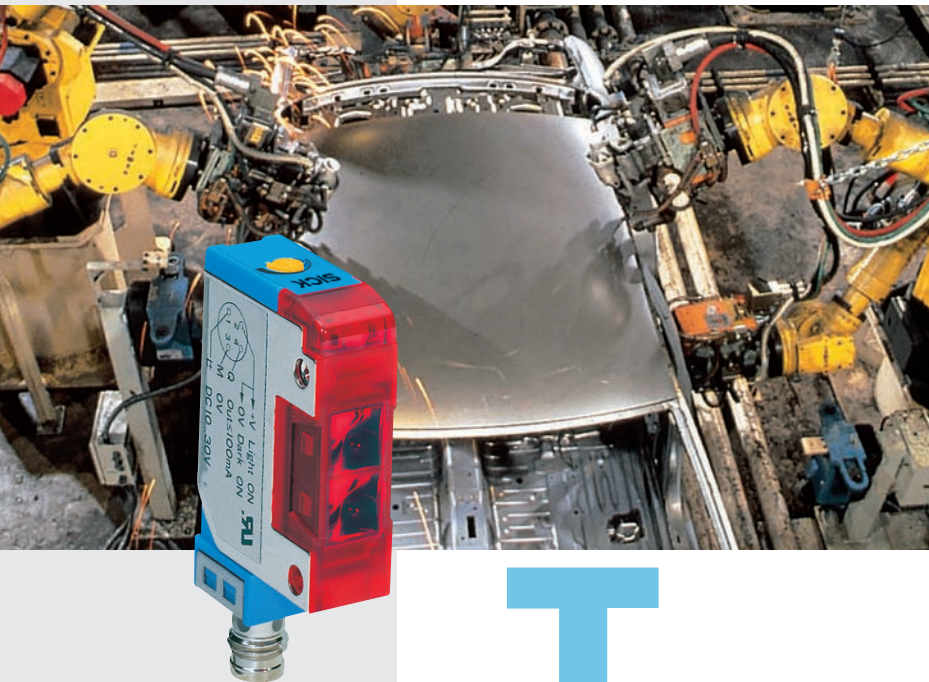


W 170: Miniature photoelectric switches – robust, functional, complete

Photoelectric proximity switches, BGB

Photoelectric proximity switches, energetic

Photoelectric reflex switches



Through-beam photoelectric switches

Thanks to the system's large scanning ranges, stainless-steel housings, red transmission light and the deliberate omission of operating elements, this series of photoelectric switches offers major benefits for the user, such as simple handling and high functionality.

The L.ON/D.ON control cable reduces the number of variants by half.

The W 170 switches have, therefore, proven particularly successful in the following sectors:

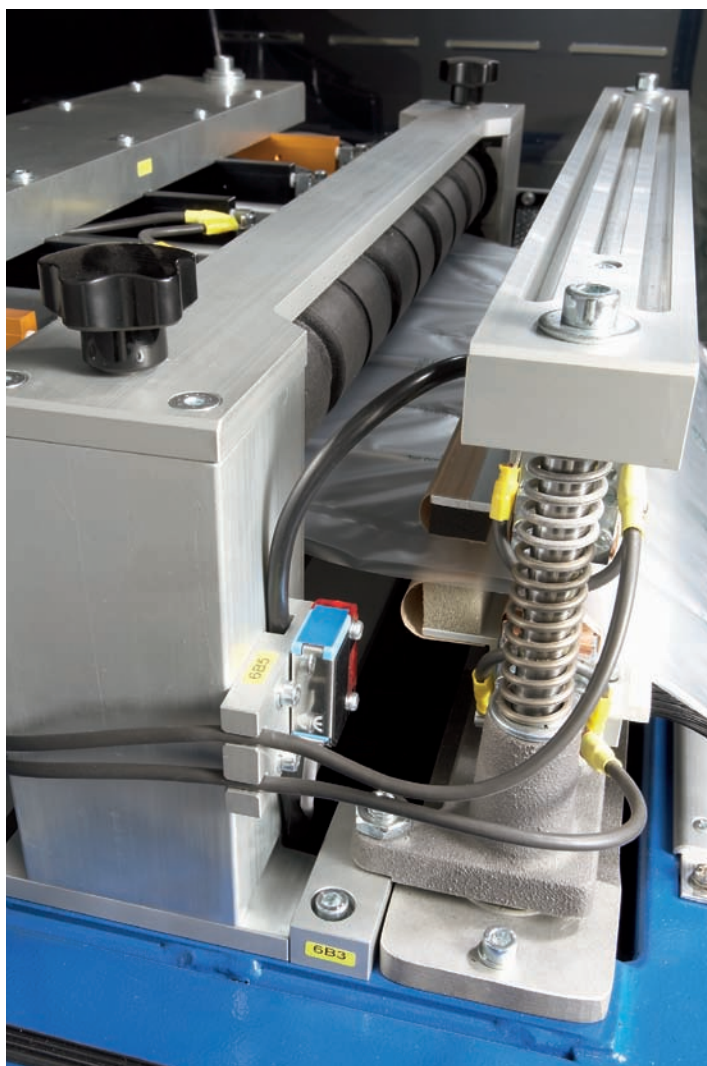
- conveyor systems,
- packaging industry,
- assembly and handling systems, and
- construction of special-purpose machines.

The scanning ranges:

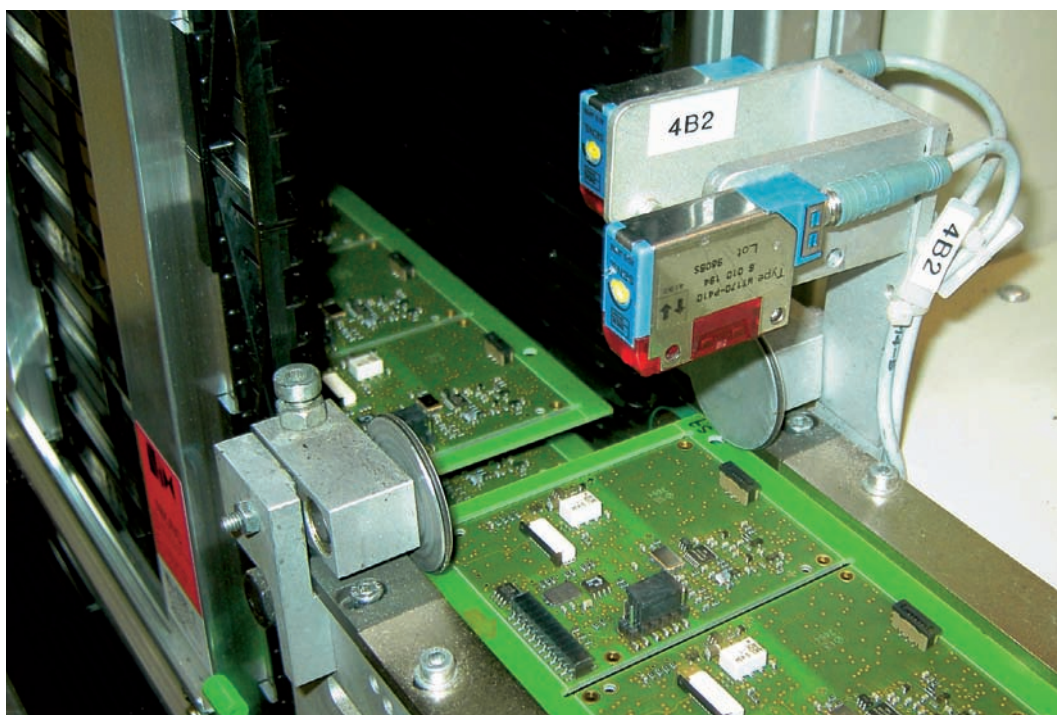
- WS/WE 170 through-beam photoelectric switch: 7 m, slotted masks and polarising filter attachments as accessories. The polarising attachments reduce mutual interference. WS/WE 170 switches also allow configuration of simple light grids.
- WL 170 photoelectric reflex switch: 3.5 m (PL 80 A), with polarising filter. Also available as a version with reduced switching hysteresis: especially suitable for detecting transparent objects such as glass or film.
- WT 170 photoelectric proximity switch: energetic: scanning distance 400 mm (90 % remission), for standard scanning tasks; with focused optics: scanning distance 10...90 mm, background blanking, small light spot, high sensitivity.

The mounting bracket and P 250 reflector (with WL 170) are included. Enclosure rating IP 67, $V_S = 10 \dots 30$ V DC, PNP or NPN switching output, M8 plug or cable are all standard features of the series.

▼ The WL 170 miniature photoelectric reflex switch controls the presence of material for the production of air bubble film.



▲ The WS/WE 170 miniature through-beam photoelectric switch controlling the system timing of a plastic bag sealing machine. Polarising filter attachments allow block assembly.

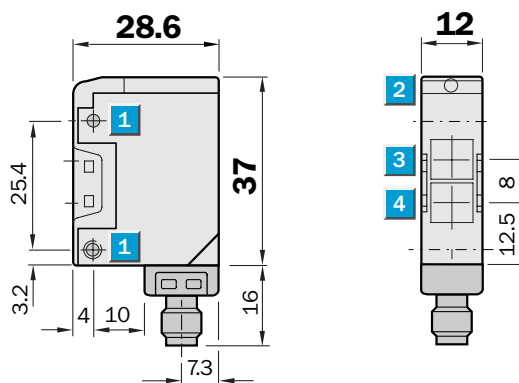


◀ The WT 170 miniature photoelectric proximity switch supervises and controls supply of e-cards in a buffer store.

	Scanning distance 10...100 mm
Photoelectric proximity switches	

- Focused sensor: with background blanking and high sensitivity
- Adjustable sensitivity (270°)
- Visible red light as alignment aid

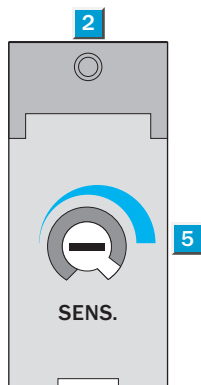
Dimensional drawing



Adjustments possible

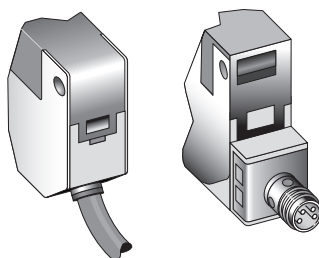
WT 170-P 112	WT 170-P 410
WT 170-N 112	WT 170-N 410

- 1 Mounting holes $\varnothing$ 3 mm with integrated M3 thread
- 2 LED signal strength indicator, red: light received $\geq$ switching threshold
- 3 Centre of optical axis, receiver
- 4 Centre of optical axis, sender
- 5 Sensitivity control (potentiometer, 270°)

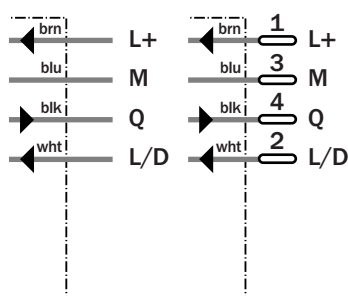


Connection types

WT 170-P 112	WT 170-P 410
WT 170-N 112	WT 170-N 410


4 x 0.18 mm²

4-pin, M8



See chapter Accessories

Cables and connectors

Mounting systems *)

*) Mounting brackets included with delivery

Technical data		WT 170-	P 112	P 410	N 112	N 410							
Scanning distance , max. typical	10...100 mm ¹⁾												
Operating distance	10...90 mm ¹⁾												
Background suppression	From approx. 120 mm, Background, 90% remission												
Sensitivity	Potentiometer, 270° (adjustable)												
Light source²⁾, light type	LED, visible red light												
Light spot size	Approx. 3.5 mm at 40 mm												
Angle of dispersion, sender	Focused, focal point 40 mm												
Supply voltage V_S	10...30 V DC ³⁾												
Ripple ⁴⁾	± 10 %												
Current consumption ⁵⁾	≤ 30 mA												
Switching outputs	PNP, open collector: Q NPN, open collector: Q												
Output current I_A max.	100 mA												
Switching mode	Light-/dark-switch. via L/D control cable + V_S = light-switching 0 V = dark-switching												
Response time ⁶⁾	≤ 0.7 ms												
Max. switching frequency ⁷⁾	700/s												
Connection types cable	PVC, 2 m ⁸⁾ ; 4 x 0.18 mm ² , Ø 3.8 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...+ 70 °C												
Weight with cable 2 m	Approx. 25 g												
with M8 plug, 4-pin	Approx. 66 g												
Housing material	Housing: stainless steel/ABS; optics: PC												

1) Object with 90 % remission
(based on standard white to DIN 5033)

2) Average service life 100,000 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) Do not bend below 0 °C

9) Reference voltage 50 V DC

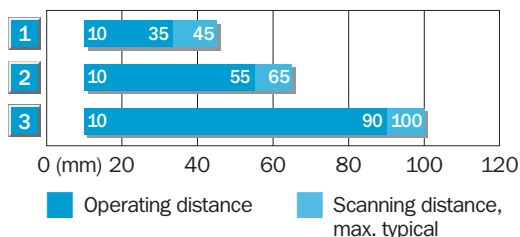
10) A = V_S connections reverse-polarity
protected

B = Inputs and outputs reverse-
polarity protected

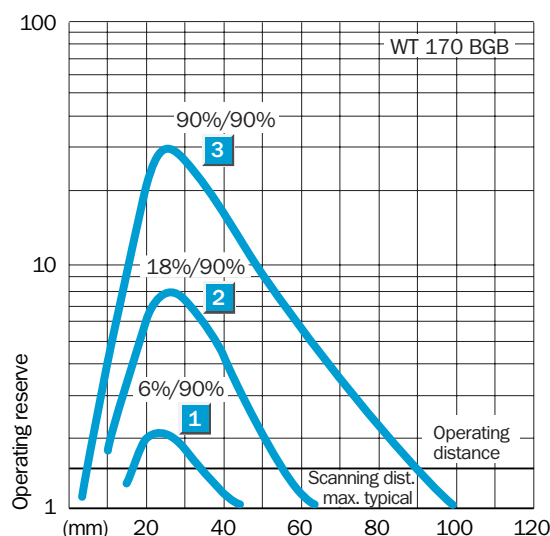
C = Interference pulse suppression

D = Outputs overcurrent and short-
circuit protected

Scanning distance



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



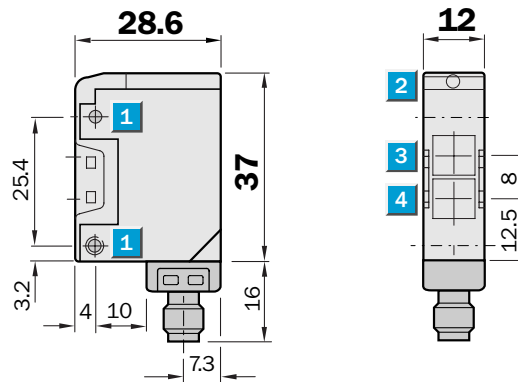
Order information

Type	Order no.
WT 170-P 112	6 010 193
WT 170-P 410	6 010 194
WT 170-N 112	6 010 195
WT 170-N 410	6 010 196

	Scanning distance 10...550 mm
Photoelectric proximity switches	

- Energetic photoelectric proximity switch for standard applications
- Adjustable sensitivity
- Visible red light LED transmitter alignment aid

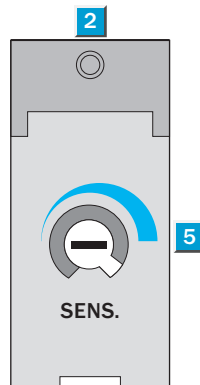
Dimensional drawing



Adjustments possible

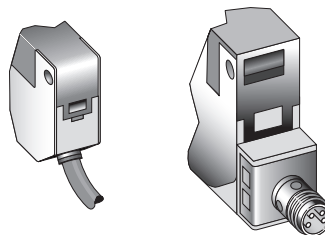
WT 170-P 132	WT 170-P 430
WT 170-N 132	WT 170-N 430

- 1 Mounting holes $\varnothing$ 3 mm with integrated M3 thread
- 2 LED signal strength indicator, red: light received $\geq$ switching threshold
- 3 Centre of optical axis, receiver
- 4 Centre of optical axis, sender
- 5 Sensitivity control (potentiometer, 270°)



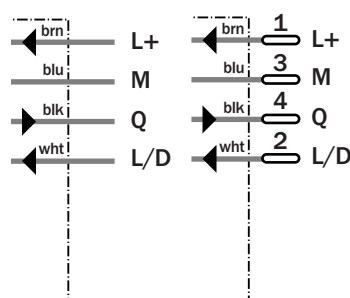
Connection types

WT 170-P 132	WT 170-P 430
WT 170-N 132	WT 170-N 430



4 x 0.18 mm²

4-pin, M8



See chapter Accessories

Cables and connectors

Mounting systems *)

*) Mounting brackets included with delivery



Technical data		WT 170-	P 132	P 430	N 132	N 430						
Scanning distance , max. typical	10...550 mm ¹⁾											
Operating distance	10...400 mm ¹⁾											
Sensitivity	Adjustable											
Light source²⁾, light type	LED, visible red light											
Light spot size	Approx. 40 mm at 400 mm											
Angle of dispersion, sender	Approx. 5°											
Supply voltage V_S	10...30 V DC ³⁾											
Ripple ⁴⁾	± 10 %											
Current consumption ⁵⁾	≤ 30 mA											
Switching outputs	PNP, open collector: Q											
	NPN, open collector: Q											
Output current I_A max.	100 mA											
Switching mode	Light-/dark-switch. via L/D control cable											
	+ V_S = light-switching											
	0 V = dark-switching											
Response time ⁶⁾	≤ 0.7 ms											
Max. switching frequency ⁷⁾	700/s											
Connection types cable	PVC, 2 m ⁸⁾ ; 4 x 0.18 mm ² , Ø 3.8 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...+ 70 °C											
Weight with cable 2 m	Approx. 25 g											
with M8 plug, 4-pin	Approx. 66 g											
Housing material	Housing: stainless steel/ABS; optics: PC											

1) Object with 90 % remission
(based on standard white to DIN 5033)

2) Average service life 100,000 h
at $T_A = +25\text{ °C}$

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) Do not bend below 0 °C

9) Reference voltage 50 V DC

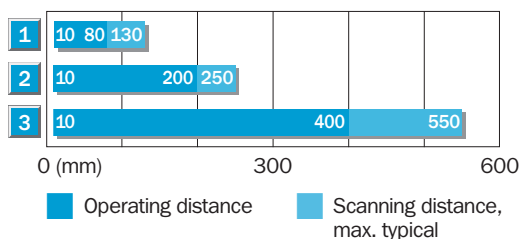
10) A = V_S connections reverse-polarity
protected

B = Inputs and outputs reverse-
polarity protected

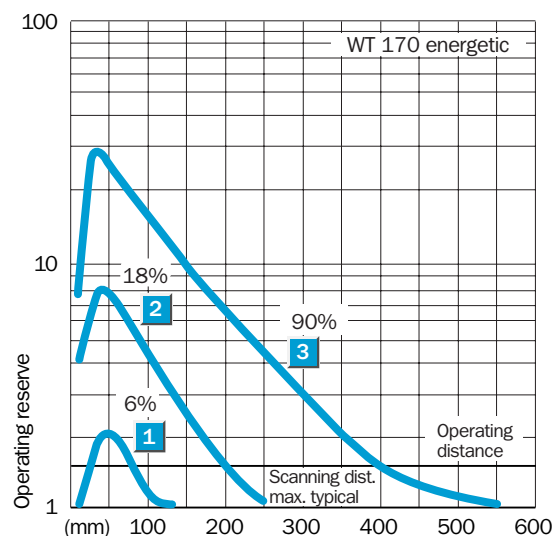
C = Interference pulse suppression

D = Outputs overcurrent and short-
circuit protected

Scanning distance



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



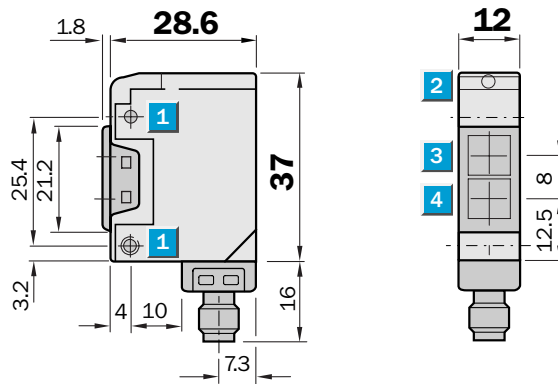
Order information

Type	Order no.
WT 170-P 132	6 010 197
WT 170-P 430	6 010 198
WT 170-N 132	6 010 199
WT 170-N 430	6 010 200

	Scanning range 0.01...4.0 m
Photoelectric reflex switches	

- Polarising filter enabling reliable detection of objects with shiny surfaces
- Also suitable for “Diamond Grade” reflective tape
- Visible red light LED transmitter as alignment aid

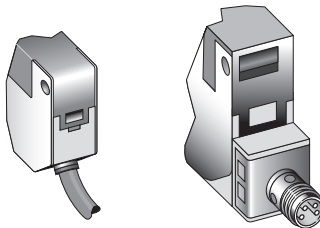
Dimensional drawing



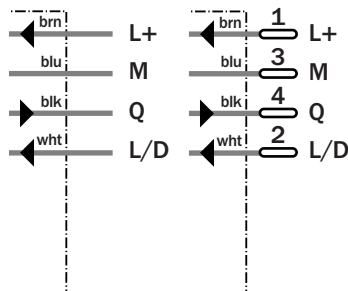
- 1 Mounting holes $\varnothing$ 3 mm with integrated M3 thread
- 2 LED signal strength indicator, red:
light received $\geq$ switching threshold
- 3 Centre of optical axis, receiver
- 4 Centre of optical axis, sender

Connection types

WL 170-P 132	WL 170-P 430
WL 170-N 132	WL 170-N 430



4 x 0.18 mm ²	4-pin, M8
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See chapter Accessories

Cables and connectors

Mounting systems *)

Reflectors **)

*) Mounting brackets included with delivery

**) Reflector P 250 included with delivery

Technical data		WL 170-	P 132	P 430	N 132	N 430						
Scanning range , max. typical/ on reflector	0.01...4 m/PL 80 A											
	0.01...3 m/P 250 (included)											
Operating range	0.01...2.5 m/P 250											
Light source ¹⁾ , light type	LED, visible red light											
	with polarising filter											
Light spot size	Approx. 200 mm at 2.5 mm											
Angle of dispersion, sender	Approx. 2.7°											
Supply voltage V_S		10...30 V DC ³⁾										
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 mode	Light-/dark-switch. via L/D control cable											
	+ V_S = light-switching											
	0 V = dark-switching											
Response time ⁵⁾	≤ 0.7 ms											
Max. switching frequency ⁶⁾	700/s											
Connection types	cable	PVC, 2 m ⁷⁾ ; 4 x 0.18 mm ² , Ø 3.8 mm										
	plug	M8, 4-pin										
VDE protection class ⁸⁾		□										
Circuit protection ⁹⁾		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	Approx. 25 g										
	with M8 plug, 4-pin	Approx. 66 g										
Housing material		Housing: stainless steel/ ABS; optics: PMMA										

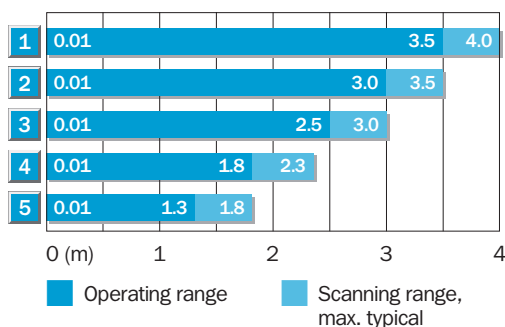
- 1) Average service life 100,000 h at T_A = + 25 °C
2) Limit values
3) May not exceed or fall short of V_S tolerances

- 4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Do not bend below 0 °C
8) Reference voltage 50 V DC

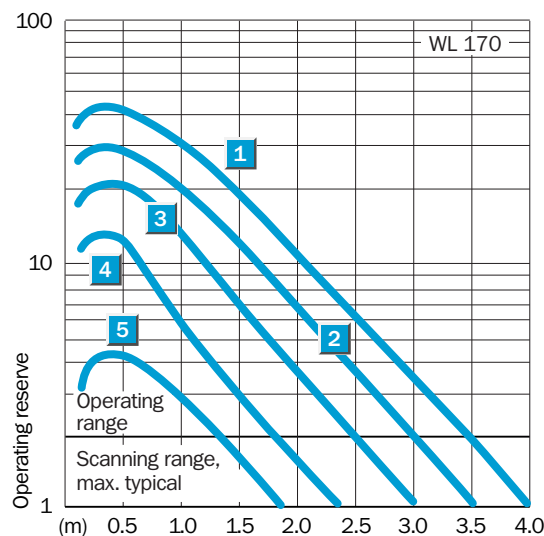
- 9) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected

- 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 – 3.5 m
2 PL 50 A	0.01 – 3.0 m
PL 40 A	0.01 – 3.0 m
3 P 250	0.01 – 2.5 m
PL 30 A	0.01 – 2.5 m
PL 31	0.01 – 2.5 m
4 PL 20	0.01 – 1.8 m
5 Reflective tape	0.01 – 1.3 m
«Diamond Grade» 90 x 90 mm	



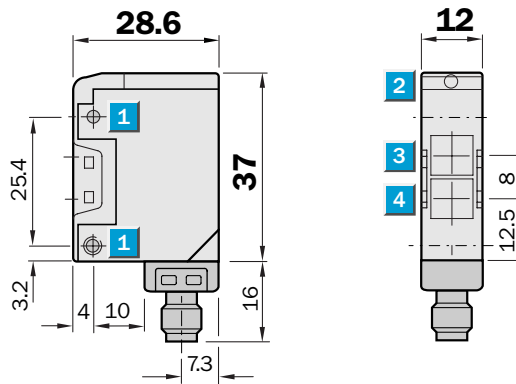
Order information

Type	Order no.
WL 170-P 132	6 010 189
WL 170-P 430	6 010 190
WL 170-N 132	6 010 191
WL 170-N 430	6 010 192

	Scanning range 0.1...0.8 m
Photoelectric reflex switches	

- Ideal for the detection of glass, transparent objects or small parts
- Detection reliability:
Min. attenuation 20 %;
Min. transmission variation 15 %,
Adjustable sensitivity
- Focused optics

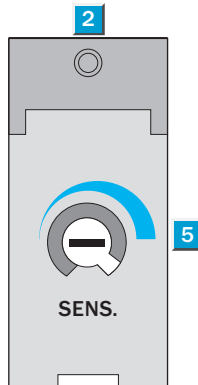
Dimensional drawing



Adjustments possible

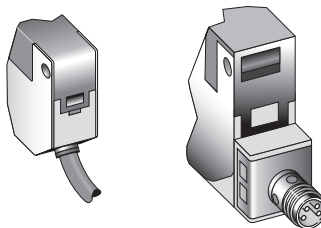
WL 170-P 122	WL 170-P 420
WL 170-N 122	WL 170-N 420

- 1 Mounting holes $\varnothing$ 3 mm with integrated M3 thread
- 2 LED signal strength indicator, red:
light received $\geq$ switching threshold
- 3 Centre of optical axis, receiver
- 4 Centre of optical axis, sender
- 5 Sensitivity control (potentiometer, 270°)



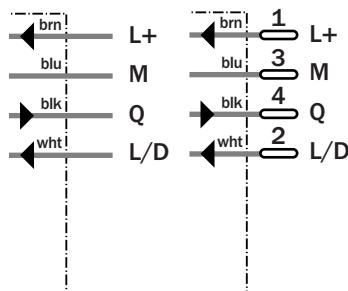
Connection types

WL 170-P 122	WL 170-P 420
WL 170-N 122	WL 170-N 420



4 x 0.18 mm²

4-pin, M8



See chapter Accessories

Cables and connectors

Mounting systems *)

Reflectors **)

*) Mounting brackets included with delivery

**) Reflector P 250 included with delivery



Technical data		WL 170-	P 122	P 420	N 122	N 420							
Detection of transparent objects													
Attenuation along light beam	min. 20 %												
Attenuation difference	min. 15 %												
Sensitivity	Potentiometer, 270° (adjustable)												
Scanning range, max. typical/	0.1...0.8 m/PL 80 A												
on reflector	0.1...0.6 m/P 250 (included)												
Operating range	0.1...0.5 m/P 250												
	Reflective tape: not suitable												
Light source¹⁾, light type		LED, visible red light											
Light spot size	Approx. 30 mm at 0.5 m												
Angle of dispersion, sender	Focused: $\varnothing$ approx. 5 mm where SR = 90 mm												
Supply voltage V_S		10...30 V DC ³⁾											
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 mode	Light-/dark-switch. via L/D control cable												
	+ V_S = light-switching												
	0 V = dark-switching												
Response time ⁵⁾	≤ 0.7 ms												
Max. switching frequency ⁶⁾	700/s												
Connection types													
cable	PVC, 2 m ⁷⁾ ; 4 x 0.18 mm ² , $\varnothing$ 3.8 mm												
plug	M8, 4-pin												
VDE protection class⁸⁾		□											
Circuit protection⁹⁾		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	Approx. 25 g												
with M8 plug, 4-pin	Approx. 66 g												
Housing material		Housing: stainless steel/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) Signal transit time with resistive load

6) With light/dark ratio 1:1

7) Do not bend below 0 °C

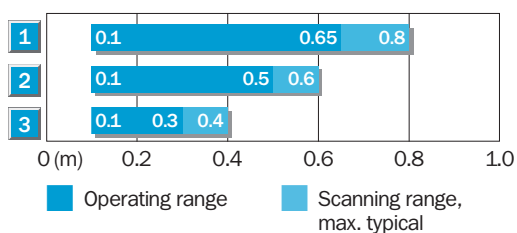
8) Reference voltage 50 V DC

9) A = V_S connections reverse-polarity protected

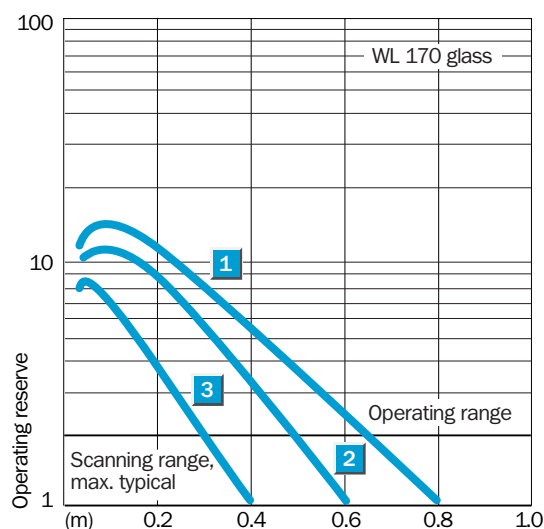
B = Inputs and outputs reverse-polarity protected

C = Interference pulse suppression
D = Outputs overcurrent and short-circuit protected

Scanning range and operating reserve



Reflector type	Operating range
1 PL 80 A	0.1...0.65 m
2 P 250	0.1...0.5 m
3 PL 20 A	0.1...0.3 m



Order information

Type	Order no.
WL 170-P 122	6 010 185
WL 170-P 420	6 010 186
WL 170-N 122	6 010 187
WL 170-N 420	6 010 188

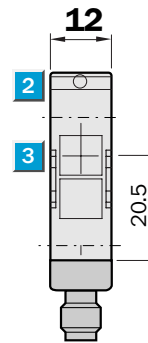
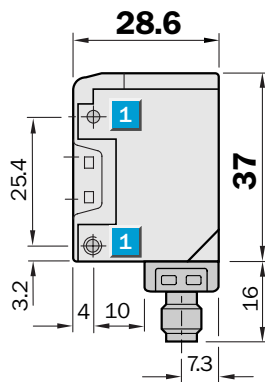


Scanning range
8.5 m

Through-beam photoelectric switches

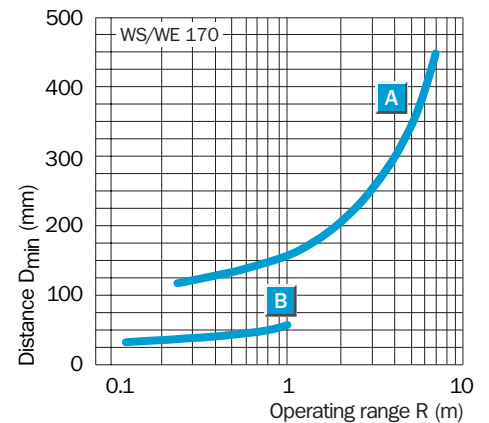
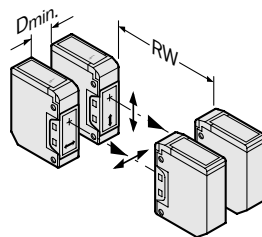
- Polarising filter attachments (accessories) to reduce mutual interference if several WS/WE 170 units are used
- Test input (WS 170 sender) for device and system testing
- Slotted masks (1 mm) to detect small parts or for positioning tasks

Dimensional drawing



- 1 Mounting holes $\varnothing$ 3 mm with integrated M3 thread
- 2 LED signal strength indicator, red: light received $\geq$ switching threshold
- 3 Centre of optical axis, sender (WS) and receiver (WE)

Minimum distance $D_{min.}$ between sides of two WS/WE 170 units



Prevention of mutual interference with two WS/WE 170 units

Minimum distance $D_{min.}$ observed for:

- A R 0.25 m ... 7 m: without optical attachments
- B R 0.15 m ... 1 m: with slotted masks BL170-10

No mutual interference if polarising filters are used

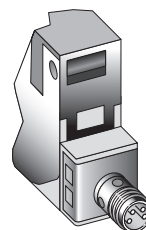
- C Polarising filter attachments BL170-POLF up to $R \leq 3$ m only
- D Polarising filter BL170-POLF and slotted masks BL170-10 up to $R \leq 0.5$ m



Connection types

WS/WE170-P132
WS/WE170-N132

WS/WE170-P430
WS/WE170-N430



See chapter Accessories

Cables and connectors
Mounting systems *)
Special accessories

*) Mounting brackets included with delivery

3 x 0.18 mm ² Sender	4 x 0.18 mm ² Receiver	4-pin, M8 Sender	4-pin, M8 Receiver

Technical data		WS/WE 170-	P 132	P 430	N 132	N 430						
Scanning range, max. typical	8.5 m											
Operating range	7 m											
Light source¹⁾, light type	LED, red light											
Light spot size	Approx. 850 mm at 7 m											
Angle of dispersion, sender	Approx. 7°											
Angle of dispersion, receiver	Approx. 20°											
Supply voltage V_S	10...30 V DC ²⁾											
Ripple ³⁾	± 10 %											
Current consumption ⁴⁾ sender	≤ 20 mA											
receiver	≤ 30 mA											
Switching outputs	PNP, open collector: Q											
	NPN, open collector: Q											
Output current I_A max.	100 mA											
Switching mode	Light-/dark-switch. via L/D control cable											
	+ V_S = light-switching											
	0 V = dark-switching											
Response time ⁵⁾	≤ 1.0 ms											
Max. switching frequency ⁶⁾	500/s											
Test input "TE" sender OFF	PNP, NPN: TE to 0 V											
Connection types cable	PVC, 2 m ⁷⁾											
sender WS	3 x 0.18 mm ² , Ø 3.8 mm											
receiver WE	4 x 0.18 mm ² , Ø 3.8 mm											
plug	M8, 4-pin											
VDE protection class⁸⁾	□											
Circuit protection⁹⁾												
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: approx. 66 g											
	Receiver: approx. 66 g											
with M8 plug, 4-pin	Sender: approx. 25 g											
	Receiver: approx. 25 g											
Housing material	Housing: stainless steel/ABS; optics: PC											

1) Average service life 100,000 h at $T_A = +25\text{ °C}$

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) Do not bend below 0 °C

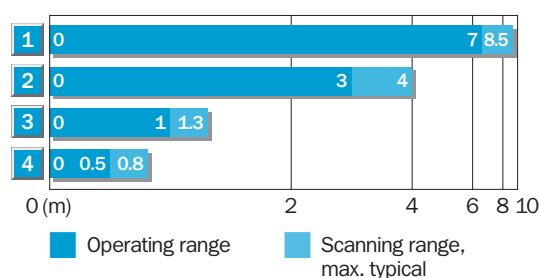
8) Reference voltage 50 V DC

9) A = V_S connections reverse-polarity protected

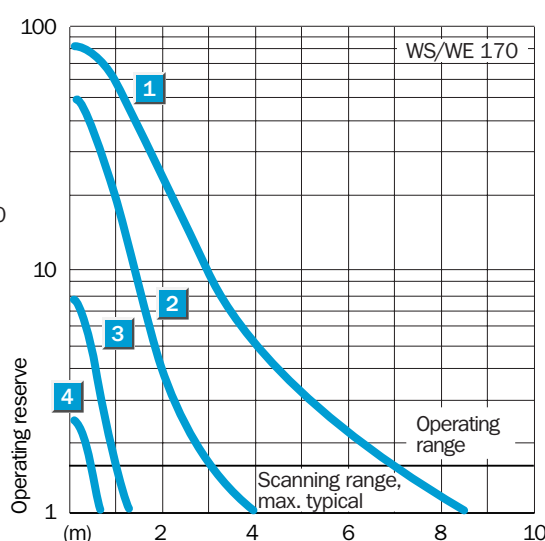
B = Inputs and outputs reverse-polarity protected

C = Interference pulse suppression
D = Outputs overcurrent and short-circuit protected

Scanning range and operating reserve



1	Without attachments
2	With polarising filter attachment
3	With slotted mask, 1 mm
4	With polarising filter and slotted mask, 1 mm



Order information

Type	Order no.*
WS/WE170-P132	6 010 181
WS/WE170-N132	6 010 183
WS/WE170-P430	6 010 182
WS/WE170-N430	6 010 184

* Order no. includes sender and receiver