W45: Farther than the eye can see

In harsh environmental conditions, photoelectric switches require a large safety margin in terms of their specification and performance. The W45 series of photoelectric switches easily meets this requirement.
The absolute highlight is the through-beam photoelectric switch with a range of up to 300 m.
A signal strength indicator in conjunction with an integrated viewfinder facilitates adjustment over such long scanning ranges.

The solid metal housing can withstand flying scale in steel and rolling mills, for example, and can be used in conjunction with cooling jacket accessories in temperatures up to +120°C.

A further plus is the simplicity of operation, e.g. easily accessible terminal chamber as well as the additional functionality provided by timing elements.

The comprehensive range of accessories such as cooling plates, weather hood and dust shield means that the performance is further increased and the range of applications is further extended.

Overview of W45:

- Solid metal housing for harsh industrial applications,
- Super range of the through-beam photoelectric switch of 300 m,
- Accessories for specialist applications,
- Universal supply voltage,
- On request: specialist devices for detecting very hot surfaces (>800 °C).

Main industries:

- Steel industry,
- Plant construction,
- Crane systems,
- Transport technology.

◄ The robust design and large scanning distance are of advantage to the WT45 photoelectric proximity switch when used to check for tear-off on a paper rolling machine.

► A WS/WE45 through-beam photoelectric switch monitors tear-off on a paper web.

▲ Extreme operating conditions exist in steel making plants – the WT45 photoelectric proximity switch is ideal for many applications, such as detecting metal sheets before they are wound onto coils.

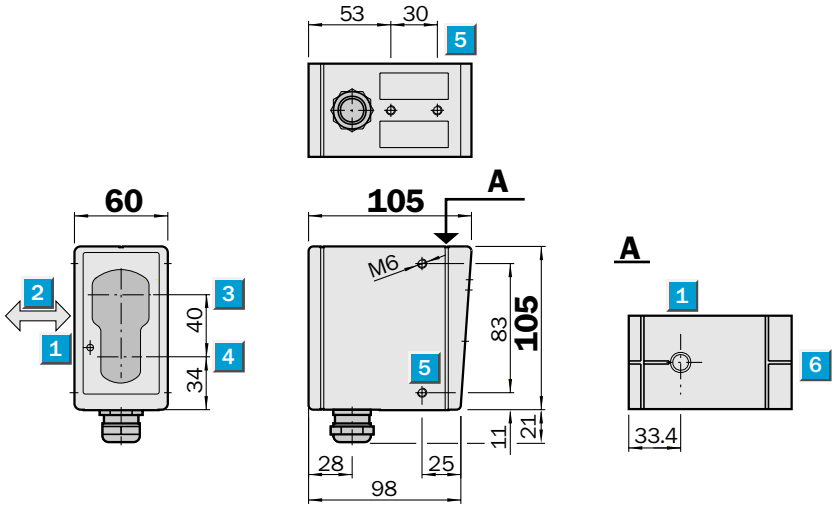
► Scale, steam and heat in a rolling mill does not affect the WT45 – here used to detect the presence of steel slabs.

Scanning distance
400 ... 2000 mm

Photoelectric proximity switches

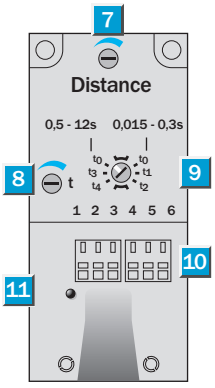
- Robust metal housing
- Infrared light, very long scanning range
- Adjustable background suppression
- Front lens heating, optional

Dimensional drawing



Adjustments possible

WT45-P250
WT45-P260
WT45-N250
WT45-N260



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 M6 – 8 mm deep
6	Alignment sight
7	Scanning distance adjustment
8	Time adjustment
9	Time delay selector switch
10	Terminal strip
11	Status indicator

Switch-selectable time delay

0.5 – 12 s

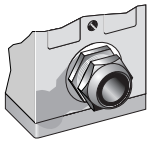
t_0 without time delay
t_3 ON-delay when object enters detection zone
t_4 OFF-delay when object leaves detection zone

0.015 – 0.3 s

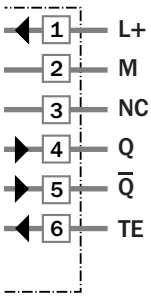
t_0 without time delay
t_1 ON-delay when object enters detection zone
t_2 OFF-delay when object leaves detection zone

Connection type

WT45-P250
WT45-P260
WT45-N250
WT45-N260



PG 13.5; terminals



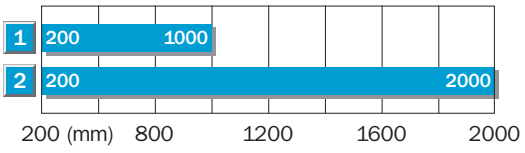
See chapter Accessories

Mounting systems
Special accessories

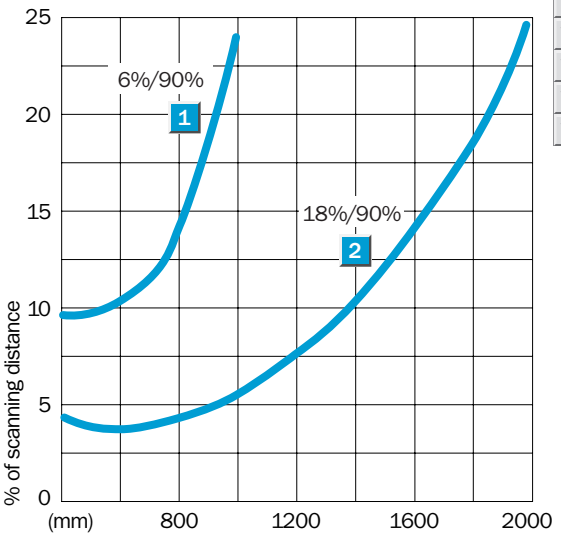
Technical data	WT45-	P250	P260	N250	N260
Scanning distance	400…2000 mm, adjustable	■	■	■	■
Light source[1], light type	LED, infrared light	■	■	■	■
Light spot diameter	Approx. 35 mm at 2000 mm	■	■	■	■
Supply voltage V_S	10…60 V DC[2]	■	■	■	■
Residual ripple[3]	< 5 V_{SS}	■	■	■	■
Current consumption[4]	≤ 50 mA		■		■
	≤ 250 mA, front lens heating	■		■	
Switching outputs	PNP, Q and $\overline{Q}$	■	■		
	NPN, Q and $\overline{Q}$			■	■
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 protection[7]	A, B, C	■	■	■	■
Enclosure rating	IP 67	■	■	■	■
Ambient temperature T_A[8]	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 and $\overline{Q}$ 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
2 Scanning distance on grey, 18 % remission



Order Information

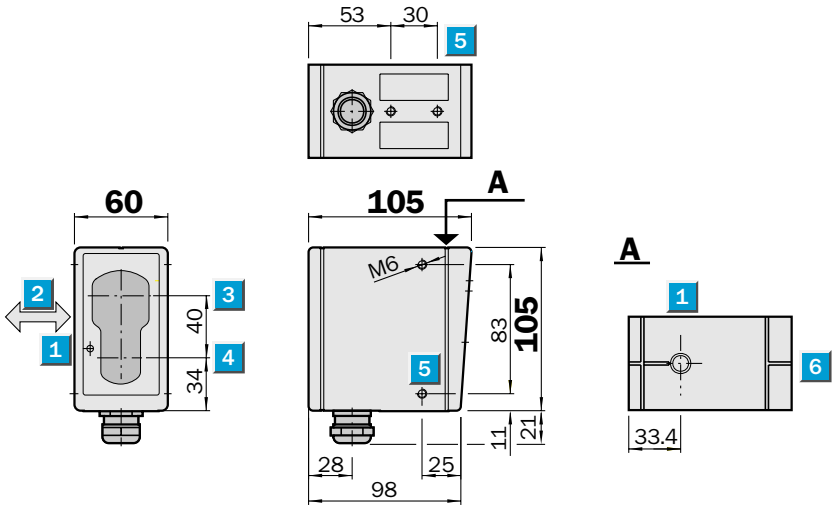
Type	Order no.
WT45-P250	1009117
WT45-P260	1009108
WT45-N250	1009116
WT45-N260	1009109

Scanning distance
400 ... 2000 mm

Photoelectric proximity switches

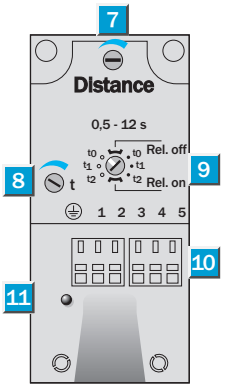
- Universal voltage
- Robust metal housing
- Infrared light, very long scanning range
- Adjustable background suppression
- Front lens heating, optional

Dimensional drawing



Adjustments possible

WT45-R250
WT45-R260



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	M6 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

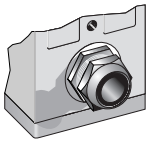
Switch-selectable time delay

0.5 – 12 s

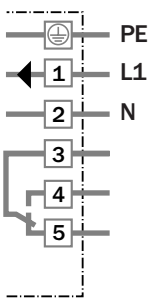
t_0 without time delay
t_1 ON-delay when object enters detection zone
t_2 OFF-delay when object leaves detection zone

Connection type

WT45-R250
WT45-R260



PG 13.5; terminals

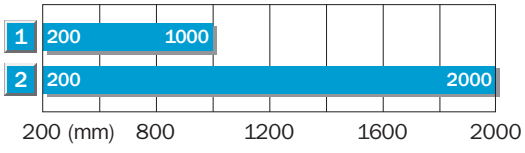


See chapter Accessories
Mounting systems
Special accessories

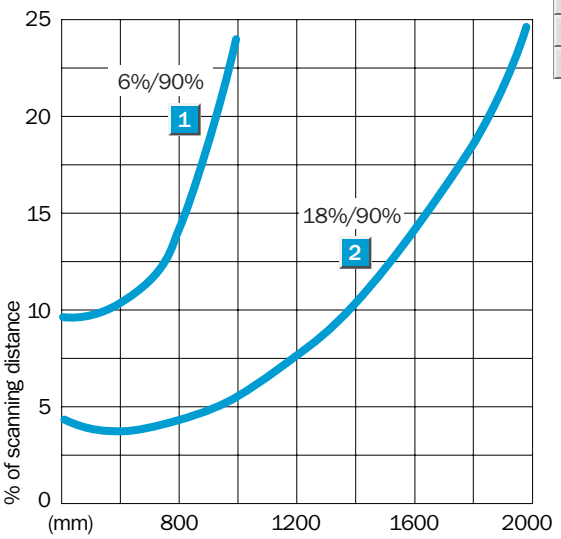
Technical data	WT45-	R250	R260
Scanning distance	400…2000 mm, adjustable	■	■
Light source[1], light type	LED, infrared light	■	■
Light spot diameter	Approx. 35 mm at 2000 mm	■	■
Supply voltage V_S	24…240 V UC (+ 10 %, – 25 %)	■	■
Power consumption	≤ 3 VA		■
	≤ 6 VA, front lens heating	■	
Switching outputs	Relay, SPDT, isolated[2]	■	■
Max. switching voltage	AC: 250 V / DC: 120 V	■	■
Switching current	4 A / 240 V AC o. 24 V DC[3]	■	■
Max. switching capacity	AC: 1000 VA / DC: 100 W	■	■
Response time	≤ 20 ms	■	■
Max. switching frequency[4]	10/s	■	■
Connection type	Terminal connection	■	■
VDE protection class	⏚	■	■
Circuit protection[5]	A, C	■	■
Enclosure rating	IP 67	■	■
Ambient temperature T_A	Operation – 25 °C…+ 55 °C[6]	■	■
	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) Usage Category to EN 60947-1, 15 AC, 13 DC
4) With light/dark ratio 1:1
5) A = V_S connections reverse-polarity protected
C = Interference pulse suppression
6) 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	Order no.
WT45-R250	1009118
WT45-R260	1009107

Scanning range
0.01 ... 55 m

Photoelectric reflex switches

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

CE

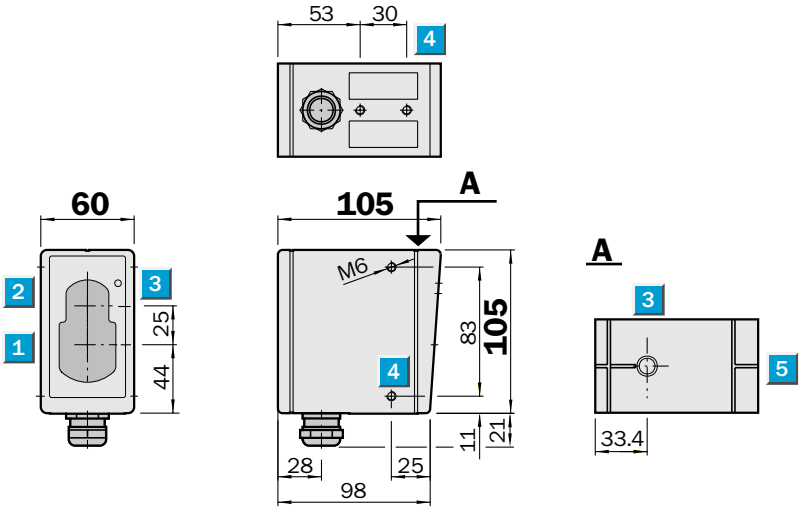
See chapter Accessories

Mounting systems

Reflectors

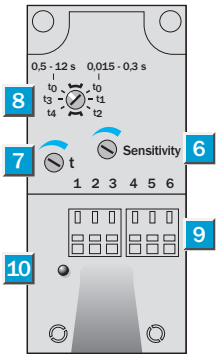
Special accessories

Dimensional drawing



Adjustments possible

WL45-P250
WL45-P260
WL45-N250
WL45-N260



1	Centre of optical axis, sender
2	Centre of optical axis, receiver
3	LED signal strength indicator
4	M6 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

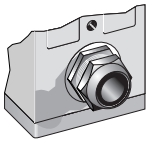
t_0 without time delay
t_3 ON-delay when object enters detection zone
t_4 OFF-delay when object leaves detection zone

0.015 – 0.3 s

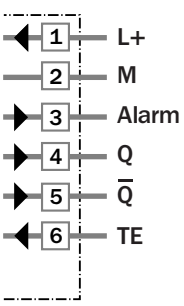
t_0 without time delay
t_1 ON-delay when object enters detection zone
t_2 OFF-delay when object leaves detection zone

Connection type

WL45-P250
WL45-P260
WL45-N250
WL45-N260



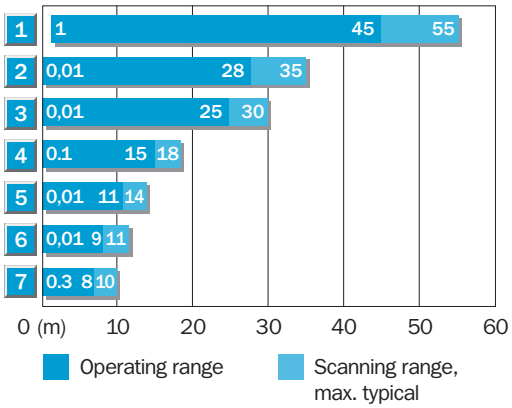
PG 13.5; terminals

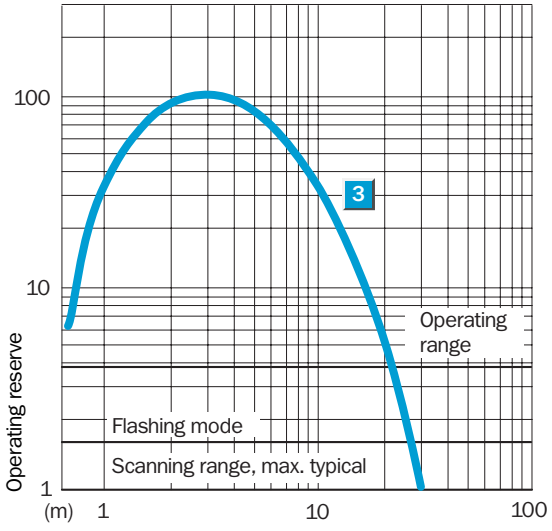


Technical data	WL45-	P250	P260	N250	N260
Scanning range, max. typical/on refl.	0.01…55 m/OP 60	■	■	■	■
Sensitivity	Adjustable	■	■	■	■
Light source[1], light type	LED, visible red light	■	■	■	■
Light spot diameter	Approx. 230 mm at 16 m	■	■	■	■
Supply voltage V_S	10…60 V DC[2]	■	■	■	■
Residual ripple[3]	< 5 V_{SS}	■	■	■	■
Current consumption[4]	≤ 50 mA		■		■
	≤ 250 mA, front lens heating	■		■	
Switching outputs	PNP, Q and $\overline{Q}$	■	■		
	NPN, Q and $\overline{Q}$			■	■
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 class[7]	⏚	■	■	■	■
Circuit protection[8]	A, B, C	■	■	■	■
Enclosure rating	IP 67	■	■	■	■
Ambient temperature T_A[9]	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 and $\overline{Q}$ 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 – ∞	1 ... 45 m
2	4 x PL 80	0,01 ... 28 m
3	PL 80 A	0,01 ... 25 m
4	C 110	0.1 ... 15 m
5	PL 50	0,01 ... 11 m
6	PL 30	0,01 ... 9 m
7	Reflective tape Diamond Grade	0.3 ... 8 m

Order information

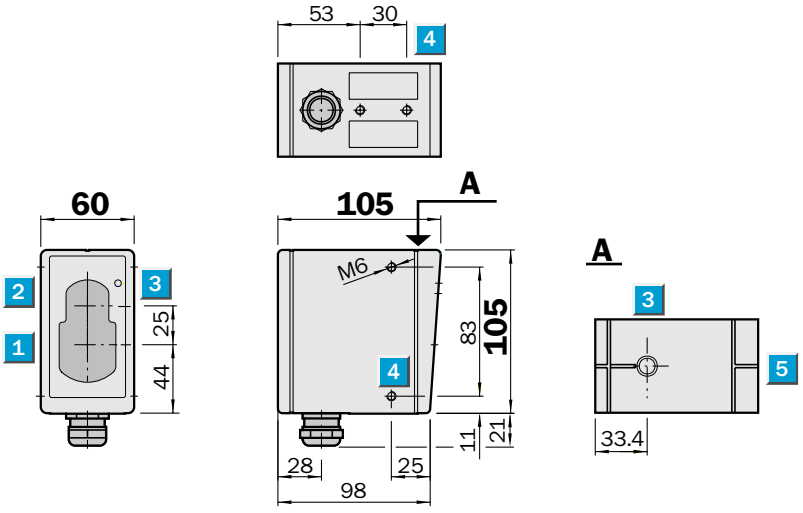
Type	Order no.
WL45-P250	1008840
WL45-P260	1008668
WL45-N250	1008839
WL45-N260	1008669

Scanning range
0.01 ... 55 m

Photoelectric reflex switches

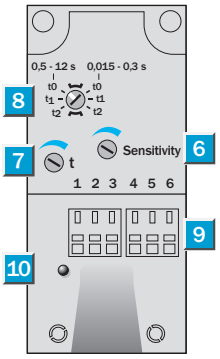
- Universal voltage
- Robust metal housing
- Red light
- Adjustable sensitivity
- Front lens heating, optional

Dimensional drawing



Adjustments possible

WL45-R250
WL45-R260



1 Centre of optical axis, sender
2 Centre of optical axis, receiver
3 LED signal strength indicator
4 M6 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

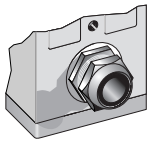
Switch-selectable time delay

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

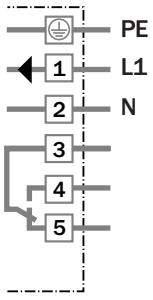
Connection type

WL45-R250
WL45-R260



See chapter Accessories
Mounting systems
Reflectors
Special accessories

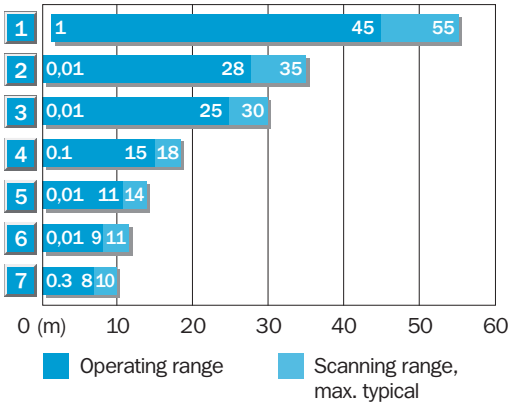
PG 13.5; terminals

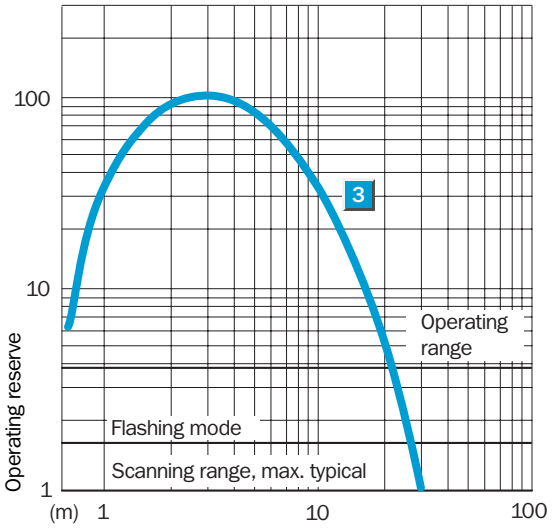


Technical data	WL45-	R250	R260
Scanning range, max. typ./on reflector	0.01…55 m/OP 60		
Sensitivity	Adjustable		
Light source[1], light type	LED, visible red light		
Light spot diameter	Approx. 230 mm at 16 m		
Supply voltage V_S	24…240 V UC (+ 10 %, – 25 %)		
Power consumption	≤ 3 VA		
	≤ 6 VA, front 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[3]		
Max. switching capacity	AC: 1000 VA / DC: 100 W		
Response time	≤ 20 ms		
Max. switching frequency[4]	10/s		
Connection type	Terminal connection		
VDE protection class	⏚		
Circuit protection[5]	A, C		
Enclosure rating	IP 67		
Ambient temperature T_A	Operation – 25 °C…+ 55 °C[6]		
	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) Usage Category to EN 60947-1, 15 AC, 13 DC
4) With light/dark ratio 1:1
5) A = V_S connections reverse-polarity protected
C = Interference pulse suppression
6) 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	0,01 ... 28 m
3 PL 80 A	0,01 ... 25 m
4 C 110	0.1 ... 15 m
5 PL 50	0,01 ... 11 m
6 PL 30	0,01 ... 9 m
7 Reflective tape	0.3 ... 8 m
Diamond Grade	

Order information

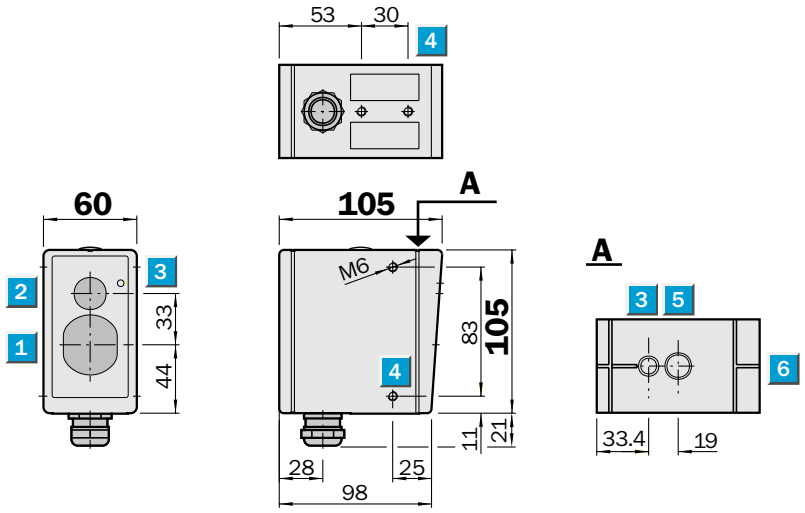
Type	Order no.
WL45-R250	1008841
WL45-R260	1008562

Scanning range
0 ... 350 m

Through-beam photoelectric switches

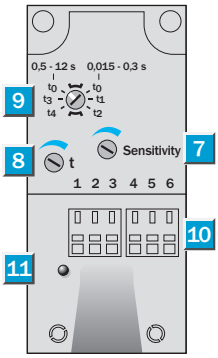
- Robust metal housing
- Red light, very long range
- Adjustable sensitivity
- Front lens heating, optional
- Pre-failure signalling output

Dimensional drawing



Adjustments possible

WS/WE45-P250
WS/WE45-P260
WS/WE45-N250
WS/WE45-N260



1 Centre of optical axis, sender (WS)
Centre of optical axis, receiver (WE)
2 View finder lens
3 LED signal strength indicator
4 M6 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

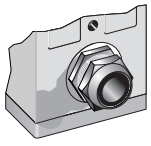
Switch-selectable time delay

0.5 – 12 s
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

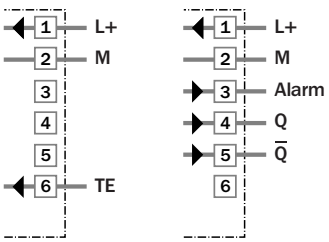
Connection type

WS/WE45-P250
WS/WE45-P260
WS/WE45-N250
WS/WE45-N260



PG 13.5; terminals

Sender	Receiver

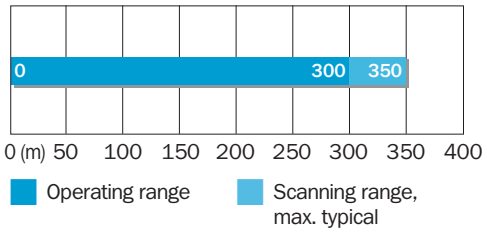


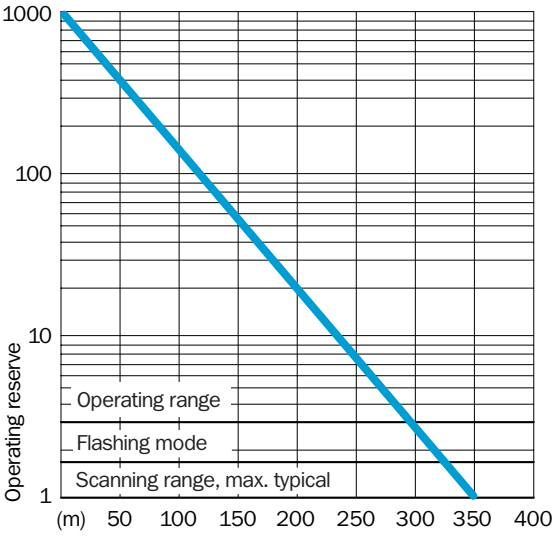
See chapter Accessories
Mounting systems
Special accessories

Technical data	WS/WE45-	P250	P260	N250	N260
Scanning range, max. typical	0…350 m	■	■	■	■
Sensitivity	Adjustable	■	■	■	■
Light source[1], 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]	■	■	■	■
Residual ripple[3]	< 5 V_{SS}	■	■	■	■
Current consumption[4]					
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 $\overline{Q}$	■	■		
	NPN, Q and $\overline{Q}$			■	■
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	■	■	■	■
Connection type	Terminal connection	■	■	■	■
VDE protection class	⏚	■	■	■	■
Circuit protection[7]	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 and $\overline{Q}$ short-circuit protected
C = Interference pulse suppression
8) Up to 140 °C with cooling plates (see Accessories)

Scanning range and operating reserve





Order information

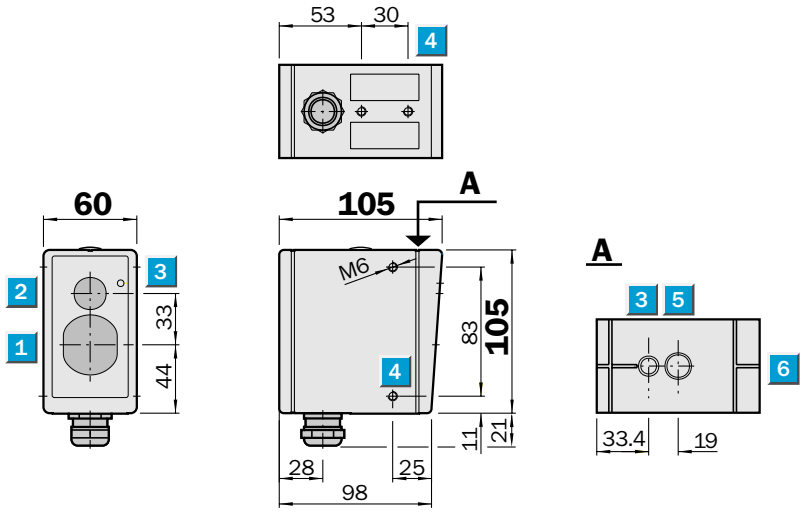
Type	Order no.
WS/WE45-P250	1010983
WS/WE45-P260	1010985
WS/WE45-N250	1010982
WS/WE45-N260	1010984

Scanning range
0 ... 350 m

Through-beam photoelectric switches

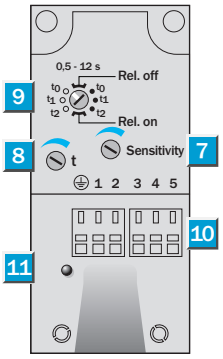
- Robust metal housing
- Red light, very long range
- Adjustable sensitivity
- Front lens heating, optional

Dimensional drawing



Adjustments possible

WS/WE45-R250
WS/WE45-R260



1 Centre of optical axis, sender (WS)
Centre of optical axis, receiver (WE)
2 View finder lens
3 LED signal strength indicator
4 M6 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

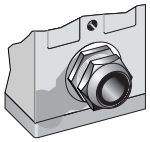
0.5 – 12 s

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

cULus LISTED

Connection type

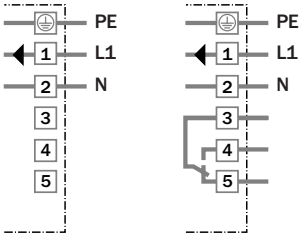
WS/WE45-R250
WS/WE45-R260



See chapter Accessories
Mounting systems
Special accessories

PG 13.5; terminals

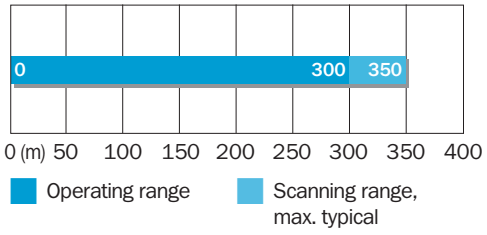
Sender	Receiver

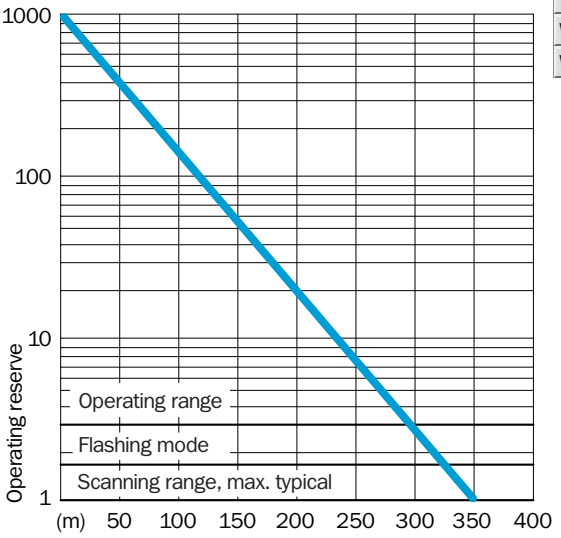


Technical data	WS/WE45-	R250	R260
Scanning range, max. typical	0…350 m		
Sensitivity	Adjustable		
Light source[1], light type	LED, infrared light, pulsating		
Light spot diameter	Approx. 4.5 m at 300 m		
Angle of dispersion	Approx. 0.9°		
Supply voltage V_S	24…240 V UC (+ 10 %, – 25 %)		
Power consumption			
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[3]		
Max. switching capacity	AC: 1000 VA / DC: 100 W		
Response time	≤ 10 ms		
Max. switching frequency[4]	10/s		
Connection type	Terminal connection		
VDE protection class	⏚		
Circuit protection[5]	A, C		
Enclosure rating	IP 67		
Ambient temperature T_A	Operation – 25 °C…+ 55 °C[6]		
	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) Usage Category to EN 60947-1, 15 AC, 13 DC
4) With light/dark ratio 1:1
5) A = V_S connections reverse-polarity protected
C = Interference pulse suppression
6) Up to 140 °C with cooling plates (see Accessories)

Scanning range and operating reserve





Order information

Type	Order no.
WS/WE45-R250	1010994
WS/WE45-R260	1010995