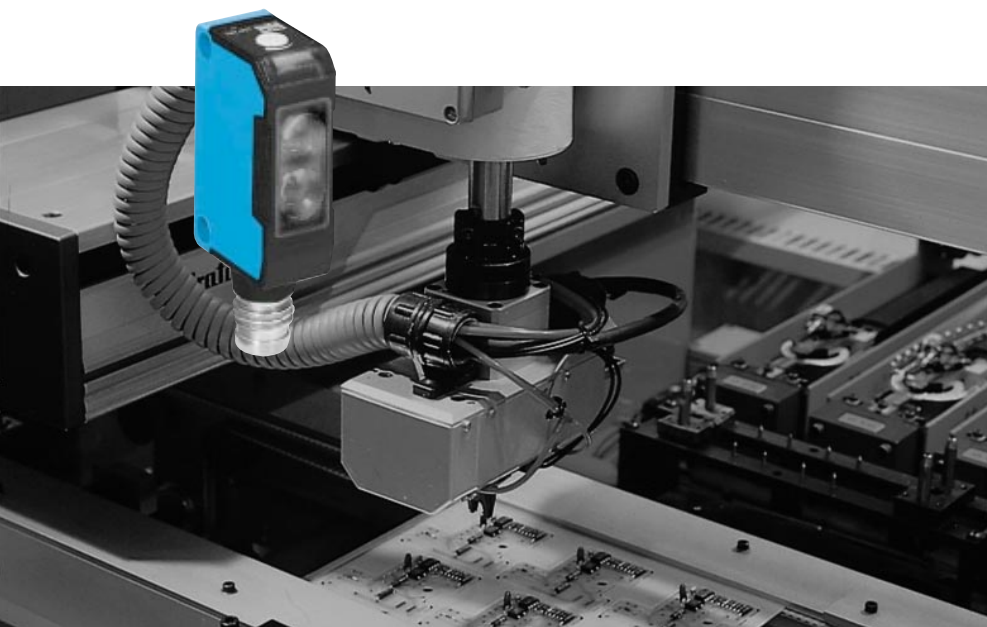


W 150: Miniature photoelectric switch series with completely integrated electronics



- Special mechanical engineering tasks.

The W 150 optics systems and their ranges:

- WS/WE 150 through-beam photoelectric switch: 4.4 m, slotted masks as accessory.
- WL 150 photoelectric reflex switch : 2.4 m (PL 80 A), with polarizing filter.
- WL 150 photoelectric reflex switch with increased sensitivity: 0.7 m, especially for detecting transparent objects such as glass and film.
- WT 150 photoelectric proximity switch, energetic: scanning distance = 250 mm (90% reflectance), for standard scanning jobs. With background suppression: scanning distance = 100 mm, adjustable; for reliable operation even with otherwise interfering background influences.

	BGS photoelectric proximity switches
	Photoelectric proximity switches energetic
	Photoelectric reflex switches
	Through-beam photoelectric switches

The W 150 photoelectric switches provide the system data and features of standard photoelectric switches without restrictions. The high scanning ranges are a special focal point. W 150 devices are always the right choice when little space is available for equipment mounting.

Consequently, they are especially successful in the typical application fields:

- Electronic components and printed circuit production,
- Packaging and graphic arts industries,
- Assembly and handling technologies,

All electrical and mechanical values fulfill the standard for adjustable potentiometers, IP 67, $V_s = 10 \dots 30$ V DC, PNP or NPN switching output, M 8 plug or cable ...

The visible red light of the transmission LED simplifies handling additionally.

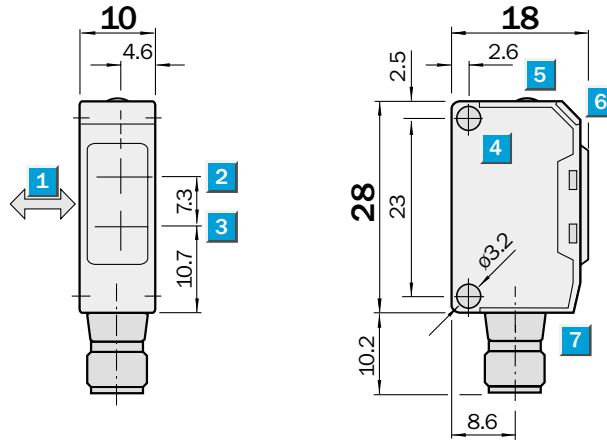


Scanning distance
2 ... 100 mm

Photoelectric proximity switch

- With background suppression (BGS), consequently reliable detection of dark objects in front of a light background
- Switching point largely independent of object color and surface
- Scanning distance can be adjusted stepless, scanning distance control (5 turns)

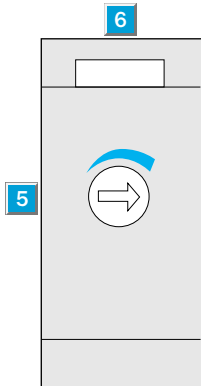
Dimension illustration



Setting options

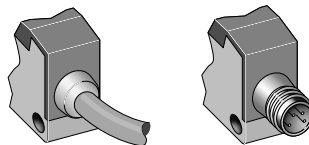
WT 150-P 162
WT 150-N 162
WT 150-P 460
WT 150-N 460

- 1 Standard direction of the material to be scanned
- 2 Optics center, receiver
- 3 Optics center, transmitter
- 4 Mounting hole \varnothing 3.2 mm
- 5 Scanning distance control (5 turns)
- 6 Red LED indicator:
Light reception \geq switching threshold
- 7 M 8 plug, 4 pin or connection cable



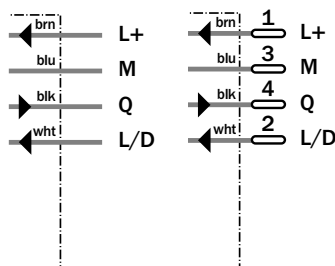
Connection type

WT 150-P 162	WT 150-P 460
WT 150-N 162	WT 150-N 460



4 x 0.18 mm²

4 pin, M 8



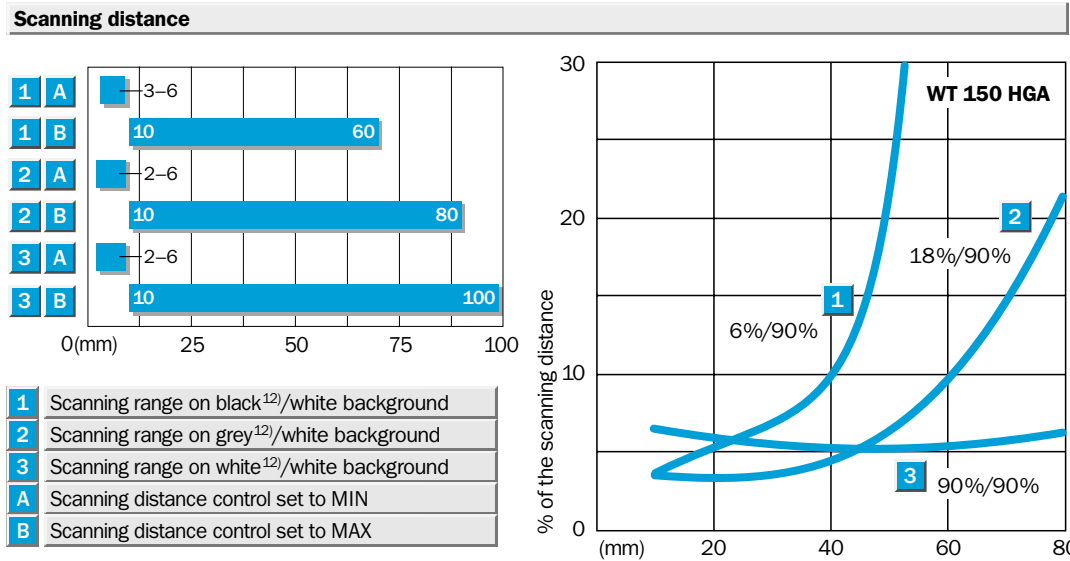
Accessories

- Cable receptacles
- Mounting bracket Type A*


* Provided with equipment

Technical data		WT 150-	P 162	P 460	N 162	N 460						
Scanning distance , typ. max.	2 ... 100 mm ¹⁾ , adjustable											
Operating distance												
Object with 90% reflectance	Min. 2 ... 6 mm to max. 10 ... 100 mm											
Object with 18% reflectance	Min. 2 ... 6 mm to max. 10 ... 80 mm											
Object with 6% reflectance	Min. 3 ... 6 mm to max. 10 ... 60 mm											
Scanning distance, adjustable	Potentiometer, 5 rotations											
Background suppression	In % of the set scanning distance (See characteristic curve)											
Light source ²⁾												
Light spot diameter	Approx. 4 mm at 40 mm distance											
Transmitter dispersion angle	Approx. 5°											
Supply voltage V _s												
Ripple ⁴⁾	± 10%											
Current consumption ⁵⁾	≤ 20 mA											
Switching outputs												
	PNP, open collector: Q											
	NPN, open collector: Q											
Output current I _A max.	100 mA											
Switching type ⁶⁾	Light/dark switching via control wire L/D + V _s = light switching 0 V = dark switching											
Response time ⁷⁾	≤ 0.5 ms											
Switching frequency max. ⁸⁾	1000/s											
Connection type												
cable	PVC, 2 m ⁹⁾ ; 4 x 0.18 mm ² , Ø 3.5 mm											
plug	M 8 – 4 pin											
VDE protection class ¹⁰⁾												
	□											
Circuit protection ¹¹⁾												
	A, B, C, D											
Enclosure rating												
	IP 67											
Ambient temperature												
	Operation – 25 °C ... + 55 °C Storage – 40 °C ... + 75 °C											
Weight												
	with cable 2 m Approx. 44 g											
	with plug M 8 – 4 pin Approx. 7 g											
Housing material												
	Housing: ABS /optics: PC											

- 1) Object with 90% reflectance (with reference to standard white according to DIN 5033)
- 2) Average service life 100,000 h at T_J = +25 °C
- 3) Limit values
- 4) Must be within V_s tolerances
- 5) Without load
- 6) Control wire open:
NPN: light switching
PNP: dark switching
- 7) With resistive load
- 8) With light/dark ratio 1 : 1
- 9) Do not bend cable below 0 °C
- 10) Rated voltage 50 V DC
- 11) A = V_s connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected
C = Interference suppression
D = Outputs overcurrent and short-circuit protected
- 12) Black = 6% reflectance
Gray = 18% reflectance
White = 90% reflectance



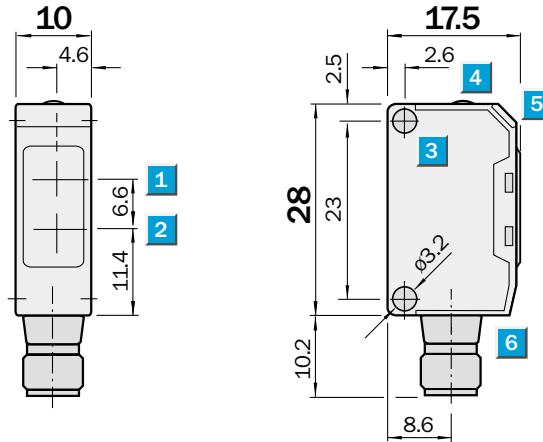
Order information	
Type	Order no.
WT 150-P 162	6 011 048
WT 150-P 460	6 011 050
WT 150-N 162	6 011 045
WT 150-N 460	6 011 047

 **Scanning distance**
10 ... 250 mm

Photoelectric proximity switch

- Energetic photoelectric proximity switch
 - for standard applications
 - for simple contrast detection
- Adjustable switching point with sensitivity potentiometer

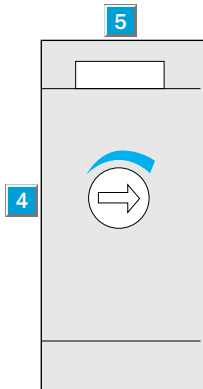
Dimension illustration



Setting options

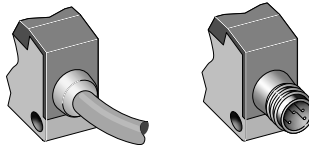
WT 150-P 132
WT 150-N 132
WT 150-P 430
WT 150-N 430

- 1** Optics center, receiver
- 2** Optics center, transmitter
- 3** Mounting hole \varnothing 3.2 mm
- 4** Sensitivity control 270°
- 5** Red LED indicator:
Light reception \geq switching threshold
- 6** M 8 plug, 4 pin or connection cable



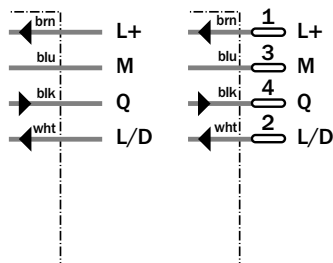
Connection type

WT 150-P 132	WT 150-P 430
WT 150-N 132	WT 150-N 430



4 x 0.18 mm²

4 pin, M 8



Accessories

- Cable receptacles
- Mounting bracket Type A*

* Provided with equipment

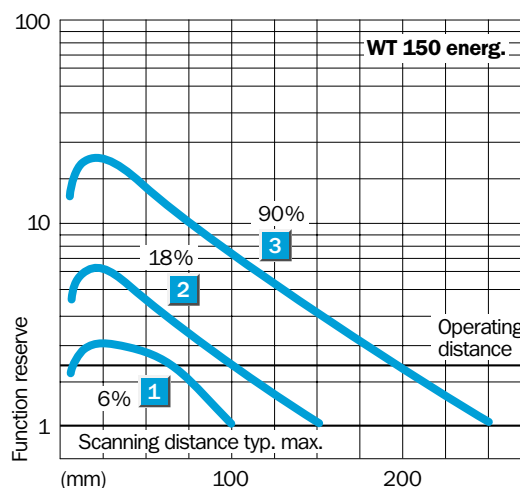
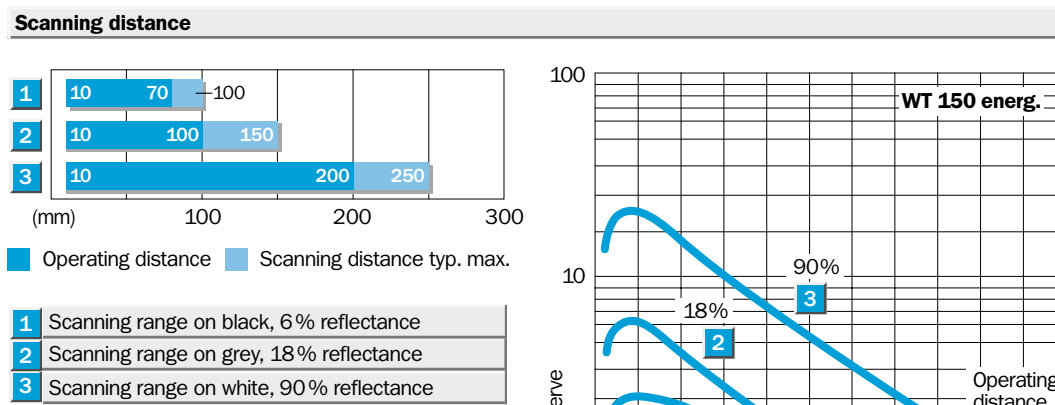
Technical data		WT 150-	P 132	P 430	N 132	N 430						
Scanning distance , typ. max.	10 ... 250 mm ¹⁾											
Operating distance	10 ... 200 mm ¹⁾											
Sensitivity, adjustable	Potentiometer, 270°											
Light source ²⁾	LED, visible red light											
Light spot diameter	Approx. 20 mm at 200 mm distance											
Transmitter dispersion angle	Approx. 6°											
Supply voltage V _s	10 ... 30 V DC ³⁾											
Ripple ⁴⁾	± 10 %											
Current consumption ⁵⁾	≤ 20 mA											
Switching outputs	PNP, open collector: Q											
	NPN, open collector: Q											
Output current I _A max.	100 mA											
Switching type ⁶⁾	Light/dark switching via control wire L/D											
	+ V _s = light switching											
	0 V = dark switching											
Response time ⁷⁾	≤ 0.5 ms											
Switching frequency max. ⁸⁾	1000/s											
Connection type	cable PVC, 2 m ⁹⁾ ; 4 x 0.18 mm ² , ø 3.5 mm											
	plug M 8 – 4 pin											
VDE protection class ¹⁰⁾	□											
Circuit protection ¹¹⁾	A, B, C, D											
Enclosure rating	IP 67											
Ambient temperature	Operation – 25 °C ... + 55 °C											
	Storage – 40 °C ... + 70 °C											
Weight												
	with cable 2 m Approx. 44 g											
	with plug M 8 – 4 pin Approx. 7 g											
Housing material	Housing: ABS/optics: PC											

¹⁾ Object with 90 % reflectance (with reference to standard white according to DIN 5033)
²⁾ Average service life 100,000 h at T_U = +25 °C

³⁾ Limit values
⁴⁾ Must be within V_s tolerances
⁵⁾ Without load
⁶⁾ Control wire open:
 NPN: light switching
 PNP: dark switching


⁷⁾ With resistive load
⁸⁾ With light/dark ratio 1 : 1
⁹⁾ Do not bend cable below 0 °C
¹⁰⁾ Rated voltage 50 V DC

¹¹⁾ A = V_s connections reverse-polarity protected
 B = Inputs and outputs reverse-polarity protected
 C = Interference suppression
 D = Outputs overcurrent and short-circuit protected



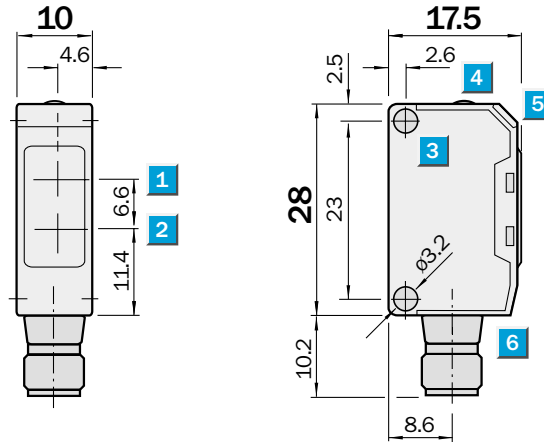
Order information

Type	Order no.
WT 150-P 132	6 011 042
WT 150-P 430	6 011 044
WT 150-N 132	6 011 039
WT 150-N 430	6 011 041


Scanning range
0.005 ... 2.4 m
 Photoelectric reflex switch

- Polarizing filter, consequently reliable detection of objects even with shiny surfaces
- Also suitable for “Diamond Grade” reflecting tape
- Adjustable sensitivity

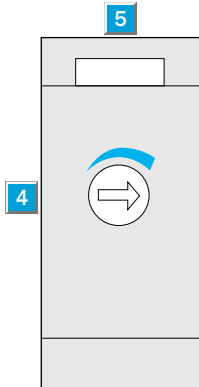
Dimension illustration



Setting options

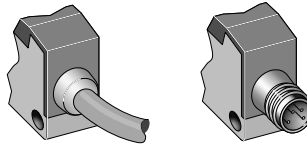
WL 150-P 132
WL 150-N 132
WL 150-P 430
WL 150-N 430

- 1 Optics center, receiver
- 2 Optics center, transmitter
- 3 Mounting hole \varnothing 3.2 mm
- 4 Sensitivity control 270°
- 5 Red LED indicator:
Light reception \geq switching threshold
- 6 M 8 plug, 4 pin or connection cable



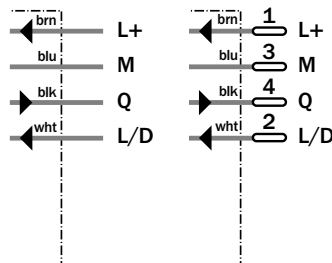
Connection type

WL 150-P 132	WL 150-P 430
WL 150-N 132	WL 150-N 430



4 x 0.18 mm²

4 pin, M 8



Accessories

- Cable receptacles
- Mounting bracket Type A*
- Reflectors**

* Provided with equipment

** Reflector PL 20 A provided with equipment

Technical data		WL 150-	P 132	P 430	N 132	N 430						
Scanning range , typ. max./on reflector	0.005 ... 2.4 m/PL 80 A											
	0.005 ... 1.0 m/PL 20 A (Provided with equipment)											
Operation range	0.01 ... 0.8 m/PL 20 A											
Sensitivity, adjustable	Potentiometer, 270°											
Light source ¹⁾	LED, visible red light with polarizing filter											
Light spot diameter	Approx. 150 mm at 1.5 m distance											
Transmitter dispersion angle	Approx. 6°											
Supply voltage V _s	10 ... 30 V DC ²⁾											
Ripple ³⁾	± 10 %											
Current consumption ⁴⁾	≤ 20 mA											
Switching outputs	PNP, open collector: Q											
	NPN, open collector: Q											
Output current I _A max.	100 mA											
Switching type ⁵⁾	Light/dark switching via control wire L/D											
	+ V _s = light switching											
	0 V = dark switching											
Response time ⁶⁾	≤ 0.5 ms											
Switching frequency max. ⁷⁾	1000/s											
Connection type	cable PVC, 2 m ⁸⁾ ; 4 x 0.18 mm ² , Ø 3.5 mm											
	plug M 8 – 4 pin											
VDE protection class ⁹⁾	□											
Circuit protection ¹⁰⁾	A, B, C, D											
Enclosure rating	IP 67											
Ambient temperature	Operation – 25 °C ... + 55 °C											
	Storage – 40 °C ... + 75 °C											
Weight	with cable 2 m	Approx. 44 g										
	with plug M 8 – 4 pin	Approx. 7 g										
Housing material	Housing: ABS/optics: PMMA											

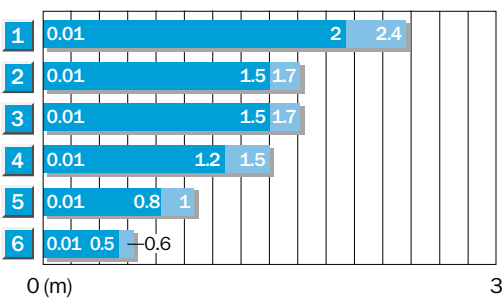
¹⁾ Average service life 100,000 h at T_U = +25 °C
²⁾ Limit values
³⁾ Must be within V_s tolerances

⁴⁾ Without load
⁵⁾ Control wire open:
 NPN: light switching
 PNP: dark switching

⁶⁾ With resistive load
⁷⁾ With light/dark ratio 1 : 1
⁸⁾ Do not bend cable below 0 °C
⁹⁾ Rated voltage 50 V DC

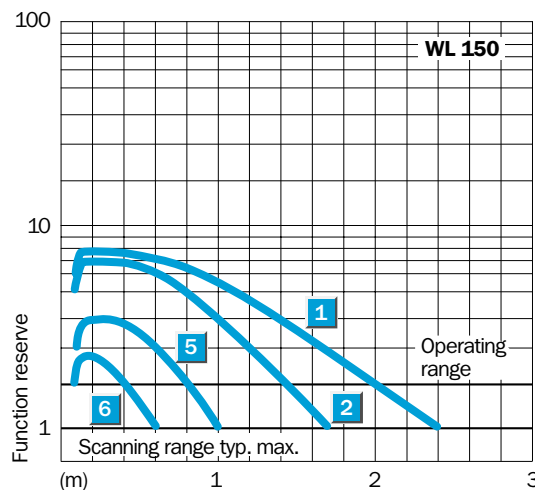
¹⁰⁾ A = V_s connections reverse-polarity protected
 B = Inputs and outputs reverse-polarity protected
 C = Interference suppression
 D = Outputs overcurrent and short-circuit protected

Scanning range and function reserve



■ Operating range ■ Scanning range typ. max.

Reflector type	Operating range
1 PL 80 A	0.01 ... 2 m
2 P 250	0.01 ... 1.5 m
3 PL 50 A or PL 40 A	0.01 ... 1.5 m
4 PL 30 A or PL 31 A	0.01 ... 1.2 m
5 PL 20 A	0.01 ... 0.8 m
6 Diamond Grade reflective tape	0.01 ... 0.5 m



Order information

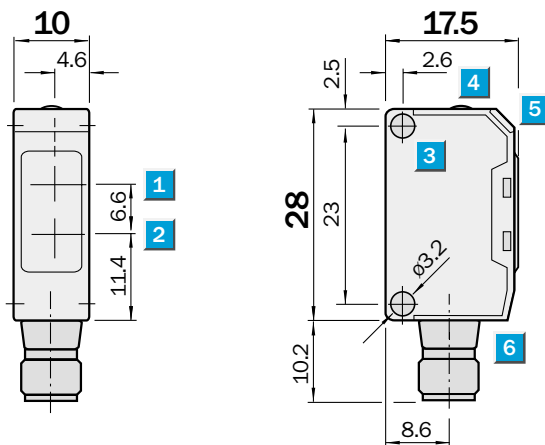
Type	Order no.
WL 150-P 132	6 011 036
WL 150-P 430	6 011 038
WL 150-N 132	6 011 033
WL 150-N 430	6 011 035

Scanning range
0.01 ... 0.7 m

Photoelectric reflex switch

- Ideal for detecting glass, transparent film or small parts
- Detection reliability:
Attenuation min. 20%;
transmission change min. 15%
- Adjustable sensitivity

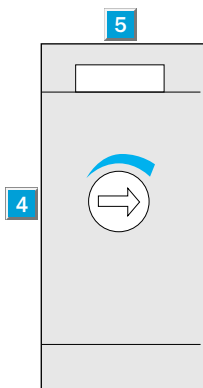
Dimension illustration



Setting options

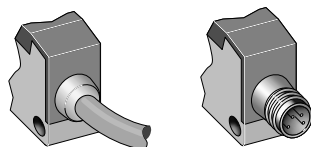
WL 150-P 122
WL 150-N 122
WL 150-P 420
WL 150-N 420

- 1 Optics center, receiver
- 2 Optics center, transmitter
- 3 Mounting hole \varnothing 3.2 mm
- 4 Sensitivity control 270°
- 5 Red LED indicator:
Light reception \geq switching threshold
- 6 M 8 plug, 4 pin or connection cable

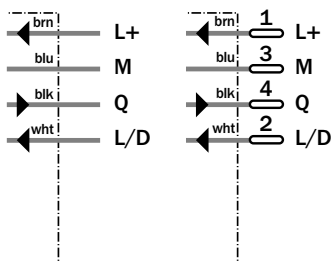


Connection type

WL 150-P 122	WL 150-P 420
WL 150-N 122	WL 150-N 420



4 x 0.18 mm ²	4 pin, M 8
--------------------------	------------



Accessories

Cable receptacles
Mounting bracket Type A*
Reflectors**

* Provided with equipment
** Reflector PL 20 A provided with equipment

Technical data		WL 150-	P 122	P 420	N 122	N 420						
Detection of transparent objects												
Attenuation in light path	Min. 20%											
Attenuation difference in light path	Min. 15%											
Object attenuation difference	Min. 7.5%											
Sensitivity, adjustable	Potentiometer, 270°											
Scanning range , typ. max./on reflector	0.01...0.7 m/PL 80 A											
	0.01...0.35 m/PL 20 A											
	(Provided with equipment)											
Operating range	0.01...0.6 m/PL 80 A											
	0.01...0.3 m/PL 20 A											
	Reflective tape: not suitable											
Light source ¹⁾	LED, visible red light											
Light spot diameter	Approx. 40 mm at 0.3 m distance											
Transmitter dispersion angle	Approx. 7.5°											
Supply voltage V _s	10 ... 30 V DC ²⁾											
Ripple ³⁾	± 10 %											
Current consumption ⁴⁾	≤ 30 mA											
Switching outputs	PNP, open collector: Q											
	NPN, open collector: Q											
Output current I _A max.	100 mA											
Switching type ⁵⁾	Light/dark switching via control wire L/D											
	+ V _s = light switching											
	0 V = dark switching											
Response time ⁶⁾	≤ 0.5 ms											
Switching frequency max. ⁷⁾	1000/s											
Connection type	cable PVC, 2 m ⁸⁾ ; 4 x 0.18 mm ² , Ø 3.5 mm											
	plug M 8 – 4 pin											
VDE protection class ⁹⁾	□											
Circuit protection ¹⁰⁾	A, B, C, D											
Enclosure rating	IP 67											
Ambient temperature	Operation – 25 °C ... + 55 °C											
	Storage – 40 °C ... + 75 °C											
Weight	with cable 2 m	Approx. 44 g										
	with plug M 8 – 4 pin	Approx. 7 g										
Housing material	Housing: ABS/optics: PC											

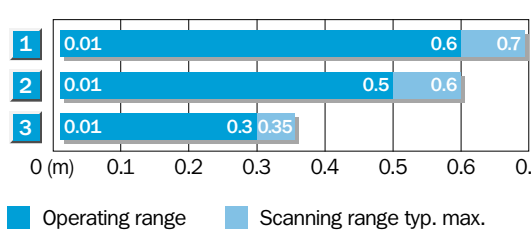
1) Average service life 100,000 h at T_J = +25 °C
 2) Limit values
 3) Must be within V_s tolerances

4) Without load
 5) Control wire open:
 NPN: light switching
 PNP: dark switching

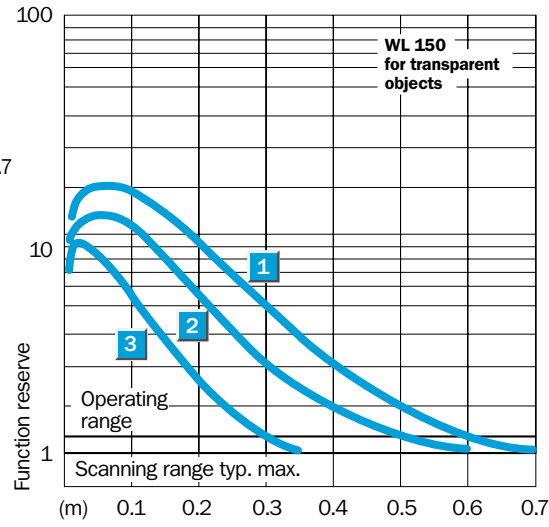
6) With resistive load
 7) With light/dark ratio 1 : 1
 8) Do not bend cable below 0 °C
 9) Rated voltage 50 V DC

10) A = V_s connections reverse-polarity protected
 B = Inputs and outputs reverse-polarity protected
 C = Interference suppression
 D = Outputs overcurrent and short-circuit protected

Scanning range and function reserve



Reflector type	Operating range
1 PL 80 A	0.01...0.6 m
2 P 250	0.01...0.5 m
3 PL 20 A	0.01...0.3 m



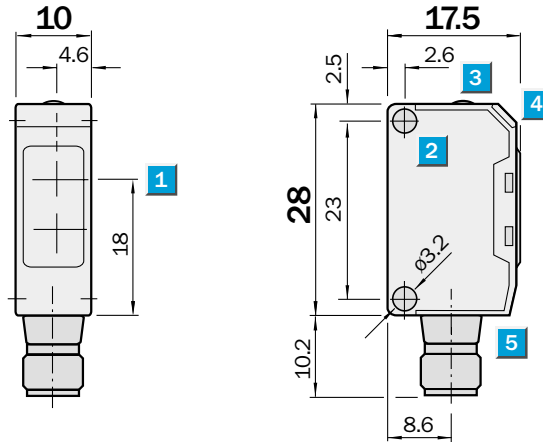
Order information	
Type	Order no.
WL 150-P 122	6 020 686
WL 150-P 420	6 020 688
WL 150-N 122	6 020 683
WL 150-N 420	6 020 685

Scanning range
4.4 m

Through-beam photoelectric switch

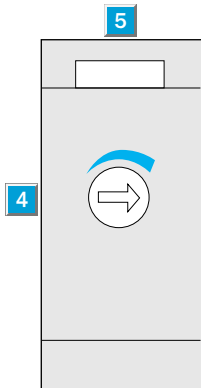
- Slotted masks (0.5 mm, 1 mm and 2 mm) for detecting small parts or for positioning
- Adjustable sensitivity
- Direct voltage supply 10 ... 30 V DC

Dimension illustration



Setting options

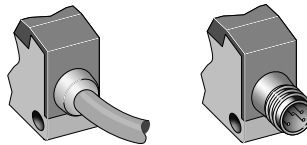
- WS/WE 150-P 132
- WS/WE 150-N 132
- WS/WE 150-P 430
- WS/WE 150-N 430



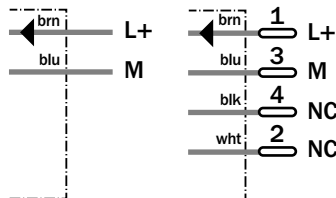
- 1 Optics center, transmitter (WS)
Optics center, receiver (WE)
- 2 Mounting hole \varnothing 3.2 mm
- 3 Sensitivity control 270°
(only WE)
- 4 Red LED indicator (only WE):
Light reception \geq switching threshold
- 5 M 8 plug, 4 pin or connection cable

Connection type

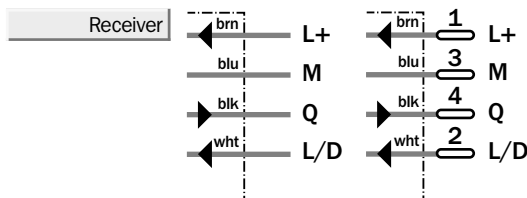
- WS/WE 150-P 132 WS/WE 150-P 430
- WS/WE 150-N 132 WS/WE 150-N 430



2 x 0.18 mm² 4 pin, M 8



4 x 0.18 mm² 4 pin, M 8



Accessories

- Cable receptacles
- Mounting bracket Type A*
- Slotted masks

* Provided with equipment

Technical data		WS/WE 150-	P 132	P 430	N 132	N 430
Scanning range, typ. max.	4.4 m					
Operating range	4 m					
Operating range with mask,						
Width 2.0 mm	2.0 m					
Width 1.0 mm	1.0 m					
Width 0.5 mm	0.5 m					
Sensitivity, adjustable	Potentiometer 270°					
Light source¹⁾	LED, red light					
Light spot diameter	Approx. 400 mm at 4 m distance					
Transmitter dispersion angle	Approx. 6°					
Receiver reception angle	Approx. 15°					
Supply voltage V_s	10 ... 30 V DC ²⁾					
Ripple ³⁾	± 10%					
Current consumption ⁴⁾	transmitter	≤ 15 mA				
	receiver	≤ 20 mA				
Switching outputs	PNP, open collector: Q					
	NPN, open collector: Q					
Output current I _A max.	100 mA					
Switching type ⁵⁾	Light/dark switching via control wire L/D					
	+ V _s = light switching					
	0 V = dark switching					
Response time ⁶⁾	≤ 0.5 ms					
Switching frequency max. ⁷⁾	1000/s					
Connection type						
Connection cable	PVC, 2 m ⁸⁾					
Transmitter WS	2 x 0.18 mm ² , Ø 3.5 mm					
Receiver WE	4 x 0.18 mm ² , Ø 3.5 mm					
Plug	M 8 – 4 pin					
VDE protection class⁹⁾	□					
Circuit protection¹⁰⁾						
transmitter	A, B					
receiver	A, B, C, D					
Enclosure rating						
	IP 67					
Ambient temperature						
	Operation – 25 °C ... + 55 °C					
	Storage – 40 °C ... + 70 °C					
Weight						
with cable 2 m	Transm.: approx. 44 g, rec.: approx. 44 g					
with plug M 8 – 4 pin	Transm.: approx. 7 g, rec.: approx. 7 g					
Housing material						
	Housing: ABS/optics: PC					

1) Average service life 100,000 h at T_J = +25 °C

2) Limit values

3) Must be within V_s tolerances

4) Without load

5) Control wire open:
NPN: light switching
PNP: dark switching

6) With resistive load

7) With light/dark ratio 1 : 1

8) Do not bend cable below 0 °C

9) Rated voltage 50 V DC

10) A = V_s connections reverse-polarity protected

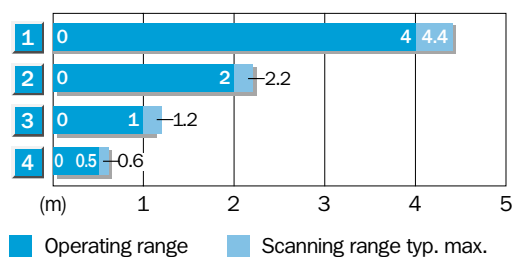
B = Inputs and outputs reverse-polarity protected

C = Interference suppression

D = Outputs overcurrent and short-circuit protected

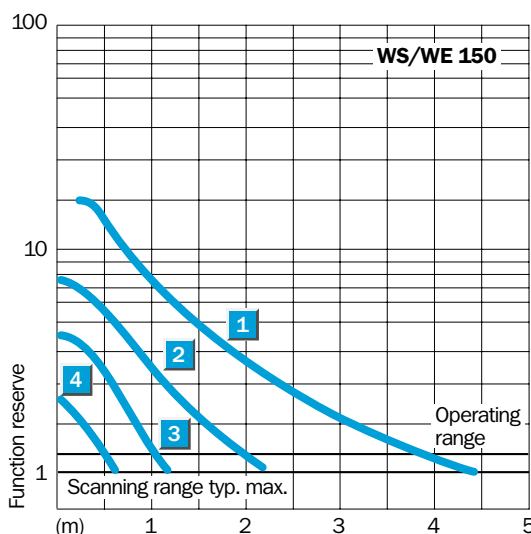
11) The order no. contains transmitter and receiver.

Scanning range and function reserve



Scanning range reduction when slotted masks are used

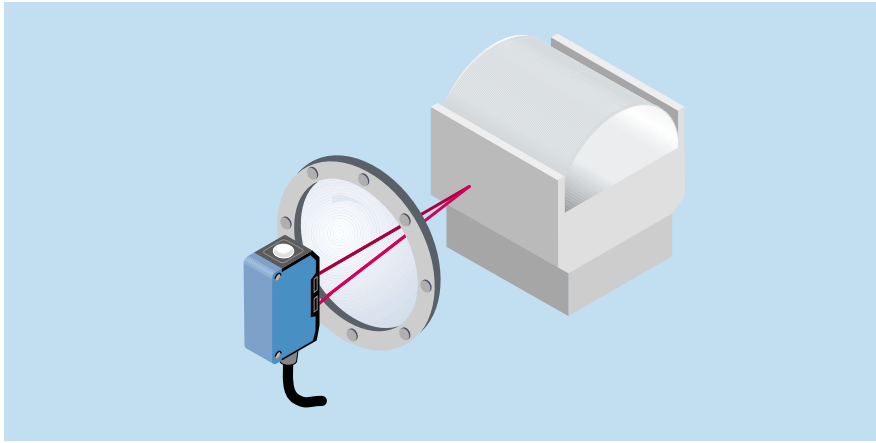
1	Without masks/polarizing filter
2	With slotted mask, width 2.0 mm
3	With slotted mask, width 1.0 mm
4	With slotted mask, width 0.5 mm



Order information

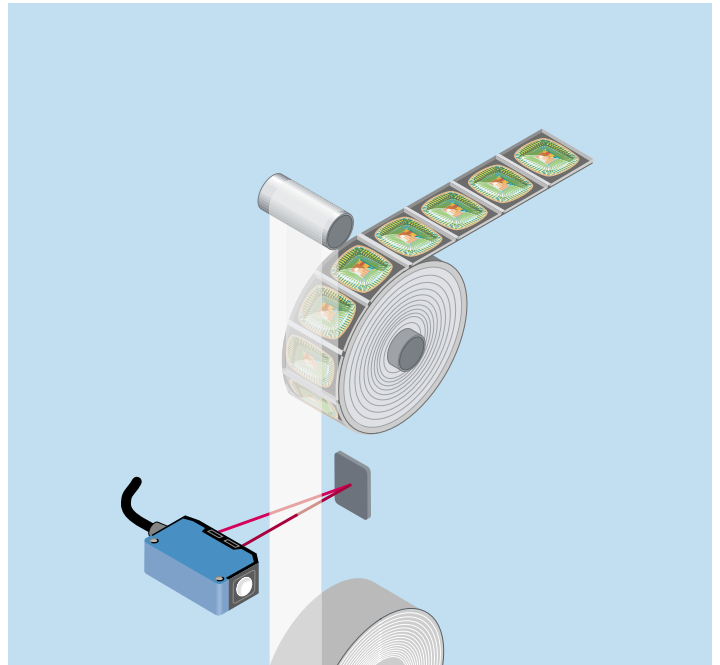
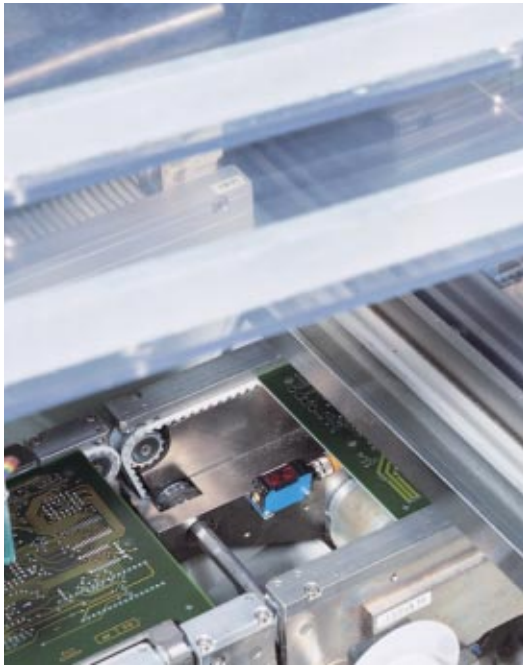
Type	Order no. ¹¹⁾
WS/WE 150-P132	6 011 030
WS/WE 150-P430	6 011 032
WS/WE 150-N132	6 011 027
WS/WE 150-N430	6 011 029

► The WT 150 photoelectric proximity switch with background suppression detects wafer cassettes through glass in clean rooms.

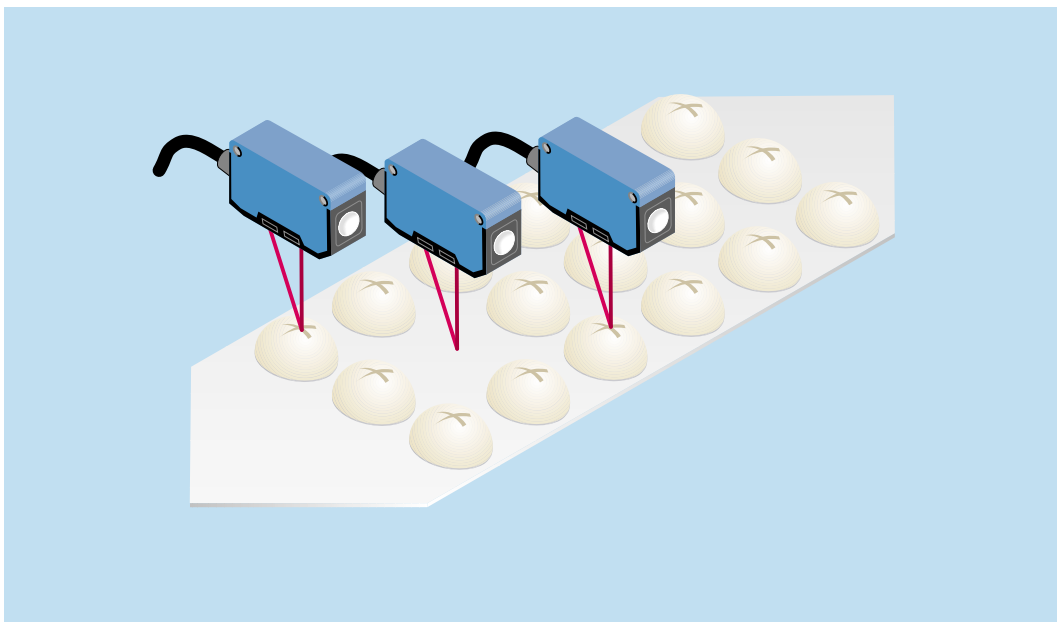


▼ Electronic components are covered by wafer-thin transparent films in the production process. The WT 150 photoelectric proximity switch with increased sensitivity detects the film reliably.

► Mini in space requirements, maxi in performance: The W 150 miniature photoelectric proximity switches monitors the presence of printed circuit boards in automated electronics manufacturing.



► The WT 150 photoelectric proximity switch with background suppression (HGA) detects bakery goods on a conveyor belt reliably. It distinguishes between the conveyed goods and the conveyor system even at short distances.

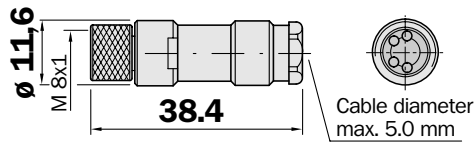


Dimension illustrations and ordering information

SENSICK circular screwing system, M 8 plug, 4 pin, enclosure rating IP 67

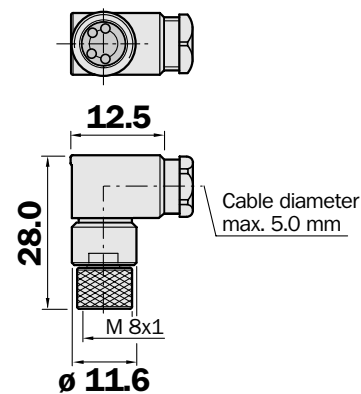
M 8 cable receptacle, 4 pin, straight

Type	Order no.
DOS-0804-G	6 009 974



M 8 cable receptacles, 4 pin, angled

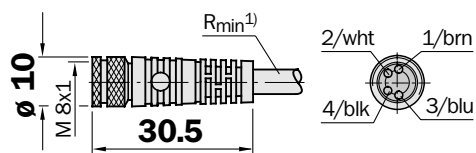
Type	Order no.
DOS-0804-W	6 009 975



M 8 cable receptacle, 4 pin, straight

Cable diameter 5 mm, 4 x 0.25 mm², PVC coating

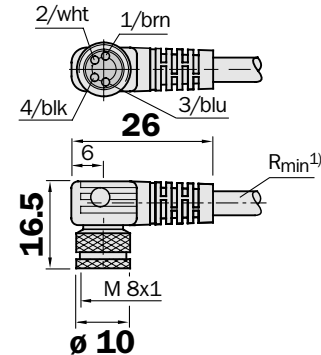
Type	Order no.	Cable length
DOL-0804-G02M	6 009 870	2 m
DOL-0804-G05M	6 009 872	5 m
DOL-0804-G10M	6 010 754	10 m



M 8 cable receptacles, 4 pin, angled

Cable diameter 5 mm, 4 x 0.25 mm², PVC coating

Type	Order no.	Cable length
DOL-0804-W02M	6 009 871	2 m
DOL-0804-W05M	6 009 873	5 m
DOL-0804-W10M	6 010 755	10 m

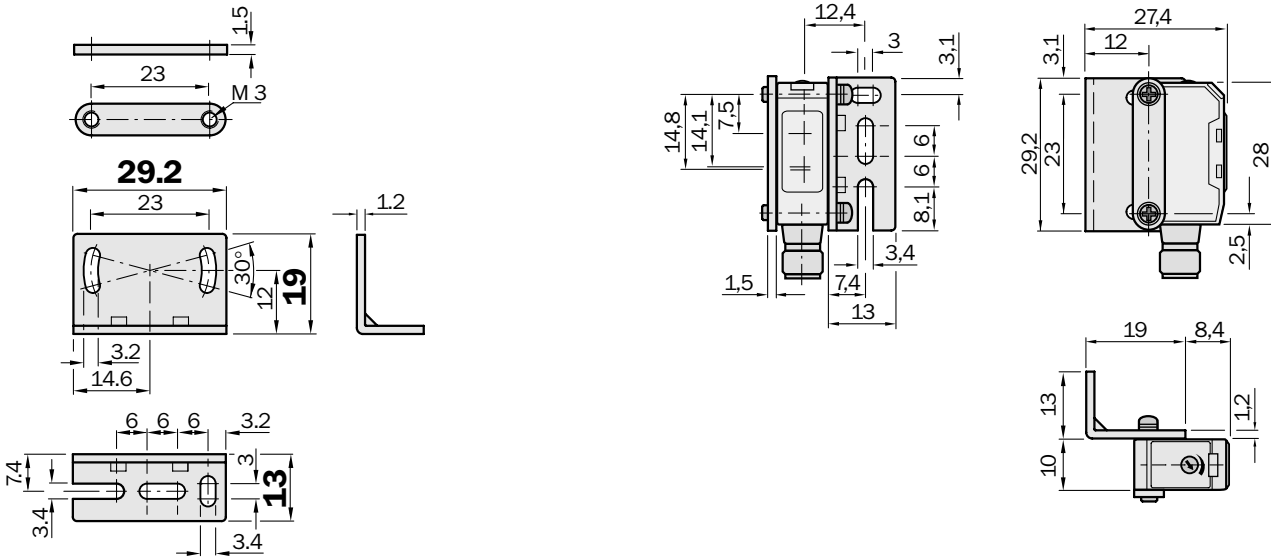


1) Minimum bending radius with dynamic use
 $R_{min} = 20 \times \text{cable diameter}$

Dimension illustrations and ordering information

Mounting brackets, horizontal

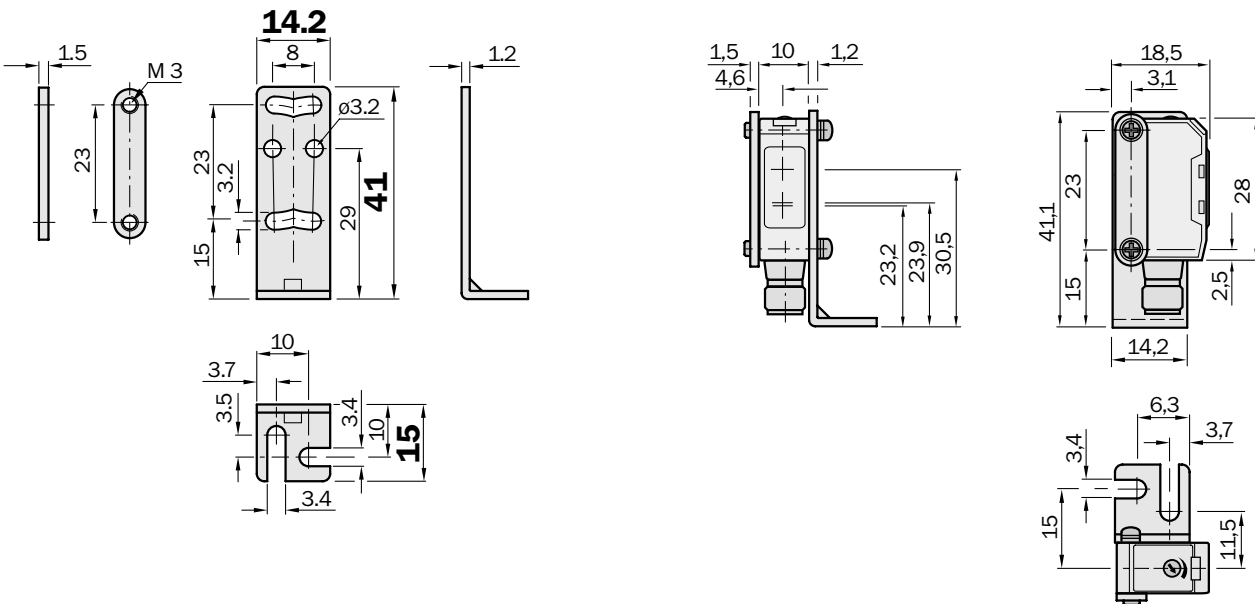
Type	Order no.
BEF-W150-A	5 306 217



Supplied with WL 150.

Mounting brackets, vertical

Type	Order no.
BEF-W150-B	5 306 279



Dimension illustrations and ordering information

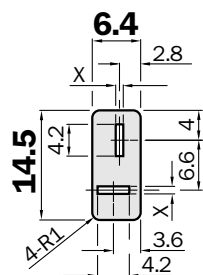
Masks

Slotted masks* for WS/WE 150

Slot width X: 0.5 mm/1.0 mm/2.0 mm

Type	Order no.
BL-150-10	5 306 216

* Two pieces each



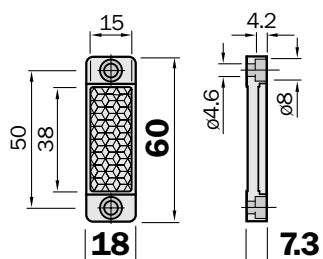
3 pairs with slot widths A, B and C are supplied with equipment.
 Mounting by self-adhesive back.
 Stick mask on red optics body of WS 150 and WE 150.
 For detecting smaller objects or increasing the switching accuracy.
 Only for WS/WE 150.
 Changed operating ranges:
 A) Slot width 2.0 mm: OR = 2.0 m
 B) Slot width 1.0 mm: OR = 1.0 m
 C) Slot width 0.5 mm: OR = 0.5 m

Reflectors

Plastic model for temperatures up to 65 °C

Reflector 15 x 38 mm

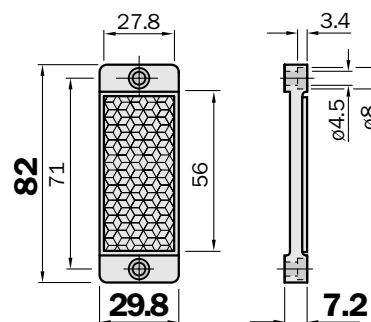
Type	Order no.
PL 20 A	1 012 719



Supplied with WL 150.

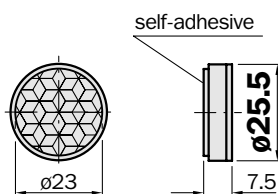
Reflector 30 x 50 mm

Type	Order no.
PL 30 A	1 002 314



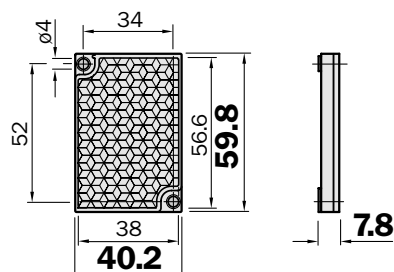
Reflector, ø 23 mm

Self-adhesive	
Type	Order no.
PL 30 A	1 002 314



Reflector 40 x 60 mm

Type	Order no.
PL 40 A	1 012 720



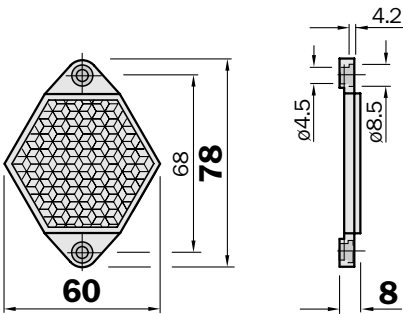
Dimension illustrations and ordering information

Plastic model for temperatures up to 65 °C

Reflector, hexagonal

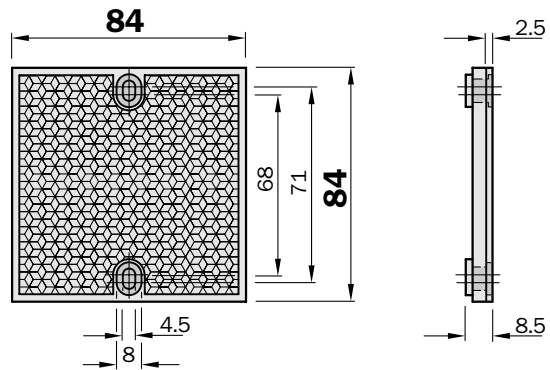
Opening width 48 mm

Type	Order no.
PL 50 A	1 000 132



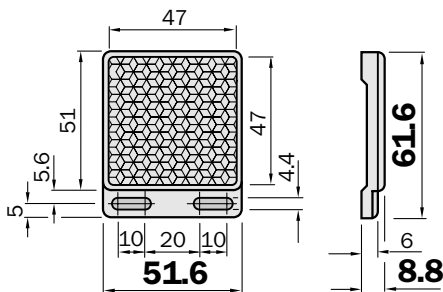
Reflector 80 x 80 mm

Type	Order no.
PL 80 A	1 003 865



Reflector 47 x 47 mm

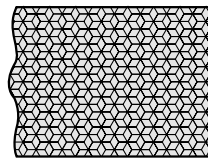
Type	Order no.
P 250	5 304 812



Reflective tape

Self-adhesive	
Type	Order no.
REF-DG-K	4 019 634
REF-DG	5 304 334

Ready-made
Sheet 749 x 914 mm



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