Photoelectric proximity switches, BGB

Photoelectric proximity switches, energetic

Photoelectric reflex switches

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

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:

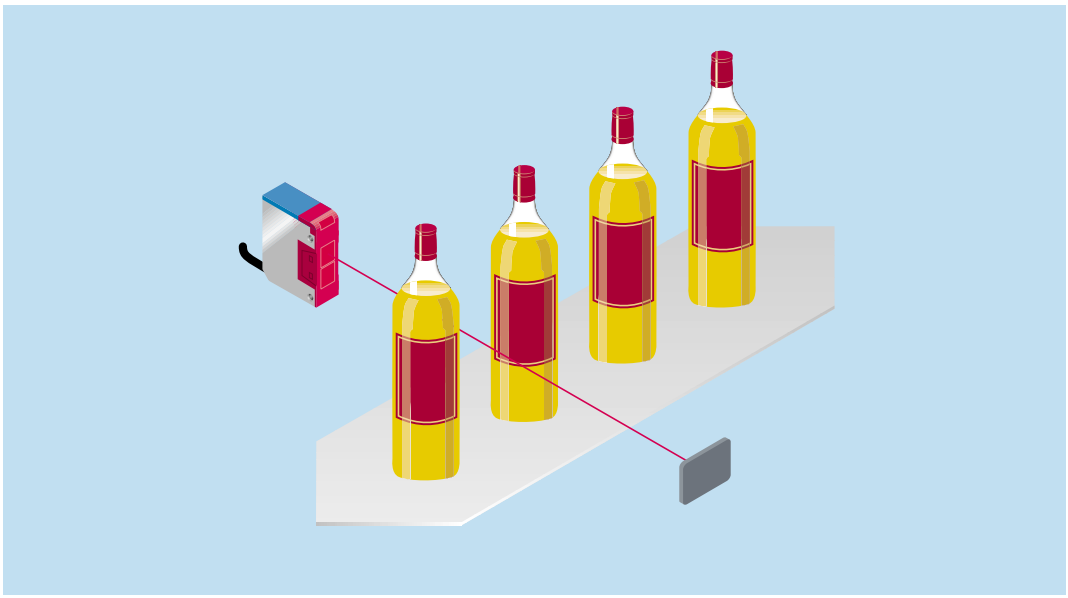
- conveyor systems,
- packaging industry,
- assembly and handling systems, and
- construction of special-purpose machines.

The scanning ranges:

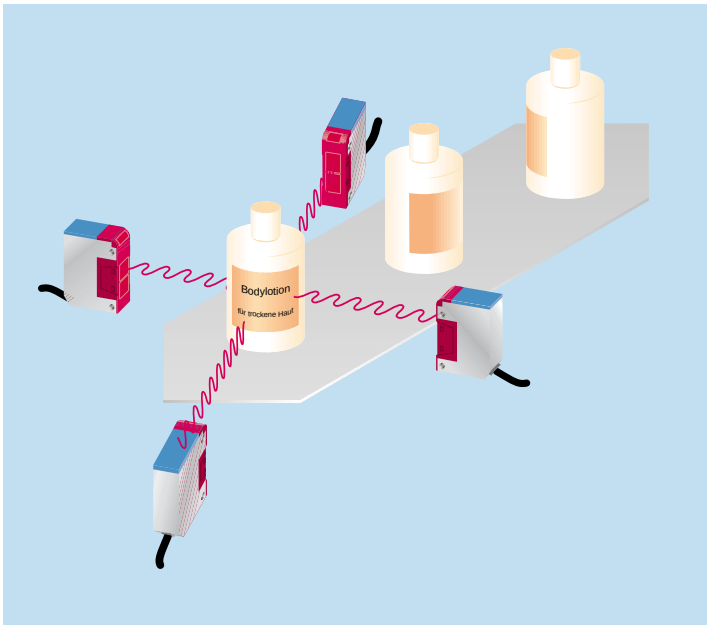
- WS/WE 170 through-beam photoelectric switch: 7 m, slotted masks and polarising filter attachments as accessories. The polarising attachments reduce mutual interference. WS/WE 170 switches also allow configuration of simple light grids.
- WL 170 photoelectric reflex switch: 3.5 m (PL 80 A), with polarising 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…30 V DC, PNP or NPN switching output, M 8 plug or cable are all standard features of the series.

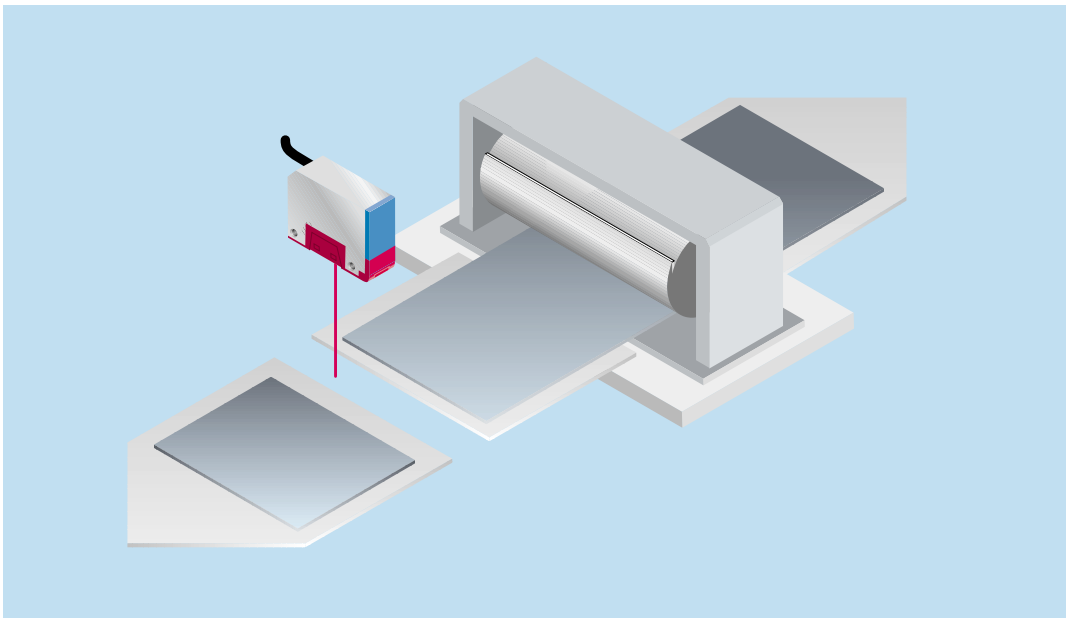
► The WL 170 miniature photoelectric reflex switch with reduced switching hysteresis is used to reliably signal jams on conveyors, even if the bottles contain transparent liquids.



▼ 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 WS/WE 170 miniature through-beam photoelectric switch used to the presence of labels on transparent objects; polarising filter attachments prevent mutual interference.



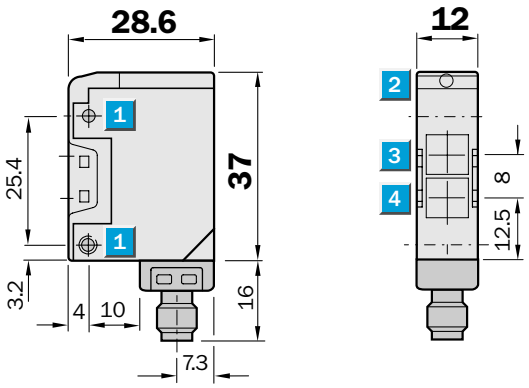
◄ The WT 170 miniature photoelectric proximity switch used for detecting individual sheet-metal sections to monitor the functioning of the guillotine shears.

Scanning distance 10…100 mm

Photoelectric proximity switches

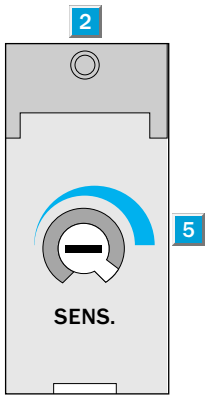
- Focused sensor: with background blanking and high sensitivity
- Adjustable sensitivity (270°)
- Visible red light as alignment aid

Dimensional drawing



Adjustments possible

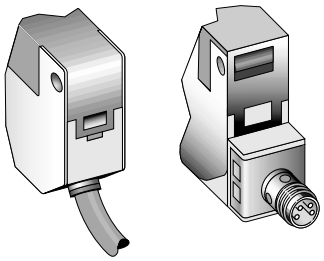
WT 170-P 112	WT 170-P 410
WT 170-N 112	WT 170-N 410



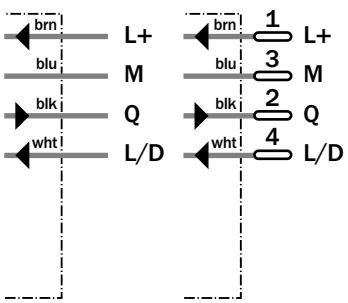
1 Mounting holes ø 3 mm with integrated M3 thread
2 LED signal strength indicator, red: light received ≥ switching threshold
3 Centre of optical axis, receiver
4 Centre of optical axis, sender
5 Sensitivity control (potentiometer, 270°)

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, M 8



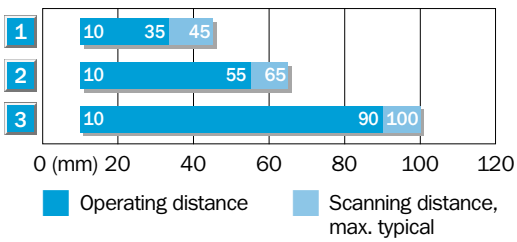
Accessories	page
Cable receptacles	496
Mounting brackets*	510

* included with delivery

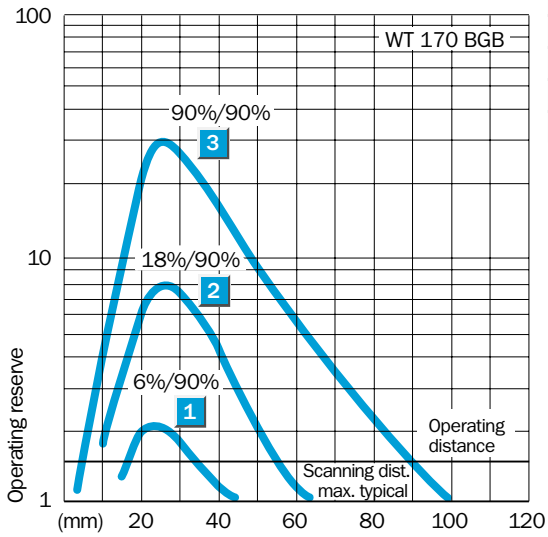
Technical data		WT 170-	P 112	P 410	N 112	N 410
Scanning distance, max. typical		10…100 mm[1]	■	■	■	■
Operating distance		10…90 mm[1]	■	■	■	■
Background suppression		From approx. 120 mm,	■	■	■	■
		Background, 90% remission				
Sensitivity		Potentiometer, 270° (adjustable)	■	■	■	■
Light source[2], **light 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 mm², ø 3.8 mm	■		■	
	plug	M 8, 4-pin		■		■
VDE protection class[9]		⧈	■	■	■	■
Circuit protection[10]		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 M 8 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

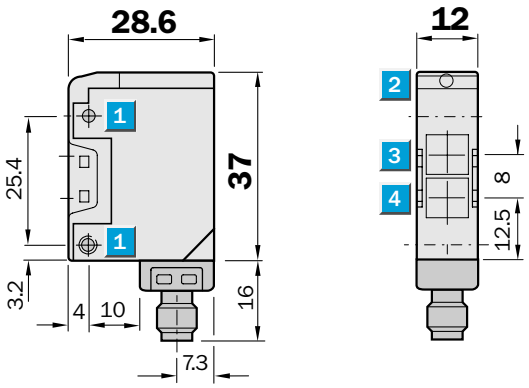
Type	Part no.
WT 170-P 112	6 010 193
WT 170-P 410	6 010 194
WT 170-N 112	6 010 195
WT 170-N 410	6 010 196

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

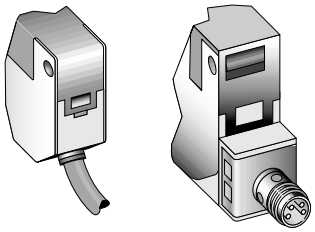


Adjustments possible	
WT 170-P 132	WT 170-P 430
WT 170-N 132	WT 170-N 430

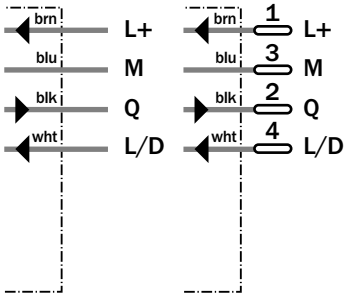
1 Mounting holes ø 3 mm with integrated M3 thread
2 LED signal strength indicator, red: light received ≥ switching threshold
3 Centre of optical axis, receiver
4 Centre of optical axis, sender
5 Sensitivity control (potentiometer, 270°)

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, M 8



Accessories	page
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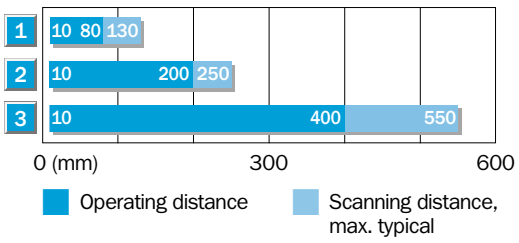
Mounting brackets*	510

* included with delivery

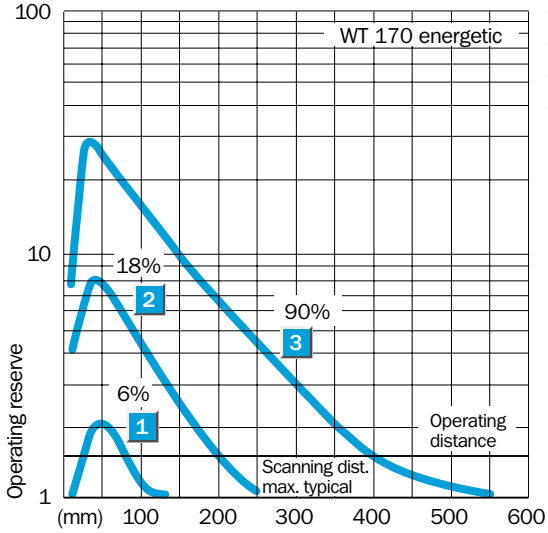
Technical data		WT 170-	P 132	P 430	N 132	N 430
Scanning distance, max. typical		10…550 mm[1]	■	■	■	■
Operating distance		10…400 mm[1]	■	■	■	■
Sensitivity		Adjustable	■	■	■	■
Light source[2], light type		LED, visible red light	■	■	■	■
Light spot size		Approx. 40 mm at 400 mm	■	■	■	■
Angle of dispersion, 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 mm², ø 3.8 mm	■		■	
	plug	M 8, 4-pin		■		■
VDE protection class[9]		⧈	■	■	■	■
Circuit protection[10]		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 M 8 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

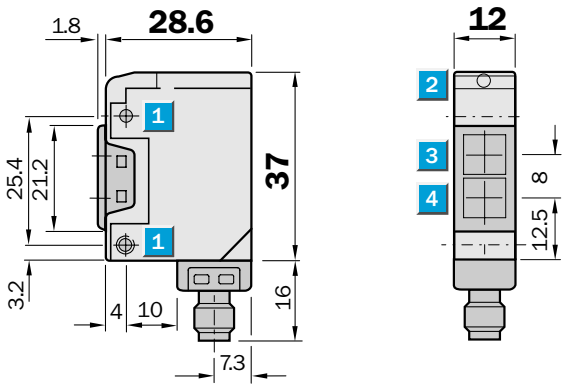
Type	Part no.
WT 170-P 132	6 010 197
WT 170-P 430	6 010 198
WT 170-N 132	6 010 199
WT 170-N 430	6 010 200

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

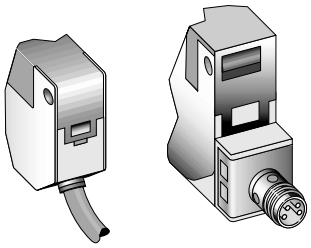
Dimensional drawing



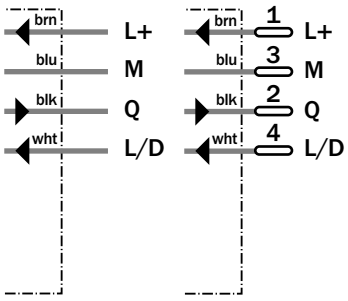
1 Mounting holes ø 3 mm with integrated M3 thread
2 LED signal strength indicator, red:
light received ≥ switching threshold
3 Centre of optical axis, receiver
4 Centre of optical axis, sender

Connection types

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



4 x 0.18 mm²	4-pin, M 8



Accessories	page
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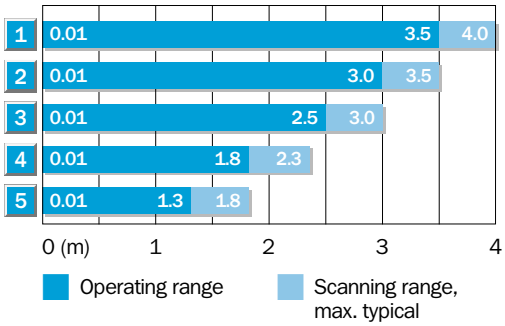
Mounting brackets*	510
Reflectors**	520

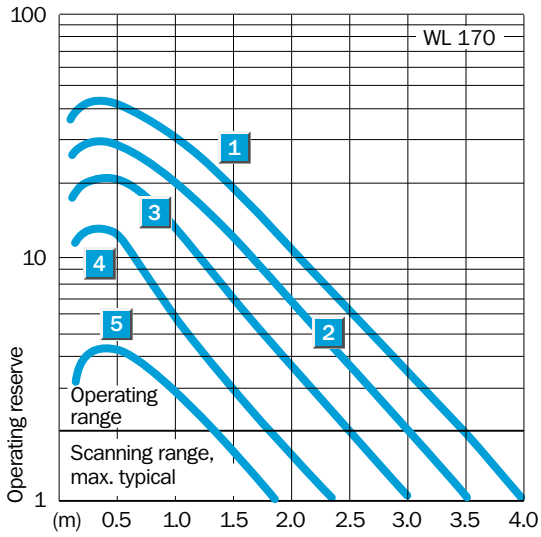
* included with delivery
** Reflector P 250 included with delivery

Technical data	WL 170-	P 132	P 430	N 132	N 430
Scanning range, max. typical/	0.01…4 m/PL 80 A				
on reflector	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 mm², ø 3.8 mm				
plug	M 8, 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 M 8 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

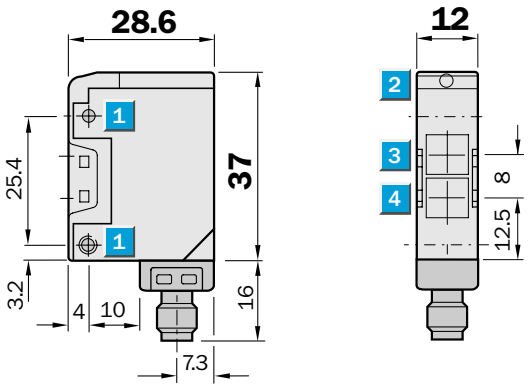
Type	Part no.
WL 170-P 132	6 010 189
WL 170-P 430	6 010 190
WL 170-N 132	6 010 191
WL 170-N 430	6 010 192

Scanning range
0.1…0.8 m

Photoelectric reflex switches

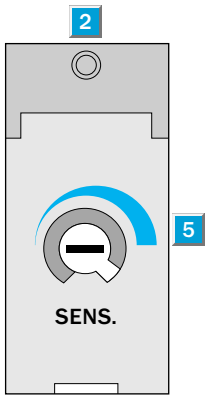
- Ideal for the detection of glass, transparent objects or small parts
- Detection reliability:
  Min. attenuation 20 %;
  Min. transmission variation 15 %,
  Adjustable sensitivity
- Focused optics

Dimensional drawing



Adjustments possible

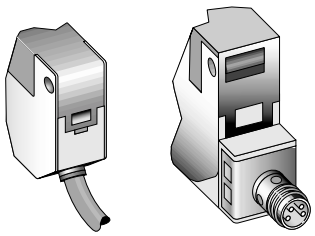
WL 170-P 122	WL 170-P 420
WL 170-N 122	WL 170-N 420



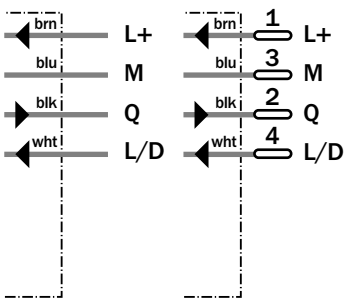
1 Mounting holes ⌀ 3 mm with integrated M3 thread
2 LED signal strength indicator, red:
light received ≥ switching threshold
3 Centre of optical axis, receiver
4 Centre of optical axis, sender
5 Sensitivity control (potentiometer, 270°)

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, M 8



Accessories	page
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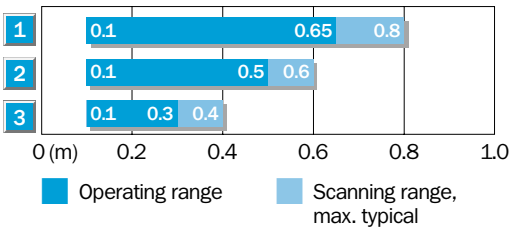
Mounting brackets*	510
Reflectors**	520

* included with delivery
** Reflector P 250 included with delivery

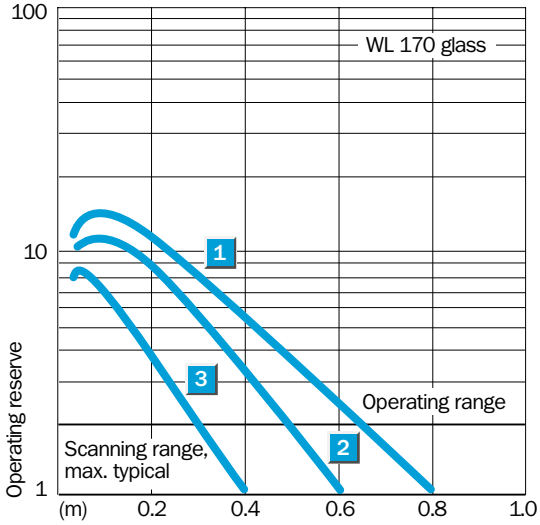
Technical data		WL 170-	P 122	P 420	N 122	N 420
Detection of transparent objects			■	■	■	■
Attenuation along light beam		min. 20 %	■	■	■	■
Attenuation difference		min. 15 %	■	■	■	■
Sensitivity		Potentiometer, 270° (adjustable)	■	■	■	■
Scanning range, max. typical/		0.1…0.8 m/PL 80 A	■	■	■	■
on reflector		0.1…0.6 m/P 250 (included)	■	■	■	■
Operating range		0.1…0.5 m/P 250	■	■	■	■
		Reflective tape: not suitable	■	■	■	■
Light source[1], **light type**		LED, visible red light	■	■	■	■
Light spot size		Approx. 30 mm at 0.5 m	■	■	■	■
Angle of dispersion, sender		Focused: ø 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 mm², ø 3.8 mm	■		■	
	plug	M 8, 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 M 8 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

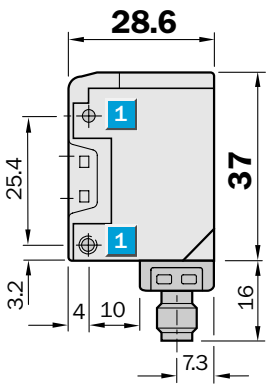
Type	Part no.
WL 170-P 122	6 010 185
WL 170-P 420	6 010 186
WL 170-N 122	6 010 187
WL 170-N 420	6 010 188

Scanning range 8.5 m

Through-beam photoelectric switches

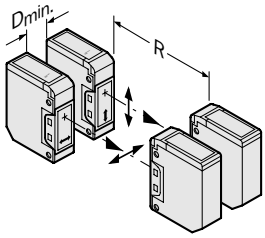
- Polarising filter attachments (accessories) to reduce mutual interference if several WS/WE 170 units are used
- Test input (WS 170 sender) for device and system testing
- Slotted masks (1 mm) to detect small parts or for positioning tasks

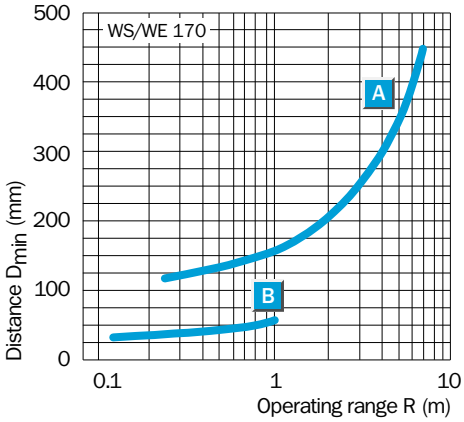
Dimensional drawing



1 Mounting holes ø 3 mm with integrated M3 thread
2 LED signal strength indicator, red: light received ≥ 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:

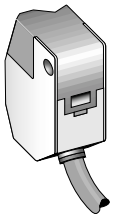
A R 0.25 m…7 m: without optical attachments
B R 0.15 m…1 m: with slotted masks BL170-10

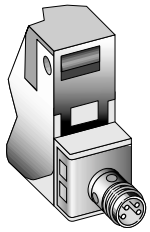
No mutual interference if polarising filters are used

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

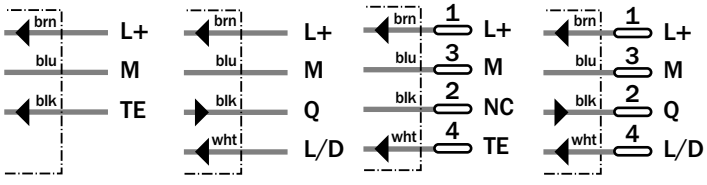
Connection types

WS/WE170-P132	WS/WE170-P430
WS/WE170-N132	WS/WE170-N430





3 x 0.18 mm²	4 x 0.18 mm²	4-pin, M 8	4-pin, M 8
Sender	Receiver	Sender	Receiver



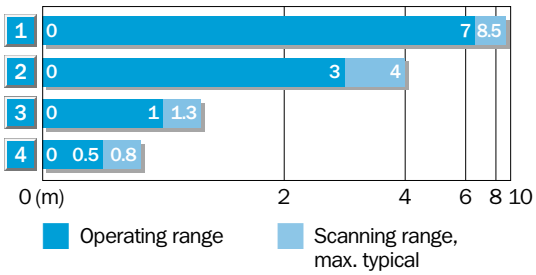
Accessories	page
Cable receptacles	496
Mounting brackets*	510
Slotted masks	556
Polarising filter attachments	556

* included with delivery

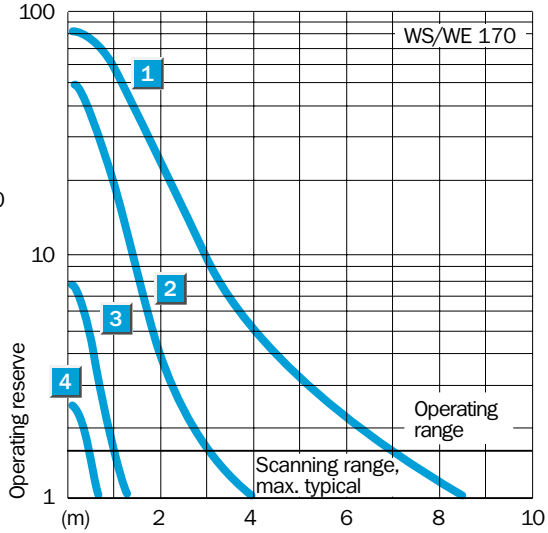
Technical data		WS/WE 170-	P 132	P 430	N 132	N 430
Scanning range, max. typical		8.5 m	■	■	■	■
Operating range		7 m	■	■	■	■
Light source[1], **light type**		LED, red light	■	■	■	■
Light spot size		Approx. 850 mm at 7 m	■	■	■	■
Angle of dispersion, sender		Approx. 7°	■	■	■	■
Angle of dispersion, receiver		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 mm², ⌀ 3.8 mm	■		■	
	receiver WE	4 x 0.18 mm², ⌀ 3.8 mm	■		■	
	plug	M 8, 4-pin		■		■
VDE protection class[8]		⧈	■	■	■	■
Circuit protection[9]						
	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 M 8 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 °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	Part 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

* Part no. includes sender and receiver