W 12 L-2: Laser photoelectric switches – long-sighted, certainly, and no need for extra safety precautions

The W 12 L-2 series offers a complete range of photoelectric switches using innovative laser technology, contained in a rugged metal housing. Pulsed lasers are used to transmit light. Because they have in protection class 2, the machine operator does not need to take any extra safety or protective measures when using the sensors.

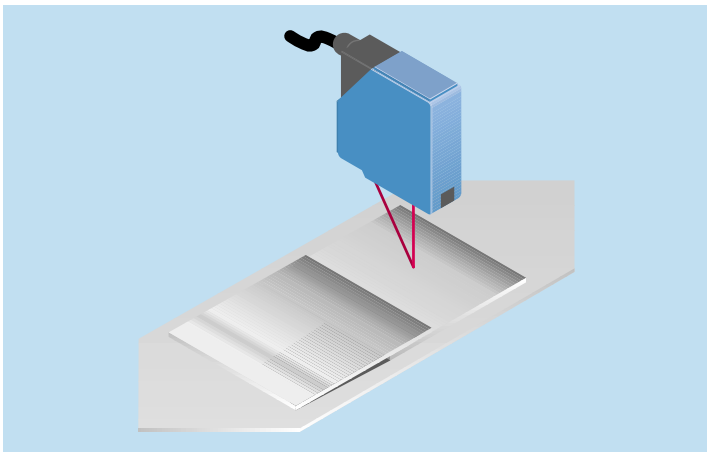
All the devices in this series are particularly "long-sighted": the WS/WE 12 L-2 through-beam photoelectric switch covers distances up to 80 m, while the WL 12 L-2 reflex photoelectric switch can reach up to 18 m. Their integrated polarisation filter makes it possible to reliably detect shiny surfaces. The WT 12 L-2 photoelectric proximity switch also covers a relatively long range: it is the right choice for scanning fixed distances of 20…50 mm, or offers precise background suppression that can be adjusted between 30 and 200 mm.

In addition to the scanning range, the small dimensions of the light spot generated on the object is a further advantage of laser technology. This makes it possible to detect even minute items of just 0.5 mm at maximum switching frequencies of 2,500/s.

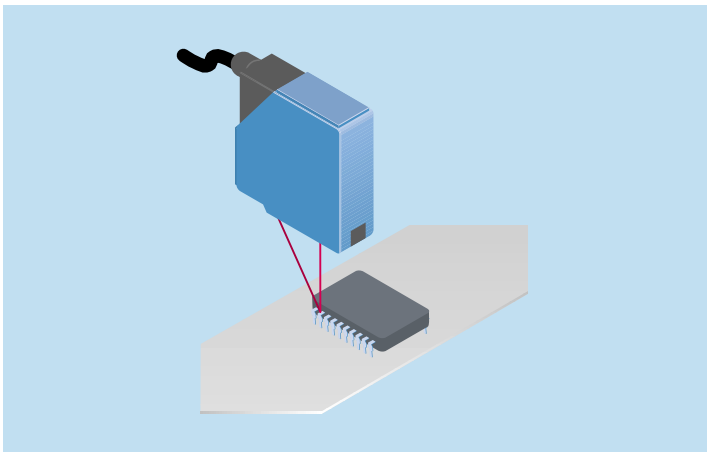
W 12 L-2 laser photoelectric switches – the best solution for millimetre precision, or even smaller!

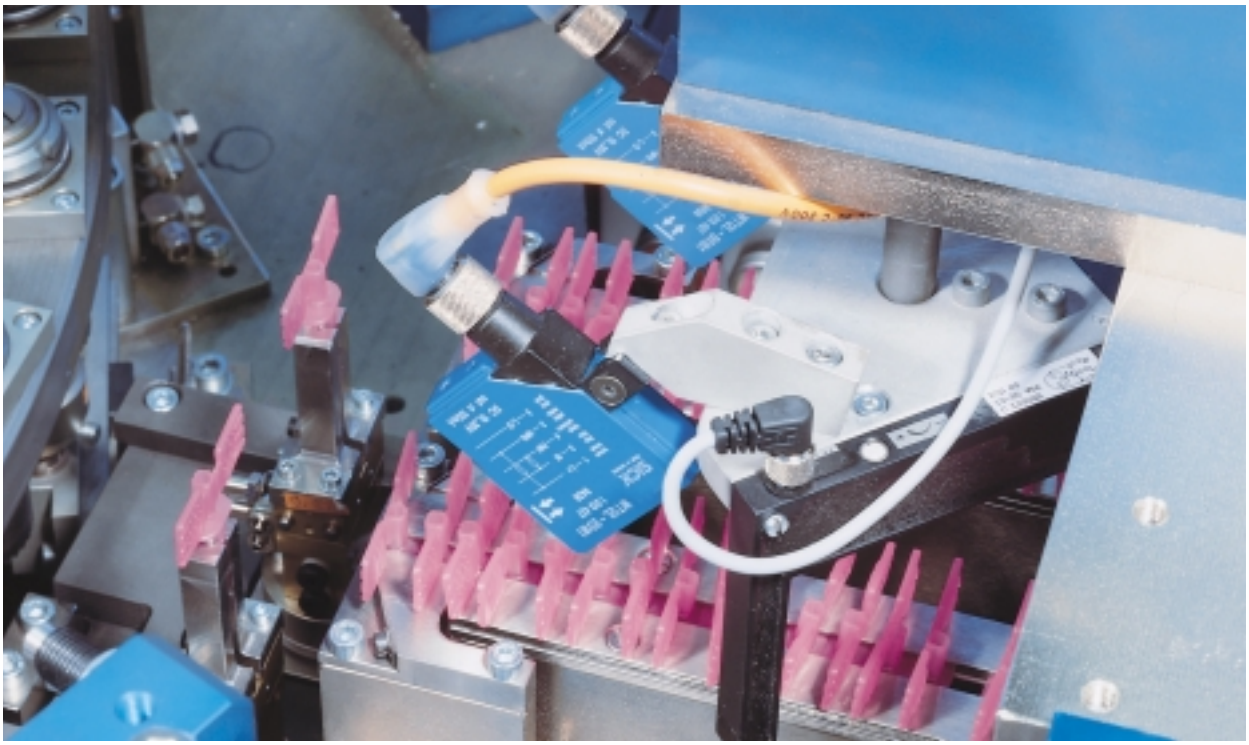
▼ Moulded sheet-metal parts used for the production of automobiles are detected with millimetre accuracy by WL 12 L-2 laser photoelectric switches so they can then be picked up and mounted with precision

► The laser photoelectric proximity switch detects minimal differences in height, such as overlapping metal sheets, during continuous metal production processes.



► The W 12 L-2 with laser technology detects the smallest electronic components with precision even at high switching frequencies.





▲ Thanks to their small light spot, laser sensors such as the WT 12 L-2 photoelectric proximity switch can also reliably detect the smallest objects such as packaging units in the pharmaceutical industry.

Scanning distance 30…200 mm

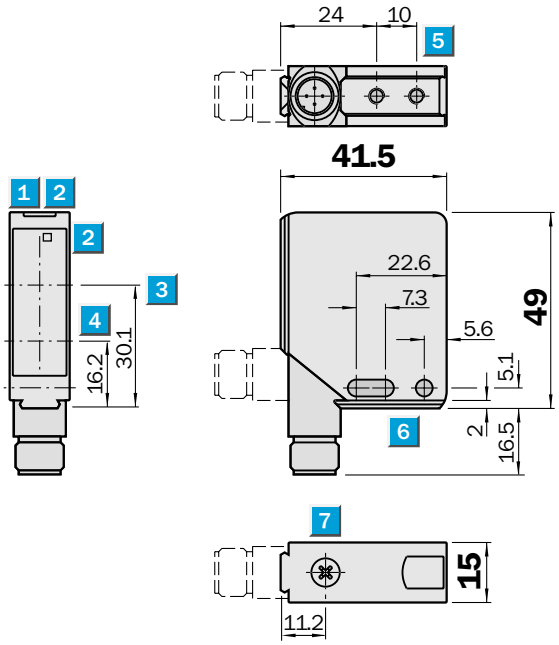
Photoelectric proximity switches

- Laser class 2
- 90° rotatable M 12 plug
- Adjustable and fixed background suppression

Laser class 2

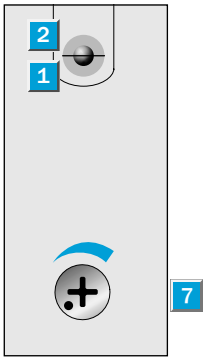
Accessories	page
Clamps	496
Mounting brackets	510

Dimensional drawing



Adjustments possible

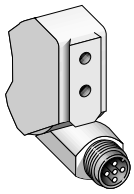
- WT 12L-2B 510*
- WT 12L-2B 530
- WT 12L-2B 540
- WT 12L-2B 550



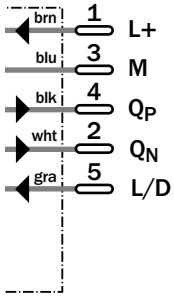
1 LED operating indicator, green
2 LED reception indicator, yellow
3 Optical axis, receiver
4 Optical axis, sender
5 M 4 threaded mounting hole – 4 mm deep
6 Mounting hole ⌀ 4.2 mm
7 Scanning distance control
* (not for fixed scanning distances)

Connection type

- WT 12L-2B 510
- WT 12L-2B 530
- WT 12L-2B 540
- WT 12L-2B 550



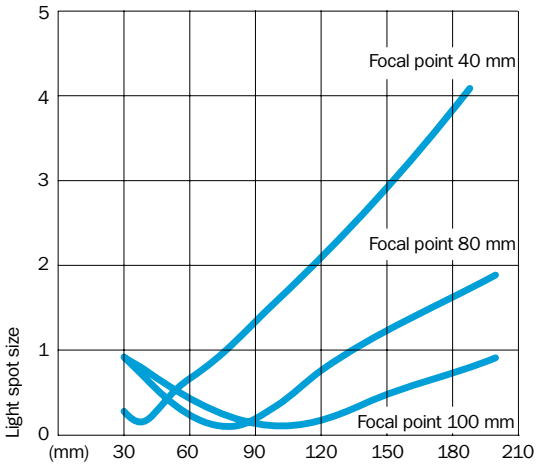
5-pin, M 12

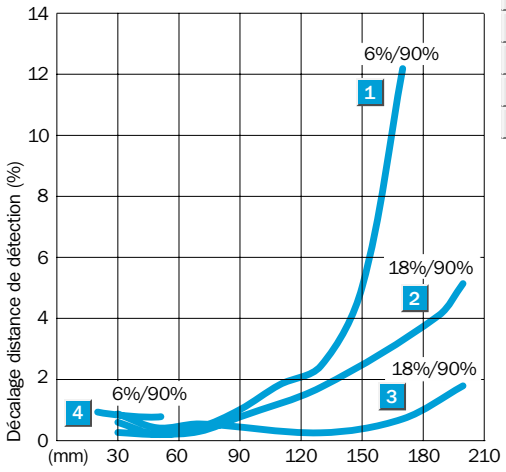


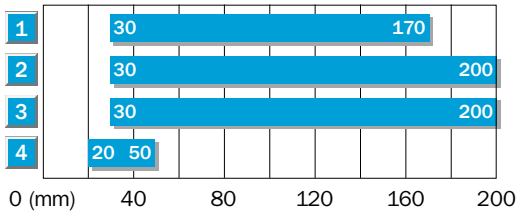
Technical data	WT 12L-2	B510	B530	B540	B550
Scanning distance, adjustable	30…200 mm, 18 % remission		■	■	■
	Focus 45 mm		■		
	Focus 80 mm			■	
	Focus 100 mm				■
Scanning range, fixed, 6 % remission	20…50 mm, focus 45 mm	■			
Light source [1]	Laser 650 nm, pulsed	■	■	■	■
Light spot diameter focal point	0.1 mm	■	■		
	0.2 mm			■	■
Supply voltage V_S	10…30 V DC [2]	■	■	■	■
Ripple [3]	≤ 5 V_{SS}	■	■	■	■
Current consumption [4]	≤ 55 mA	■	■	■	■
Switching output Q_N and Q_P	PNP, NPN	■	■	■	■
Signal voltage HIGH	V_S – < 2 V, V_S	■	■	■	■
Signal voltage LOW [5]	0 V, ≤ 1.5 V	■	■	■	■
Output current I_A max.	100 mA	■	■	■	■
Operating mode	Light- or dark-switching [6]	■	■	■	■
Control input L/D	0 V or open, light-switching	■	■	■	■
Control input L/D	V_S, dark-switching	■	■	■	■
Response time max. [7]	Typ. 200 µs	■	■	■	■
Max. switching frequency [8]	2500/s	■	■	■	■
Laser class	2 (IEC 825-1; EN 60825-1:97)	■	■	■	■
VDE protection class [9]	⧈	■	■	■	■
Enclosure rating	IP 67	■	■	■	■
Circuit protection [10]	A, B, C	■	■	■	■
Ambient temperature T_A	Operation – 10 °C…+ 50 °C	■	■	■	■
	Storage – 25 °C…+ 75 °C	■	■	■	■
Connection type	M 12 plug, 5-pin	■	■	■	■
Weight	Approx. 130 g with plug	■	■	■	■

1) Average service life 50,000 h at T_A = + 25 °C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) At T_A = + 25 °C and 100 mA output current
6) Reversible via control input L/D
7) Signal transit time with resistive load
8) At light/dark ratio 1:1
9) Reference voltage 50 V DC
10) A = V_S connections reverse-polarity protected
B = Outputs protected against short-circuiting
C = Interference pulse suppression

Scanning distance and light spot size







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

Order information

Type	Part no.
WT 12L-2B 510	1 017 959
WT 12L-2B 530	1 018 250
WT 12L-2B 540	1 018 251
WT 12L-2B 550	1 017 904

Scanning range 18 m

Photoelectric reflex switches

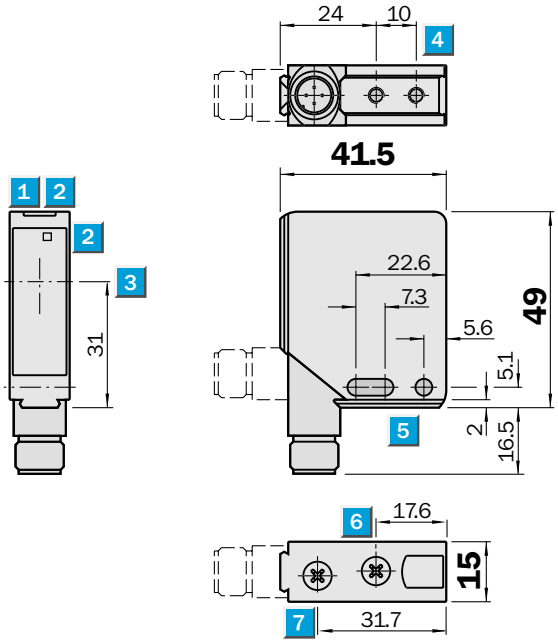
- Laser class 2
- Adjustable focus
- 90° rotatable M 12 plug

CE

Laser class 2

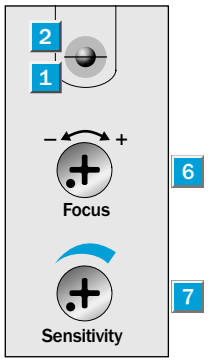
Accessories	page
Cable receptacles	496
Clamps	510
Mounting brackets	510
Reflectors	520

Dimensional drawing



Adjustments possible

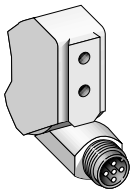
WL 12L-2B 530
WL 12L-2B 520



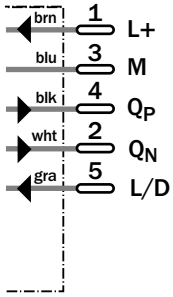
1	LED operating indicator, green
2	LED reception indicator, yellow
3	Centre of optical axis
4	M4 threaded mounting hole – 4 mm deep
5	Mounting hole ⌀ 4.2 mm
6	Focal adjustment
7	Sensitivity adjustment

Connection type

WL 12L-2B 530
WL 12L-2B 520



5-pin, M 12

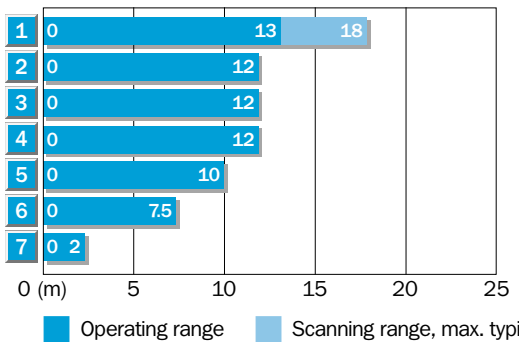


Technical data	WL 12L-2	B530	B520
Scanning range,	18 m/PL 80 A	■	
max. typical/on reflector	15 m/PL 80 A		■
Light source[1]	Laser 650 nm, pulsed	■	■
Light spot diameter	min. 0.8 mm	■	■
in focal range	300 mm to ∞	■	
	150 mm to 450 mm		■
Supply voltage V_S	10…30 V DC[2]	■	■
Ripple[3]	≤ 5 V_{SS}	■	■
Current consumption[4]	≤ 55 mA	■	■
Switching output Q_N and Q_P	PNP, NPN	■	■
Signal voltage HIGH	V_S – < 2.9 V, V_S	■	■
Signal voltage LOW[5]	0 V, ≤ 1.5 V	■	■
Output current I_A max.	100 mA	■	■
Operating mode	Light- or dark-switching[6]	■	■
Control input L/D	0 V or open, light-switching	■	■
Control input L/D	V_S, dark-switching	■	■
Response time max.[7]	Typ. 200 µs	■	■
Max. switching frequency[8]	2500/s	■	■
Laser class	2 (IEC 825-1; EN 60825-1:97)	■	■
VDE protection class[9]	⧈	■	■
Enclosure rating	IP 67	■	■
Circuit protection[10]	A, B, C	■	■
Ambient temperature T_A	Operation – 10 °C…+ 50 °C	■	■
	Storage – 25 °C…+ 75 °C	■	■
Connection type	M 12 plug, 5-pin	■	■
Weight	Approx. 130 g with plug	■	■

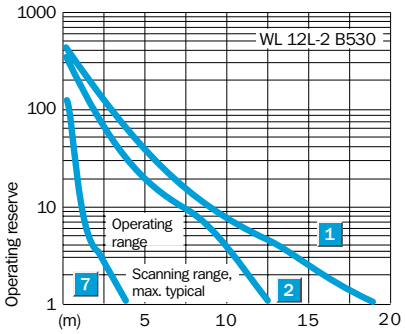
1) Average service life 50,000 h at T_A = + 25 °C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) At T_A = + 25 °C and 100 mA output current
6) Reversible via control input L/D
7) Signal transit time with resistive load
8) At light/dark ratio 1:1
9) Reference voltage 50 V DC
10) A = V_S connections reverse-polarity protected
B = Outputs protected against short-circuiting
C = Interference pulse suppression

Scanning range and operating reserve

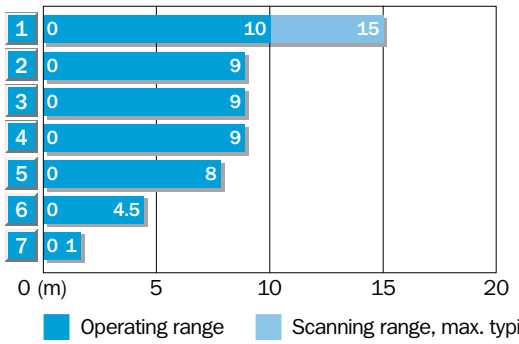
WL 12L-2 B530



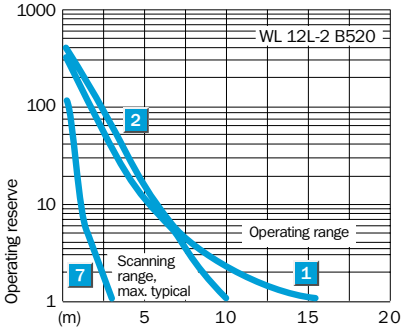
Reflector type	Operating range
1 PL 80 A	0…13.0 m
2 PL 50 A	0…12.0 m
3 PL 40 A	0…12.0 m
4 P 250	0…12.0 m
5 PL 30 A	0…10.0 m
6 PL 20 A	0…7.5 m
7 Reflective tape «Diamond Grade»	0…2.0 m



WL 12L-2 B520



Reflector type	Operating range
1 PL 80 A	0…10.0 m
2 PL 50 A	0…9.0 m
3 PL 40 A	0…9.0 m
4 P 250	0…9.0 m
5 PL 30 A	0…8.0 m
6 PL 20 A	0…4.5 m
7 Reflective tape «Diamond Grade»	0…1.0 m



Order information

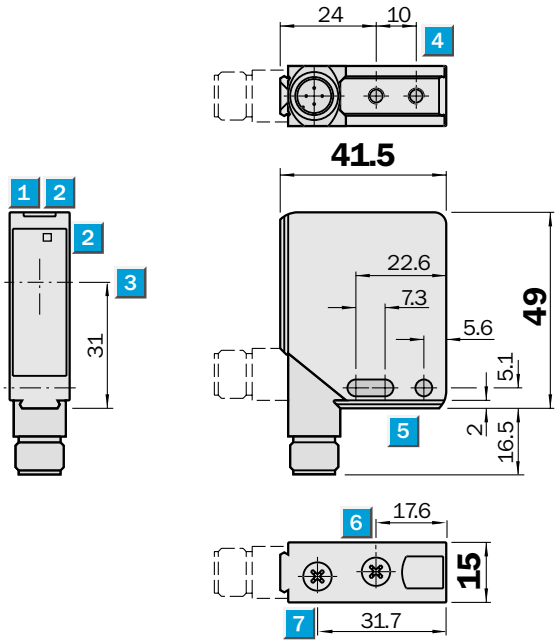
Type	Part no.
WL 12L-2B 530	1 018 252
WL 12L-2B 520	1 018 253

Scanning range 80 m

Through-beam photoelectric switches

- Laser class 2
- Adjustable focus and sensitivity
- 90° rotatable M 12 plug

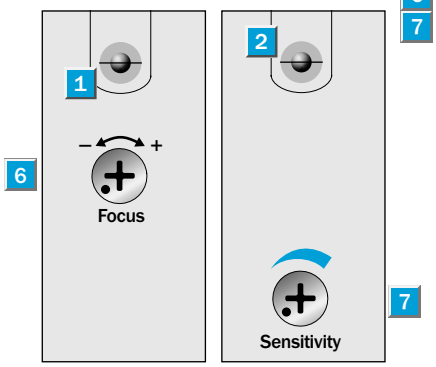
Dimensional drawing



Adjustments possible

WS/WE 12L-2P430	WS/WE 12L-2P410
WS/WE 12L-2N430	WS/WE 12L-2N410

Sender WS	Receiver WE

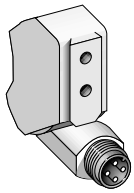


1 LED operating indicator (WS above only)
2 LED reception indicator (WE)
3 Centre of optical axis
4 M 4 threaded mounting hole – 4 mm deep
5 Mounting drill hole ⌀ 4.2 mm
6 Focal adjustment (WS)
7 Sensitivity adjustment (WE)

Laser class 2

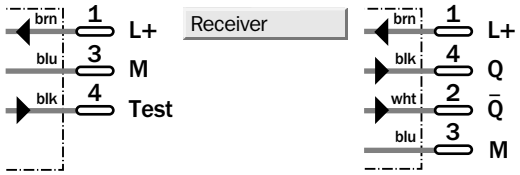
Connection type

WS/WE 12L-2P430
WS/WE 12L-2N430
WS/WE 12L-2P410
WS/WE 12L-2N410



4-pin, M 12

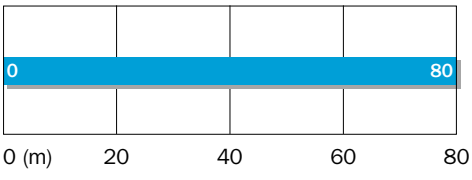
Accessories	page
Cable receptacles	496
Clamps	510
Mounting brackets	510



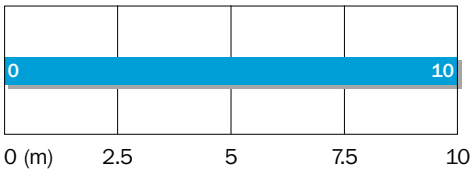
Technical data	WS/WE 12L-2	P430	N430	P410	N410
Scanning range, max. typical	80 m	■	■		
	10 m			■	■
Recommended operating range	80 m	■	■		
	10 m			■	■
Focus adjustable	300 mm…∞	■	■		
	Fixed parallel light beam			■	■
Light source[1]	Laser 650 nm, pulsed	■	■	■	■
Light spot diameter	150 mm at 60 m	■	■		
	1.0 mm at 1 m			■	■
Supply voltage V_S	10…30 V DC[2]	■	■	■	■
Ripple[3]	≤ 5 V_{SS}	■	■	■	■
Current consumption[4]	WS ≤ 45 mA, WE ≤ 15 mA	■	■	■	■
Switching outputs Q and $\bar{Q}$	PNP	■		■	
	NPN		■		■
Signal voltage HIGH	V_S – < 2.9 V, V_S	■	■	■	■
Signal voltage LOW[5]	Approx. 0 V, ≤ 1.5 V	■	■	■	■
Output current I_A max.	100 mA	■	■	■	■
Response time max.[6]	Typ. 200 µs	■	■	■	■
Max. switching frequency[7]	2500/s	■	■	■	■
Input "TE" system test	V_S or open: sender active	■	■	■	■
	0 V: sender inactive	■	■	■	■
VDE protection class[8]	⧈	■	■	■	■
Laser class	2 (IEC 825-1; EN 60825-1:97)	■	■	■	■
Enclosure rating	IP 67	■	■	■	■
Circuit protection[9]	A, B, C	■	■	■	■
Ambient temperature T_A	Operation – 10 °C…+ 50 °C	■	■	■	■
	Storage – 25 °C…+ 75 °C	■	■	■	■
Connection type	M 12 plug, 4-pin	■	■	■	■
Weight (WS + WE)	Approx. 260 g	■	■	■	■

1) Average service life 50,000 h at T_A = + 25 °C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) At T_A = + 25 °C and 100 mA output current
6) Signal transit time with resistive load
7) At light/dark ratio 1:1
8) Reference voltage 50 V DC
9) A = V_S connections reverse-polarity protected
B = Outputs protected against short-circuiting
C = Interference pulse suppression

Scanning range



Operating range/scanning range, max. typical



Operating range/scanning range, max. typical

Order information

Type	Part no.
WS/WE 12L-2P430	1 018 254
WS/WE 12L-2N430	1 018 255
WS/WE 12L-2P410	1 018 256
WS/WE 12L-2N410	1 018 257