70
Temperature drift [range]	[%SR]	15 [-5... 55]	15 [-5... 55]
Protection class		IP 67	A, B: IP 66 / IP 68; C: IP 64
Rated insulation voltage	Ui [V]	75 d. c.	75 d. c.
Material of housing		A-G : PTFE	A: PBT; B: PBT; C: PBT/PE
Utilisation category		DC13	DC13
Connection		2m / 3x 0,2mm ² PTFE	2m / 3x 0,34mm ² PUR
Supply voltage range UB	Ub [V]	10... 35	10... 35
No-load supply current	Iomax. [mA]	10	15
Minimum operational current	I _m [mA]		
Operational current	I _e [mA]	300	300
Off-state current	I _r [mA]		
Voltage drop	U _d @ I _e [V]	1,5	1,8
Time delay before availability	t _v [ms]		
Indicator [UB / Output]		- / • LED int.	• / •
Short circuit- overload-protection		• / •	• / •
Reverse polarity protection		•	•
Conformity	EMC EEC-direct.	IEC 60947-5-2 : 2004	IEC 60947-5-2 : 2004
EMC		IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.45-3.5 Mhz. SNG-###AC...	IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.15-4.1 Mhz. SNG-###AC...
Associated equipment			
Additional functionality			S / Ö NO / NC

Application





Typ / Type
 SK1-30-M30-PNBX-PBT-Y2
 SK1-30-M30-NNBX-PBT-Y2

Typ / Type
 SK1-30-M30-PNBX-VA/PTFE
 SK1-30-M30-NNBX-VA/PTFE

Typ / Type
 SK1-30-M30-PNBX-VA/PTFE-Y2
 SK1-30-M30-NNBX-VA/PTFE-Y2

NB
1... 30
15
100
5
-30... 70
15 [-5... 55]
A, B: IP 66 / IP 68; C: IP 64
75 d. c.
A: PBT; B: PBT; C: PBT/PE
DC13
Z20; Z21
10... 35
15
300
1,8
•/•
•/•
•

NB
2... 30
15
100
5
-30... 70
15 [-5... 55]
A, B: IP 66 / IP 67; C: IP 64
75 d. c.
A: PTFE; B: VA; C: PBT/PE
DC13
2m / 3x 0,34mm ² PUR
10... 35
15
300
1,8
•/•
•/•
•

NB
1... 30
15
100
5
-30... 70
15 [-5... 55]
A, B: IP 66 / IP 67; C: IP 64
75 d. c.
A: PTFE; B: VA; C: PBT/PE
DC13
Z20; Z21
10... 35
15
300
1,8
•/•
•/•
•

IEC 60947-5-2 : 2004

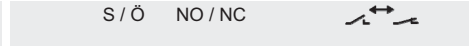
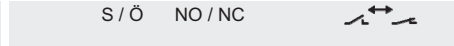
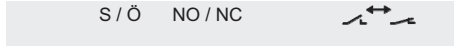
IEC 60947-5-2 : 2004

IEC 60947-5-2 : 2004

IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.15-4.1 Mhz. SNG-###AC...

IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.15-4.1 Mhz. SNG-###AC...

IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.15-4.1 Mhz. SNG-###AC...



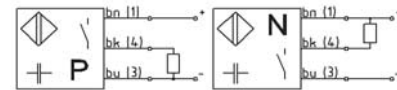
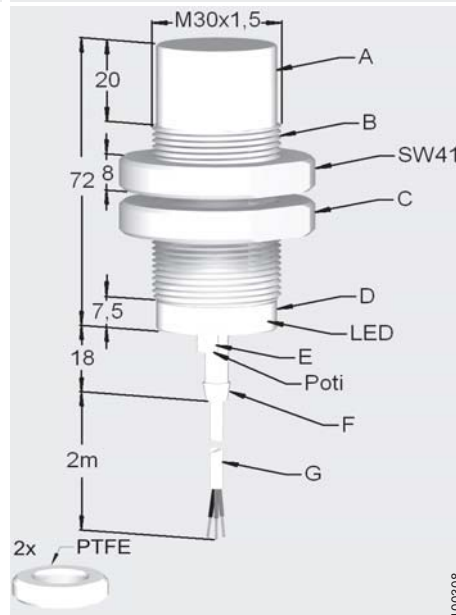
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2...30



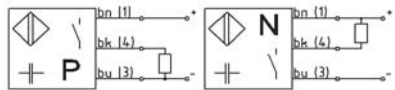
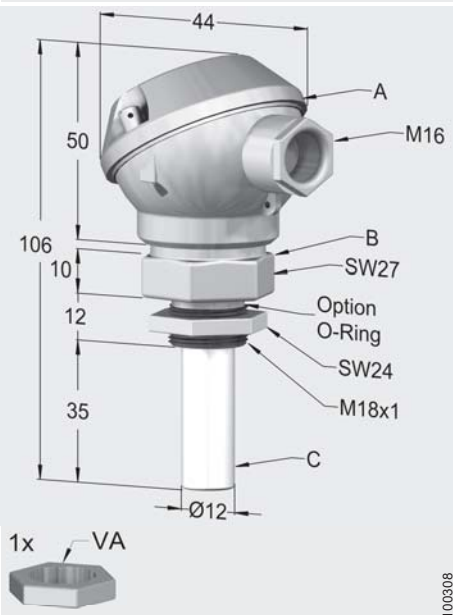
M30



Typ / Type
 SK1-30-M30-PNBS-CPTFE
 SK1-30-M30-PNBO-CPTFE
 SK1-30-M30-NNBS-CPTFE
 SK1-30-M30-NNBO-CPTFE



DC M18



Typ / Type
 SK1-HT125-FS-JM18-PS-VA/PTFE
 SK1-HT125-FS-JM18-PO-VA/PTFE
 SK1-HT125-FS-JM18-NS-VA/PTFE
 SK1-HT125-FS-JM18-NO-VA/PTFE

Type code (abstract)

SK sensor capacitive, w/o amplifier
 SKF sensor cap., w/o amplifier, flexible
 SK1 sensor capacitive, self-contained
 SV(D) sensor amplifier (dynamic)
 SNG sensor power pack

HT### high temperature use
 TM pulse modulation technique (High noise immune)

/ FS(A) max sensing distance / Fill-level switch (adaptive)

M30 model and/or dimension

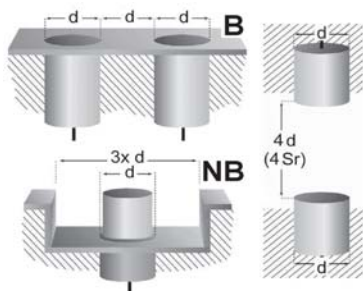
P output stage PNP, NPN, X (switchable)

B mounting B=flush NB=non-flush

S S=N.O. Ö=N.C. X=function switchable

(C)PTFE Housing material, e.g. PTFE CPTFE=complete PTFE

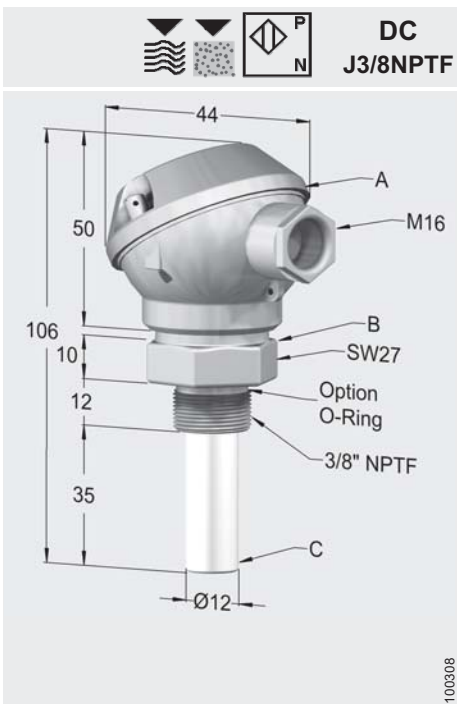
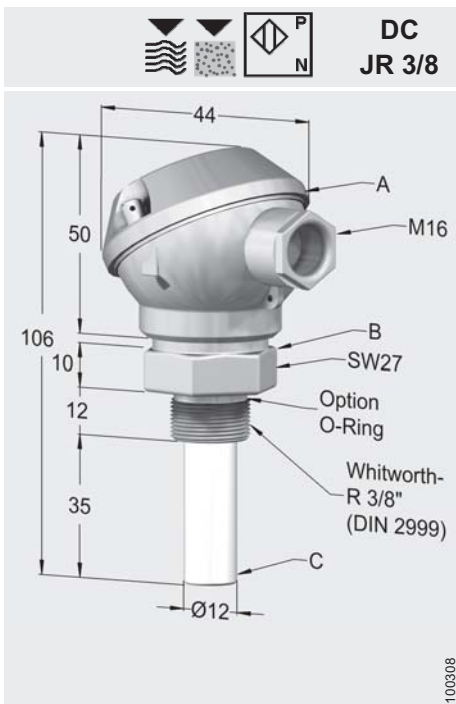
1M2-Y2 cable & connector: Y# = connector 1M2 = 1.2m cable length



Mounting [flush / nonflush]	[B / NB]	NB	
Operating distance	Sn [mm]	2... 30	
Hysteresis	H [%SR]	10	
Frequency of operating cycles	f [Hz]	100	
Repeat accuracy	R [%SR]	2	
Operating temperature range	Ta [C°]	-30... 70	-30... 125 [-30... 100]LED
Temperature drift [range]	[%SR]	15 [-5... 55]	
Protection class		IP 67	IP 67 / IP 68 - 10 bar
Rated insulation voltage	Ui [V]	75 d. c.	75 d. c.
Material of housing		A-G : PTFE	A: Al-Druckguss; B: V2A; C: PTFE
Utilisation category		DC13	DC13
Connection		2m / 3x 0,2mm ² PTFE	Klemmen
Supply voltage range UB	Ub [V]	10... 35	10... 35
No-load supply current	Iomax. [mA]	10	10
Minimum operational current	Imin [mA]		
Operational current	Ie [mA]	300	100
Off-state current	Ir [mA]		200
Voltage drop	Ud @ Ie [V]	1,5	2,7
Time delay before availability	tv [ms]		
Indicator [UB / Output]		- / • LED int.	- / • LED int.
Short circuit- overload-protection		• / •	• / •
Reverse polarity protection		•	•
Conformity	EMC EEC-direct.	IEC 60947-5-2 : 2004	IEC 60947-5-2 : 2004
EMC		IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.15-4.1 Mhz. SNG-###AC...	IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 2.3-19.2 Mhz. MA-M18-###/10-V2A
Associated equipment			
Additional functionality			

Application

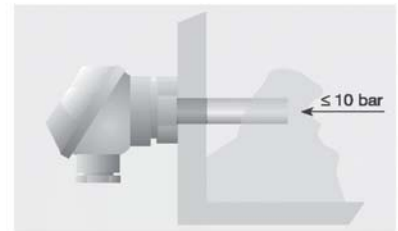




application notes

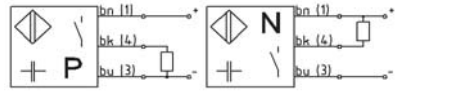
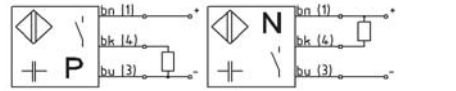
Sensor applicability
This capacitive level sensor can detect liquids and other pourable products, even when installed in high-temperature surroundings. A sensor of such caliber can be used where there is a difficulty in managing or controlling product flows or levels.

Application examples
Level sensing of nearly all products: viscous medium, grainy materials, powder and liquids.



Adjustment
The device is adjusted using the potentiometer. Note that a mean value between the switch-on and switch-off points of the tripped sensor must be set. In individual cases, when high temperature dynamic response and very adhesive media are involved, a slight re-adjustment may be necessary. The adjustment instructions for non-flush sensors on page 1.09 also apply.

Signal evaluation
The SNG series (page 12.01-12.03) is available for signal evaluation. Depending on the application involved, you can choose between a power supply, a power supply with timer function, or a MinMax control unit. This level sensor can also be run from a PLC.

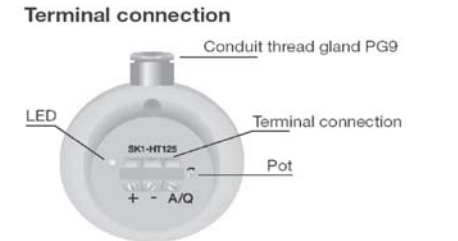


Typ / Type
SK1-HT125-FS-JR3/8-PS-VA/PTFE
SK1-HT125-FS-JR3/8-PO-VA/PTFE
SK1-HT125-FS-JR3/8-NS-VA/PTFE
SK1-HT125-FS-JR3/8-NO-VA/PTFE

Typ / Type
SK1-HT125-FS-J3/8NPTF-PS-VA/PTFE
SK1-HT125-FS-J3/8NPTF-PO-VA/PTFE
SK1-HT125-FS-J3/8NPTF-NS-VA/PTFE
SK1-HT125-FS-J3/8NPTF-NO-VA/PTFE

5
-30... 125
[-30... 100]LEC
IP 67 / IP 68 - 10 bar
75 d. c.
A: Al-Druckguss; B: V2A; C: PTFE
DC13
Klemmen
10... 35
10
100
200
2,7
- / •
• / •
•
LED int.

5
-30... 125
[-30... 100]LEC
IP 67 / IP 68 - 10 bar
75 d. c.
A: Al-Druckguss; B: V2A; C: PTFE
DC13
Klemmen
10... 35
10
100
200
2,7
- / •
• / •
•
LED int.



IEC 60947-5-2 : 2004

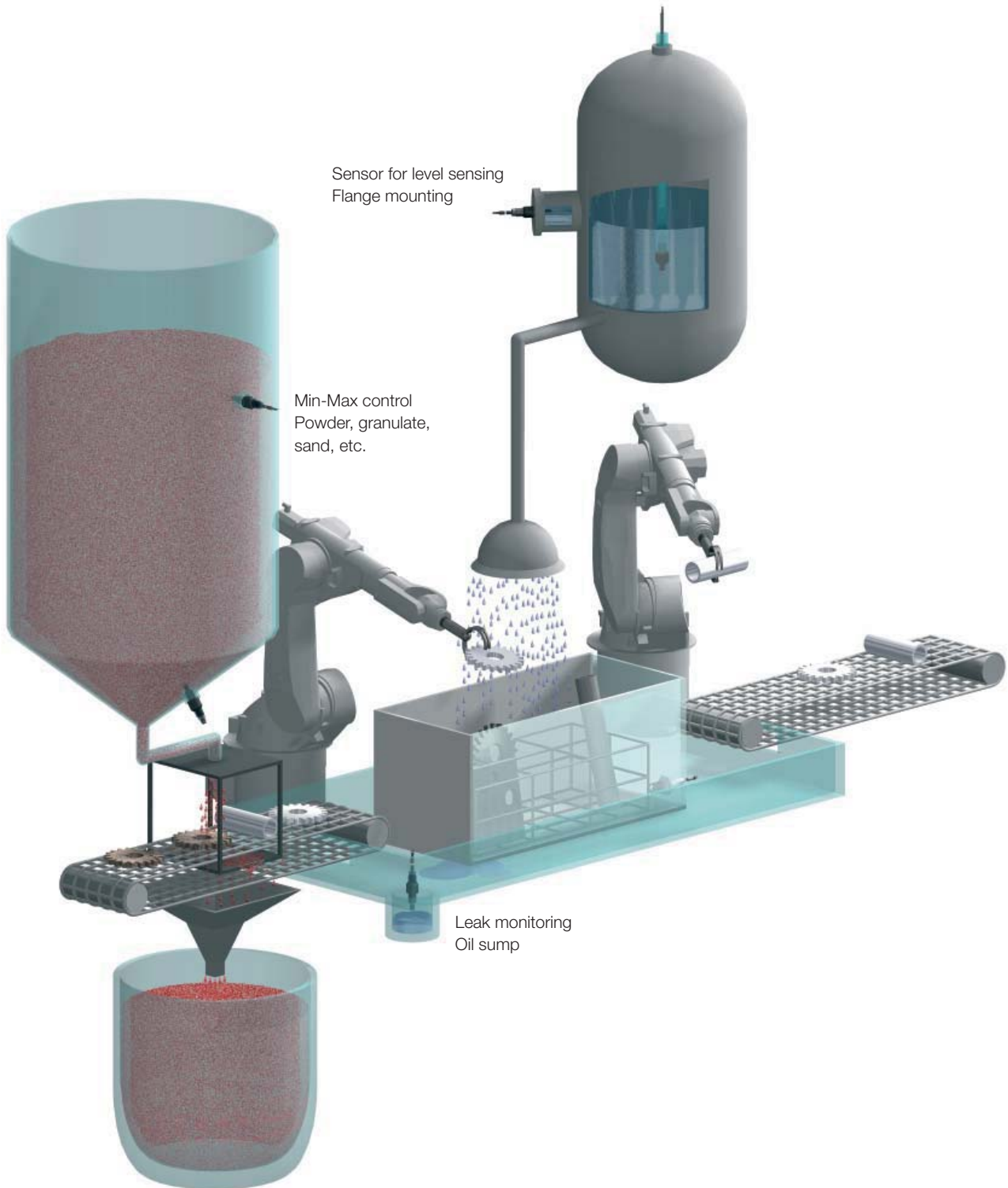
IEC 60947-5-2 : 2004

IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 2.4-19.2 Mhz. MA-M18####/10-V2A

IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.5-0.8 Mhz. MA-M18####/10-V2A



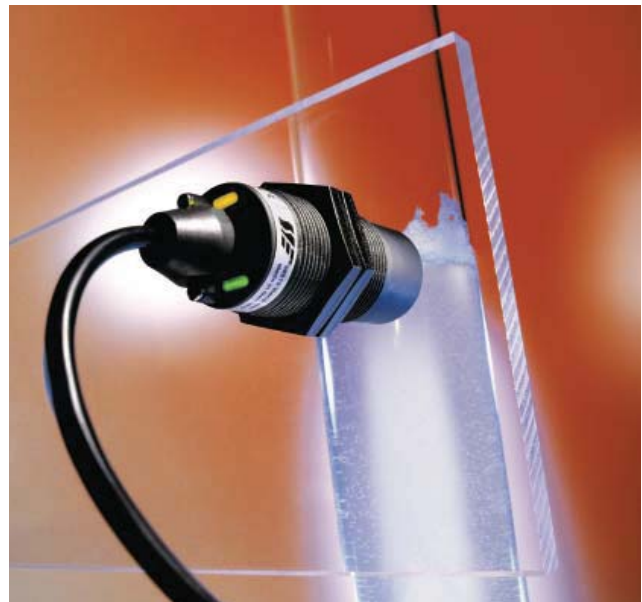
Applications



Sensors for level sensing smartLEVEL-Technology

Series SK1-FSA 0710

- For aqueous media
- No adjustment in standard application
- Self-compensating
- Through glass or plastic walls
- Versions for flush and non-flush mounting



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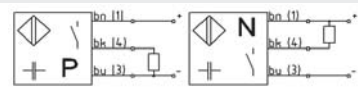
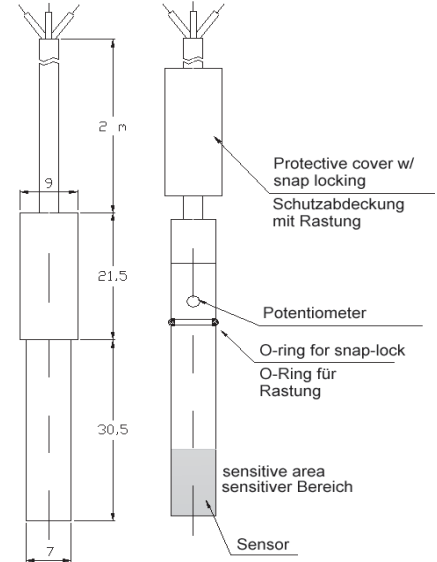
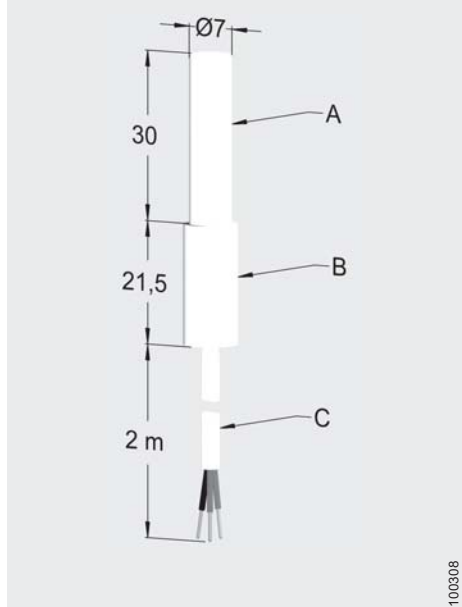
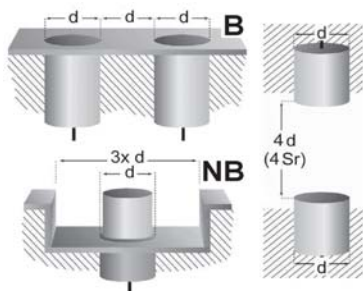


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application notes

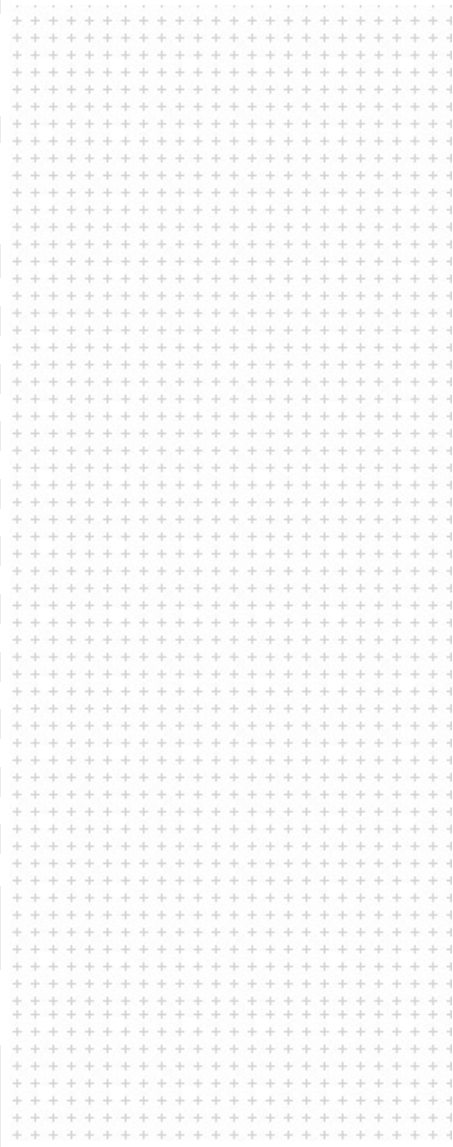
Type code (abstract)

- SK sensor capacitive, w/o amplifier
- SKF sensor cap. w/o amplifier, flexible
- SK1 sensor capacitive, self-contained
- SV(D) sensor amplifier (dynamic)
- SNG sensor power pack
- HT### high temperature use
- TM pulse modulation technique (High noise immune)
- ## / FS(A) max sensing distance / Fill-level switch (adaptive)
- M30 model and/or dimension
- P output stage PNP, NPN, X (switchable)
- B mounting B=flush NB=non-flush
- S S=N.O. Ö=N.C. X=function switchable
- (C)PTFE Housing material, e.g. PTFE CPTFE=complete PTFE
- 1M2-Y2 cable & connector: Y# = connector 1M2 = 1.2m cable length



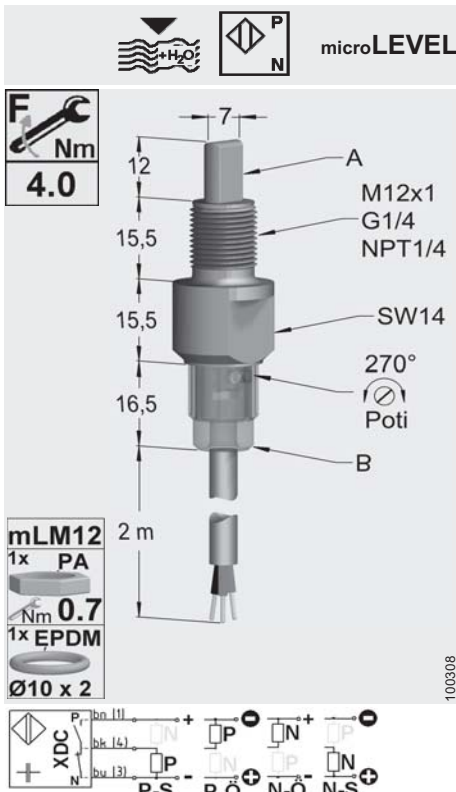
- SK1-FSA-D7B9/52-PNBS-CPTFE
- SK1-FSA-D7B9/52-PNBO-CPTFE
- SK1-FSA-D7B9/52-NNBS-CPTFE
- SK1-FSA-D7B9/52-NNBO-CPTFE

Mounting [flush / nonflush]	[B / NB]	NB
Operating distance	Sn [mm]	FSA
Hysteresis	H [%SR]	-
Frequency of operating cycles	f [Hz]	10
Repeat accuracy	R [%SR]	-
Operating temperature range	Ta [C°]	5...100
Temperature drift [range]	[%SR]	-
Protection class		IP 66 / A: IP 68
Rated insulation voltage	Ui [V]	75 d. c.
Material of housing		A-B: PTFE
Utilisation category		DC13
Connection		2m / 3x 0,2mm ² PTFE
Supply voltage range UB	Ub [V]	10... 30
No-load supply current	Iomax. [mA]	< 10
Minimum operational current	Imin [mA]	-
Operational current	Ie [mA]	50 O.C.
Off-state current	Ir [mA]	< 10
Voltage drop	Ud @ Ie [V]	< 1,5
Time delay before availability	tv [ms]	< 100
Indicator [UB / Output]		- / -
Short circuit- overload-protection		- / -
Reverse polarity protection		• +/- UB
Conformity	EMC EEC-direct.	IEC 60947-5-2 : 2004
EMC		IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 1-14.1 Mhz.
Associated equipment		
Additional functionality		



Application

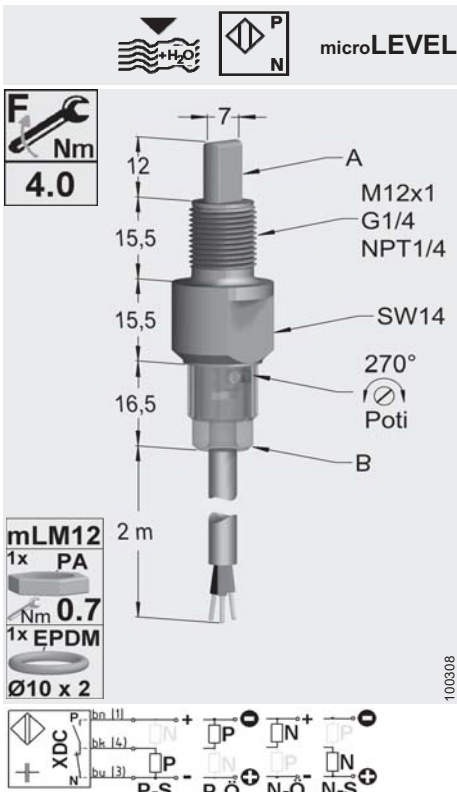
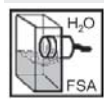




Typ / Type
 SK1-FSA-MLM12-XDC-PSU
 SK1-FSA-MLG1/4-XDC-PSU
 SK1-FSA-MLNPT1/4-XDC-PSU

NB	
FSA	
5	
-10... 105	
A : IP 68 / 10bar; B : IP 69K	
75 d. c.	
PSU	
DC13	
2m / 3x 0,34mm ² PUR	
10... 35	
20	
-	
50 / 50 XDC	
-	
3	
< 300	
•/•	
•/•	
!	
IEC 60947-5-2 : 2004	CE

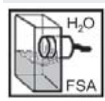
IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 1.95-13.1 Mhz.



Typ / Type
 SK1-FSA-MLM12-XDCS-PSU
 SK1-FSA-MLG1/4-XDCS-PSU
 SK1-FSA-MLNPT1/4-XDCS-PSU

NB	
FSA	
100	
-10... 105	
A : IP 68 / 10bar; B : IP 69K	
75 d. c.	
PSU	
DC13	
2m / 3x 0,34mm ² PUR	
10... 35	
20	
-	
50 / 50 XDC	CST
-	
3	
< 300	
•/•	
•/•	
!	
IEC 60947-5-2 : 2004	CE

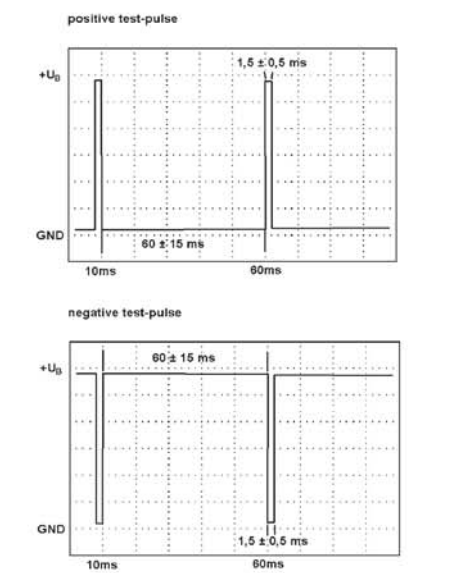
IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 1.95-13.1 Mhz.



application notes

The microLEVEL in Smart Level FSA-Technology have been adjusted in the factory for most applications. With this setting, the Smart Level Sensors are suitable for detecting water based media without any further adjustment. The setting compensates within wide limits for foaming, condensation and product filming.

i The continuous self-test signal (CST) overlaps the output signal.

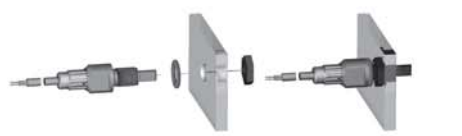


Specialized applications
 Sensors in Smart Level FSA-Technology can also be used with water based media in until now unsolved and critical applications. For this purpose, the factory setting can be altered by the user. Adjustment instructions are supplied with the sensor.

N.B.!
 The cable can not be wound for the sensor to function properly. Excess length cable has to be shortened or wound in meander windings.



Mounting
 Standard through hole mounting can be done using the enclosed nut. It is not required but recommended while mounted in a female thread. Sealing can be done using an O-ring or flat type gasket. We recommend to close the pot access hole by the use of the circular clip.



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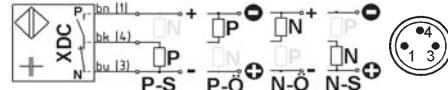


microLEVEL

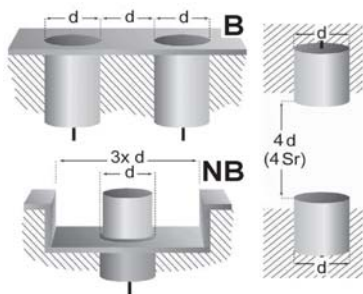
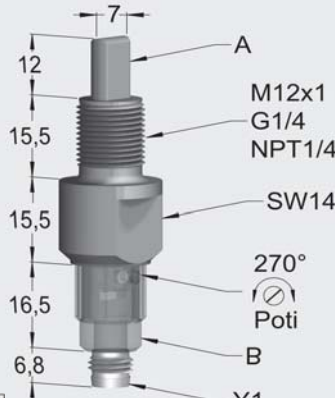
application notes

Type code (abstract)

- SK sensor capacitive, w/o amplifier
- SKF sensor cap. w/o amplifier, flexible
- SK1 sensor capacitive, self-contained
- SV(D) sensor amplifier (dynamic)
- SNG sensor power pack
- HT### high temperature use
- TM pulse modulation technique (High noise immune)
- ## / FS(A) max sensing distance / Fill-level switch (adaptive)
- M30 model and/or dimension
- P output stage PNP, NPN, X (switchable)
- B mounting B=flush NB=non-flush
- S S=N.O. Ö=N.C. X=function switchable
- (C)PTFE Housing material, e.g. PTFE CPTFE=complete PTFE
- 1M2-Y2 cable & connector: Y# = connector 1M2 = 1.2m cable length



Typ / Type
SK1-FSA-MLM12-XDC-PSU-Y1
SK1-FSA-MLG1/4-XDC-PSU-Y1
SK1-FSA-MLNPT1/4-XDC-PSU-Y1

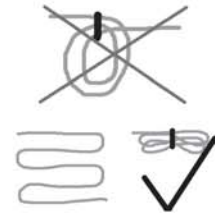


Mounting [flush / nonflush]	[B / NB]	NB
Operating distance	Sn [mm]	FSA
Hysteresis	H [%SR]	
Frequency of operating cycles	f [Hz]	5
Repeat accuracy	R [%SR]	
Operating temperature range	Ta [C°]	-10... 105
Temperature drift [range]	[%SR]	
Protection class		A : IP 68 / 10bar; B : IP 69K
Rated insulation voltage	Ui [V]	75 d. c.
Material of housing		PSU
Utilisation category		DC13
Connection		Z10; Z11
Supply voltage range UB	Ub [V]	10... 35
No-load supply current	Iomax. [mA]	20
Minimum operational current	Imin [mA]	-
Operational current	Ie [mA]	50 / 50 XDC
Off-state current	Ir [mA]	-
Voltage drop	Ud @ Ie [V]	3
Time delay before availability	tv [ms]	< 300
Indicator [UB / Output]		• / •
Short circuit- overload-protection		• / •
Reverse polarity protection		!
Conformity	EMC EEC-direct.	IEC 60947-5-2 : 2004
EMC		IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 2.1-13.5 Mhz.
Associated equipment		
Additional functionality		

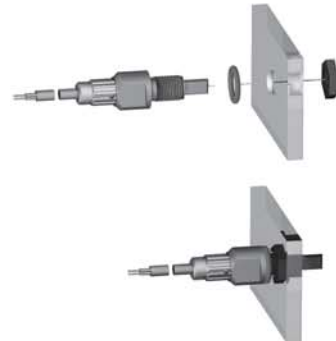
The microLEVEL in Smart Level FSA-Technology have been adjusted in the factory for most applications. **With this setting, the Smart Level Sensors are suitable for detecting water based media without any further adjustment.** The setting compensates within wide limits for foaming, condensation and product filming.

Specialized applications
Sensors in Smart Level FSA-Technology can also be used with water based media in until now unsolved and critical applications. For this purpose, the factory setting can be altered by the user. Adjustment instructions are supplied with the sensor.

N.B.!
The cable can not be wound for the sensor to function properly. Excess length cable has to be shortened or wound in meander windings.



Mounting
Standard through hole mounting can be done using the enclosed nut. It is not required but recommended while mounted in a female thread. Sealing can be done using an O-ring or flat type gasket. We recommend to close the pot access hole by the use of the circular clip.

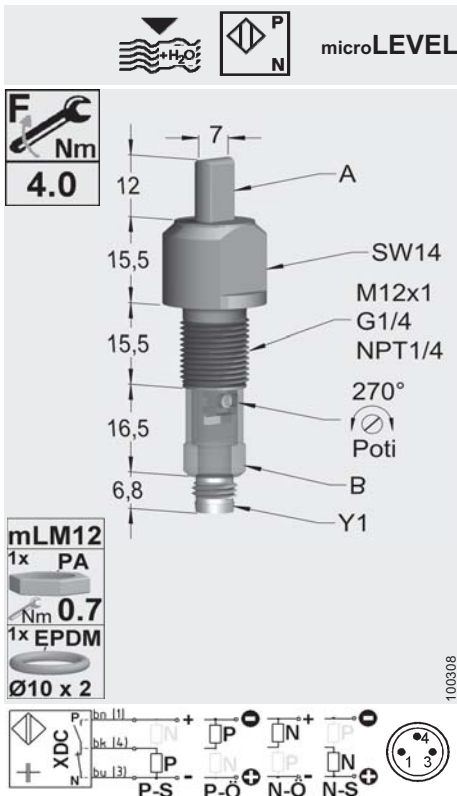


A liquid limit switch of any length can be realized by the use of a **reverse mount sensor**. Sealing can be done using an O-ring or flat type gasket.



Application





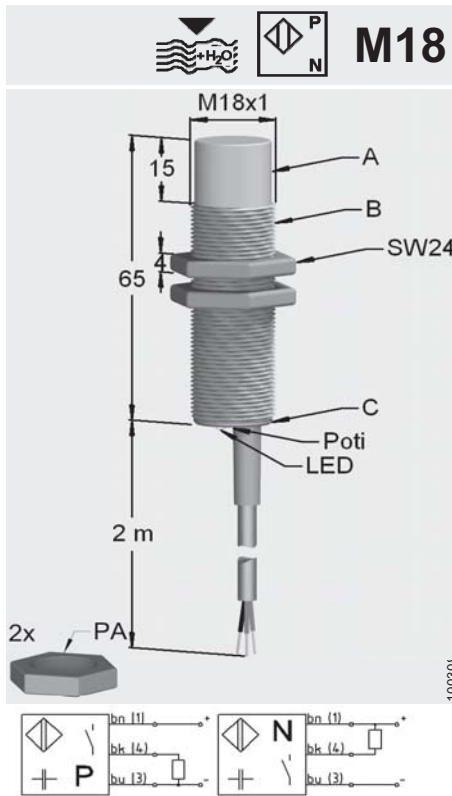
Typ / Type
 SK1-FSA-MLRM12-XDC-PSU-Y1
 SK1-FSA-MLRG1/4-XDC-PSU-Y1
 SK1-FSA-MLRNPT1/4-XDC-PSU-Y1

NB
FSA
5
-10... 105
A : IP 68 / 10bar; B : IP 64
75 d. c.
PSU
DC13
Z10; Z11
10... 35
20
-
50 / 50 XDC
-
3
< 300
•/•
•/•
!

IEC 60947-5-2 : 2004



IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 2.1-13.5 Mhz.



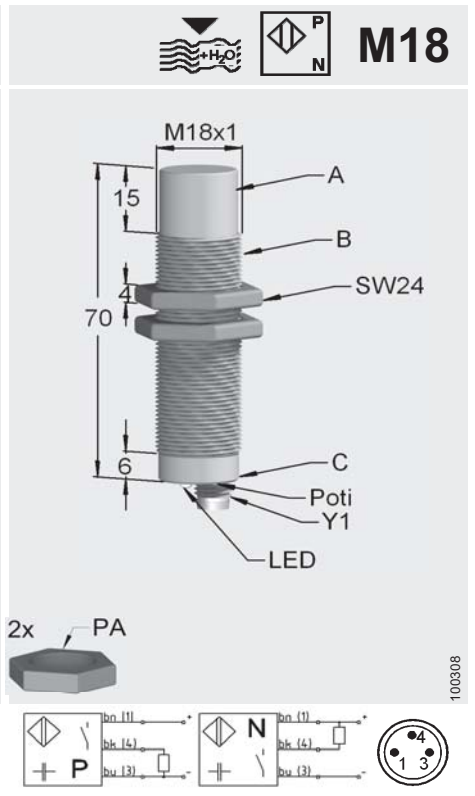
Typ / Type
 SK1-FSA-M18-PNBS-PVC
 SK1-FSA-M18-PNBO-PVC
 SK1-FSA-M18-NNBS-PVC
 SK1-FSA-M18-NNBO-PVC

NB
FSA
2
-10... 60
A, B: IP 66 / IP 68; C: IP 64
75 d. c.
A: PVC; B: PVC; C: PBT
DC13
2m / 3x 0,25mm ² PVC
10... 35
20
-
300
-
1,8
-/•
•/•
•

IEC 60947-5-2 : 2004



IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 2.65-14.9 Mhz. SNG-###AC...



Typ / Type
 SK1-FSA-M18-PNBS-PVC-Y1
 SK1-FSA-M18-PNBO-PVC-Y1
 SK1-FSA-M18-NNBS-PVC-Y1
 SK1-FSA-M18-NNBO-PVC-Y1

NB
FSA
2
-10... 60
A, B: IP 66 / IP 68; C: IP 64
75 d. c.
A: PVC; B: PVC; C: PVC
DC13
Z10; Z11
10... 35
20
-
300
-
1,8
-/•
•/•
•

IEC 60947-5-2 : 2004



IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 2.65-11 Mhz. SNG-###AC...



BALLUFF
SIESENSORIK

Type code (abstract)

SK sensor capacitive, w/o amplifier
SKF sensor cap., w/o amplifier, flexible
SK1 sensor capacitive, self-contained
SV(D) sensor amplifier (dynamic)
SNG sensor power pack

HT### high temperature use
TM pulse modulation technique (High noise immune)

/ FS(A) max sensing distance / Fill-level switch (adaptive)

M30 model and/or dimension

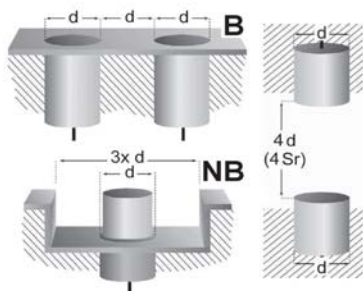
P output stage PNP, NPN, X (switchable)

B mounting B=flush NB=non-flush

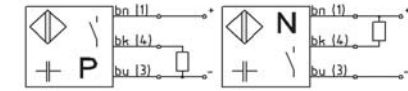
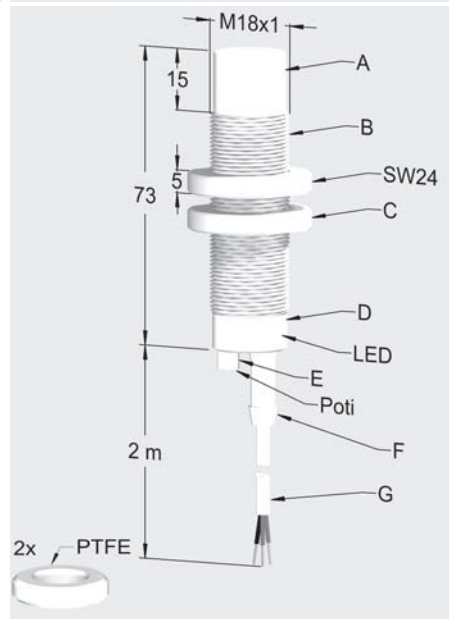
S S=N.O. Ö=N.C. X=function switchable

(C)PTFE Housing material, e.g. PTFE
CPTFE=complete PTFE

1M2-Y2 cable & connector:
Y# = connector
1M2 = 1.2m cable length

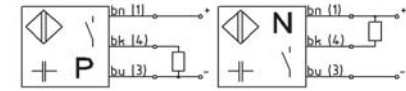
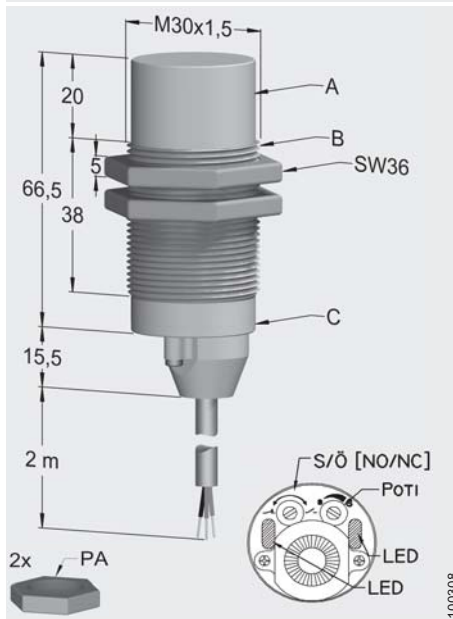


M18



Typ / Type
SK1-FSA-M18-PNBS-CPTFE
SK1-FSA-M18-PNBO-CPTFE
SK1-FSA-M18-NNBS-CPTFE
SK1-FSA-M18-NNBO-CPTFE

M30

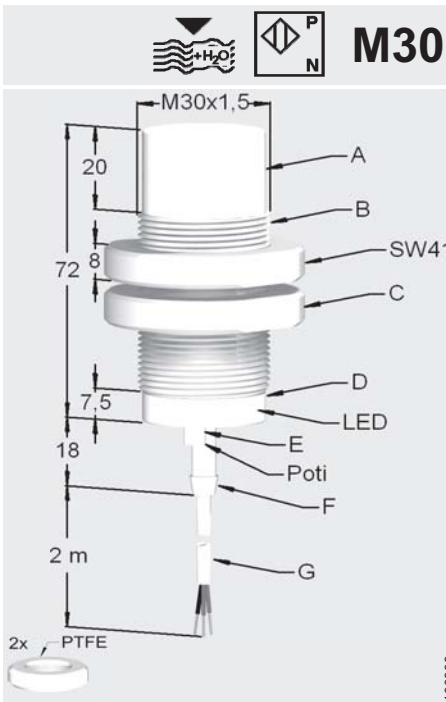
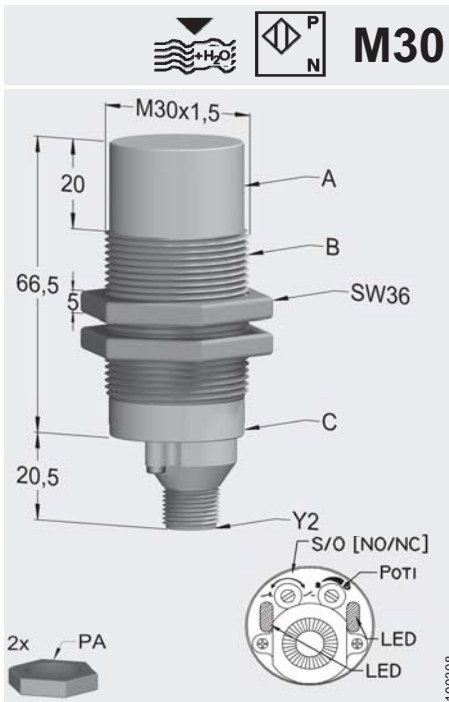


Typ / Type
SK1-FSA-M30-PNBX-PBT
SK1-FSA-M30-NNBX-PBT

Mounting [flush / nonflush]	[B / NB]		NB
Operating distance	Sn [mm]		FSA
Hysteresis	H [%SR]		
Frequency of operating cycles	f [Hz]		2
Repeat accuracy	R [%SR]		
Operating temperature range	Ta [C°]		-10... 60
Temperature drift [range]	[%SR]		
Protection class			A, B: IP 66 / IP 68; D: IP 64
Rated insulation voltage	Ui [V]		75 d. c.
Material of housing			A-G : PTFE
Utilisation category			DC13
Connection			2m / 3x 0,2mm ² PTFE
Supply voltage range UB	Ub [V]		10... 35
No-load supply current	Iomax. [mA]		20
Minimum operational current	I _m [mA]		
Operational current	I _e [mA]		300
Off-state current	I _r [mA]		
Voltage drop	U _d @ I _e [V]		1,8
Time delay before availability	t _v [ms]		
Indicator [UB / Output]			- / • LED int.
Short circuit- overload-protection			• / •
Reverse polarity protection			•
Conformity	EMC EEC-direct.		IEC 60947-5-2 : 2004
EMC			IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 2.65-11 Mhz.
Associated equipment			SNG-###AC...
Additional functionality			S / Ö NO / NC

Application



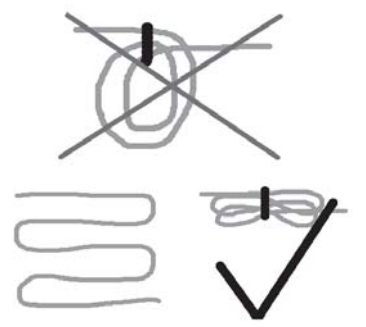


application notes

The Smart Level Sensors of the SK1-FSA... series have been adjusted in the factory for standard applications. With this setting, the Smart Level Sensors are suitable for detecting water based liquids through glass or plastic walls without any further adjustment. The factory setting can automatically mask out glass or plastic walls (approx. 0.5 mm to 6 mm), and compensates within wide limits for foam, moisture and dirt adhering to the inside and outside of the tank concerned.

Specialized applications
The Smart Level Sensors of the SK1-FSA... series can also be used with water based liquids in hitherto insoluble and critical applications, e.g. with glass or plastic walls thicker than 6 mm. For this purpose, the factory setting can be altered by the user.

N.B.!
The cable can not be wound for the sensor to function properly. Excess length cable has to be shortened or wound in meander windings.




Typ / Type
SK1-FSA-M30-PNBX-PBT-Y2
SK1-FSA-M30-NNBX-PBT-Y2

NB
FSA
2
-10... 60
A, B: IP 66 / IP 68; C: IP 64
75 d. c.
A: PBT; B: PBT; C: PBT/PE
DC13
Z20; Z21
10... 35
20
300
1,8
•/•
•/•
•


Typ / Type
SK1-FSA-M30-PNBS-CPTFE
SK1-FSA-M30-PNBO-CPTFE
SK1-FSA-M30-NNBS-CPTFE
SK1-FSA-M30-NNBO-CPTFE


NB
FSA
2
-10... 60
A, B: IP 66 / IP 68; D: IP 64
75 d. c.
A-G : PTFE
DC13
2m / 3x 0,2mm ² PTFE
10... 35
20
300
1,8
-/•
•/•
•

 cPTFE-Sensors
Output state indicator: LED red fully covered (inside the housing)

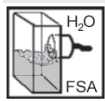
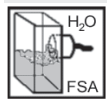
IEC 60947-5-2 : 2004 

IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 1.15-14.9 Mhz. SNG-###AC...

S / Ö NO / NC 

IEC 60947-5-2 : 2004 

IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 1.15-14.9 Mhz. SNG-###AC...

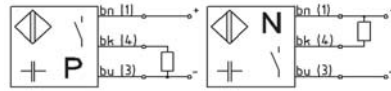
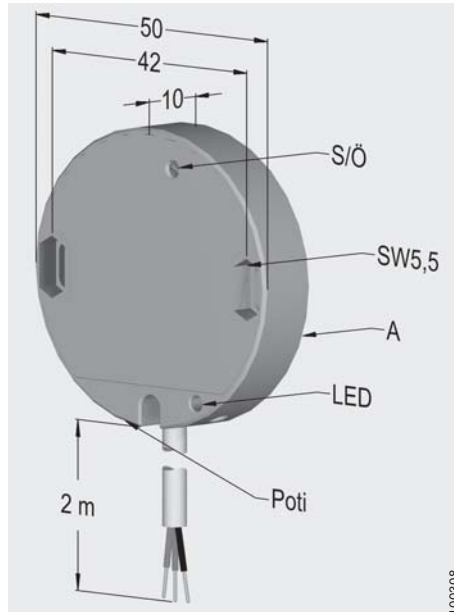
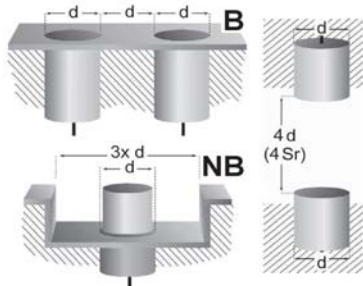


BALLUFF

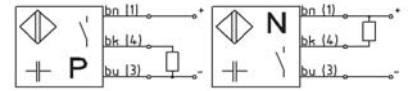
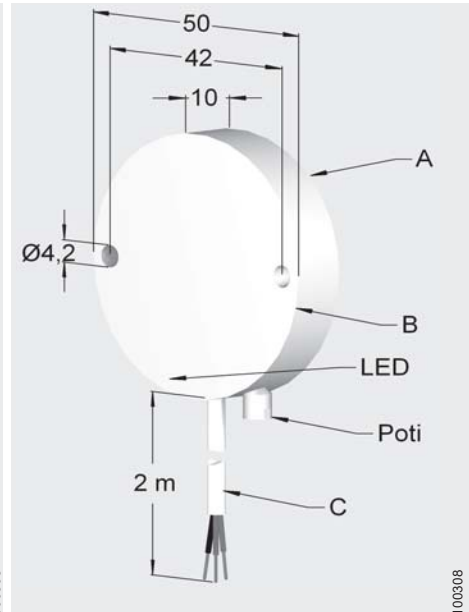
SIESENSORIK

Type code (abstract)

- SK sensor capacitive, w/o amplifier
- SKF sensor cap., w/o amplifier, flexible
- SK1 sensor capacitive, self-contained
- SV(D) sensor amplifier (dynamic)
- SNG sensor power pack
- HT### high temperature use
- TM pulse modulation technique (High noise immune)
- ## / FS(A) max sensing distance / Fill-level switch (adaptive)
- M30 model and/or dimension
- P output stage PNP, NPN, X (switchable)
- B mounting B=flush NB=non-flush
- S S=N.O. Ö=N.C. X=function switchable
- (C)PTFE Housing material, e.g. PTFE CPTFE=complete PTFE
- 1M2-Y2 cable & connector: Y# = connector 1M2 = 1.2m cable length



Typ / Type
 SK1-FSA-50/10-PBX-POM
 SK1-FSA-50/10-NBX-POM

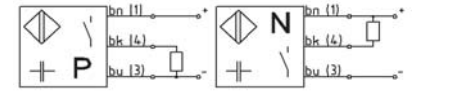
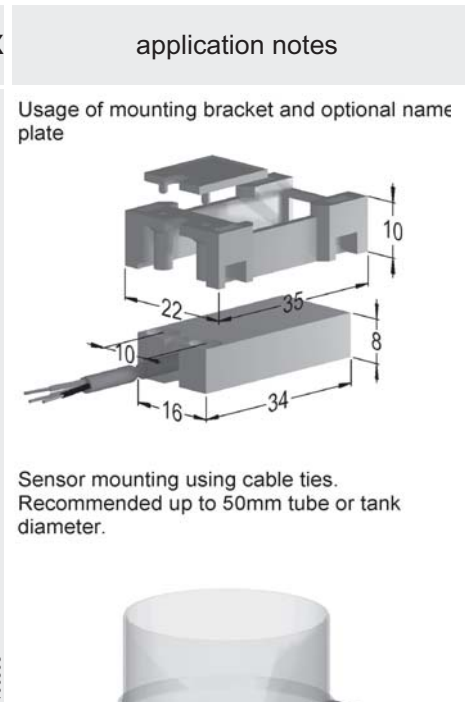
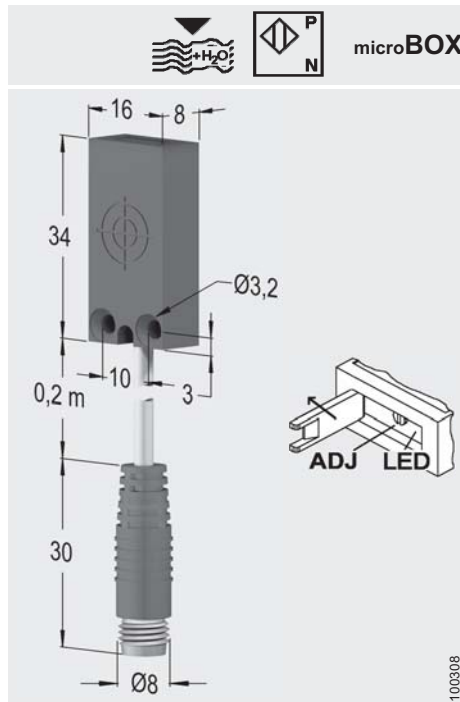
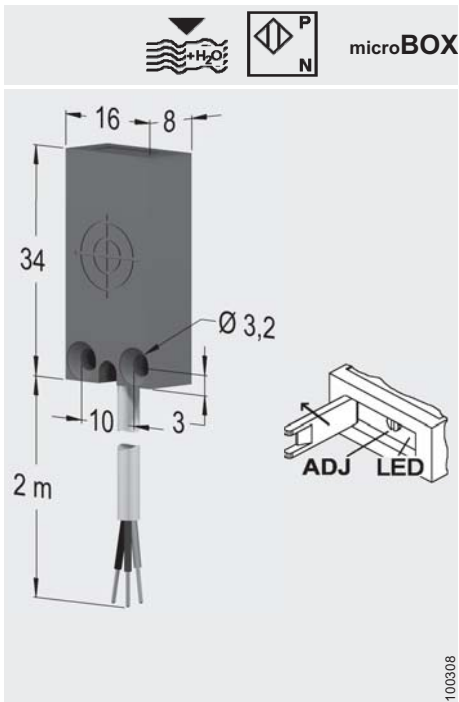


Typ / Type
 SK1-FSA-50/10-PBS-CPTFE
 SK1-FSA-50/10-PBO-CPTFE
 SK1-FSA-50/10-NBS-CPTFE
 SK1-FSA-50/10-NBO-CPTFE

Mounting [flush / nonflush]	[B / NB]	B	B
Operating distance	Sn [mm]	FSA	FSA
Hysteresis	H [%SR]		
Frequency of operating cycles	f [Hz]	2	2
Repeat accuracy	R [%SR]		
Operating temperature range	Ta [C°]	-10... 60	-10... 60
Temperature drift [range]	[%SR]		
Protection class		IP 67	IP 67
Rated insulation voltage	Ui [V]	75 d. c.	75 d. c.
Material of housing		POM	A-C : PTFE
Utilisation category		DC13	DC13
Connection		2m / 3x 0,25mm ² PVC	2m / 3x 0,2mm ² PTFE
Supply voltage range UB	Ub [V]	10... 35	10... 35
No-load supply current	Iomax. [mA]	20	20
Minimum operational current	I _m [mA]		
Operational current	I _e [mA]	300	300
Off-state current	I _r [mA]		
Voltage drop	U _d @ I _e [V]	1,8	1,8
Time delay before availability	t _v [ms]		
Indicator [UB / Output]		- / •	- / • LED int.
Short circuit- overload-protection		• / •	• / •
Reverse polarity protection		•	•
Conformity	EMC EEC-direct.	IEC 60947-5-2 : 2004	IEC 60947-5-2 : 2004
EMC		IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.8-9.8 Mhz.	IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.8-9.8 Mhz.
Associated equipment		SNG-###AC...	SNG-###AC...
Additional functionality		S / Ö NO / NC	

Application





Typ / Type
 SK1-FSA-34/16/8-PBS-PP
 SK1-FSA-34/16/8-PBO-PP
 SK1-FSA-34/16/8-NBS-PP
 SK1-FSA-34/16/8-NBO-PP

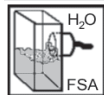
Typ / Type
 SK1-FSA-34/16/8-PBS-PP-M2/Y1
 SK1-FSA-34/16/8-PBO-PP-M2/Y1
 SK1-FSA-34/16/8-NBS-PP-M2/Y1
 SK1-FSA-34/16/8-NBO-PP-M2/Y1

B
FSA
2
5
-30... 70
IP 67
75 d. c.
PP
DC13
2m / 3x 0,14 mm ² / PUR
12... 30
< 10
-
50
O.C.
1,5
< 100
- / •
• / •
•
IEC 60947-5-2 : 2004

B
FSA
2
5
-30... 70
IP 67
75 d. c.
PP
DC13
0,2m / 3x 0,14mm ² PUR; Z10; Z11
12... 30
< 10
-
50
O.C.
1,5
< 100
- / •
• / •
•
IEC 60947-5-2 : 2004

IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.85-8.3 Mhz. SNG-###AC...

IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.85-8.3 Mhz. SNG-###AC...



Use of a mounting strap recommended for fastening when diameter is more than 50mm.



Applications

