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SIESENSORIK

Capacitive Sensors

... new possibilities in object detection and level sensing

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

Mini-sensors

Series SK 0300

- Housing starting at Ø 4 mm
- Flat disk shapes starting at Ø 18 mm
- Housing material V2A/PTFE
- Adjustment using sensor amplifiers 0400
- Sensor lead with plug

DIN EN ISO 9001:2000
QA 05 100 1050

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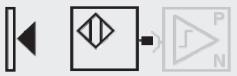
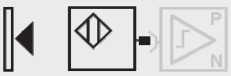
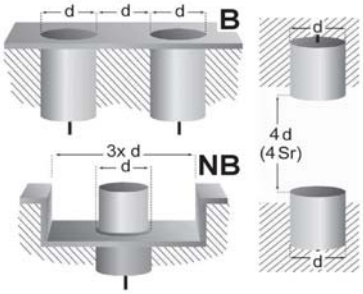
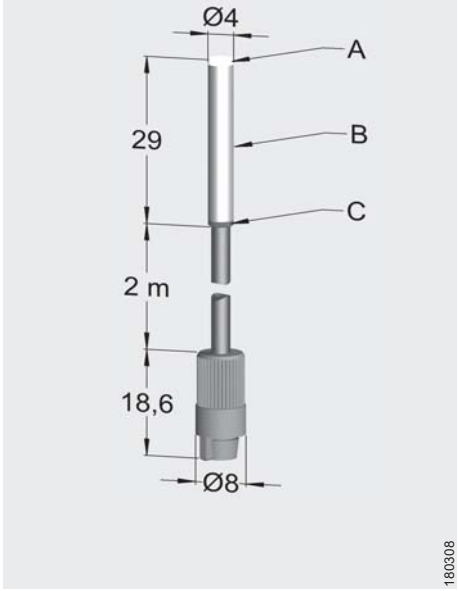
0,1..1  4∅

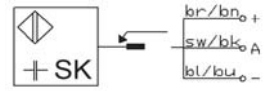
0,1..1  M5

Type code (abstract)

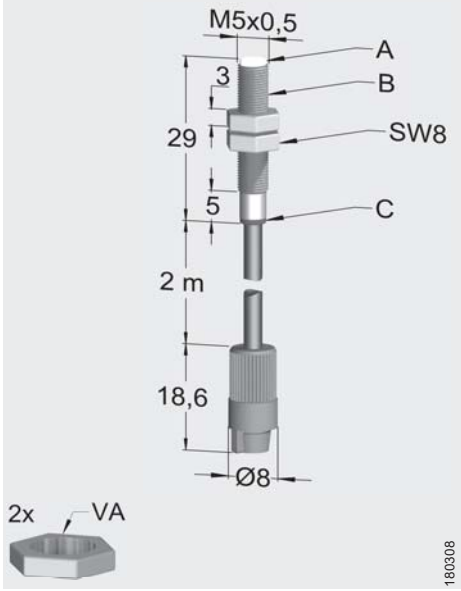
SK SKF SK1 SV(D) SNG	sensor capacitive, w/o amplifier sensor cap., w/o amplifier, flexible sensor capacitive, self-contained sensor amplifier (dynamic) sensor power pack
HT### TM	high temperature use pulse modulation technique (High noise immune)
## / FS(A)	max sensing distance / Fill-level switch (adaptive)
M30	model and/or dimension
P	ouput 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

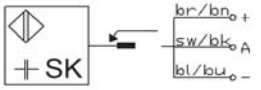






Typ / Type
SK-1-4-B-VA/PTFE

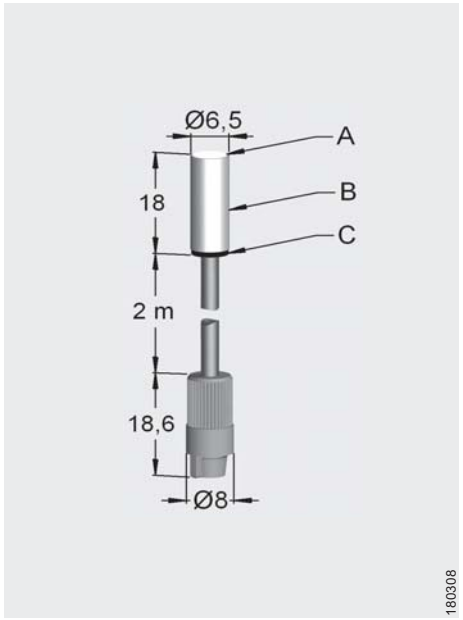


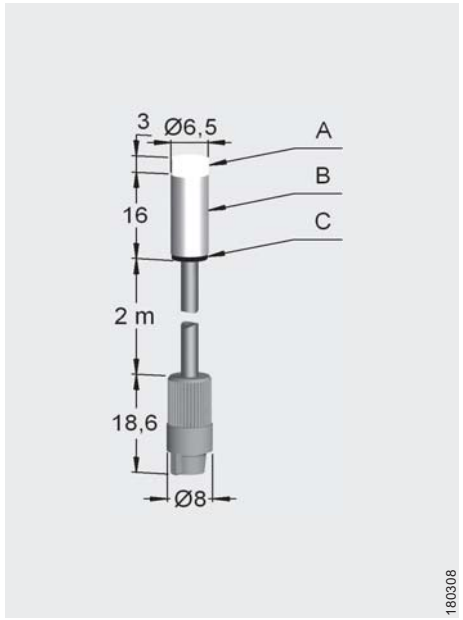


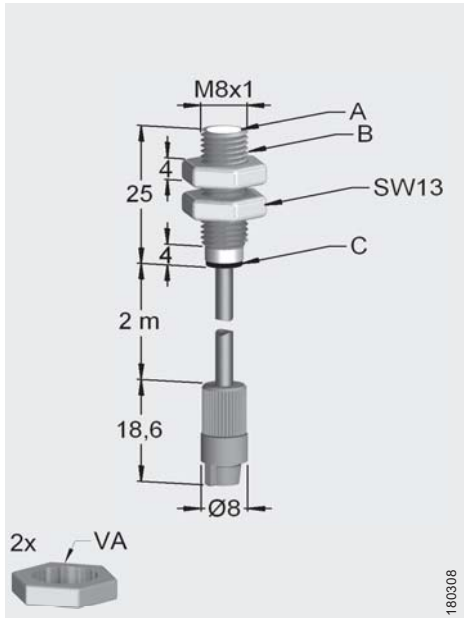
Typ / Type
SK-1-M5-B-VA/PTFE

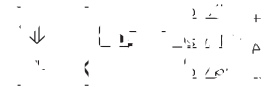
Mounting [flush / nonflush]		[B / NB]	B	B
Operating distance	Sn	[mm]	0,1... 1	0,1... 1
Hysteresis	H	[%SR]	20	20
Frequency of operating cycles	f	[Hz]	100	100
Repeat accuracy	R	[%SR]	2	2
Operating temperature range	Ta	[C°]	-30... 80	-30... 80
Temperature drift [range]		[%SR]	20 [+5... 55]	20 [+5... 55]
Protection class			IP 67	IP67
Rated insulation voltage	Ui	[V]	75 d. c.	75 d. c.
Material of housing			A: PTFE; B: V2A; C: POM	A: PTFE; B: V2A; C: POM
Utilisation category				
Connection			2m / 3x 0,14mm² / PUR ¨ ZA	2m / 3x 0,14mm² / PUR ¨ ZA
Supply voltage range UB	Ub	[V]	4...8	4...8
No-load supply current	Iomax.	[mA]		
Minimum operational current	Im	[mA]		
Operational current	Ie	[mA]		
Off-state current	Ir	[mA]		
Voltage drop	Ud @ Ie	[V]		
Time delay before availability	tv	[ms]		
Indicator [UB / Output]				
Short circuit- overload-protection				
Reverse polarity protection				
Conformity	EMC EEC-direct.		IEC 60947-5-2 : 2004 73/23 CE	IEC 60947-5-2 : 2004 73/23 CE
EMC			IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 1.2-5.4 Mhz.	IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 1.6-5 Mhz.
Associated equipment			SV-; SVD-; SNG-...-K; SNG-...K-T SL-YA-m20	SV-; SVD-; SNG-...-K; SNG-...K-T SL-YA-m20
Additional functionality				
Application				

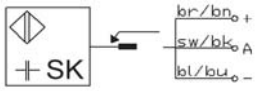
0,1..1,5	0,1..3	0,1..1,5
6,5Ø	6,5Ø	M8

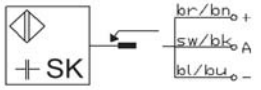












Typ / Type	**Typ / Type**	**Typ / Type**
SK-1.5-6.5-B-VA/PTFE	SK-3-6.5-NB-VA/PTFE	SK-1.5-M8-B-VA/PTFE
B	NB	B
0,1... 1,5	0,1... 3	0,1... 1,5
10	10	10
100	100	100
2	2	2
-30... 80	-30... 80	-30... 80
20 [-5... 55]	20 [-5... 55]	20 [-5... 55]
IP 67	IP 67	IP 67
75 d. c.	75 d. c.	75 d. c.
A: PTFE: B: V2A; C: POM	A: PTFE; B: V2A; C: POM	A: PTFE; B: V2A; C: POM
2m / 3x 0,14mm^2 / PUR ¯ ZA	2m / 3x 0,14mm^2 / PUR ¯ ZA	2m / 3x 0,14mm^2 / PUR ¯ ZA
4...8	4...8	4...8
IEC 60947-5-2 : 2004 73/23 CE	IEC 60947-5-2 : 2004 73/23 CE	IEC 60947-5-2 : 2004 73/23 CE
IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.8-2.1 Mhz.	IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.7-2.8 Mhz.	IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.7-1.9 Mhz.
SV-; SVD-; SNG-...-K; SNG-...K-T SL-YA-m20	SV-; SVD-; SNG-...-K; SNG-...K-T SL-YA-m20	SV-; SVD-; SNG-...-K; SNG-...K-T SL-YA-m20

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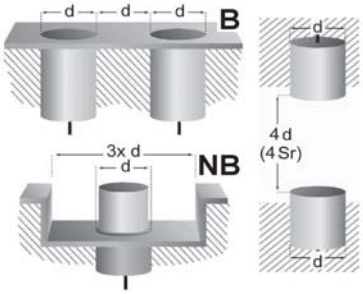
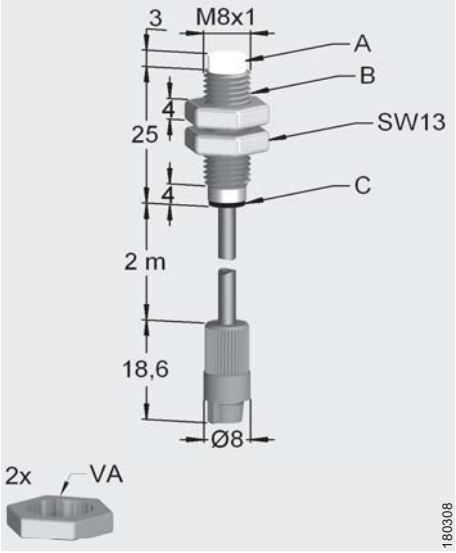
0,1..3 **M8**

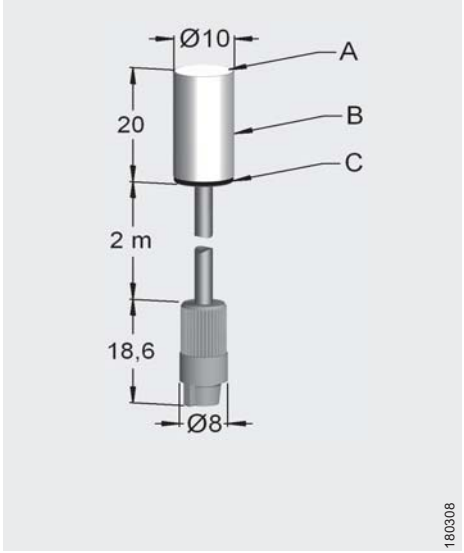
0,1..4 **10Ø**

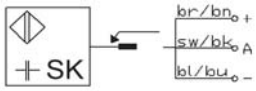
Type code (abstract)

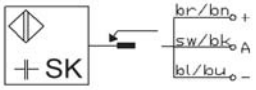
SK	sensor capacitive, w/o amplifier
SKF	sensor cap., w/o amplifier, flexible
SK1	sensor capacitive, self-contained
SV(D)	sensor amplifier (dynamic)
SNG	sensor power pack
HT###	high temperature use
TM	pulse modulation technique (High noise immune)
## / FS(A)	max sensing distance / Fill-level switch (adaptive)
M30	model and/or dimension
P	ouput 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









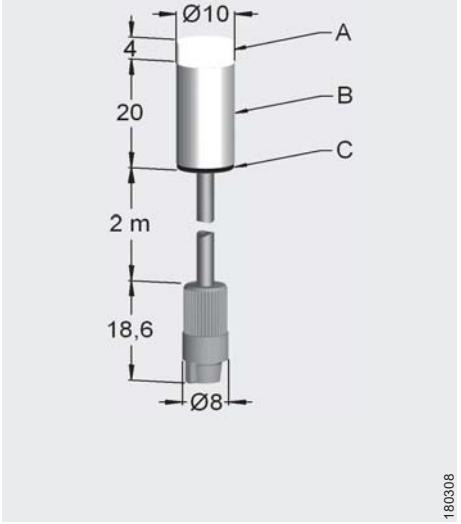


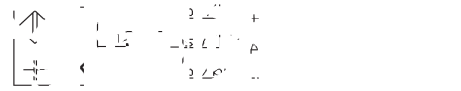
Typ / Type
SK-3-M8-NB-VA/PTFE

Typ / Type
SK-4-10-B-VA/PTFE

Mounting [flush / nonflush]		[B / NB]	NB	B
Operating distance	Sn	[mm]	0,1... 3	0,1... 4
Hysteresis	H	[%SR]	10	10
Frequency of operating cycles	f	[Hz]	100	100
Repeat accuracy	R	[%SR]	2	2
Operating temperature range	Ta	[C°]	-30... 80	-30... 80
Temperature drift [range]		[%SR]	20 [-5... 55]	20 [-5... 55]
Protection class			IP 67	IP 67
Rated insulation voltage	Ui	[V]	75 d. c.	75 d. c.
Material of housing			A: PTFE; B:V2A; C: POM	A: PTFE; B: V2A; C: POM
Utilisation category				
Connection			2m / 3x 0,14mm² / PUR ˚ ZA	2m / 3x 0,14mm² / PUR ˚ ZA
Supply voltage range UB	Ub	[V]	4...8	4...8
No-load supply current	Iomax.	[mA]		
Minimum operational current	Im	[mA]		
Operational current	Ie	[mA]		
Off-state current	Ir	[mA]		
Voltage drop	Ud @ Ie	[V]		
Time delay before availability	tv	[ms]		
Indicator [UB / Output]				
Short circuit- overload-protection				
Reverse polarity protection				
Conformity	EMC		IEC 60947-5-2 : 2004	IEC 60947-5-2 : 2004
	EEC-direct.		73/23	73/23
EMC			IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.6-3.1 Mhz.	IEC 60947-5-2 : 2004 IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 1.1-3.1 Mhz.
Associated equipment			SV-; SVD-; SNG-...-K; SNG-...K-T SL-YA-m20	SV-; SVD-; SNG-...-K; SNG-...K-T SL-YA-m20
Additional functionality				
Application				

1..8 10Ø





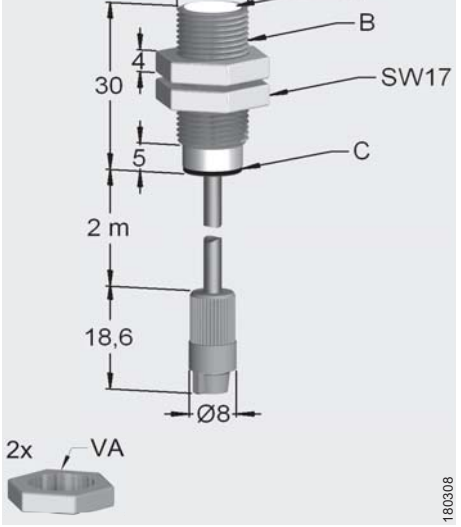
Typ / Type
SK-8-10-NB-VA/PTFE

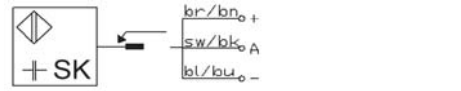
NB
1... 8
10
100
2
-30... 80
20 [-5... 55]
IP 67
75 d.c.
A: PTFE; B: V2A; C: POM
2m / 3x 0,14mm² / PUR ¯ ZA
4...8

IEC 60947-5-2 : 2004
73/23 CE

IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.7-3.8 Mhz.
SV-; SVD-; SNG-...-K; SNG-...K-T SL-YA-m20

0,1..4 M12





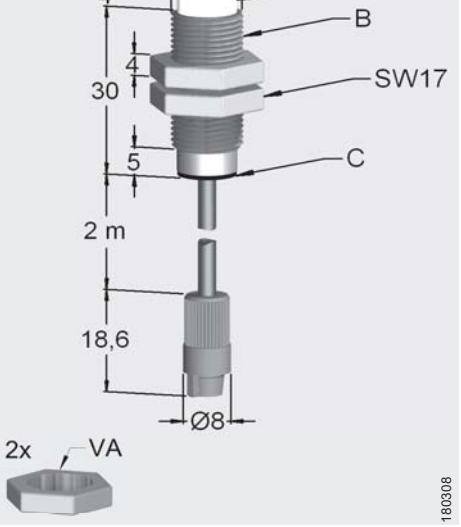
Typ / Type
SK-4-M12-B-VA/PTFE

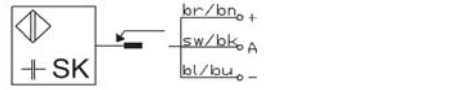
B
0,1... 4
10
100
2
-30... 80
20 [-5... 55]
IP 67
75 d. c.
A: PTFE; B: V2A; C: POM
2m / 3x 0,14mm² / PUR ¯ ZA
4...8

IEC 60947-5-2 : 2004
73/23 CE

IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.9-2.4 Mhz.
SV-; SVD-; SNG-...-K; SNG-...K-T SL-YA-m20

1..8 M12





Typ / Type
SK-8-M12-NB-VA/PTFE

NB
1... 8
10
100
2
-30... 80
20 [-5... 55]
IP 67
75 d. c.
A: PTFE; B: V2A; C: POM
2m / 3x 0,14mm² / PUR ¯ ZA
4...8

IEC 60947-5-2 : 2004
73/23 CE

IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.7-3.5 Mhz.
SV-; SVD-; SNG-...-K; SNG-...K-T SL-YA-m20

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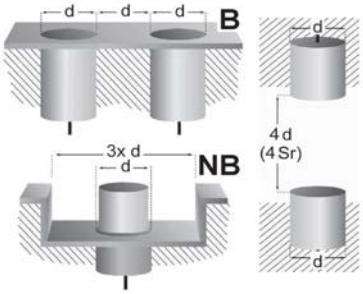
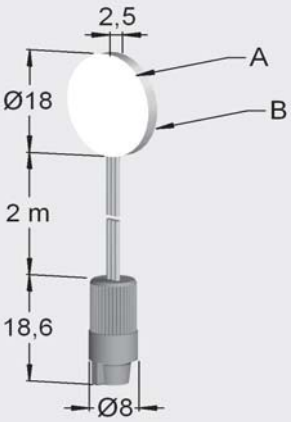
Type code (abstract)

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	ouput stage **P**NP, **N**PN, **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



0,1..3 **18Ø/2,5**



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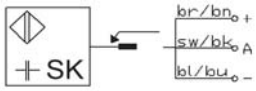
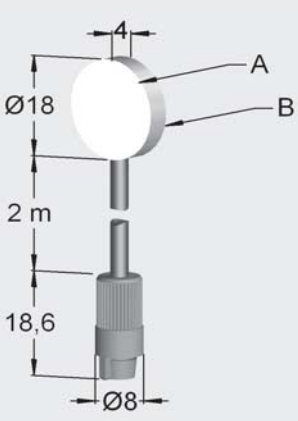


Typ / Type
SK-3-18/2.5-B-VA/PTFE

1..5 **18Ø/4**



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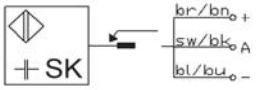
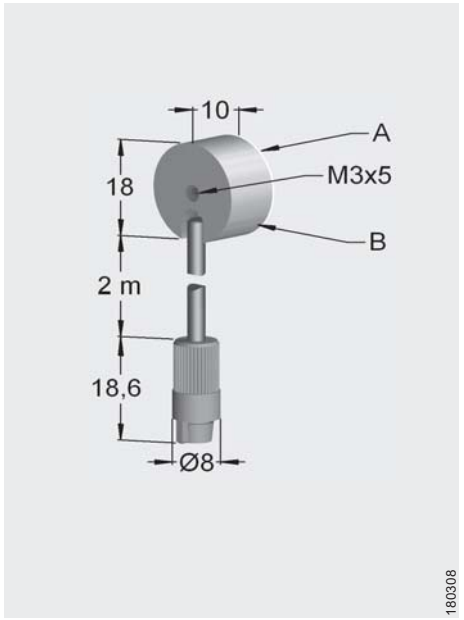
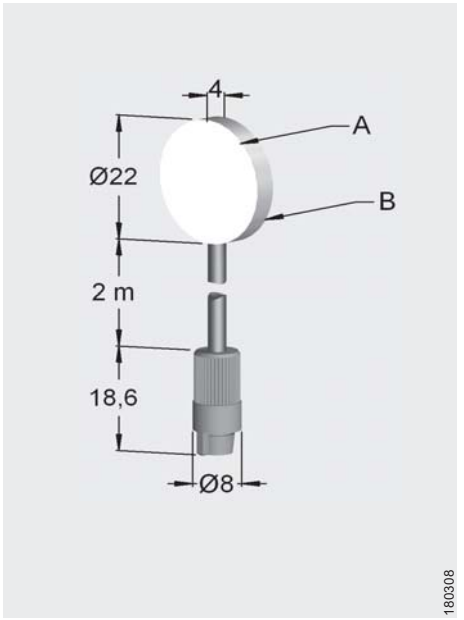


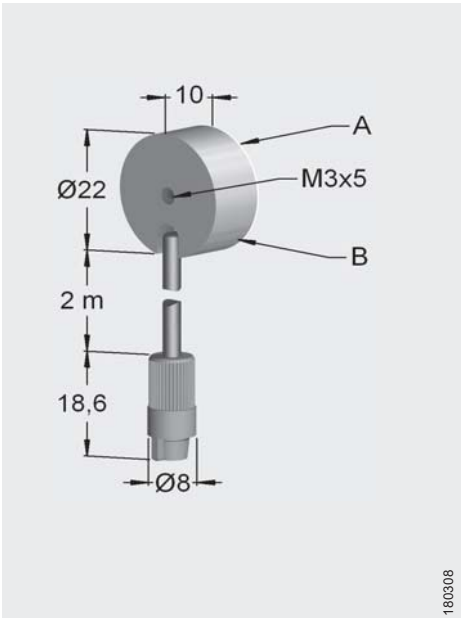
Typ / Type
SK-5-18/4-B-VA/PTFE

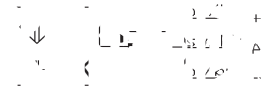
Mounting [flush / nonflush]	[B / NB]		B	B
Operating distance	Sn	[mm]	0,1... 3	1... 5
Hysteresis	H	[%SR]	15	15
Frequency of operating cycles	f	[Hz]	100	100
Repeat accuracy	R	[%SR]	2	2
Operating temperature range	Ta	[C°]	-30... 70	-30... 80
Temperature drift [range]		[%SR]	20 [-5... 55]	20 [-5... 55]
Protection class			IP 66	IP 66
Rated insulation voltage	Ui	[V]	75 d. c.	75 d. c.
Material of housing			A: PTFE; B: V2A	A: PTFE; B: V2A
Utilisation category				
Connection			2m / 3x 0,09mm² / PVC ˚ ZA	2m / 3x 0,14mm² / PUR ˚ ZA
Supply voltage range UB	Ub	[V]	4...8	4...8
No-load supply current	Iomax.	[mA]		
Minimum operational current	Im	[mA]		
Operational current	Ie	[mA]		
Off-state current	Ir	[mA]		
Voltage drop	Ud @ Ie	[V]		
Time delay before availability	tv	[ms]		
Indicator [UB / Output]				
Short circuit- overload-protection				
Reverse polarity protection				
Conformity	EMC		IEC 60947-5-2 : 2004	IEC 60947-5-2 : 2004
	EEC-direct.		73/23	73/23
EMC			IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 2.9-6.9 Mhz.	IEC 60947-5-2 : 2004 IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.8-2.2 Mhz.
Associated equipment			SV-; SVD-; SNG-...-K; SNG-...K-T SL-YA-m20	SV-; SVD-; SNG-...-K; SNG-...K-T SL-YA-m20
Additional functionality				
Application				

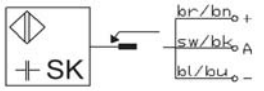
1..5	18Ø/10	1..10	22Ø/4	1..10	22Ø/10

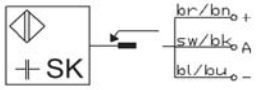












Typ / Type
SK-5-18/10-B-VA/PTFE

Typ / Type
SK-10-22/4-B-VA/PTFE

Typ / Type
SK-10-22/10-B-VA/PTFE

B	B	B
1... 5	1... 10	1... 10
15	15	15
100	100	100
2	2	2
-30... 80	-30... 80	-30... 80
20 [-5... 55]	20 [-5... 55]	20 [-5... 55]
IP 66	IP 66	IP 66
75 d. c.	75 d. c.	75 d. c.
A: PTFE; B: VA	A: PTFE; B: V2A	A:PTFE; B: VA
2m / 3x 0,14mm^2 / PUR - ZA	2m / 3x 0,14mm^2 / PUR - ZA	2m / 3x 0,14mm^2 / PUR - ZA
4...8	4...8	4...8
IEC 60947-5-2 : 2004 CE	IEC 60947-5-2 : 2004 CE	IEC 60947-5-2 : 2004 CE
IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.8-2.3 Mhz.	IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.4-2.1 Mhz.	IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.3-1.9 Mhz.
SV-; SVD-; SNG-...-K; SNG-...K-T SL-YA-m20	SV-; SVD-; SNG-...-K; SNG-...K-T SL-YA-m20	SV-; SVD-; SNG-...-K; SNG-...K-T SL-YA-m20

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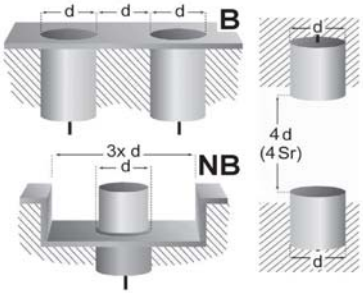
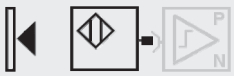
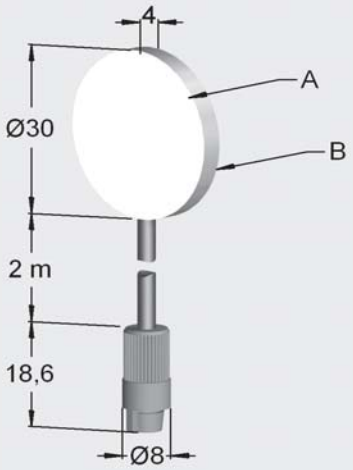
SIESENSORIK

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	ouput 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



1..15  **30Ø/4**



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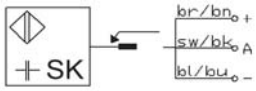
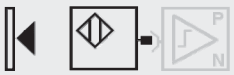
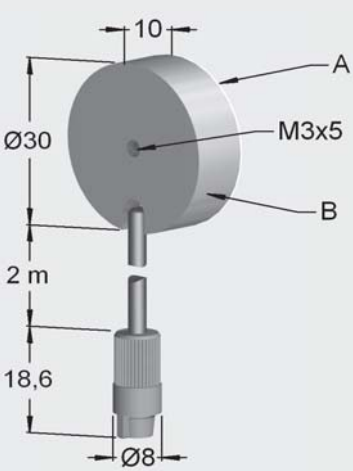


Typ / Type
SK-15-30/4-B-VA/PTFE

1..15  **30Ø/10**



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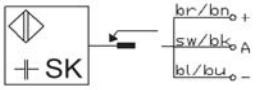
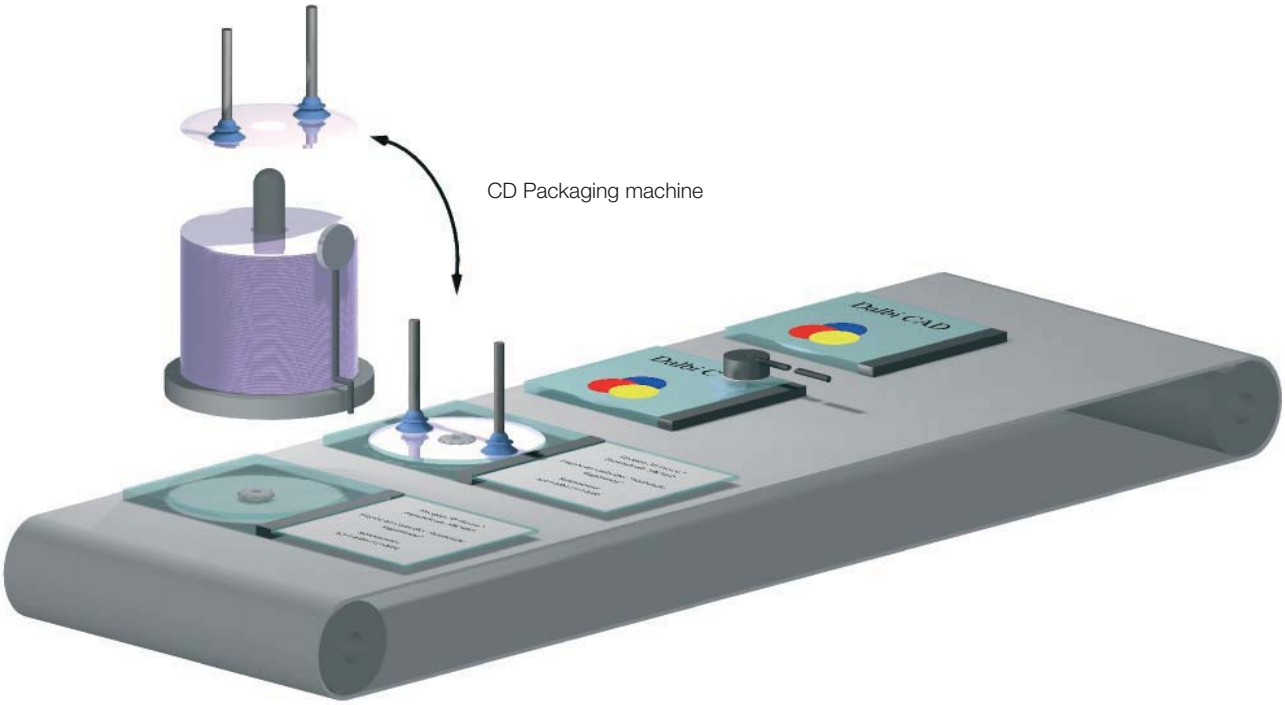


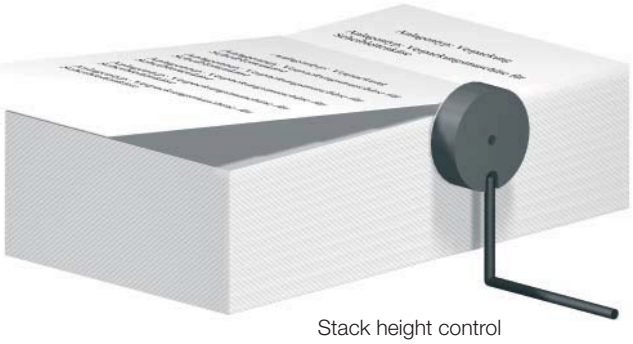
Typ / Type
SK-15-30/10-B-VA/PTFE

Mounting [flush / nonflush]		[B / NB]	B	B
Operating distance	Sn	[mm]	1... 15	1... 15
Hysteresis	H	[%SR]	15	15
Frequency of operating cycles	f	[Hz]	100	100
Repeat accuracy	R	[%SR]	2	2
Operating temperature range	Ta	[C°]	-30... 80	-30... 80
Temperature drift [range]		[%SR]	20 [-5... 55]	20 [-5... 55]
Protection class			IP 66	IP 66
Rated insulation voltage	Ui	[V]	75 d. c.	75 d. c.
Material of housing			A: PTFE; B:V2A	A: PTFE; B: VA
Utilisation category				
Connection			2m / 3x 0,14mm² / PUR ˚ ZA	2m / 3x 0,14mm² / PUR ˚ ZA
Supply voltage range UB	Ub	[V]	4...8	4...8
No-load supply current	Iomax.	[mA]		
Minimum operational current	Im	[mA]		
Operational current	Ie	[mA]		
Off-state current	Ir	[mA]		
Voltage drop	Ud @ Ie	[V]		
Time delay before availability	tv	[ms]		
Indicator [UB / Output]				
Short circuit- overload-protection				
Reverse polarity protection				
Conformity	EMC EEC-direct.		IEC 60947-5-2 : 2004 CE	IEC 60947-5-2 : 2004 CE
EMC			IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.6-2.8 Mhz.	IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.6-2.6 Mhz.
Associated equipment			SV-; SVD-; SNG-...-K; SNG-...K-T SL-YA-m20	SV-; SVD-; SNG-...-K; SNG-...K-T SL-YA-m20
Additional functionality				
Application				

Applications



CD Packaging machine



Stack height control

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

Table of Contents **Page**

Sensor amplifiers

Series SV, SNG...-K-... 0400

- For sensors SK and SKF
- Sensing distance adjustable
- DC or AC versions
- Logic amplifier
- Min-Max control

TÜV CERT CE

DIN EN ISO 9001:2000
QA 05 100 1050

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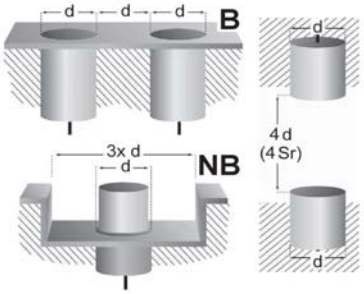
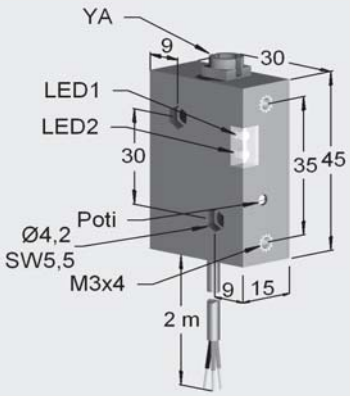
DC

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	ouput 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





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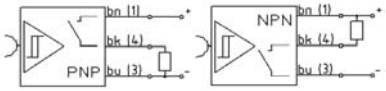
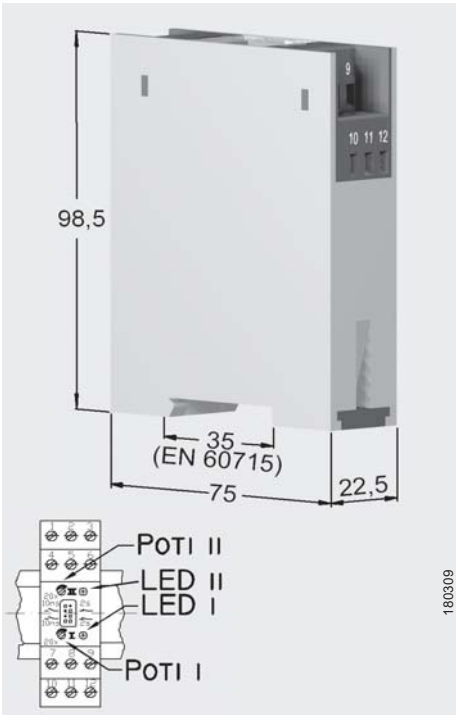


Function overview

LED 1: Control state indicator
LED 2: Indicated operating voltage present
Pos. 1: Through-hole Ø4.2 (4.2 mm in diameter), hexagonal on both sides, for inserting an M3 nut in each case

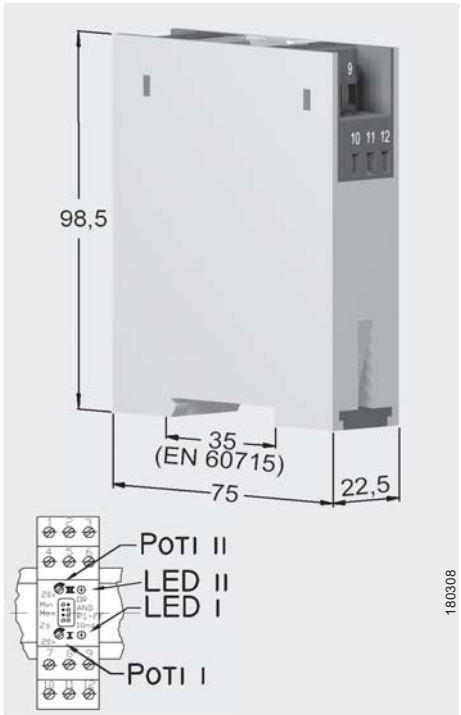
Typ / Type			
SV-45/30/15-PS			
SV-45/30/15-PO			
SV-45/30/15-NS			
SV-45/30/15-NO			
Mounting [flush / nonflush]		[B / NB]	
Operating distance	Sn	[mm]	
Hysteresis	H	[%SR]	
Frequency of operating cycles	f	[Hz]	100
Repeat accuracy	R	[%SR]	
Operating temperature range	Ta	[C°]	-30... 70
Temperature drift [range]		[%SR]	
Protection class			IP 67 IP40
Rated insulation voltage	Ui	[V]	75 d. c.
Material of housing			PC
Utilisation category			DC13
Connection			YA - 2m / 3x 0,14mm² / PUR
Supply voltage range UB	Ub	[V]	12... 35
No-load supply current	Iomax.	[mA]	20
Minimum operational current	Im	[mA]	
Operational current	Ie	[mA]	300
Off-state current	Ir	[mA]	
Voltage drop	Ud @ Ie	[V]	0,8
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 CE
EMC			
Associated equipment			SK-...
Additional functionality			
Application			

PNP **DC**



Typ / Type
SV-2VX-LDG12

PNP **DC**



Typ / Type
SV-X2L-LDG12

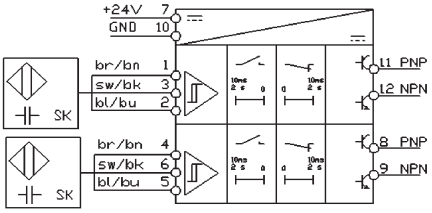
100		
-30... 70		
IP 40 / 20	⊘	IP 20
75 d. c.		
PC		
DC13		
max. 2,5mm² / AWG 14	⊘	
10... 35		
15		
PNP: 300 / NPN: 300		
0,8		
< 300		
• / •		
• / •		
•		
IEC 60947-5-2 : 2004	CE	
SK-...	SL-YA-m20	
S / Ö NO / NC 10ms / 2s 2x SV = 1x 2VX P / N - A/Q per SV		

100		
-30... 70		
IP 40 / 20	⊘	IP 20
75 d. c.		
PC		
DC13		
max. 2,5mm² / AWG 14	⊘	
10... 35		
25		
PNP: 300 / NPN: 300		
0,8		
< 300		
– / •		
• / •		
•		
IEC 60947-5-2 : 2004	CE	
SK-...	SL-YA-m20	
10ms / 2s OR , AND , RS-FlipFlop , MinMax P / N - A/Q & P / N Ainv/Qinv		

application notes

SV-2VX

- Two separate sensor amplifiers in one housing
- Connection for two Mini-SK or SKF Sensors
- PNP and NPN transistor output
- Function switchable between N.O./N.C.
- Pick-up delay (N.O. contact) switchable between 10 ms/2 s
- Drop-out delay (N.C. contact) switchable between 10 ms/2 s
- Clamp terminal
- Sensing distance of sensors can be adjusted separately
- Control state signalled by two separate LED indicators



SV-X2L

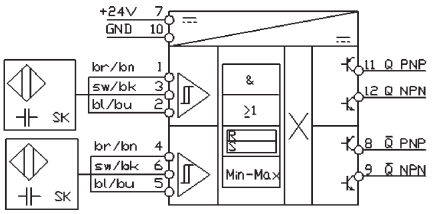
- Sensor amplifier with logic
- Connection for two Mini-SK or SKF sensors
- Two outputs each (PNP/NPN) for Q and Q
- Pick-up delay switchable between10 ms / 2 s
- Function selectable between OR/AND/RS-FF/Min-Max
- Clamp terminal
- Sensing distance of sensors can be adjusted separately
- Control state signalled by two separate LED indicators

OR function
Output Q active when one or both sensors are activated.

AND function
Output Q active only when both sensors are activated.

RS-FF function
Output Q active when sensor is activated once at the set input. This state is retained until the sensor is activated at the reset input.

Min-Max function
Output Q is active when both sensors are activated. The output is reset only when both sensors are no longer activated.



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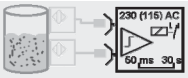

AC

application notes

Type code (abstract)

SK	sensor capacitive, w/o amplifier
SKF	sensor cap., w/o amplifier, flexible
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SV(D)	sensor amplifier (dynamic)
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TM	pulse modulation technique (High noise immune)
## / FS(A)	max sensing distance / Fill-level switch (adaptive)
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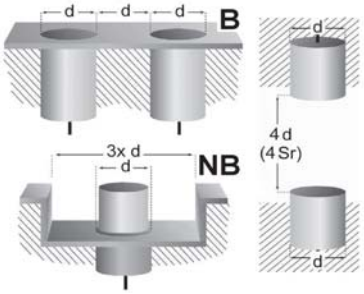
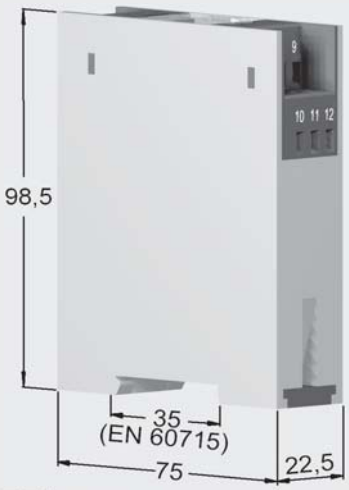
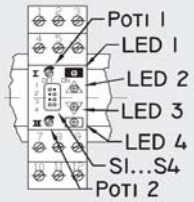




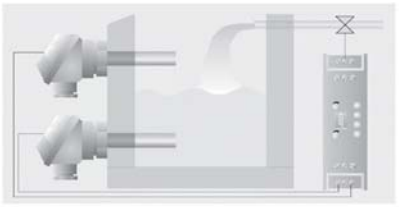


100308

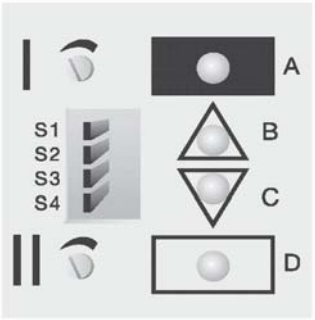
Typ / Type
SNG-230AC-K-MinMax
SNG-115AC-K-MinMax

Mounting [flush / nonflush]		[B / NB]		
Operating distance	Sn	[mm]		
Hysteresis	H	[%SR]		
Frequency of operating cycles	f	[Hz]	5	
Repeat accuracy	R	[%SR]		
Operating temperature range	Ta	[C°]	-30... 70	
Temperature drift [range]		[%SR]		
Protection class			IP 40 / 20	IP 20
Rated insulation voltage	Ui	[V]	250 a.c.	
Material of housing			PC	
Utilisation category			-	
Connection			max. 2,5mm² / AWG 14	
Supply voltage range UB	Ub	[V]	230 (115) V 40... 60 Hz	
No-load supply current	Iomax.	[mA]	20 / 40	
Minimum operational current	Im	[mA]		
Operational current	Ie	[mA]	380VAC / 250VDC / 8A	
Off-state current	Ir	[mA]		
Voltage drop	Ud @ Ie	[V]		
Time delay before availability	tv	[ms]	< 300	
Indicator [UB / Output]			– / •	
Short circuit- overload-protection			–	
Reverse polarity protection			–	
Conformity		EMC	IEC 60947-5-2 : 2004	CE
		EEC-direct.	73/23	
EMC				
Associated equipment			SK-...	SL-YA-m20
Additional functionality			Min Sensor: 0,2 s / 5s Max-Sensor: 0,2s / 5s INIT-set-up	
Application				

Function



When both sensors are de-activated, the relay switches on “LED-empty” lights up (contact 7/9 locked out). When the minimum sensor gives a closed signal, the “LED-filling” illuminates. As soon as both sensors are activated, the relay switches off “LED-full” lights up (contact 7/9 open). When the maximum sensor signals open, the “LED indicating empty” will light up. The relay will not switch on again until both sensors are de-activated. Further functions are possible with the Mini-Dip-Switch (see below).

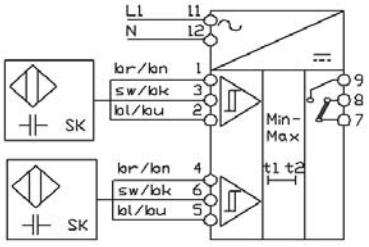


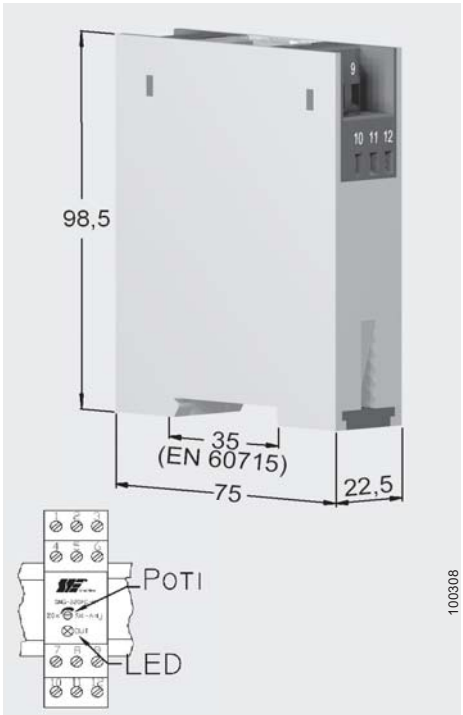
Dip-switch function
Sensor setting (sketch) = as-delivered condition
S1 Time-delay max-sensor
(off: approx. 0.2 s; on: approx. 5 s)
S2 Time-delay min-sensor
(off: approx. 0.2 s; on: approx. 5 s)
S3 Power-on set-up (off: filling; on: emptying)
S4 Output (relay invers)

Functions description
A full - **B** filling - **C** emptying - **D** empty

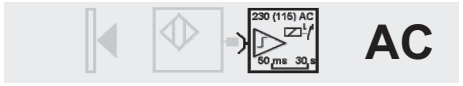
Sensoradjustment
Max-sensor: pot I
Min-sensor: pot II

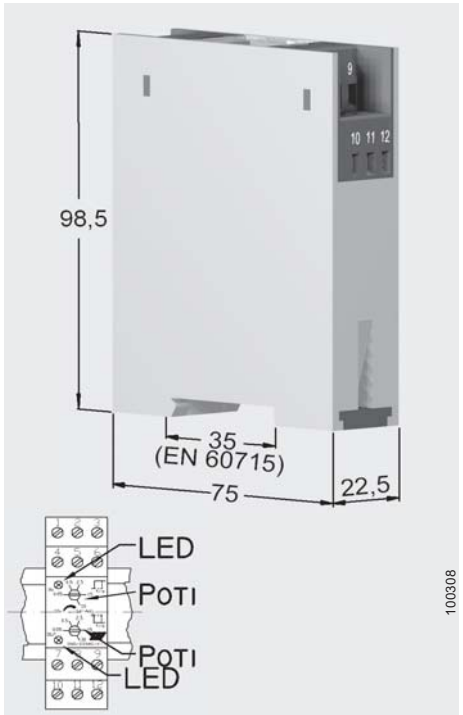
Features
- Min- and max-level sensor controls
- Connection points for the two SK- or SKF series sensors, with separate pot adjustment
- Short circuit proof on the DC side
- Separate switchable delays for either min- and max-sensor





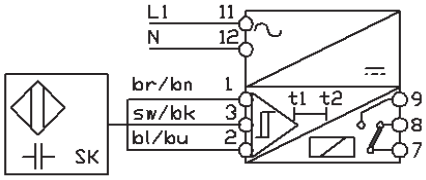
Typ / Type
SNG-230AC-K
SNG-115AC-K





Typ / Type
SNG-230AC-K-T
SNG-115AC-K-T

application notes



10		
-30... 70		
IP 40	IP 20	
250 a.c.		
PC		
-		
max. 2,5mm² / AWG 14		
230 (115) V 40... 60 Hz		
20		
380VAC / 250VDC / 8A		
< 300		
– / •		
–		
–		
IEC 60947-5-2 : 2004 73/23	CE	
SK-...	SL-YA-m20	

10		
-30... 70		
IP 40	IP 20	
250 a.c.		
PC		
-		
max. 2,5mm² / AWG 14		
230 (115) V 40... 60 Hz		
20		
380VAC / 250VDC / 8A		
< 300		
– / •		
-		
-		
IEC 60947-5-2 : 2004 73/23	CE	
SK-...	SL-YA-m20	
	50ms...30s	
	50ms...30s	

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

Table of Contents	Page
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microBOX	7.21
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Sensor power packs	12.01 – 12.03
Accessories	13.01 – 13.05

Sensors for object detection

Series SK1 0600/0650

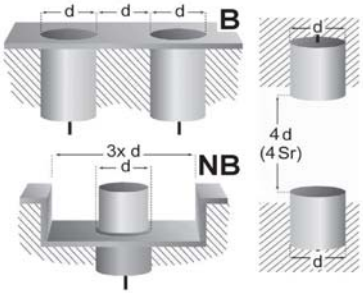
- Model with output stage from Ø–6.5 mm
- Sensing distance adjustable
- Flush mounting
- Connecting lead or plug connector

TÜV CERT CE
DIN EN ISO 9001:2000
QA 05 100 1050

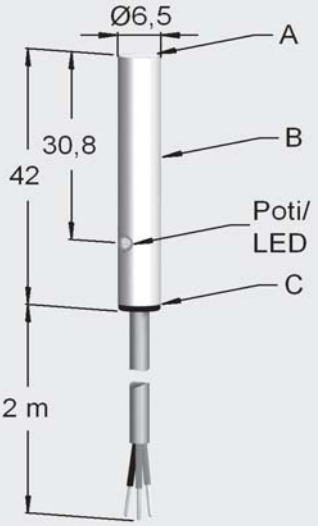
BALLUFF
SIESENSORIK

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	ouput 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



0,1...1,5 P N **6,5Ø**



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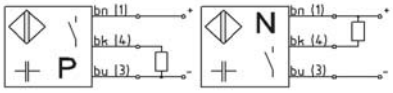
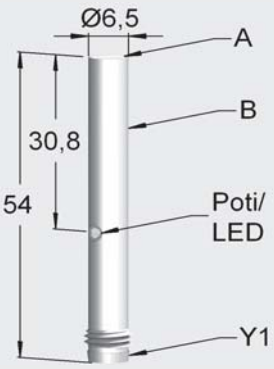


0,1...1,5 P N **6,5Ø**



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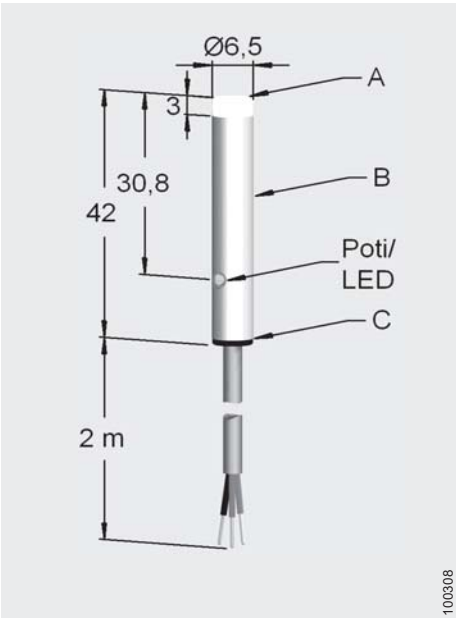
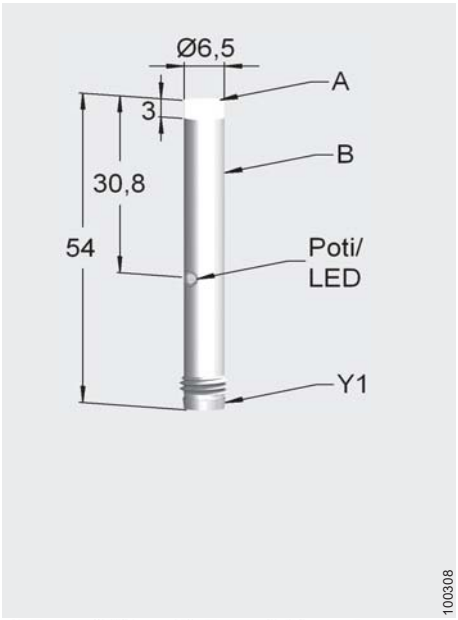
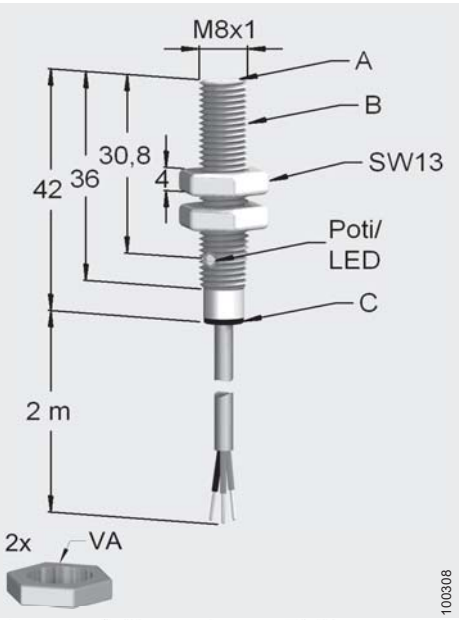
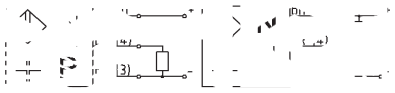
			Typ / Type	**Typ / Type**
			SK1-1.5-6.5-PBS-VA/PTFE	SK1-1.5-6.5-PBS-VA/PTFE-Y1
			SK1-1.5-6.5-PBO-VA/PTFE	SK1-1.5-6.5-PBO-VA/PTFE-Y1
			SK1-1.5-6.5-NBS-VA/PTFE	SK1-1.5-6.5-NBS-VA/PTFE-Y1
			SK1-1.5-6.5-NBO-VA/PTFE	SK1-1.5-6.5-NBO-VA/PTFE-Y1
Mounting [flush / nonflush]		[B / NB]	B	B
Operating distance	Sn	[mm]	0,1...1,5	0,1...1,5
Hysteresis	H	[%SR]	15	15
Frequency of operating cycles	f	[Hz]	100	100
Repeat accuracy	R	[%SR]	2	2
Operating temperature range	Ta	[C°]	-10... 70	-10... 70
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: PTFE; B: V2A; C: POM	A: PTFE; B: V2A; C: PA
Utilisation category				
Connection			2m / 3x 0,14mm^2 PUR	Z10; Z11
Supply voltage range UB	Ub	[V]	11...30	11...30
No-load supply current	Iomax.	[mA]	10	10
Minimum operational current	Im	[mA]		
Operational current	Ie	[mA]	50	50
Off-state current	Ir	[mA]		
Voltage drop	Ud @ Ie	[V]	2	2
Time delay before availability	tv	[ms]		
Indicator [UB / Output]			– / •	– / •
Short circuit- overload-protection			• / •	• / •
Reverse polarity protection			•	•
Conformity	EMC EEC-direct.		IEC 60947-5-2 : 2004 CE	IEC 60947-5-2 : 2004 CE
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				SNG-###AC...
Additional functionality				
Application				

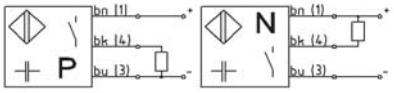
0,1...3	6,5Ø	0,1...3	6,5Ø	0,1...1,5	M8











Typ / Type	Typ / Type	Typ / Type
SK1-3-6.5-PNBS-VA/PTFE	SK1-3-6.5-PNBS-VA/PTFE-Y1	SK1-1.5-M8-PBS-VA/PTFE
SK1-3-6.5-PNBO-VA/PTFE	SK1-3-6.5-PNBO-VA/PTFE-Y1	SK1-1.5-M8-PBO-VA/PTFE
SK1-3-6.5-NNBS-VA/PTFE	SK1-3-6.5-NNBS-VA/PTFE-Y1	SK1-1.5-M8-NBS-VA/PTFE
SK1-3-6.5-NNBO-VA/PTFE	SK1-3-6.5-NNBO-VA/PTFE-Y1	SK1-1.5-M8-NBO-VA/PTFE
NB	NB	B
0,1...3	0,1...3	0,1...1,5
15	15	15
100	100	100
2	2	2
-10... 70	-10... 70	-10... 70
15 [-5... 55]	15 [-5... 55]	15 [-5... 55]
IP 65	IP 65	IP 65
75 d. c.	75 d. c.	75 d. c.
A: PTFE; B: V2A; C: POM	A: PTFE; B: V2A; C: PA	A: PTFE; B: V2A; C: POM
	DC13	DC13
2m / 3x 0,14mm^2 PUR	Z10; Z11	2m / 3x 0,14mm^2 PUR PUR
11...30	11...30	11...30
10	10	10
50	50	50
2	2	2
– / •	– / •	– / •
• / •	• / •	• / •
•	•	•
IEC 60947-5-2 : 2004 CE	IEC 60947-5-2 : 2004 CE	IEC 60947-5-2 : 2004 CE
IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.3-1.1 Mhz. SNG-###AC...	IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.3-1.1 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...

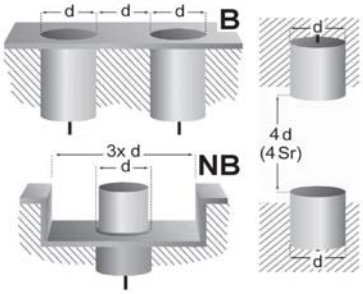
BALLUFF
SIESENSORIK

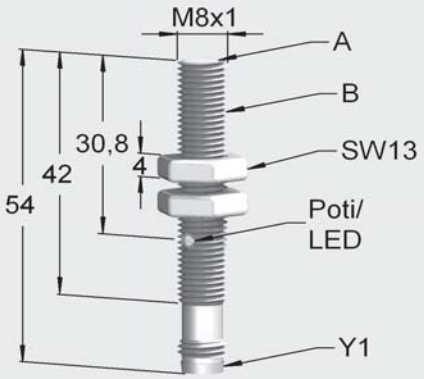
0,1...1,5 **M8**

0,1...3 **M8**

Type code (abstract)

SK SKF SK1 SV(D) SNG	sensor capacitive, w/o amplifier sensor cap., w/o amplifier, flexible sensor capacitive, self-contained sensor amplifier (dynamic) sensor power pack
HT### TM	high temperature use pulse modulation technique (High noise immune)
## / FS(A)	max sensing distance / Fill-level switch (adaptive)
M30	model and/or dimension
P	ouput stage **P**NP, **N**PN, **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





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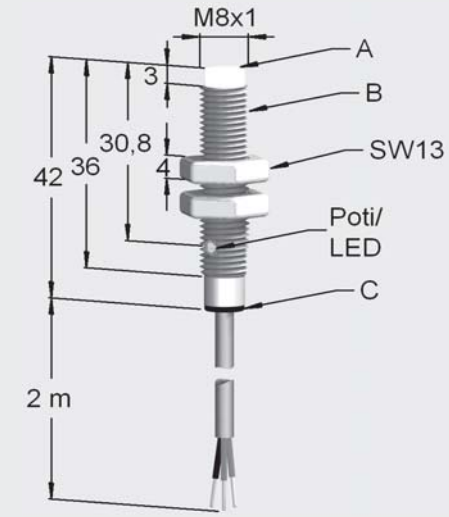

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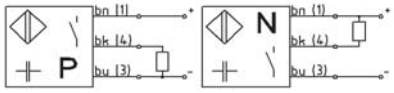
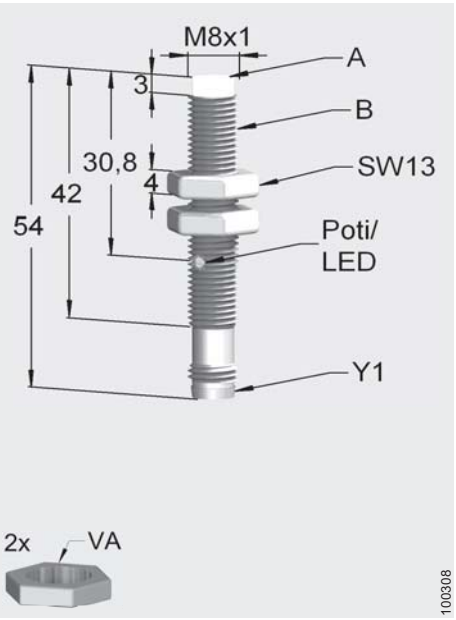
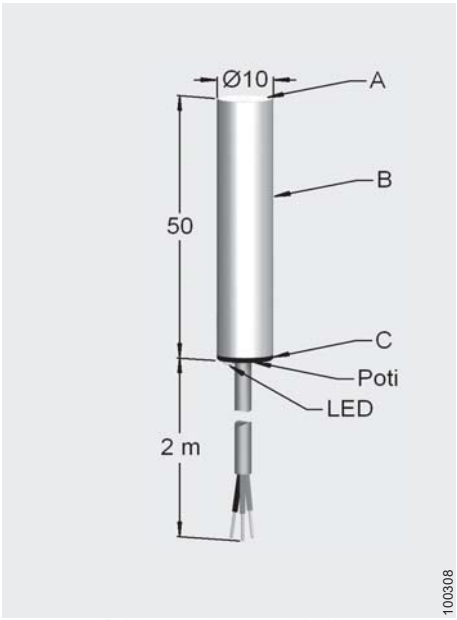
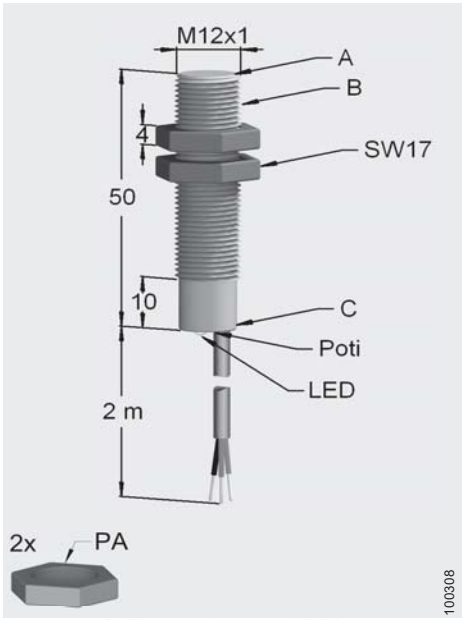


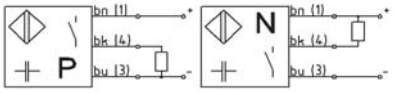
	Typ / Type	Typ / Type
	SK1-1.5-M8-PBS-VA/PTFE-Y1	SK1-3-M8-PNBS-VA/PTFE
	SK1-1.5-M8-PBO-VA/PTFE-Y1	SK1-3-M8-PNBO-VA/PTFE
	SK1-1.5-M8-NBS-VA/PTFE-Y1	SK1-3-M8-NNBS-VA/PTFE
	SK1-1.5-M8-NBO-VA/PTFE-Y1	SK1-3-M8-NNBO-VA/PTFE
Mounting [flush / nonflush] [B / NB]	B	NB
Operating distance Sn [mm]	0,1...1,5	0,1...3
Hysteresis H [%SR]	15	15
Frequency of operating cycles f [Hz]	100	100
Repeat accuracy R [%SR]	2	2
Operating temperature range Ta [C°]	-10... 70	-10... 70
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: PTFE; B: V2A	A: PTFE; B: V2A; C: POM
Utilisation category	DC13	DC13
Connection	Z10; Z11	2m / 3x 0,14mm^2 PUR
Supply voltage range UB Ub [V]	11...30	11...30
No-load supply current Iomax. [mA]	10	10
Minimum operational current Im [mA]		
Operational current Ie [mA]	50	50
Off-state current Ir [mA]		
Voltage drop Ud @ Ie [V]	2	2
Time delay before availability tv [ms]		
Indicator [UB / Output]	– / •	– / •
Short circuit- overload-protection	• / •	• / •
Reverse polarity protection	•	•
Conformity EMC EEC-direct.	IEC 60947-5-2 : 2004 CE	IEC 60947-5-2 : 2004 CE
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 0.25-1.1 Mhz.
Associated equipment	SNG-###AC...	SNG-###AC...
Additional functionality		
Application		

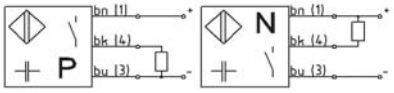
0,1...3	1..4	1..4
M8	**10Ø**	**M12**











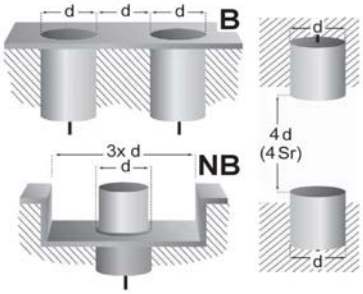
Typ / Type	**Typ / Type**	**Typ / Type**
SK1-3-M8-PNBS-VA/PTFE-Y1	SK1-4-10-PBS-VA/PTFE	SK1-4-M12-PBS-PVC
SK1-3-M8-PNBO-VA/PTFE-Y1	SK1-4-10-PBO-VA/PTFE	SK1-4-M12-PBO-PVC
SK1-3-M8-NNBS-VA/PTFE-Y1	SK1-4-10-NBS-VA/PTFE	SK1-4-M12-NBS-PVC
SK1-3-M8-NNBO-VA/PTFE-Y1	SK1-4-10-NBO-VA/PTFE	SK1-4-M12-NBO-PVC
NB	B	B
0,1...3	1... 4	1... 4
15	15	15
100	100	100
2	2	2
-10... 70	-30... 70	-30... 60
15 [-5... 55]	20 [-5... 55]	20 [-5... 55]
IP 65	IP 65	IP 65
75 d. c.	75 d. c.	75 d. c.
A: PTFE; B: V2A	A: PTFE; B: V2A; C: POM	A: PVC; B: PVC; C: PVC
DC13	DC13	DC13
Z10; Z11	2m / 3x 0,14mm^2 PUR	2m / 3x 0,14mm^2 PUR
11...30	12... 35	12... 35
10	10	10
50	200	200
2	0,8	0,8
– / •	– / •	– / •
• / •	• / •	• / •
•	•	•
IEC 60947-5-2 : 2004 CE	IEC 60947-5-2 : 2004 CE	IEC 60947-5-2 : 2004 CE
IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.25-1.1 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 0.4-1.3 Mhz. SNG-###AC...

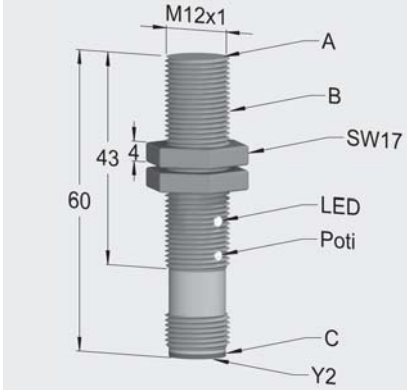
BALLUFF
SIESENSORIK

1..4 M12 1..4 M12

Type code (abstract)

SK SKF SK1 SV(D) SNG	sensor capacitive, w/o amplifier sensor cap., w/o amplifier, flexible sensor capacitive, self-contained sensor amplifier (dynamic) sensor power pack
HT### TM	high temperature use pulse modulation technique (High noise immune)
## / FS(A)	max sensing distance / Fill-level switch (adaptive)
M30	model and/or dimension
P	ouput 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





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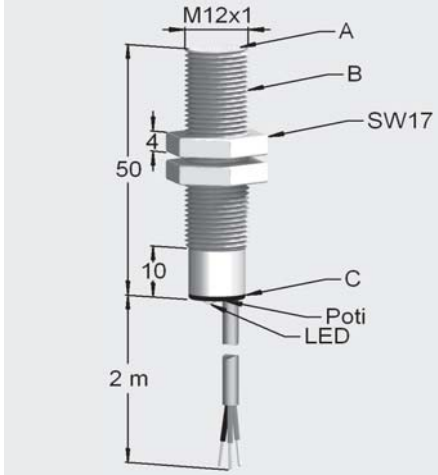

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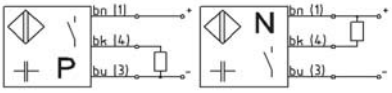
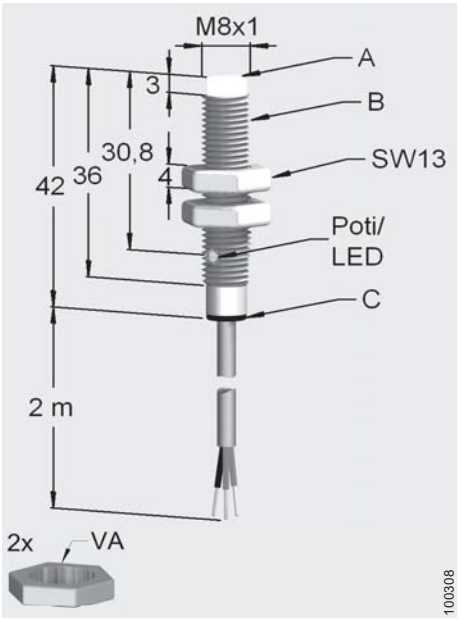
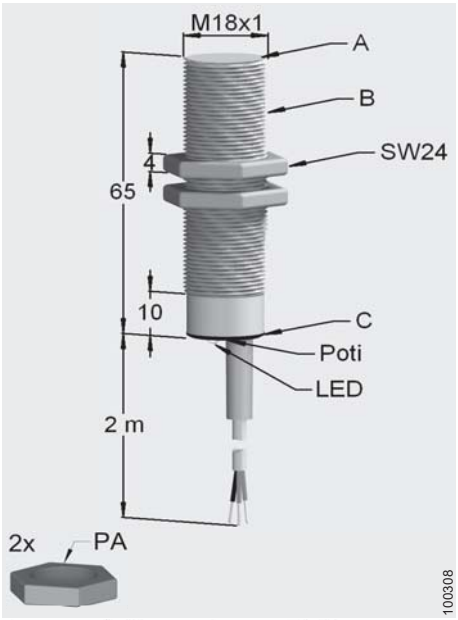
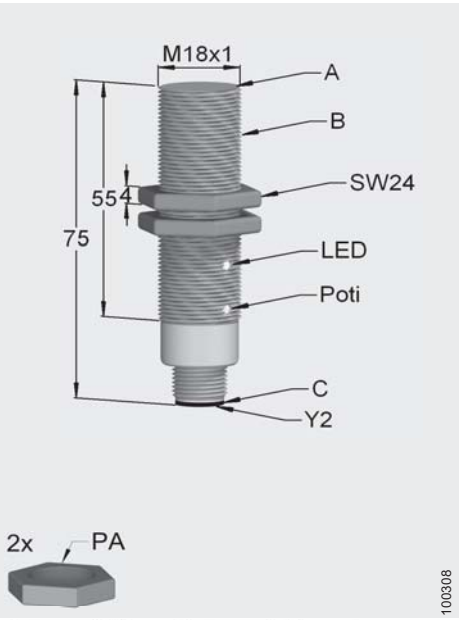
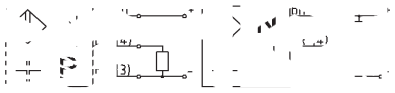
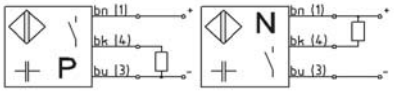


			Typ / Type	**Typ / Type**
			SK1-4-M12-PBS-PVC-Y2 SK1-4-M12-PBO-PVC-Y2 SK1-4-M12-NBS-PVC-Y2 SK1-4-M12-NBO-PVC-Y2	SK1-4-M12-PBS-VA/PTFE SK1-4-M12-PBO-VA/PTFE SK1-4-M12-NBS-VA/PTFE SK1-4-M12-NBO-VA/PTFE
Mounting [flush / nonflush]		[B / NB]	B	B
Operating distance	Sn	[mm]	1... 4	1... 4
Hysteresis	H	[%SR]	15	15
Frequency of operating cycles	f	[Hz]	100	100
Repeat accuracy	R	[%SR]	2	2
Operating temperature range	Ta	[C°]	-30... 60	-30... 70
Temperature drift [range]		[%SR]	20 [-5... 55]	20 [-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:PA	A: PTFE; B: VA; C: POM
Utilisation category			DC13	DC13
Connection			Z20; Z21	2m / 3x 0,14mm^2 PUR
Supply voltage range UB	Ub	[V]	12... 35	12... 35
No-load supply current	Iomax.	[mA]	10	10
Minimum operational current	Im	[mA]		
Operational current	Ie	[mA]	200	200
Off-state current	Ir	[mA]		
Voltage drop	Ud @ Ie	[V]	1,6	0,8
Time delay before availability	tv	[ms]		
Indicator [UB / Output]			– / •	– / •
Short circuit- overload-protection			• / •	• / •
Reverse polarity protection			•	•
Conformity	EMC EEC-direct.		IEC 60947-5-2 : 2004 CE	IEC 60947-5-2 : 2004 CE
EMC			IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.4-1.3 Mhz.	IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.5-0.8 Mhz.
Associated equipment			SNG-###AC...	SNG-###AC...
Additional functionality				
Application				

0,1...3 M8	2..8 M18	2..8 M18
		
		
Typ / Type	**Typ / Type**	**Typ / Type**
SK1-3-M8-PNBS-VA/PTFE	SK1-8-M18-PBS-PVC	SK1-8-M18-PBS-PVC-Y2
SK1-3-M8-PNBO-VA/PTFE	SK1-8-M18-PBO-PVC	SK1-8-M18-PBO-PVC-Y2
SK1-3-M8-NNBS-VA/PTFE	SK1-8-M18-NBS-PVC	SK1-8-M18-NBS-PVC-Y2
SK1-3-M8-NNBO-VA/PTFE	SK1-8-M18-NBO-PVC	SK1-8-M18-NBO-PVC-Y2
NB	B	B
0,1...3	2... 8	2... 8
15	15	15
100	100	100
2	2	2
-10... 70	-30... 60	-30... 60
15 [-5... 55]	15 [-5... 55]	15 [-5... 55]
IP 65	IP 67	IP 67
75 d. c.	75 d. c.	75 d. c.
A: PTFE; B: V2A; C: POM	A: PVC; B: PVC; C: PBT	A: PVC; B: PVC; C: PA
DC13	DC13	DC13
2m / 3x 0,14mm^2 PUR	2m / 3x 0,25mm^2 PVC	Z20; Z21
11...30	10... 35	10... 35
10	10	10
50	300	300
2	1,5	1,5
– / •	– / •	– / •
• / •	• / •	• / •
•	•	•
IEC 60947-5-2 : 2004 CE	IEC 60947-5-2 : 2004 CE	IEC 60947-5-2 : 2004 CE
IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.25-1.1 Mhz. SNG-###AC...	IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.45-1.2 Mhz. SNG-###AC...	IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.55-2 Mhz. SNG-###AC...

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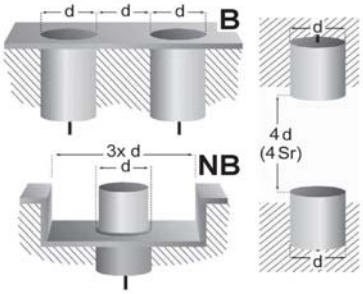
SIESENSORIK

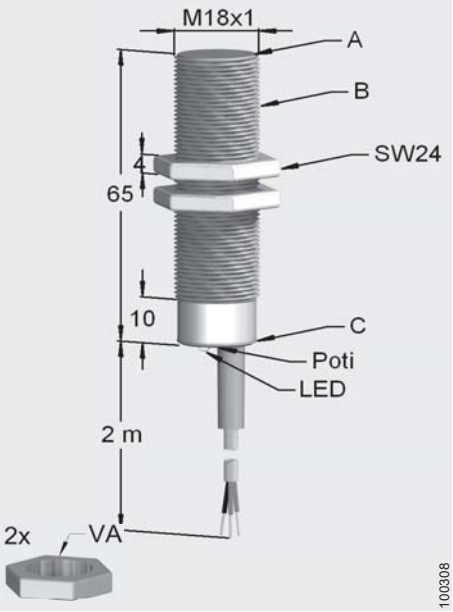
2..8 **M18**

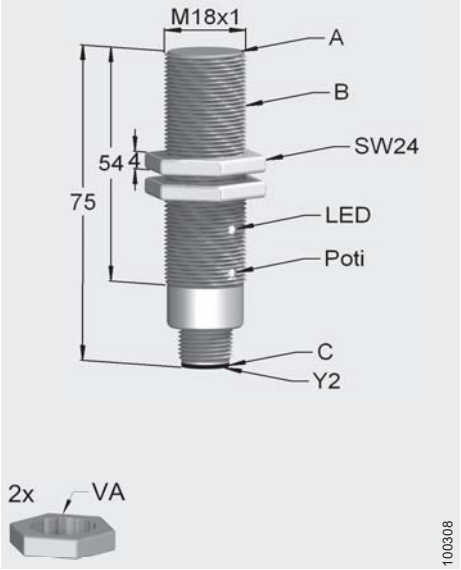
2..8 **M18**

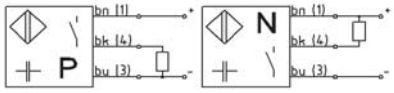
Type code (abstract)

SK SKF SK1 SV(D) SNG	sensor capacitive, w/o amplifier sensor cap., w/o amplifier, flexible sensor capacitive, self-contained sensor amplifier (dynamic) sensor power pack
HT### TM	high temperature use pulse modulation technique (High noise immune)
## / FS(A)	max sensing distance / Fill-level switch (adaptive)
M30	model and/or dimension
P	ouput 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



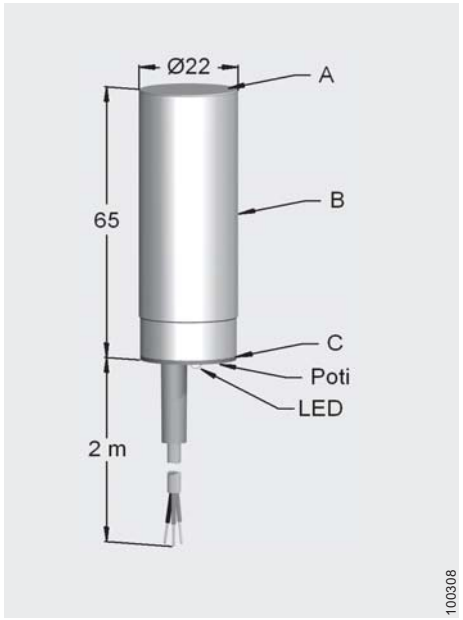


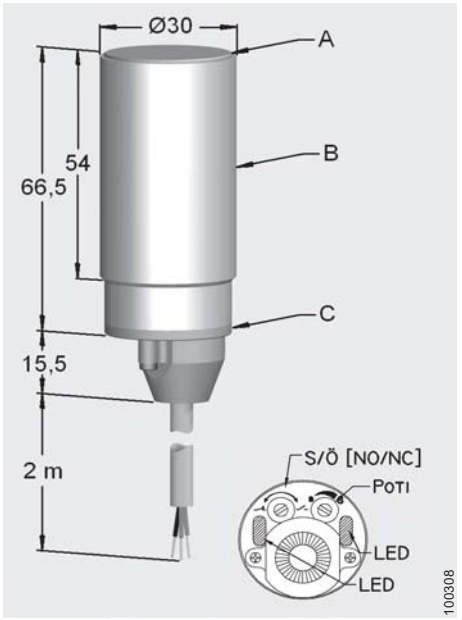


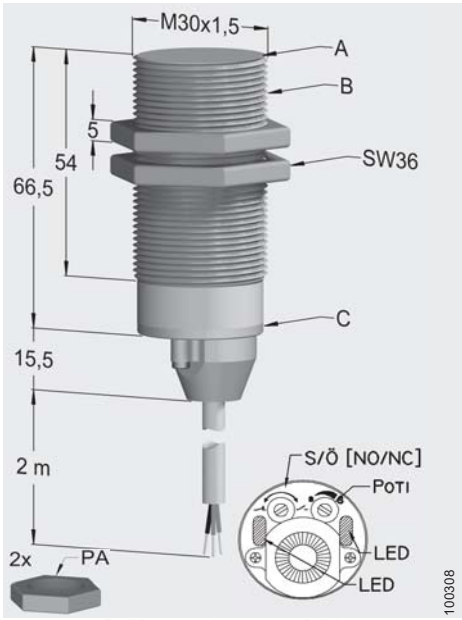


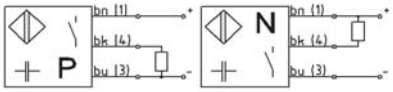
			Typ / Type	**Typ / Type**
			SK1-8-M18-PBS-VA/PBT SK1-8-M18-PBO-VA/PBT SK1-8-M18-NBS-VA/PBT SK1-8-M18-NBO-VA/PBT	SK1-8-M18-PBS-VA/PBT-Y2 SK1-8-M18-PBO-VA/PBT-Y2 SK1-8-M18-NBS-VA/PBT-Y2 SK1-8-M18-NBO-VA/PBT-Y2
Mounting [flush / nonflush]		[B / NB]	B	B
Operating distance	Sn	[mm]	2... 8	2... 8
Hysteresis	H	[%SR]	15	15
Frequency of operating cycles	f	[Hz]	100	100
Repeat accuracy	R	[%SR]	2	2
Operating temperature range	Ta	[C°]	-30... 70	-30... 70
Temperature drift [range]		[%SR]	15 [-5... 55]	15 [-5... 55]
Protection class			IP 67	IP 67
Rated insulation voltage	Ui	[V]	75 d. c.	75 d. c.
Material of housing			A: PBT; B: VA; C:PBT	A: PBT; B: VA; C: PA
Utilisation category			DC13	DC13
Connection			2m / 3x 0,25mm^2 PVC	Z20; Z21
Supply voltage range UB	Ub	[V]	10... 35	10... 35
No-load supply current	Iomax.	[mA]	10	10
Minimum operational current	Im	[mA]		
Operational current	Ie	[mA]	300	300
Off-state current	Ir	[mA]		
Voltage drop	Ud @ Ie	[V]	1,5	1,5
Time delay before availability	tv	[ms]		
Indicator [UB / Output]			– / •	– / •
Short circuit- overload-protection			• / •	• / •
Reverse polarity protection			•	•
Conformity	EMC EEC-direct.		IEC 60947-5-2 : 2004 CE	IEC 60947-5-2 : 2004 CE
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 0.75-2.5 Mhz.
Associated equipment			SNG-###AC...	SNG-###AC...
Additional functionality				
Application				

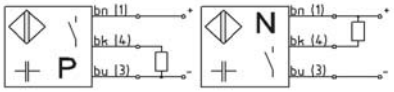
2..10	2..20	1..20
22Ø	30Ø	M30











Typ / Type	Typ / Type	Typ / Type
SK1-10-22-PBS-VA/PVC SK1-10-22-PBO-VA/PVC SK1-10-22-NBS-VA/PVC SK1-10-22-NBO-VA/PVC	SK1-20-30-PBX-VA/PBT SK1-20-30-NBX-VA/PBT	SK1-20-M30-PBX-PBT SK1-20-M30-NBX-PBT
B	B	B
2... 10	2... 20	1... 20
15	15	15
100	100	100
2	5	5
-30... 60	-30... 70	-30... 70
20 [-5... 55]	20 [-5... 55]	20 [-5... 55]
IP 67	A, B: IP 66 / IP 68; C: IP 64	A, B: IP 66 / IP 68; C: IP 64
75 d. c.	75 d. c.	75 d. c.
A: PVC; B: VA; C: PVC	A: PBT; B: VA; C: PBT/PE	A: PBT; B: PBT; C: PBT/PE
DC13	DC13	DC13
2m / 3x 0,25mm^2 PVC	2m / 3x 0,34mm^2 PUR	2m / 3x 0,34mm^2 PUR
10... 35	10... 35	10... 35
10	<15	<15
300	300	300
1,5	1,8	1,8
– / •	• / •	• / •
• / •	• / •	• / •
•	•	•
IEC 60947-5-2 : 2004 CE	IEC 60947-5-2 : 2004 CE	IEC 60947-5-2 : 2004 CE
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 0.15-2.5 Mhz. SNG-###AC...	IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.15-2.5 Mhz. SNG-###AC...

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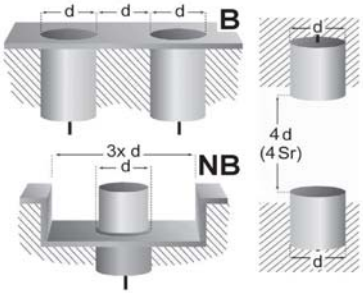
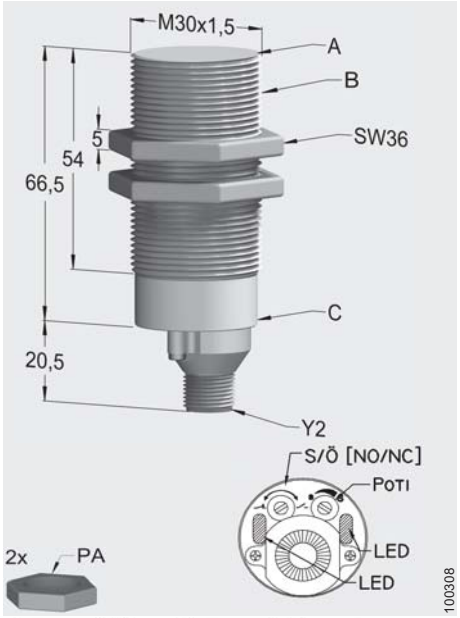
SIESENSORIK

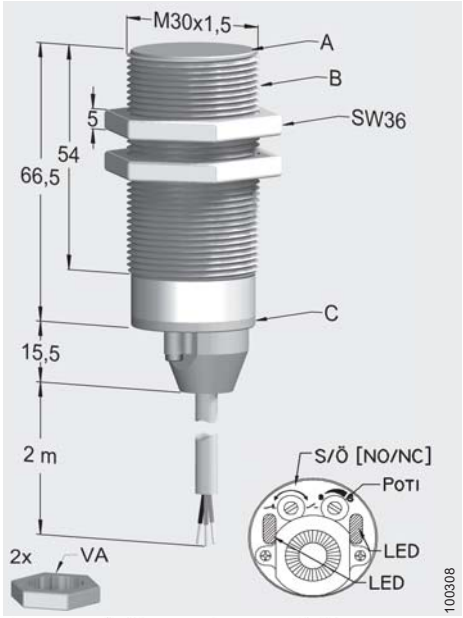
1..20 M30 — 1..20 M30

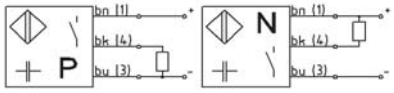
Type code (abstract)

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	ouput 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



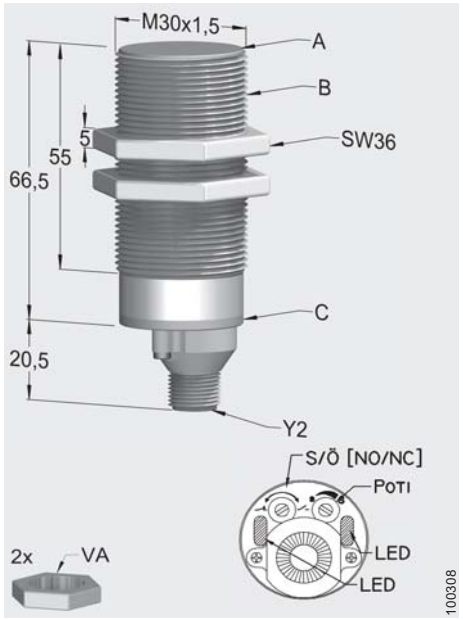


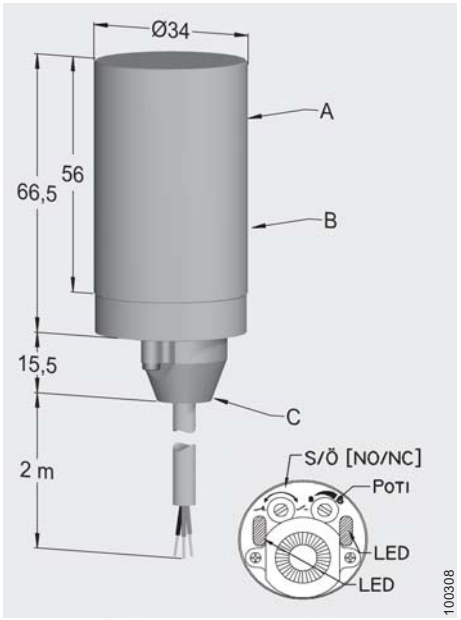


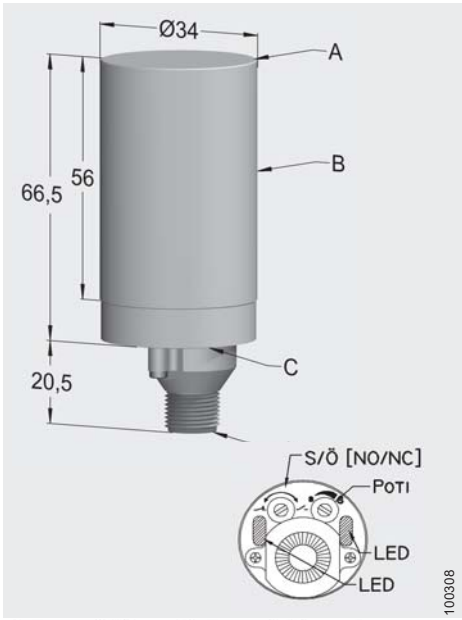


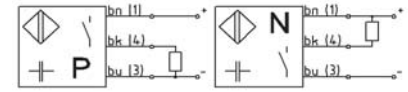
			Typ / Type	**Typ / Type**
			SK1-20-M30-PBX-PBT-Y2	SK1-20-M30-PBX-VA/PBT
			SK1-20-M30-NBX-PBT-Y2	SK1-20-M30-NBX-VA/PBT
Mounting [flush / nonflush]		[B / NB]	B	B
Operating distance	Sn	[mm]	1... 20	1... 20
Hysteresis	H	[%SR]	15	15
Frequency of operating cycles	f	[Hz]	100	100
Repeat accuracy	R	[%SR]	5	5
Operating temperature range	Ta	[C°]	-30... 70	-30... 70
Temperature drift [range]		[%SR]	20 [-5... 55]	20 [-5... 55]
Protection class			A, B: IP 66 / IP 68; C: IP 64	A, B: IP 66 / IP 67; C: IP 64
Rated insulation voltage	Ui	[V]	75 d. c.	75 d. c.
Material of housing			A: PBT; B: PBT; C: PBT/PE	A: PBT; B: VA; C: PBT/PE
Utilisation category			DC13	DC13
Connection			Z20; Z21	2m / 3x 0,34mm^2 PUR
Supply voltage range UB	Ub	[V]	10... 35	10... 35
No-load supply current	Iomax.	[mA]	<15	<15
Minimum operational current	Im	[mA]		
Operational current	Ie	[mA]	300	300
Off-state current	Ir	[mA]		
Voltage drop	Ud @ Ie	[V]	1,8	1,8
Time delay before availability	tv	[ms]		
Indicator [UB / Output]			• / •	• / •
Short circuit- overload-protection			• / •	• / •
Reverse polarity protection			•	•
Conformity		EMC EEC-direct.	IEC 60947-5-2 : 2004 CE	IEC 60947-5-2 : 2004 CE
EMC			IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.15-2.5 Mhz.	IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.15-2.5 Mhz.
Associated equipment			SNG-###AC...	SNG-###AC...
Additional functionality			S / Ö NO / NC	S / Ö NO / NC
Application				

1..20	1..25	1..25
M30	34Ø	34Ø









Typ / Type	**Typ / Type**	**Typ / Type**
SK1-20-M30-PBX-VA/PBT-Y2 SK1-20-M30-NBX-VA/PBT-Y2	SK1-25-34-PBX-PVC SK1-25-34-NBX-PVC	SK1-25-34-PBX-PVC-Y2 SK1-25-34-NBX-PVC-Y2
B	B	B
1... 20	1... 25	1... 25
15	15	15
100	100	100
5	5	5
-30... 70	-30... 60	-30... 60
20 [-5... 55]	20 [-5... 55]	20 [-5... 55]
A, B: IP 66 / IP 67; C: IP 64	A, B: IP 66 / IP 68; C: IP 64	A, B: IP 66 / IP 68; C: IP 64
75 d. c.	75 d. c.	75 d. c.
A: PBT; B: VA; C: PBT/PE	A: PVC; B: PVC; C: PBT/PE	A: PVC; B: PVC; C: PBT/PE
DC13	DC13	DC13
Z20; Z21	2m / 3x 0,34mm^2 PUR	Z20; Z21
10... 35	10... 35	10... 35
<15	<15	<15
300	300	300
1,8	1,8	1,8
• / •	• / •	• / •
• / •	• / •	• / •
•	•	•
IEC 60947-5-2 : 2004 CE	IEC 60947-5-2 : 2004 CE	IEC 60947-5-2 : 2004 CE
IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.15-2.5 Mhz. SNG-###AC...	IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.15-2.4 Mhz. SNG-###AC...	IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.15-2.5 Mhz. SNG-###AC...
S / Ö NO / NC	S / Ö NO / NC	S / Ö NO / NC

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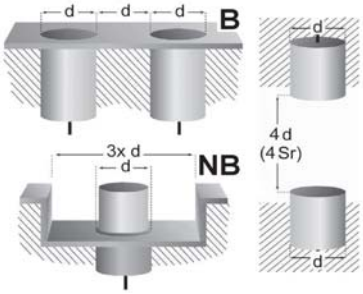
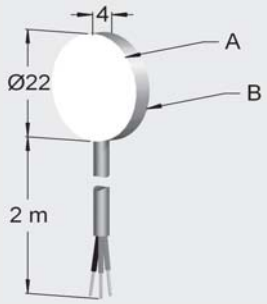
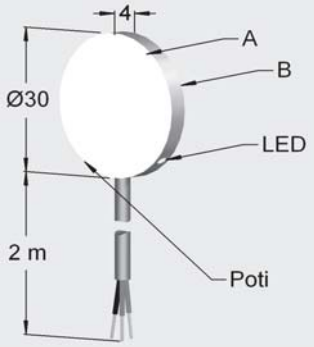
Type code (abstract)

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	ouput stage **P**NP, **N**PN, **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



	6 ±10%	2..15
	22Ø/4	30Ø/4





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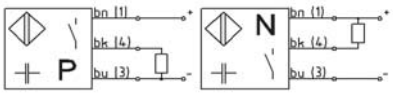

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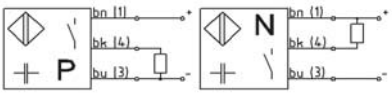
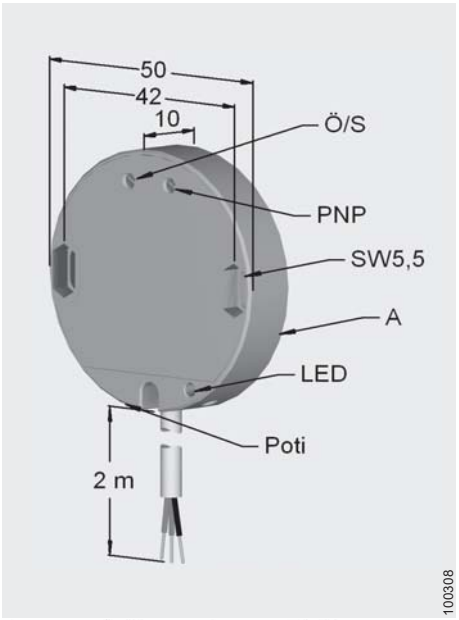
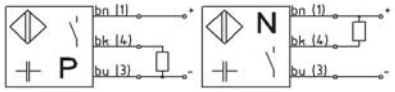


			Typ / Type	Typ / Type
			SK1-6F-22/4-PBS-VA/PTFE	SK1-15-30/4-PBS-VA/PTFE
				SK1-15-30/4-PBO-VA/PTFE
			SK1-6F-22/4-NBS-VA/PTFE	SK1-15-30/4-NBS-VA/PTFE
				SK1-15-30/4-NBO-VA/PTFE
Mounting [flush / nonflush]		[B / NB]	B	B
Operating distance	Sn	[mm]	6... ±10%	2... 15
Hysteresis	H	[%SR]	15	15
Frequency of operating cycles	f	[Hz]	100	100
Repeat accuracy	R	[%SR]	2	2
Operating temperature range	Ta	[C°]	-30... 70	-30... 70
Temperature drift [range]		[%SR]	10 [-5... 55]	10 [-5... 55]
Protection class			IP 67	IP 67
Rated insulation voltage	Ui	[V]	75 d. c.	75 d. c.
Material of housing			A: PTFE; B: V2A	A:PTFE; B: V2A
Utilisation category			DC13	DC13
Connection			2m / 3x 0,14 mm^2 PUR	2m / 3x 0,14 mm^2 PUR
Supply voltage range UB	Ub	[V]	12... 30	10... 35
No-load supply current	Iomax.	[mA]	< 10	< 10
Minimum operational current	Im	[mA]		
Operational current	Ie	[mA]	300	300
Off-state current	Ir	[mA]		
Voltage drop	Ud @ Ie	[V]	0,8	0,8
Time delay before availability	tv	[ms]		
Indicator [UB / Output]			– / –	– / •
Short circuit- overload-protection			• / •	• / •
Reverse polarity protection			•	•
Conformity	EMC EEC-direct.		IEC 60947-5-2 : 2004 CE	IEC 60947-5-2 : 2004 CE
EMC			IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.15-0.6 Mhz.	IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.15-1.7 Mhz.
Associated equipment			SNG-###AC...	SNG-###AC...
Additional functionality				
Application				

2..25 P N 50Ø/10





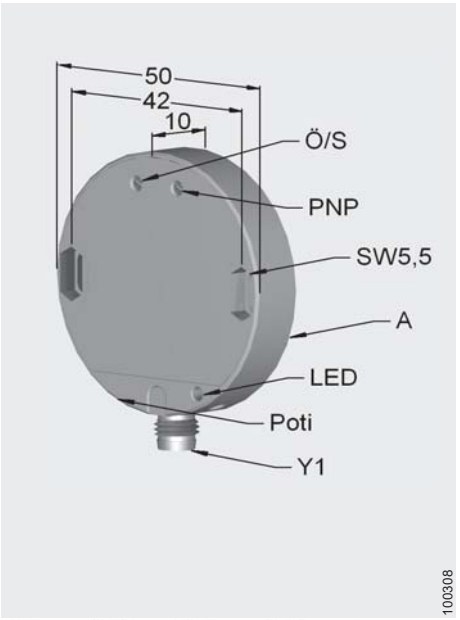
Typ / Type
SK1-25-50/10-XBX-POM

B
2... 25
20
50
2
-30... 60
20 [-5... 55]
IP 67
75 d. c.
POM
DC13
2m / 3x 0,25mm^2 PVC
10... 30
< 15
150
2
– / •
• / •
•
IEC 60947-5-2 : 2004 CE

IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.55-1.6 Mhz.
SNG-###AC...

PNP / NPN P ↔ N
S / Ö NO / NC

2..25 P N 50Ø/10



Typ / Type
SK1-25-50/10-XBX-POM-Y1

B
2... 25
20
50
2
-30... 60
20 [-5... 55]
IP 65
75 d. c.
POM
DC13
Z10; Z11
10... 30
< 15
150
1,5
– / •
• / •
•
IEC 60947-5-2 : 2004 CE

IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.55-1.6 Mhz.
SNG-###AC...

PNP / NPN P ↔ N
S / Ö NO / NC

application notes

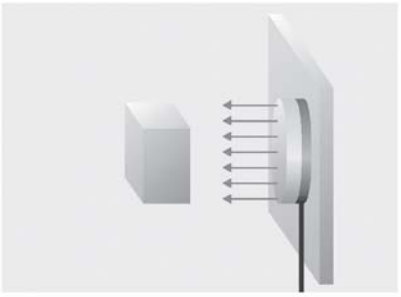
Range of use

As a distance sensor with an adjustable sensing distance of up to 25 mm, the compact-size disk sensor, 50 mm diameter, is suitable for scanning plastics, glass, ceramics, wood, etc. This sensor's large active surface also enables it to be used as a fill level indicator, since it can detect liquids and granules through plastic or glass walls.

Applications

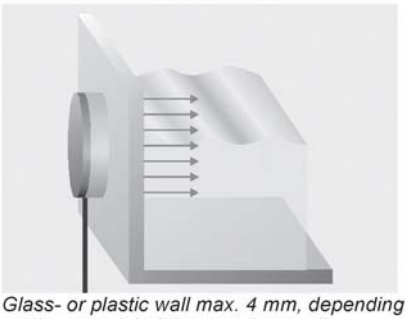
1. Object detection

Detecting plastics, glass, ceramics, wood and all metals, etc.



2. Fill level monitoring

Level control of liquids and granules like water, blood, cereals, coffee beans, etc.



Glass- or plastic wall max. 4 mm, depending on the material of the container wall.

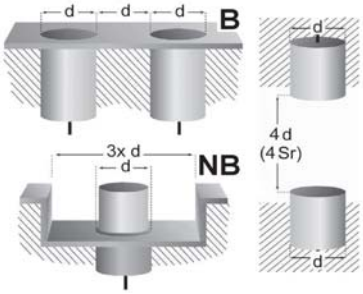
Adjustment
The sensor is adjusted using a flushmounted Potentiometer, adjustment instructions for flush sensor versions see on page 1.09.

Signal evaluation
The SNG series (page 12.01-12.03) of sensor devices 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. The sensor can also be run from a PLC.

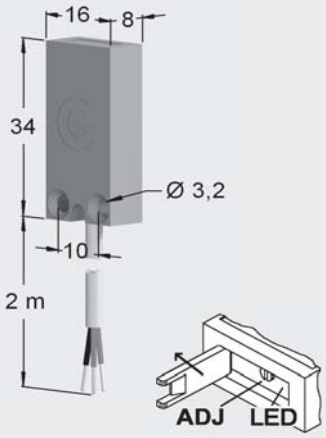
BALLUFF
SIESENSORIK

Type code (abstract)

SK SKF SK1 SV(D) SNG	sensor capacitive, w/o amplifier sensor cap., w/o amplifier, flexible sensor capacitive, self-contained sensor amplifier (dynamic) sensor power pack
HT### TM	high temperature use pulse modulation technique (High noise immune)
## / FS(A)	max sensing distance / Fill-level switch (adaptive)
M30	model and/or dimension
P	ouput stage **P**NP, **N**PN, **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



1...8 mm P N **microBOX**



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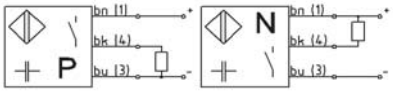
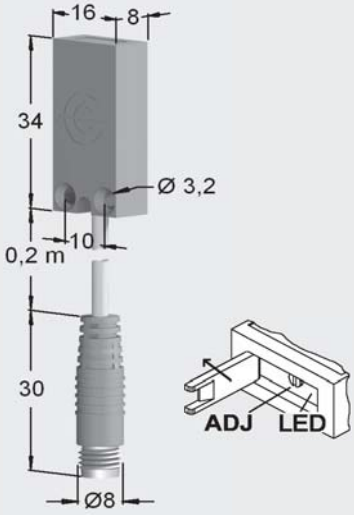


1...8 mm P N **microBOX**



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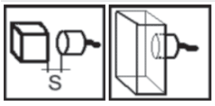
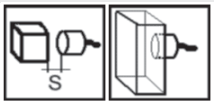
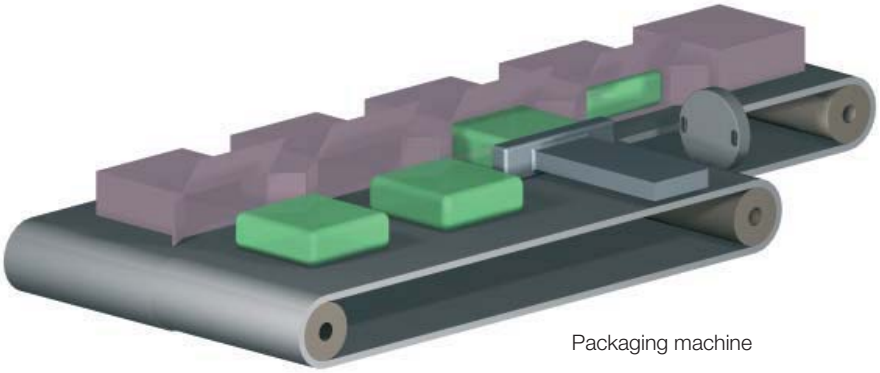
		Typ / Type		**Typ / Type**
		SK1-8-34/16/8-PBS-PP		SK1-8-34/16/8-PBS-PP-M2/Y1
		SK1-8-34/16/8-PBO-PP		SK1-8-34/16/8-PBO-PP-M2/Y1
		SK1-8-34/16/8-NBS-PP		SK1-8-34/16/8-NBS-PP-M2/Y1
		SK1-8-34/16/8-NBO-PP		SK1-8-34/16/8-NBO-PP-M2/Y1
Mounting [flush / nonflush]	[B / NB]	B		B
Operating distance	Sn [mm]	1...8		1...8
Hysteresis	H [%SR]	15		15
Frequency of operating cycles	f [Hz]	100		100
Repeat accuracy	R [%SR]	5		5
Operating temperature range	Ta [C°]	-30... 70		-30... 70
Temperature drift [range]	[%SR]	20 [-5... 55]		20 [-5... 55]
Protection class		IP 67		IP 67
Rated insulation voltage	Ui [V]	75 d. c.		75 d. c.
Material of housing		PP		PP
Utilisation category		DC13		DC13
Connection		2m / 3x 0,14 mm² PUR		0,2m / 3x 0,14mm² PUR; Z10; Z11
Supply voltage range UB	Ub [V]	12... 30		12... 30
No-load supply current	Iomax. [mA]	< 10		< 10
Minimum operational current	Im [mA]	-		-
Operational current	Ie [mA]	50	O.C.	50 O.C.
Off-state current	Ir [mA]			
Voltage drop	Ud @ Ie [V]	1,5		1,5
Time delay before availability	tv [ms]	< 100		< 100
Indicator [UB / Output]		– / •		– / •
Short circuit- overload-protection		• / •		• / •
Reverse polarity protection		•		•
Conformity	EMC EEC-direct.	IEC 60947-5-2 : 2004 CE		IEC 60947-5-2 : 2004 CE
EMC		IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.25-3 Mhz.		IEC 61000-4-6 (Testlevel 3V) Functional errors may occur in partition of working frequency 0.25-3 Mhz.
Associated equipment		SNG-###AC...		SNG-###AC...
Additional functionality				
Application				

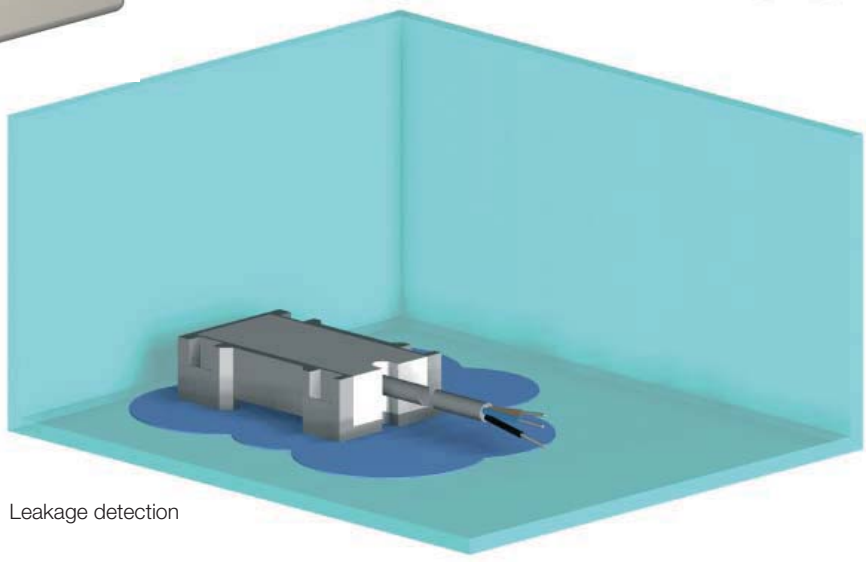
Applications



Packaging machine

Sensing small metal or plastic parts in a tube type feeder

Bulk material sensing through



Leakage detection