


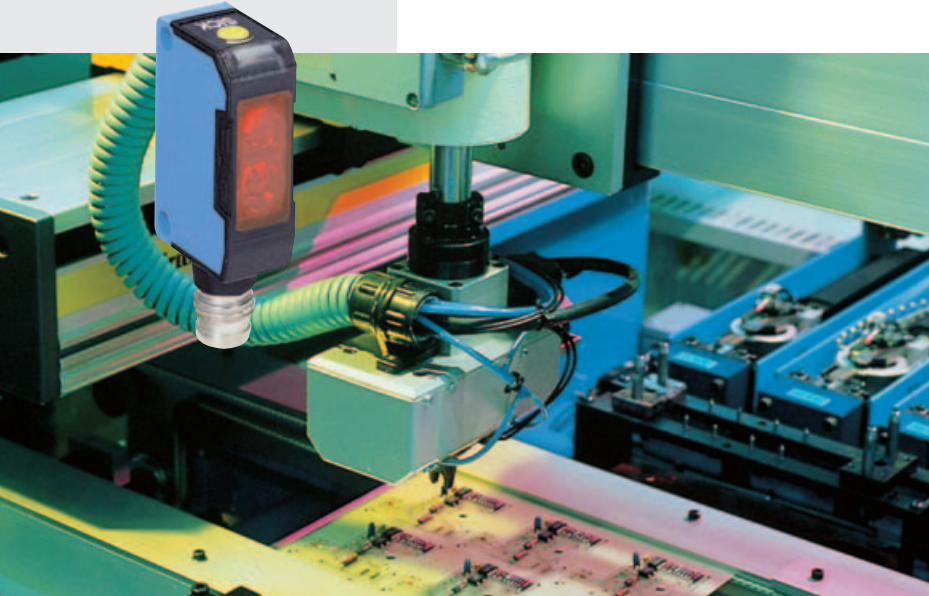


W 150: Miniature photoelectric switch series with fully integrated electronics

	Photoelectric proximity switches, BGS
	Photoelectric proximity switches, energetic
	Photoelectric reflex switches



The optical systems of the W 150 series and their scanning ranges:

- WS/WE 150 through-beam photoelectric switch: 4 m, slotted masks available as accessories,
- WL 150 photoelectric reflex switch: 2 m (PL 80 A), with polarising filter,
- WL 150 photoelectric reflex switch with enhanced sensitivity: especially suitable for detecting transparent objects such as glass and film,
- WT 150 photoelectric proximity switch, energetic: scanning distance 200 mm (90 % remission), for standard scanning tasks. With background suppression: scanning distance 100 mm on white, adjustable; for reliable operation in applications with background interference.

Through-beam photoelectric switches

Despite their miniature housing, the W 150 photoelectric switches have exactly the same system characteristics and features as standard photoelectric switches. They are especially characterised by their large scanning ranges. W 150 units are ideal for use at locations where installation space is limited.

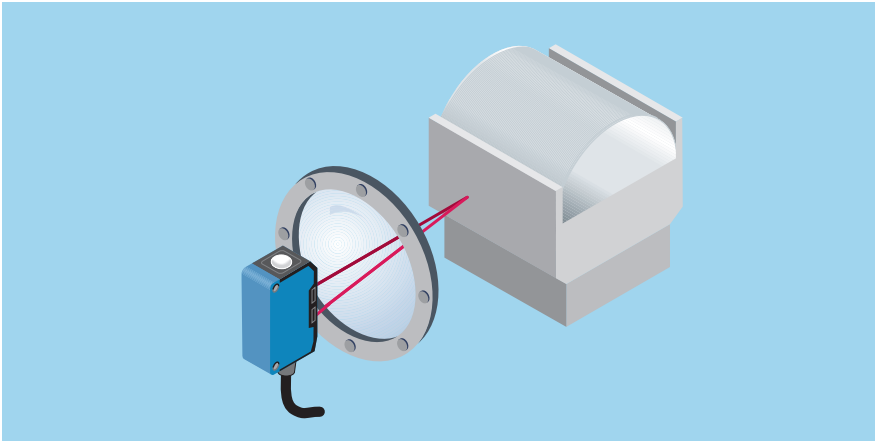
They are, therefore, particularly suitable for the following areas of application:

- electronic component and printed circuit board production,
- the packaging and printing industries,
- assembly and handling systems,
- the construction of special-purpose machines.

All electrical and mechanical values meet the standards for low-voltage devices: potentiometer for adjustment, IP 67, $V_s = 10 \dots 30$ V DC, PNP or NPN switching output, M8 plug or cable...

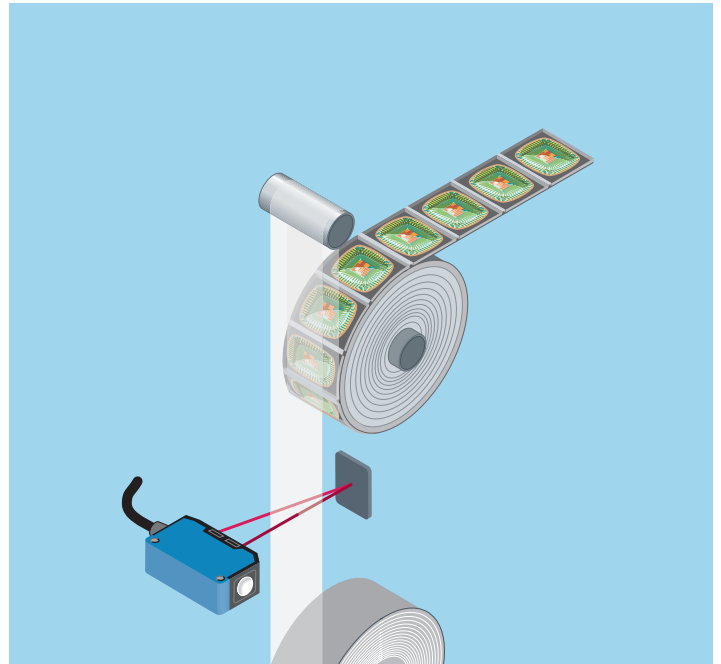
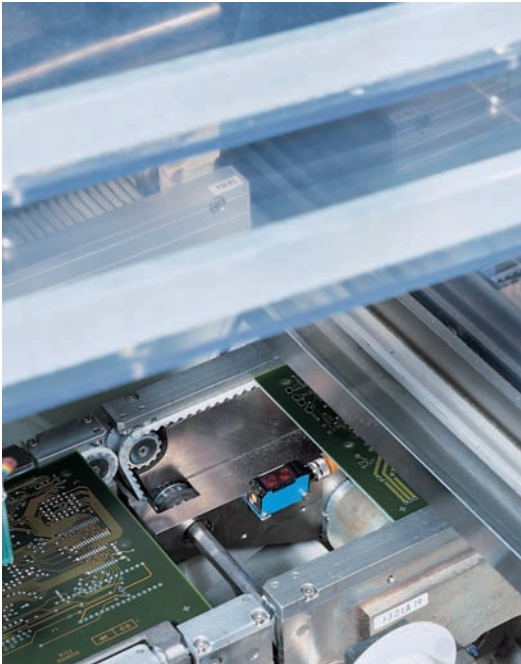
An added bonus: the visible red light of the sender LED facilitates handling.

▶ WT 150 photoelectric proximity switch with background suppression used to detect wafer cassettes in a clean room through a glass window.

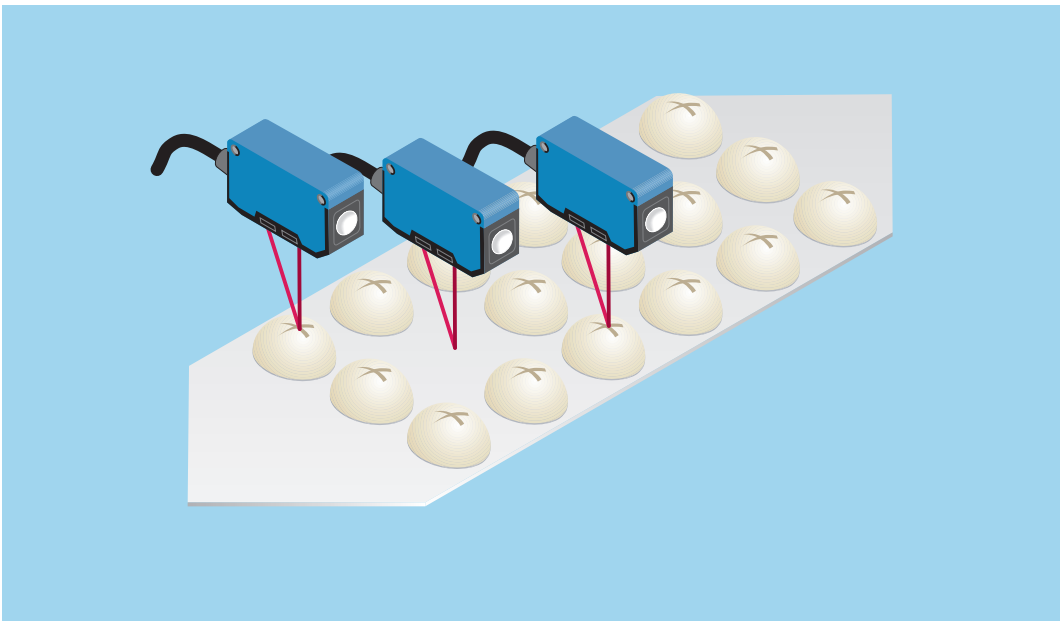


▼ Electronic components are coated with extremely thin transparent films during the production process. A WL 150 photoelectric reflex switch with decreased switching hysteresis is used for reliable detection of the film.

▶ Minimum space requirements – maximum power: WT 150 miniature photoelectric proximity switch used to check the presence of printed circuit boards in the automated production of electronic components.



▶ WT 150 photoelectric proximity switches with background suppression (BGS) used for the reliable detection of bread and confectionery on a conveyor belt – even if the distance between the scanned surface of the object being transported and the surface of the conveyor belt varies slightly.

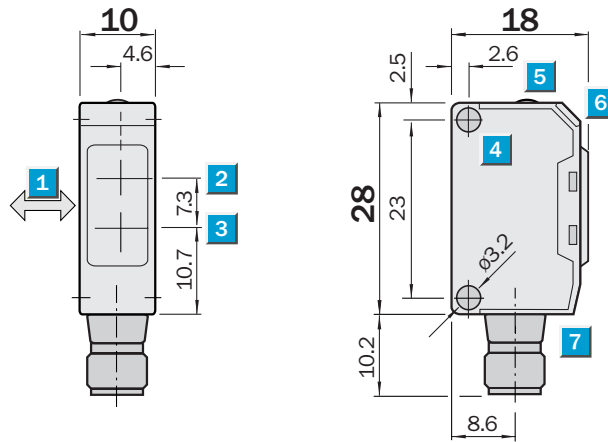


Scanning distance
2 ... 100 mm

Photoelectric proximity switches

- With background suppression for reliable detection of dark objects, even in front of light backgrounds
- Switching point is largely independent of colour and surface of object
- Scanning distance continuously variable, control using 5-turn adjustment screw

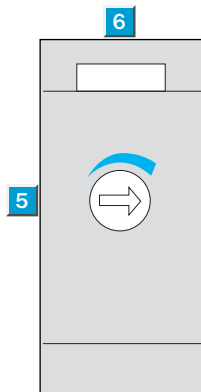
Dimensional drawing



Adjustments possible

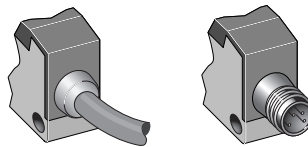
WT 150-P 162
WT 150-N 162
WT 150-P 460
WT 150-N 460

- 1 Standard direction of the material being scanned
- 2 Centre of optical axis, receiver
- 3 Centre of optical axis, sender
- 4 Mounting holes \varnothing 3.2 mm
- 5 Scanning distance adjustment (5 rev.)
- 6 LED indicator, red light received \geq switching threshold
- 7 M8 plug – 4-pin or cable



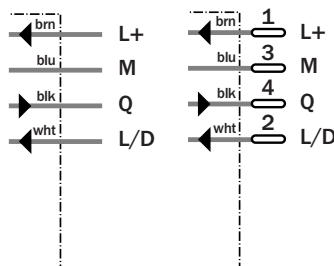
Connection types

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



4 x 0.18 mm²

4-pin, M8



See chapter Accessories

Cables and connectors

Mounting systems *)

*) Mounting brackets Type A included with delivery

Technical data		WT 150-	P 162	P 460	N 162	N 460						
Scanning distance, max. typical	2...100 mm ¹⁾ , adjustable											
Operating distance												
Scanned object with 90% remission	Min. 2...6 mm to max. 10...100 mm											
Scanned object with 18% remission	Min. 2...6 mm to max. 10...80 mm											
Scanned object with 6% remission	Min. 3...6 mm to max. 10...60 mm											
Scanning distance, adjustable	Potentiometer, 5 revolutions											
Background suppression	in % of set scanning distance (see characteristic curve)											
Light source²⁾, light type		LED, visible red light										
Light spot diameter	approx. 4 mm at 40 mm											
Angle of dispersion of sender	approx. 5°											
Supply voltage V_S		10...30 V DC ³⁾										
Residual ripple ⁴⁾	± 10 %											
Current consumption ⁵⁾	≤ 20 mA											
Switching outputs		PNP, open collector: Q										
	NPN, open collector: Q											
Max. output current I _A	100 mA											
Switching mode ⁶⁾		Dark-/light-switching via control cable L/D										
	+ V _S = light-switching											
	0 V = dark-switching											
Response time ⁷⁾	≤ 0.5 ms											
Max. switching frequency ⁸⁾	1000/s											
Connection types												
cable	PVC, 2 m ⁹⁾ ; 4 x 0.18 mm ² , ø 3.5 mm											
plug	M8 – 4-pin											
VDE protection class¹⁰⁾		□										
Circuit protection¹¹⁾		A, B, C, D										
Enclosure rating		IP 67										
Ambient temperature T_A		Operation – 25 °C...+ 55 °C										
	Storage – 40 °C...+ 75 °C											
Weight												
with cable 2 m	Approx. 44 g											
with plug M8 – 4-pin	Approx. 7 g											
Housing material		Housing: ABS/optics: PC										

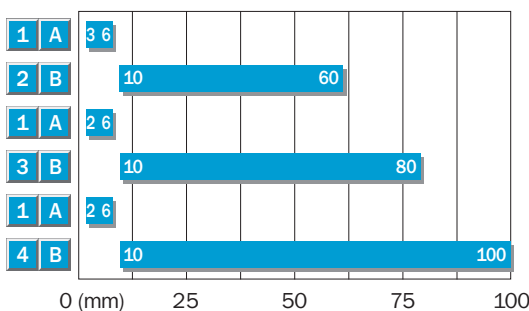
- 1) Object with 90 % remission (based on standard white to DIN 5033)
- 2) Average service life 100,000 h where T_A = + 25 °C
- 3) Limit values
- 4) May not exceed or fall short of V_S tolerances

- 5) Without load
- 6) Control cable open:
NPN: light-switching
PNP: dark-switching
- 7) Signal transit time with resistive load
- 8) With light/dark ratio 1:1

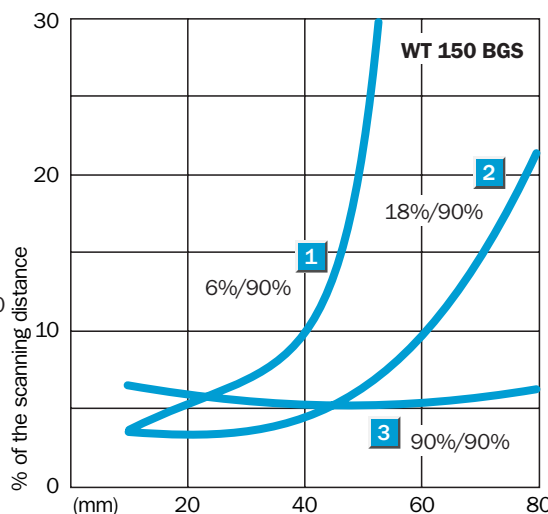
- 9) Do not bend below 0 °C
- 10) Reference voltage 50 V DC
- 11) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected

- C = Interference pulse suppression
- D = Outputs overcurrent and short-circuit protected
- 12) Black = 6 % remission
Grey = 18 % remission
White = 90 % remission

Scanning distance



- 1 Scanning distance on black¹²⁾/white background
- 2 Scanning distance on grey¹²⁾/white background
- 3 Scanning distance on white¹²⁾/white background
- A Scanning distance control set to MIN
- B Scanning distance control set to MAX



Order information

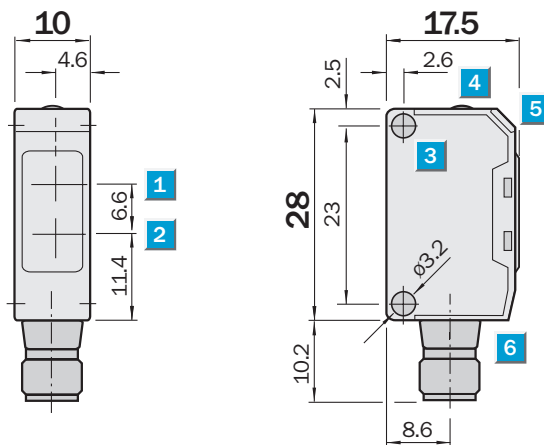
Type	Order no.
WT 150-P 162	6 011 048
WT 150-P 460	6 011 050
WT 150-N 162	6 011 045
WT 150-N 460	6 011 047

Scanning distance
10 ... 250 mm

Photoelectric proximity switches

- Energetic photoelectric proximity switches
 - for standard applications
 - for simple contrast detection
- Switching point adjustable with sensitivity potentiometer

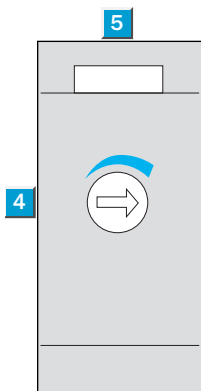
Dimensional drawing



Adjustments possible

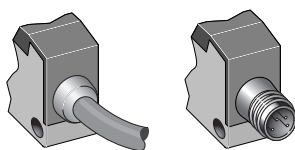
WT 150-P 132
WT 150-N 132
WT 150-P 430
WT 150-N 430

- 1 Centre of optical axis, receiver
- 2 Centre of optical axis, sender
- 3 Mounting holes \varnothing 3.2 m
- 4 Sensitivity adjustment 270°
- 5 LED indicator, red:
Light received \geq switching threshold
- 6 M8 plug – 4-pin or connecting cable

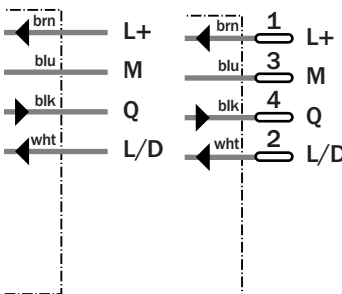


Connection types

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



4 x 0.18 mm ²	4-pin, M8
--------------------------	-----------



See chapter Accessories

Cables and connectors

Mounting systems ^{*)}

^{*)} Mounting brackets Type A included with delivery

Technical data		WT 150-	P 132	P 430	N 132	N 430
Scanning distance, max. typical	10...250 mm ¹⁾					
Operating distance	10...200 mm ¹⁾					
Sensitivity, adjustable	Potentiometer, 270°					
Light source ²⁾ , light type	LED, red light					
Light spot diameter	Approx. 20 mm at 200 mm					
Angle of dispersion of sender	Approx. 6°					
Supply voltage V _S	10...30 V DC ³⁾					
Residual ripple ⁴⁾	± 10 %					
Current consumption ⁵⁾	≤ 20 mA					
Switching outputs	PNP, open collector: Q					
	NPN, open collector: Q					
Max. output current I _A	100 mA					
Switching mode ⁶⁾	Dark-/light-switching via control cable L/D					
	+ V _S = light-switching					
	0 V = dark-switching					
Response time ⁷⁾	≤ 0.5 ms					
Max. switching frequency ⁸⁾	1000/s					
Connection types						
cable	PVC, 2 m ⁹⁾ ; 4 x 0.18 mm ² , ø 3.5 mm					
plug	M8 – 4-pin					
VDE protection class ¹⁰⁾	□					
Circuit protection ¹¹⁾	A, B, C, D					
Enclosure rating	IP 67					
Ambient temperature T _A	Operation – 25 °C...+ 55 °C					
	Storage – 40 °C...+ 70 °C					
Weight	with cable 2 m					
	with plug M8 – 4-pin					
Housing material	Housing: ABS/optics: PC					

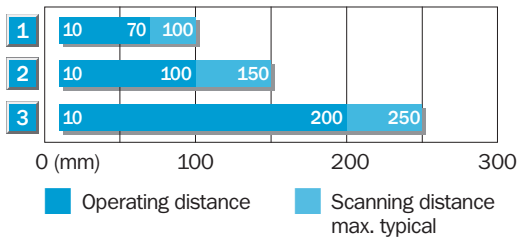
1) Object with 90 % remission (based on standard white to DIN 5033)
 2) Average service life 100,000 h where T_A = + 25 °C
 3) Limit values

4) May not exceed or fall short of V_S tolerances
 5) Without load
 6) Control cable open:
 NPN: light-switching
 PNP: dark-switching

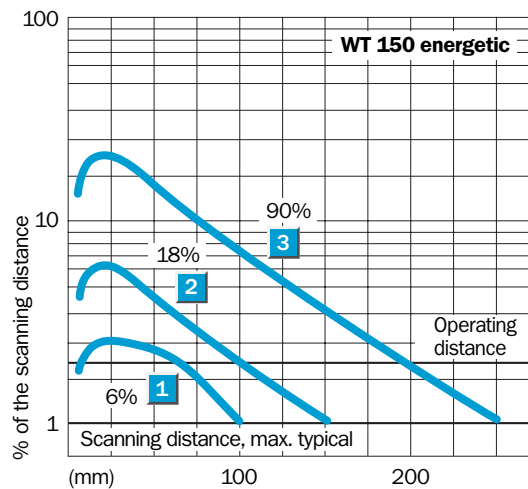
7) Signal transit time with resistive load
 8) With light/dark ratio 1:1
 9) Do not bend below 0 °C
 10) Reference voltage 50 V DC

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

Scanning distance



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



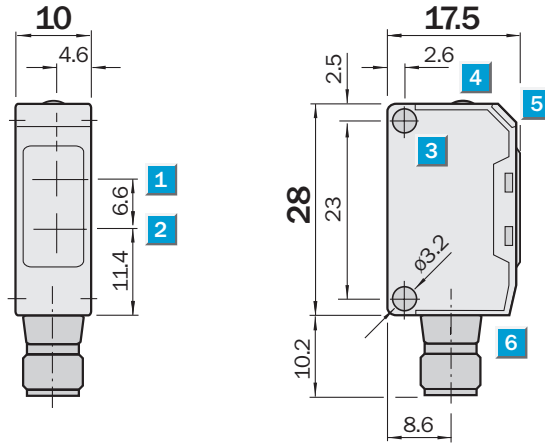
Order information

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

	Scanning range 0.005 ... 2.4 m
Photoelectric reflex switches	

- Polarising filter which also permits reliable detection of objects with shiny surfaces
- Also suitable for "Diamond Grade" reflective tape
- Adjustable sensitivity

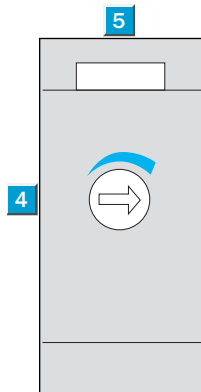
Dimensional drawing



Adjustments possible

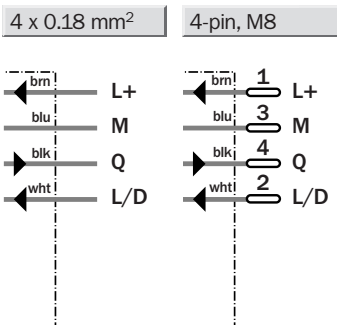
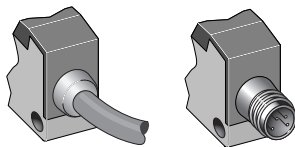
WL 150-P 132
WL 150-N 132
WL 150-P 430
WL 150-N 430

- 1** Centre of optical axis, receiver
- 2** Centre of optical axis, sender
- 3** Mounting hole \varnothing 3.2 mm
- 4** Sensitivity adjustment 270°
- 5** LED indicator, red:
Light received \geq switching threshold
- 6** M8 plug – 4-pin or cable



Connection types

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



See chapter Accessories

Cables and connectors
Mounting systems ^{*)}
Reflectors ^{**)}

^{*)} Mounting brackets Type A included with delivery

^{**)} PL 20 A included with delivery

Technical data		WL 150-	P 132	P 430	N 132	N 430						
Scanning range, max. typical/ on reflector	0.005...2.4 m/PL 80 A 0.005...1.0 m/PL 20 A (included)											
Operating range	0.01...0.8 m/PL 20 A											
Sensitivity, adjustable	Potentiometer 270°											
Light source¹⁾, light type	LED, visible red light with polarising filter											
Light spot diameter	Approx. 150 mm at 1.5 m											
Angle of dispersion, sender	Approx. 6°											
Supply voltage V_s	10...30 V DC ²⁾											
Residual ripple ³⁾	± 10 %											
Current consumption ⁴⁾	≤ 20 mA											
Switching outputs	PNP, open collector: Q NPN, open collector: Q											
Max. output current I _A	100 mA											
Switching mode ⁵⁾	Dark-/light-switching via control cable L/D + V _s = light-switching 0 V = dark-switching											
Response time ⁶⁾	≤ 0.5 ms											
Max. switching frequency ⁷⁾	1000/s											
Connection types												
cable	PVC, 2 m ⁸⁾ ; 4 x 0.18 mm ² , ø 3.5 mm											
plug	M8 – 4-pin											
VDE protection class⁹⁾	□											
Circuit protection¹⁰⁾	A, B, C, D											
Enclosure rating	IP 67											
Ambient temperature T_A	Operation – 25 °C...+ 55 °C Storage – 40 °C...+ 75 °C											
Weight	with cable (2 m) Approx. 44 g with M8 plug – 4-pin Approx. 7 g											
Housing material	Housing: ABS/optics: PMMA											

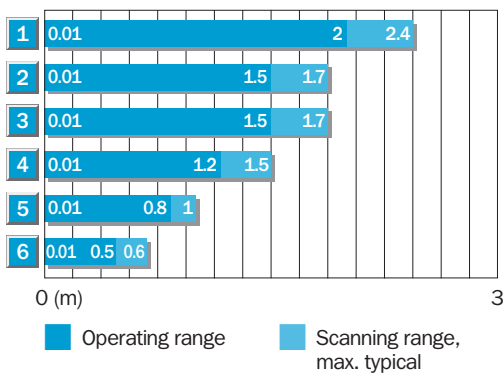
1) Average service life 100,000 h where T_A = + 25 °C
2) Limit values
3) May not exceed or fall short of V_s tolerances

4) Without load
5) Control cable open: NPN: light-switching PNP: dark-switching
6) Signal transit time with resistive load

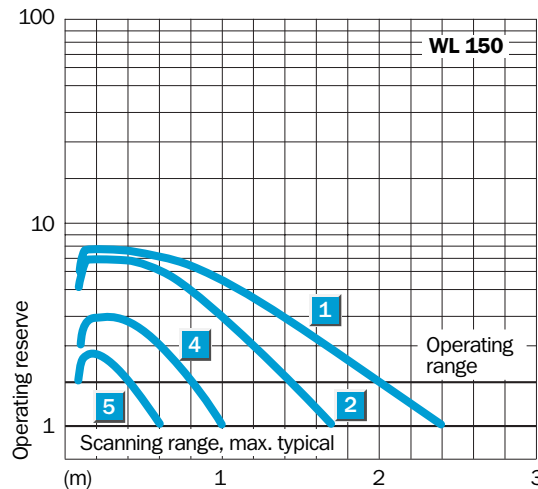
7) With light/dark ratio 1:1
8) Do not bend below 0 °C
9) Reference voltage 50 V DC

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

Scanning range and operating reserve



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 Reflect. tape «Diamond Grade»	0.01...0.5 m



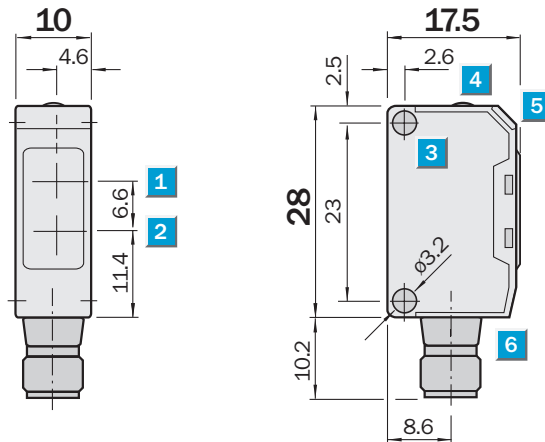
Order information

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 switches	

- Ideal for detecting glass, transparent films or small parts
- Detection reliability:
min. attenuation 20 %
min. transmission variation 15 %
- Adjustable sensitivity

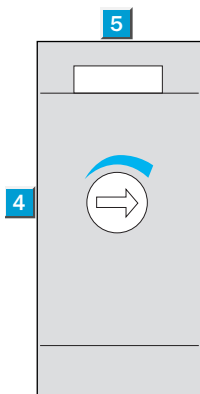
Dimensional drawing



Adjustments possible

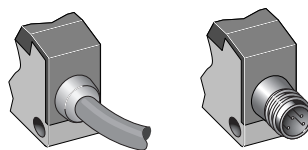
WL 150-P 122
WL 150-N 122
WL 150-P 420
WL 150-N 420

- 1** Centre of optical axis, receiver
- 2** Centre of optical axis, sender
- 3** Mounting hole \varnothing 3.2 mm
- 4** Sensitivity adjustment 270°
- 5** LED indicator, red:
Light received \geq switching threshold
- 6** M8 plug – 4-pin or cable



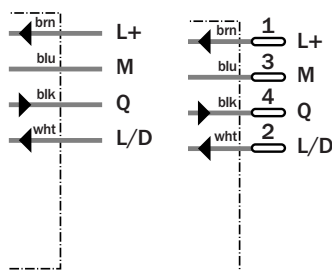
Connection types

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



4 x 0.18 mm²

4-pin, M8



See chapter Accessories

Cables and connectors
Mounting systems ^{*)}
Reflectors ^{**)}

^{*)} Mounting brackets Type A included with delivery

^{**)} PL 20 A included with delivery

Technical data		WL 150-	P 122	P 420	N 122	N 420						
Detection of transparent objects												
Attenuation along light beam	min. 20 %											
Attenuation difference along light beam	min. 15 %											
Attenuation difference of object	min. 7.5 %											
Sensitivity, adjustable	Potentiometer, 270°											
Scanning range, max. typical/ on reflector	0.01...0.70 m/PL 80 A 0.01...0.35 m/PL 20 A (included)											
Operating range	0.01...0.60 m/PL 80 A 0.01...0.30 m/PL 20 A Reflective tape: not suitable											
Light source⁴⁾, light type	LED, visible red light											
Light spot diameter	Approx. 40 mm at 0.3 mm											
Angle of dispersion of sender	Approx. 7.5°											
Supply voltage V_S	10...30 V DC ²⁾											
Residual ripple ³⁾	± 10 %											
Current consumption ⁴⁾	≤ 30 mA											
Switching outputs	PNP, open collector: Q NPN, open collector: Q											
Max. output current I _A	100 mA											
Switching mode ⁵⁾	Dark-/light-switching via control cable L/D + V _S = light-switching 0 V = dark-switching											
Response time ⁶⁾	≤ 0.5 ms											
Max. switching frequency ⁷⁾	1000/s											
Connection types												
cable	PVC, 2 m ⁸⁾ ; 4 x 0.18 mm ² , ø 3.5 mm											
plug	M8 – 4-pin											
VDE protection class⁹⁾	□											
Circuit protection¹⁰⁾	A, B, C, D											
Enclosure rating	IP 67											
Ambient temperature T_A	Operation – 25 °C...+ 55 °C Storage – 40 °C...+ 75 °C											
Poids with cable 2 m	Approx. 44 g											
with plug M8 – 4-pin	Approx. 7 g											
Housing material	Housing: ABS/optics: PC											

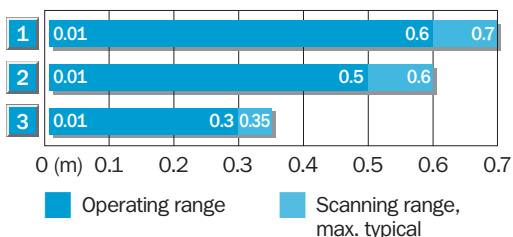
1) Average service life 100,000 h at T_A = + 25 °C
2) Limit values
3) May not exceed or fall short of V_S tolerances

4) Without load
5) Control cable open:
NPN: light-switching
PNP: dark-switching
6) Signal transit time with resistive load

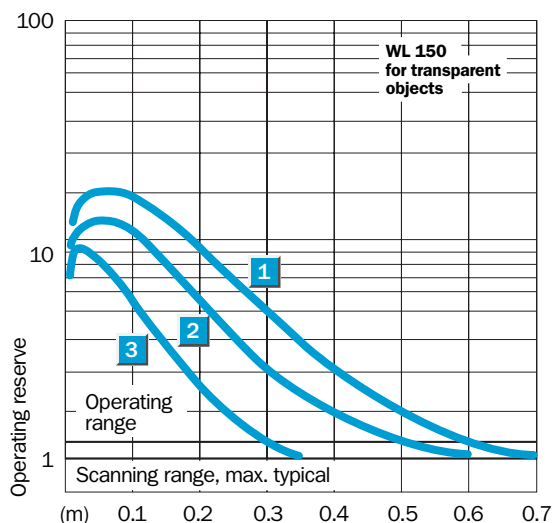
7) With light/dark ratio 1:1
8) Do not bend below 0 °C
9) Reference voltage 50 V DC

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

Scanning range and operating 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

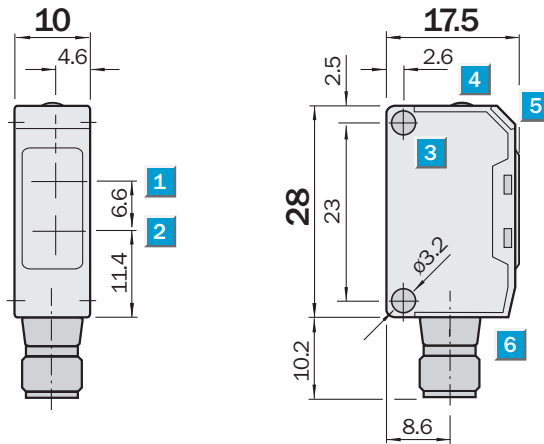
Type	Order no.
WL 150-P 122	6 020 686
WL 150-P 420	6 020 688
WL 150-N 122	6 020 683
WL 150-N 420	6 020 685

Scanning range
4.4 m

Through-beam photoelectric switches

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

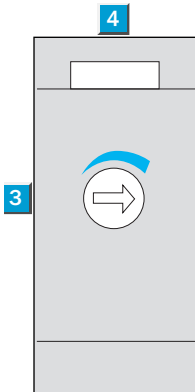
Dimensional drawing



Adjustments possible

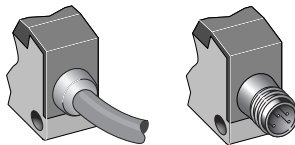
WS/WE 150-P132
WS/WE 150-N132
WS/WE 150-P430
WS/WE 150-N430

- 1** Centre of optical axis, sender (WS)
Centre of optical axis, receiver (WE)
- 2** Mounting holes \varnothing 3.2 mm
- 3** Sensitivity adjustment 270° (WE only)
- 4** LED indicator, red (WE only):
Light received \geq switching threshold
- 5** M8 plug – 4-pin or cable



Connection types

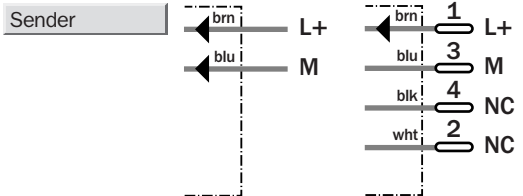
WS/WE 150-P132	WS/WE 150-P430
WS/WE 150-N132	WS/WE 150-N430



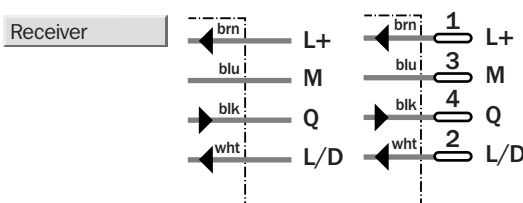
2 x 0.18 mm² 4-pin, M8

See chapter Accessories
Cables and connectors
Mounting systems ^{*)}
Special accessories

^{*)} Mounting brackets Type A included with delivery



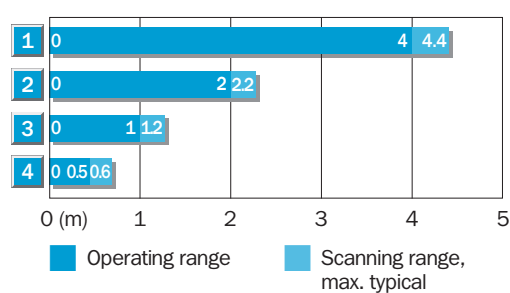
4 x 0.18 mm² 4-pin, M8



Technical data		WS/WE 150-	P 132	P 430	N 132	N 430
Scanning range, max. typical	4.4 m					
Operating range	4 m					
Operating range with mask,						
Aperture width 2.0 mm	2.0 m					
Aperture width 1.0 mm	1.0 m					
Aperture width 0.5 mm	0.5 m					
Sensitivity, adjustable	Potentiometer, 270°					
Light source ⁴⁾ , light type	LED, red light					
Light spot diameter	Approx. 400 mm at 4 mm					
Angle of dispersion of sender	Approx. 6°					
Angle of reception of receiver	Approx. 15°					
Supply voltage V _A	10...30 V DC ²⁾					
Residual ripple ³⁾	± 10 %					
Current consumption ⁴⁾ sender	≤ 15 mA					
receiver	≤ 20 mA					
Switching outputs	PNP, open collector: Q NPN, open collector: Q					
Max. output current I _A	100 mA					
Switching mode ⁵⁾	Dark-/light-switching via control cable L/D + V _S = light-switching 0 V = dark-switching					
Response time ⁶⁾	≤ 0.5 ms					
Max. switching frequency ⁷⁾	1000/s					
Connection types cable	PVC, 2 m ⁸⁾					
sender WS	2 x 0.18 mm ² , ø 3.5 mm					
receiver WE	4 x 0.18 mm ² , ø 3.5 mm					
Plug	M8 – 4-pin					
VDE protection class ⁹⁾	□					
Circuit protection ¹⁰⁾						
sender	A, B					
receiver	A, B, C, D					
Enclosure rating	IP 67					
Ambient temperature T _A	Operation – 25 °C...+ 55 °C Storage – 40 °C...+ 70 °C					
Weight	with cable 2 m Sender: appr. 44 g, receiver: appr. 44 g with plug Sender: appr. 7 g, receiver: appr. 7 g					
Housing material	Housing: ABS/optics: PC					

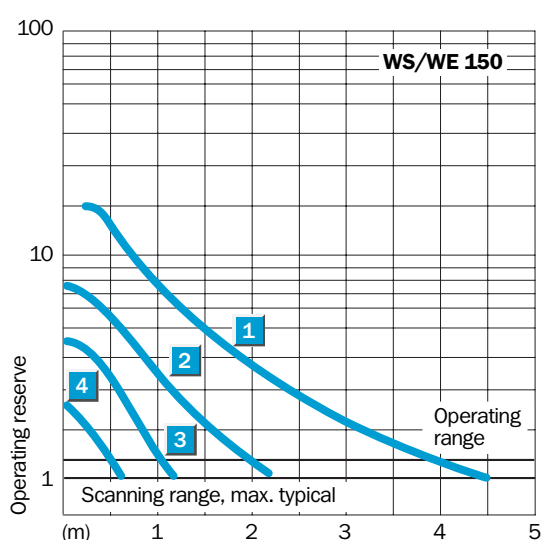
1) Average service life 100,000 h at T_A = + 25 °C
 2) Limit values
 3) May not exceed or fall short of V_S tolerances
 4) Without load
 5) Control cable open:
 NPN: light-switching
 PNP: dark-switching
 6) Signal transit time with resistive load
 7) With light/dark ratio 1:1
 8) Do not bend below 0 °C
 9) Reference voltage 50 V DC
 10) A = V_S connections reverse-polarity protected
 B = Inputs and outputs reverse-polarity protected
 C = Interference impulse suppression
 D = Outputs overcurrent and short-circuit protected
 11) Order no. includes both sender and receiver!

Scanning range and operating reserve



Reduction in scanning range with slotted masks

1	Without slotted mask
2	Mask aperture width 2.0 mm
3	Mask aperture width 1.0 mm
4	Mask aperture width 0.5 mm



Order information

Type	Order no. ¹¹⁾
WS/WE 150-P 132	6 011 030
WS/WE 150-P 430	6 011 032
WS/WE 150-N 132	6 011 027
WS/WE 150-N 430	6 011 029