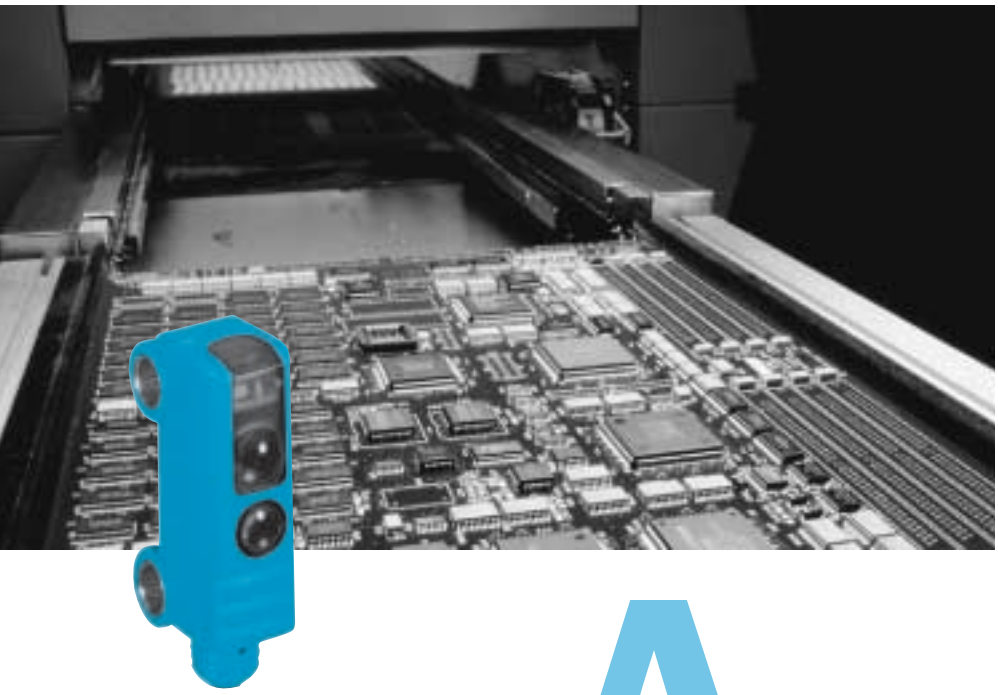
W 2: Subminiature photoelectric switch series: extremely small and extremely strong

DATA SHEET



	Photoelectric proximity switches BGS
	Photoelectric proximity switches energetic, (V optics)
	Photoelectric reflex switches
	Through-beam photoelectric switches

As subminiature photoelectric switches, the sensors of the W 2 series demonstrate their strengths in all places where high demands are put on optical sensors in the most cramped spaces and the most difficult conditions.

Thanks to the integration of exclusively developed optical ASICs and especially for SICK AG designed Pin-Point LED with homogenous light emission, a unique size/performance ratio has been achieved.

Very precise detection jobs can be solved using the photoelectric reflex switches, because:

- A laser-like light spot makes it possible to detect the smallest parts and position objects accurately.
- With variable mounting brackets, precise settings can be made such as presence checks in SMD film strips and tablet blisters and detection of subminiature parts in separating independent of the color.
- Critical and moving backgrounds such as shiny metal parts of robots can be faded out very well.

The photoelectric proximity switch is distinguished by a range unmatched in this size of 1.2 m on a 40 mm x 40 mm reflector.

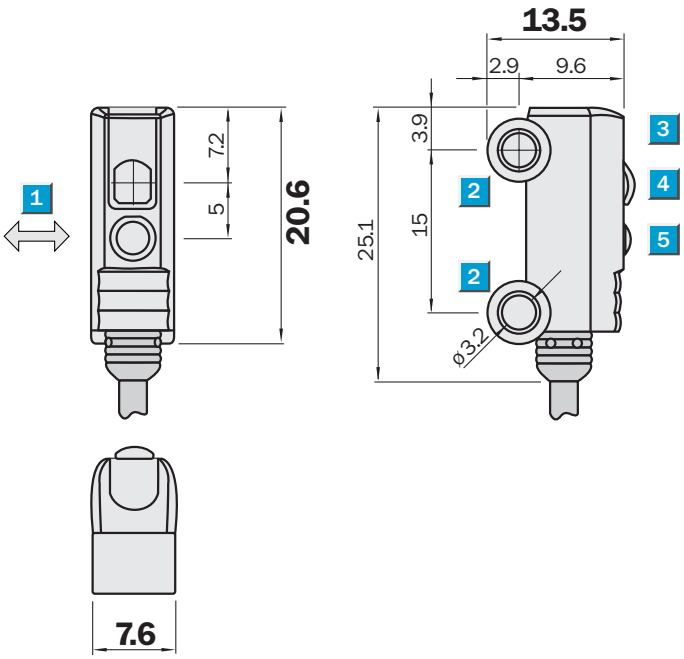
The homogeneous light spot makes the one-way light barrier with a maximum range of 1.2 metres ideal for detecting small parts.

SICK

Scanning distance	1 ... 15 mm
Scanning distance	1 ... 30 mm
Photoelectric proximity switch	

- A focused, laser-like light spot makes the most precise detection jobs possible
- Insensitive to interference from critical backgrounds
- Sturdy housing with metal sleeves for M 3 bolts

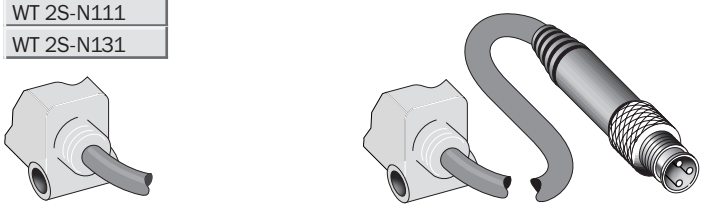
Dimensional drawing



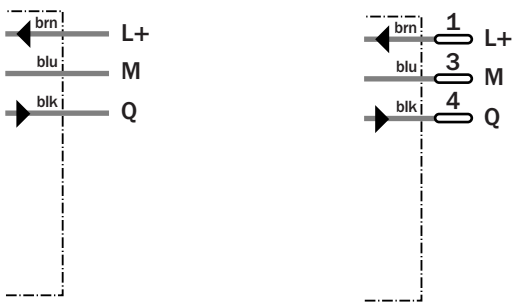
1 Standard direction of material being scanned
2 Mounting hole Ø 3.2 mm
3 LED signal strength indicator
4 Optical axis, receiver
5 Optical axis, sender

Connection types

WT 2S-P111	WT 2S-P211
WT 2S-P131	WT 2S-P231
WT 2S-N111	
WT 2S-N131	



3 x 0.09 mm², Ø 2.4 mm	3-pin, M 8, 200 mm



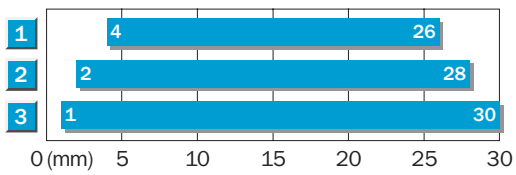
Accessories
Connectors
Mounting systems
Mounting set of screws [1]

[1] included with delivery

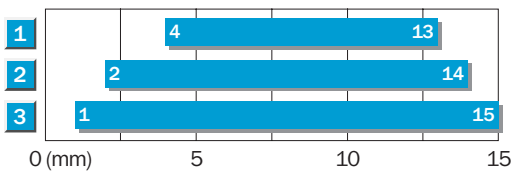
Technical data	WT 2S-	P 111	P 211	N 111	P 131	P 231	N 131
Scanning distance (fix), typ.	1 ... 15 mm [1]	■	■	■			
	1 ... 30 mm [1]				■	■	■
Background suppression from	18 mm	■	■	■			
	35 mm				■	■	■
Light source [2], light type	Pin-Point LED, red light	■	■	■	■	■	■
Light spot diameter	Approx. 1.0 mm at 15 mm				■	■	■
	Approx. 4.5 mm at 30 mm				■	■	■
	Approx. 1.2 mm at 8 mm	■	■	■			
	Approx. 2.5 mm at 15 mm	■	■	■			
Supply voltage V_S	10 ... 30 V DC [3]	■	■	■	■	■	■
Ripple [4]	< 5 V_{PP}	■	■	■	■	■	■
Current consumption [5]	< 20 mA	■	■	■	■	■	■
Switching outputs	PNP, Q	■	■		■	■	
	NPN, Q			■			■
	light-switching	■	■	■	■	■	■
Output current I_A max.	< 50 mA	■	■	■	■	■	■
Response time [6]	< 0.6 ms	■	■	■	■	■	■
Max. switching frequency [7]	800/s	■	■	■	■	■	■
Connection types	Cable [8], 2 m	■		■	■		■
	Cable [8], 200 mm with plug		■			■	
VDE protection class [9]	III	■	■	■	■	■	■
Circuit protection [10]	A, B, C	■	■	■	■	■	■
Enclosure rating	IP 67	■	■	■	■	■	■
Ambient temperature	Operation – 20 °C ... + 50 °C	■	■	■	■	■	■
	Storage – 40 °C ... + 75 °C	■	■	■	■	■	■
Weight	With cable 18 g	■		■	■		■
	With plug 20 g		■			■	
Housing material	ABS, PMMA	■	■	■	■	■	■

1) Tolerance ± 13 %
2) Average service life 75,000 h at T_A = + 25 °C
3) Limit values
4) May not exceed or fall short of V_S tolerances
5) Without load
6) Signal transit time with resistive load
7) With light/dark ratio 1:1
8) PVC, 2.4 mm Ø, do not bend below 0 °C
9) Reference voltage 50 V
10) A = V_S-connections reverse-polarity protected
B = Output Q and $\overline{Q}$ reverse-polarity protected
C = Interference pulse suppression

Scanning distance, 30 mm background suppression



Scanning distance, 15 mm background suppression

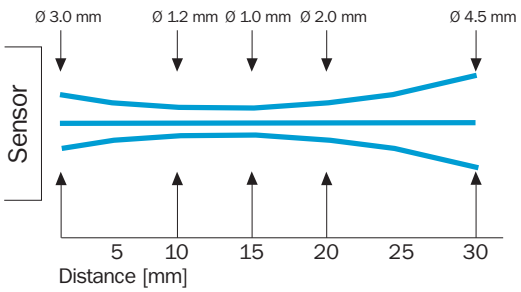


1 Scanning distance on black, 6 % remission
2 Scanning distance on grey, 18 % Remission
3 Scanning distance on white, 90 % Remission

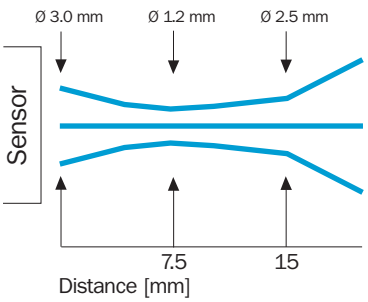
Order information

Type	Part no.
WT 2S-P111	1 022 660
WT 2S-P131	1 022 661
WT 2S-P211	1 022 658
WT 2S-P231	1 022 659
WT 2S-N111	1 022 662
WT 2S-N131	1 022 663

Light spot diameter WT 2S 30 mm HGA



Light spot diameter WT 2S 15 mm HGA

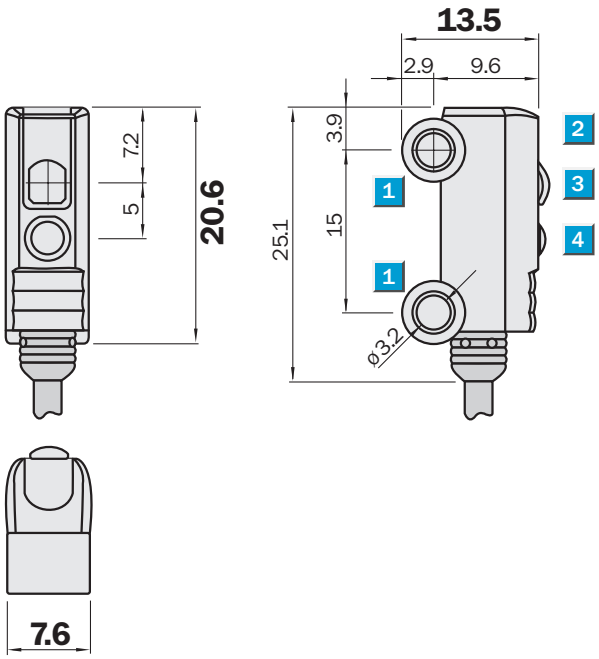


Scanning distance
2 ... 50 mm

Photoelectric proximity switch

- Precise, small light spot
- Extremely good size/ performance ratio
- Sturdy housing with metal sleeves for M 3 bolts

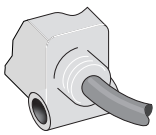
Dimensional drawing



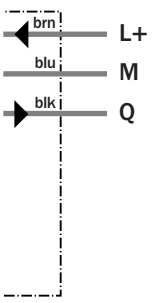
1 Mounting hole Ø 3.2 mm
2 LED signal strength indicator
3 Optical axis, receiver
4 Optical axis, sender

Connection types

WT 2S-P161
WT 2S-N161



3 x 0.09 mm², Ø 2.4 mm



Accessories

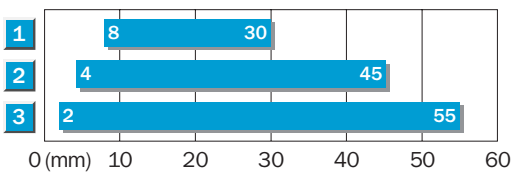
Connectors
Mounting systems
Mounting set of screws [1]

[1] included with delivery

Technical data	WT 2S-	P 161	N 161
Scanning distance (fix), typ.	2 ... 55 mm		
Light source[1], **light type**	Pin-Point LED, red light		
Light spot diameter	Approx. 3.5 mm at 50 mm		
Supply voltage V_S	10 ... 30 V DC[2]		
Ripple[3]	< 5 V_{PP}		
Current consumption[4]	< 20 mA		
Switching outputs	PNP, Q		
	NPN, Q		
	Light-switching		
Output current I_A max.	< 50 mA		
Response time[5]	< 0.6 ms		
Max. switching frequency[6]	800/s		
Connection types	Cable[7], 2 m		
VDE protection class[8]	III		
Circuit protection[9]	A, B, C		
Enclosure rating	IP 67		
Ambient temperature	Operation – 20 °C ... + 50 °C		
	Storage – 40 °C ... + 75 °C		
Weight	With cable 18 g		
Housing material	ABS, PMMA		

1) Average service life 75.000 h at T_A = + 25 °C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) 2 m, PVC, 2.4 mm Ø, do not bend below 0 °C
8) Reference voltage 50 V
9) A = V_S-connections reverse-polarity protected
B = Output Q and $\overline{Q}$ reverse-polarity protected
C = Interference pulse suppression

Scanning distance, 50 mm

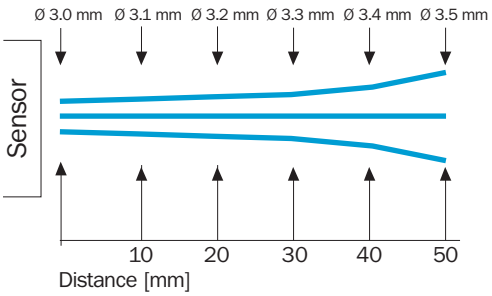


1 Scanning distance on black, 6 % remission
2 Scanning distance on grey, 18 % remission
3 Scanning distance on white, 90 % remission

Order information

Type	Part no.
WT 2S-P161	1 022 664
WT 2S-N161	1 022 665

Light spot diameter WT 2S 50 mm, energetic, V optics



Scanning range
0.8 m/PL 20A

Photoelectric reflex switch

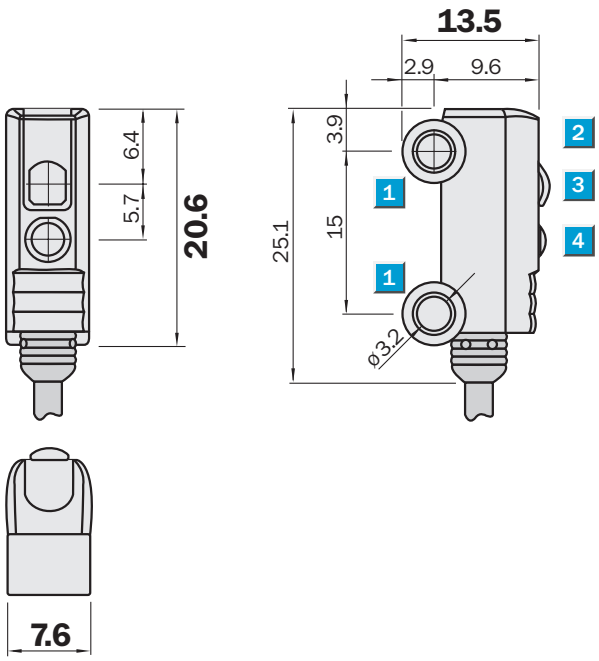
- Extremely good size/ performance ratio
- Easy and fast alignment using ball joint bracket
- Sturdy housing with metal sleeves for M 3 bolts

CE

Accessories
Reflectors
Connectors
Mounting systems
Mounting set of screws [1]

[1] included with delivery

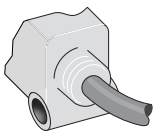
Dimensional drawing



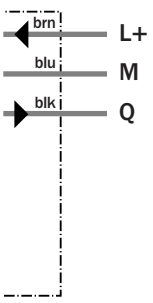
1 Mounting hole Ø 3.2 mm
2 LED signal strength indicator
3 Optical axis, receiver
4 Optical axis, sender

Connection types

WL 2S-F111
WL 2S-E111



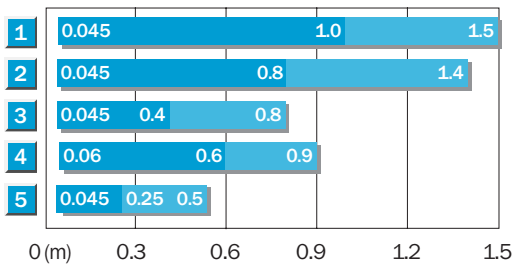
3 x 0.09 mm², Ø 2.4 mm



Technical data	WL 2S-	F 111	E 111
Scanning range, typ. max.	0.8 m/PL 20 A	■	■
Light source[1], light type	Pin-Point LED, red light	■	■
Light spot diameter	10 mm at 100 mm	■	■
Supply voltage V_S	10 ... 30 V DC[2]	■	■
Ripple[3]	< 5 V_{PP}	■	■
Current consumption[4]	< 20 mA	■	■
Switching outputs	PNP, $\bar{Q}$	■	
	NPN, $\bar{Q}$		■
	Dark-switching	■	■
Output current I_A max.	< 50 mA	■	■
Response time[5]	< 0.6 ms	■	■
Max. switching frequency[6]	800/s	■	■
Connection types	Cable[7], 2 m	■	■
VDE protection class[8]	III	■	■
Circuit protection[9]	A, B, C	■	■
Enclosure rating	IP 67	■	■
Ambient temperature	Operation – 20 °C ... + 50 °C	■	■
	Storage – 40 °C ... + 75 °C	■	■
Weight	With cable 18 g	■	■
Housing material	ABS, PMMA	■	■

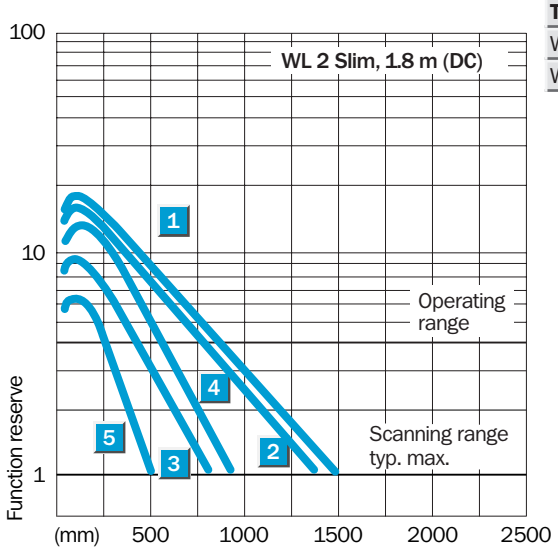
1) Average service life 75.000 h at T_A = + 25 °C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) 2 m, PVC, 2.4 mm Ø, do not bend below 0 °C
8) Reference voltage 50 V
9) A = V_S-connections reverse-polarity protected
B = Output Q and $\bar{Q}$ reverse-polarity protected
C = interference pulse suppression

Operating range and function reserve



Operating range Scanning range typ. max.

	Reflector Type	Operating range
1	PL 40 A	0.045 ... 1.0 m
2	PL 30 A	0.045 ... 0.8 m
3	PL 20 A	0.045 ... 0.4 m
4	PL 22	0.06 ... 0.6 m
5	PL 10 F	0.045 ... 0.25 m



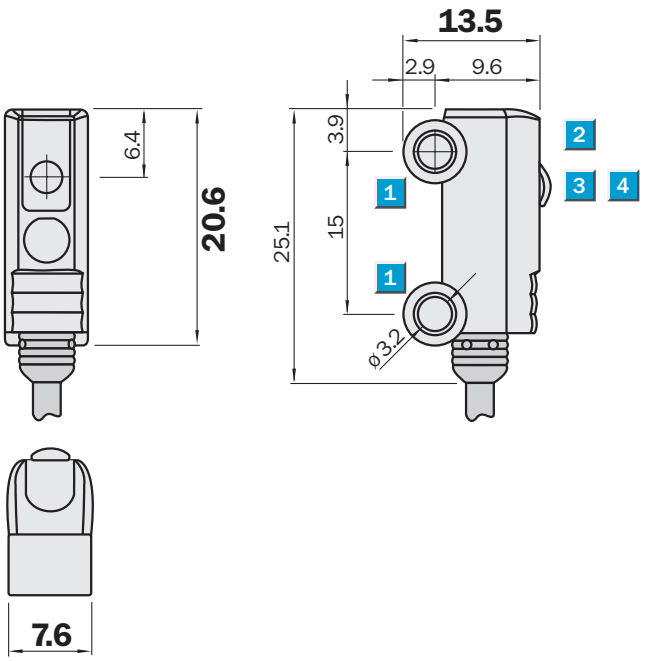
Order information	
Type	**Part no.**
WL 2S-F111	1 022 666
WL 2S-E111	1 022 667

Scanning range 1.2 m

Through-beam photoelectric switch

- Excellent size/performance ratio
- Sturdy housing with metal sleeves for M 3 bolts

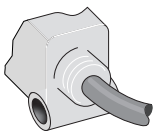
Dimensional drawing



1 Mounting hole Ø 3.2 mm
2 LED signal strength indicator
3 Optical axis, receiver
4 Optical axis, sender

Connection types

WS/WE 2S-F113
WS/WE 2S-E113



Sender	2 x 0.09 mm², Ø 2.4 mm	Receiver	3 x 0.09 mm², Ø 2.4 mm

Accessories

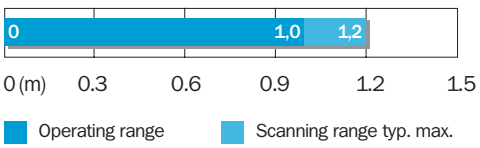
Connectors
Mounting systems
Mounting set of screws [1]

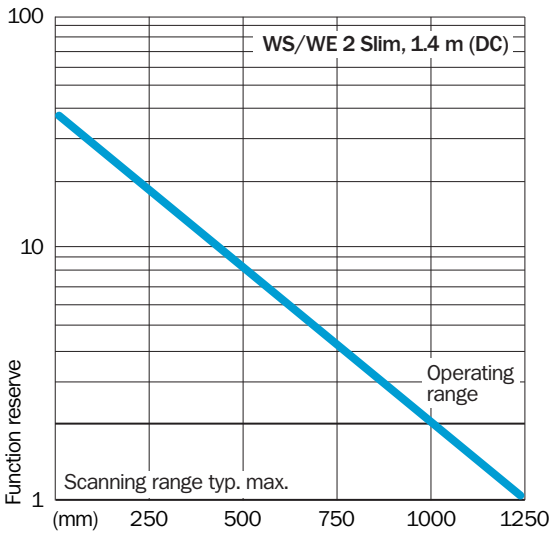
[1] included with delivery

Technical data	WS/WE 2S-	F 113	E 113
Scanning range, typ. max.	1.2 m	■	■
Light source[1], light type	Pin-Point LED, red light	■	■
Light spot diameter	10 mm at 100 mm	■	■
Supply voltage V_S	10 ... 30 V DC[2]	■	■
Ripple[3]	< 5 V_{PP}	■	■
Current consumption[4]	< 10 mA (WE), < 20 mA (WS)	■	■
Switching outputs	PNP, $\bar{Q}$	■	
	NPN, $\bar{Q}$		■
	Dark-switching	■	■
Output current I_A max.	< 50 mA	■	■
Response time[5]	< 2.5 ms	■	■
Max. switching frequency[6]	200/s	■	■
Connection types	Cable[7], 2 m	■	■
VDE protection class[8]	III	■	■
Circuit protection[9]	A, B, C	■	■
Enclosure rating	IP 67	■	■
Ambient temperature	Operation – 20 °C ... + 50 °C	■	■
	Storage – 40 °C ... + 75 °C	■	■
Weight	With cable 36 g	■	■
Housing material	ABS, PMMA	■	■

1) Average service life 75.000 h at T_A = + 25 °C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) 2 m, PVC, 2.4 mm Ø, do not bend below 0 °C
8) Reference voltage 50 V
9) A = V_S-connections reverse-polarity protected
B = Output Q and $\bar{Q}$ reverse-polarity protected
C = Interference pulse suppression

Operating range und function reserve





Order information

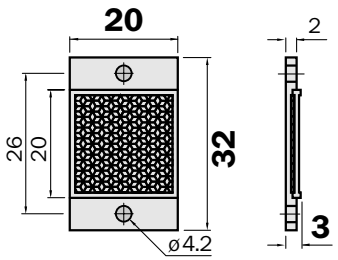
Type	Part no.
WS/WE 2S-F113	1 022 668
WS/WE 2S-E113	1 022 669

Dimensional drawings and order informations

Plastic design for temperatures up to 65 °C

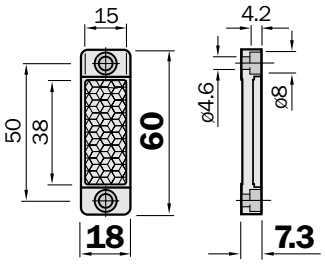
Reflector, 20 x 20 mm, micro triple

Type	Part no.
PL 10 F	5 311 210



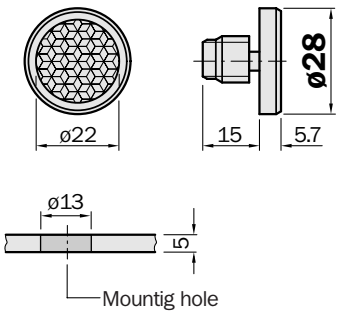
Reflector, 20 x 40 mm

Type	Part no.
PL 20 A	1 012 719



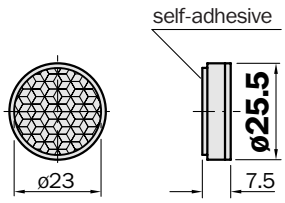
Reflector, ∅ 22 mm, plug-in style

Type	Part no.
PL 22-1	1 003 546



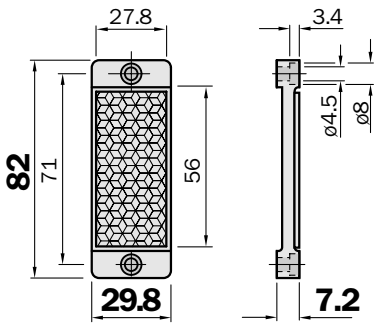
Reflector, ∅ 22 mm, self-adhesive

Type	Part no.
PL 22-2	1 003 621



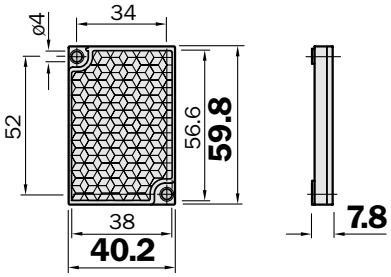
Reflector, 30 x 50 mm

Type	Part no.
PL 30 A	1 002 314



Reflector, 40 x 60 mm

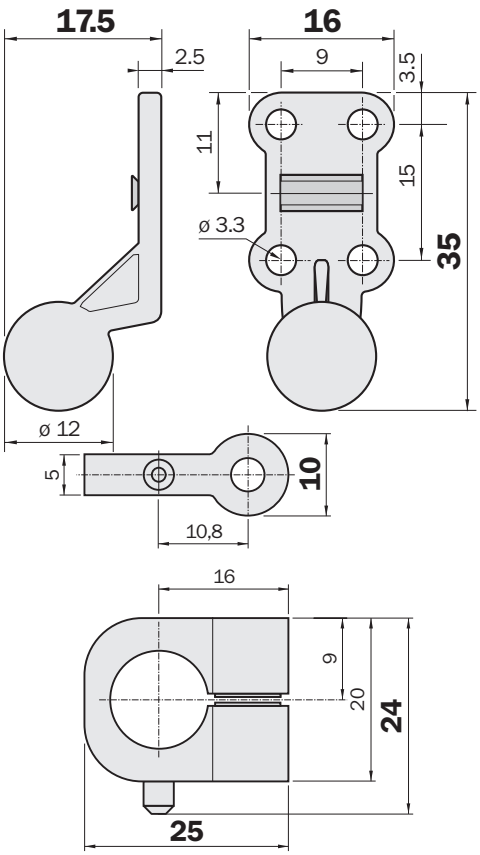
Type	Part no.
PL 40 A	1 012 720

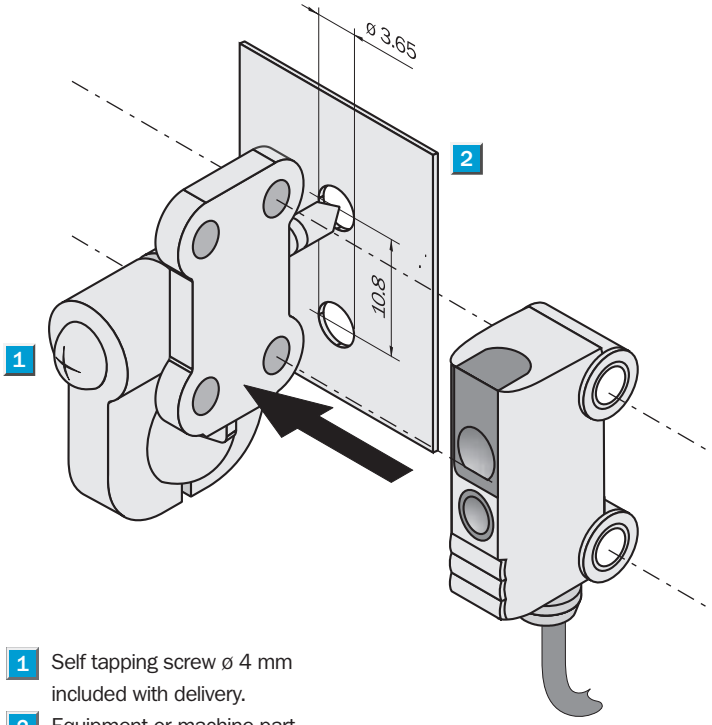


Dimensional drawings and order informations

Ball joint bracket with self-grooving screw ø 4 mm

Type	Part no.
BEF-GH-Mini01	2 023 160



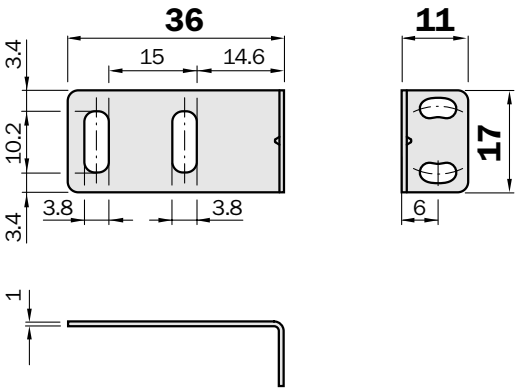


1 Self tapping screw ø 4 mm included with delivery.

2 Equipment or machine part.
Screw M 3 x 16 mm included with delivery.

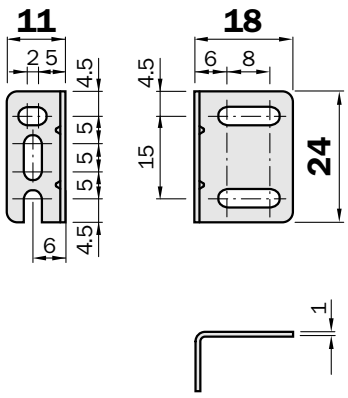
Mounting bracket floor mounting for W 2 Slim

Type	Part no.
BEF-W2S-A	4 034 748



Mounting bracket wall mounting for W 2 Slim

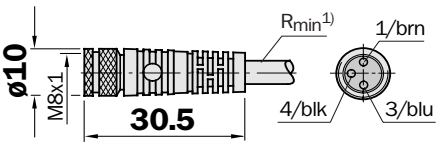
Type	Part no.
BEF-W2S-B	4 034 749



SENSICK screw-in system M 8, 3-pin, enclosure rating IP 67

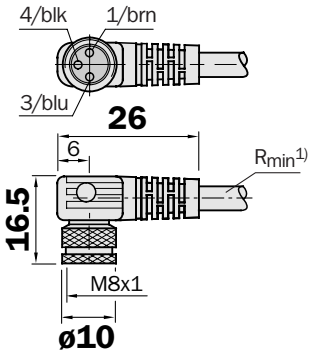
Female connector M 8, 3-pin, straight
Cable diameter 5 mm, 3 x 0.34 mm², sheath PVC

Type	Part no.	Cable length
DOL-0803-G02M	6 010 785	2 m
DOL-0803-G05M	6 022 009	5 m
DOL-0803-G10M	6 022 011	10 m



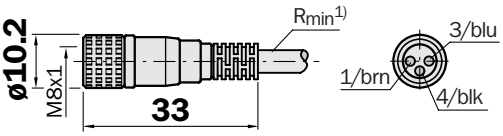
Female connector M 8, 3-pin, right angled
Cable diameter 5 mm, 3 x 0.34 mm², sheath PVC

Type	Part no.	Cable length
DOL-0803-W02M	6 008 489	2 m
DOL-0803-W05M	6 022 010	5 m
DOL-0803-W10M	6 022 012	10 m



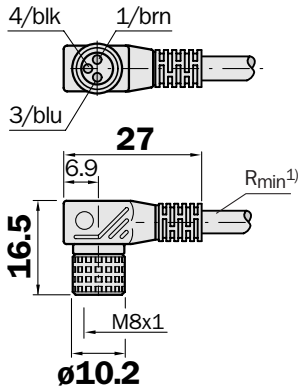
Female connector M 8, 3-pin, straight
Cable diameter 4.5 mm, 3 x 0.25 mm², sheath PUR

Type	Part no.	Cable length
DOL-0803-G05MB	7 902 080	5 m



Female connector M 8, 3-pin, right angled
Cable diameter 4.5 mm, 3 x 0.25 mm², sheath PUR

Type	Part no.	Cable length
DOL-0803-W05MB	7 902 081	5 m



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