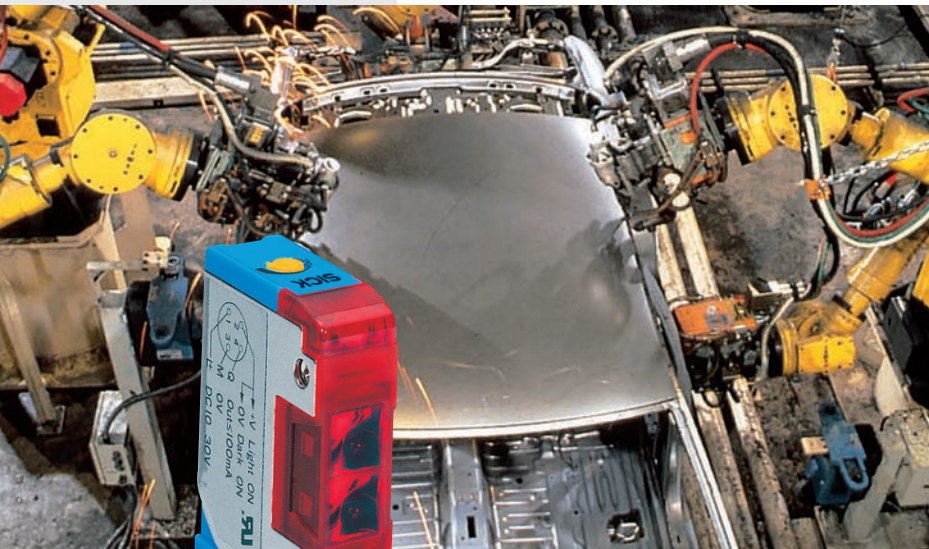


# W 170: Miniature photoelectric switches – robust, functional, complete

	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:

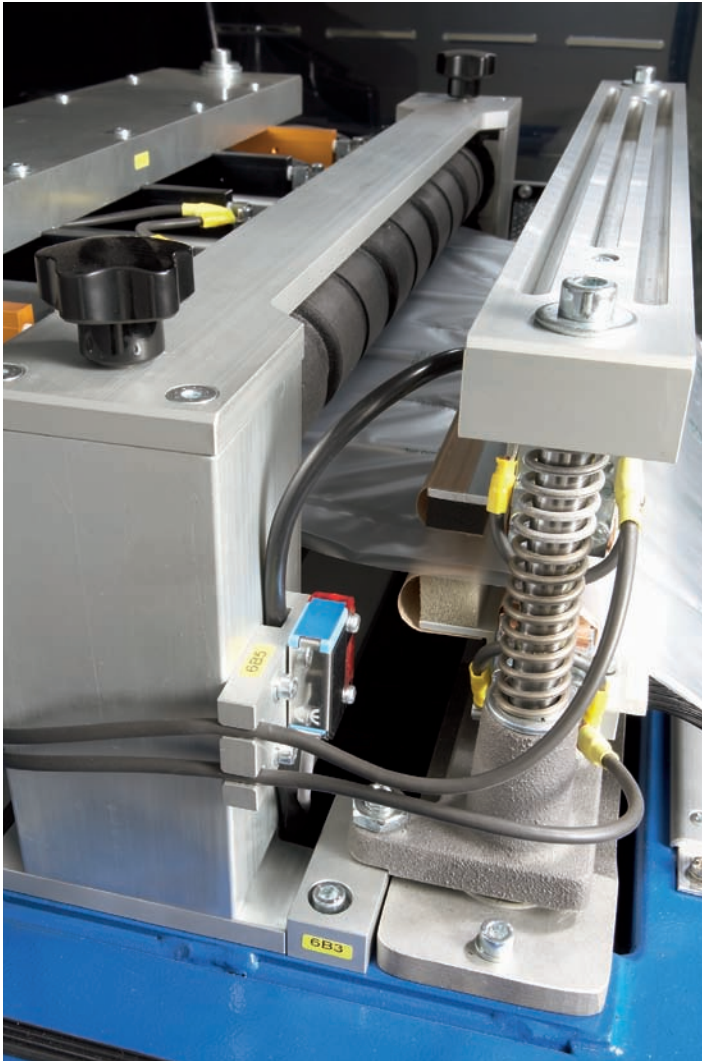
- conveyor systems,
- packaging industry,
- assembly and handling systems, and
- construction of special-purpose machines.

The scanning ranges:

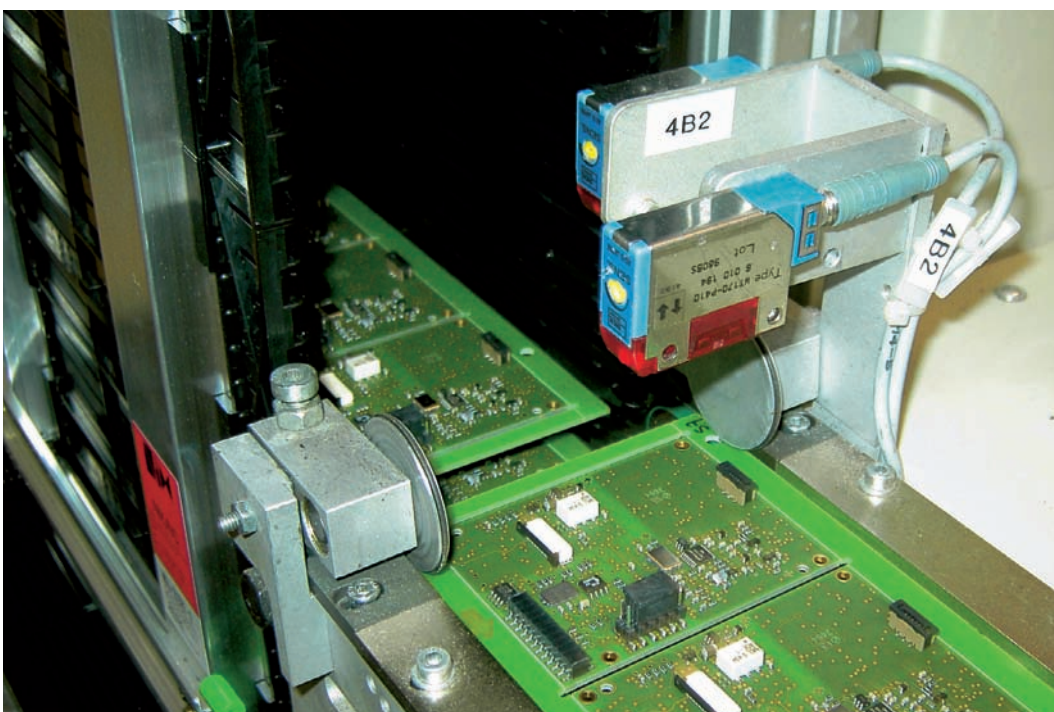
- WS/WE 170 through-beam photoelectric switch: 7 m, slotted masks and polarising filter attachments as accessories. The polarising attachments reduce mutual interference. WS/WE 170 switches also allow configuration of simple light grids.
- WL 170 photoelectric reflex switch: 3.5 m (PL 80 A), with polarising 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.



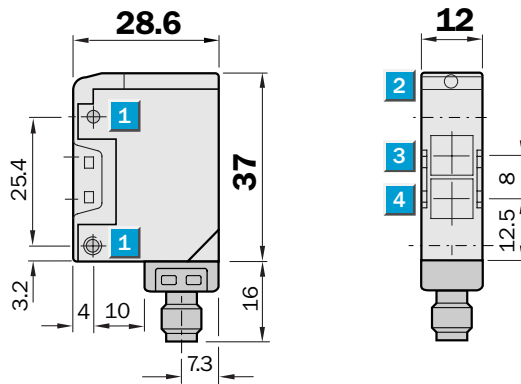
◀ The WT 170 miniature photoelectric proximity switch supervises and controls supply of e-cards in a buffer store.

 **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

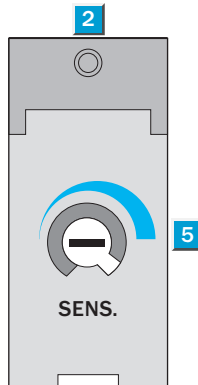
Dimensional drawing



Adjustments possible

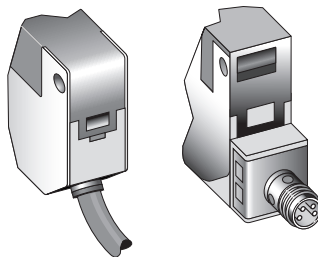
WT 170-P 112	WT 170-P 410
WT 170-N 112	WT 170-N 410

- 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°)

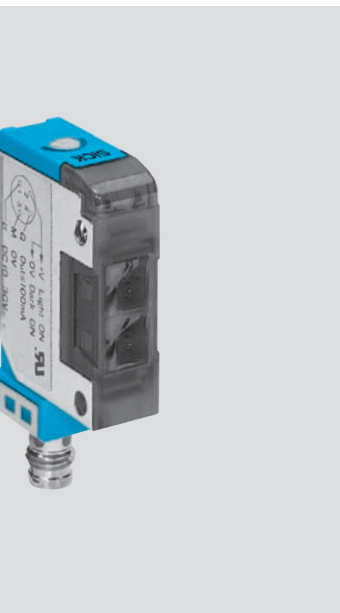
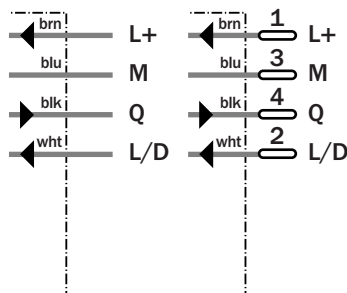


Connection types

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



4 x 0.18 mm <sup>2</sup>	4-pin, M8
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See chapter Accessories

Cables and connectors

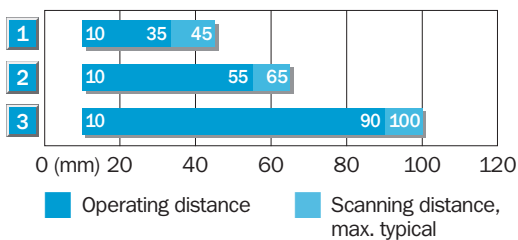
Mounting systems \*)

\*) Mounting brackets included with delivery

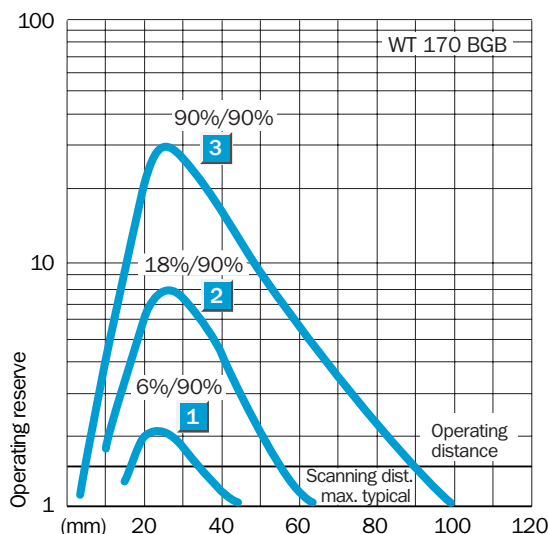
Technical data		WT 170-	P 112	P 410	N 112	N 410						
<b>Scanning distance, max. typical</b>	10...100 mm <sup>1)</sup>											
<b>Operating distance</b>	10...90 mm <sup>1)</sup>											
Background suppression	From approx. 120 mm, Background, 90% remission											
Sensitivity	Potentiometer, 270° (adjustable)											
<b>Light source<sup>2)</sup>, light type</b>	LED, visible red light											
Light spot size	Approx. 3.5 mm at 40 mm											
Angle of dispersion, sender	Focused, focal point 40 mm											
<b>Supply voltage V<sub>S</sub></b>	10...30 V DC <sup>3)</sup>											
Ripple <sup>4)</sup>	± 10 %											
Current consumption <sup>5)</sup>	≤ 30 mA											
<b>Switching outputs</b>	PNP, open collector: Q NPN, open collector: Q											
Output current I <sub>A</sub> max.	100 mA											
Switching mode	Light-/dark-switch. via L/D control cable + V <sub>S</sub> = light-switching 0 V = dark-switching											
Response time <sup>6)</sup>	≤ 0.7 ms											
Max. switching frequency <sup>7)</sup>	700/s											
<b>Connection types</b>	cable PVC, 2 m <sup>8)</sup> ; 4 x 0.18 mm <sup>2</sup> , ø 3.8 mm plug M8, 4-pin											
<b>VDE protection class<sup>9)</sup></b>	□											
<b>Circuit protection<sup>10)</sup></b>	A, B, C, D											
<b>Enclosure rating</b>	IP 67											
<b>Ambient temperature T<sub>A</sub></b>	Operation - 25 °C...+ 55 °C Storage - 40 °C...+ 70 °C											
<b>Weight</b>	with cable 2 m Approx. 25 g with M8 plug, 4-pin Approx. 66 g											
<b>Housing material</b>	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<sub>A</sub> = + 25 °C
- 3) Limit values
- 4) May not exceed or fall short of V<sub>S</sub> 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<sub>S</sub> 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



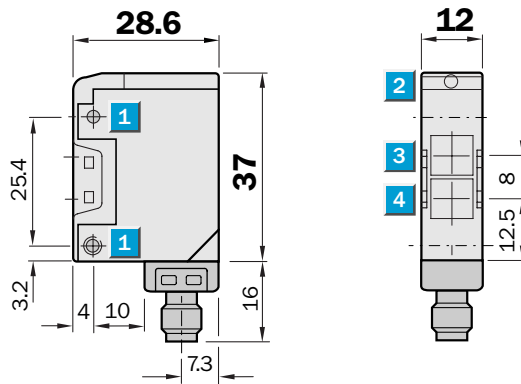
**Order information**

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

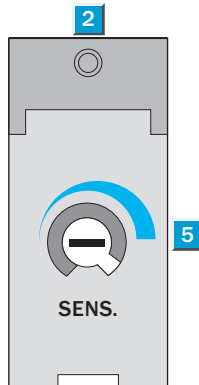
**Dimensional drawing**



**Adjustments possible**

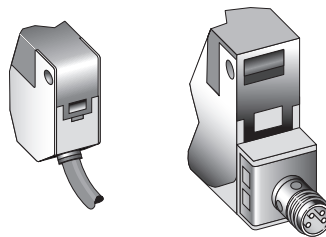
WT 170-P 132	WT 170-P 430
WT 170-N 132	WT 170-N 430

- 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°)

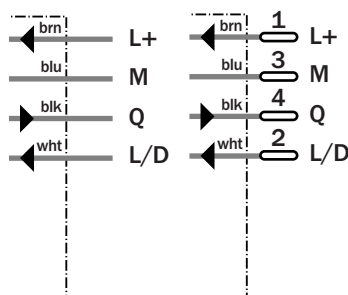


**Connection types**

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



4 x 0.18 mm<sup>2</sup>      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 <sup>1)</sup>											
Operating distance	10...400 mm <sup>1)</sup>											
Sensitivity	Adjustable											
Light source <sup>2)</sup> , light type	LED, visible red light											
Light spot size	Approx. 40 mm at 400 mm											
Angle of dispersion, sender	Approx. 5°											
Supply voltage V <sub>S</sub>	10...30 V DC <sup>3)</sup>											
Ripple <sup>4)</sup>	± 10 %											
Current consumption <sup>5)</sup>	≤ 30 mA											
Switching outputs	PNP, open collector: Q NPN, open collector: Q											
Output current I <sub>A</sub> max.	100 mA											
Switching mode	Light-/dark-switch. via L/D control cable + V <sub>S</sub> = light-switching 0 V = dark-switching											
Response time <sup>6)</sup>	≤ 0.7 ms											
Max. switching frequency <sup>7)</sup>	700/s											
Connection types	cable PVC, 2 m <sup>8)</sup> ; 4 x 0.18 mm <sup>2</sup> , ø 3.8 mm plug M8, 4-pin											
VDE protection class <sup>9)</sup>	□											
Circuit protection <sup>10)</sup>	A, B, C, D											
Enclosure rating	IP 67											
Ambient temperature T <sub>A</sub>	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<sub>A</sub> = + 25 °C
- 3) Limit values
- 4) May not exceed or fall short of V<sub>S</sub> 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<sub>S</sub> connections reverse-polarity protected  
B = Inputs and outputs reverse-polarity protected  
C = Interference pulse suppression  
D = Outputs overcurrent and short-circuit protected

### Scanning distance

Remission	Operating distance (mm)	Scanning distance, max. typical (mm)
6% (black)	10	130
18% (grey)	10	250
90% (white)	10	550

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

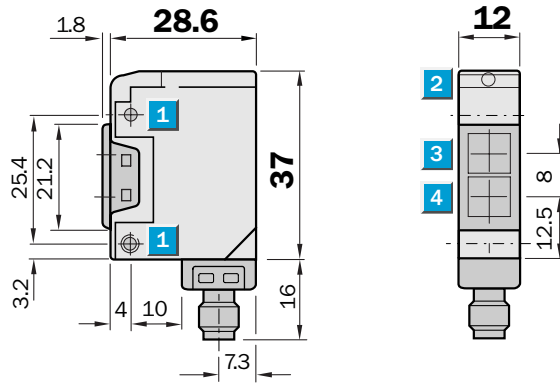
### Order information

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

	<b>Scanning range</b> 0.01...4.0 m
<b>Photoelectric reflex switches</b>	

- 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

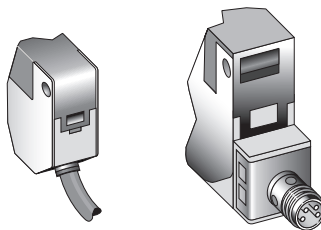
**Dimensional drawing**



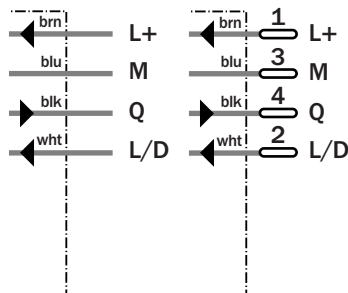
- 1 Mounting holes  $\varnothing$  3 mm with integrated M3 thread
- 2 LED signal strength indicator, red:  
light received  $\geq$  switching threshold
- 3 Centre of optical axis, receiver
- 4 Centre of optical axis, sender

**Connection types**

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



4 x 0.18 mm <sup>2</sup>	4-pin, M8
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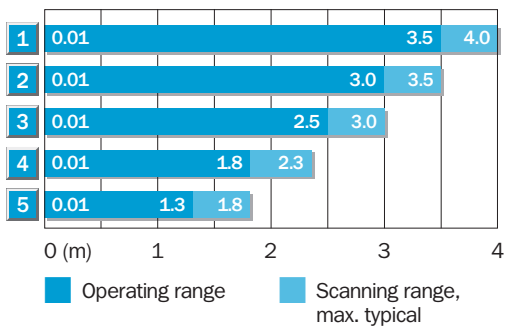
<b>See chapter Accessories</b>
Cables and connectors
Mounting systems *)
Reflectors **)

\*) Mounting brackets included with delivery  
 \*\*) Reflector P 250 included with delivery

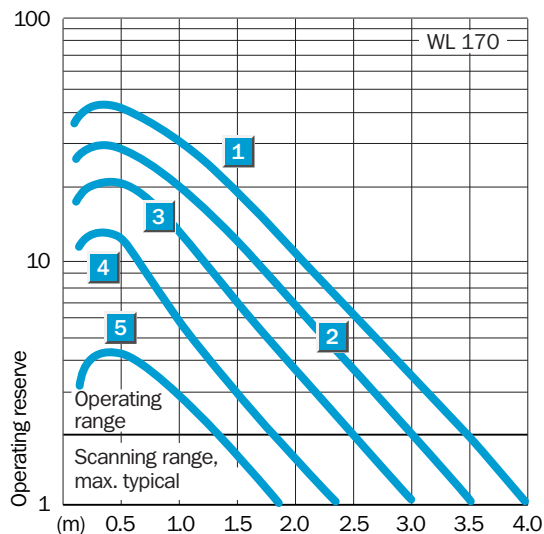
Technical data		WL 170-	P 132	P 430	N 132	N 430
<b>Scanning range, max. typical/</b> on reflector	0.01...4 m/PL 80 A 0.01...3 m/P 250 (included)					
<b>Operating range</b>	0.01...2.5 m/P 250					
<b>Light source<sup>1)</sup>, light type</b>	LED, visible red light with polarising filter					
Light spot size	Approx. 200 mm at 2.5 mm					
Angle of dispersion, sender	Approx. 2.7°					
<b>Supply voltage V<sub>S</sub></b>	10...30 V DC <sup>3)</sup>					
Ripple <sup>3)</sup>	± 10 %					
Current consumption <sup>4)</sup>	≤ 30 mA					
<b>Switching outputs</b>	PNP, open collector: Q NPN, open collector: Q					
Output current I <sub>A</sub> max.	100 mA					
Switching mode	Light-/dark-switch. via L/D control cable + V <sub>S</sub> = light-switching 0 V = dark-switching					
Response time <sup>5)</sup>	≤ 0.7 ms					
Max. switching frequency <sup>6)</sup>	700/s					
<b>Connection types</b> cable	PVC, 2 m <sup>7)</sup> ; 4 x 0.18 mm <sup>2</sup> , ø 3.8 mm					
plug	M8, 4-pin					
<b>VDE protection class<sup>8)</sup></b>	□					
<b>Circuit protection<sup>9)</sup></b>	A, B, C, D					
<b>Enclosure rating</b>	IP 67					
<b>Ambient temperature T<sub>A</sub></b>	Operation - 25 °C...+ 55 °C Storage - 40 °C...+ 70 °C					
<b>Weight</b> with cable 2 m	Approx. 25 g					
with M8 plug, 4-pin	Approx. 66 g					
<b>Housing material</b>	Housing: stainless steel/ ABS; optics: PMMA					

- 1) Average service life 100,000 h at T<sub>A</sub> = + 25 °C
- 2) Limit values
- 3) May not exceed or fall short of V<sub>S</sub> 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<sub>S</sub> 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**

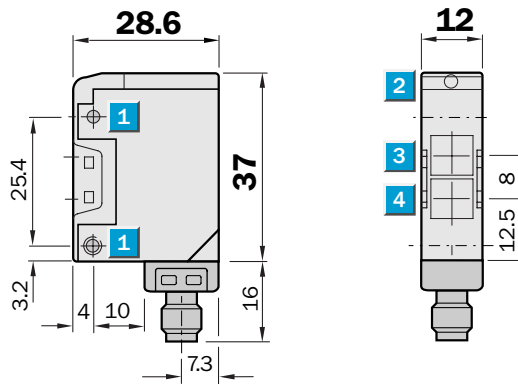
Type	Order no.
WL 170-P 132	6 010 189
WL 170-P 430	6 010 190
WL 170-N 132	6 010 191
WL 170-N 430	6 010 192




**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

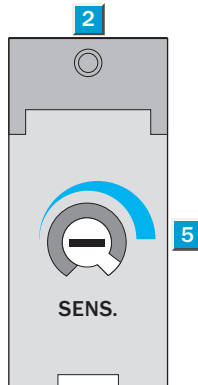
**Dimensional drawing**



**Adjustments possible**

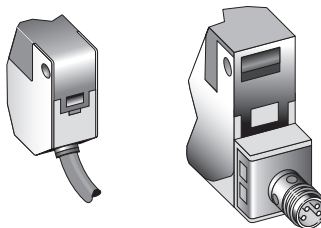
WL 170-P 122	WL 170-P 420
WL 170-N 122	WL 170-N 420

- 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°)



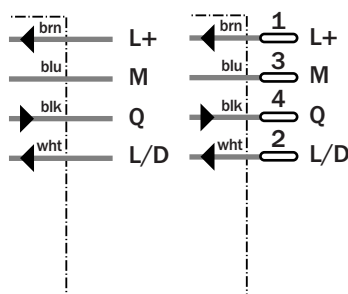
**Connection types**

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



4 x 0.18 mm<sup>2</sup>

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
<b>Detection of transparent objects</b>						
Attenuation along light beam	min. 20 %					
Attenuation difference	min. 15 %					
Sensitivity	Potentiometer, 270° (adjustable)					
<b>Scanning range, max. typical/</b>	0.1...0.8 m/PL 80 A					
on reflector	0.1...0.6 m/P 250 (included)					
<b>Operating range</b>	0.1...0.5 m/P 250					
	Reflective tape: not suitable					
<b>Light source<sup>1)</sup>, light type</b>						
	LED, visible red light					
Light spot size	Approx. 30 mm at 0.5 m					
Angle of dispersion, sender	Focused: $\phi$ approx. 5 mm where SR = 90 mm					
<b>Supply voltage <math>V_S</math></b>						
	10...30 V DC <sup>3)</sup>					
Ripple <sup>3)</sup>	$\pm 10 \%$					
Current consumption <sup>4)</sup>	$\leq 30$ mA					
<b>Switching outputs</b>						
	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 <sup>5)</sup>	$\leq 0.7$ ms					
Max. switching frequency <sup>6)</sup>	700/s					
<b>Connection types</b>						
cable	PVC, 2 m <sup>7)</sup> ; 4 x 0.18 mm <sup>2</sup> , $\phi$ 3.8 mm					
plug	M8, 4-pin					
<b>VDE protection class<sup>8)</sup></b>						
	<input type="checkbox"/>					
<b>Circuit protection<sup>9)</sup></b>						
	A, B, C, D					
<b>Enclosure rating</b>						
	IP 67					
<b>Ambient temperature <math>T_A</math></b>						
	Operation - 25 °C...+ 55 °C					
	Storage - 40 °C...+ 70 °C					
<b>Weight</b>						
with cable 2 m	Approx. 25 g					
with M8 plug, 4-pin	Approx. 66 g					
<b>Housing material</b>						
	Housing: stainless steel/ABS; optics: PC					

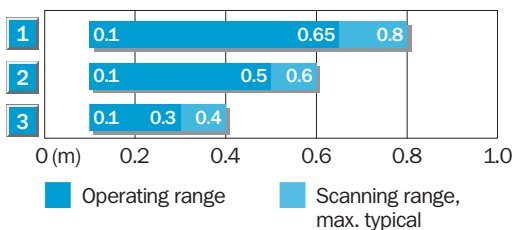
- 1) Average service life 100,000 h at  $T_A = +25$  °C
- 2) Limit values
- 3) May not exceed or fall short of  $V_S$  tolerances

- 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

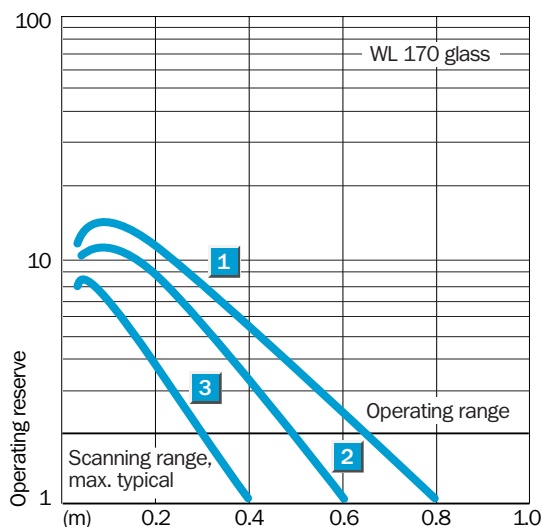
- 9) A =  $V_S$  connections reverse-polarity protected
- B = Inputs and outputs reverse-polarity protected

- 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**

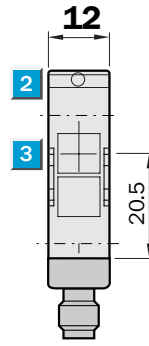
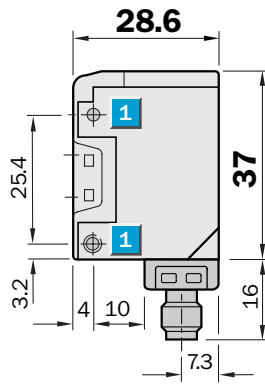
Type	Order no.
WL 170-P 122	6 010 185
WL 170-P 420	6 010 186
WL 170-N 122	6 010 187
WL 170-N 420	6 010 188

**Scanning range**  
8.5 m

Through-beam photoelectric switches

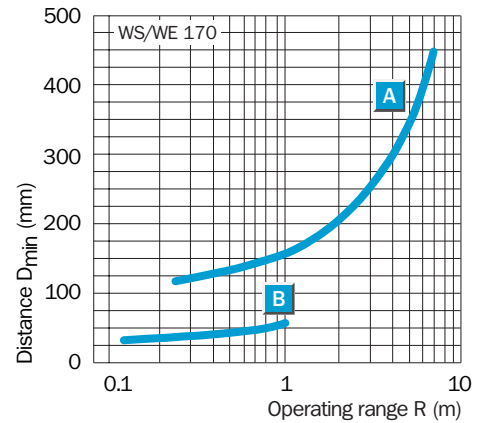
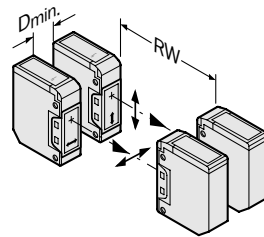
- Polarising filter attachments (accessories) to reduce mutual interference if several WS/WE 170 units are used
- Test input (WS 170 sender) for device and system testing
- Slotted masks (1 mm) to detect small parts or for positioning tasks

**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

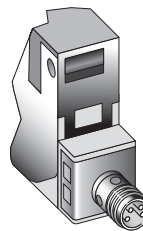
- C Polarising filter attachments BL170-POLF up to  $R \leq 3$  m only
- D Polarising filter BL170-POLF and slotted masks BL170-10 up to  $R \leq 0.5$  m



**Connection types**

WS/WE170-P 132  
WS/WE170-N132

WS/WE170-P 430  
WS/WE170-N 430

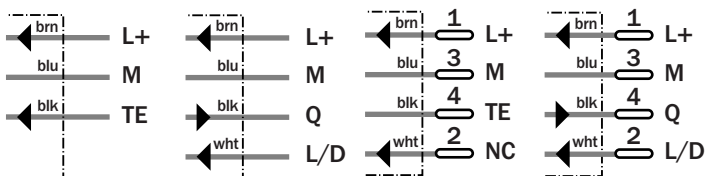


**See chapter Accessories**

- Cables and connectors
- Mounting systems \*)
- Special accessories

\*) Mounting brackets included with delivery

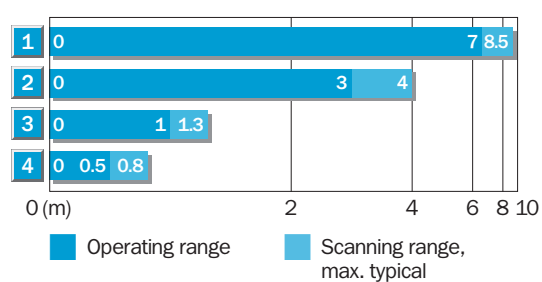
3 x 0.18 mm <sup>2</sup> Sender	4 x 0.18 mm <sup>2</sup> Receiver	4-pin, M8 Sender	4-pin, M8 Receiver
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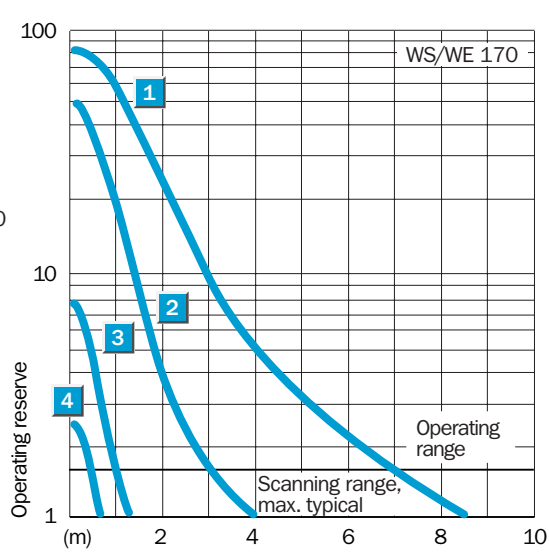
Technical data		WS/WE 170-	P 132	P 430	N 132	N 430
<b>Scanning range, max. typical</b>	8.5 m					
<b>Operating range</b>	7 m					
<b>Light source<sup>1)</sup>, light type</b>	LED, red light					
Light spot size	Approx. 850 mm at 7 m					
Angle of dispersion, sender	Approx. 7°					
Angle of dispersion, receiver	Approx. 20°					
<b>Supply voltage V<sub>S</sub></b>	10...30 V DC <sup>2)</sup>					
Ripple <sup>3)</sup>	± 10 %					
Current consumption <sup>4)</sup> sender	≤ 20 mA					
receiver	≤ 30 mA					
<b>Switching outputs</b>	PNP, open collector: Q					
	NPN, open collector: Q					
Output current I <sub>A</sub> max.	100 mA					
Switching mode	Light-/dark-switch. via L/D control cable					
	+ V <sub>S</sub> = light-switching					
	0 V = dark-switching					
Response time <sup>5)</sup>	≤ 1.0 ms					
Max. switching frequency <sup>6)</sup>	500/s					
<b>Test input "TE"</b> sender OFF	PNP, NPN: TE to 0 V					
<b>Connection types</b> cable	PVC, 2 m <sup>7)</sup>					
sender WS	3 x 0.18 mm <sup>2</sup> , ø 3.8 mm					
receiver WE	4 x 0.18 mm <sup>2</sup> , ø 3.8 mm					
plug	M8, 4-pin					
<b>VDE protection class<sup>8)</sup></b>	□					
<b>Circuit protection<sup>9)</sup></b>						
sender	A, B					
receiver	A, B, C, D					
<b>Enclosure rating</b>	IP 67					
<b>Ambient temperature T<sub>A</sub></b>	Operation - 25 °C...+ 55 °C					
	Storage - 40 °C...+ 70 °C					
<b>Weight</b> 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					
<b>Housing material</b>	Housing: stainless steel/ABS; optics: PC					

- 1) Average service life 100,000 h at T<sub>A</sub> = + 25 °C
- 2) Limit values
- 3) May not exceed or fall short of V<sub>S</sub> 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<sub>S</sub> 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