

W 45: Farther than the eye can see

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



The W 45 with its sturdy metal housing was designed to cope with the most hostile operating environments. The sensors are completely immune to scaling film in steel plants and rolling mills, just as they are to temperatures above 120 °C.

Their efficiency can be increased further with a comprehensive range of accessories such as cooling plates for water cooling, weather hoods and dust shields.

Only photoelectric switches with high performance reserves are suitable for use in hostile operating conditions. The W 45 series has been specially developed for such applications and meets this requirement with ease. The WS/WE 45 through-beam photoelectric switch, which has been tried and tested in industrial environments, has a scanning range of 300 m.

The WL 45 photoelectric reflex switch is incredibly "far-sighted" with a huge scanning range of 45 metres. If a photoelectric proximity switch is required, the WT 45 with its adjustable scanning distance ranging up to 2,000 mm, and background suppression, is ideal even for harsh conditions.

However, it is not only robustness but also the variety of practical design features that characterise this outstanding series of photoelectric switches. To improve "operator-friendliness", the adjusting elements for time delay and sensitivity are housed in an easily accessible terminal chamber. A signal strength indicator together with an integrated optical finder assist alignment of through-beam photoelectric switches – a particularly important consideration bearing in mind the large scanning ranges.

Universal voltage versions and a large range of mounting accessories complete the functionality of the W 45. All UL devices have UL approval for Canada and the USA.



◀ The robust design and large scanning distance are of advantage to the WT 45 photoelectric proximity switch when used to check for tear-off on a paper rolling machine.



▶ A WS/WE 45 through-beam photoelectric switch monitors tear-off on a paper web.



▶ Scale, steam and heat in a rolling mill does not affect the WT 45 – here used to detect the presence of steel slabs.



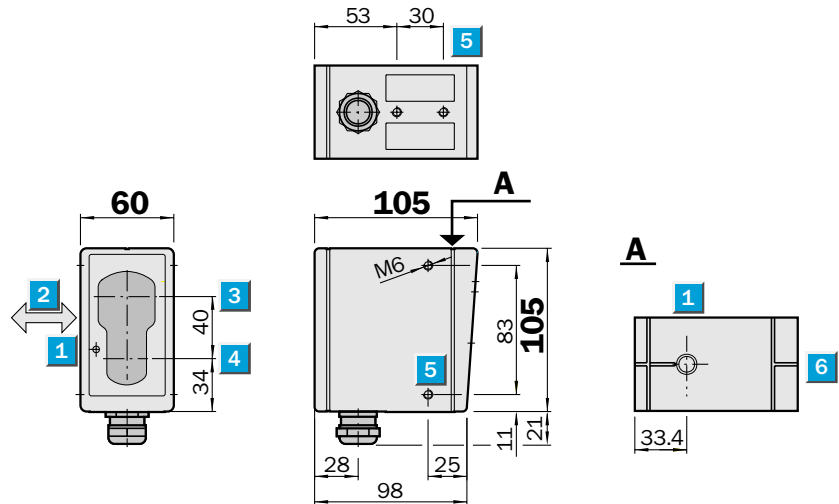
▲ Extreme operating conditions exist in steel making plants – the WT 45 photoelectric proximity switch is ideal for many applications, such as detecting metal sheets before they are wound onto coils.

Scanning distance
400...2000 mm

Photoelectric proximity switches

- Robust metal housing
- Infrared light
- Adjustable background suppression
- Front lens heating, optional

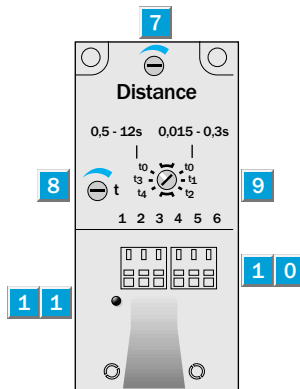
Dimensional drawing



Adjustments possible

WT 45-P 250
WT 45-P 260
WT 45-N 250
WT 45-N 260

- 1 LED signal strength indicator
- 2 Standard direction of the material being scanned
- 3 Centre of optical axis, receiver
- 4 Centre of optical axis, sender
- 5 Threaded mounting hole M 6 – 8 mm deep
- 6 Alignment sight
- 7 Scanning distance adjustment
- 8 Time adjustment
- 9 Time delay selector switch
- 1 0 Terminal strip
- 1 1 Status indicator



Switch-selectable time delay

0.5 – 12 s

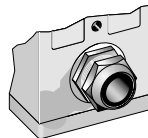
- t_0 without time delay
- t_3 ON-delay when object enters detection zone
- t_4 OFF-delay when object leaves detection zone

0.015 – 0.3 s

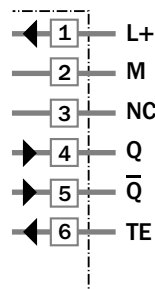
- t_0 without time delay
- t_1 ON-delay when object enters detection zone
- t_2 OFF-delay when object leaves detection zone

Connection type

WT 45-P 250
WT 45-P 260
WT 45-N 250
WT 45-N 260



PG 13.5; terminals



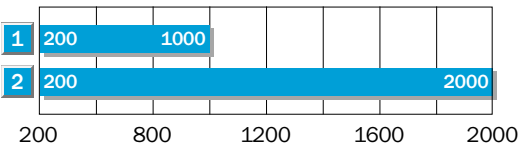
Accessories	page
Ball-type brackets	510
Mounting brackets	510
Cooling plates	556
Dust shield	556
Weather hood	556



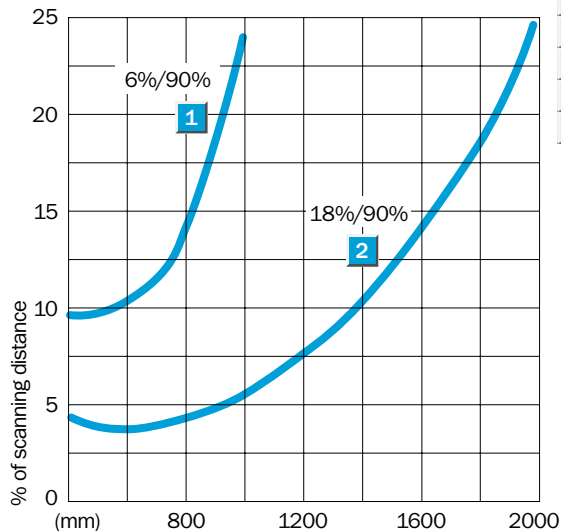
Technical data		WT 45-	P 250	P 260	N 250	N 260					
Scanning distance	400...2000 mm, adjustable										
Light source¹⁾, light type	LED, infrared light										
Light spot diameter	35 mm at 2000 mm										
Supply voltage V_S	10...60 V DC ²⁾										
Ripple ³⁾	< 5 V_{SS}										
Current consumption ⁴⁾	≤ 50 mA										
	≤ 250 mA, front lens heating										
Switching outputs	PNP, Q and \bar{Q}										
	NPN, Q and \bar{Q}										
Output current I_A max.	200 mA										
Response time ⁵⁾	6 ms										
Max. switching frequency ⁶⁾	50/s										
Test input "TE"											
Sender OFF	PNP: Test input to 0 V										
	NPN: Test input to V_S										
Connection type	Terminal connection										
VDE protection class	⊕										
Circuit protection⁷⁾	A, B, C										
Enclosure rating	IP 67										
Ambient temperature T_A⁸⁾	Operation - 25 °C...+ 55 °C										
	Storage - 40 °C...+ 70 °C										
Weight	Approx. 800 g										
Front lens heating											
Housing material	Metal housing										

- 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) A = V_S connections reverse-polarity protected
 B = Output Q_N and Q_P short-circuit protected
 C = Interference pulse suppression
- 8) Up to 140 °C with cooling plates (see Accessories)

Scanning distance




- 1 Scanning distance on black, 6 % remission
- 1 Scanning distance on grey, 18 % remission



Order Information

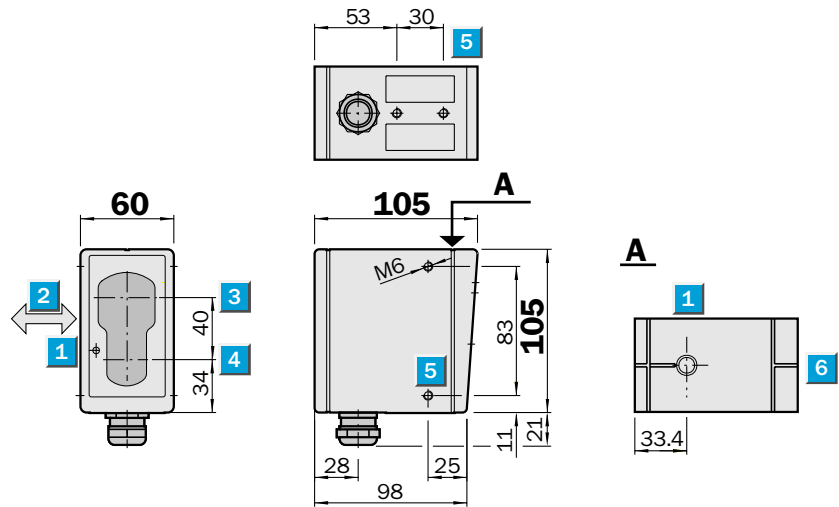
Type	Part no.
WT 45-P 250	1 009 117
WT 45-P 260	1 009 108
WT 45-N 250	1 009 116
WT 45-N 260	1 009 109


Scanning distance
400...2000 mm

Photoelectric proximity switches

- Robust metal housing
- Infrared light
- Adjustable background suppression
- Front lens heating, optional

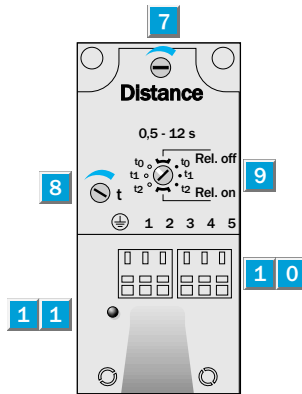
Dimensional drawing



Adjustments possible

WT 45-R 250

WT 45-R 260



- 1 LED signal strength indicator
- 2 Standard direction of the material being scanned
- 3 Centre of optical axis, receiver
- 4 Centre of optical axis, sender
- 5 M 6 threaded mounting hole – 8 mm deep
- 6 Alignment sight
- 7 Scanning distance adjustment
- 8 Time adjustment
- 9 Time delay selector switch
left: light-switching, right: dark-switching
- 10 Terminal strip
- 11 Status indicator

Switch-selectable time delay

0.5 – 12 s

t_0 without time delay

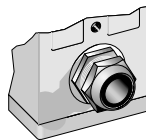
t_1 ON-delay when object enters detection zone

t_2 OFF-delay when object leaves detection zone

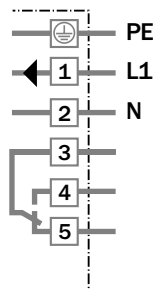
Connection type

WT 45-R 250

WT 45-R 260



PG 13.5; terminals



Accessories	page
Ball-type brackets	510
Mounting brackets	510
Cooling plates	556
Dust shield	556
Weather hood	556



Technical data		WT 45-	R 250	R 260								
Scanning distance	400...2000 mm, adjustable											
Light source¹⁾, light type	LED, infrared light											
Light spot diameter	35 mm at 2000 mm											
Supply voltage V_S	24...240 V UC (+ 10 %, - 25 %)											
Power consumption	≤ 3 VA											
	≤ 6 VA, front lens heating											
Switching outputs	Relay, SPDT, isolated ²⁾											
Max. switching voltage	AC: 250 V / DC: 120 V											
Switching current	4 A / 240 V AC o. 24 V DC											
Max. switching capacity	AC: 1000 VA / DC: 100 W											
Response time	≤ 20 ms											
Max. switching frequency ³⁾	10/s											
Connection type	Terminal connection											
VDE protection class	⊕											
Circuit protection⁴⁾	A, C											
Enclosure rating	IP 67											
Ambient temperature T_A⁵⁾	Operation - 25 °C...+ 55 °C											
	Storage - 40 °C...+ 70 °C											
Weight	Approx. 800 g											
Front lens heating												
Housing material	Metal housing											

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

2) Provide suitable spark suppression for inductive or capacitive loads

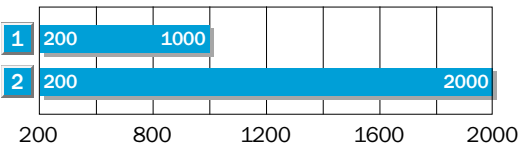
3) With light/dark ratio 1:1

4) A = V_S connections reverse-polarity protected

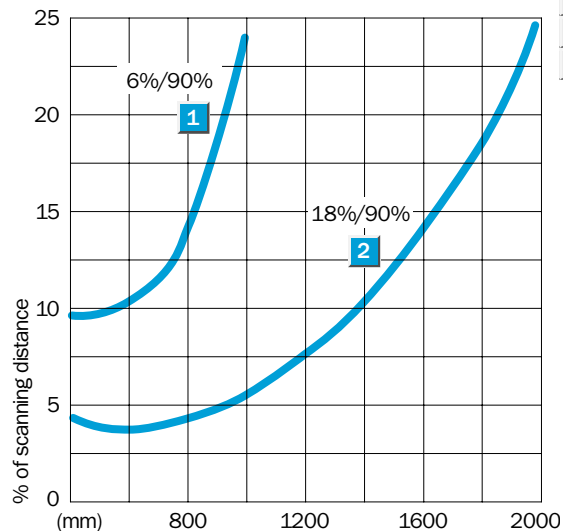
C = Interference pulse suppression

5) Up to 140 °C with cooling plates (see Accessories)

Scanning distance




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



Order information

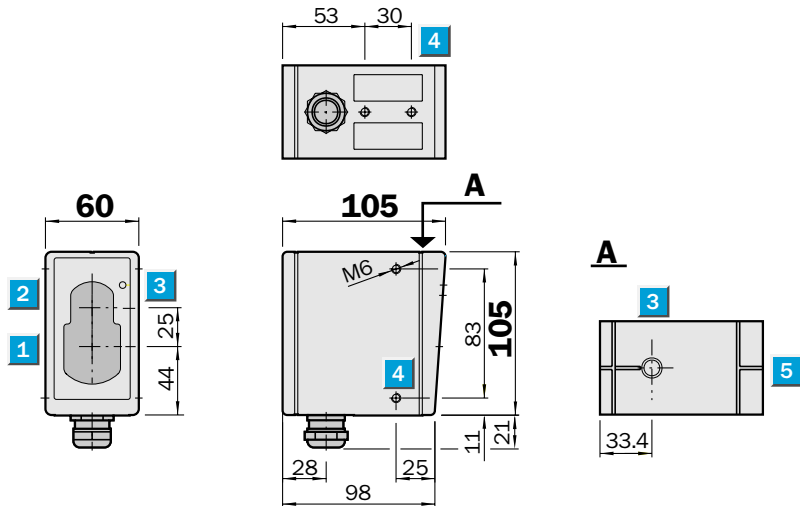
Type	Part no.
WT 45-R 250	1 009 118
WT 45-R 260	1 009 107


Scanning range
55 m

Photoelectric reflex switches

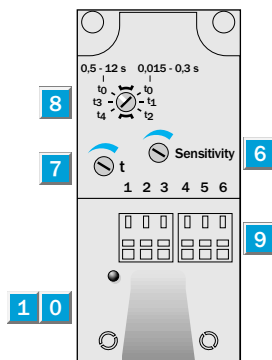
- Robust metal housing
- Red light
- Adjustable sensitivity
- Front lens heating, optional
- Pre-failure signalling output

Dimensional drawing



Adjustments possible

- WL 45-P 250
- WL 45-P 260
- WL 45-N 250
- WL 45-N 260



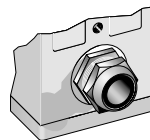
- 1 Centre of optical axis, sender
- 2 Centre of optical axis, receiver
- 3 LED signal strength indicator
- 4 M 6 threaded mounting hole – 8 mm deep
- 5 Alignment sight
- 6 Sensitivity adjustment
- 7 Time adjustment
- 8 Time delay selector switch
- 9 Terminal strip
- 10 Status indicator

Switch-selectable time delay

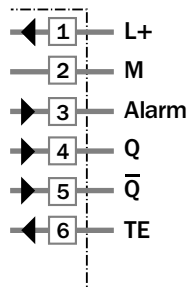
0.5 – 12 s	0.015 – 0.3 s
t_0 without time delay	t_0 without time delay
t_3 ON-delay when object enters detection zone	t_1 ON-delay when object enters detection zone
t_4 OFF-delay when object leaves detection zone	t_2 OFF-delay when object leaves detection zone

Connection type

- WL 45-P 250
- WL 45-P 260
- WL 45-N 250
- WL 45-N 260



PG 13.5; terminals

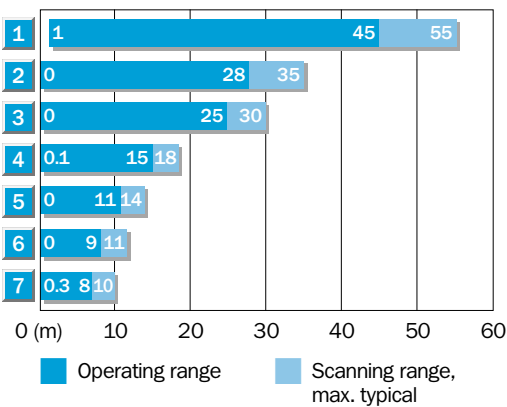


Accessories	page
Mounting brackets	510
Ball-type brackets	510
Reflectors	520
Cooling plates	556
Dust shield	556
Weather hood	556

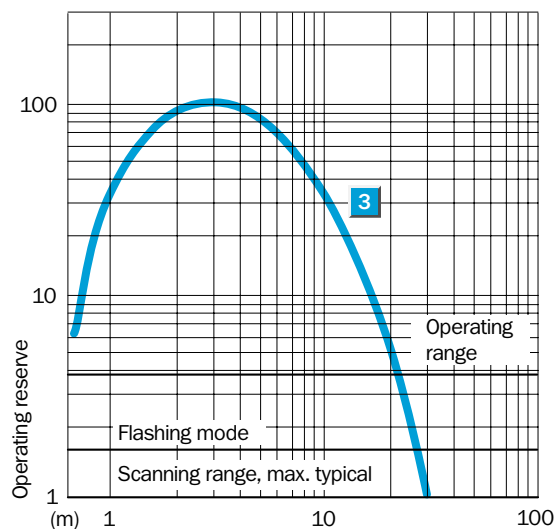
Technical data		WL 45-	P 250	P 260	N 250	N 260
Scanning range , max. typical/on refl.	55 m/OP 60					
Sensitivity	Adjustable					
Light source¹⁾, light type	LED, visible red light					
Light spot diameter	Approx. 230 mm at 16 m					
Supply voltage V_S	10...60 V DC ²⁾					
Ripple ³⁾	< 5 V_{SS}					
Current consumption ⁴⁾	≤ 50 mA					
	≤ 250 mA, front lens heating					
Switching outputs	PNP, Q and \bar{Q}					
	NPN, Q and \bar{Q}					
Output current I_A max.	200 mA					
Response time ⁵⁾	≤ 1.2 ms					
Max. switching frequency ⁶⁾	400/s					
Pre-failure signalling output	Alarm					
Output current I_A max.	100 mA, open collector					
Insufficient light received	Flashes at approx. 5/s, switch to V_S					
(Reserve < 50 %)						
Test input "TE"						
Sender OFF	PNP: Test input to 0 V					
	NPN: Test input to V_S					
Connection type	Terminal connection					
VDE protection class⁷⁾	⊕					
Circuit protection⁸⁾	A, B, C					
Enclosure rating	IP 67					
Ambient temperature T_A⁹⁾	Operation -25 °C...+55 °C					
	Storage -40 °C...+70 °C					
Weight	Approx. 800 g					
Front lens heating						
Polarising filter						
Housing material	Metal housing					

- 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) Reference voltage 50 V DC
- 8) A = V_S connections reverse-polarity protected
B = Output Q_N and Q_P short-circuit protected
C = Interference pulse suppression
- 9) Up to 140°C with cooling plates (see Accessories)

Scanning range and operating reserve




Reflector type	Operating range
1	OP 60 - ∞
2	4 x PL 80
3	PL 80 A
4	C 110
5	PL 50
6	PL 30
7	Reflective tape
	«Diamond Grade»



Order information

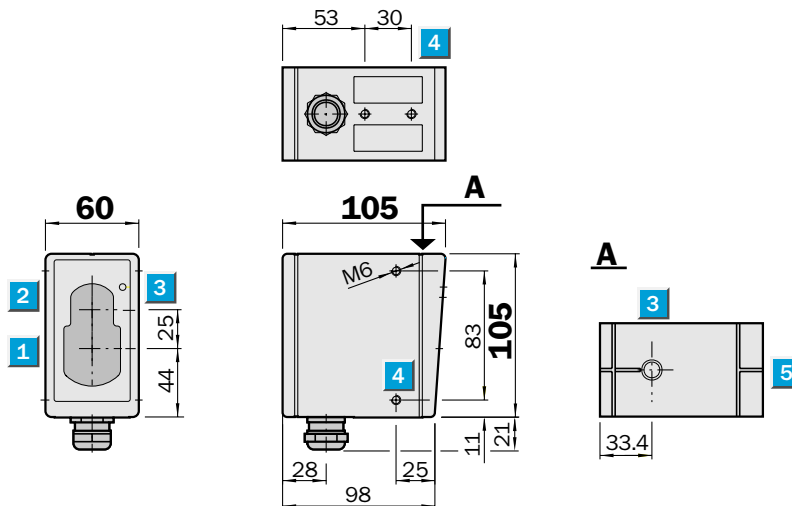
Type	Part no.
WL 45-P 250	1 008 840
WL 45-P 260	1 008 668
WL 45-N 250	1 008 839
WL 45-N 260	1 008 669


Scanning range
55 m

Photoelectric reflex switches

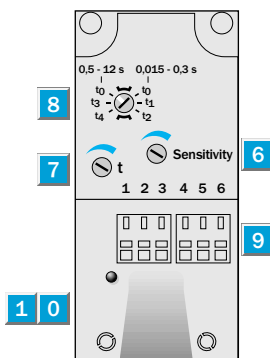
- Robust metal housing
- Red light
- Adjustable sensitivity
- Front lens heating, optional

Dimensional drawing



Adjustments possible

- WL 45-R 250
- WL 45-R 260



- 1 Centre of optical axis, sender
- 2 Centre of optical axis, receiver
- 3 LED signal strength indicator
- 4 M 6 threaded mounting hole – 8 mm deep
- 5 Alignment sight
- 6 Sensitivity adjustment
- 7 Time adjustment
- 8 Time delay selector switch
left: light-switching, right: dark-switching
- 9 Terminal strip
- 10 Status indicator

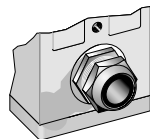
Switch-selectable time delay

0.5 – 12 s

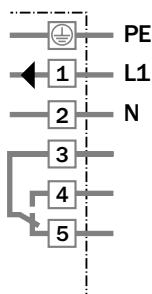
- t_0 without time delay
- t_1 ON-delay when object enters detection zone
- t_2 OFF-delay when object leaves detection zone

Connection type

- WL 45-R 250
- WL 45-R 260



PG 13.5; terminals



Accessories	page
Mounting brackets	510
Ball-type brackets	510
Reflectors	520
Cooling plates	556
Dust shield	556
Weather hood	556

Technical data		WL 45-	R 250	R 260								
Scanning range , max. typ./on reflector	55 m/OP 60											
Sensitivity	Adjustable											
Light source¹⁾, light type	LED, visible red light											
Light spot diameter	Approx. 230 mm at 16 m											
Supply voltage V_S	24...240 V UC (+ 10 %, - 25 %)											
Power consumption	≤ 3 VA											
	≤ 6 VA, front lens heating											
Switching outputs	Relay, SPDT, isolated ²⁾											
Max. switching voltage	AC: 250 V / DC: 120 V											
Switching current	4 A / 240 V AC or 24 V DC											
Max. switching capacity	AC: 1000 VA / DC: 1000 W											
Response time	≤ 20 ms											
Max. switching frequency ³⁾	10/s											
Connection type	Terminal connection											
VDE protection class	⊕											
Circuit protection⁴⁾	A, C											
Enclosure rating	IP 67											
Ambient temperature T_A⁵⁾	Operation - 25 °C...+ 55 °C											
	Storage - 40 °C...+ 70 °C											
Weight	Approx. 800 g											
Front lens heating												
Polarising filter												
Housing material	Metal housing											

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

2) Provide suitable spark suppression for inductive or capacitive loads

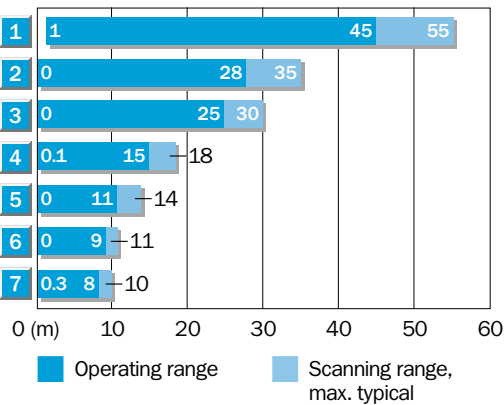
3) With light/dark ratio 1:1

4) A = V_S connections reverse-polarity protected

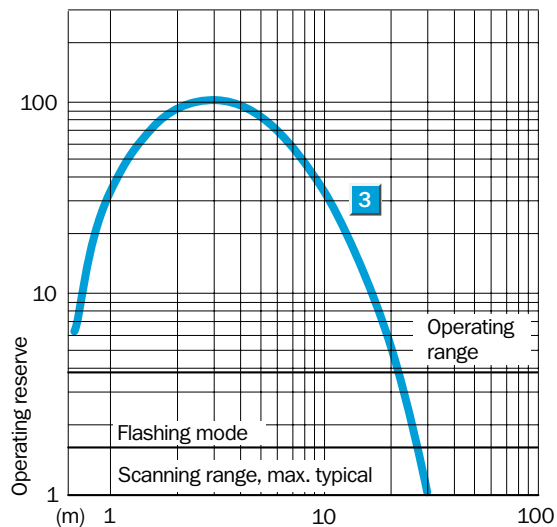
C = Interference pulse suppression

5) Up to 140 °C with cooling plates (see Accessories)

Scanning range and operating reserve



Reflector type	Operating range
1 OP 60 -∞	1...45 m
2 4 x PL 80	0...28 m
3 PL 80 A	0...25 m
4 C 110	0.1...15 m
5 PL 50	0...11 m
6 PL 30	0...9 m
7 Reflective tape	0.3...8 m
«Diamond Grade»	



Order information

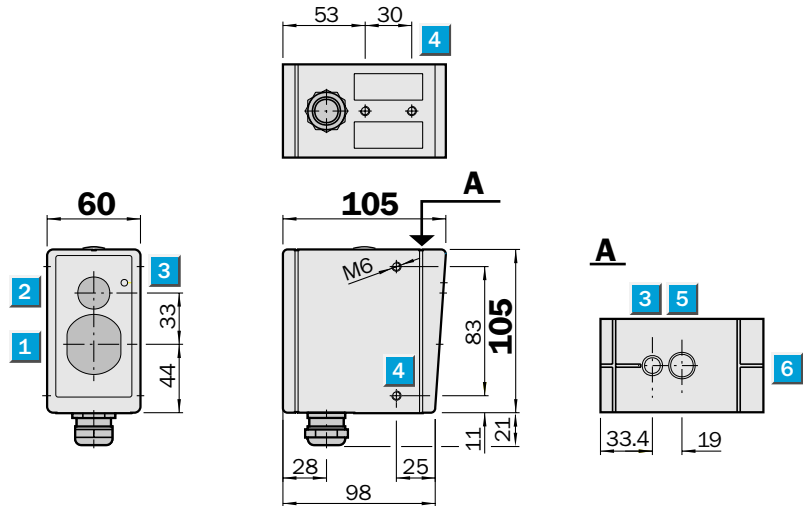
Type	Part no.
WL 45-R 250	1 008 841
WL 45-R 260	1 008 562

Scanning range
350 m

Through-beam photoelectric switches

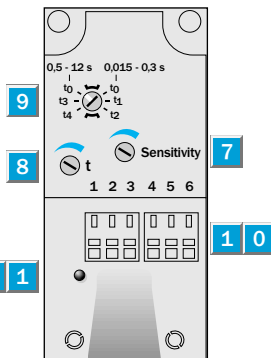
- Robust metal housing
- Red light
- Adjustable sensitivity
- Front lens heating, optional
- Pre-failure signalling output

Dimensional drawing



Adjustments possible

- WS/WE 45-P 250
- WS/WE 45-P 260
- WS/WE 45-N 250
- WS/WE 45-N 260



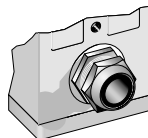
- 1 Centre of optical axis, sender (WS)
Centre of optical axis, receiver (WE)
- 2 View finder lens
- 3 LED signal strength indicator
- 4 M 6 threaded mounting hole – 8 mm deep
- 5 Eyepiece for alignment aid
- 6 Alignment sight
- 7 Sensitivity adjustment
- 8 Time adjustment
- 9 Time delay selector switch
- 10 Terminal strip
- 11 Status indicator

Switch-selectable time delay

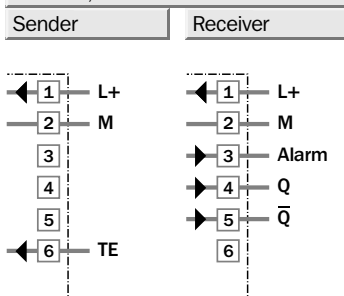
0.5 – 12 s	0.015 – 0.3 s
t_0 without time delay	t_0 without time delay
t_3 ON-delay when object enters detection zone	t_1 ON-delay when object enters detection zone
t_4 OFF-delay when object leaves detection zone	t_2 OFF-delay when object leaves detection zone

Connection type

- WS/WE 45-P 250
- WS/WE 45-P 260
- WS/WE 45-N 250
- WS/WE 45-N 260



PG 13.5; terminals



Accessories	page
Mounting brackets	510
Ball-type brackets	510
Cooling plates	556
Dust shield	556
Weather hood	556



Technical data		WS/WE 45-	P 250	P 260	N 250	N 260
Scanning range, max. typical	350 m					
Sensitivity	Adjustable					
Light source¹⁾, light type	LED, infrared light					
Light spot diameter	Approx. 4.5 m at 300 m					
Angle of dispersion	Approx. 0.9°					
Supply voltage V_S	10...60 V DC ²⁾					
Ripple ³⁾	< 5 V _{SS}					
Current consumption⁴⁾						
sender without heating	≤ 50 mA					
sender with heating	≤ 250 mA					
receiver without heating	≤ 50 mA					
receiver with heating	≤ 250 mA					
Switching outputs	PNP, Q and \bar{Q}					
	NPN, Q and \bar{Q}					
Output current I _A max.	200 mA					
Response time ⁵⁾	≤ 500 μs					
Max. switching frequency ⁶⁾	1000/s					
Pre-failure signalling output	Alarm					
Max. output current I _{Alarm}	100 mA, open collector					
Insufficient light received	Flashes at approx. 5/s, switch to V _S					
(Reserve < 50 %)						
Test input "TE", sender OFF	PNP: Test input to 0 V					
	NPN: Test input to V _S					
Connection type	Terminal connection					
VDE protection class	⊕					
Circuit protection⁷⁾	A, B, C					
Enclosure rating	IP 67					
Ambient temperature T_A	Operation - 25 °C...+ 55 °C ⁸⁾					
	Storage - 40 °C...+ 70 °C					
Weight	Approx. 800 g					
Front lens heating						
Housing material	Metal housing					

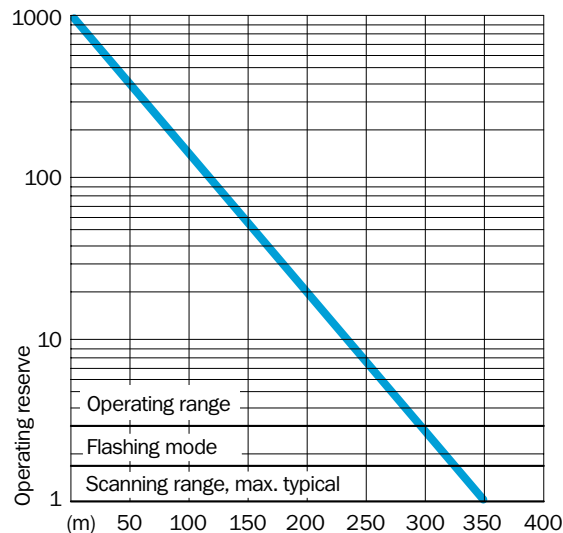
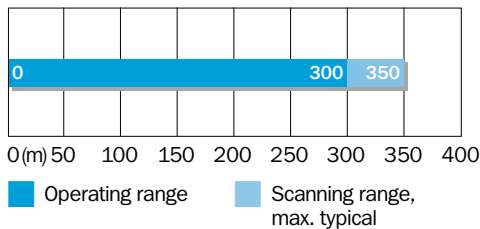
- 1) Average service life 100,000 h at T_A = + 25 °C
- 2) Limit values
- 3) May not exceed or fall short of V_S tolerances

- 4) Without load
- 5) Signal transit time with resistive load
- 6) With light/dark ratio 1:1

- 7) A = V_S connections reverse-polarity protected
- B = Output Q_N and Q_P short-circuit protected
- C = Interference pulse suppression

- 8) Up to 140 °C with cooling plates (see Accessories)

Scanning range and operating reserve



Order information

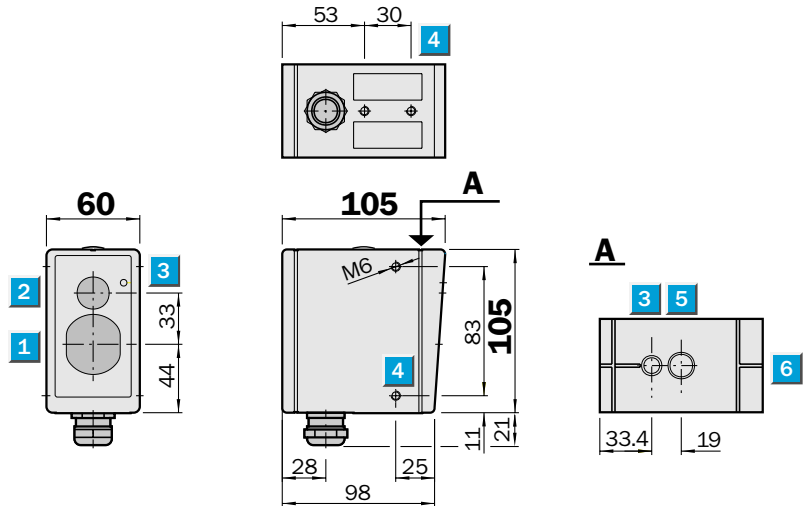
Type	Part no.
WS/WE 45-P 250	1 010 983
WS/WE 45-P 260	1 010 985
WS/WE 45-N 250	1 010 982
WS/WE 45-N 260	1 010 984

Scanning range
350 m

Through-beam photoelectric switches

- Robust metal housing
- Red light
- Adjustable sensitivity
- Front lens heating, optional

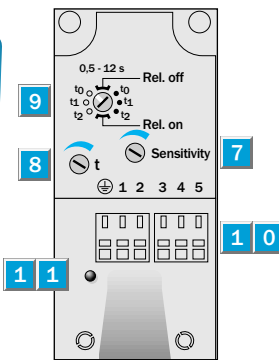
Dimensional drawing



Adjustments possible

WS/WE 45-R 250

WS/WE 45-R 260



- 1 Centre of optical axis, sender (WS)
Centre of optical axis, receiver (WE)
- 2 View finder lens
- 3 LED signal strength indicator
- 4 M 6 threaded mounting hole – 8 mm deep
- 5 Eyepiece for alignment aid
- 6 Alignment sight
- 7 Sensitivity adjustment
- 8 Time adjustment
- 9 Time delay selector switch
left: light-switching, right: dark-switching
- 10 Terminal strip
- 11 Status indicator

Switch-selectable time delay

0.5 – 12 s

t_0 without time delay

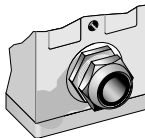
t_1 ON-delay when object enters detection zone

t_2 OFF-delay when object leaves detection zone

Connection type

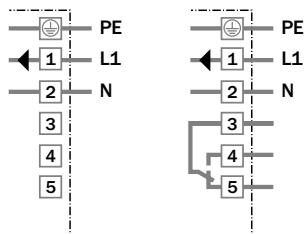
WS/WE 45-R 250

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PG 13.5; terminals

Sender	Receiver
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Accessories	page
Mounting brackets	510
Ball-type brackets	510
Cooling plates	556
Dust shield	556
Weather hood	556



Technical data		WS/WE 45-	R 250	R 260								
Scanning range , max. typical	350 m											
Sensitivity	Adjustable											
Light source¹⁾, light type	LED, infrared light, pulsating											
Light spot diameter	Approx. 4.5 m at 300 m											
Angle of dispersion	Approx. 0.9°											
Supply voltage V_S	24...240 V UC (+ 10 %, - 25 %)											
Power consumption												
sender without heating	≤ 3 VA											
sender with heating	≤ 6 VA											
receiver without heating	≤ 3 VA											
receiver with heating	≤ 6 VA											
Switching outputs	Relay, SPDT, isolated ²⁾											
Max. switching voltage	AC: 250 V / DC: 120 V											
Switching current	4 A / 240 V AC o. 24 V DC											
Max. switching capacity	AC: 1000 VA / DC: 100 W											
Response time	≤ 10 ms											
Max. switching frequency ³⁾	10/s											
Connection type	Terminal connection											
VDE protection class	⊕											
Circuit protection⁴⁾	A, C											
Enclosure rating	IP 67											
Ambient temperature T_A	Operation - 25 °C...+ 55 °C ⁵⁾											
	Storage - 40 °C...+ 70 °C											
Weight	Approx. 800 g											
Front lens heating												
Housing material	Metal housing											

- 1) Average service life 100,000 h at T_A = + 25 °C
- 2) Provide suitable spark suppression for inductive or capacitive loads
- 3) With light/dark ratio 1:1
- 4) A = V_S connections reverse-polarity protected
C = Interference pulse suppression
- 5) Up to 140 °C with cooling plates (see Accessories)

