




W160: Miniature Series for Optimum Solutions

	Photoelectric proximity switches, BGB
	Photoelectric proximity switches, energetic
	Photoelectric reflex switches






W160 are especially well-suited for use in the branches:

- Food and beverage industry,
- Electronic components and circuit board manufacturing,
- Packaging and printing industry,
- Assembly and handling technology,
- Special mechanical engineering,
- Conveyor technology.

The ranges:

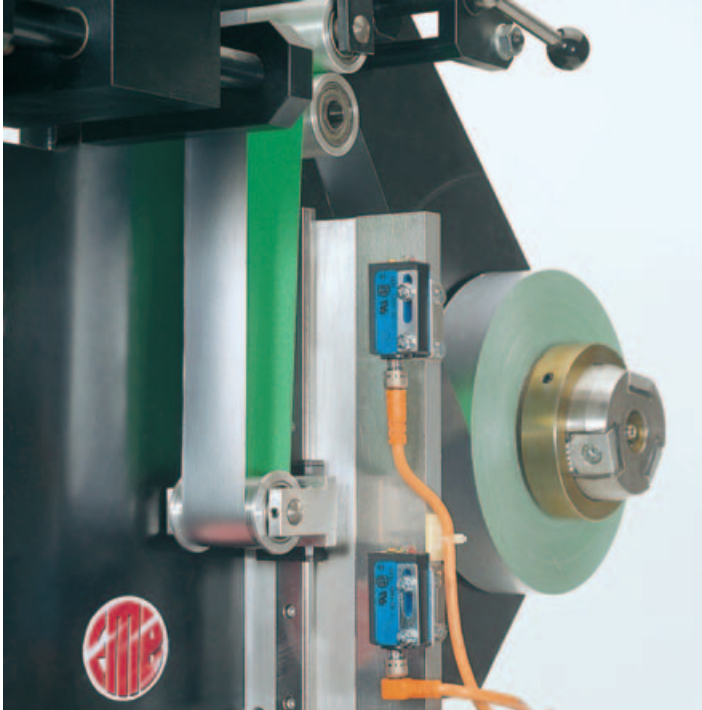
- Through-beam photoelectric switch WS/WE160: 15 m, 3 slotted masks as accessory,
- Photoelectric reflex switch WL160: 6.5 m (PL80 A), with polarizing filter,
- Photoelectric proximity switch WT160: energetic: scanning distance to 1000 mm (90% reflectance), for standard scanning jobs,
- With focussed optics: Scanning distance 8 to 60 mm, background suppression, small light spot, high sensitivity,
- With divergent optics (opening angle approx. 50°): scanning distance to 115 mm. Ideal for detecting objects conveyed loosely.

Simple handling, large scanning distances, reduced number of types thanks to integrated L.ON/D.ON switches are system focal points. All W160 optics variants are available in two housing models with axial or 90° light emission. The WLL160 photoelectric switch for fiber-optic cables with switching point setting, manually per potentiometer or automatically per Teach-In at the push of a button, rounds out the W160 series. Plastic fiber-optic cables of the LL3 series in approx. 90 different options are available as accessories.

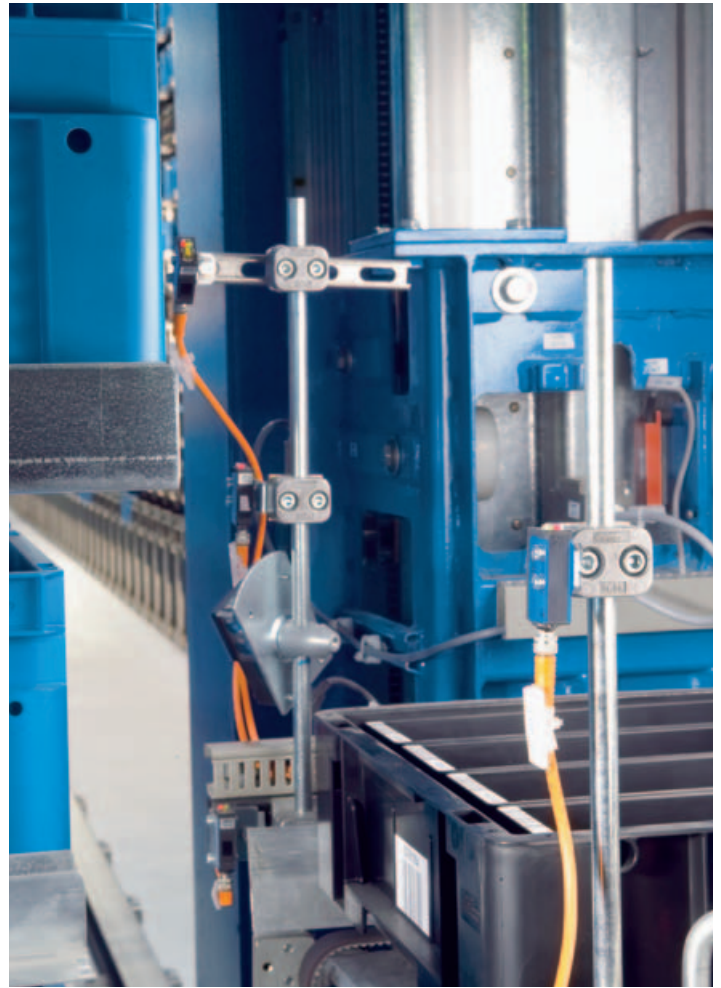
	Through-beam photoelectric switches
	With fibre optic cables (through-beam)
	With fibre optic cables (proximity)

► The WS/WE 160 through-beam photoelectric switch is used for entry control in rack shelves.

▼ The WT 160 miniature photoelectric proximity switch is used in film and foil processing to control feed tension.



▼ The WT 160 miniature photoelectric proximity switch checks the width of packages on a conveyor belt.

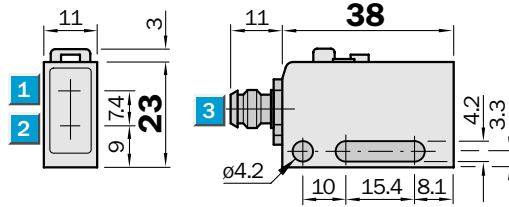


Scanning distance
4 ... 60 mm

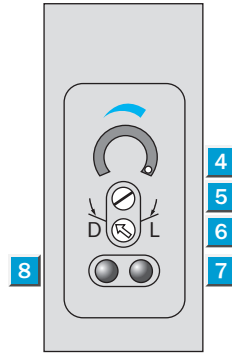
Photoelectric proximity switch

- Horizontal models
- Focussed proximity switch with background blanking
- Red light as alignment aid
- Switching point adjustable
- LED indicator: operating reserve

Dimensional drawing



Adjustments possible

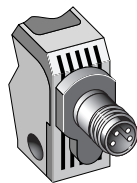


- 1 Centre of optical axis, receiver
- 2 Centre of optical axis, sender
- 3 Connector
- 4 Scaling 270°
- 5 Sensitivity adjuster
- 6 Light/dark rotary switch:
L = light switching
D = dark switching
- 7 LED indicator orange: switching output active
- 8 LED indicator green: light reception with operating reserve > 1.1 and < 0.9

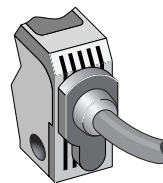
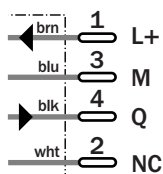


Connection type

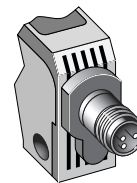
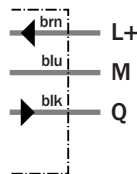
WT160-E410	WT160-E112	WT160-E310
WT160-F410	WT160-F112	WT160-F310



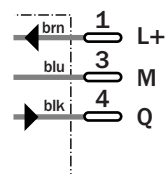
M8, 4-pin



3 x 0.2 mm²



M8, 3-pin



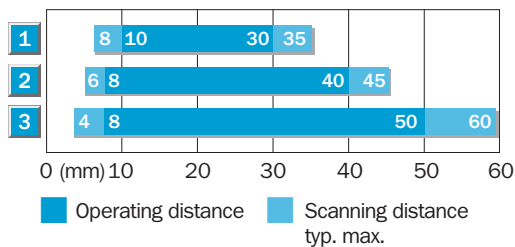
See chapter Accessories

- Connector, M8, 3-pin
- Connector, M8, 4-pin
- Mounting systems

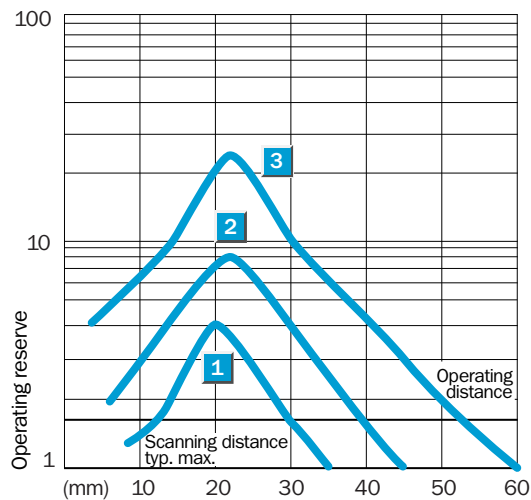
Technical specifications		WT160-	E112	E310	E410	F112	F310	F410				
Scanning distance typ. max.	4 ... 60 mm ¹⁾											
Operating distance	8 ... 50 mm ¹⁾											
Adjustment of operating distance	Potentiometer, 2 rotations											
Light source, light type	LED, red light, 680 nm ²⁾											
Light spot diameter	Approx. 3 mm at 25 mm distance											
Supply voltage V_s	DC 10 ... 30 V ³⁾											
Ripple	± 10 % ⁴⁾											
Power consumption	≤ 25 mA ⁵⁾											
Switching outputs	NPN: open collector: Q											
	PNP: open collector: Q											
Switching mode	Light-/dark-switching via rotary switch											
Signal voltage PNP HIGH / LOW	V _s - 1.8 V / approx. 0 V											
Signal voltage NPN HIGH / LOW	Approx. V _s / < 1.8 V											
Output current I _a max	100 mA											
Response time	≤ 0.5 ms ⁶⁾											
Switching frequency	1,000 Hz ⁷⁾											
Connection type	Cable, PVC, 2 m ⁸⁾											
	Connector, M8, 3-pin											
	Connector, M8, 4-pin											
VDE protection class	◆											
Circuit protection	V _s connections reverse-polarity protected / In-/outputs short-circuit protected / Interference suppression / Outputs overcurrent and short-circuit protected											
Enclosure rating	IP 67, IP 69K											
Ambient temperature operation	-25 °C ... +55 °C											
Ambient temperature storage	-40 °C ... +70 °C											
Weight	Approx. 60 g											
	Approx. 20 g											
Housing design	Horizontal											
Housing material	PBT, PMMA											

¹⁾ Object with 90 % remission (based on standard white to DIN 5033) at T_a = +25 °C
²⁾ Average service life 100,000 h ³⁾ Limit values, reverse-polarity protected operation in short-circuit protected ⁴⁾ may not exceed or fall short of V_s tolerances network max. 8 A
⁵⁾ without load ⁶⁾ Signal transit time with resistive load ⁷⁾ with light/dark ratio 1:1
⁸⁾ do not bend below 0 °C

Scanning distance



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



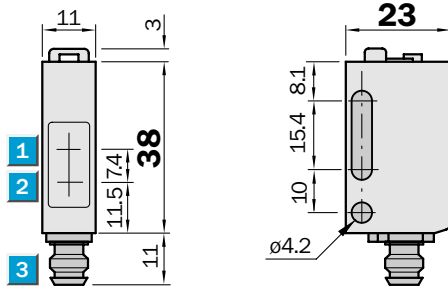
Ordering information	
Type	Order no.
WT160-E112	6 022 775
WT160-E310	6 022 779
WT160-E410	6 022 780
WT160-F112	6 022 783
WT160-F310	6 022 787
WT160-F410	6 022 788

Scanning distance
4 ... 60 mm

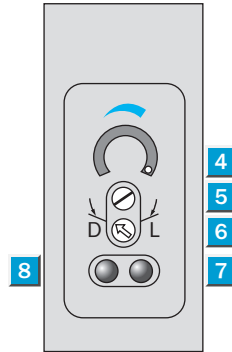
Photoelectric proximity switch

- Vertical models
- Focussed proximity switch with background blanking
- Red light as alignment aid
- Switching point adjustable
- LED indicator: operating reserve

Dimensional drawing



Adjustments possible

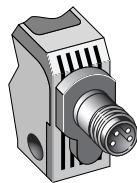


- 1 Centre of optical axis, receiver
- 2 Centre of optical axis, sender
- 3 Connector
- 4 Scaling 270°
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- 8 LED indicator green: light reception with operating reserve > 1.1 and < 0.9

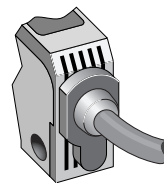
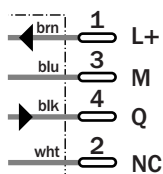


Connection type

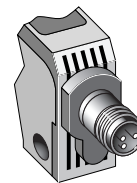
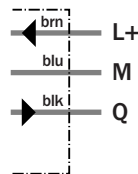
WT160-E420	WT160-E122	WT160-E320
WT160-F420	WT160-F122	WT160-F320



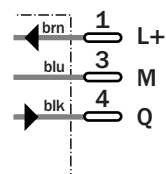
M8, 4-pin



3 x 0.2 mm²



M8, 3-pin



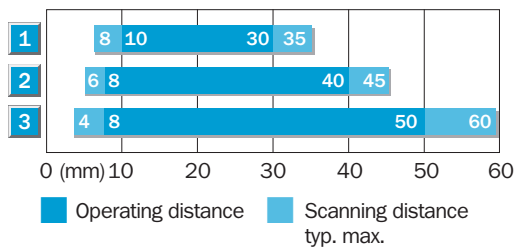
See chapter Accessories

- Connector, M8, 3-pin
- Connector, M8, 4-pin
- Mounting systems

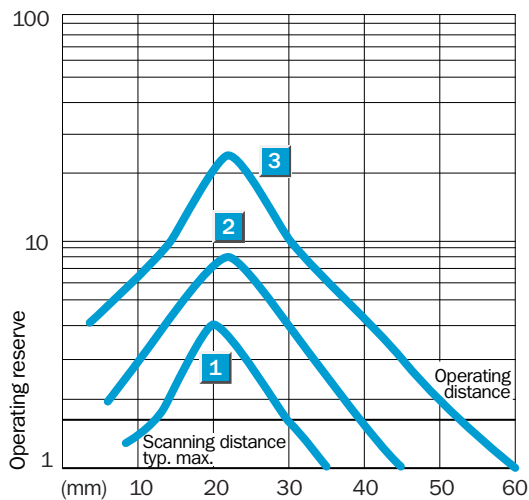
Technical specifications		WT160-	E122	E320	E420	F122	F320	F420				
Scanning distance typ. max.	4 ... 60 mm ¹⁾											
Operating distance	8 ... 50 mm ¹⁾											
Adjustment of operating distance	Potentiometer, 2 rotations											
Light source, light type	LED, red light, 680 nm ²⁾											
Light spot diameter	Approx. 3 mm at 25 mm distance											
Supply voltage V_s	DC 10 ... 30 V ³⁾											
Ripple	± 10 % ⁴⁾											
Power consumption	≤ 25 mA ⁵⁾											
Switching outputs	NPN: open collector: Q											
	PNP: open collector: Q											
Switching mode	Light-/dark-switching via rotary switch											
Signal voltage PNP HIGH / LOW	V _s - 1.8 V / approx. 0 V											
Signal voltage NPN HIGH / LOW	Approx. V _s / < 1.8 V											
Output current I _a max	100 mA											
Response time	≤ 0.5 ms ⁶⁾											
Switching frequency	1,000 Hz ⁷⁾											
Connection type	Cable, PVC, 2 m ⁸⁾											
	Connector, M8, 3-pin											
	Connector, M8, 4-pin											
VDE protection class	⊠											
Circuit protection	V _s connections reverse-polarity protected / In-/outputs short-circuit protected / Interference suppression / Outputs overcurrent and short-circuit protected											
Enclosure rating	IP 67, IP 69K											
Ambient temperature operation	-25 °C ... +55 °C											
Ambient temperature storage	-40 °C ... +70 °C											
Weight	Approx. 60 g											
	Approx. 20 g											
Housing design	Vertical											
Housing material	PBT, PMMA											

¹⁾ Object with 90 % remission (based on standard white to DIN 5033)
 ²⁾ Average service life 100,000 h
 ³⁾ at T_a = +25 °C
 ⁴⁾ Limit values, reverse-polarity protected operation in short-circuit protected
 ⁵⁾ network max. 8 A
 ⁶⁾ may not exceed or fall short of V_s tolerances
 ⁷⁾ without load
 ⁸⁾ Signal transit time with resistive load with light/dark ratio 1:1
⁸⁾ do not bend below 0 °C

Scanning distance



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



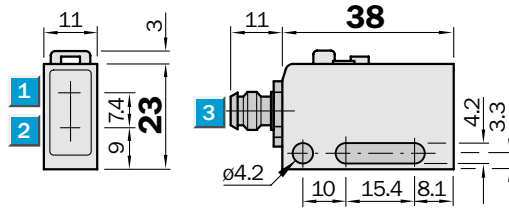
Ordering information	
Type	Order no.
WT160-E122	6 022 777
WT160-E320	6 022 781
WT160-E420	6 022 782
WT160-F122	6 022 785
WT160-F320	6 022 789
WT160-F420	6 022 790

Scanning distance
0 ... 1,000 mm

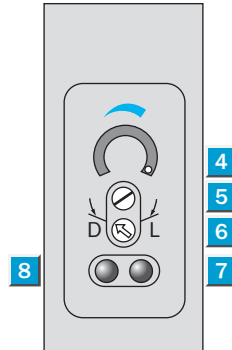
Photoelectric proximity switch

- Horizontal models
- Energetic proximity switch for standard applications
- Red light as alignment aid
- Switching point adjustable
- LED indicator: operating reserve

Dimensional drawing



Adjustments possible

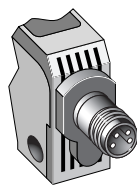


- 1 Centre of optical axis, receiver
- 2 Centre of optical axis, sender
- 3 Connector
- 4 Scaling 270°
- 5 Sensitivity adjuster
- 6 Light/dark rotary switch:
L = light switching
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- 7 LED indicator orange: switching output active
- 8 LED indicator green: light reception with operating reserve > 1.1 and < 0.9

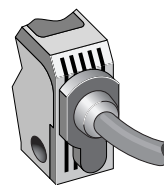
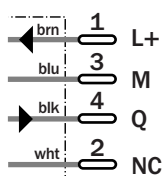


Connection type

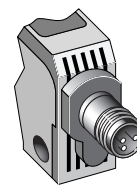
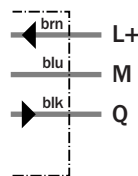
WT160-E470	WT160-E172	WT160-E370
WT160-F470	WT160-F172	WT160-F370



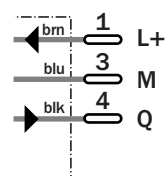
M8, 4-pin



3 x 0.2 mm²



M8, 3-pin



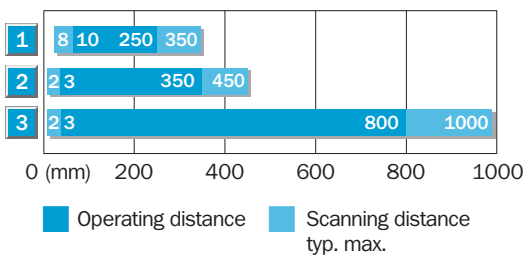
See chapter Accessories

- Connector, M8, 3-pin
- Connector, M8, 4-pin
- Mounting systems

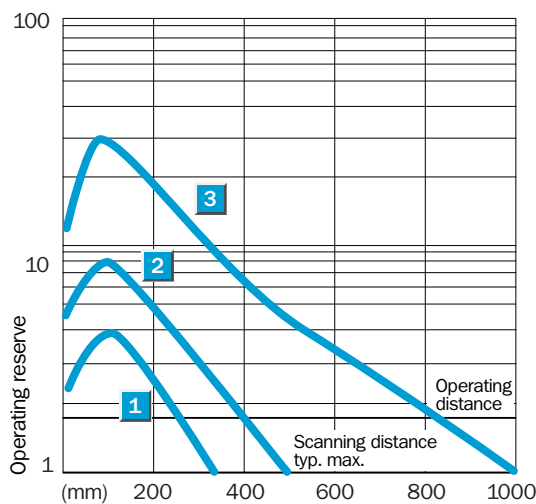
Technical specifications		WT160-	E172	E370	E470	F172	F370	F470				
Scanning distance typ. max.	0 ... 1,000 mm ¹⁾											
Operating distance	0 ... 800 mm ¹⁾											
Adjustment of operating distance	Potentiometer, 2 rotations											
Light source, light type	LED, red light, 680 nm ²⁾											
Light spot diameter	Approx. 90 mm at 500 mm distance											
Angle of dispersion	Approx. 10 °											
Supply voltage V _s	DC 10 ... 30 V ³⁾											
Ripple	± 10 % ⁴⁾											
Power consumption	≤ 25 mA ⁵⁾											
Switching outputs	NPN: open collector: Q											
	PNP: open collector: Q											
Switching mode	Light-/dark-switching via rotary switch											
Signal voltage PNP HIGH / LOW	V _s - 1.8 V / approx. 0 V											
Signal voltage NPN HIGH / LOW	Approx. V _s / < 1.8 V											
Output current I _a max	100 mA											
Response time	≤ 0.5 ms ⁶⁾											
Switching frequency	1,000 Hz ⁷⁾											
Connection type	Cable, PVC, 2 m ⁸⁾											
	Connector, M8, 3-pin											
	Connector, M8, 4-pin											
VDE protection class	◆											
Circuit protection	V _s connections reverse-polarity protected / In-/outputs short-circuit protected / Interference suppression / Outputs overcurrent and short-circuit protected											
Enclosure rating	IP 67, IP 69K											
Ambient temperature operation	-25 °C ... +55 °C											
Ambient temperature storage	-40 °C ... +70 °C											
Weight	Approx. 60 g											
	Approx. 20 g											
Housing design	Horizontal											
Housing material	PBT, PMMA											

¹⁾ Object with 90 % remission (based on standard white to DIN 5033) at T_a = +25 °C
²⁾ Average service life 100,000 h ³⁾ Limit values, reverse-polarity protected operation in short-circuit protected ⁴⁾ may not exceed or fall short of V_s tolerances network max. 8 A
⁵⁾ without load ⁶⁾ Signal transit time with resistive load ⁷⁾ with light/dark ratio 1:1
⁸⁾ do not bend below 0 °C


Scanning distance



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

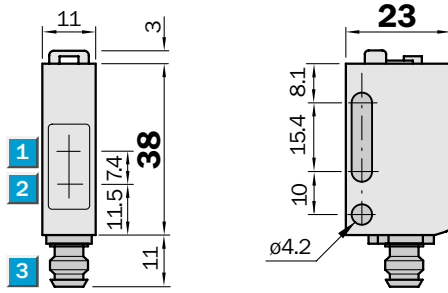


Ordering information	
Type	Order no.
WT160-E172	6 022 807
WT160-E370	6 022 811
WT160-E470	6 022 812
WT160-F172	6 022 815
WT160-F370	6 022 819
WT160-F470	6 022 820

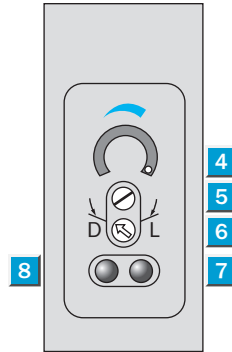

Scanning distance
0 ... 1,000 mm
Photoelectric proximity switch

- Vertical models
- Energetic proximity switch for standard applications
- Red light as alignment aid
- Switching point adjustable
- LED indicator: operating reserve

Dimensional drawing



Adjustments possible

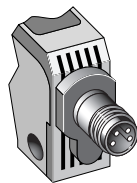


- 1 Centre of optical axis, receiver
- 2 Centre of optical axis, sender
- 3 Connector
- 4 Scaling 270°
- 5 Sensitivity adjuster
- 6 Light/dark rotary switch:
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- 7 LED indicator orange: switching output active
- 8 LED indicator green: light reception with operating reserve > 1.1 and < 0.9

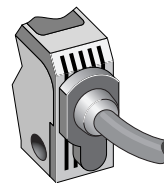
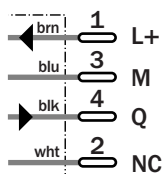


Connection type

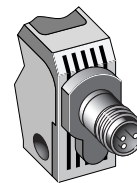
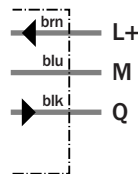
WT160-E480	WT160-E182	WT160-E380
WT160-F480	WT160-F182	WT160-F380



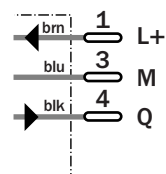
M8, 4-pin



3 x 0.2 mm²



M8, 3-pin



See chapter Accessories

- Connector, M8, 3-pin
- Connector, M8, 4-pin
- Mounting systems

Technical specifications		WT160-	E182	E380	E480	F182	F380	F480				
Scanning distance typ. max.	0 ... 1,000 mm ¹⁾											
Operating distance	0 ... 800 mm ¹⁾											
Adjustment of operating distance	Potentiometer, 2 rotations											
Light source, light type	LED, red light, 680 nm ²⁾											
Light spot diameter	Approx. 90 mm at 500 mm distance											
Angle of dispersion	Approx. 10 °											
Supply voltage V _s	DC 10 ... 30 V ³⁾											
Ripple	± 10 % ⁴⁾											
Power consumption	≤ 25 mA ⁵⁾											
Switching outputs	NPN: open collector: Q											
	PNP: open collector: Q											
Switching mode	Light-/dark-switching via rotary switch											
Signal voltage PNP HIGH / LOW	V _s - 1.8 V / approx. 0 V											
Signal voltage NPN HIGH / LOW	Approx. V _s / < 1.8 V											
Output current I _a max	100 mA											
Response time	≤ 0.5 ms ⁶⁾											
Switching frequency	1,000 Hz ⁷⁾											
Connection type	Cable, PVC, 2 m ⁸⁾											
	Connector, M8, 3-pin											
	Connector, M8, 4-pin											
VDE protection class	◆											
Circuit protection	V _s connections reverse-polarity protected / In-/outputs short-circuit protected / Interference suppression / Outputs overcurrent and short-circuit protected											
Enclosure rating	IP 67, IP 69K											
Ambient temperature operation	-25 °C ... +55 °C											
Ambient temperature storage	-40 °C ... +70 °C											
Weight	Approx. 60 g											
	Approx. 20 g											
Housing design	Vertical											
Housing material	PBT, PMMA											

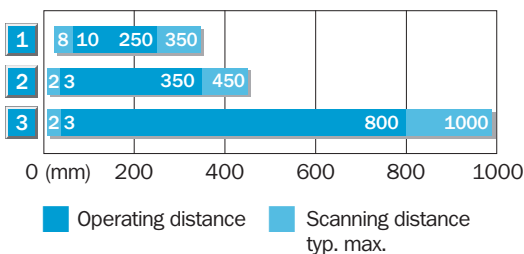
¹⁾ Object with 90 % remission (based on standard white to DIN 5033)
²⁾ Average service life 100,000 h

at T_a = +25 °C
³⁾ Limit values, reverse-polarity protected operation in short-circuit protected

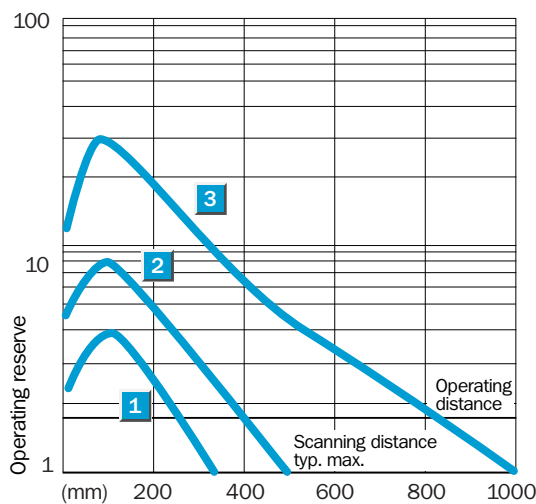
network max. 8 A
⁴⁾ may not exceed or fall short of V_s tolerances

⁵⁾ without load
⁶⁾ Signal transit time with resistive load
⁷⁾ with light/dark ratio 1:1
⁸⁾ do not bend below 0 °C

Scanning distance



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



Ordering information

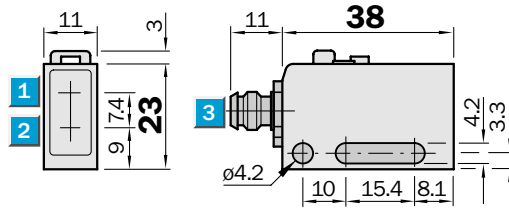
Type	Order no.
WT160-E182	6 022 809
WT160-E380	6 022 813
WT160-E480	6 022 814
WT160-F182	6 022 817
WT160-F380	6 022 821
WT160-F480	6 022 822

Scanning distance
0 ... 115 mm

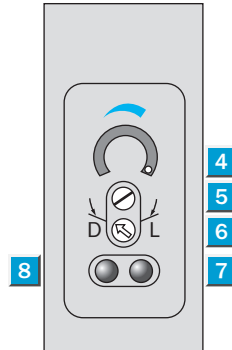
Photoelectric proximity switch

- Horizontal models
- Proximity switch with large opening angle for detecting objects conveyed loosely
- Red light as alignment aid
- Switching point adjustable
- LED indicator: operating reserve

Dimensional drawing



Adjustments possible

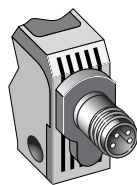


- 1 Centre of optical axis, receiver
- 2 Centre of optical axis, sender
- 3 Connector
- 4 Scaling 270°
- 5 Sensitivity adjuster
- 6 Light/dark rotary switch:
L = light switching
D = dark switching
- 7 LED indicator orange: switching output active
- 8 LED indicator green: light reception with operating reserve > 1.1 and < 0.9

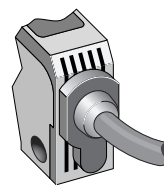
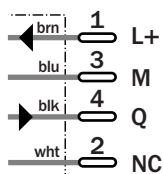


Connection type

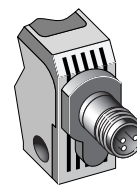
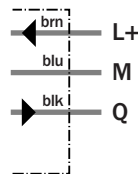
WT160-E450	WT160-E152	WT160-E350
WT160-F450	WT160-F152	WT160-F350



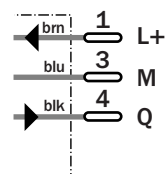
M8, 4-pin



3 x 0.2 mm²



M8, 3-pin



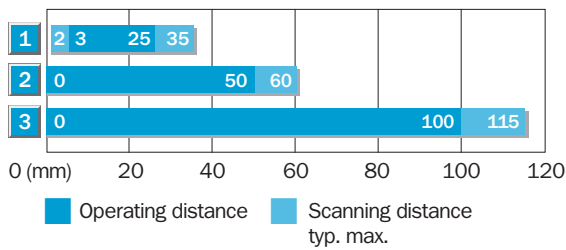
See chapter Accessories

- Connector, M8, 3-pin
- Connector, M8, 4-pin
- Mounting systems

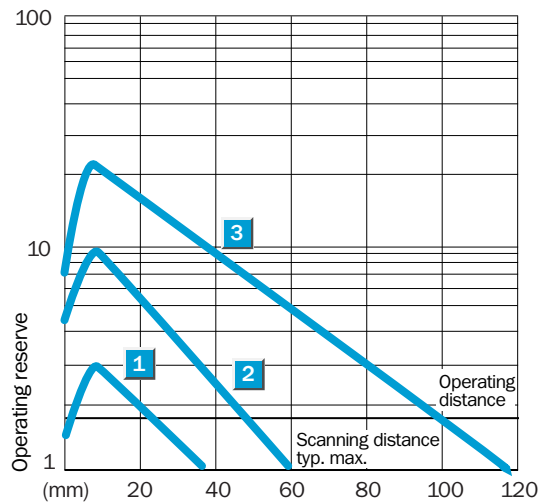
Technical specifications		WT160-	E152	E350	E450	F152	F350	F450				
Scanning distance typ. max.	0 ... 115 mm ¹⁾											
Operating distance	0 ... 100 mm ¹⁾											
Adjustment of operating distance	Potentiometer, 2 rotations											
Light source, light type	LED, red light, 680 nm ²⁾											
Light spot diameter	Approx. 100 mm at 100 mm distance											
Angle of dispersion	Approx. 50 °											
Supply voltage V _s	DC 10 ... 30 V ³⁾											
Ripple	± 10 % ⁴⁾											
Power consumption	≤ 25 mA ⁵⁾											
Switching outputs	NPN: open collector: Q											
	PNP: open collector: Q											
Switching mode	Light-/dark-switching via rotary switch											
Signal voltage PNP HIGH / LOW	V _s - 1.8 V / approx. 0 V											
Signal voltage NPN HIGH / LOW	Approx. V _s / < 1.8 V											
Output current I _a max	100 mA											
Response time	≤ 0.5 ms ⁶⁾											
Switching frequency	1,000 Hz ⁷⁾											
Connection type	Cable, PVC, 2 m ⁸⁾											
	Connector, M8, 3-pin											
	Connector, M8, 4-pin											
VDE protection class	◆											
Circuit protection	V _s connections reverse-polarity protected / In-/outputs short-circuit protected / Interference suppression / Outputs overcurrent and short-circuit protected											
Enclosure rating	IP 67, IP 69K											
Ambient temperature operation	-25 °C ... +55 °C											
Ambient temperature storage	-40 °C ... +70 °C											
Weight	Approx. 60 g											
	Approx. 20 g											
Housing design	Horizontal											
Housing material	PBT, PMMA											

¹⁾ Object with 90 % remission (based on standard white to DIN 5033) ²⁾ Average service life 100,000 h ³⁾ at T_a = +25 °C ⁴⁾ Limit values, reverse-polarity protected operation in short-circuit protected ⁵⁾ network max. 8 A ⁶⁾ may not exceed or fall short of V_s tolerances ⁷⁾ without load ⁸⁾ Signal transit time with resistive load with light/dark ratio 1:1 ⁹⁾ do not bend below 0 °C


Scanning distance



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

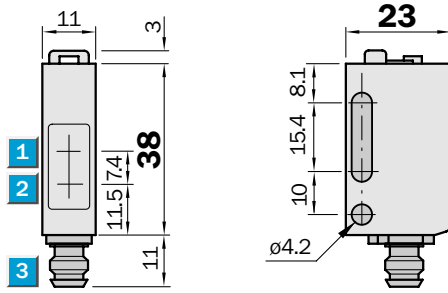


Ordering information	
Type	Order no.
WT160-E152	6 022 791
WT160-E350	6 022 795
WT160-E450	6 022 796
WT160-F152	6 022 799
WT160-F350	6 022 803
WT160-F450	6 022 804

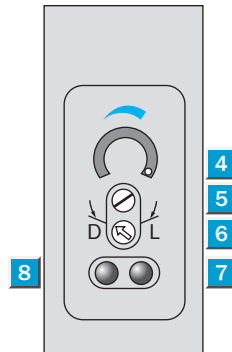

Scanning distance
0 ... 115 mm
Photoelectric proximity switch

- Vertical models
- Proximity switch with large opening angle for detecting objects conveyed loosely
- Red light as alignment aid
- Switching point adjustable
- LED indicator: operating reserve

Dimensional drawing



Adjustments possible

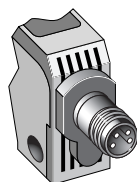


- 1 Centre of optical axis, receiver
- 2 Centre of optical axis, sender
- 3 Connector
- 4 Scaling 270°
- 5 Sensitivity adjuster
- 6 Light/dark rotary switch:
L = light switching
D = dark switching
- 7 LED indicator orange: switching output active
- 8 LED indicator green: light reception with operating reserve > 1.1 and < 0.9

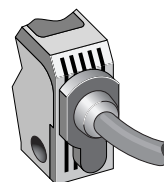
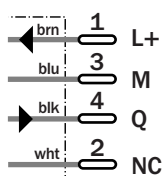


Connection type

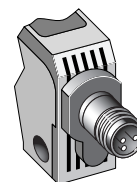
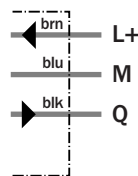
WT160-E460	WT160-E162	WT160-E360
WT160-F460	WT160-F162	WT160-F360



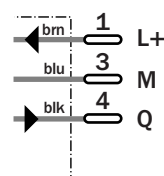
M8, 4-pin



3 x 0.2 mm²



M8, 3-pin



See chapter Accessories

- Connector, M8, 3-pin
- Connector, M8, 4-pin
- Mounting systems

Technical specifications		WT160-	E162	E360	E460	F162	F360	F460				
Scanning distance typ. max.	0 ... 115 mm ¹⁾											
Operating distance	0 ... 100 mm ¹⁾											
Adjustment of operating distance	Potentiometer, 2 rotations											
Light source, light type	LED, red light, 680 nm ²⁾											
Light spot diameter	Approx. 100 mm at 100 mm distance											
Angle of dispersion	Approx. 50 °											
Supply voltage V _s	DC 10 ... 30 V ³⁾											
Ripple	± 10 % ⁴⁾											
Power consumption	≤ 25 mA ⁵⁾											
Switching outputs	NPN: open collector: Q											
	PNP: open collector: Q											
Switching mode	Light-/dark-switching via rotary switch											
Signal voltage PNP HIGH / LOW	V _s - 1.8 V / approx. 0 V											
Signal voltage NPN HIGH / LOW	Approx. V _s / < 1.8 V											
Output current I _a max	100 mA											
Response time	≤ 0.5 ms ⁶⁾											
Switching frequency	1,000 Hz ⁷⁾											
Connection type	Cable, PVC, 2 m ⁸⁾											
	Connector, M8, 3-pin											
	Connector, M8, 4-pin											
VDE protection class	◆											
Circuit protection	V _s connections reverse-polarity protected / In-/outputs short-circuit protected / Interference suppression / Outputs overcurrent and short-circuit protected											
Enclosure rating	IP 67, IP 69K											
Ambient temperature operation	-25 °C ... +55 °C											
Ambient temperature storage	-40 °C ... +70 °C											
Weight	Approx. 60 g											
	Approx. 20 g											
Housing design	Vertical											
Housing material	PBT, PMMA											

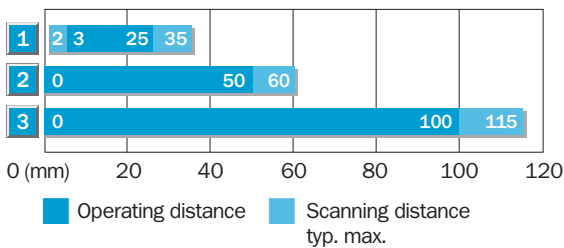
¹⁾ Object with 90 % remission (based on standard white to DIN 5033)
²⁾ Average service life 100,000 h

at T_a = +25 °C
³⁾ Limit values, reverse-polarity protected operation in short-circuit protected

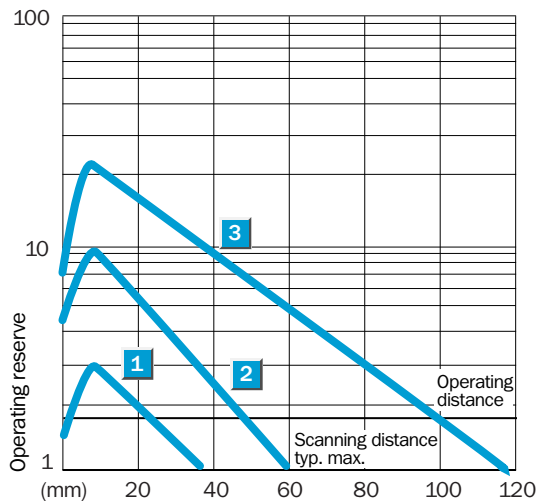
network max. 8 A
⁴⁾ may not exceed or fall short of V_s tolerances

⁵⁾ without load
⁶⁾ Signal transit time with resistive load
⁷⁾ with light/dark ratio 1:1
⁸⁾ do not bend below 0 °C

Scanning distance



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



Ordering information

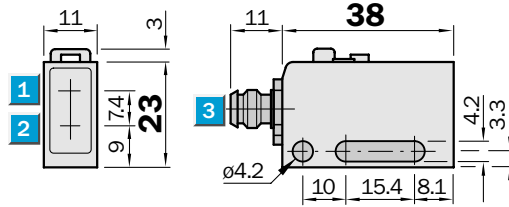
Type	Order no.
WT160-E162	6 022 793
WT160-E360	6 022 797
WT160-E460	6 022 798
WT160-F162	6 022 801
WT160-F360	6 022 805
WT160-F460	6 022 806

Scanning range
0.01 ... 6.5 m

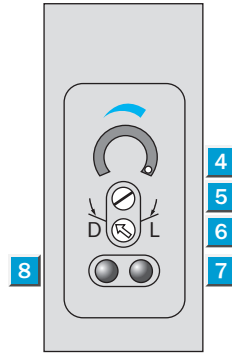
Photoelectric reflex switch

- Horizontal models
- Polarization filter, consequently reliable detection of objects with shiny surfaces
- Red light as alignment aid
- Sensitivity adjustable
- LED indicator: operating reserve

Dimensional drawing



Adjustments possible

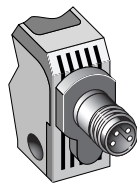


- 1 Centre of optical axis, receiver
- 2 Centre of optical axis, sender
- 3 Connector
- 4 Scaling 270°
- 5 Sensitivity adjuster
- 6 Light/dark rotary switch:
L = light switching
D = dark switching
- 7 LED indicator orange: switching output active
- 8 LED indicator green: light reception with operating reserve > 1.1 and < 0.9

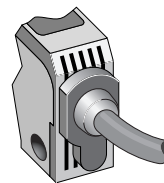
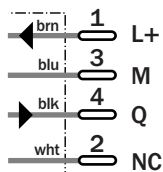


Connection type

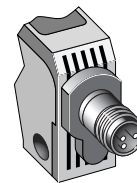
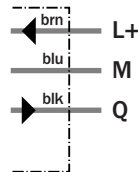
WL160-E430	WL160-E132	WL160-E330
WL160-F430	WL160-F132	WL160-F330



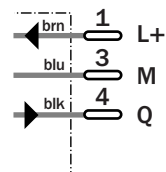
M8, 4-pin



3 x 0.2 mm²



M8, 3-pin



See chapter Accessories

- Connector, M8, 3-pin
- Connector, M8, 4-pin
- Mounting systems
- Reflectors

Technical specifications		WL160-	E132	E330	E430	F132	F330	F430				
Scanning range typ. max.	0.01 ... 6.5 m											
Scanning range, recommended	0.01 ... 4.5 m											
Relating to	Reflector PL80A											
Sensitivity adjustment	Potentiometer, 2 rotations											
Light source, light type	LED, red light, 680 nm ¹⁾											
Light spot diameter	Approx. 300 mm at 3 m distance											
Angle of dispersion	Approx. 5.8 °											
Polarisation filter	✓											
Supply voltage V_s	DC 10 ... 30 V ²⁾											
Ripple	± 10 % ³⁾											
Power consumption	≤ 25 mA ⁴⁾											
Switching outputs	NPN: open collector: Q											
	PNP: open collector: Q											
Switching mode	Light-/dark-switching via rotary switch											
Signal voltage PNP HIGH / LOW	V _s - 1.8 V / approx. 0 V											
Signal voltage NPN HIGH / LOW	Approx. V _s / < 1.8 V											
Output current I _a max	100 mA											
Response time	≤ 0.5 ms ⁵⁾											
Switching frequency	1,000 Hz ⁶⁾											
Connection type	Cable, PVC, 2 m ⁷⁾											
	Connector, M8, 3-pin											
	Connector, M8, 4-pin											
VDE protection class	⊠											
Circuit protection	V _s connections reverse-polarity protected / In-/outputs short-circuit protected / Interference suppression / Outputs overcurrent and short-circuit protected											
Enclosure rating	IP 67, IP 69K											
Ambient temperature operation	-25 °C ... +55 °C											
Ambient temperature storage	-40 °C ... +70 °C											
Weight	Approx. 60 g											
	Approx. 20 g											
Housing design	Horizontal											
Housing material	PBT, PMMA											

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

operation in short-circuit protected network max. 8 A

V_s tolerances

⁴⁾ without load

⁵⁾ Signal transit time with resistive load

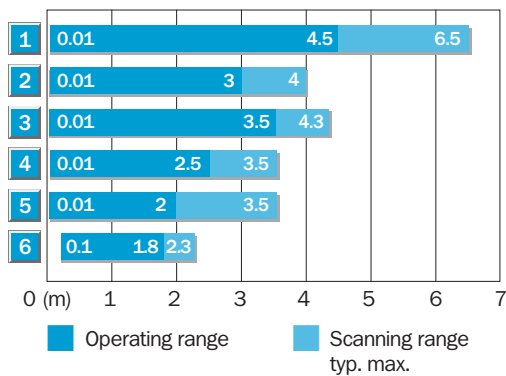
⁶⁾ with light/dark ratio 1:1

⁷⁾ do not bend below 0 °C

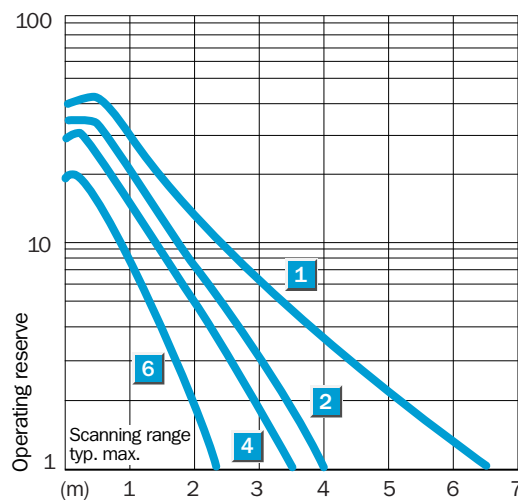
²⁾ Limit values, reverse-polarity protected

³⁾ may not exceed or fall short of

Scanning range and operating reserve



Reflector type	Operating range
1 PL80A	0.01 ... 4.5 m
2 P250	0.01 ... 3 m
3 PL50A/PL40A	0.01 ... 3.5 m
4 PL30A/PL31A	0.01 ... 2.5 m
5 PL20A	0.01 ... 2 m
6 Reflective tape Diamond Grade	0.1 ... 1.8 m (100 x 100 mm ²)



Ordering information

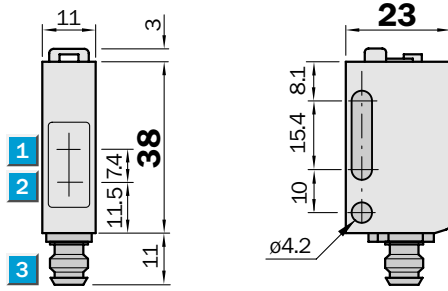
Type	Order no.
WL160-E132	6 022 759
WL160-E330	6 022 763
WL160-E430	6 022 764
WL160-F132	6 022 767
WL160-F330	6 022 771
WL160-F430	6 022 772

Scanning range
0.01 ... 6.5 m

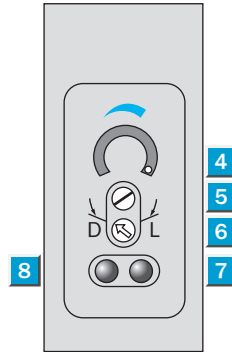
Photoelectric reflex switch

- Vertical models
- Polarization filter, consequently reliable detection of objects with shiny surfaces
- Red light as alignment aid
- Sensitivity adjustable
- LED indicator: operating reserve

Dimensional drawing



Adjustments possible

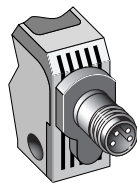


- 1 Centre of optical axis, receiver
- 2 Centre of optical axis, sender
- 3 Connector
- 4 Scaling 270°
- 5 Sensitivity adjuster
- 6 Light/dark rotary switch:
L = light switching
D = dark switching
- 7 LED indicator orange: switching output active
- 8 LED indicator green: light reception with operating reserve > 1.1 and < 0.9

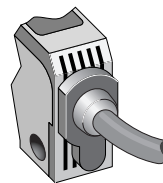
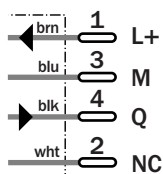


Connection type

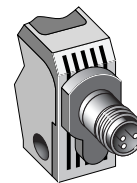
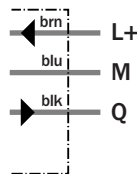
WL160-E440	WL160-E142	WL160-E340
WL160-F440	WL160-F142	WL160-F340



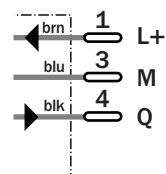
M8, 4-pin



3 x 0.2 mm²



M8, 3-pin



See chapter Accessories

- Connector, M8, 3-pin
- Connector, M8, 4-pin
- Mounting systems
- Reflectors

Technical specifications		WL160-	E142	E340	E440	F142	F340	F440				
Scanning range typ. max.	0.01 ... 6.5 m											
Scanning range, recommended	0.01 ... 4.5 m											
Relating to	Reflector PL80A											
Sensitivity adjustment	Potentiometer, 2 rotations											
Light source, light type	LED, red light, 680 nm ¹⁾											
Light spot diameter	Approx. 300 mm at 3 m distance											
Angle of dispersion	Approx. 5.8 °											
Polarisation filter	✓											
Supply voltage V_s	DC 10 ... 30 V ²⁾											
Ripple	± 10 % ³⁾											
Power consumption	≤ 25 mA ⁴⁾											
Switching outputs	NPN: open collector: Q											
	PNP: open collector: Q											
Switching mode	Light-/dark-switching via rotary switch											
Signal voltage PNP HIGH / LOW	V _s - 1.8 V / approx. 0 V											
Signal voltage NPN HIGH / LOW	Approx. V _s / < 1.8 V											
Output current I _a max	100 mA											
Response time	≤ 0.5 ms ⁵⁾											
Switching frequency	1,000 Hz ⁶⁾											
Connection type	Cable, PVC, 2 m ⁷⁾											
	Connector, M8, 3-pin											
	Connector, M8, 4-pin											
VDE protection class	⊠											
Circuit protection	V _s connections reverse-polarity protected / In-/outputs short-circuit protected / Interference suppression / Outputs overcurrent and short-circuit protected											
Enclosure rating	IP 67, IP 69K											
Ambient temperature operation	-25 °C ... +55 °C											
Ambient temperature storage	-40 °C ... +70 °C											
Weight	Approx. 60 g											
	Approx. 20 g											
Housing design	Vertical											
Housing material	PBT, PMMA											

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

operation in short-circuit protected network max. 8 A

V_s tolerances

⁴⁾ without load

⁵⁾ Signal transit time with resistive load

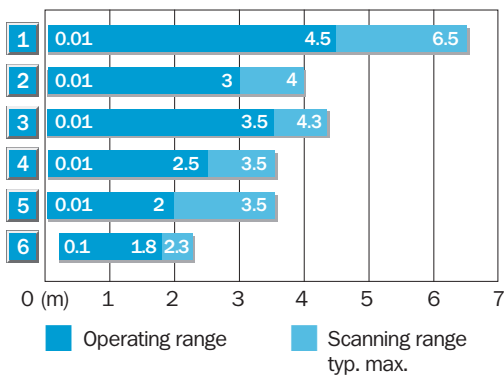
⁶⁾ with light/dark ratio 1:1

⁷⁾ do not bend below 0 °C

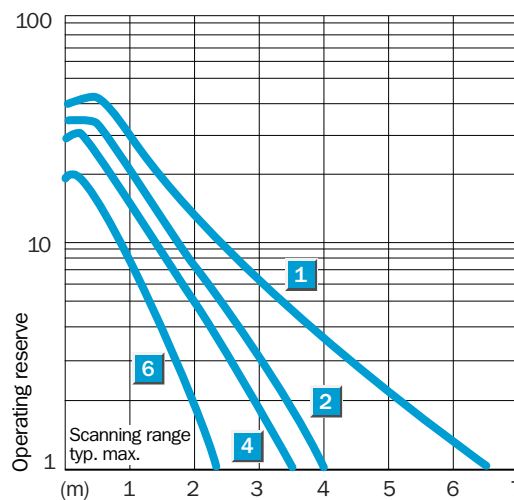
²⁾ Limit values, reverse-polarity protected

³⁾ may not exceed or fall short of

Scanning range and operating reserve



Reflector type	Operating range
1 PL80A	0.01 ... 4.5 m
2 P250	0.01 ... 3 m
3 PL50A/PL40A	0.01 ... 3.5 m
4 PL30A/PL31A	0.01 ... 2.5 m
5 PL20A	0.01 ... 2 m
6 Reflective tape Diamond Grade	0.1 ... 1.8 m (100 x 100 mm ²)



Ordering information

Type	Order no.
WL160-E142	6 022 761
WL160-E340	6 022 765
WL160-E440	6 022 766
WL160-F142	6 022 769
WL160-F340	6 022 773
WL160-F440	6 022 774

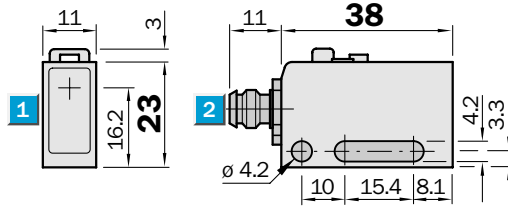


Scanning range
0 ... 15 m

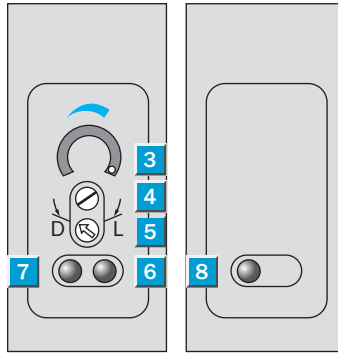
Through-beam photoelectric switch

- Horizontal models
- Slotted masks (accessories) for detecting small objects or positioning jobs
- Red light as alignment aid
- Sensitivity adjustable
- LED indicator: operating reserve

Dimensional drawing



Sender/receiver



- 1 Centre of optical axis
- 2 Connector
- 3 Sensitivity adjuster
- 4 Scaling 270°
- 5 Light/dark rotary switch:
L = light switching
D = dark switching
- 6 LED indicator orange: switching output active
- 7 LED indicator green: light reception with operating reserve > 1.1 and < 0.9
- 8 LED indicator red: sender active

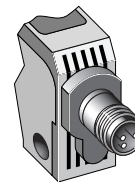
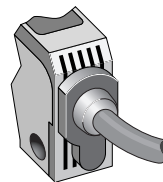
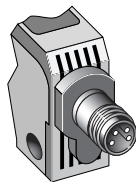


Connection type

WS/WE160-E430
WS/WE160-F430

WS/WE160-E132
WS/WE160-F132

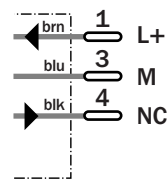
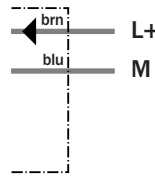
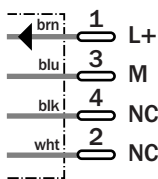
WS/WE160-E330
WS/WE160-F330



Sender M8, 4-pin

2 x 0.2 mm²

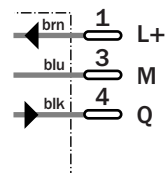
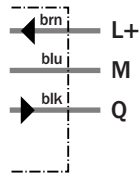
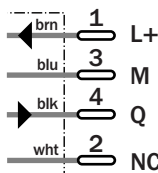
M8, 3-pin



Receiver M8, 4-pin

3 x 0.2 mm²

M8, 3-pin



See chapter Accessories

Connector, M8, 3-pin

Connector, M8, 4-pin

Mounting systems



Technical specifications		WS/WE160-	E132	E330	E430	F132	F330	F430				
Scanning range typ. max.	0 ... 15 m											
Scanning range, recommended	0 ... 11 m											
Sensitivity adjustment	Potentiometer, 2 rotations											
Light source, light type	LED, red light, 680 nm ¹⁾											
Light spot diameter	Approx. 1500 mm at 10 m distance											
Angle of dispersion	Approx. 8.5 °											
Angle of reception	Approx. 15 °											
Supply voltage V_s	DC 10 ... 30 V ²⁾											
Ripple	± 10 % ³⁾											
Power consumption, sender	≤ 20 mA ⁴⁾											
Power consumption, receiver	≤ 20 mA ⁴⁾											
Switching outputs	NPN: open collector: Q											
	PNP: open collector: Q											
Switching mode	Light-/dark-switching via rotary switch											
Signal voltage PNP HIGH / LOW	V _s - 1.8 V / approx. 0 V											
Signal voltage NPN HIGH / LOW	Approx. V _s / < 1.8 V											
Output current I _a max	100 mA											
Response time	≤ 0.5 ms ⁵⁾											
Switching frequency	1,000 Hz ⁶⁾											
Connection type	Cable, PVC, 2 m ⁷⁾											
	Connector, M8, 3-pin											
	Connector, M8, 4-pin											
VDE protection class	◆											
Circuit protection	V _s connections reverse-polarity protected / In-/outputs short-circuit protected / Interference suppression (receiver only) / Outputs overcurrent and short-circuit protected (receiver only)											
Enclosure rating	IP 67, IP 69K											
Ambient temperature operation	-25 °C ... +55 °C											
Ambient temperature storage	-40 °C ... +70 °C											
Weight	Approx. 60 g											
	Approx. 20 g											
Housing design	Horizontal											
Housing material	PBT, PMMA											

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

²⁾ Limit values, reverse-polarity protected

operation in short-circuit protected network max. 8 A

³⁾ may not exceed or fall short of

V_s tolerances

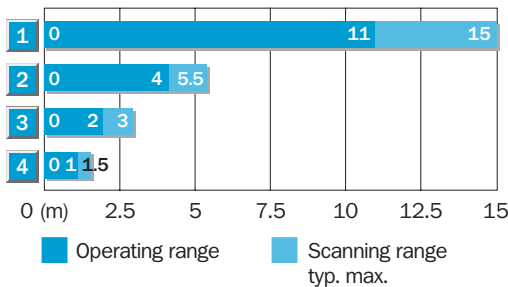
⁴⁾ without load

⁵⁾ Signal transit time with resistive load

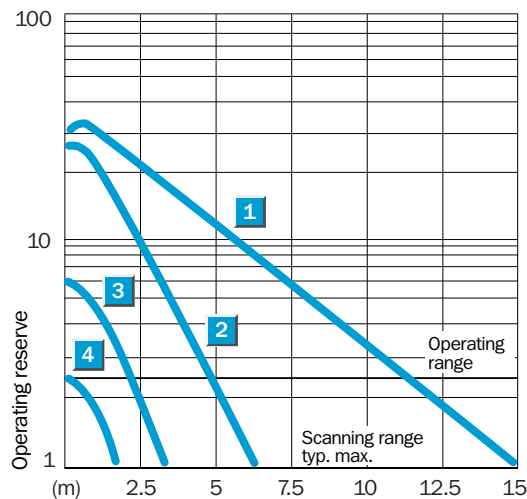
⁶⁾ with light/dark ratio 1:1

⁷⁾ do not bend below 0 °C

Scanning range and operating reserve



- 1 Without slotted mask
- 2 With slotted mask 2 mm, BL-160-SK
- 3 With slotted mask 1 mm, BL-160-SK
- 4 With slotted mask 0.5 mm, BL-160-SK



Ordering information

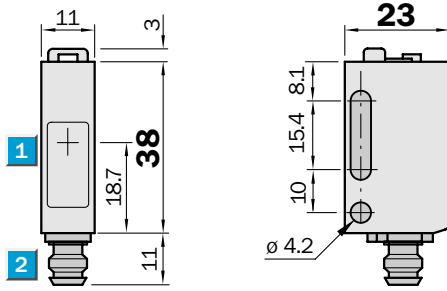
Type	Order no.
WS/WE160-E132	6 022 743
WS/WE160-E330	6 022 747
WS/WE160-E430	6 022 748
WS/WE160-F132	6 022 751
WS/WE160-F330	6 022 755
WS/WE160-F430	6 022 756

Scanning range
0 ... 15 m

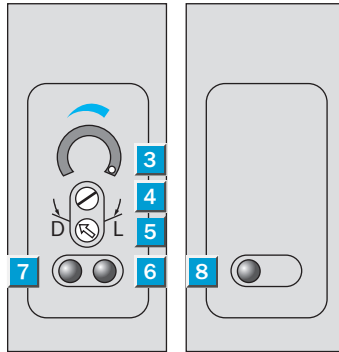
Through-beam photoelectric switch

- Vertical models
- Slotted masks (accessories) for detecting small objects or positioning jobs
- Red light as alignment aid
- Sensitivity adjustable
- LED indicator: operating reserve

Dimensional drawing



Sender/receiver

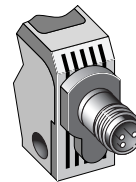
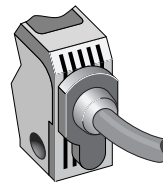
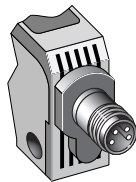


- 1 Centre of optical axis
- 2 Connector
- 3 Sensitivity adjuster
- 4 Scaling 270°
- 5 Light/dark rotary switch:
L = light switching
D = dark switching
- 6 LED indicator orange: switching output active
- 7 LED indicator green: light reception with operating reserve > 1.1 and < 0.9
- 8 LED indicator red: sender active



Connection type

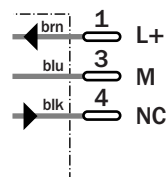
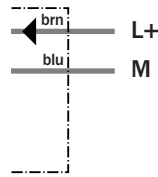
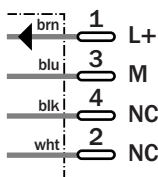
WS/WE160-E440	WS/WE160-E142	WS/WE160-E340
WS/WE160-F440	WS/WE160-F142	WS/WE160-F340



Sender M8, 4-pin

2 x 0.2 mm²

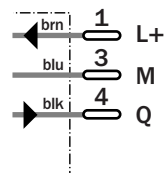
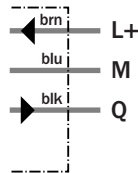
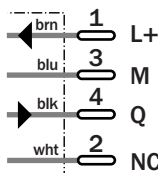
M8, 3-pin



Receiver M8, 4-pin

3 x 0.2 mm²

M8, 3-pin



See chapter Accessories

- Connector, M8, 3-pin
- Connector, M8, 4-pin
- Mounting systems



Technical specifications		WS/WE160-	E142	E340	E440	F142	F340	F440				
Scanning range typ. max.	0 ... 15 m											
Scanning range, recommended	0 ... 11 m											
Sensitivity adjustment	Potentiometer, 2 rotations											
Light source, light type	LED, red light, 680 nm ¹⁾											
Light spot diameter	Approx. 1500 mm at 10 m distance											
Angle of dispersion	Approx. 8.5 °											
Angle of reception	Approx. 15 °											
Supply voltage V _s	DC 10 ... 30 V ²⁾											
Ripple	± 10 % ³⁾											
Power consumption, sender	≤ 20 mA ⁴⁾											
Power consumption, receiver	≤ 20 mA ⁴⁾											
Switching outputs	NPN: open collector: Q											
	PNP: open collector: Q											
Switching mode	Light-/dark-switching via rotary switch											
Signal voltage PNP HIGH / LOW	V _s - 1.8 V / approx. 0 V											
Signal voltage NPN HIGH / LOW	Approx. V _s / < 1.8 V											
Output current I _a max	100 mA											
Response time	≤ 0.5 ms ⁵⁾											
Switching frequency	1,000 Hz ⁶⁾											
Connection type	Cable, PVC, 2 m ⁷⁾											
	Connector, M8, 3-pin											
	Connector, M8, 4-pin											
VDE protection class	◇											
Circuit protection	V _s connections reverse-polarity protected / In-/outputs short-circuit protected / Interference suppression (receiver only) / Outputs overcurrent and short-circuit protected (receiver only)											
Enclosure rating	IP 67, IP 69K											
Ambient temperature operation	-25 °C ... +55 °C											
Ambient temperature storage	-40 °C ... +70 °C											
Weight	Approx. 60 g											
	Approx. 20 g											
Housing design	Vertical											
Housing material	PBT, PMMA											

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

²⁾ Limit values, reverse-polarity protected

operation in short-circuit protected network max. 8 A

³⁾ may not exceed or fall short of

V_s tolerances

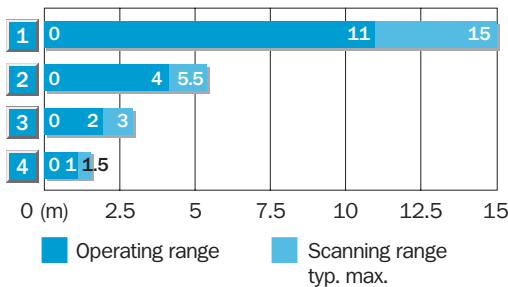
⁴⁾ without load

⁵⁾ Signal transit time with resistive load

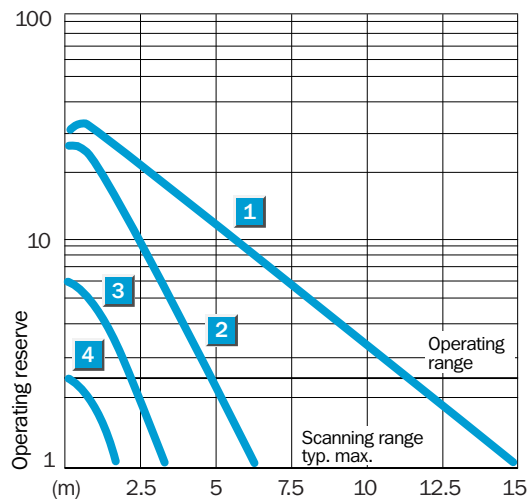
⁶⁾ with light/dark ratio 1:1

⁷⁾ do not bend below 0 °C

Scanning range and operating reserve



- 1 Without slotted mask
- 2 With slotted mask 2 mm, BL-160-SK
- 3 With slotted mask 1 mm, BL-160-SK
- 4 With slotted mask 0.5 mm, BL-160-SK



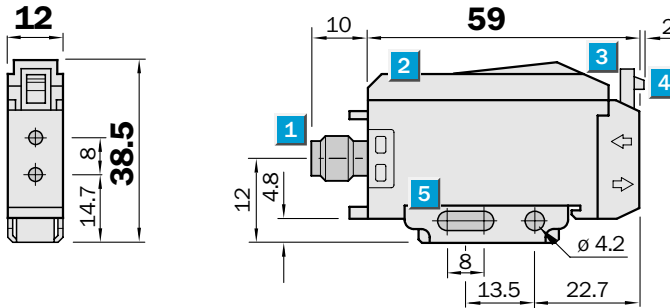
Ordering information

Type	Order no.
WS/WE160-E142	6 022 745
WS/WE160-E340	6 022 749
WS/WE160-E440	6 022 750
WS/WE160-F142	6 022 753
WS/WE160-F340	6 022 757
WS/WE160-F440	6 022 758

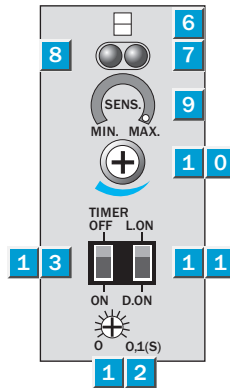
	Scanning distance 0 ... 70
	Scanning range 0 ... 2.000 mm
Proximity switch with fibre optic cables	

- Sensitivity setting with potentiometer, scaled
- Large selection of LL3 fiber-optic cables
- Switch-off delay 0 to 100 ms
- Contamination control output and test input for equipment and system testing

Dimensional drawing



Adjustments possible



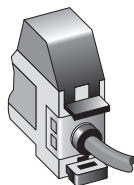
- 1 Connector
- 2 Protective hood
- 3 Locking the fiber-optic cables (press down)
- 4 Releasing the fiber-optic cables (press lug)
- 5 Mounting bracket (included in delivery)
- 6 Indication of correct fiber-optic cable mounting
- 7 LED indicator red (lights when switching threshold is exceeded)
- 8 LED indicator green (lights when operating reserve is exceeded >1.3)
- 9 Sensitivity scale 270°
- 10 Sensitivity adjuster (4 turns)
- 11 Light/dark slide switch
- 12 Switch-off delay 0 ...100 ms
- 13 Time delay on/off switch



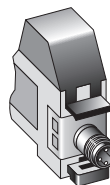
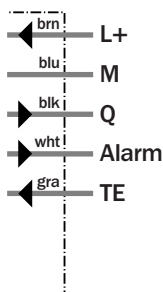
Connection type

WLL160-E122
WLL160-F122

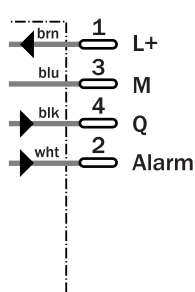
WLL160-E420
WLL160-F420



5 x 0.2 mm²



M8, 4-pin



See chapter Accessories

- Adapter for fibre-optic cables
- Connector, M8, 4-pin
- Fibre-optic cables LL3
- Mounting systems
- Tip adaptors

Technical specifications		WLL160-	E122	E420	F122	F420						
Operating distance	0 ... 70 mm ¹⁾											
Fibre-optic cable (proximity system)	LL3-DB01											
Adjustment of operating distance	Potentiometer, 4 revolutions ²⁾											
Scanning range typ. max.	0 ... 2,000 mm											
Fibre-optic cable (through-beam system)	LL3-TB02 and tip adapter LL3-TA01											
Scanning range, recommended	0 ... 400 mm											
Fibre-optic cable (through-beam system)	LL3-TB01											
Sensitivity adjustment	Potentiometer, 4 revolutions ²⁾											
Light source, light type	LED, Red light, 660 nm ³⁾											
Light spot diameter	Depending on the scanning range											
Angle of dispersion	Approx. 65 °											
Supply voltage V_s	DC 10 ... 30 V ⁴⁾											
Ripple	± 10 % ⁵⁾											
Power consumption	≤ 30 mA ⁶⁾											
Switching outputs	NPN: open collector: Q											
	PNP: open collector: Q											
Switching mode	Light-/dark-switching via slide switch											
Output current I _{a,max}	100 mA											
Response time	≤ 0.35 ms ⁷⁾											
Switching frequency	1,500 Hz ⁸⁾											
Time delay	Selectable, via slide switch											
Time type	Switch-off delay T _{OFF} 0 ... 100 ms											
Test input sender off	TE to 0 V											
	TE to V+											
Alarm output	Contamination message, 100mA, static											
Connection type	Cable, PVC, 2 m ⁹⁾											
	Connector, M8, 4-pin											
VDE protection class	⊠											
Circuit protection	V _s connections reverse-polarity protected / In-/outputs short-circuit protected / Interference suppression / Outputs overcurrent and short-circuit protected											
Enclosure rating	IP 66											
Ambient temperature operation	-25 °C ... +55 °C											
Ambient temperature storage	-40 °C ... +70 °C											
Weight	Approx. 80 g											
	Approx. 30 g											
Housing material	ABS											

¹⁾ Object with 90 % remission (based on standard white to DIN 5033)

²⁾ Sensitivity scale 270

³⁾ Average service life 100,000 h

at T_a = +25 °C

⁴⁾ Limit values, reverse-polarity protected operation in short-circuit protected

network max. 8 A

⁵⁾ may not exceed or fall short of V_s tolerances

⁶⁾ without load

⁷⁾ Signal transit time with resistive load

⁸⁾ with light/dark ratio 1:1

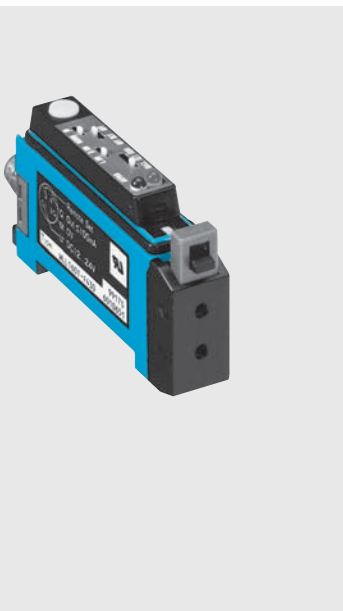
⁹⁾ do not bend below 0 °C

Ordering information

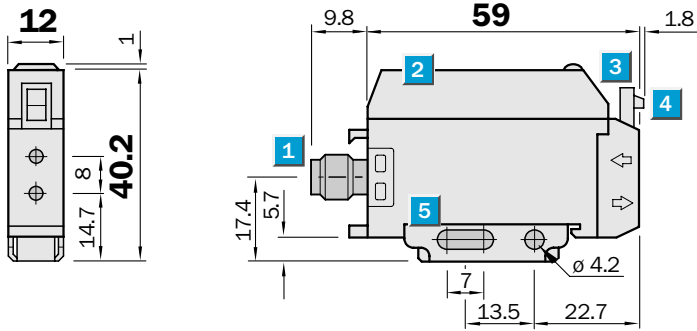
Type	Order no.
WLL160-E122	6 009 981
WLL160-E420	6 009 982
WLL160-F122	6 009 989
WLL160-F420	6 009 990

	Scanning distance 0 ... 70
	Scanning range 0 ... 2.000 mm
Proximity switch with fibre optic cables	

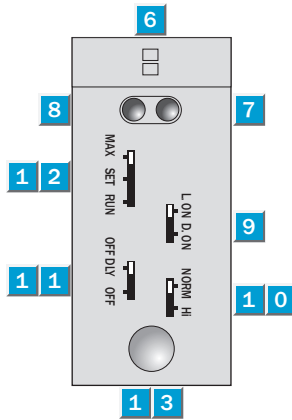
- Automatic setting of the switching threshold and hysteresis with Teach-In per push button or via external control wire ET
- Large selection of LL3 plastic fiber-optic cables
- Switching frequency 830/s or 1660/s, switchable



Dimensional drawing



Adjustments possible



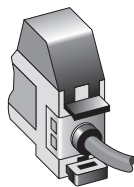
- Connector
- Protective hood
- Lock the fiber-optic cables (press down)
- Release the fiber-optic cables (press lug)
- Mounting bracket, supplied with equipment
- Indication of correct fiber-optic cable mounting
- LED signal strength indicator, red (lights when switching threshold is exceeded)
- LED signal strength indicator, green
- Selector switch light ("L.ON") / dark switching ("D.ON")
- Selector switch response time, NORM (600 μ s) / HI (300 μ s)
- Selector switch switch-off delay On ("OFF DLY") / off ("OFF"); 40 ms fix
- Operating mode selector switch "MAX / SET / RUN"
- Push button Teach-In



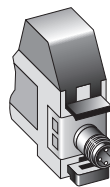
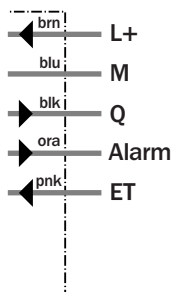
Connection type

WLL160T-E132
WLL160T-F132

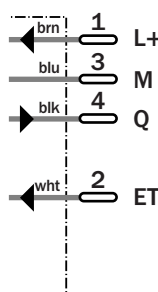
WLL160T-E430
WLL160T-F430



5 x 0.18 mm²



M8, 4-pin



See chapter Accessories

Adapter for fibre-optic cables
Connector, M8, 4-pin
Fibre-optic cables LL3
Mounting systems
Tip adaptors

Technical specifications		WLL160T-	E132	E430	F132	F430						
Operating distance	0 ... 70 mm ¹⁾											
Fibre-optic cable (proximity system)	LL3-DB01											
Adjustment of operating distance	Teach-in: single teach button & cable											
Scanning range typ. max.	0 ... 2,000 mm											
Fibre-optic cable (through-beam system)	LL3-TB02 and tip adapter LL3-TA01											
Scanning range, recommended	0 ... 400 mm											
Fibre-optic cable (through-beam system)	LL3-TB01											
Sensitivity adjustment	Teach-in: single teach button & cable											
Light source, light type	LED, Red light, 660 nm ²⁾											
Light spot diameter	depending on the scanning range											
Angle of dispersion	Approx. 65 °											
Supply voltage V_s	DC 10 ... 24 V ³⁾											
Ripple	≤ 5 V _{ss} ⁴⁾											
Power consumption	≤ 50 mA ⁵⁾											
Switching outputs	NPN: open collector: Q											
	PNP: open collector: Q											
Switching mode	Light-/dark-switching via slide switch											
Output current I _{a,max}	100 mA											
Response time	Selectable: 0.3 ms / 0.6 ms											
Switching frequency	Selectable: 1660/s; 830/s											
Time delay	Selectable: 40 ms fixed											
Time type	Switch-off delay T _{OFF}											
Alarm output	30 mA, one shot, pulse length 40 ms											
Connection type	Cable, PVC, 2 m ⁶⁾											
	Connector, M8, 4-pin											
VDE protection class	⊕											
Circuit protection	V _s connections reverse-polarity protected / In-/outputs short-circuit protected / Interference suppression / Outputs overcurrent and short-circuit protected											
Enclosure rating	IP 66											
Ambient temperature operation	-25 °C ... +55 °C											
Ambient temperature storage	-40 °C ... +70 °C											
Weight	Approx. 80 g											
	Approx. 30 g											
Housing material	ABS, acrylonitrile butadiene styrene											

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⁾ ± 10 %

⁴⁾ may not exceed or fall short of

V_s tolerances




⁵⁾ without load

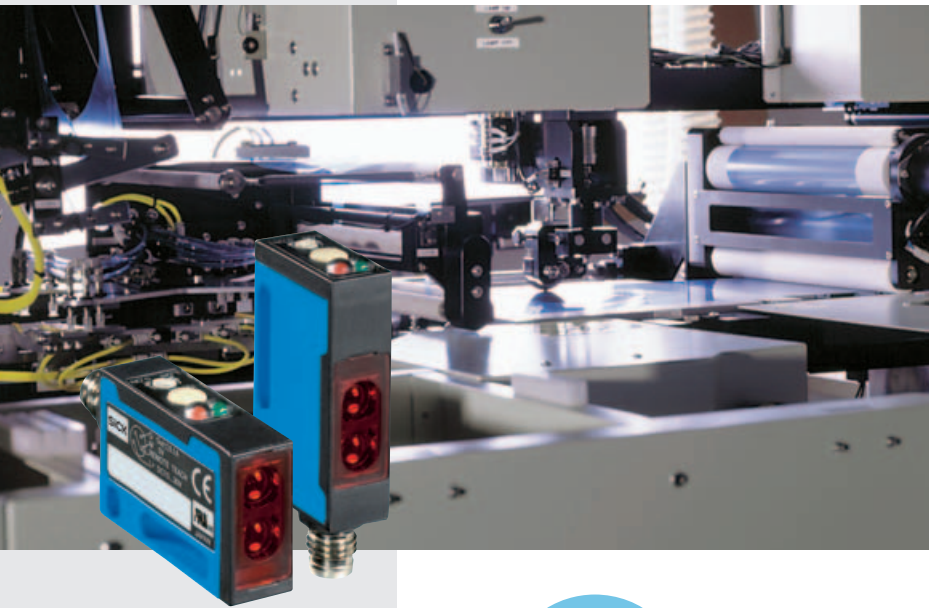
⁶⁾ do not bend below 0 °C


Ordering information

Type	Order no.
WLL160T-E132	6 010 648
WLL160T-E430	6 010 649
WLL160T-F132	6 010 650
WLL160T-F430	6 010 651

W160T: With the smallest LED light spot

	BGS Photoelectric proximity switches
	Photoelectric proximity switches mark sensor
	Photoelectric proximity switches energetic



	Photoelectric reflex switches
--	--------------------------------------

System focal points are small, precise light spot for small objects, including transparent ones, and high-speed applications. Teach-in function – external or at the push of a button – with high precision simplifies handling. Sturdy, sealed-in housing enables use even under difficult ambient conditions. The W160T even fits in small spaces thanks to its compact design. This makes it especially easy to mount. All W160T variants are available in two housing models with axial or 90° light emission.

WTM160T “Mark”, the spot sensor for fast detection of colour contrasts. It resolves ten gray levels and colour changes in the spectral range HKS 33 N to 88 N.

WTB160T “BGS” in two variants with precise background suppression: it focuses at a range of up to 50 mm or larger ranges up to 150 mm with additional Teach-in mode for shiny and irregular surfaces.

WL160T, the photoelectric reflex switch with red light and 1 m scanning range is ideal for detecting smaller and (semi-)transparent objects.

WTF160T “Focus”, an energetic scanner with focused light beam for detecting contrasts and smaller parts over larger distances.

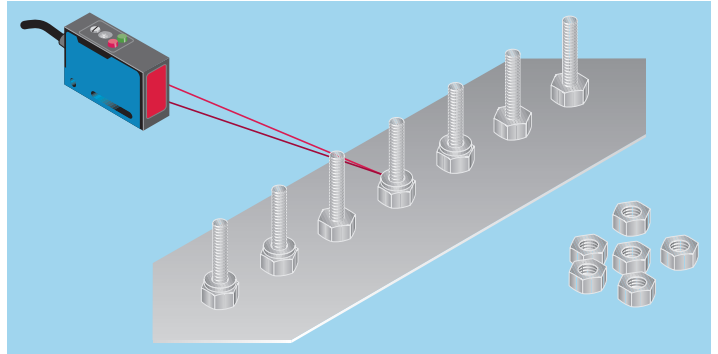
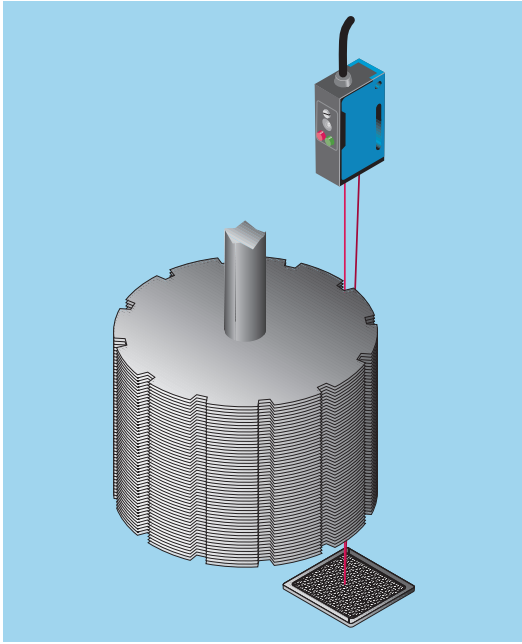
WTE160T “Energetic”, an energetic scanner with large scanning ranges, available in infrared and red light models.

The W160T devices are especially successful in the application fields:

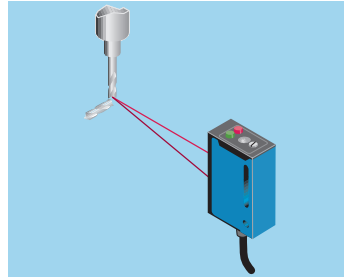
- Electronics and semiconductor manufacturing,
- Packaging and graphic arts industries,
- Assembly and handling (Pick & Place),
- Special mechanical engineering tasks.

Applications

▶ The WL160T photoelectric proximity switch detects the position of bundles of sheet metal and individual sheets of a rotor.



▲ WTB160T BGS detects the presence of washers, gasket rings and o-rings.



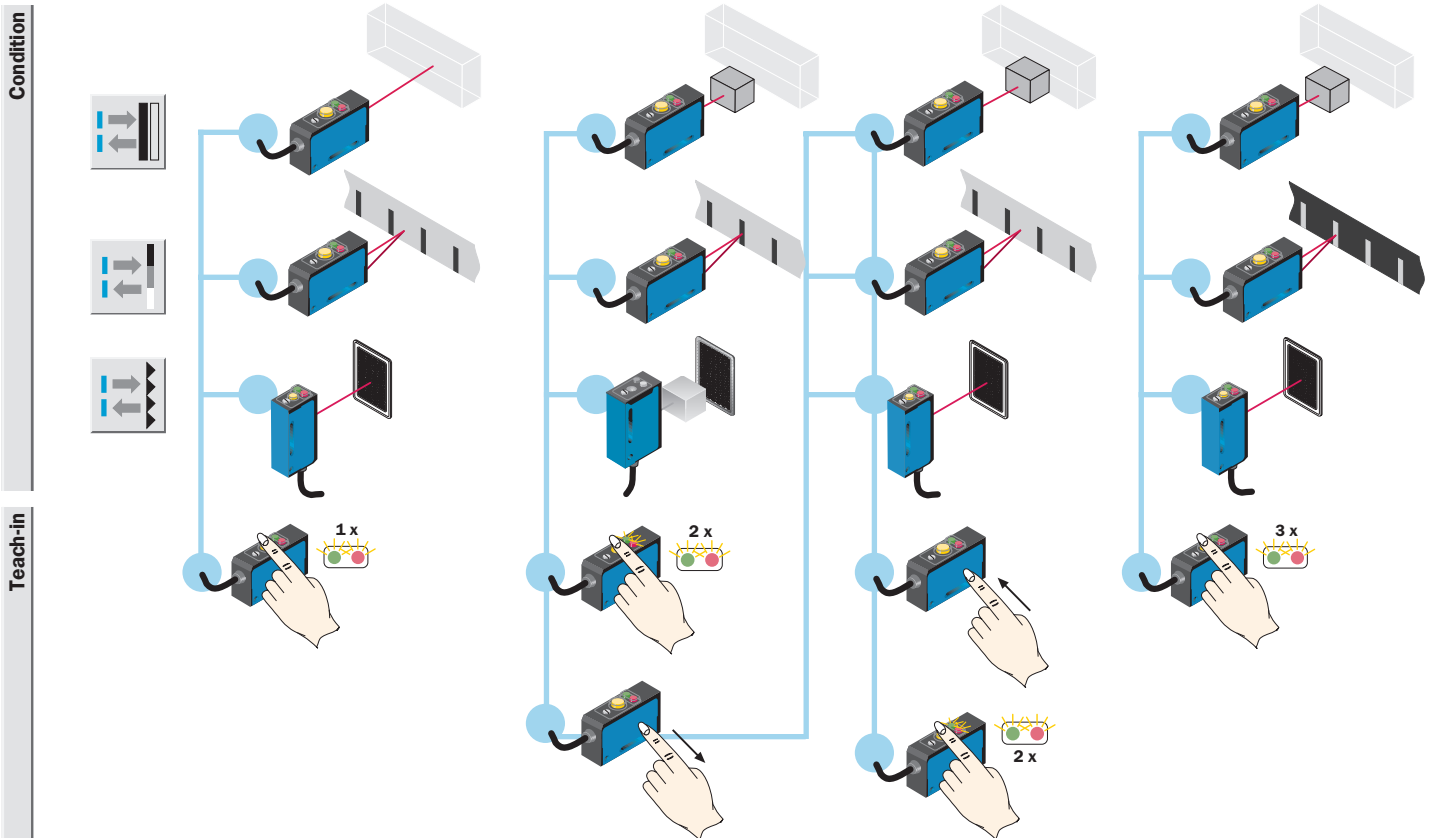
◀ Monitoring of tool imprints, e.g., in printed circuit board manufacturing. The WTB160T BGS detects the smallest drills reliably down to 0.3 mm diameter.

Teach-in

1-point Teach-in:

2-point Teach-in:

Position Teach-in



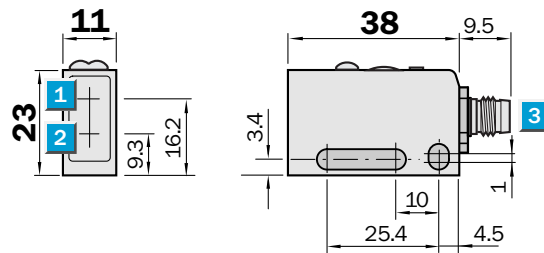
Condition	1-point Teach-in:	2-point Teach-in:	Position Teach-in
Background will <i>just not</i> be detected.	Sensitivity aligned to the centre between the two teach-in points.	Object will <i>just</i> be detected.	
Dark mark will <i>just not</i> be detected.	Sensitivity aligned to the centre between the two teach-in points.	Light mark will <i>just</i> be detected.	
Reflector is detected <i>with reserve</i> .	Sensitivity aligned to the centre between the two teach-in points.	Reflector is detected <i>without reserve</i> .	

Scanning distance
15 ... 50 mm

Photoelectric proximity switch

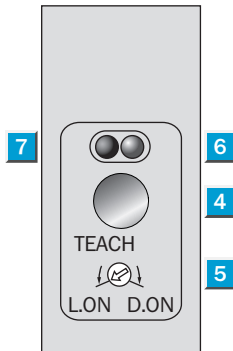
- Horizontal models
- Very small light spot to detect smallest objects
- Scanning distance adjustable via teach-in
- Precise background suppression
- LED indicator: function reserve

Dimensional drawing



Adjustments possible

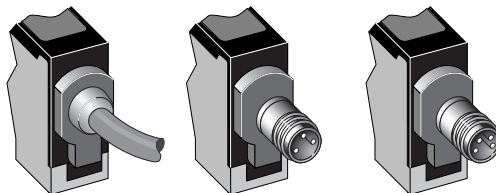
All types



- 1 Centre of optical axis, receiver
- 2 Centre of optical axis, sender
- 3 Plug M8, 3/4-pin or connection cable
- 4 Teach-in button
- 5 Light/dark rotary switch:
L = light switching
D = dark switching
- 6 LED indicator orange: switching output active
- 7 LED indicator green: light reception with operating reserve > 1.1

Connection type

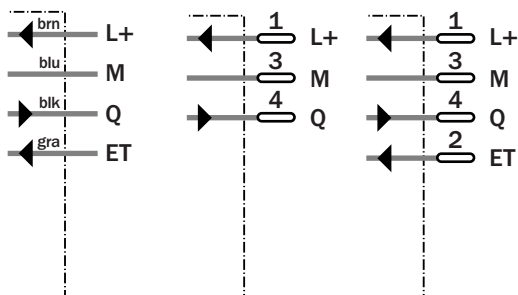
WTB160T-P212	WTB160T-P311	WTB160T-P412
WTB160T-N212	WTB160T-N311	WTB160T-N412



4 x 0.2 mm²

3-pin, M8

4-pin, M8



See chapter Accessories

Cables and connectors

Mounting systems *

* Mounting bracket included with delivery

Technical data		WTB160T-	P212	P311	P412	N212	N311	N412				
Scanning distance, max. typical	10 ... 50 mm ¹⁾											
Operating distance	15 ... 50 mm ¹⁾											
Adjustment of operating distance	Teach-in											
External Teach (ET)												
Light source ²⁾	LED, red light, 650 nm											
Light spot diameter	Approx. 1.2 mm at 40 mm distance											
Dispersion angle	Focused, focus 40 mm											
Supply voltage V _S	10 ... 30 V DC ³⁾											
Residual ripple ⁴⁾	± 10 %											
Current consumption ⁵⁾	≤ 40 mA											
Switching outputs	PNP, open collector: Q NPN, open collector: Q											
Signal voltage PNP HIGH / LOW	V _S - 1.8 V / approx. 0 V											
Signal voltage NPN HIGH / LOW	Approx. V _S / < 1.8 V											
Switching mode, adjustable	Light/dark switching per rotary switch											
Output current I _A max.	100 mA											
Response time ⁶⁾	≤ 0.9 ms											
Switching frequency max. ⁷⁾	550/s											
Connection type: cable	PVC, 2 m ⁸⁾ ; 4 x 0.2 mm ² , ø 4.2 mm											
plug	M8, 3-pin											
plug	M8, 4-pin											
VDE protection class	⊕											
Circuit protection ⁹⁾	A, B, C, D											
Enclosure rating	IP 67 / IP 69K											
Ambient temperature	Operation -25 ... +55 °C Storage -40 ... +70 °C											
Weight	With cable 2 m approx. 60 g With plug M8 approx. 20 g											
Housing form	Horizontal											
Housing material	Housing: PBT; Optic: PMMA											

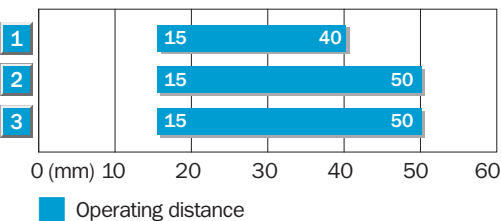
1) Object with 90% remission (with reference to standard white according to DIN 5033)
2) Average service life 100,000 h at T_A = +25 °C

3) Limit values, operation in short circuit protected network max. 8 A
4) Must be within V_S tolerances
5) Without load
6) With resistive load

7) With light/dark ratio 1:1
8) 5 m are available on request, do not bend cable below 0 °C
9) A = V_S connections reverse-polarity protected

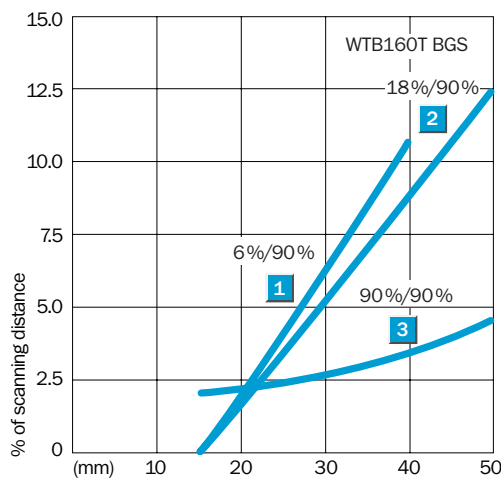
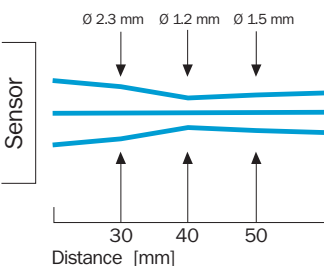
B = Inputs and outputs reverse-polarity protected
C = Interference suppression
D = Outputs overcurrent and short-circuit protected

Scanning distance



- 1 Scanning range on black, 6 % reflectance
- 2 Scanning range on grey, 18 % reflectance
- 3 Scanning range on white, 90 % reflectance

Light spot diameter WTB160T HGA



Order information

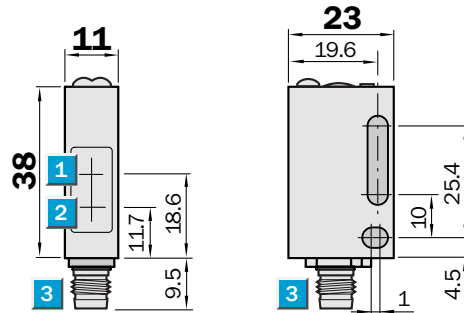
Type	Order no.
WTB160T-P212	6020895
WTB160T-P311	6021318
WTB160T-P412	6020991
WTB160T-N212	6020894
WTB160T-N311	6021319
WTB160T-N412	6020947

Scanning distance
15 ... 50 mm

Photoelectric proximity switch

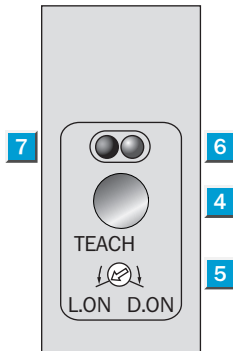
- Vertical models
- Very small light spot to detect smallest objects
- Scanning distance adjustable via teach-in
- Precise background suppression
- LED indicator: function reserve

Dimensional drawing



Adjustments possible

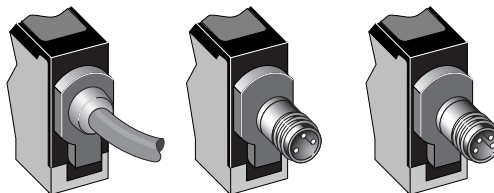
All types



- 1 Centre of optical axis, receiver
- 2 Centre of optical axis, sender
- 3 Plug M8, 3/4-pin or connection cable
- 4 Teach-in button
- 5 Light/dark rotary switch:
L = light switching
D = dark switching
- 6 LED indicator orange: switching output active
- 7 LED indicator green: light reception with operating reserve > 1.1

Connection type

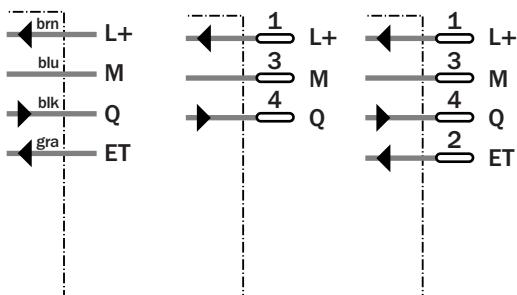
WTB160T-F212	WTB160T-F311	WTB160T-F412
WTB160T-E212	WTB160T-E311	WTB160T-E412



4 x 0.2 mm²

3-pin, M8

4-pin, M8



See chapter Accessories

Cables and connectors

Mounting systems *

* Mounting bracket included with delivery

Technical data		WTB160T-	F212	F311	F412	E212	E311	E412				
Scanning distance, max. typical	10 ... 50 mm ¹⁾											
Operating distance	15 ... 50 mm ¹⁾											
Adjustment of operating distance	Teach-in											
External Teach (ET)												
Light source ²⁾	LED, red light, 650 nm											
Light spot diameter	Approx. 1.2 mm at 40 mm distance											
Dispersion angle	Focused, Focus 40 mm											
Supply voltage V _S	10 ... 30 V DC ³⁾											
Residual ripple ⁴⁾	± 10 %											
Current consumption ⁵⁾	≤ 40 mA											
Switching outputs	PNP, open collector: Q NPN, open collector: Q											
Signal voltage PNP HIGH / LOW	V _S - 1.8 V / approx. 0 V											
Signal voltage NPN HIGH / LOW	Approx. V _S / < 1.8 V											
Switching mode, adjustable	Light/dark switching per rotary switch											
Output current I _A max.	100 mA											
Response time ⁶⁾	≤ 0.9 ms											
Switching frequency max. ⁷⁾	550/s											
Connection type: cable	PVC, 2 m ⁸⁾ ; 4 x 0.2 mm ² , Ø 4.2 mm											
plug	M8, 3-pin											
plug	M8, 4-pin											
VDE protection class	⊠											
Circuit protection ⁹⁾	A, B, C, D											
Enclosure rating	IP 67 / IP 69K											
Ambient temperature	Operation -25 ... +55 °C Storage -40 ... +70 °C											
Weight	With cable 2 m approx. 60 g With plug M8 approx. 20 g											
Housing form	Vertical											
Housing material	Housing: PBT; Optic: PMMA											

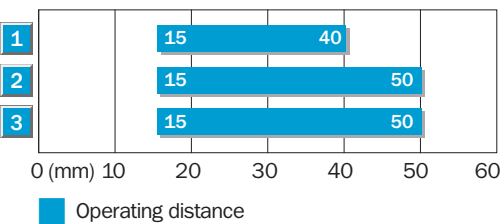
1) Object with 90% remission (with reference to standard white according to DIN 5033)
2) Average service life 100,000 h at T_A = +25 °C

3) Limit values, operation in short circuit protected network max. 8 A
4) Must be within V_S tolerances
5) Without load
6) With resistive load

7) With light/dark ratio 1:1
8) 5 m are available on request, do not bend cable below 0 °C
9) A = V_S connections reverse-polarity protected

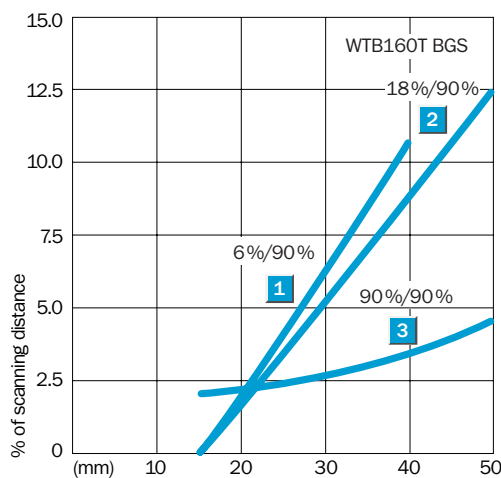
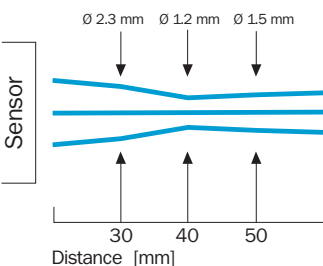
B = Inputs and outputs reverse-polarity protected
C = Interference suppression
D = Outputs overcurrent and short-circuit protected

Scanning distance



- 1 Scanning range on black, 6 % reflectance
- 2 Scanning range on grey, 18 % reflectance
- 3 Scanning range on white, 90 % reflectance

Light spot diameter WTB160T HGA



Order information

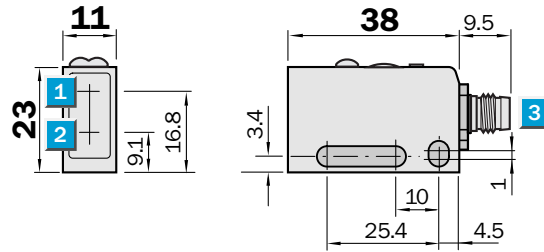
Type	Order no.
WTB160T-F212	6020952
WTB160T-F311	6021316
WTB160T-F412	6021158
WTB160T-E212	6020951
WTB160T-E311	6021317
WTB160T-E412	6021157

Scanning distance
50 ... 150 mm

Photoelectric proximity switch

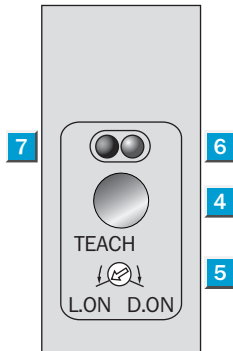
- Horizontal models
- Large scanning distance (150 mm)
- Additional teach-in mode for shiny and structured surfaces
- LED indicator: function reserve

Dimensional drawing



Adjustments possible

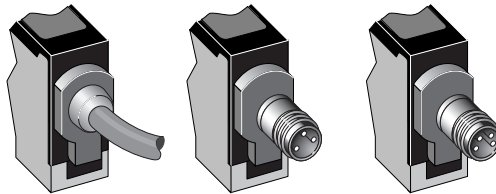
All types



- Centre of optical axis, receiver
- Centre of optical axis, sender
- Plug M8, 3/4-pin or connection cable
- Teach-in button
- Light/dark rotary switch:
L = light switching
D = dark switching
- LED indicator orange: switching output active
- LED indicator green: light reception with operating reserve > 1.1

Connection type

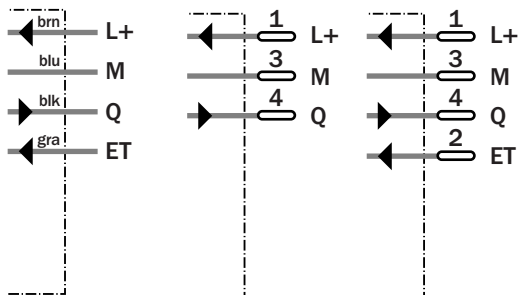
WTB160T-P232	WTB160T-P331	WTB160T-P432
WTB160T-N232	WTB160T-N331	WTB160T-N432



4 x 0.2 mm²

3-pin, M8

4-pin, M8



See chapter Accessories

Cables and connectors

Mounting systems *

* Mounting bracket included with delivery

Technical data		WTB160T-	P232	P331	P432	N232	N331	N432				
Scanning distance, max. typical	20 ... 150 mm ¹⁾											
Operating distance	50 ... 150 mm ¹⁾											
Adjustment of operating distance	Teach-in											
External Teach (ET)												
Light source ²⁾	LED, red light, 700 nm											
Light spot diameter	10 mm at 150 mm distance											
Supply voltage V _S	10 ... 30 V DC ³⁾											
Residual ripple ⁴⁾	± 10 %											
Current consumption ⁵⁾	≤ 45 mA											
Switching outputs	PNP, open collector: Q NPN, open collector: Q											
Signal voltage PNP HIGH / LOW	V _S - 1.8 V / approx. 0 V											
Signal voltage NPN HIGH / LOW	Approx. V _S / < 1.8 V											
Switching mode, adjustable	Light/dark switching per rotary switch											
Output current I _A max.	100 mA											
Response time ⁶⁾	≤ 2.5 ms											
Switching frequency max. ⁷⁾	200/s											
Connection type: cable	PVC, 2 m ⁸⁾ ; 4 x 0.2 mm ² , ∅ 4.2 mm											
plug	M8, 3-pin											
plug	M8, 4-pin											
VDE protection class	⊕											
Circuit protection ⁹⁾	A, B, C, D											
Enclosure rating	IP 67 / IP 69K											
Ambient temperature	Operation -25 ... +55 °C Storage -40 ... +70 °C											
Weight	With cable 2 m approx. 60 g With plug M8 approx. 20 g											
Housing form	Horizontal											
Housing material	Housing: PBT; Optic: PMMA											

1) Object with 90% remission (with reference to standard white according to DIN 5033)
2) Average service life 100,000 h at T_A = +25 °C

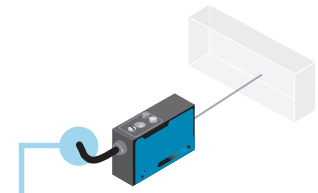
3) Limit values, operation in short circuit protected network max. 8 A
4) Must be within V_S tolerances
5) Without load
6) With resistive load

7) With light/dark ratio 1:1
8) 5 m are available on request, do not bend cable below 0 °C
9) A = V_S connections reverse-polarity protected

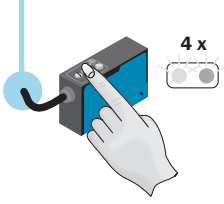
B = Inputs and outputs reverse-polarity protected
C = Interference suppression
D = Outputs overcurrent and short-circuit protected

FGS Teach-in

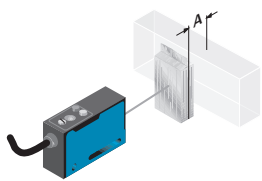
Condition



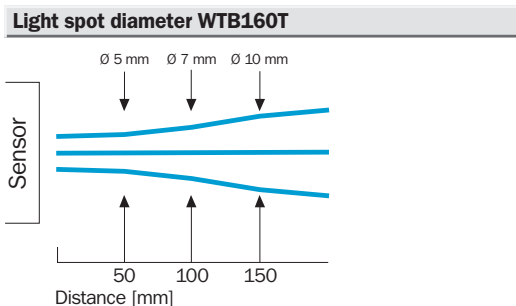
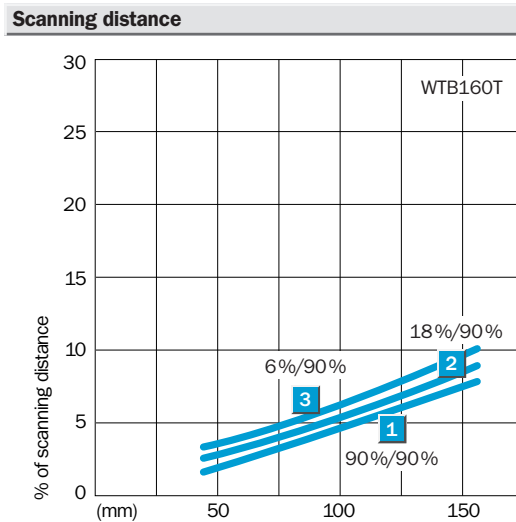
Teach-in



Status



Object in "A" area is detected.



Order information

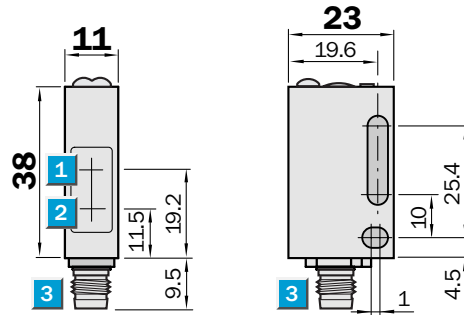
Type	Order no.
WTB160T-P232	6021868
WTB160T-P331	6021867
WTB160T-P432	6021870
WTB160T-N232	6021872
WTB160T-N331	6021871
WTB160T-N432	6021874

Scanning distance
50 ... 150 mm

Photoelectric proximity switch

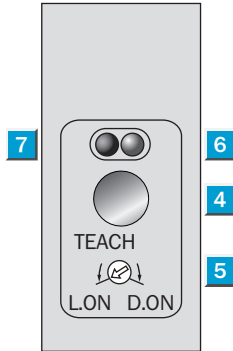
- Vertical models
- Large scanning distance (150 mm)
- Additional teach-in mode for shiny and structured surfaces
- LED indicator: function reserve

Dimensional drawing



Adjustments possible

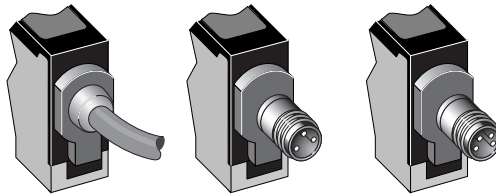
All types



- 1 Centre of optical axis, receiver
- 2 Centre of optical axis, sender
- 3 Plug M8, 3/4-pin or connection cable
- 4 Teach-in button
- 5 Light/dark rotary switch:
L = light switching
D = dark switching
- 6 LED indicator orange: switching output active
- 7 LED indicator green: light reception with operating reserve > 1.1

Connection type

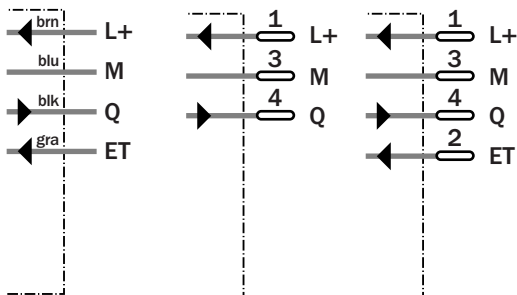
WTB160T-F232	WTB160T-F331	WTB160T-F432
WTB160T-E232	WTB160T-E331	WTB160T-E432



4 x 0.2 mm²

3-pin, M8

4-pin, M8



See chapter Accessories

Cables and connectors

Mounting systems *

* Mounting bracket included with delivery

Technical data		WTB160T-	F232	F331	F432	E232	E331	E432				
Scanning distance, max. typical	20 ... 150 mm ¹⁾											
Operating distance	50 ... 150 mm ¹⁾											
Adjustment of operating distance	Teach-in											
External Teach (ET)												
Light source ²⁾	LED, red light, 700 nm											
Light spot diameter	10 mm at 150 mm distance											
Supply voltage V _S	10 ... 30 V DC ³⁾											
Residual ripple ⁴⁾	± 10 %											
Current consumption ⁵⁾	≤ 45 mA											
Switching outputs	PNP, open collector: Q NPN, open collector: Q											
Signal voltage PNP HIGH / LOW	V _S - 1.8 V / approx. 0 V											
Signal voltage NPN HIGH / LOW	Approx. V _S / < 1.8 V											
Switching mode, adjustable	Light/dark switching per rotary switch											
Output current I _A max.	100 mA											
Response time ⁶⁾	≤ 2.5 ms											
Switching frequency max. ⁷⁾	200/s											
Connection type: cable	PVC, 2 m ⁸⁾ ; 4 x 0.2 mm ² , Ø 4.2 mm											
plug	M8, 3-pin											
plug	M8, 4-pin											
VDE protection class	⊕											
Circuit protection ⁹⁾	A, B, C, D											
Enclosure rating	IP 67 / IP 69K											
Ambient temperature	Operation -25 ... +55 °C Storage -40 ... +70 °C											
Weight	With cable 2 m approx. 60 g With plug M8 approx. 20 g											
Housing form	Vertical											
Housing material	Housing: PBT; Optic: PMMA											

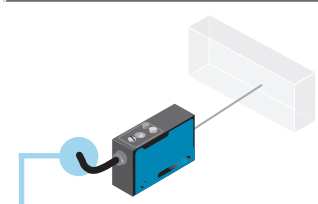
1) Object with 90% remission (with reference to standard white according to DIN 5033)
2) Average service life 100,000 h at T_A = +25 °C

3) Limit values, operation in short circuit protected network max. 8 A
4) Must be within V_S tolerances
5) Without load
6) With resistive load

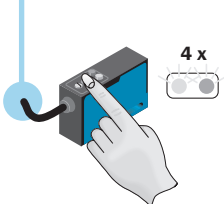
7) With light/dark ratio 1:1
8) 5 m are available on request, do not bend cable below 0 °C
9) A = V_S connections reverse-polarity protected

B = Inputs and outputs reverse-polarity protected
C = Interference suppression
D = Outputs overcurrent and short-circuit protected

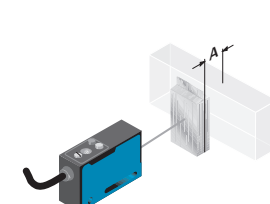
Condition



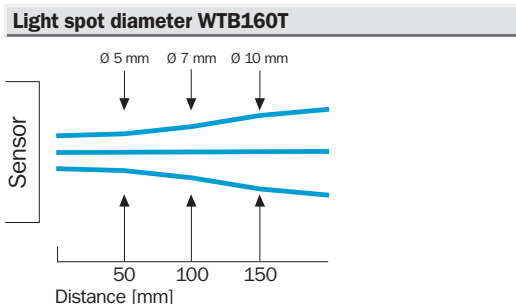
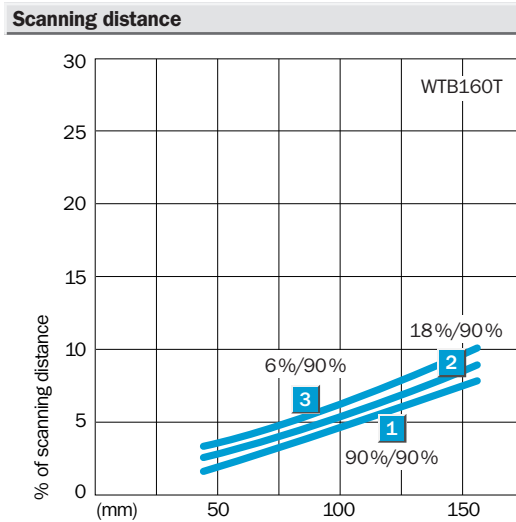
Teach-in



Status



Object in "A" area is detected.



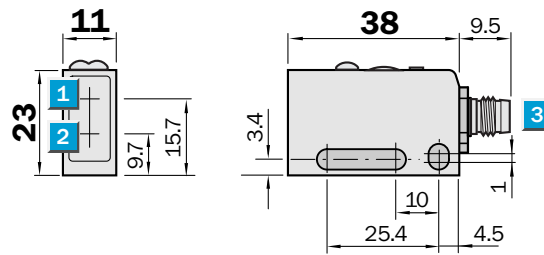
Order information

Type	Order no.
WTB160T-F232	6021860
WTB160T-F331	6021859
WTB160T-F432	6021862
WTB160T-E232	6021864
WTB160T-E331	6021863
WTB160T-E432	6021866

Scanning distance
10 mm
 Photoelectric proximity switch

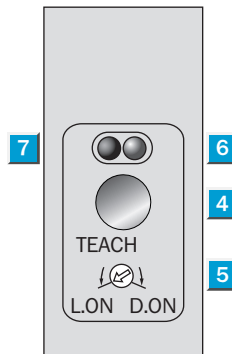
- Horizontal models
- Mark sensor
- Enclosure rating: IP 67
- Resolves ten gray levels
- LED indicator: function reserve

Dimensional drawing



Adjustments possible

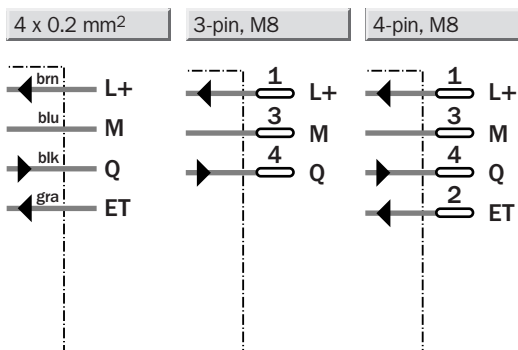
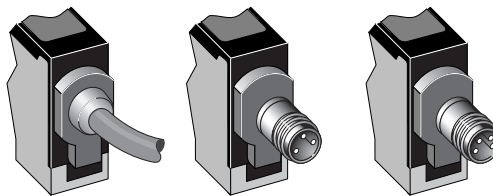
All types



- 1 Centre of optical axis, receiver
- 2 Centre of optical axis, sender
- 3 Plug M8, 3/4-pin or connection cable
- 4 Teach-in button
- 5 Light/dark rotary switch:
L = light switching
D = dark switching
- 6 LED indicator orange: switching output active
- 7 LED indicator green: light reception with operating reserve > 1.1

Connection type

WTM160T-P292	WTM160T-P391	WTM160T-P492
WTM160T-N292	WTM160T-N391	WTM160T-N492



See chapter Accessories

Cables and connectors

Mounting systems *

* Mounting bracket included with delivery

Technical data		WTM160T-	P292	P391	P492	N292	N391	N492				
Operating distance	10 ± 2 mm											
Adjustment of operating distance	Teach-in											
External Teach (ET)												
Light source¹⁾	LED, green light, 540 nm											
Light spot diameter	Approx. 2 x 5 mm at 10 mm distance											
Dispersion angle sender	Focused, focus 10 mm											
Supply voltage V_S	10 ... 30 V DC ²⁾											
Residual ripple ³⁾	± 10 %											
Current consumption ⁴⁾	≤ 40 mA											
Switching outputs	PNP, open collector: Q											
	NPN, open collector: Q											
Signal voltage PNP HIGH / LOW	V _S - 1.8 V / approx. 0 V											
Signal voltage NPN HIGH / LOW	Approx. V _S / < 1.8 V											
Switching mode, adjustable	Light/dark switching per rotary switch											
Output current I _A max.	100 mA											
Response time ⁵⁾	≤ 0.2 ms											
Switching frequency max. ⁶⁾	2500/s											
Connection type: cable	PVC, 2 m ⁷⁾ ; 4 x 0.2 mm ² , ø 4.2 mm											
plug	M8, 3-pin											
plug	M8, 4-pin											
VDE protection class	⏏											
Circuit protection ⁸⁾	A, B, C, D											
Enclosure rating	IP 67 / IP 69K											
Ambient temperature	Operation - 25 ... + 55 °C											
	Storage - 40 ... + 70 °C											
Weight	With cable 2 m approx. 60 g											
	With plug M8 approx. 20 g											
Housing form	Horizontal											
Housing material	Housing: PBT; Optic: PMMA											

1) Average service life 100,000 h at T_A = + 25 °C
 2) Limit values, operation in short circuit protected network max. 8 A
 3) Must be within V_S tolerances

4) Without load
 5) With resistive load
 6) With light/dark ratio 1:1
 7) 5 m are available on request, do not bend cable below 0 °C

8) A = V_S connections reverse-polarity protected
 B = Inputs and outputs reverse-polarity protected
 C = Interference suppression
 D = Outputs overcurrent and short-circuit protected

Colour detection

Detection of colour changes in the spectral range HKS ¹¹⁾ 33 N (violet) to 88 N (black) from 25 % to 100 %. The orange LED or the green and orange LEDs light when there is detection.

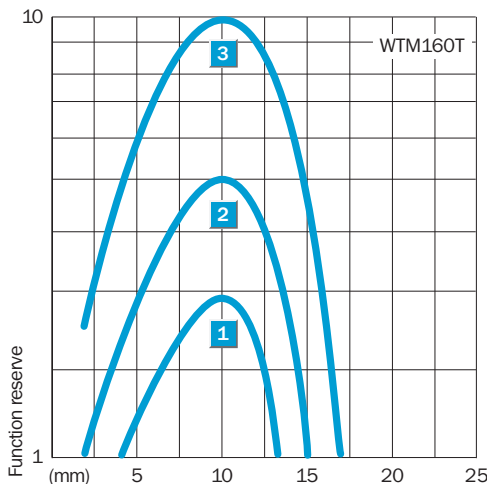
The following are not resolved:
 33 N (25 %)/88 N (25 %),
 33 N (25 %)/77 N (25 %),
 33 N (25 %)/23 N (25 %),
 43 N (50 %)/54 N (75 %),
 43 N (25 %)/77 N (25 %),
 43 N (25 %)/8 N (25 %),
 54 N (50 %)/4 N (75 %), and
 23 N (25 %)/77 N (25 %).

- 88 N: black
- 77 N: brown
- 23 N: red
- 8 N: orange
- 4 N: yellow
- 54 N: green
- 47 N: light blue
- 43 N: dark blue
- 33 N: violet

¹¹⁾ HKS ≙ Hostmann-Steinberg, K+E printing inks, Schminke & Co. HKS colours are printing inks, which were developed by the above-mentioned companies, to guarantee the precise reproducibility of a colour. They are standard in the graphic arts industry. HKS-N stands for uncoated paper in offset and letterpress printing with a colour spectrum of 1 (yellow) to 97 (black). The colour scale is available from SICK upon request. Order no.: 8006387.


Scanning distance

- 1 Scanning range on black, 6 % reflectance
- 2 Scanning range on grey, 18 % reflectance
- 3 Scanning range on white, 90 % reflectance



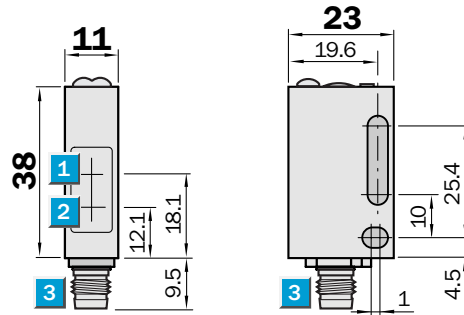
Order information

Type	Order no.
WTM160T-P292	6020493
WTM160T-P391	6021506
WTM160T-P492	6020495
WTM160T-N292	6020492
WTM160T-N391	6021382
WTM160T-N492	6020494


Scanning distance
10 mm
Photoelectric proximity switch

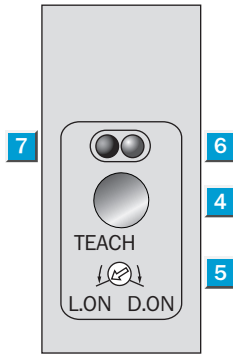
- Vertical models
- Mark sensor
- Enclosure rating: IP 67
- Resolves ten gray levels
- LED indicator: function reserve

Dimensional drawing



Adjustments possible

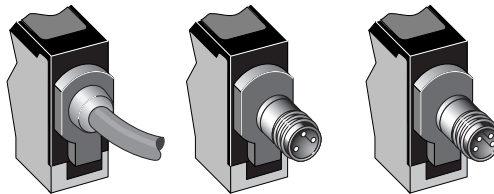
All types



- 1** Centre of optical axis, receiver
- 2** Centre of optical axis, sender
- 3** Plug M8, 3/4-pin or connection cable
- 4** Teach-in button
- 5** Light/dark rotary switch:
L = light switching
D = dark switching
- 6** LED indicator orange: switching output active
- 7** LED indicator green: light reception with operating reserve > 1.1

Connection type

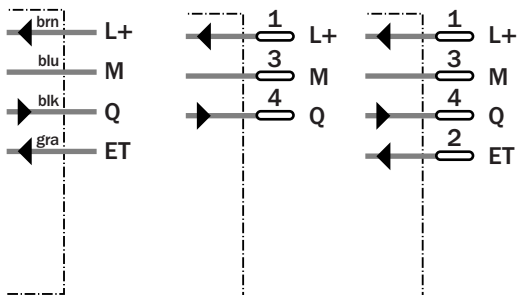
WTM160T-F292	WTM160T-F391	WTM160T-F492
WTM160T-E292	WTM160T-E391	WTM160T-E492



4 x 0.2 mm²

3-pin, M8

4-pin, M8



See chapter Accessories

Cables and connectors

Mounting systems *

* Mounting bracket included with delivery

Technical data		WTM160T-	F292	F391	F492	E292	E391	E492				
Operating distance	10 ± 2 mm											
Adjustment of operating distance	Teach-in											
External Teach (ET)												
Light source¹⁾	LED, green light, 540 nm											
Light spot diameter	Approx. 2 x 5 mm at 10 mm distance											
Dispersion angle sender	Focused, focus 10 mm											
Supply voltage V_S	10 ... 30 V DC ²⁾											
Residual ripple ³⁾	± 10 %											
Current consumption ⁴⁾	≤ 40 mA											
Switching outputs	PNP, open collector: Q											
	NPN, open collector: Q											
Signal voltage PNP HIGH / LOW	V _S - 1.8 V / approx. 0 V											
Signal voltage NPN HIGH / LOW	Approx. V _S / < 1.8 V											
Switching mode, adjustable	Light/dark switching per rotary switch											
Output current I _A max.	100 mA											
Response time ⁵⁾	≤ 0.2 ms											
Switching frequency max. ⁶⁾	2500/s											
Connection type: cable	PVC, 2 m ⁷⁾ ; 4 x 0.2 mm ² , ø 4.2 mm											
plug	M8, 3-pin											
plug	M8, 4-pin											
VDE protection class	⏏											
Circuit protection ⁸⁾	A, B, C, D											
Enclosure rating	IP 67 / IP 69K											
Ambient temperature	Operation - 25 ... + 55 °C											
	Storage - 40 ... + 70 °C											
Weight	With cable 2 m approx. 60 g											
	With plug M8 approx. 20 g											
Housing form	Vertical											
Housing material	Housing: PBT; Optic: PMMA											

1) Average service life 100,000 h at T_A = + 25 °C
 2) Limit values, operation in short circuit protected network max. 8 A
 3) Must be within V_S tolerances

4) Without load
 5) With resistive load
 6) With light/dark ratio 1:1
 7) 5 m are available on request, do not bend cable below 0 °C

8) A = V_S connections reverse-polarity protected
 B = Inputs and outputs reverse-polarity protected
 C = Interference suppression

D = Outputs overcurrent and short-circuit protected

Colour detection

Detection of colour changes in the spectral range HKS ¹¹⁾ 33 N (violet) to 88 N (black) from 25 % to 100 %. The orange LED or the green and orange LEDs light when there is detection.

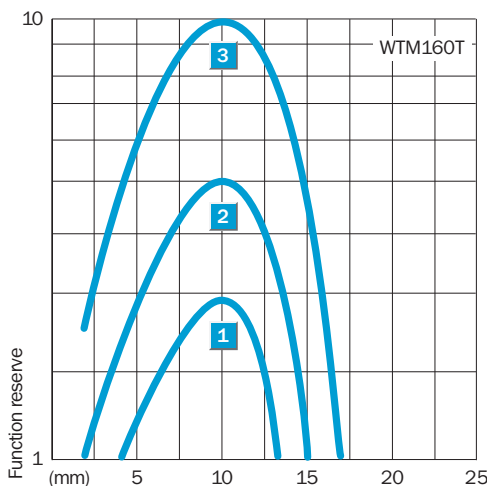
The following are not resolved:
 33 N (25 %)/88 N (25 %),
 33 N (25 %)/77 N (25 %),
 33 N (25 %)/23 N (25 %),
 43 N (50 %)/54 N (75 %),
 43 N (25 %)/77 N (25 %),
 43 N (25 %)/8 N (25 %),
 54 N (50 %)/4 N (75 %), and
 23 N (25 %)/77 N (25 %).

88 N: black
 77 N: brown
 23 N: red
 8 N: orange
 4 N: yellow
 54 N: green
 47 N: light blue
 43 N: dark blue
 33 N: violet

¹¹⁾ HKS ≙ Hostmann-Steinberg, K+E printing inks, Schminke & Co. HKS colours are printing inks, which were developed by the above-mentioned companies, to guarantee the precise reproducibility of a colour. They are standard in the graphic arts industry. HKS-N stands for uncoated paper in offset and letterpress printing with a colour spectrum of 1 (yellow) to 97 (black). The colour scale is available from SICK upon request. Order no.: 8006387.

Scanning distance

- 1 Scanning range on black, 6 % reflectance
- 2 Scanning range on grey, 18 % reflectance
- 3 Scanning range on white, 90 % reflectance



Order information

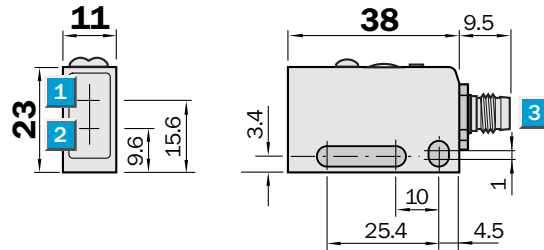
Type	Order no.
WTM160T-F292	6020671
WTM160T-F391	6021351
WTM160T-F492	6020785
WTM160T-E292	6020667
WTM160T-E391	6021505
WTM160T-E492	6020695

Scanning distance
5 ... 120 mm

Photoelectric proximity switch

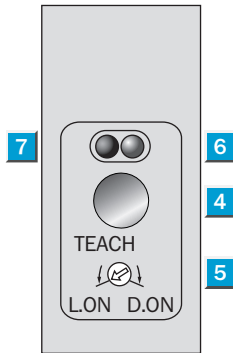
- Horizontal models
- Detects small objects and contrast differences at a large distance (100 mm)
- Focused light beam
- LED indicator: function reserve

Dimensional drawing



Adjustments possible

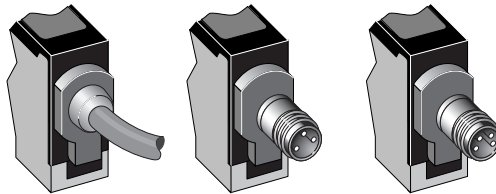
All types



- 1 Centre of optical axis, receiver
- 2 Centre of optical axis, sender
- 3 Plug M8, 3/4-pin or connection cable
- 4 Teach-in button
- 5 Light/dark rotary switch:
L = light switching
D = dark switching
- 6 LED indicator orange: switching output active
- 7 LED indicator green: light reception with operating reserve > 1.1

Connection type

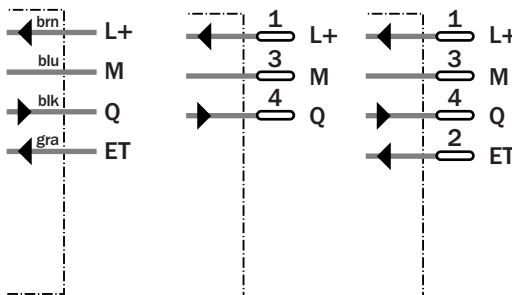
WTF160T-P212	WTF160T-P311	WTF160T-P412
WTF160T-N212	WTF160T-N311	WTF160T-N412



4 x 0.2 mm²

3-pin, M8

4-pin, M8



See chapter Accessories

Cables and connectors

Mounting systems *

* Mounting bracket included with delivery

Technical data		WTF160T-	P212	P311	P412	N212	N311	N412				
Scanning distance , max. typical	4 ... 120 mm ¹⁾											
Operating distance	5 ... 100 mm ¹⁾											
Sensitivity control	Teach-in											
External Teach (ET)												
Light source ²⁾	LED, red light, 650 nm											
Light spot diameter	Approx. 1 mm at 80 mm distance											
Dispersion angle	Focused, Focus 80 mm											
Supply voltage VS	10 ... 30 V DC ³⁾											
Residual ripple ⁴⁾	± 10 %											
Current consumption ⁵⁾	≤ 40 mA											
Switching outputs	PNP, open collector: Q NPN, open collector: Q											
Signal voltage PNP HIGH / LOW	V _S - 1.8 V / approx. 0 V											
Signal voltage NPN HIGH / LOW	Approx. V _S / < 1.8 V											
Switching mode, adjustable	Light/dark switching per rotary switch											
Output current I _A max.	100 mA											
Response time ⁶⁾	≤ 0.5 ms											
Switching frequency max. ⁷⁾	1000/s											
Connection type: cable	PVC, 2 m ⁸⁾ ; 4 x 0.2 mm ² , ø 4.2 mm											
plug	M8, 3-pin											
plug	M8, 4-pin											
VDE protection class	⏏											
Circuit protection ⁹⁾	A, B, C, D											
Enclosure rating	IP 67 / IP 69K											
Ambient temperature	Operation -25 ... +55 °C Storage -40 ... +70 °C											
Weight	With cable 2 m approx. 60 g With plug M8 approx. 20 g											
Housing form	Horizontal											
Housing material	Housing: PBT; Optic: PMMA											

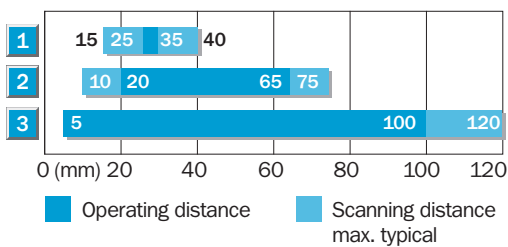
1) Object with 90% remission (with reference to standard white according to DIN 5033)
2) Average service life 100,000 h at T_A = +25 °C

3) Limit values, operation in short circuit protected network max. 8 A
4) Must be within V_S tolerances
5) Without load
6) With resistive load

7) With light/dark ratio 1:1
8) 5 m are available on request, do not bend cable below 0 °C
9) A = V_S connections reverse-polarity protected

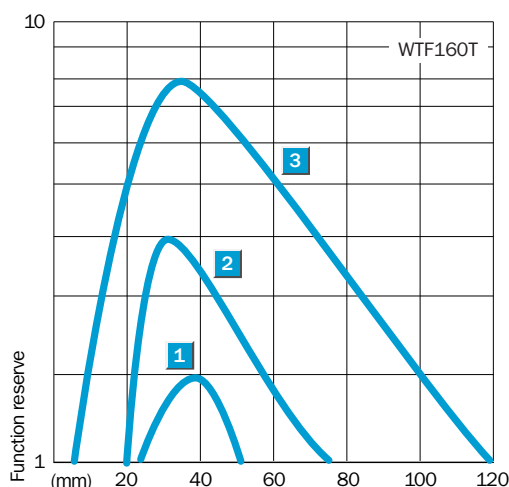
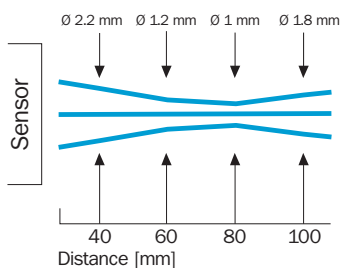
B = Inputs and outputs reverse-polarity protected
C = Interference suppression
D = Outputs overcurrent and short-circuit protected

Scanning distance




- 1 Scanning range on black, 6 % reflectance
- 2 Scanning range on grey, 18 % reflectance
- 3 Scanning range on white, 90 % reflectance

Light spot diameter WTF160T



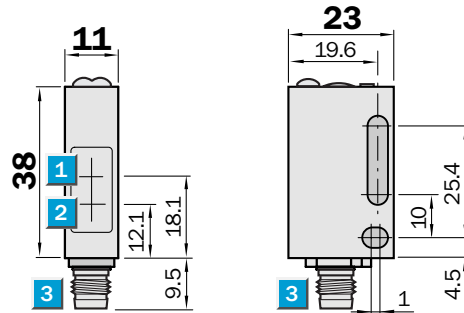
Order information

Type	Order no.
WTF160T-P212	6021135
WTF160T-P311	6020942
WTF160T-P412	6021237
WTF160T-N212	6021286
WTF160T-N311	6021272
WTF160T-N412	6021290


Scanning distance
 5 ... 120 mm
 Photoelectric proximity switch

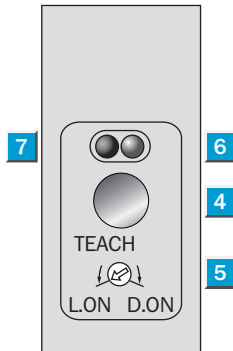
- Vertical models
- Detects small objects and contrast differences at a large distance (100 mm)
- Focused light beam
- LED indicator: function reserve

Dimensional drawing



Adjustments possible

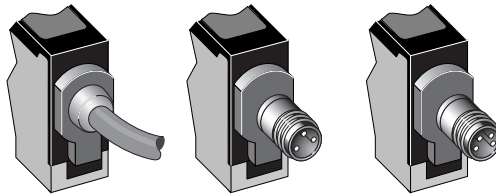
All types



- 1 Centre of optical axis, receiver
- 2 Centre of optical axis, sender
- 3 Plug M8, 3/4-pin or connection cable
- 4 Teach-in button
- 5 Light/dark rotary switch:
L = light switching
D = dark switching
- 6 LED indicator orange: switching output active
- 7 LED indicator green: light reception with operating reserve > 1.1

Connection type

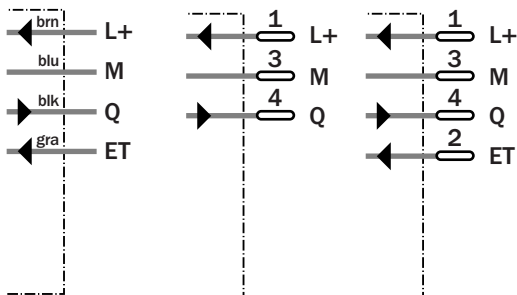
WTF160T-F212	WTF160T-F311	WTF160T-F412
WTF160T-E212	WTF160T-E311	WTF160T-E412



4 x 0.2 mm²

3-pin, M8

4-pin, M8



See chapter Accessories

Cables and connectors

Mounting systems *

* Mounting bracket included with delivery

Technical data		WTF160T-	F212	F311	F412	E212	E311	E412				
Scanning distance , max. typical	4 ... 120 mm ¹⁾											
Operating distance	5 ... 100 mm ¹⁾											
Sensitivity control	Teach-in											
External Teach (ET)												
Light source ²⁾	LED, red light, 650 nm											
Light spot diameter	Approx. 1 mm at 80 mm distance											
Dispersion angle	Focused, Focus 80 mm											
Supply voltage V_S	10 ... 30 V DC ³⁾											
Residual ripple ⁴⁾	± 10 %											
Current consumption ⁵⁾	≤ 40 mA											
Switching outputs	PNP, open collector: Q											
	NPN, open collector: Q											
Signal voltage PNP HIGH / LOW	V _S - 1.8 V / approx. 0 V											
Signal voltage NPN HIGH / LOW	Approx. V _S / < 1.8 V											
Switching mode, adjustable	Light/dark switching per rotary switch											
Output current I _A max.	100 mA											
Response time ⁶⁾	≤ 0.5 ms											
Switching frequency max. ⁷⁾	1000/s											
Connection type: cable	PVC, 2 m ⁸⁾ ; 4 x 0.2 mm ² , ∅ 4.2 mm											
plug	M8, 3-pin											
plug	M8, 4-pin											
VDE protection class	◊											
Circuit protection ⁹⁾	A, B, C, D											
Enclosure rating	IP 67 / IP 60K											
Ambient temperature	Operation -25 ... +55 °C											
	Storage -40 ... +70 °C											
Weight	With cable 2 m approx. 60 g											
	With plug M8 approx. 20 g											
Housing form	Vertical											
Housing material	Housing: PBT; Optic: PMMA											

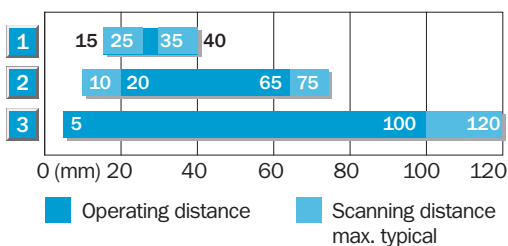
1) Object with 90% remission (with reference to standard white according to DIN 5033)
 2) Average service life 100,000 h at T_A = +25 °C

3) Limit values, operation in short circuit protected network max. 8 A
 4) Must be within V_S tolerances
 5) Without load
 6) With resistive load

7) With light/dark ratio 1:1
 8) 5 m are available on request, do not bend cable below 0 °C
 9) A = V_S connections reverse-polarity protected

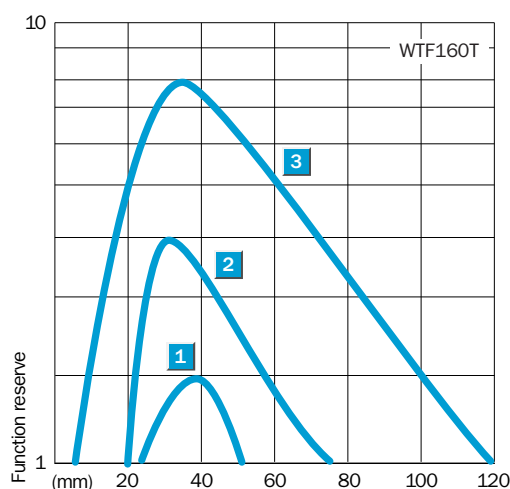
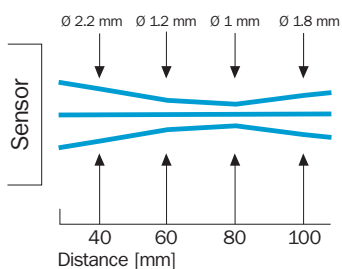
B = Inputs and outputs reverse-polarity protected
 C = Interference suppression
 D = Outputs overcurrent and short-circuit protected

Scanning distance




- 1 Scanning range on black, 6 % reflectance
- 2 Scanning range on grey, 18 % reflectance
- 3 Scanning range on white, 90 % reflectance

Light spot diameter WTF160T



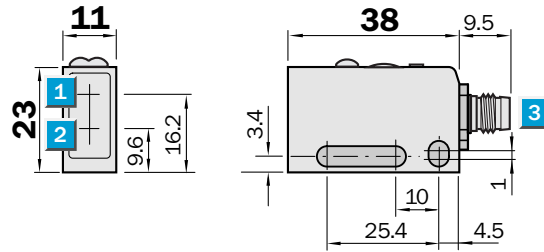
Order information

Type	Order no.
WTF160T-F212	6021708
WTF160T-F311	6021700
WTF160T-F412	6021722
WTF160T-E212	6020411
WTF160T-E311	6020391
WTF160T-E412	6020934


Scanning distance
0 ... 900 mm
 Photoelectric proximity switch

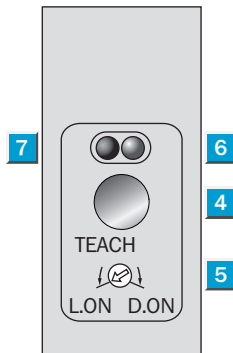
- Horizontal models
- Large scanning distance
- Red light variant for standard applications
- LED indicator: function reserve

Dimensional drawing



Adjustments possible

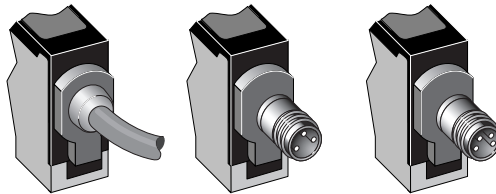
All types



- 1 Centre of optical axis, receiver
- 2 Centre of optical axis, sender
- 3 Plug M8, 3/4-pin or connection cable
- 4 Teach-in button
- 5 Light/dark rotary switch:
L = light switching
D = dark switching
- 6 LED indicator orange: switching output active
- 7 LED indicator green: light reception with operating reserve > 1.1

Connection type

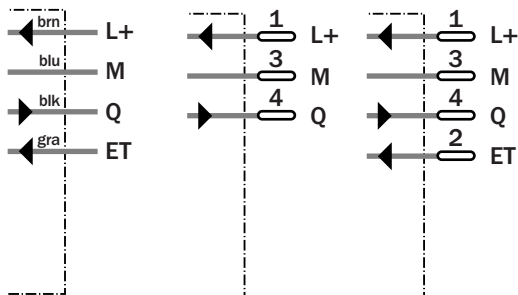
WTE160T-P232	WTE160T-P331	WTE160T-P432
WTE160T-N232	WTE160T-N331	WTE160T-N432



4 x 0.2 mm²

3-pin, M8

4-pin, M8



See chapter Accessories

Cables and connectors

Mounting systems *

* Mounting bracket included with delivery

Technical data	WTE160T-	P232	P331	P432	N232	N331	N432				
Scanning distance, max. typical	0 ... 900 mm ¹⁾										
Operating distance	0 ... 700 mm ¹⁾										
Sensitivity control	Teach-in										
External Teach (ET)											
Light source ²⁾	LED, red light, 680 nm										
Light spot diameter	Approx. 45 mm at 700 mm distance										
Supply voltage V _S	10 ... 30 V DC ³⁾										
Residual ripple ⁴⁾	± 10 %										
Current consumption ⁵⁾	≤ 40 mA										
Switching outputs	PNP, open collector: Q NPN, open collector: Q										
Signal voltage PNP HIGH / LOW	V _S - 1.8 V / approx. 0 V										
Signal voltage NPN HIGH / LOW	Approx. V _S / < 1.8 V										
Switching mode, adjustable	Light/dark switching per rotary switch										
Output current I _A max.	100 mA										
Response time ⁶⁾	≤ 0.5 ms										
Switching frequency max. ⁷⁾	1000/s										
Connection type: cable	PVC, 2 m ⁸⁾ ; 4 x 0.2 mm ² , Ø 4.2 mm										
plug	M8, 3-pin										
plug	M8, 4-pin										
VDE protection class	ⓘ										
Circuit protection ⁹⁾	A, B, C, D										
Enclosure rating	IP 67 / IP 69K										
Ambient temperature	Operation -25 ... +55 °C Storage -40 ... +70 °C										
Weight	With cable 2 m approx. 60 g With plug M8 approx. 20 g										
Housing form	Horizontal										
Housing material	Housing: PBT; Optic: PMMA										

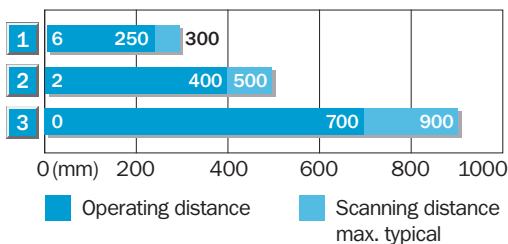
1) Object with 90% remission (with reference to standard white according to DIN 5033)
2) Average service life 100,000 h at T_A = +25 °C

3) Limit values, operation in short circuit protected network max. 8 A
4) Must be within V_S tolerances
5) Without load
6) With resistive load

7) With light/dark ratio 1:1
8) 5 m are available on request, do not bend cable below 0 °C
9) A = V_S connections reverse-polarity protected

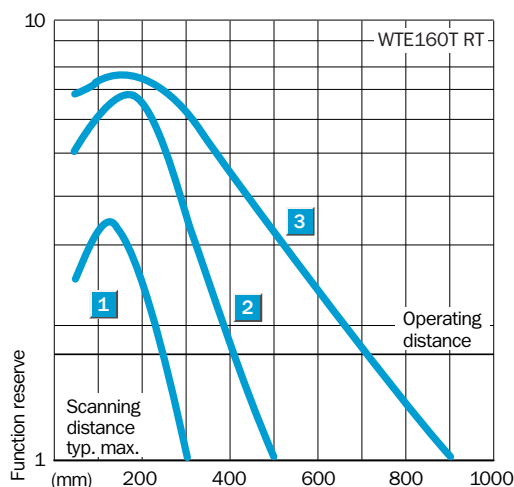
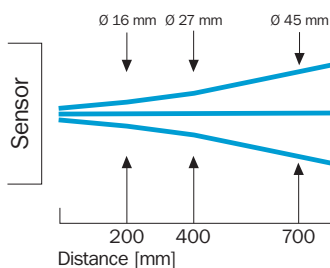
B = Inputs and outputs reverse-polarity protected
C = Interference suppression
D = Outputs overcurrent and short-circuit protected

Scanning distance




- 1 Scanning range on black, 6 % reflectance
- 2 Scanning range on grey, 18 % reflectance
- 3 Scanning range on white, 90 % reflectance

Light spot diameter WTE160T red light



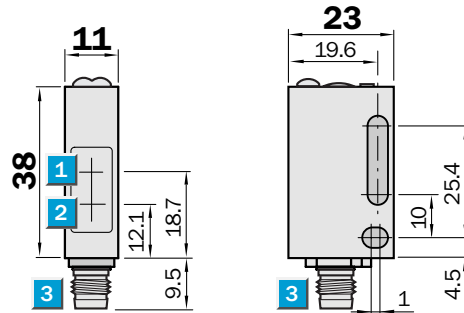
Order information

Type	Order no.
WTE160T-P232	6021884
WTE160T-P331	6021883
WTE160T-P432	6021886
WTE160T-N232	6021888
WTE160T-N331	6021887
WTE160T-N432	6021890


Scanning distance
0 ... 900 mm
 Photoelectric proximity switch

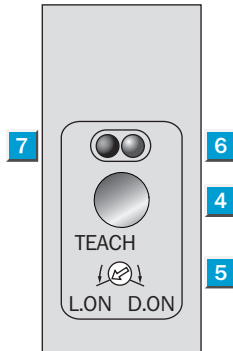
- Vertical models
- Large scanning distance
- Red light variant for standard applications
- LED indicator: function reserve

Dimensional drawing



Adjustments possible

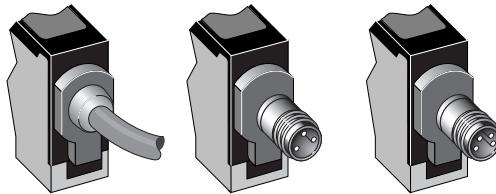
All types



- 1 Centre of optical axis, receiver
- 2 Centre of optical axis, sender
- 3 Plug M8, 3/4-pin or connection cable
- 4 Teach-in button
- 5 Light/dark rotary switch:
L = light switching
D = dark switching
- 6 LED indicator orange: switching output active
- 7 LED indicator green: light reception with operating reserve > 1.1

Connection type

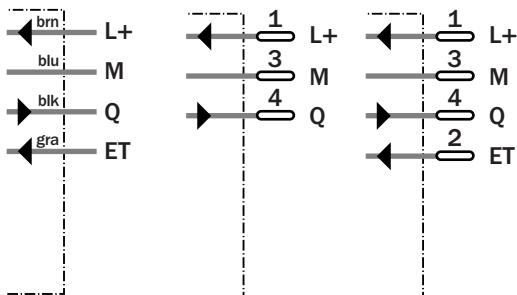
WTE160T-F232	WTE160T-F331	WTE160T-F432
WTE160T-E232	WTE160T-E331	WTE160T-E432



4 x 0.2 mm²

3-pin, M8

4-pin, M8



See chapter Accessories

Cables and connectors

Mounting systems *

* Mounting bracket included with delivery

Technical data		WTE160T-	F232	F331	F432	E232	E331	E432				
Scanning distance, max. typical	0 ... 900 mm ¹⁾											
Operating distance	0 ... 700 mm ¹⁾											
Sensitivity control	Teach-in											
External Teach (ET)												
Light source ²⁾	LED, red light, 680 nm											
Light spot diameter	Approx. 45 mm at 700 mm distance											
Supply voltage VS	10 ... 30 V DC ³⁾											
Residual ripple ⁴⁾	± 10 %											
Current consumption ⁵⁾	≤ 40 mA											
Switching outputs	PNP, open collector: Q NPN, open collector: Q											
Signal voltage PNP HIGH / LOW	V _S - 1.8 V / approx. 0 V											
Signal voltage NPN HIGH / LOW	Approx. V _S / < 1.8 V											
Switching mode, adjustable	Light/dark switching per rotary switch											
Output current I _A max.	100 mA											
Response time ⁶⁾	≤ 0.5 ms											
Switching frequency max. ⁷⁾	1000/s											
Connection type: cable	PVC, 2 m ⁸⁾ ; 4 x 0.2 mm ² , Ø 4.2 mm											
plug	M8, 3-pin											
plug	M8, 4-pin											
VDE protection class	⚡											
Circuit protection ⁹⁾	A, B, C, D											
Enclosure rating	IP 67 / IP 69K											
Ambient temperature	Operation -25 ... +55 °C Storage -40 ... +70 °C											
Weight	With cable 2 m approx. 60 g With plug M8 approx. 20 g											
Housing form	Vertical											
Housing material	Housing: PBT; Optic: PMMA											

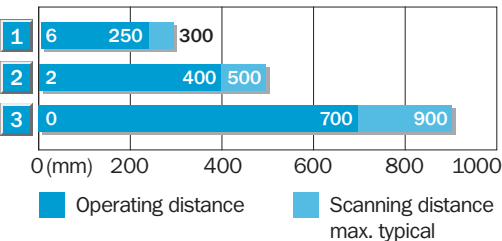
1) Object with 90% remission (with reference to standard white according to DIN 5033)
2) Average service life 100,000 h at T_A = +25 °C

3) Limit values, operation in short circuit protected network max. 8 A
4) Must be within V_S tolerances
5) Without load
6) With resistive load

7) With light/dark ratio 1:1
8) 5 m are available on request, do not bend cable below 0 °C
9) A = V_S connections reverse-polarity protected

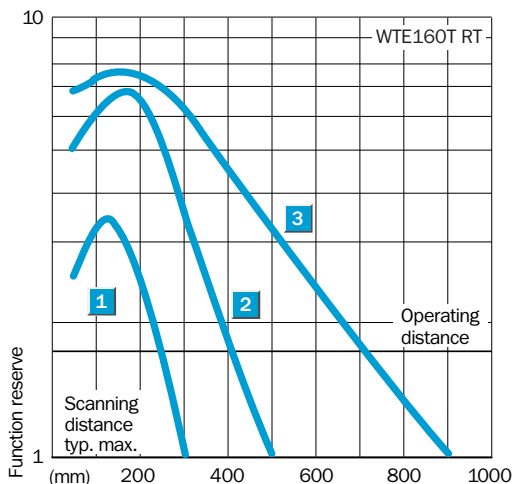
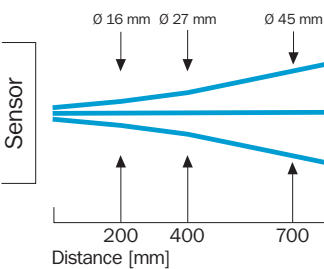
B = Inputs and outputs reverse-polarity protected
C = Interference suppression
D = Outputs overcurrent and short-circuit protected

Scanning distance




- 1 Scanning range on black, 6 % reflectance
- 2 Scanning range on grey, 18 % reflectance
- 3 Scanning range on white, 90 % reflectance

Light spot diameter WTE160T red light



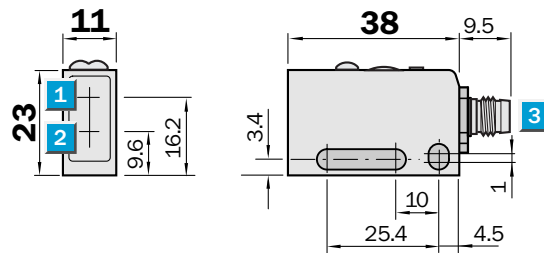
Order information

Type	Order no.
WTE160T-F232	6021876
WTE160T-F331	6021875
WTE160T-F432	6021878
WTE160T-E232	6021880
WTE160T-E331	6021879
WTE160T-E432	6021882


Scanning distance
0 ... 1300 mm
 Photoelectric proximity switch

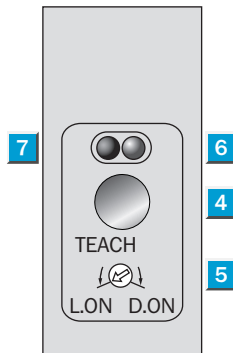
- Horizontal models
- Large scanning distance
- Infrared variant for objects with low reflectance
- LED indicator: function reserve

Dimensional drawing



Adjustments possible

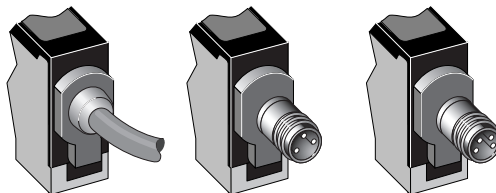
All types



- 1 Centre of optical axis, receiver
- 2 Centre of optical axis, sender
- 3 Plug M8, 3/4-pin or connection cable
- 4 Teach-in button
- 5 Light/dark rotary switch:
L = light switching
D = dark switching
- 6 LED indicator orange: switching output active
- 7 LED indicator green: light reception with operating reserve > 1.1

Connection type

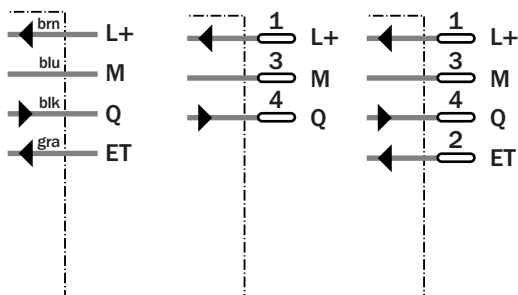
WTE160T-P262	WTE160T-P361	WTE160T-P462
WTE160T-N262	WTE160T-N361	WTE160T-N462



4 x 0.2 mm²

3-pin, M8

4-pin, M8



See chapter Accessories

Cables and connectors

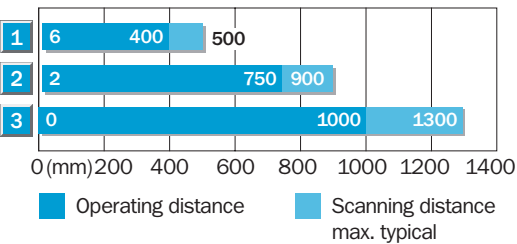
Mounting systems *

* Mounting bracket included with delivery

Technical data		WTE160T-	P262	P361	P462	N262	N361	N462				
Scanning distance, max. typical	0 ... 1300 mm ¹⁾											
Operating distance	0 ... 1000 mm ¹⁾											
Sensitivity control	Teach-in											
External Teach (ET)												
Light source ²⁾	LED, infrared light, 890 nm											
Light spot diameter	Approx. 85 mm at 1 m distance											
Supply voltage V _S	10 ... 30 V DC ³⁾											
Residual ripple ⁴⁾	± 10 %											
Current consumption ⁵⁾	≤ 40 mA											
Switching outputs	PNP, open collector: Q NPN, open collector: Q											
Signal voltage PNP HIGH / LOW	V _S - 1.8 V / approx. 0 V											
Signal voltage NPN HIGH / LOW	Approx. V _S / < 1.8 V											
Switching mode, adjustable	Light/dark switching per rotary switch											
Output current I _A max.	100 mA											
Response time ⁶⁾	≤ 0.5 ms											
Switching frequency max. ⁷⁾	1000/s											
Connection type: cable	PVC, 2 m ⁸⁾ ; 4 x 0.2 mm ² , Ø 4.2 mm											
plug	M8, 3-pin											
plug	M8, 4-pin											
VDE protection class	ⓘ											
Circuit protection ⁹⁾	A, B, C, D											
Enclosure rating	IP 67 / IP 69K											
Ambient temperature	Operation -25 ... +55 °C Storage -40 ... +70 °C											
Weight	With cable 2 m approx. 60 g With plug M8 approx. 20 g											
Housing form	Horizontal											
Housing material	Housing: PBT; Optic: PMMA											

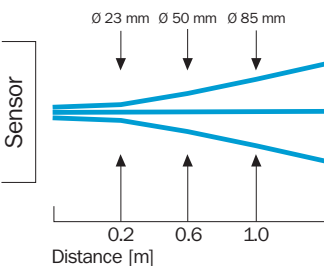
- 1) Object with 90% remission (with reference to standard white according to DIN 5033)
 - 2) Average service life 100,000 h at T_A = +25 °C
 - 3) Limit values, operation in short circuit protected network max. 8 A
 - 4) Must be within V_S tolerances
 - 5) Without load
 - 6) With resistive load
 - 7) With light/dark ratio 1:1
 - 8) 5 m are available on request, do not bend cable below 0 °C
 - 9) A = V_S connections reverse-polarity protected
- B = Inputs and outputs reverse-polarity protected
C = Interference suppression
D = Outputs overcurrent and short-circuit protected

Scanning distance



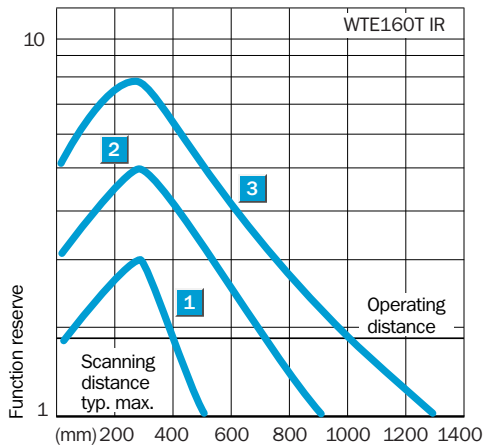
- 1 Scanning range on black, 6 % reflectance
- 2 Scanning range on grey, 18 % reflectance
- 3 Scanning range on white, 90 % reflectance


Light spot diameter WTE160T infrared light



Order information

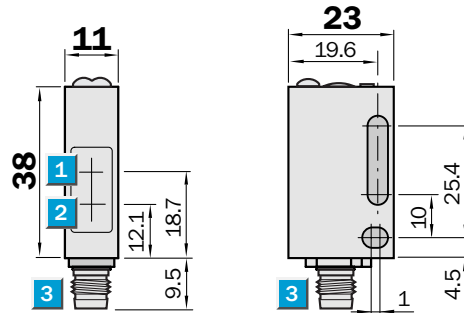
Type	Order no.
WTE160T-P262	6021900
WTE160T-P361	6021899
WTE160T-P462	6021902
WTE160T-N262	6021904
WTE160T-N361	6021903
WTE160T-N462	6021906




Scanning distance
0 ... 1300 mm
Photoelectric proximity switch

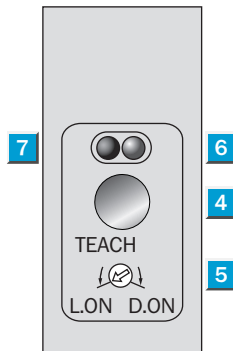
- Vertical models
- Large scanning distance
- Infrared variant for objects with low reflectance
- LED indicator: function reserve

Dimensional drawing



Adjustments possible

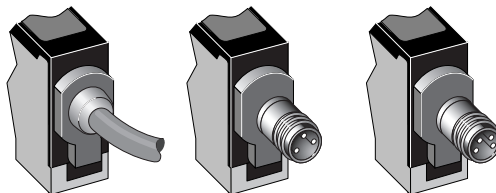
All types



- 1** Centre of optical axis, receiver
- 2** Centre of optical axis, sender
- 3** Plug M8, 3/4-pin or connection cable
- 4** Teach-in button
- 5** Light/dark rotary switch:
L = light switching
D = dark switching
- 6** LED indicator orange: switching output active
- 7** LED indicator green: light reception with operating reserve > 1.1

Connection type

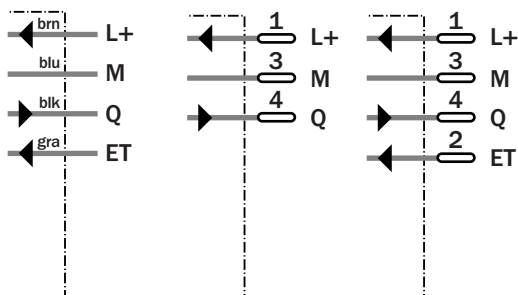
WTE160T-F262	WTE160T-F361	WTE160T-F462
WTE160T-E262	WTE160T-E361	WTE160T-E462



4 x 0.2 mm²

3-pin, M8

4-pin, M8



See chapter Accessories

Cables and connectors

Mounting systems *

* Mounting bracket included with delivery

Technical data		WTE160T-	F262	F361	F462	E262	E361	E462				
Scanning distance, max. typical	0 ... 1300 mm ¹⁾											
Operating distance	0 ... 1000 mm ¹⁾											
Sensitivity control	Teach-in											
External Teach (ET)												
Light source ²⁾	LED, infrared light, 890 nm											
Light spot diameter	Approx. 85 mm at 1 m distance											
Supply voltage VS	10 ... 30 V DC ³⁾											
Residual ripple ⁴⁾	± 10 %											
Current consumption ⁵⁾	≤ 40 mA											
Switching outputs	PNP, open collector: Q NPN, open collector: Q											
Signal voltage PNP HIGH / LOW	V _S - 1.8 V / approx. 0 V											
Signal voltage NPN HIGH / LOW	Approx. V _S / < 1.8 V											
Switching mode, adjustable	Light/dark switching per rotary switch											
Output current I _A max.	100 mA											
Response time ⁶⁾	≤ 0.5 ms											
Switching frequency max. ⁷⁾	1000/s											
Connection type: cable	PVC, 2 m ⁸⁾ ; 4 x 0.2 mm ² , Ø 4.2 mm											
plug	M8, 3-pin											
plug	M8, 4-pin											
VDE protection class	⊕											
Circuit protection ⁹⁾	A, B, C, D											
Enclosure rating	IP 67 / IP 69K											
Ambient temperature	Operation -25 ... +55 °C Storage -40 ... +70 °C											
Weight	With cable 2 m approx. 60 g With plug M8 approx. 20 g											
Housing form	Vertical											
Housing material	Housing: PBT; Optic: PMMA											

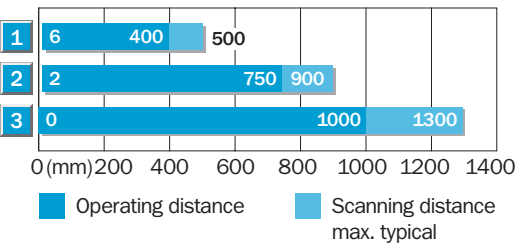
1) Object with 90% remission (with reference to standard white according to DIN 5033)
2) Average service life 100,000 h at T_A = +25 °C

3) Limit values, operation in short circuit protected network max. 8 A
4) Must be within V_S tolerances
5) Without load
6) With resistive load

7) With light/dark ratio 1:1
8) 5 m are available on request, do not bend cable below 0 °C
9) A = V_S connections reverse-polarity protected

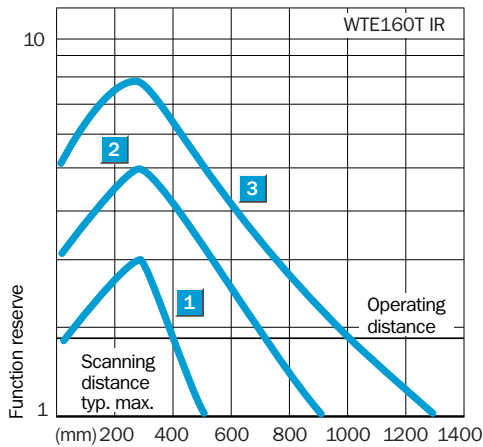
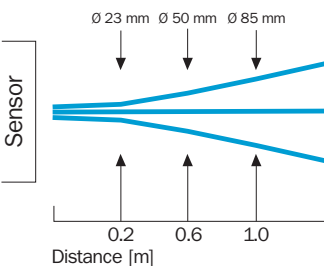
B = Inputs and outputs reverse-polarity protected
C = Interference suppression
D = Outputs overcurrent and short-circuit protected

Scanning distance




- 1 Scanning range on black, 6 % reflectance
- 2 Scanning range on grey, 18 % reflectance
- 3 Scanning range on white, 90 % reflectance

Light spot diameter WTE160T infrared light



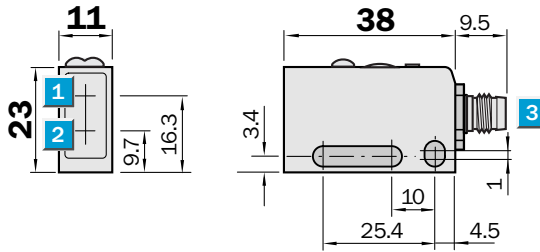
Order information

Type	Order no.
WTE160T-F262	6021892
WTE160T-F361	6021891
WTE160T-F462	6021894
WTE160T-E262	6021896
WTE160T-E361	6021895
WTE160T-E462	6021898


Scanning range
2.2 m
 Photoelectric reflex switch

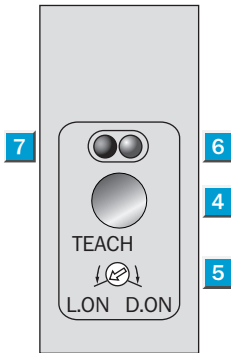
- Horizontal models
- Very small light spot
- Short response time
- Detection of transparent objects; min. attenuation 20%
- Detection of smallest objects
- LED indicator: function reserve

Dimensional drawing



Adjustments possible

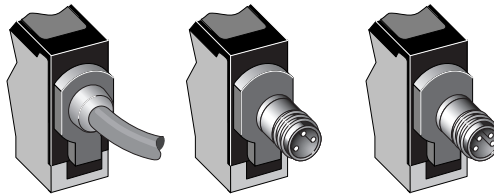
All types



- 1 Centre of optical axis, receiver
- 2 Centre of optical axis, sender
- 3 Plug M8, 3/4-pin or connection cable
- 4 Teach-in button
- 5 Light/dark rotary switch:
L = light switching
D = dark switching
- 6 LED indicator orange: switching output active
- 7 LED indicator green: light reception with operating reserve > 1.1

Connection type

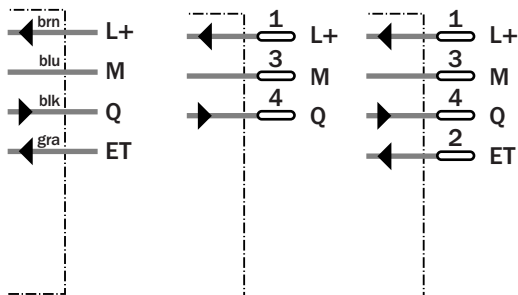
WL160T-P212	WL160T-P311	WL160T-P412
WL160T-N212	WL160T-N311	WL160T-N412



4 x 0.2 mm²

3-pin, M8

4-pin, M8



See chapter Accessories

Cables and connectors

Mounting systems *

Reflectors **

* Mounting bracket included with delivery

** Reflector P250 included with delivery

Technical data	WL160T-	P212	P311	P412	N212	N311	N412				
Scanning range, max. typical	0.03 ... 2.2 m										
Operating range, recommended	0.03 ... 1.5 m										
Measurement condition	On reflector PL80A										
Sensitivity control	Teach-in										
External Teach (ET)											
Light source ¹⁾	LED, red light, 665 nm										
Light spot diameter	Approx. 2 mm at 70 mm distance										
Dispersion angle	Focused, focus 70 mm										
Attenuation ²⁾	Min. 20%										
Supply voltage V_S	10 ... 30 V DC ³⁾										
Residual ripple ⁴⁾	± 10 %										
Current consumption ⁵⁾	≤ 40 mA										
Switching outputs	PNP, open collector: Q NPN, open collector: Q										
Signal voltage PNP HIGH / LOW	$V_S - 1.8 V / \text{approx. } 0 V$										
Signal voltage NPN HIGH / LOW	Approx. $V_S / < 1.8 V$										
Switching mode, adjustable	Light/dark switching per rotary switch										
Output current I_A max.	100 mA										
Response time ⁶⁾	≤ 0.2 ms										
Switching frequency max. ⁷⁾	2500/s										
Connection type: cable	PVC, 2 m ⁸⁾ ; 5 x 0.2 mm ² , \varnothing 4.2 mm										
plug	M8, 3-pin										
plug	M8, 4-pin										
VDE protection class	⊕										
Circuit protection ⁹⁾	A, B, C, D										
Enclosure rating	IP 67 / IP 69K										
Ambient temperature	Operation -25 ... +55 °C Storage -40 ... +70 °C										
Weight	With cable 2 m approx. 60 g With plug M8 approx. 20 g										
Housing form	Horizontal										
Housing material	Housing: PBT; Optic: PMMA										

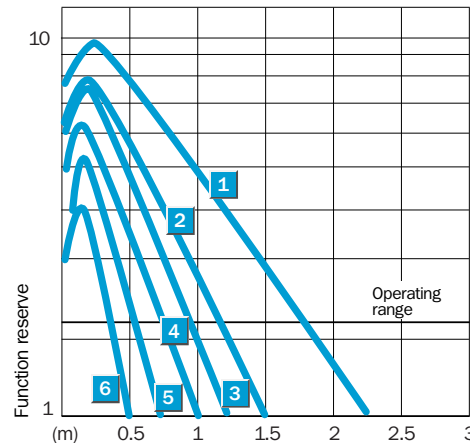
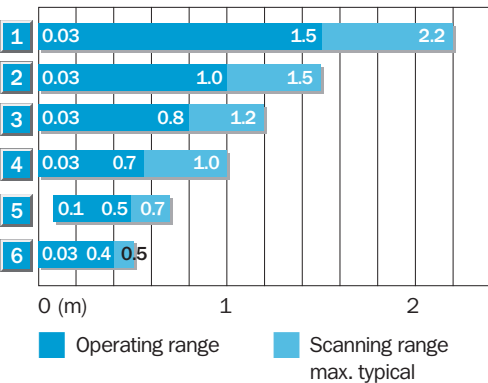
1) Average service life 100,000 h at $T_A = +25\text{ °C}$
 2) Detection of transparent objects
 3) Limit values, operation in short circuit protected network max. 8 A

4) Must be within V_S tolerances
 5) Without load
 6) With resistive load
 7) With light/dark ratio 1:1

8) 5 m are available on request, do not bend cable below 0 °C
 9) A = V_S connections reverse-polarity protected

B = Inputs and outputs reverse-polarity protected
 C = Interference suppression
 D = Outputs overcurrent and short-circuit protected

Scanning range and function reserve

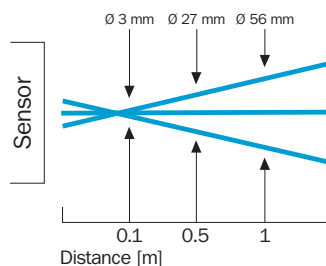



Order information

Type	Order no.
WL160T-P212	6020481
WL160T-P311	6021479
WL160T-P412	6020483
WL160T-N212	6020480
WL160T-N311	6021515
WL160T-N412	6020482

Reflector type	Operating range
1 PL80A	0.03 ... 1.5 m
2 P250/PL40/PL50A	0.03 ... 1.0 m
3 PL30A/31A	0.03 ... 0.8 m
4 PL20A	0.03 ... 0.7 m
5 Reflective tape Diamond Grade	0.1 ... 0.5 m
6 P45	0.03 ... 0.4 m

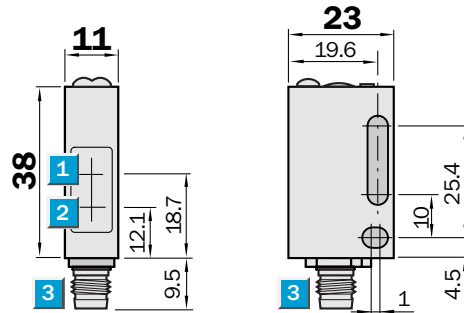
Light spot diameter WL160T




Scanning range
2.2 m
 Photoelectric reflex switch

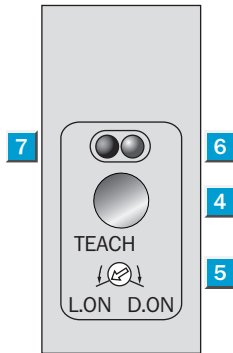
- Vertical models
- Very small light spot
- Short response time
- Detection of transparent objects; min. attenuation 20%
- Detection of smallest objects
- LED indicator: function reserve

Dimensional drawing



Adjustments possible

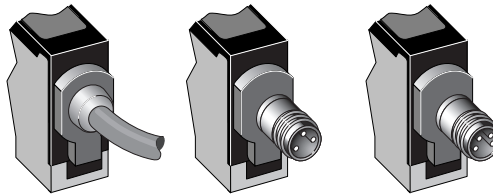
All types



- 1 Centre of optical axis, receiver
- 2 Centre of optical axis, sender
- 3 Plug M8, 3/4-pin or connection cable
- 4 Teach-in button
- 5 Light/dark rotary switch:
L = light switching
D = dark switching
- 6 LED indicator orange: switching output active
- 7 LED indicator green: light reception with operating reserve > 1.1

Connection type

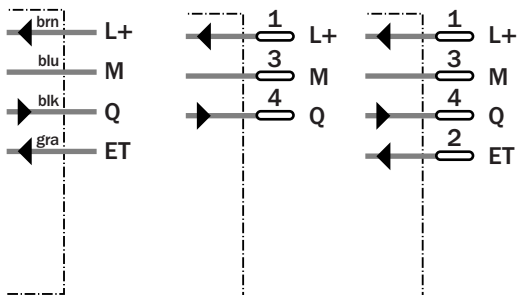
WL160T-F212	WL160T-F311	WL160T-F412
WL160T-E212	WL160T-E311	WL160T-E412



4 x 0.2 mm²

3-pin, M8

4-pin, M8



See chapter Accessories

Cables and connectors

Mounting systems *

Reflectors **

* Mounting bracket included with delivery

** Reflector P250 included with delivery

Technical data		WL160T-	F212	F311	F412	E212	E311	E412				
Scanning range, max. typical	0.03 ... 2.2 m											
Operating range, recommended	0.03 ... 1.5 m											
Measurement condition	On reflector PL80A											
Sensitivity control	Teach-in											
External Teach (ET)												
Light source ¹⁾	LED, red light, 665 nm											
Light spot diameter	Approx. 2 mm at 70 mm distance											
Dispersion angle	Focused, focus 70 mm											
Attenuation ²⁾	Min. 20%											
Supply voltage V_S	10 ... 30 V DC ³⁾											
Residual ripple ⁴⁾	± 10 %											
Current consumption ⁵⁾	≤ 40 mA											
Switching outputs	PNP, open collector: Q NPN, open collector: Q											
Signal voltage PNP HIGH / LOW	$V_S - 1.8 V / \text{approx. } 0 V$											
Signal voltage NPN HIGH / LOW	Approx. $V_S / < 1.8 V$											
Switching mode, adjustable	Light/dark switching per rotary switch											
Output current I_A max.	100 mA											
Response time ⁶⁾	≤ 0.2 ms											
Switching frequency max. ⁷⁾	2500/s											
Connection type: cable	PVC, 2 m ⁸⁾ ; 5 x 0.2 mm ² , \varnothing 4.2 mm											
plug	M8, 3-pin											
plug	M8, 4-pin											
VDE protection class	⚡											
Circuit protection ⁹⁾	A, B, C, D											
Enclosure rating	IP 67 / IP 69K											
Ambient temperature	Operation -25 ... +55 °C Storage -40 ... +70 °C											
Weight	With cable 2 m approx. 60 g With plug M8 approx. 20 g											
Housing form	Vertical											
Housing material	Housing: PBT; Optic: PMMA											

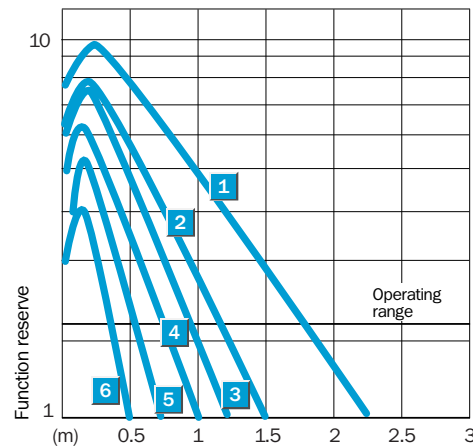
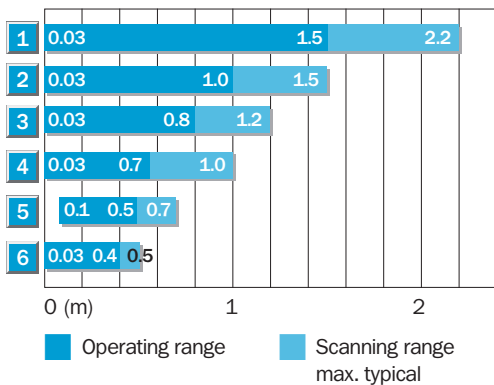
- 1) Average service life 100,000 h at $T_A = +25\text{ °C}$
- 2) Detection of transparent objects
- 3) Limit values, operation in short circuit protected network max. 8 A

- 4) Must be within V_S tolerances
- 5) Without load
- 6) With resistive load
- 7) With light/dark ratio 1:1

- 8) 5 m are available on request, do not bend cable below 0 °C
- 9) A = V_S connections reverse-polarity protected

- B = Inputs and outputs reverse-polarity protected
- C = Interference suppression
- D = Outputs overcurrent and short-circuit protected

Scanning range and function reserve

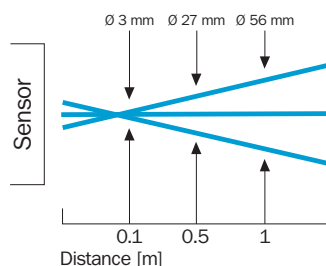


Order information




Type	Order no.
WL160T-F212	6020487
WL160T-F311	6021387
WL160T-F412	6020489
WL160T-E212	6020486
WL160T-E311	6021438
WL160T-E412	6020488

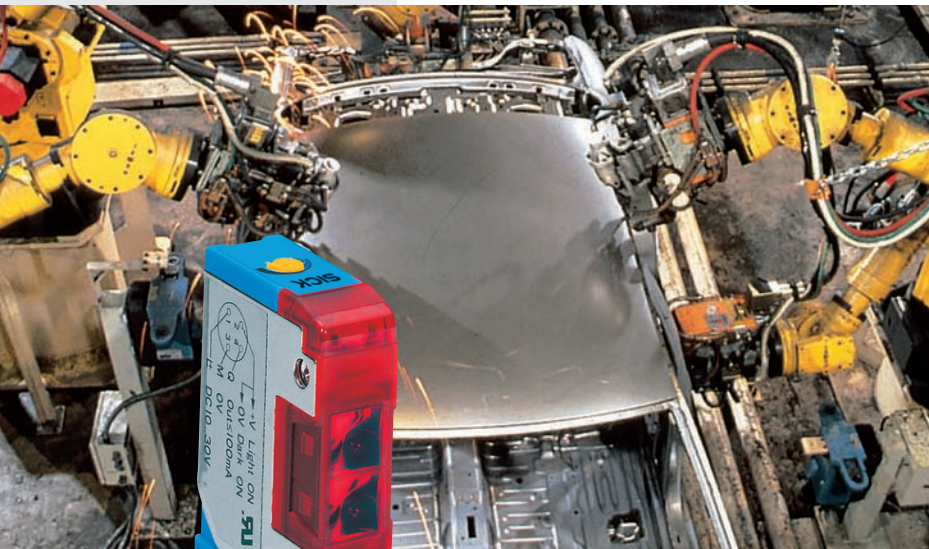
Reflector type	Operating range
1 PL80A	0.03 ... 1.5 m
2 P250/PL40/PL50A	0.03 ... 1.0 m
3 PL30A/31A	0.03 ... 0.8 m
4 PL20A	0.03 ... 0.7 m
5 Reflective tape Diamond Grade	0.1 ... 0.5 m
6 P45	0.03 ... 0.4 m


Light spot diameter WL160T



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

	Photoelectric proximity switches, BGB
	Photoelectric proximity switches, energetic
	Photoelectric reflex switches



 Through-beam photoelectric switches

Thanks to the system's large scanning ranges, stainless-steel housings, red transmission light and the deliberate omission of operating elements, this series of photoelectric switches offers major benefits for the user, such as simple handling and high functionality.

The L.ON/D.ON control cable reduces the number of variants by half.

The W 170 switches have, therefore, proven particularly successful in the following sectors:

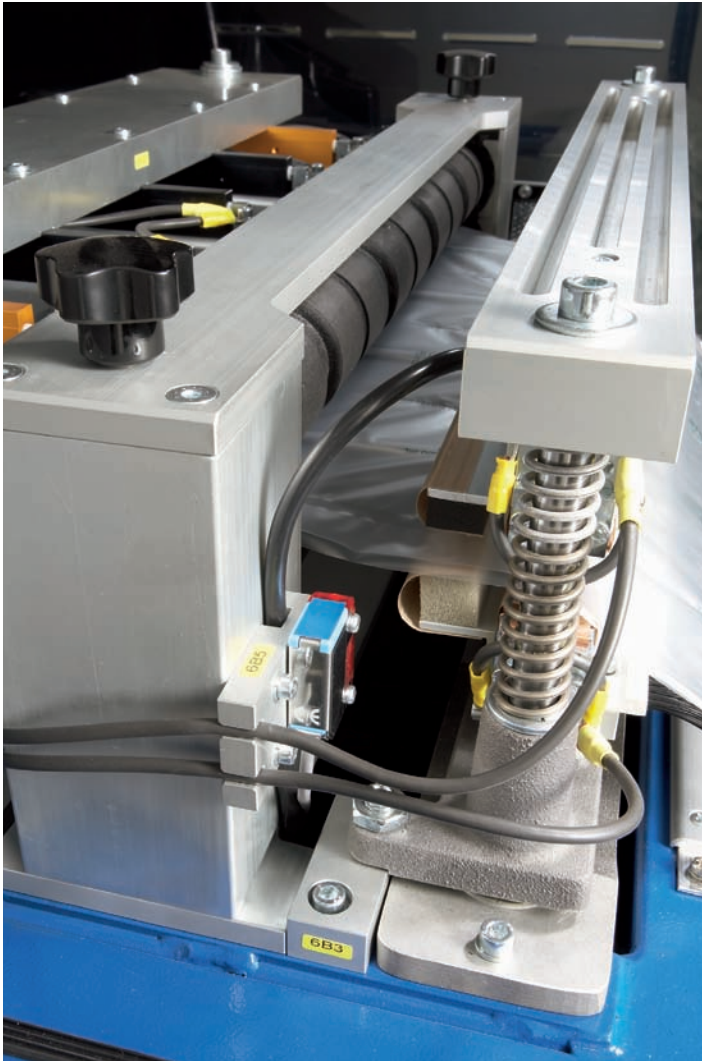
- conveyor systems,
- packaging industry,
- assembly and handling systems, and
- construction of special-purpose machines.

The scanning ranges:

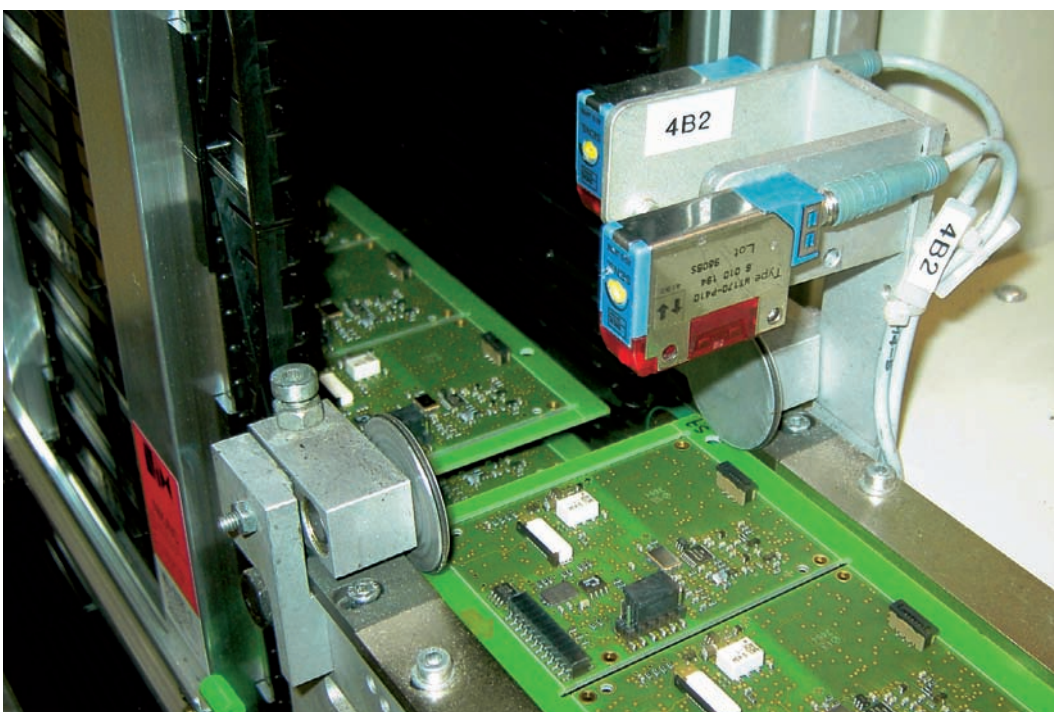
- WS/WE 170 through-beam photoelectric switch: 7 m, slotted masks and polarising filter attachments as accessories. The polarising attachments reduce mutual interference. WS/WE 170 switches also allow configuration of simple light grids.
- WL 170 photoelectric reflex switch: 3.5 m (PL 80 A), with polarising filter. Also available as a version with reduced switching hysteresis: especially suitable for detecting transparent objects such as glass or film.
- WT 170 photoelectric proximity switch: energetic: scanning distance 400 mm (90 % remission), for standard scanning tasks; with focused optics: scanning distance 10...90 mm, background blanking, small light spot, high sensitivity.

The mounting bracket and P 250 reflector (with WL 170) are included. Enclosure rating IP 67, $V_S = 10 \dots 30$ V DC, PNP or NPN switching output, M8 plug or cable are all standard features of the series.


▼ The WL 170 miniature photoelectric reflex switch controls the presence of material for the production of air bubble film.



▲ The WS/WE 170 miniature through-beam photoelectric switch controlling the system timing of a plastic bag sealing machine. Polarising filter attachments allow block assembly.



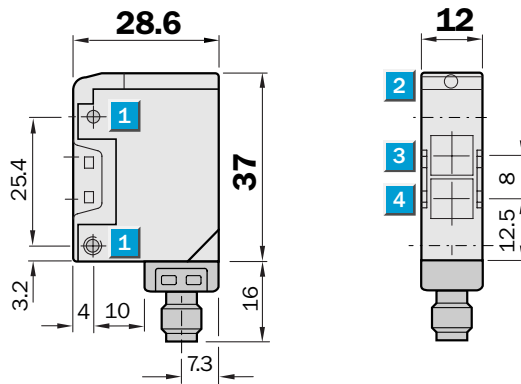
◀ The WT 170 miniature photoelectric proximity switch supervises and controls supply of e-cards in a buffer store.


Scanning distance
10...100 mm

Photoelectric proximity switches

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

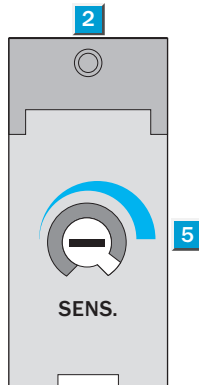
Dimensional drawing



Adjustments possible

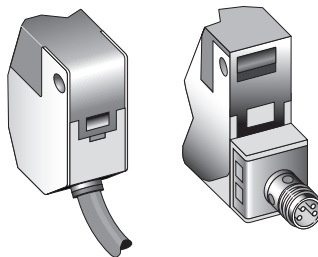
WT 170-P 112	WT 170-P 410
WT 170-N 112	WT 170-N 410

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

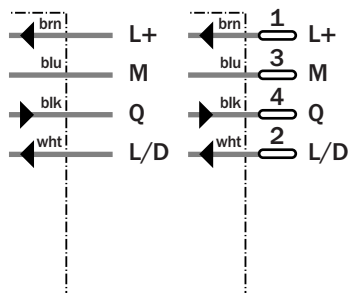


Connection types

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



4 x 0.18 mm ²	4-pin, M8
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See chapter Accessories

Cables and connectors

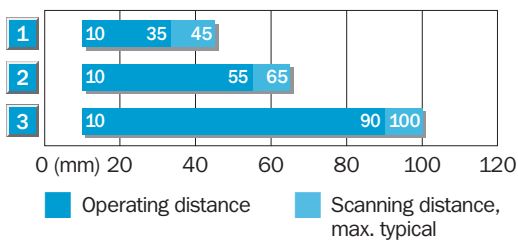
Mounting systems *)

*) Mounting brackets included with delivery

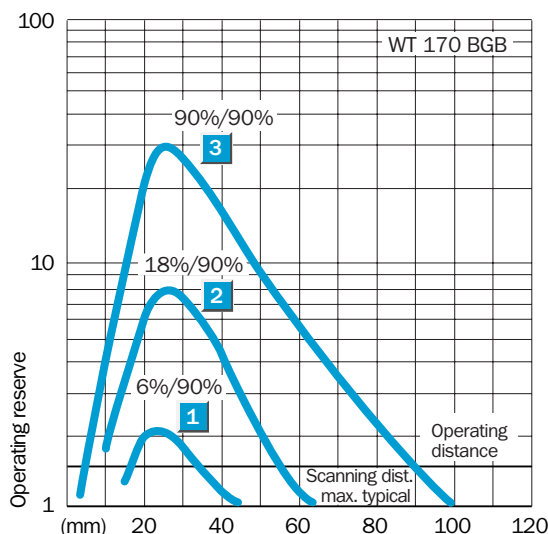
Technical data		WT 170-	P 112	P 410	N 112	N 410						
Scanning distance, max. typical	10...100 mm ¹⁾											
Operating distance	10...90 mm ¹⁾											
Background suppression	From approx. 120 mm, Background, 90% remission											
Sensitivity	Potentiometer, 270° (adjustable)											
Light source²⁾, 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 mm ² , ø 3.8 mm plug M8, 4-pin											
VDE protection class⁹⁾	□											
Circuit protection¹⁰⁾	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 M8 plug, 4-pin Approx. 66 g											
Housing material	Housing: stainless steel/ABS; optics: PC											

- 1) Object with 90 % remission (based on standard white to DIN 5033)
- 2) Average service life 100,000 h at T_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

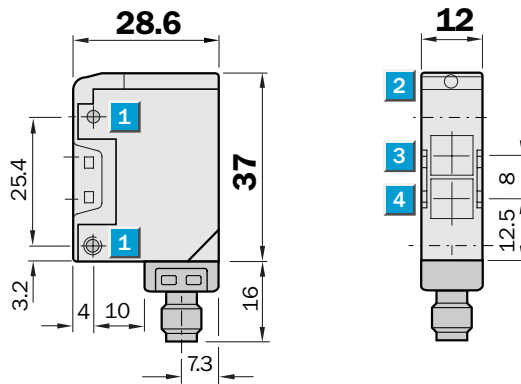
Type	Order no.
WT 170-P 112	6 010 193
WT 170-P 410	6 010 194
WT 170-N 112	6 010 195
WT 170-N 410	6 010 196


Scanning distance
10...550 mm

Photoelectric proximity switches

- Energetic photoelectric proximity switch for standard applications
- Adjustable sensitivity
- Visible red light LED transmitter alignment aid

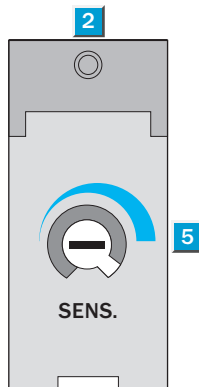
Dimensional drawing



Adjustments possible

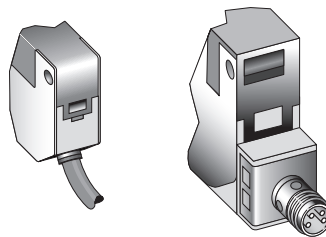
WT 170-P 132	WT 170-P 430
WT 170-N 132	WT 170-N 430

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

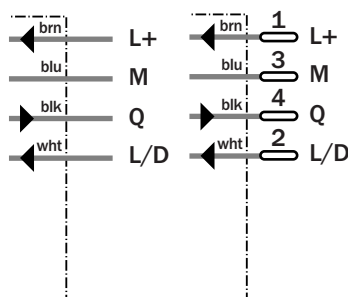


Connection types

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



4 x 0.18 mm ²	4-pin, M8
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See chapter Accessories

Cables and connectors

Mounting systems *)

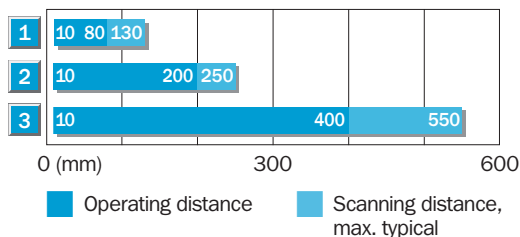
*) Mounting brackets included with delivery



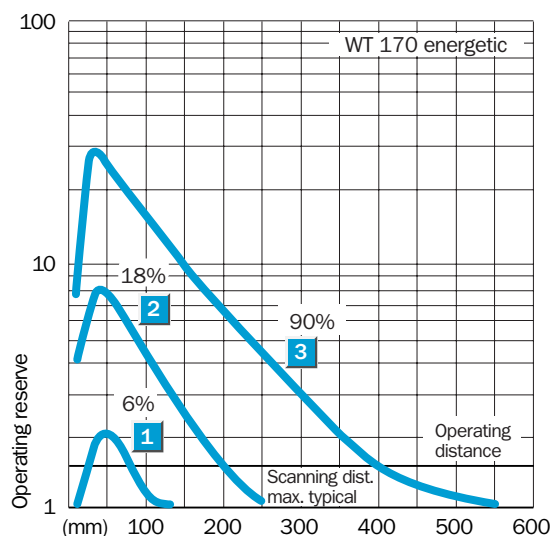
Technical data		WT 170-	P 132	P 430	N 132	N 430						
Scanning distance, max. typical	10...550 mm ¹⁾											
Operating distance	10...400 mm ¹⁾											
Sensitivity	Adjustable											
Light source²⁾, light type	LED, visible red light											
Light spot size	Approx. 40 mm at 400 mm											
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 mm ² , ø 3.8 mm plug M8, 4-pin											
VDE protection class⁹⁾	□											
Circuit protection¹⁰⁾	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 M8 plug, 4-pin Approx. 66 g											
Housing material	Housing: stainless steel/ABS; optics: PC											

- 1) Object with 90 % remission (based on standard white to DIN 5033)
- 2) Average service life 100,000 h at T_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		Order information	
1	10 80 130	Type	Order no.
2	10 200 250	WT 170-P 132	6 010 197
3	10 400 550	WT 170-P 430	6 010 198
		WT 170-N 132	6 010 199
		WT 170-N 430	6 010 200



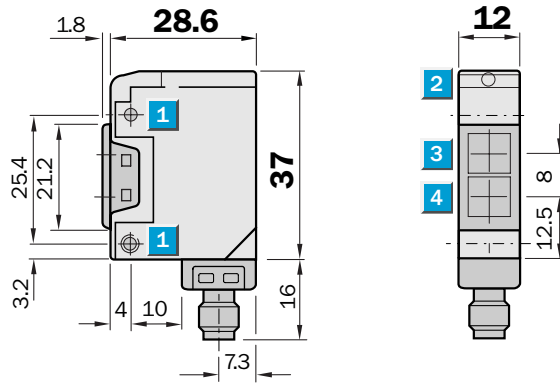
- 1 Scanning distance on black, 6 % remission
- 2 Scanning distance on grey, 18 % remission
- 3 Scanning distance on white, 90 % remission



	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

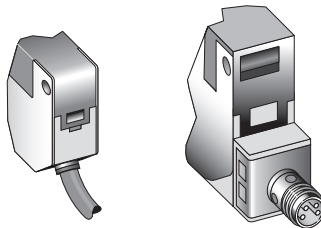
Dimensional drawing



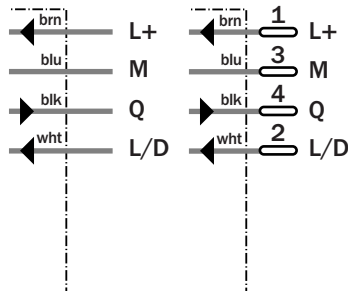
- 1 Mounting holes \varnothing 3 mm with integrated M3 thread
- 2 LED signal strength indicator, red:
light received \geq switching threshold
- 3 Centre of optical axis, receiver
- 4 Centre of optical axis, sender

Connection types

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



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

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

Technical data		WL 170-	P 132	P 430	N 132	N 430
Scanning range, max. typical/ on reflector	0.01...4 m/PL 80 A 0.01...3 m/P 250 (included)					
Operating range	0.01...2.5 m/P 250					
Light source¹⁾, 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 mm ² , ø 3.8 mm					
plug	M8, 4-pin					
VDE protection class⁸⁾	□					
Circuit protection⁹⁾	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 M8 plug, 4-pin	Approx. 66 g					
Housing material	Housing: stainless steel/ ABS; optics: PMMA					

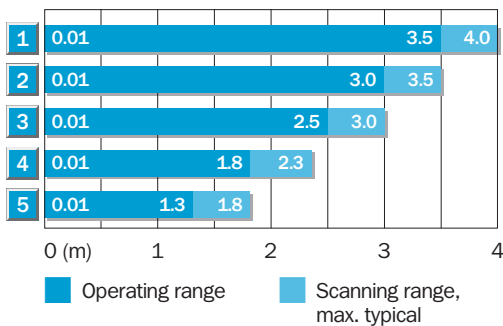
1) Average service life 100,000 h at T_A = + 25 °C
2) Limit values
3) May not exceed or fall short of V_S tolerances

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

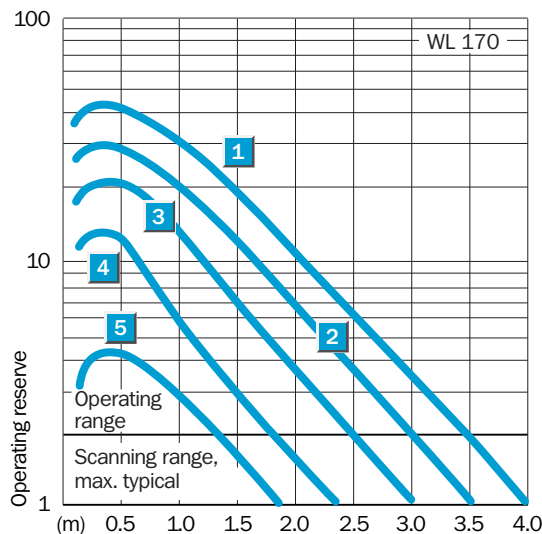
9) A = V_S connections reverse-polarity protected
B = Inputs and outputs reverse-polarity protected

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	



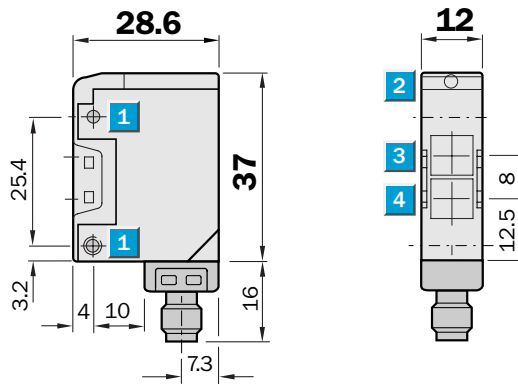
Order information

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


Scanning range
0.1...0.8 m
 Photoelectric reflex switches

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

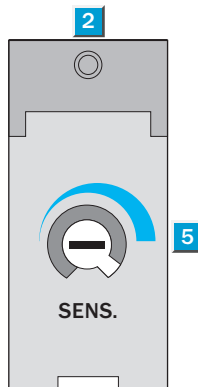
Dimensional drawing



Adjustments possible

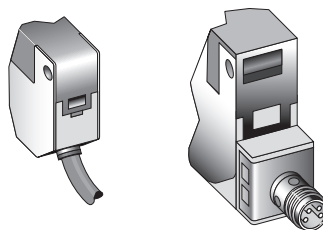
WL 170-P 122	WL 170-P 420
WL 170-N 122	WL 170-N 420

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

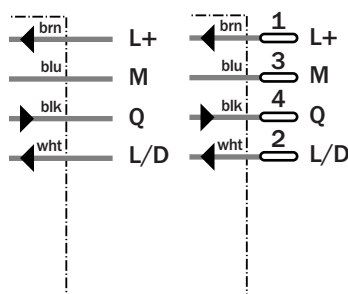


Connection types

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



4 x 0.18 mm ²	4-pin, M8
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See chapter Accessories

Cables and connectors

Mounting systems *)

Reflectors **)

*) Mounting brackets included with delivery

**) Reflector P 250 included with delivery

Technical data		WL 170-	P 122	P 420	N 122	N 420
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 source¹⁾, light type						
	LED, visible red light					
Light spot size	Approx. 30 mm at 0.5 m					
Angle of dispersion, sender	Focused: ϕ approx. 5 mm where SR = 90 mm					
Supply voltage V_S						
	10...30 V DC ³⁾					
Ripple ³⁾	$\pm 10 \%$					
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 mm ² , ϕ 3.8 mm					
plug	M8, 4-pin					
VDE protection class⁸⁾						
	<input type="checkbox"/>					
Circuit protection⁹⁾						
	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 M8 plug, 4-pin	Approx. 66 g					
Housing material						
	Housing: stainless steel/ABS; optics: PC					

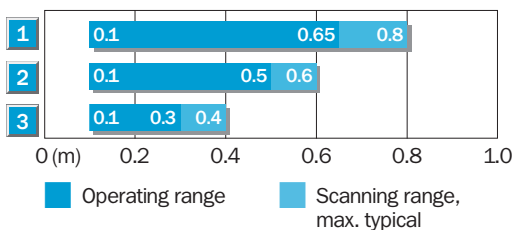
- 1) Average service life 100,000 h at $T_A = +25$ °C
- 2) Limit values
- 3) May not exceed or fall short of V_S tolerances

- 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

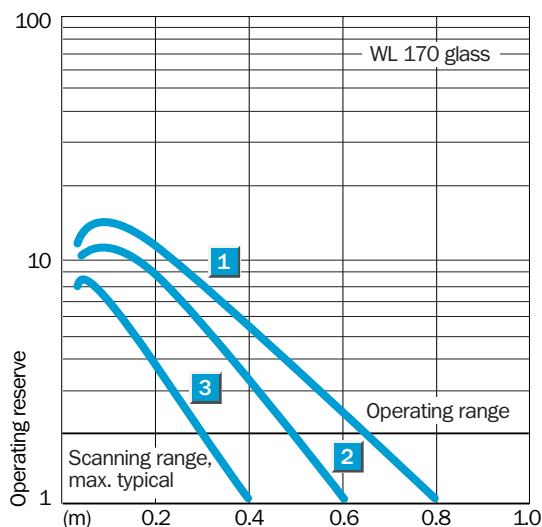
- 9) A = V_S connections reverse-polarity protected
- B = Inputs and outputs reverse-polarity protected

- 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

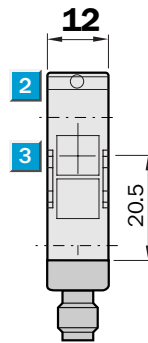
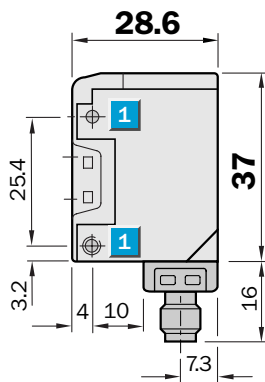
Type	Order no.
WL 170-P 122	6 010 185
WL 170-P 420	6 010 186
WL 170-N 122	6 010 187
WL 170-N 420	6 010 188

Scanning range
8.5 m

Through-beam photoelectric switches

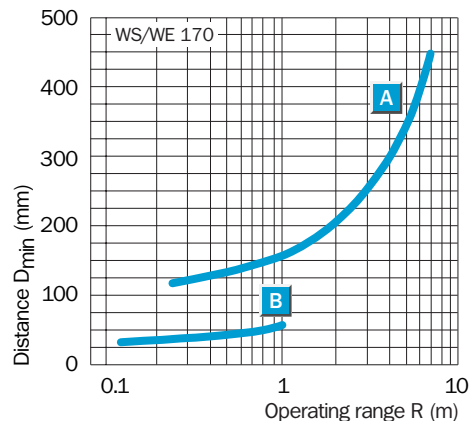
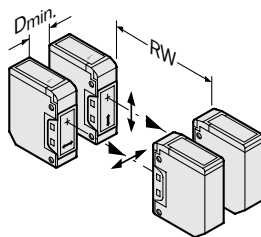
- Polarising filter attachments (accessories) to reduce mutual interference if several WS/WE 170 units are used
- Test input (WS 170 sender) for device and system testing
- Slotted masks (1 mm) to detect small parts or for positioning tasks

Dimensional drawing



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

Minimum distance $D_{min.}$ between sides of two WS/WE 170 units



Prevention of mutual interference with two WS/WE 170 units

Minimum distance $D_{min.}$ observed for:

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

No mutual interference if polarising filters are used

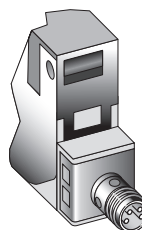
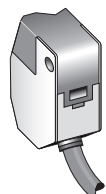
- C Polarising filter attachments BL170-POLF up to $R \leq 3$ m only
- D Polarising filter BL170-POLF and slotted masks BL170-10 up to $R \leq 0.5$ m



Connection types

WS/WE170-P 132
WS/WE170-N132

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

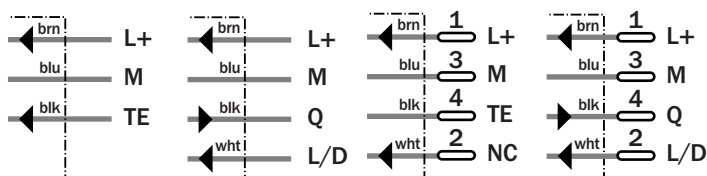


See chapter Accessories

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

*) Mounting brackets included with delivery

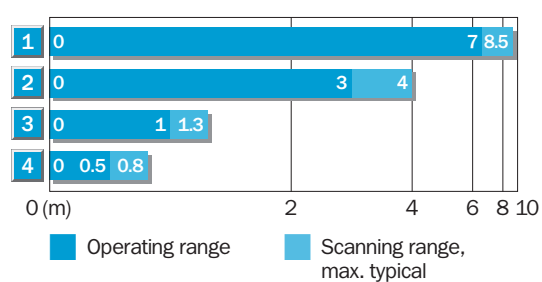
3 x 0.18 mm ² Sender	4 x 0.18 mm ² Receiver	4-pin, M8 Sender	4-pin, M8 Receiver
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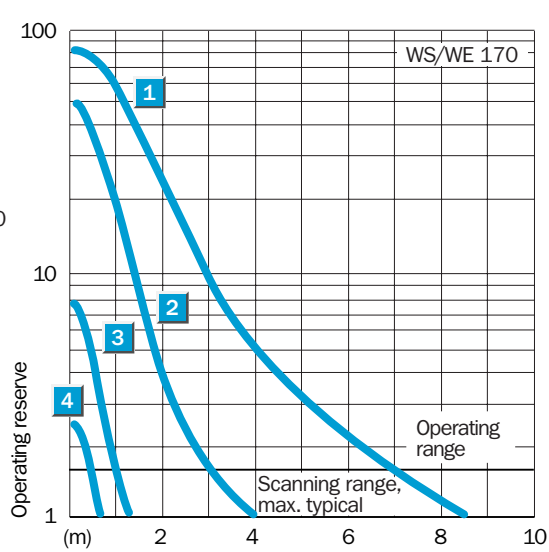
Technical data		WS/WE 170-	P 132	P 430	N 132	N 430
Scanning range, max. typical	8.5 m					
Operating range	7 m					
Light source¹⁾, light type	LED, red light					
Light spot size	Approx. 850 mm at 7 m					
Angle of dispersion, sender	Approx. 7°					
Angle of dispersion, receiver	Approx. 20°					
Supply 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 mm ² , ø 3.8 mm					
receiver WE	4 x 0.18 mm ² , ø 3.8 mm					
plug	M8, 4-pin					
VDE protection class⁸⁾	□					
Circuit protection⁹⁾						
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 M8 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

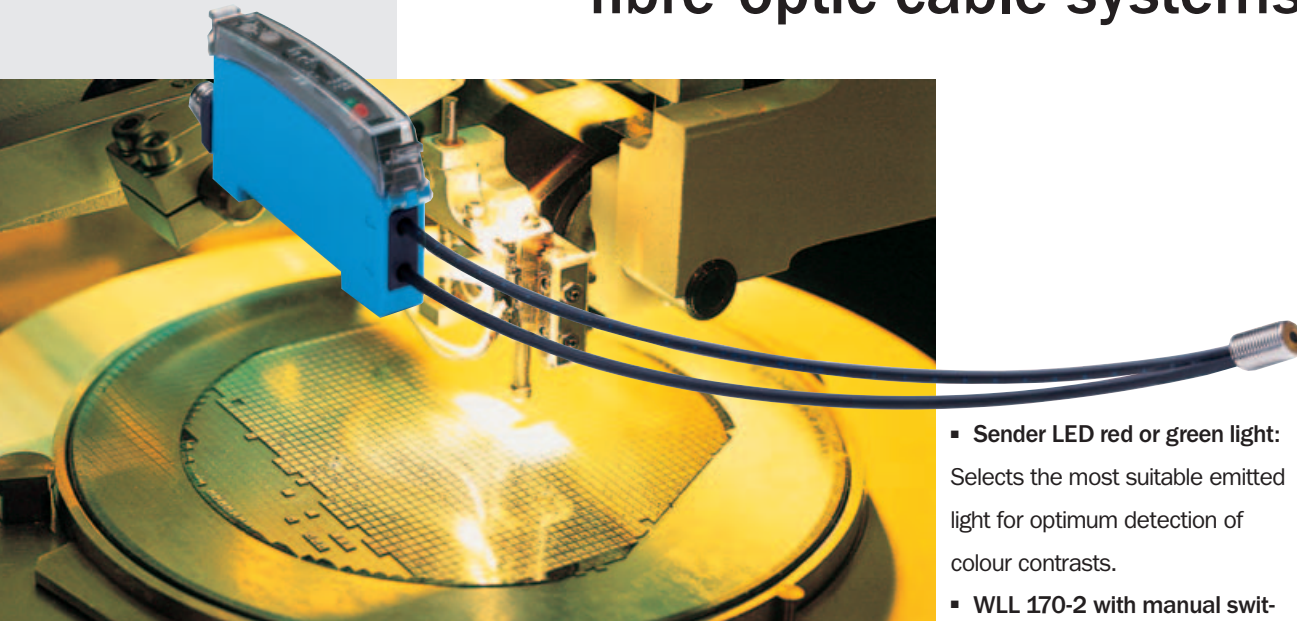


Order information	
Type	Order no.*
WS/WE170-P132	6 010 181
WS/WE170-N132	6 010 183
WS/WE170-P430	6 010 182
WS/WE170-N430	6 010 184

* Order no. includes sender and receiver

Photoelectric switches WLL 170(T), fibre-optic cables LL 3: flexible solutions with fibre-optic cable systems

	Photoelectric switches with fibre-optic cable
Proximity mode	
	Photoelectric switches with fibre-optic cable
Through-beam mode	



- **Sender LED red or green light:** Selects the most suitable emitted light for optimum detection of colour contrasts.

- **WLL 170-2 with manual switching threshold adjustment:**

The cost-effective solution for all standard applications.

- **WLL 170 High Speed:** 10,000 switching operations per second - the optimum for high speed applications.

- **WLL 170A with analogue output:** For easy measurement and control.

Large selection of suitable fibre-optic cables: Fibre-optic cable range LL 3. For WLL 170, there are around 90 LL 3 versions, offering maximum flexibility and choice for your requirements.

Typical uses for these WLL 170 / LL 3 fibre-optic cable combinations: semiconductor industry, electronics assembly, packaging technology, handling and assembly systems, special-purpose machinery, construction and precision engineering.

Fibre-optic sensors without baggage. Safe and simple switching:

The combination of photoelectric switches WLL 170(T) and fibre-optic cables LL 3 offers extremely simple handling and intelligent system options for a wide range of applications. For standard applications, but also for demanding applications such as detection of very small objects, recognition of colour marks or transparent materials.

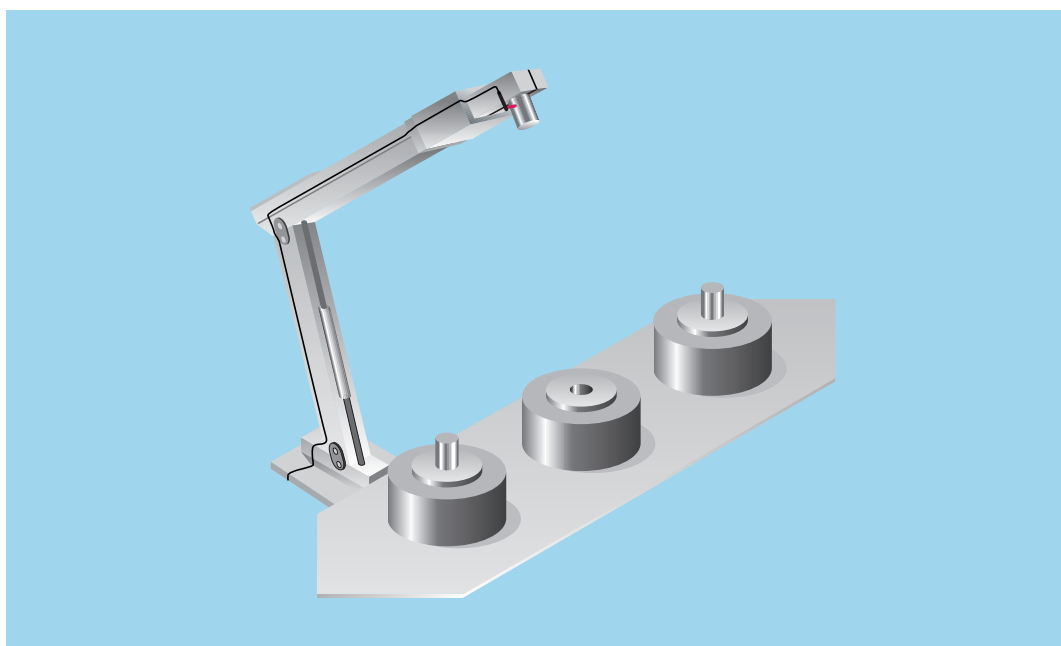
You choose:

Suitable WLL 170(T) versions, optimised for various typical uses, are available

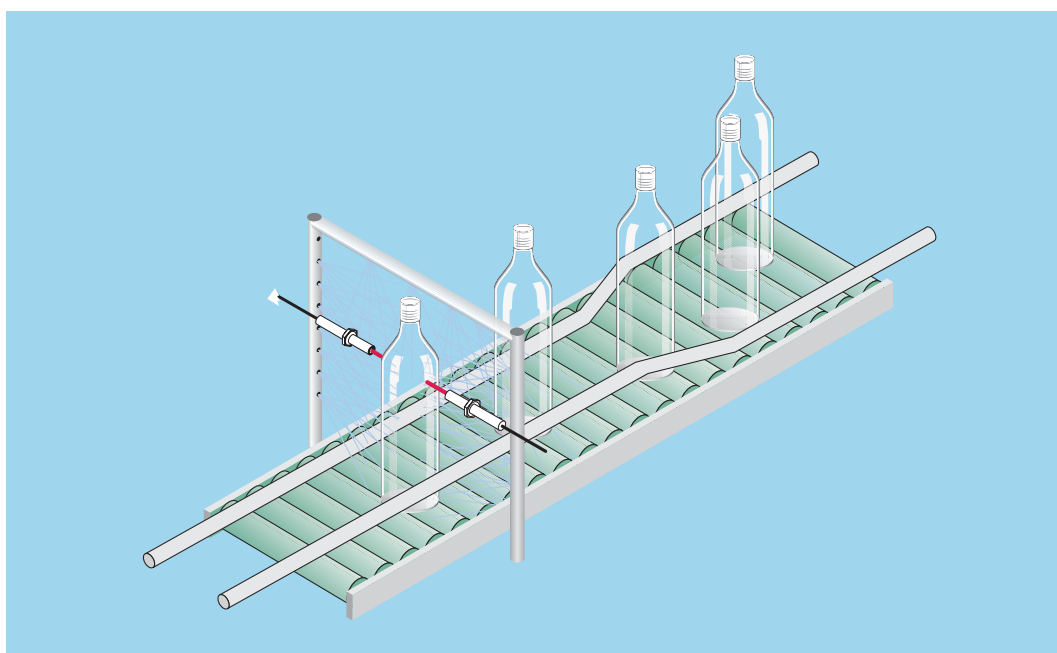
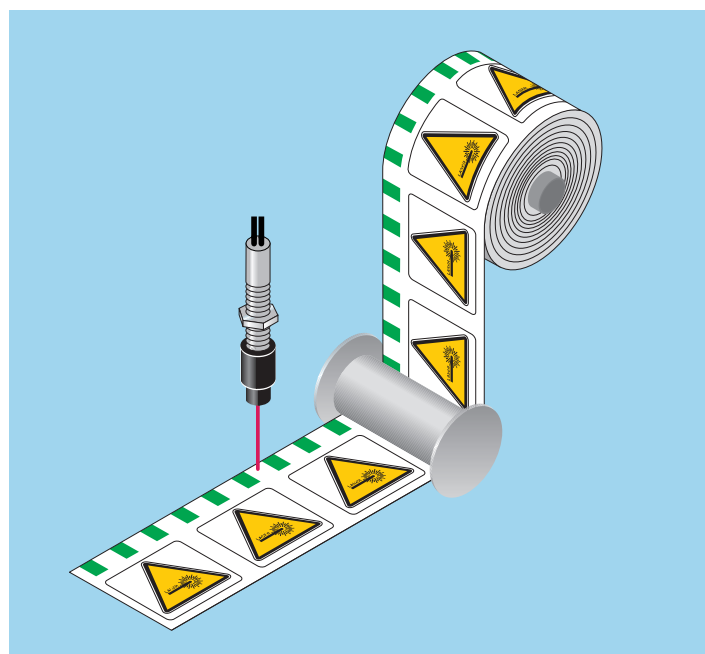
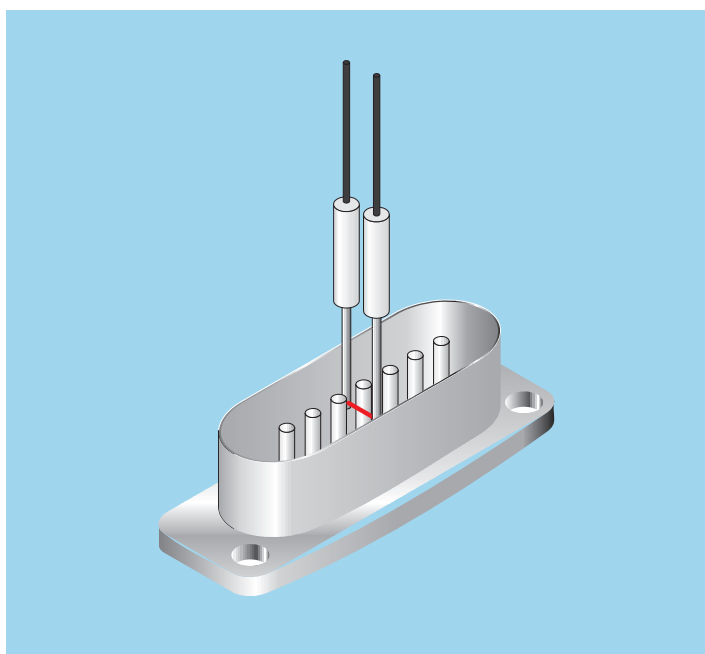
- **WLL 170T with teach-in:**

This teach-in version simplifies handling: the switching threshold and switching hysteresis are automatically set, via a push button (Teach-in).

► In pick-and-place systems, WLL 170(T) photoelectric switches with LL 3 plastic fibre-optic cables are used in a wide variety of configurations to monitor the presence or position of minute objects.





▼ Fibre-optic cables are widely used in the electronics industry. For example, fibre-optic cables with integrated 90° angle used for detecting contact pins in locations where space is restricted.



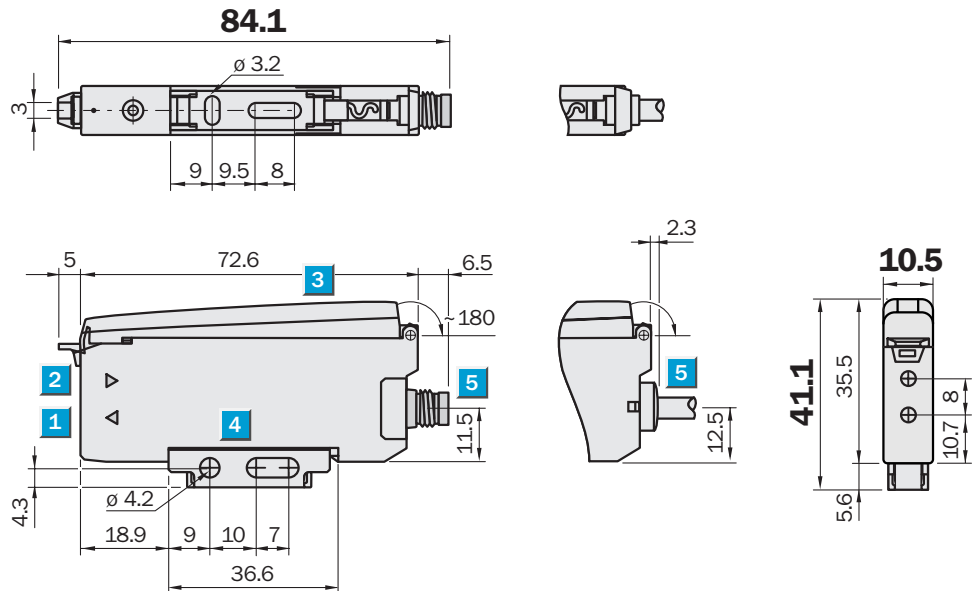
▲ WLL 170(T) units with red or green transmission light and LL 3 plastic fibre-optic cables for detecting print marks used to control labelling machines.

◀ LL 3 fibre-optic cables for special applications: here LL 3 cables with Teflon jacket are the right choice for harsh environments (i.e. contact with acids, alkaline solutions, detergents or oils).

	Scanning range 0 ... 4000 mm
Through-beam mode	
	Scanning distance 0 ... 160 mm
Proximity mode	

- Sender LED red for standard applications
- Manual sensitivity adjustment
- Simple installation and alignment

Dimensional drawing



Adjustments possible

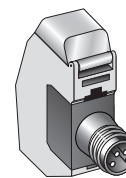
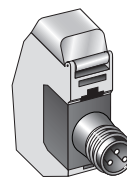
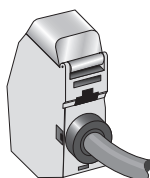


- 1 Sender LED, installation of LL 3 fibre-optic cable (sender fibre)
- 2 Receiver, installation of LL 3 fibre-optic cable (receiver fibre)
- 3 Protective hood, can be raised at both ends
- 4 Mounting bracket, included with delivery (see Accessories)
- 5 Connector
- 6 Indication of correct fibre-optic cable mounting
- 7 Indicator LED orange: lights up when switching output is active
- 8 LED signal strength indicator green, lights up when light received < 0.9 or > 1.1 (switching threshold = 1)
- 9 Sensitivity scale 270°
- 10 Sensitivity control (10 revolutions)
- 11 Selector switch for OFF delay: "OFF DLY" (=ON) / "OFF", 40 ms fixed
- 12 Selector switch: "LON" (light switching) / "D.ON" (dark switching)



Connection type

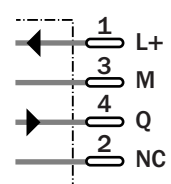
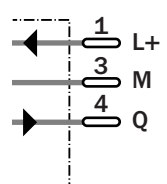
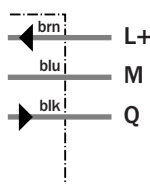
WLL170-2N132	WLL170-2N330	WLL170-2N430
WLL170-2P132	WLL170-2P330	WLL170-2P430



3 x 0.2 mm²

M8, 3-pin

M8, 4-pin



See chapter Accessories

Connector, M8, 3-pin
Connector, M8, 4-pin
Fibre-optic cable
Tip adapters
Mounting systems

Technical data		WLL170-2	N132	N330	N430	P132	P330	P430				
Operating distance	0 ... 160 mm ¹⁾											
Fibre-optic cable (proximity system):	LL3-DK06											
Adjustment of operating distance	Poti, 10 revolutions ²⁾											
Scanning range max. typ.	0 ... 4,000 mm											
Fibre-optic cable (through-beam system)	LL3-TB02 and tip adapter LL3-TA01											
Operating range, recommended	0 ... 700 mm											
Fibre-optic cable (through-beam system)	LL3-TB01											
Sensitivity adjustment	Poti, 10 revolutions ²⁾											
Light source, light type	LED, red light, 660 nm ³⁾											
Light spot diameter	Depends on scanning range											
Angle of dispersion	Approx. 65° see LL 3 fibre-optic data											
Supply voltage V_s	10 ... 30 V DC ⁴⁾											
Residual ripple	10 % ⁵⁾											
Power consumption	≤ 30 mA ⁶⁾											
Switching outputs	NPN: open collector: Q											
	PNP: open collector: Q											
Switching mode	Light/dark switching, switchable											
Output current I _a max	≤ 100 mA											
Response time	≤ 0,25 ms ⁷⁾											
Switching frequency	2,000 Hz ⁹⁾											
Time delay	40 ms fix, selectable by sliding switch											
Time type	Off delay t _{OFF}											
Connection type	Cable, Ø 3.8 mm, PVC, 2 m ⁹⁾											
	Connector, M8, 3-pin											
	Connector, M8, 4-pin											
VDE protection class	◆											
Circuit protection	V _s connections reverse-polarity protected / In-/outputs short-circuit protected / Interference pulse suppression / Outputs overcurrent and short-circuit protected											
Enclosure rating	IP 66 ¹⁰⁾											
Ambient temperature operation	-25 °C ... +55 °C											
Ambient temperature storage	-40 °C ... +70 °C											
Weight	Approx. 70 g											
Housing material	ABS/PC											

¹⁾ Object with 90 % remission (based on standard white to DIN 5033)
²⁾ Sensitivity scale 270°
³⁾ Average service life 100,000 h at T_a = +25°C

⁴⁾ Limit values
⁵⁾ may not exceed or fall short of V_s

tolerances
⁶⁾ without load
⁷⁾ Signal transit time with resistive load

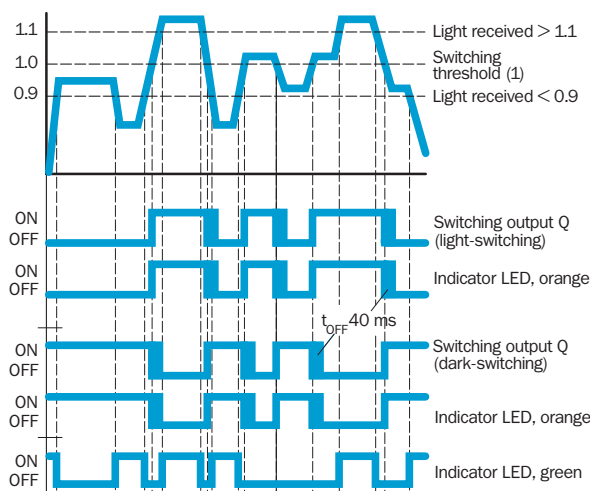
⁸⁾ with light/dark ratio 1:1
⁹⁾ do not bend below 0 °C
¹⁰⁾ with correctly attached fibre-optic cable LL 3 and closed protection hood

Function diagram for WLL 170-2

WLL 170-2



Orange LED display: lights up when switching output Q is active. Dependent on setting of light/dark selector switch.

Green LED display: lights up when light received is < 0.9 or > 1.1 (based on the switching threshold Q, switching threshold = 1).



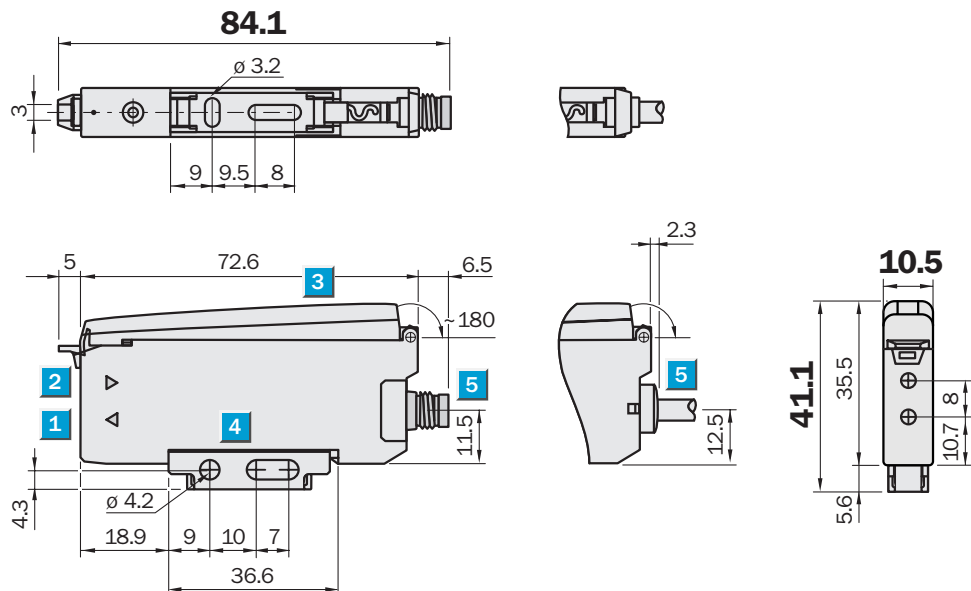
Ordering information

Type	Order no.
WLL170-2N132	6 029 515
WLL170-2N330	6 029 517
WLL170-2N430	6 029 518
WLL170-2P132	6 029 511
WLL170-2P330	6 029 513
WLL170-2P430	6 029 514

	Scanning range 0 ... 1700 mm
Through-beam mode	
	Scanning distance 0 ... 45 mm
Proximity mode	

- Sender LED green for standard applications and print mark recognition
- Manual sensitivity adjustment
- Simple installation and alignment

Dimensional drawing



Adjustments possible

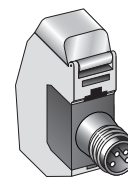
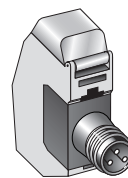
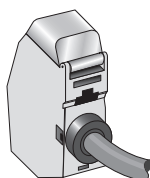


- 1 Sender LED, installation of LL 3 fibre-optic cable (sender fibre)
- 2 Receiver, installation of LL 3 fibre-optic cable (receiver fibre)
- 3 Protective hood, can be raised at both ends
- 4 Mounting bracket, included with delivery (see Accessories)
- 5 Connector
- 6 Indication of correct fibre-optic cable mounting
- 7 Indicator LED orange: lights up when switching output is active
- 8 LED signal strength indicator green, lights up when light received < 0.9 or > 1.1 (switching threshold = 1)
- 9 Sensitivity scale 270°
- 10 Sensitivity control (10 revolutions)
- 11 Selector switch for OFF delay: "OFF DLY" (=ON) / "OFF", 40 ms fixed
- 12 Selector switch: "L.ON" (light switching) / "D.ON" (dark switching)



Connection type

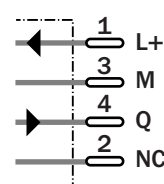
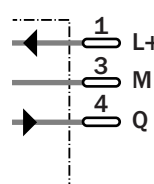
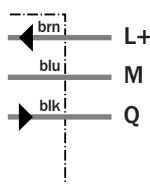
WLL170-2N192	WLL170-2N390	WLL170-2N490
WLL170-2P192	WLL170-2P390	WLL170-2P490



3 x 0.2 mm²

M8, 3-pin

M8, 4-pin



See chapter Accessories

Connector, M8, 3-pin
Connector, M8, 4-pin
Fibre-optic cable
Tip adapters
Mounting systems

Technical data		WLL170-2	N192	N390	N490	P192	P390	P490				
Operating distance	0 ... 45 mm ¹⁾											
Fibre-optic cable (proximity system):	LL3-DK06											
Adjustment of operating distance	Poti, 10 revolutions ²⁾											
Scanning range max. typ.	0 ... 1,700 mm											
Fibre-optic cable (through-beam system)	LL3-TB02 and tip adapter LL3-TA01											
Operating range, recommended	0 ... 350 mm											
Fibre-optic cable (through-beam system)	LL3-TB01											
Sensitivity adjustment	Poti, 10 revolutions ²⁾											
Light source, light type	LED, green light, 520 nm ³⁾											
Light spot diameter	Depends on scanning range											
Angle of dispersion	Approx. 65° see LL 3 fibre-optic data											
Supply voltage V_s	10 ... 30 V DC ⁴⁾											
Residual ripple	10 % ⁵⁾											
Power consumption	≤ 30 mA ⁶⁾											
Switching outputs	NPN: open collector: Q											
	PNP: open collector: Q											
Switching mode	Light/dark switching, switchable											
Output current I _a max	≤ 100 mA											
Response time	≤ 0,25 ms ⁷⁾											
Switching frequency	2,000 Hz ⁹⁾											
Time delay	40 ms fix, selectable by sliding switch											
Time type	Off delay t _{OFF}											
Connection type	Cable, Ø 3.8 mm, PVC, 2 m ⁹⁾											
	Connector, M8, 3-pin											
	Connector, M8, 4-pin											
VDE protection class	◆											
Circuit protection	V _s connections reverse-polarity protected / In-/outputs short-circuit protected / Interference pulse suppression / Outputs overcurrent and short-circuit protected											
Enclosure rating	IP 66 ¹⁰⁾											
Ambient temperature operation	-25 °C ... +55 °C											
Ambient temperature storage	-40 °C ... +70 °C											
Weight	Approx. 70 g											
Housing material	ABS/PC											

¹⁾ Object with 90 % remission (based on standard white to DIN 5033)

²⁾ Sensitivity scale 270°

³⁾ Average service life 100,000 h at

T_a = +25°C

⁴⁾ Limit values

⁵⁾ may not exceed or fall short of V_s

tolerances

⁶⁾ without load

⁷⁾ Signal transit time with resistive load

⁸⁾ with light/dark ratio 1:1

⁹⁾ do not bend below 0 °C

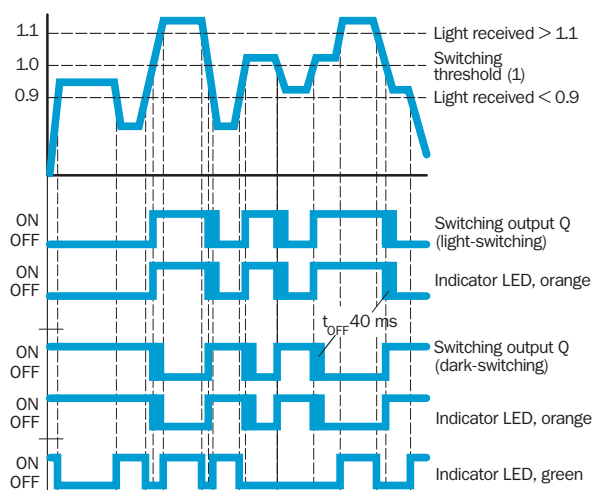
¹⁰⁾ with correctly attached fibre-optic cable LL 3 and closed protection hood

Function diagram for WLL 170-2

■ WLL 170-2



Orange LED display: lights up when switching output Q is active. Dependent on setting of light/dark selector switch.

Green LED display: lights up when light received is < 0.9 or > 1.1 (based on the switching threshold Q, switching threshold = 1).



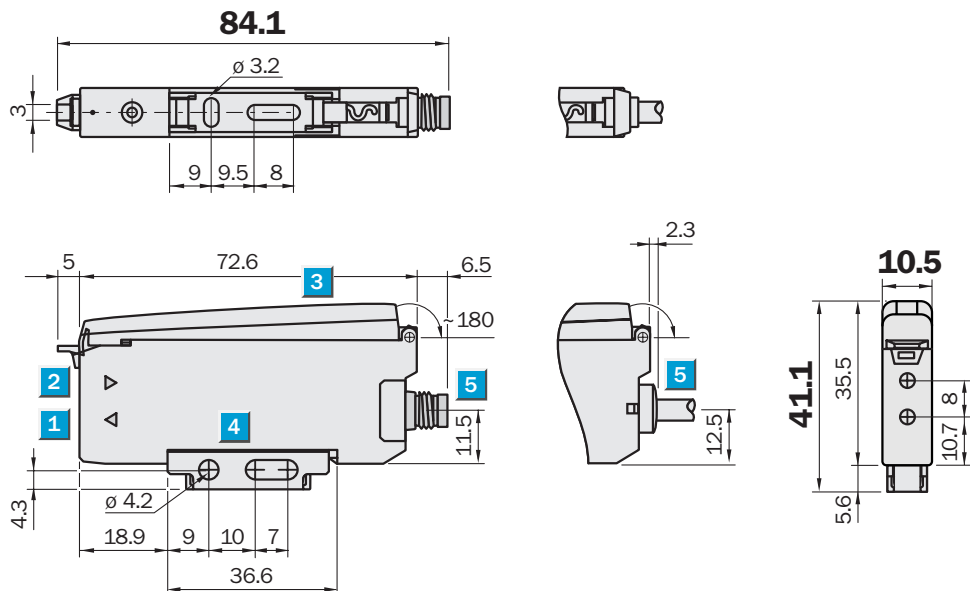
Ordering information

Type	Order no.
WLL170-2N192	6 029 523
WLL170-2N390	6 029 525
WLL170-2N490	6 029 526
WLL170-2P192	6 029 519
WLL170-2P390	6 029 521
WLL170-2P490	6 029 522

	Scanning range 0 ... 1600 mm
Through-beam mode	
	Scanning distance 0 ... 65 mm
Proximity mode	

- High speed 10,000/sec., for extremely fast processes
- Sender LED red
- Manual sensitivity adjustment
- Time delay 40 ms for signal extension

Dimensional drawing



Adjustments possible

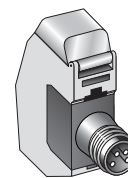
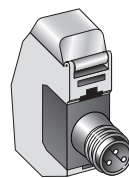
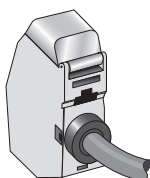


- 1 Sender LED, installation of LL 3 fibre-optic cable (sender fibre)
- 2 Receiver, installation of LL 3 fibre-optic cable (receiver fibre)
- 3 Protective hood, can be raised at both ends
- 4 Mounting bracket, included with delivery (see Accessories)
- 5 Connector
- 6 Indication of correct fibre-optic cable mounting
- 7 Indicator LED orange: lights up when switching output is active
- 8 LED signal strength indicator green, lights up when light received < 0.9 or > 1.1 (switching threshold = 1)
- 9 Sensitivity scale 270°
- 10 Sensitivity control (10 revolutions)
- 11 Selector switch for OFF delay: "OFF DLY" (=ON) / "OFF", 40 ms fixed
- 12 Selector switch: "LON" (light switching) / "D.ON" (dark switching)



Connection type

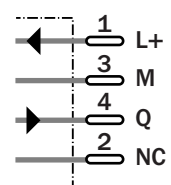
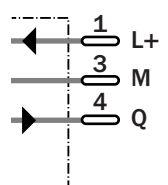
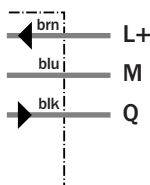
WLL170-2N162	WLL170-2N360	WLL170-2N460
WLL170-2P162	WLL170-2P360	WLL170-2P460



3 x 0.2 mm²

M8, 3-pin

M8, 4-pin



See chapter Accessories
Connector, M8, 3-pin
Connector, M8, 4-pin
Fibre-optic cable
Tip adapters
Mounting systems

Technical data		WLL170-2	N162	N360	N460	P162	P360	P460				
Operating distance	0 ... 65 mm ¹⁾											
Fibre-optic cable (proximity system):	LL3-DB01											
Adjustment of operating distance	Poti, 10 revolutions ²⁾											
Scanning range max. typ.	0 ... 1,600 mm											
Fibre-optic cable (through-beam system)	LL3-TB02 and tip adapter LL3-TA01											
Operating range, recommended	0 ... 350 mm											
Fibre-optic cable (through-beam system)	LL3-TB01											
Sensitivity adjustment	Poti, 10 revolutions ²⁾											
Light source, light type	LED, Red light, 660 nm ³⁾											
Light spot diameter	Depends on scanning range											
Angle of dispersion	Approx. 65° see LL 3 fibre-optic data											
Supply voltage V_s	10 ... 30 V DC ⁴⁾											
Residual ripple	10 % ⁵⁾											
Power consumption	≤ 30 mA ⁶⁾											
Switching outputs	NPN: open collector: Q											
	PNP: open collector: Q											
Switching mode	Light/dark switching, switchable											
Output current I _a max	≤ 100 mA											
Response time	≤ 50 µs ⁷⁾											
Switching frequency	10,000 Hz ⁸⁾											
Time delay	40 ms fix, selectable by sliding switch											
Time type	Off delay t _{OFF}											
Connection type	Cable, Ø 3.8 mm, PVC, 2 m ⁹⁾											
	Connector, M8, 3-pin											
	Connector, M8, 4-pin											
VDE protection class	◆											
Circuit protection	V _s connections reverse-polarity protected / In-/outputs short-circuit protected / Interference pulse suppression / Outputs overcurrent and short-circuit protected											
Enclosure rating	IP 66 ¹⁰⁾											
Ambient temperature operation	-25 °C ... +55 °C											
Ambient temperature storage	-40 °C ... +70 °C											
Weight	Approx. 70 g											
Housing material	ABS/PC											

¹⁾ Object with 90 % remission (based on standard white to DIN 5033)
²⁾ Sensitivity scale 270°
³⁾ Average service life 100,000 h at

T_a = +25°C

⁴⁾ Limit values

⁵⁾ may not exceed or fall short of V_s

tolerances

⁶⁾ without load

⁷⁾ Signal transit time with resistive load

⁸⁾ with light/dark ratio 1:1

⁹⁾ do not bend below 0 °C

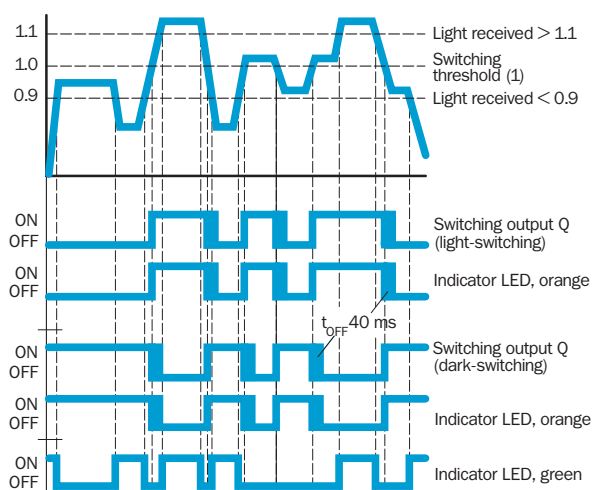
¹⁰⁾ with correctly attached fibre-optic cable LL 3 and closed protection hood

Function diagram for WLL 170-2

■ WLL 170-2

Orange LED display: lights up when switching output Q is active. Dependent on setting of light/dark selector switch.

Green LED display: lights up when light received is < 0.9 or > 1.1 (based on the switching threshold Q, switching threshold = 1).



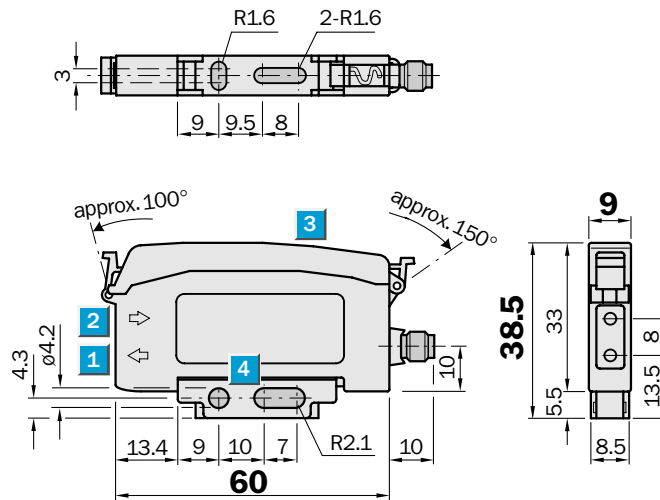
Ordering information

Type	Order no.
WLL170-2N162	6 029 531
WLL170-2N360	6 029 533
WLL170-2N460	6 029 534
WLL170-2P162	6 029 527
WLL170-2P360	6 029 529
WLL170-2P460	6 029 530

	Scanning range 0...600 mm
Through-beam systems	
	Scanning distance 0...100 mm
Proximity systems	

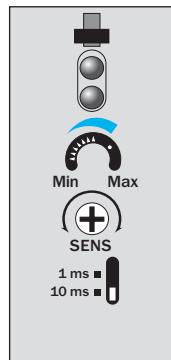
- Analogue output voltage 1...5 V
- Large range of suitable LL 3 fibre-optic cables
- Ideal for more complex requirements, e.g. positioning tasks, turbidity/transmission measurement, contrast resolution

Dimensional drawing

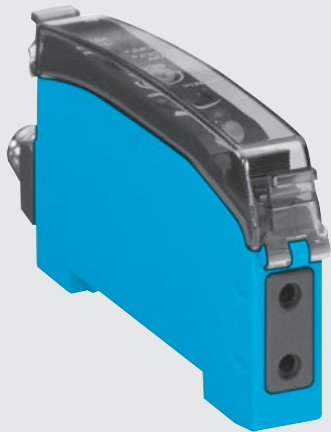


Adjustments possible

WLL 170A-V 132
WLL 170A-V 330
WLL 170A-V 430



- 1 Sender LED, installation of LL 3 fibre-optic cable (sender fibre)
- 2 Receiver, installation of LL 3 fibre-optic cable (receiver fibre)
- 3 Protective hood: can be raised at both ends, removable
- 4 Mounting bracket, included (see Accessories)
- 5 Indicator LED, orange: analogue output with saturation (≥ 5 V)
- 6 LED signal strength indicator, green: lights up when light received
- 7 Sensitivity scale, min./max. = 270°
- 8 Sensitivity control (min./max. = 7 revolutions)
- 9 Selector switch for analogue output response time

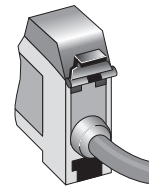
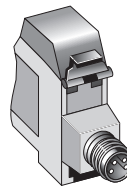
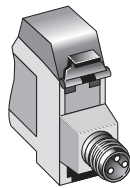


Connection types

WLL 170A-V 330

WLL 170A-V 430

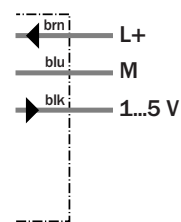
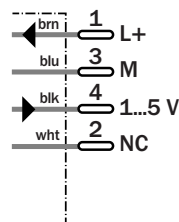
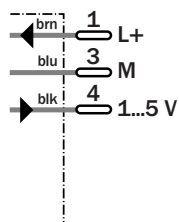
WLL 170A-V 132



3-pin, M8

4-pin, M8

Ø 4 mm



See chapter Accessories

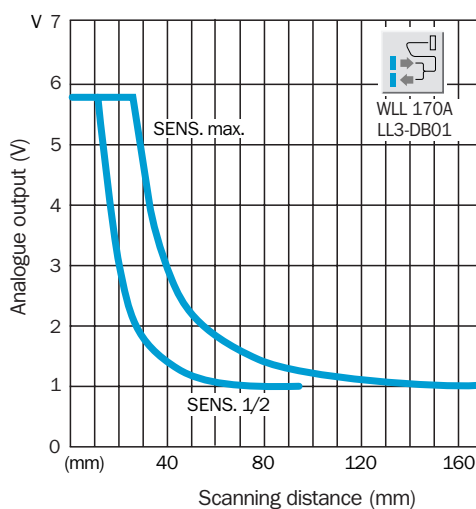
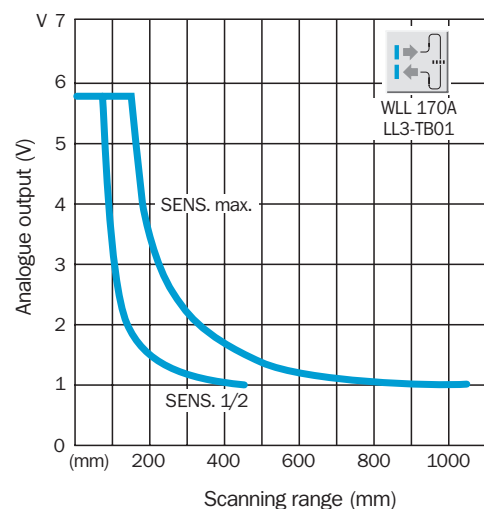
Cables and connectors
Mounting systems
Fibre-optic cables



Technical data		WLL 170T-	V 132	V 330	V 430						
Suitable fibre-optic cable	LL 3 plastic fibre-optic cables										
Scanning range¹⁾	Depends on fibre-optic cable used										
Recommended operating ranges¹⁾	max. 0...600 mm (through-beam syst.) (with tip adapters 0...3200 mm)										
Recommended operating distance¹⁾	max. 0...100 mm ²⁾ (proximity system)										
Light source³⁾, light type	LED, visible red light										
Light spot diameter of LL 3	Depends on scanning range										
Disp. angle of LL 3 fibre-optic cable	Approx. 65° ⁴⁾										
Supply voltage V_S⁵⁾	10...30 V DC										
Ripple ⁶⁾	10 %										
Current consumption ⁷⁾	≤ 40 mA										
Analogue output											
Voltage output	1...5 V 1 V = no light received 5 V = saturation										
Load current (max.)	10 mA										
Output resistance (R_i)	47 Ω										
Load resistance	≥ 5 kΩ (recommended)										
Response time, selectable⁸⁾	1 ms/10 ms										
Sensitivity, adjustable	Potentiometer, 7 turns ⁹⁾										
Connection types cable ¹⁰⁾	PVC, 2 m; 3 x 0.2 mm ² , ∅ 4.0 mm										
plug	M8, 3-pin										
plug	M8, 4-pin										
Cable extension	max. 100 m; signal loss to be expected										
Circuit protection¹¹⁾	A, C, D										
VDE protection class	⊕										
Enclosure rating	IP 50										
Ambient temperature T_A	Operation - 25 °C...+ 55 °C Storage - 40 °C...+ 70 °C										
Weight											
with cable	Approx. 60 g										
with M8 plug	Approx. 20 g										
Housing material	ABS										



- 1) See Accessories; selection table for LL 3 fibre-optic cables
- 2) Object with 90 % remission (based on standard white to DIN 5033)
- 3) Average service life 100,000 h at T_A = + 25 °C
- 4) Deviations, see data for LL 3
- 5) Limit values
- 6) May not exceed or fall short of V_S tolerances
- 7) Without load
- 8) Delay time: change in received light/change in analogue output, (90 % of upper range value)
- 9) Scale 270°
- 10) Do not bend below 0 °C
- 11) A = V_S connections reverse-polarity protected
C = Interference pulse suppression
D = Outputs overcurrent and short-circuit protected

WLL 170A, analogue, typical curves



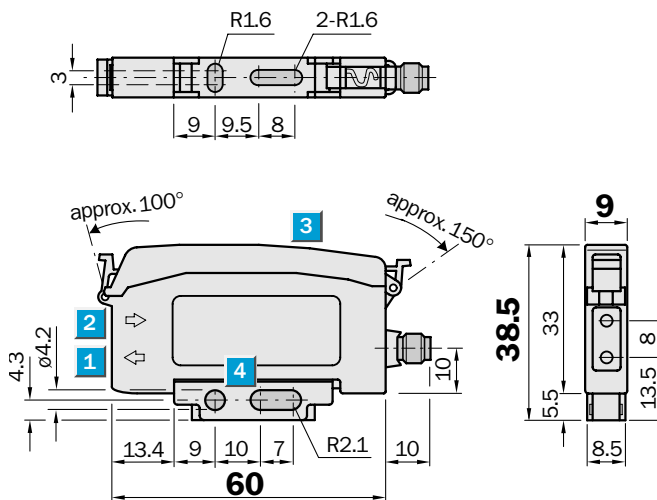
Order information

Type	Order no.
WLL 170A-V 132	6 021 078
WLL 170A-V 330	6 021 962
WLL 170A-V 430	6 021 080

	Scanning range 0...580 mm
Through-beam systems	
	Scanning distance 0...100 mm
Proximity systems	

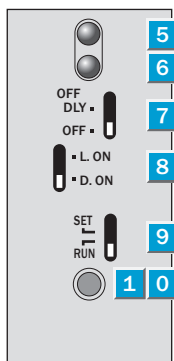
- Red sender LED
- For standard applications and mark recognition
- Easy alignment and commissioning by teach-in

Dimensional drawing



Adjustments possible

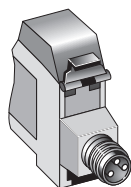
WLL 170T-P 132	WLL 170T-N 132
WLL 170T-P 330	WLL 170T-N 330
WLL 170T-P 430	WLL 170T-N 430



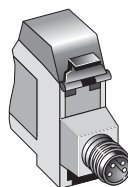
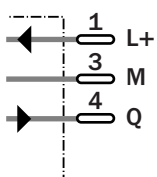
- LED sender, installation of LL 3 fibre-optic cable (sender fibre)
- Receiver, installation of LL 3 fibre-optic cable (receiver fibre)
- Protective hood, can be raised at both ends, removable
- Mounting bracket, included (see Accessories)
- Orange LED indicator, lights up when switching output is active
- Green LED reception indicator, lights up when light received is < 0.9 or > 1.1 (switching threshold = 1)
- OFF delay selector switch: "OFF DLY" (on)/"OFF", 40 ms fixed
- Selector switch: "L.ON" (light-switching)/"D.ON" (dark-switching)
- Operating mode selector switch: "SET" (Teach-in mode)/"RUN" (sensor mode)
- "Teach-in" push button

Connection types

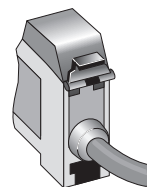
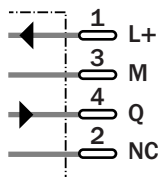
WLL 170T-P 330	WLL 170T-P 430	WLL 170T-P 132
WLL 170T-N 330	WLL 170T-N 430	WLL 170T-N 132



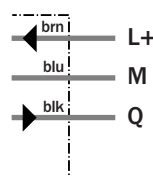
3-pin, M8



4-pin, M8



ø 4 mm



See chapter Accessories

- Cables and connectors
- Mounting systems
- Fibre-optic cables

Technical data		WLL 170T-	P 132	P 330	P 430	N 132	N 330	N 430				
Suitable fibre-optic cable	LL 3 plastic fibre-optic cables											
Scanning range	Dependent on fibre-optic cable used											
Recommended operating ranges	0...580 mm (through-beam system) (with auxiliary lens 0...3200 mm)											
Recommended operating distance	0...100 mm ¹⁾ (proximity system)											
Sensitivity setting	Automatically, by Teach-in button	Mode switch at pos. "SET" ²⁾										
Mode selector switch	position "SET"	Teach-in button active										
	position "RUN"	Teach-in button inactive ³⁾										
Light source⁴⁾, light type	LED, visible red light											
Light spot diameter LL 3	Dependent on scanning range											
Dispersion angle LL 3 fibre-optic cable	Approx. 65° ⁵⁾											
Supply voltage V_S⁶⁾	10...30 V DC											
Ripple ⁷⁾	10%											
Current consumption ⁸⁾	≤ 50 mA											
Switching outputs	PNP: open collector: Q											
	NPN: open collector: Q											
Output current I_A max.	100 mA											
Light receiver, switching type	Dark-/light-switching ⁹⁾											
Response time¹⁰⁾	≤ 0.5 ms											
Switching frequency max.¹¹⁾	1000/s											
Time delay t_{OFF} (OFF delay)	40 ms fix, selectable by sliding switch											
Connection types	cable ¹²⁾	PVC, 2 m; 3 x 0.2 mm ² , ø 4.0 mm										
	plug	M8, 3-pin										
	plug	M8, 4-pin										
Circuit protection¹³⁾	A, B, C, D											
VDE protection class	⚡											
Enclosure rating	IP 50											
Ambient temperature T_A	Operation	- 25 °C...+ 55 °C										
	Storage	- 40 °C...+ 70 °C										
Weight												
with cable 2 m	Approx. 60 g											
with M8 plug, 3-pin/4-pin	Approx. 20 g											
Housing material	ABS											

- 1) Object with 90 % remission (based on standard white to DIN 5033)
- 2) Teach-in active
- 3) Equipment in sensor mode
- 4) Average service life 100,000 h at T_A = + 25 °C
- 5) See LL 3 data for deviations
- 6) Limit values
- 7) May not exceed or fall short of V_S tolerances
- 8) Without load
- 9) By sliding switch
- 10) With light/dark ratio 1 : 1 without time delay
- 11) With resistive load
- 12) Do not bend below 0 °C
- 13) A = V_S connections reverse-polarity protected
 B = Inputs/outputs reverse-polarity protected
 C = Interference suppression
 D = Outputs overcurrent and short-circuit protected

Function diagram WLL 170T Standard

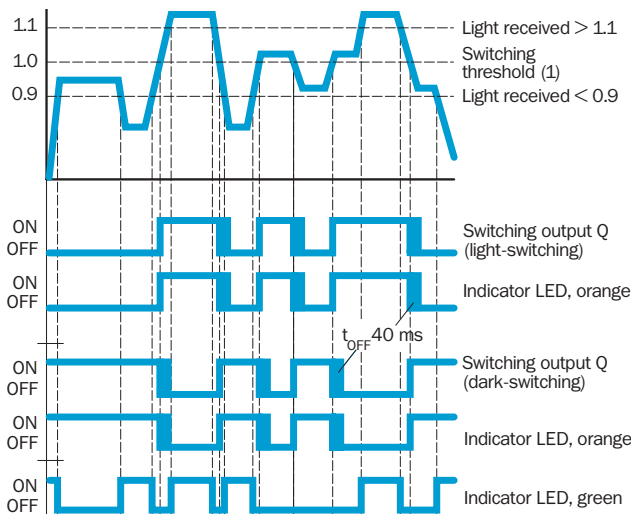
WLL 170T in sensor mode

Operating mode selector switch in RUN mode (after setting the switching threshold by means of Teach-in).

Orange LED display: lights up if switching output Q is active. Dependent on setting of light/dark selector switch.

Green LED display: lights up if light received is < 0.9 or > 1.1 (based on the switching threshold Q, switching threshold = 1).

LED display in Teach-in mode: see Teach-in page 643.



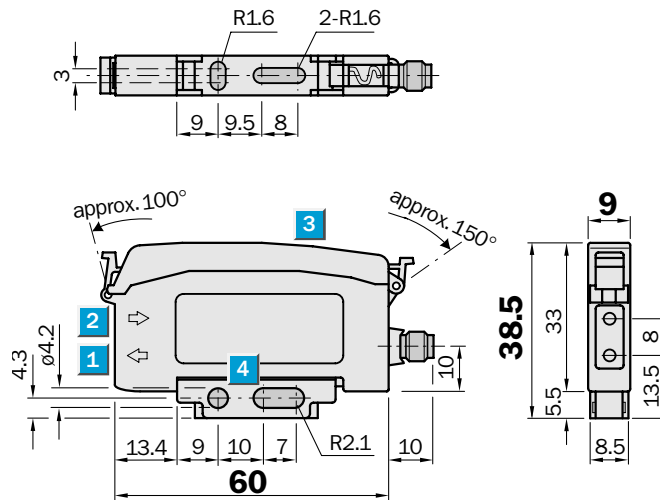
Order information

Type	Order no.
WLL 170T-P 132	6 011 722
WLL 170T-P 330	6 021 963
WLL 170T-P 430	6 011 724
WLL 170T-N 132	6 011 725
WLL 170T-N 330	6 021 964
WLL 170T-N 430	6 011 727

	Scanning range 0...140 mm
Through-beam systems	
	Scanning distance 0...25 mm
Proximity systems	

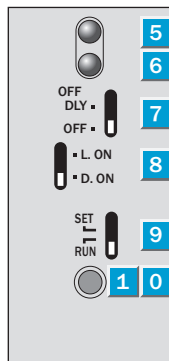
- Green sender LED
- Ideal for recognition of red marks, contrasts or parts
- Commissioning by teach-in

Dimensional drawing

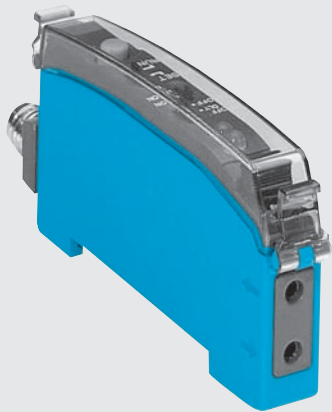


Adjustments possible

WLL 170T-P 192	WLL 170T-N 192
WLL 170T-P 390	WLL 170T-N 390
WLL 170T-P 490	WLL 170T-N 490

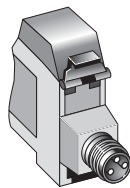


- LED sender, installation of LL 3 fibre-optic cable (sender fibre)
- Receiver, installation of LL 3 fibre-optic cable (receiver fibre)
- Protective hood, can be raised at both ends, removable
- Mounting bracket, included in delivery (see Accessories)
- Orange LED indicator, lights up when switching output is active
- Green LED reception indicator, lights up when light received is < 0.9 or > 1.1 (switching threshold = 1)
- OFF delay selector switch: "OFF DLY" (on)/"OFF", 40 ms fixed
- Selector switch: "L.ON" (light-switching)/"D.ON" (dark-switching)
- Operating mode selector switch: "SET" (Teach-in mode)/"RUN" (sensor mode)
- "Teach-in" push button

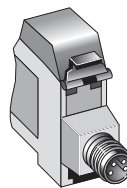
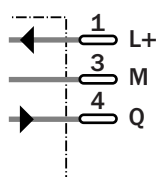


Connection types

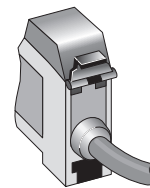
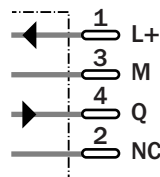
WLL 170T-P 390	WLL 170T-P 490	WLL 170T-P 192
WLL 170T-N 390	WLL 170T-N 490	WLL 170T-N 192



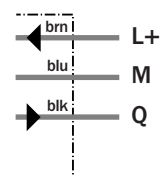
3-pin, M8



4-pin, M8



ø 4 mm



See chapter Accessories

- Cables and connectors
- Mounting systems
- Fibre-optic cables

Technical data		WLL 170T-	P 192	P 390	P 490	N 192	N 390	N 490				
Suitable fibre-optic cable	LL 3 plastic fibre-optic cables											
Scanning range	Dependent on fibre-optic cable used											
Recommended operating ranges	0...140 mm (through-beam system) (with auxiliary lens 0...650 mm)											
Recommended operating distance	0...25 mm ¹⁾ (proximity system)											
Sensitivity setting												
Automatically, by Teach-in button	Mode switch at pos. "SET" ²⁾											
Additional fine alignment, manual	Optional ⁵⁾											
Black & white resolution³⁾	8 grey levels											
Mode selector switch position "SET"	Teach-in button active											
position "RUN"	Teach-in button inactive ⁴⁾											
Light source⁵⁾, light type	LED, visible green light											
Light spot diameter LL 3	Dependent on scanning range											
Dispersion angle LL 3 fibre-optic cable	Approx. 65° ⁶⁾											
Supply voltage V_S⁷⁾	10...30 V DC											
Ripple ⁸⁾	10%											
Current consumption ⁹⁾	≤ 50 mA											
Switching outputs	PNP: open collector: Q NPN: open collector: Q											
Output current I_A max.	100 mA											
Light receiver, switching type	Dark/light switching ¹⁰⁾											
Response time¹¹⁾	≤ 0.5 ms											
Switching frequency max.¹²⁾	1000/s											
Time delay t_{OFF} (OFF delay)	40 ms fix, selectable by sliding switch											
Connection types cable ¹³⁾	PVC, 2 m; 3 x 0.2 mm ² , ø 4.0 mm											
plug	M8, 3-pin											
plug	M8, 4-pin											
Circuit protection¹⁴⁾	A, B, C, D											
VDE protection class	⚡											
Enclosure rating	IP 50											
Ambient temperature T_A	Operation - 25 °C...+ 55 °C Storage - 40 °C...+ 70 °C											
Weight with cable 2 m	Approx. 60 g											
with M8 plug, 4-pin	Approx. 20 g											
Housing material	ABS											

- 1) Object with 90 % remission (based on standard white to DIN 5033)
- 2) Teach-in active
- 3) With LL 3-DT01 proximity fibre-optic cable, scanning distance 3 mm
- 4) Equipment in sensor mode
- 5) Average service life 100,000 h at T_A = + 25 °C
- 6) See LL 3 data for deviations

- 7) Limit values
- 8) May not exceed or fall short of V_S tolerances
- 9) Without load
- 10) By sliding switch
- 11) With light/dark ratio 1: 1 without time delay
- 12) With resistive load
- 13) Do not bend below 0 °C

- 14) A = V_S connections reverse-polarity protected
- B = Inputs/outputs reverse-polarity protected
- C = Interference suppression
- D = Outputs overcurrent and short-circuit protected

Function diagram WLL 170T standard

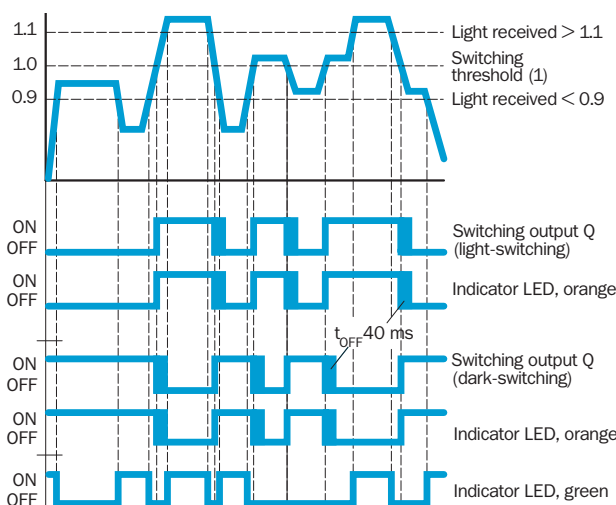
WLL 170T in sensor mode

Operating mode selector switch in RUN mode (after setting the switching threshold by means of Teach-in).

Orange LED display: lights up if switching output Q is active. Dependent on setting of light/dark selector switch.

Green LED display: lights up if light received is < 0.9 or > 1.1 (based on the switching threshold Q, switching threshold = 1).

LED display in Teach-in mode: see Teach-in page 643.



Order information

Type	Order no.
WLL 170T-P 192	6 011 728
WLL 170T-P 390	6 021 967
WLL 170T-P 490	6 011 730
WLL 170T-N 192	6 011 731
WLL 170T-N 390	6 021 968
WLL 170T-N 490	6 011 733

Functions

■ Teach-in button

Sensitivity adjustment by pressing a button. No special photoelectric switch knowledge necessary.

Only active when MODE selector switch is in the SET position (manipulation protection).

■ Switching selector switch Q

L.ON: light-switching.
D.ON: dark-switching.
Either in NPN or PNP.

■ Connection type

Either M8, 3-pin/4-pin equipment plug or 2 m connection cable.

■ OFF delay t_{off}

For switching output Q.
Also switchable, 40 ms fixed.
Enables the control unit to detect very short events.

■ Mounting system WLL 170T

Mounting by simply clipping onto profile mounting rail. (Mounting bracket included in delivery).

■ LED indicators orange, green

■ Teach-in mode:
Signalling Teach-in sequence
Constantly flashing: Teach-in error
Constantly lit: Teach-in OK.

■ Sensor mode:
Orange LED: switching output active
Green LED: receiver signal > 1.1 or < 0.9 ; (switching threshold = 1).

■ Sender LED:

Either red or green LED (see selection table)
Red LED: Ideal for all standard applications (high transmission power, large ranges), also for mark detection.
Warning: not possible to detect red marks with red light.
Green LED: Ideal for recognition of red marks.

■ μ -processor controlled, with EEPROM:

Permanent retention of taught-in switching threshold and hysteresis even if voltage is interrupted for a longer period of time.

■ Teach-in mode selector switch

Separate from other operating mode selector switches, therefore simple to operate, no double functions.

- "SET": WLL 170T in manual Teach-in mode. Optimum switching point setting by simply pressing a button (once or twice).
- "RUN": The taught-in switching threshold and switching hysteresis are saved in the EEPROM.
- "Accidental change" of the taught-in parameter is not possible.
- After 2 seconds the WLL 170T operates in the sensor mode. The saved Teach-in values are retained for an unlimited period of time even if the voltage is interrupted for a longer time.

■ Protective hood

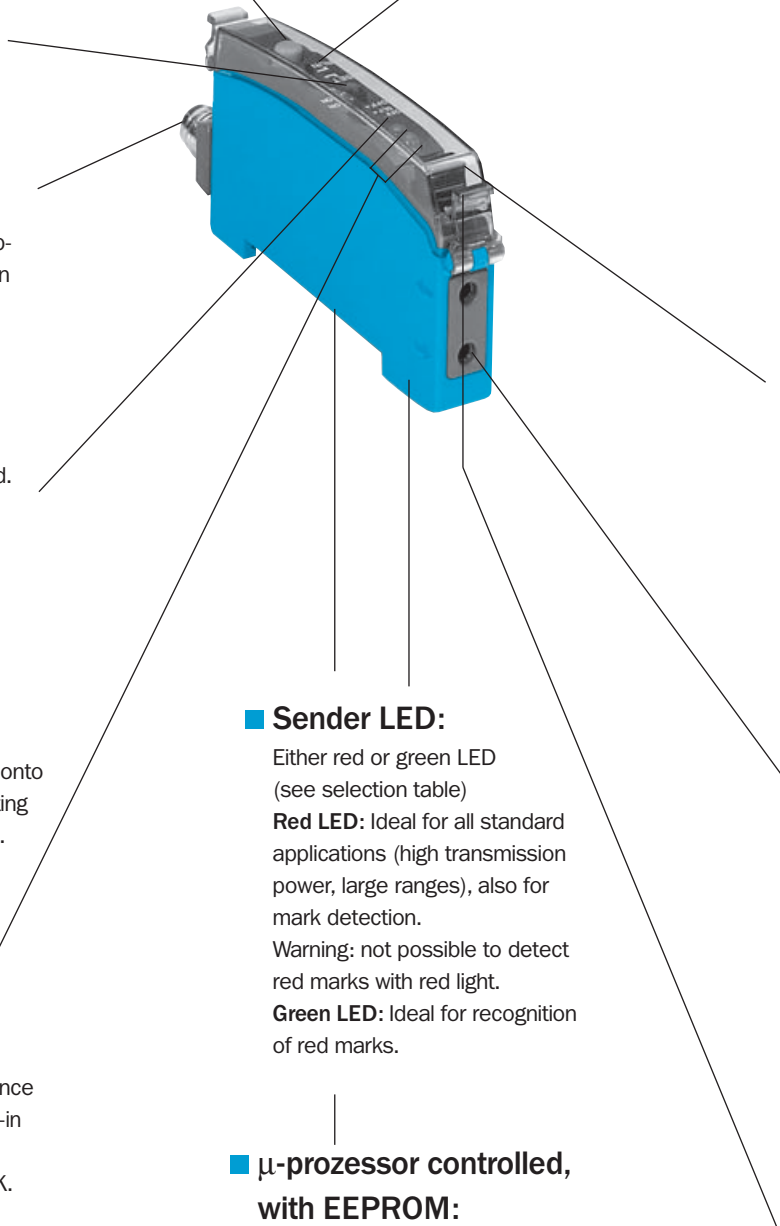
Both sides can be opened up, easy to remove. Easy locking. Also used to check correct fibre-optic cable locking (protective hood cannot be shut otherwise).

■ Snap-in connector for fibre-optic cable

- Fibre-optic cable mounting
Release fibre-optic cable: snap closure in horizontal position. Insert the fibre-optic cable. Lock the fibre-optic cable: closure in vertical position.
- Removing fibre-optic cable
Release the fibre-optic cable: put the snap closure in a horizontal position. Pull out the fibre-optic cable.

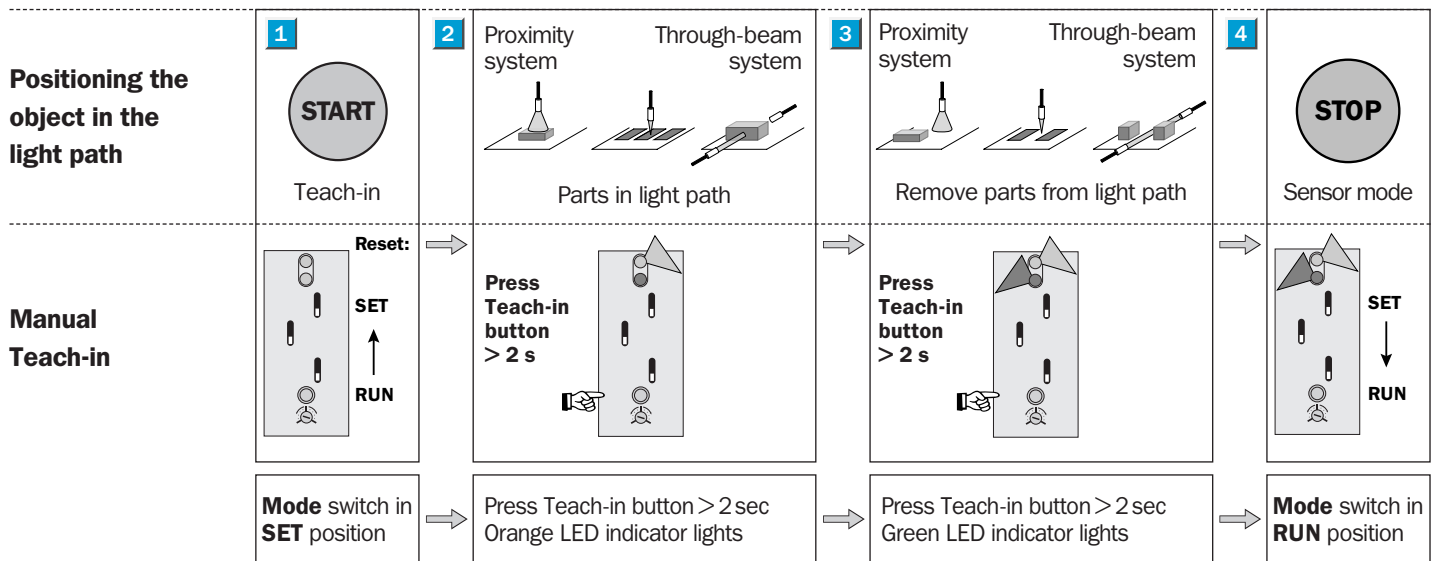
■ Fibre-optic cable receptacle

← fibre-optic cable (sender).
→ fibre-optic cable (receiver).
Suitable fibre-optic cable: LL 3 series plastic fibre-optic cable (see description of the many LL 3 variants).



1. Accurate sensitivity setting (by pressing button twice); WLL 170T

Teach-in steps

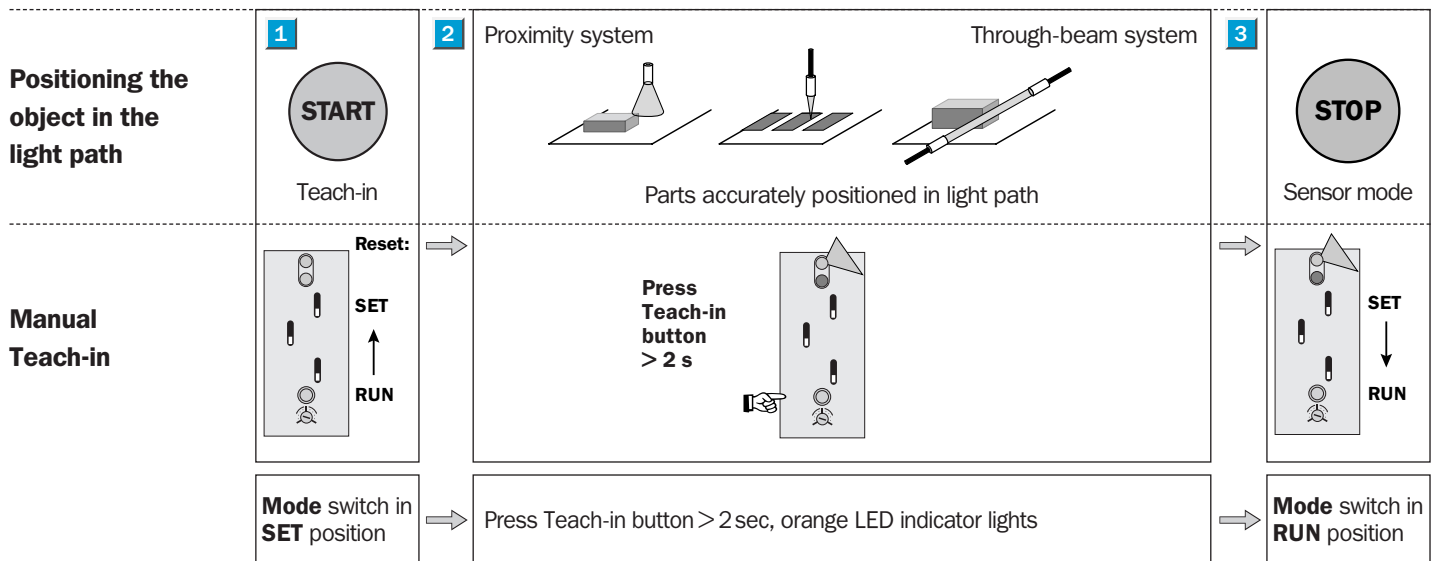


This operating mode is suitable for all applications: large ranges, precise switching points, low hysteresis, transparent objects and contrast marks. The WLL 170T automatically optimizes the switching threshold and hysteresis by means of a μ -processor and saves these values permanently in the EEPROM. No special experience with opto-electronic components is necessary. The Teach-in button is pressed twice.

- Applications:** Through-beam system: All standard applications, even thin and transparent objects are detected.
 Proximity system: All standard applications, strong background interference, small or dark target objects, simple marks with contrast differences.

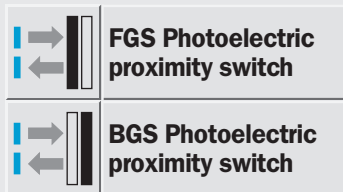
2. Accurate positioning of parts or switching positions (by pressing button once); WLL 170T

Teach-in steps

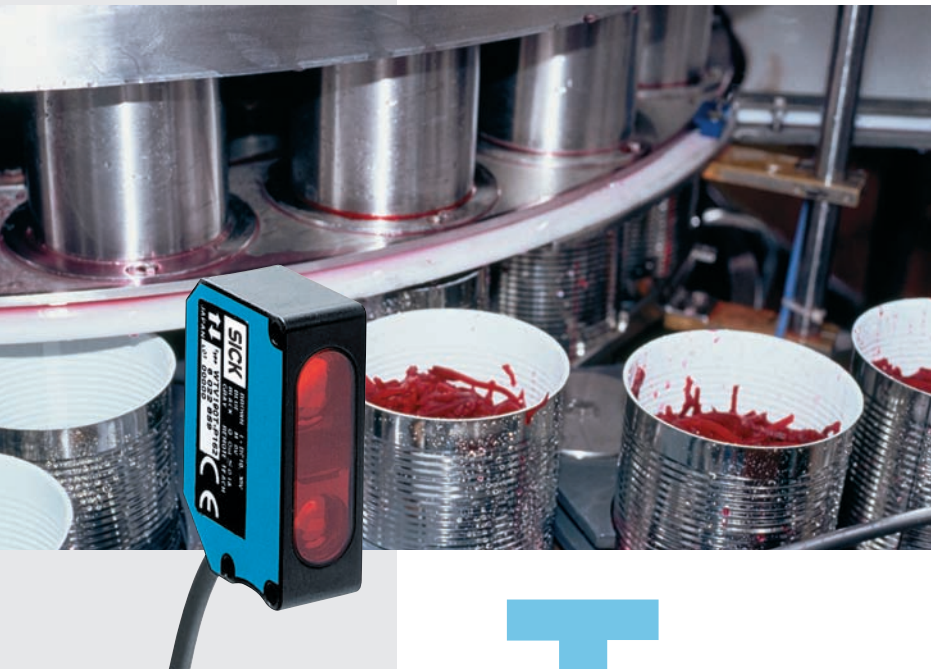


This operating mode is particularly suitable for accurate positioning tasks. After positioning the object in the desired switching position, the WLL 170T automatically optimizes the switching threshold and hysteresis by means of a μ -processor and saves the values permanently in the EEPROM. No special experience with opto-electronic components is necessary. The Teach-in button is pressed once.

- Applications:** Through-beam system: Accurate positioning of parts.
 Proximity system: Accurate positioning of parts, positioning of contrast marks.



WT190T: The convenient, reliable proximity switch – precisely the right one for challenging applications



The most important market requirements for photoelectric proximity switches in demanding applications are economic efficiency, reliability and easy operation. The WT190T series composed of the photoelectric proximity switch WTB190T with background suppression and the WTV190T with foreground suppression fulfill these requirements. The WT190T stands for innovative technologies for solving multifaceted tasks.

Standard system features:

Red light: The sensors can be aligned optimally and quickly on the object using the visible light spot.

Teach-in procedure at the push of a button or externally: This enables simplified and very effective alignment of equipment.

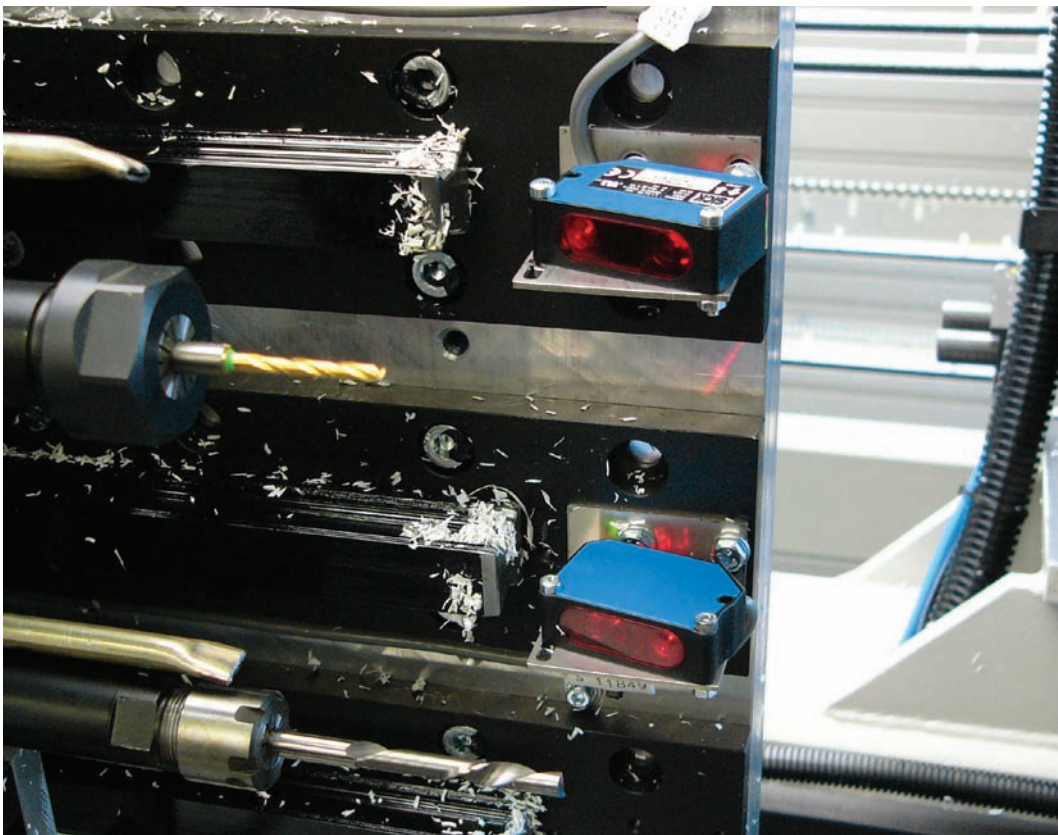
Equipment parameterization at the push of a button:

The scanners can be programmed conveniently via the selection mode and consequently aligned ideally for the application. When the situation requires it, a timer function can be activated with a time delay up to 10 seconds.

Display: Menu prompting is via the easily readable display. The compact, industrial standard ABS plastic housing makes it possible to use the equipment even in difficult environmental conditions. The 4-pin M8 equipment plug or the 2m cable are standard equipment in the same way as the 200 Hz switching frequency. The performance range of the WT190T can be used meaningfully in the following fields:

- Packaging industry,
- Electronics industry,
- Handling/robotic systems,
- Special-purposes construction machine.

► WTV190T photoelectric proximity switch with foreground suppression: presence control in a packaging machine.



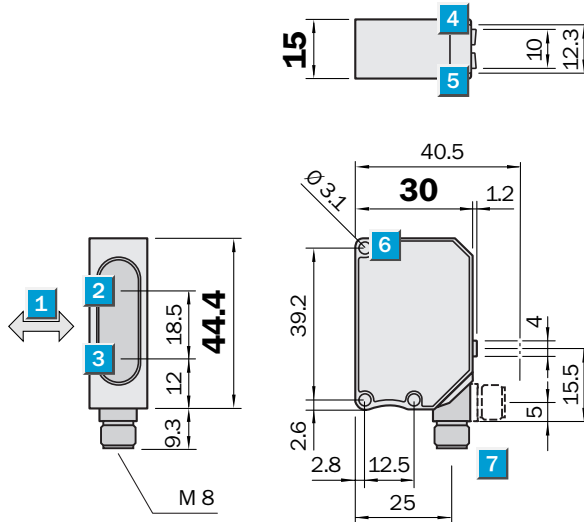
◄ WTB190T photoelectric proximity switch with background suppression for monitoring of drill fracture. The sensor supervises the presence of drills.

Scanning distance
80 ... 300 mm

Photoelectric proximity switch

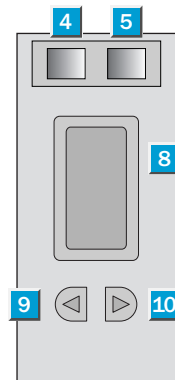
- Precise foreground suppression
- Small light spot enabling fast and precise alignment
- Scanning range setting via Teach-in procedure
- Easily readable display with menu navigation enables convenient programming and parameterization

Dimensional drawing



Adjustments possible

- WTV190T-N162
- WTV190T-N460
- WTV190T-P162
- WTV190T-P460



- 1 Standard direction of the material being scanned
- 2 Centre of optical axis, receiver
- 3 Centre of optical axis, sender
- 4 LED indicator green: output active
- 5 LED indicator orange: light reception with operating reserve > 1.1 or without light reception
- 6 Mounting holes, Ø approx. 3.1 mm
- 7 Connection
- 8 Numerical display
- 9 Select mode button
- 10 Teach-in button

External Teach-in

Time	Teach mode
1.5 s - 3.8 s	1-point teach-in
4 s - 6.3 s	2-point teach-in



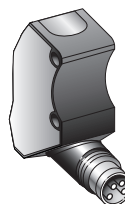
Connection type

- WTV190T-N162
- WTV190T-P162

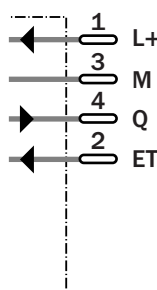
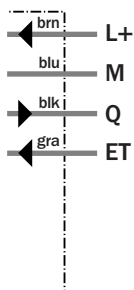
- WTV190T-N460
- WTV190T-P460



4 x 0.2 mm²



M8, 4-pin



See chapter Accessories

- Connector, M8, 4-pin
- Mounting systems

Technical specifications		WTV190T-	N162	N460	P162	P460						
Scanning distance typ. max.	80 ... 300 mm ¹⁾											
Operating distance	100 ... 300 mm ¹⁾											
Adjustment of operating distance	Teach-in: teach button & cable (ET) ²⁾											
Light source, light type	LED, Red light, 680 nm ³⁾											
Light spot diameter	11 mm at distance of 300 mm											
Supply voltage V _s	DC 10 ... 30 V ⁴⁾											
Ripple	± 10 % ⁵⁾											
Power consumption	60 mA ⁶⁾											
Switching outputs	NPN: open collector: Q PNP: open collector: Q											
Switching mode	Light/dark-switching, programmable											
Signal voltage PNP HIGH / LOW	V _s - 1.8 V / approx. 0 V											
Signal voltage NPN HIGH / LOW	Approx. V _s / < 1.8 V											
Output current I _a max	100 mA											
Response time	2.5 ms ⁷⁾											
Switching frequency	200 Hz ⁸⁾											
Time step	0...10 s, programmable											
Time type	Nor: normal Mode Ond: ON Delay Mode OFd: OFF Delay Mode											
Connection type	Cable, PVC, 2 m ⁹⁾ Connector, M8, 4-pin											
VDE protection class	⊠											
Circuit protection	V _s connections reverse-polarity protected / In-/outputs short-circuit protected / Interference pulse suppression / Outputs overcurrent and short-circuit protected											
Enclosure rating	IP 67											
Ambient temperature operation	-25 °C ... +55 °C											
Ambient temperature storage	-40 °C ... +70 °C											
Weight	Approx. 66 g Approx. 18 g											
Housing material	ABS / PMMA											

¹⁾ Object with 90% remission (based on standard white to DIN 5033)

²⁾ PNP: control wire > 7 V
NPN: control wire < 1.5 V

³⁾ Average service life 100,000 h at T_a = +25 °C

⁴⁾ Limit values, operation in short-circuit protected network max. 8 A

⁵⁾ may not exceed or fall short of V_s tolerances

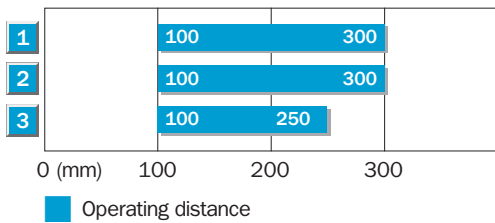
⁶⁾ without load

⁷⁾ Signal transit time with resistive load

⁸⁾ with light/dark ratio 1:1

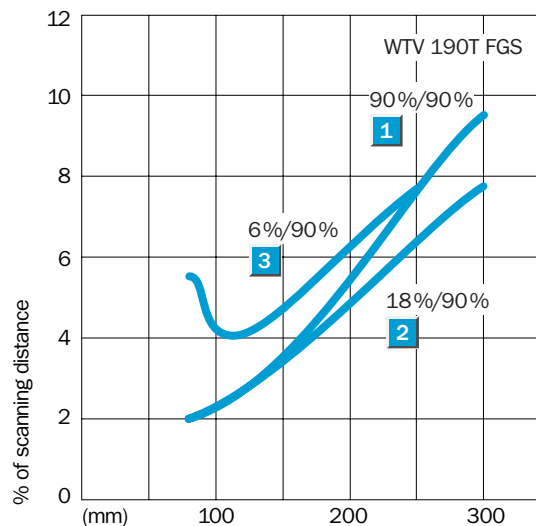
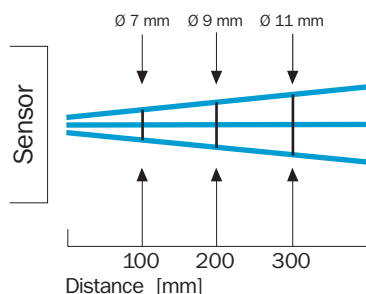
⁹⁾ do not bend below 0 °C

Operating distance



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

Light spot diameter



Ordering information

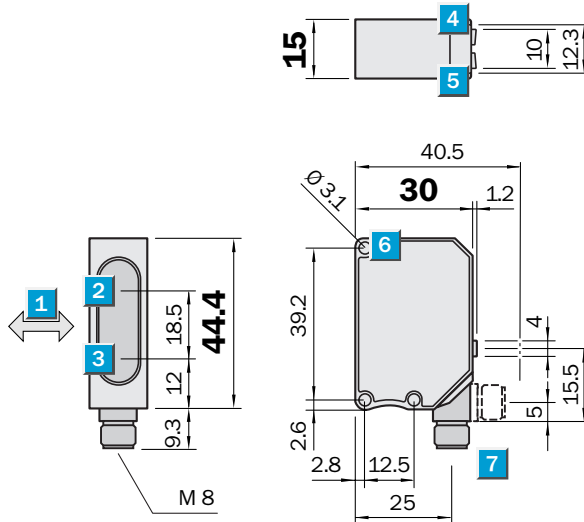
Type	Order no.
WTV190T-N162	6 022 855
WTV190T-N460	6 022 858
WTV190T-P162	6 022 859
WTV190T-P460	6 022 862

Scanning distance
30 ... 100 mm

Photoelectric proximity switch

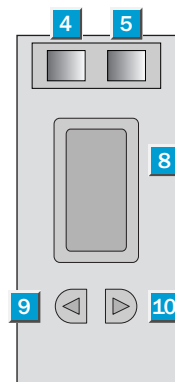
- Precise foreground suppression
- Small light spot enabling fast and precise alignment
- Scanning range setting via Teach-in procedure
- Easily readable display with menu navigation enables convenient programming and parameterization

Dimensional drawing



Adjustments possible

- WTV190T-N132
- WTV190T-N430
- WTV190T-P132
- WTV190T-P430



- 1 Standard direction of the material being scanned
- 2 Centre of optical axis, receiver
- 3 Centre of optical axis, sender
- 4 LED indicator green: output active
- 5 LED indicator orange: light reception with operating reserve > 1.1 or without light reception
- 6 Mounting holes, Ø approx. 3.1 mm
- 7 Connection
- 8 Numerical display
- 9 Select mode button
- 10 Teach-in button

External Teach-in

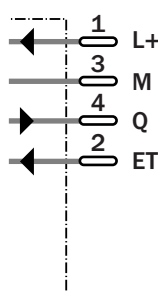
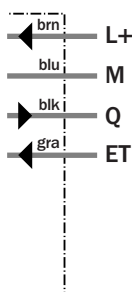
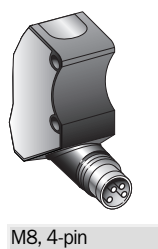
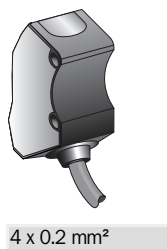
Time	Teach mode
1.5 s - 3.8 s	1-point teach-in
4 s - 6.3 s	2-point teach-in



Connection type

- WTV190T-N132
- WTV190T-P132

- WTV190T-N430
- WTV190T-P430



See chapter Accessories

Connector, M8, 4-pin

Mounting systems

Technical specifications		WTV190T-	N132	N430	P132	P430						
Scanning distance typ. max.	30 ... 100 mm ¹⁾											
Operating distance	50 ... 100 mm ¹⁾											
Adjustment of operating distance	Teach-in: teach button & cable (ET) ²⁾											
Light source, light type	LED, Red light, 680 nm ³⁾											
Light spot diameter	4 mm at distance of 100 mm											
Supply voltage V_s	DC 10 ... 30 V ⁴⁾											
Ripple	± 10 % ⁵⁾											
Power consumption	60 mA ⁶⁾											
Switching outputs	NPN: open collector: Q											
	PNP: open collector: Q											
Switching mode	Light/dark-switching, programmable											
Signal voltage PNP HIGH / LOW	V _s - 1.8 V / approx. 0 V											
Signal voltage NPN HIGH / LOW	Approx. V _s / < 1.8 V											
Output current I _a max	100 mA											
Response time	2.5 ms ⁷⁾											
Switching frequency	200 Hz ⁸⁾											
Time step	0...10 s, programmable											
Time type	Nor: normal Mode											
	Ond: ON Delay Mode											
	OFd: OFF Delay Mode											
Connection type	Cable, PVC, 2 m ⁹⁾											
	Connector, M8, 4-pin											
VDE protection class	⊠											
Circuit protection	V _s connections reverse-polarity protected / In-/outputs short-circuit protected / Interference pulse suppression / Outputs overcurrent and short-circuit protected											
Enclosure rating	IP 67											
Ambient temperature operation	-25 °C ... +55 °C											
Ambient temperature storage	-40 °C ... +70 °C											
Weight	Approx. 66 g											
	Approx. 18 g											
Housing material	ABS / PMMA											

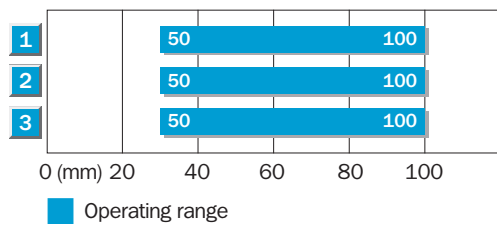
¹⁾ Object with 90% remission (based on standard white to DIN 5033)
²⁾ PNP: control wire > 7 V
 NPN: control wire < 1.5 V

³⁾ Average service life 100,000 h at T_a = +25°C
⁴⁾ Limit values, operation in short-circuit protected network max. 8 A

⁵⁾ may not exceed or fall short of V_s tolerances
⁶⁾ without load
⁷⁾ Signal transit time with resistive load

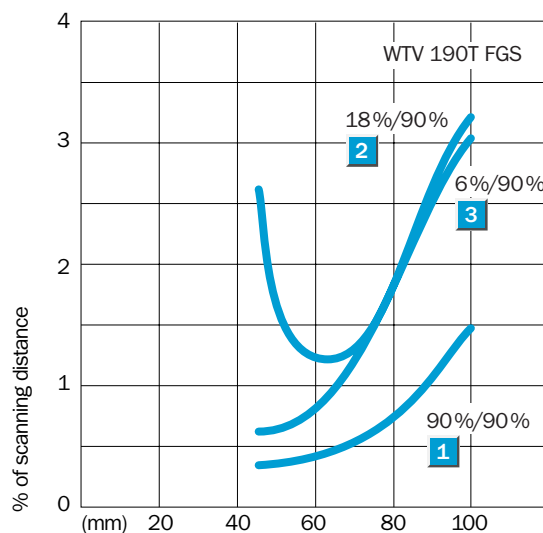
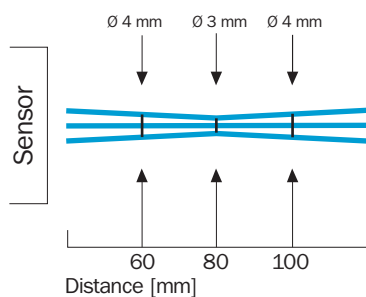
⁸⁾ with light/dark ratio 1:1
⁹⁾ do not bend below 0 °C

Operating distance



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

Light spot diameter



Ordering information

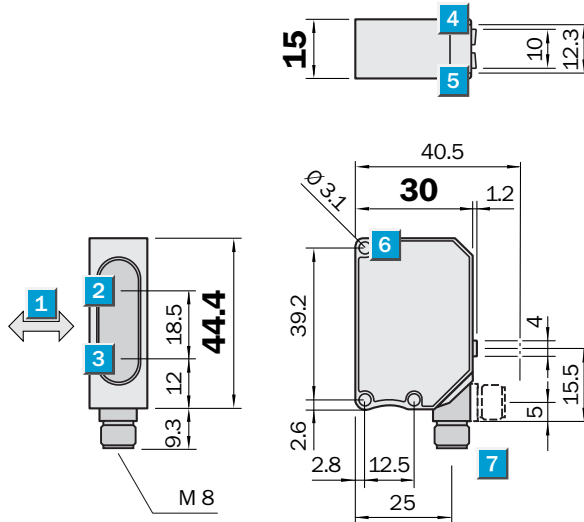
Type	Order no.
WTV190T-N132	6 022 847
WTV190T-N430	6 022 850
WTV190T-P132	6 022 851
WTV190T-P430	6 022 854

Scanning distance
80 ... 300 mm

Photoelectric proximity switch

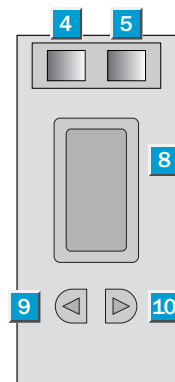
- Precise background suppression
- Small light spot enabling fast and precise alignment
- Scanning range setting via Teach-in procedure
- Easily readable display with menu navigation enables convenient programming and parameterization

Dimensional drawing



Adjustments possible

- WTB190T-N162
- WTB190T-N460
- WTB190T-P162
- WTB190T-P460



- 1 Standard direction of the material being scanned
- 2 Centre of optical axis, receiver
- 3 Centre of optical axis, sender
- 4 LED indicator green: output active
- 5 LED indicator orange: light reception with operating reserve > 1.1 or without light reception
- 6 Mounting holes, Ø approx. 3.1 mm
- 7 Connection
- 8 Numerical display
- 9 Select mode button
- 10 Teach-in button

External Teach-in

Time	Teach mode
1.5 s - 3.8 s	1-point teach-in
4 s - 6.1 s	2-point teach-in
>6.3 s	Position teach-in



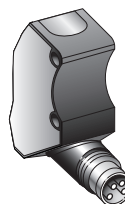
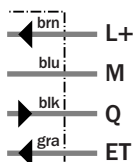
Connection type

- WTB190T-N162
- WTB190T-P162

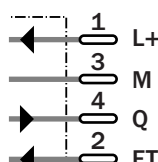
- WTB190T-N460
- WTB190T-P460



4 x 0.2 mm²



M8, 4-pin



See chapter Accessories

- Connector, M8, 4-pin
- Mounting systems

Technical specifications		WTB190T-	N162	N460	P162	P460							
Scanning distance typ. max.	80 ... 300 mm ¹⁾												
Operating distance	100 ... 300 mm ¹⁾												
Adjustment of operating distance	Teach-in: teach button & cable (ET) ²⁾												
Light source, light type	LED, Red light, 680 nm ³⁾												
Light spot diameter	11 mm at distance of 300 mm												
Supply voltage V _s	DC 10 ... 30 V ⁴⁾												
Ripple	± 10 % ⁵⁾												
Power consumption	≤ 60 mA ⁶⁾												
Switching outputs	NPN: open collector: Q PNP: open collector: Q												
Switching mode	Light/dark-switching, programmable												
Signal voltage PNP HIGH / LOW	V _s - 1.8 V / approx. 0 V												
Signal voltage NPN HIGH / LOW	Approx. V _s / < 1.8 V												
Output current I _a max	100 mA												
Response time	2.5 ms ⁷⁾												
Switching frequency	200 Hz ⁸⁾												
Time step	0...10 s, programmable												
Time type	Nor: normal Mode Ond: ON Delay Mode OFd: OFF Delay Mode												
Connection type	Cable, PVC, 2 m ⁹⁾ Connector, M8, 4-pin												
VDE protection class	⊠												
Circuit protection	V _s connections reverse-polarity protected / In-/outputs short-circuit protected / Interference pulse suppression / Outputs overcurrent and short-circuit protected												
Enclosure rating	IP 67												
Ambient temperature operation	-25 °C ... +55 °C												
Ambient temperature storage	-40 °C ... +70 °C												
Weight	Approx. 66 g Approx. 18 g												
Housing material	ABS / PMMA												

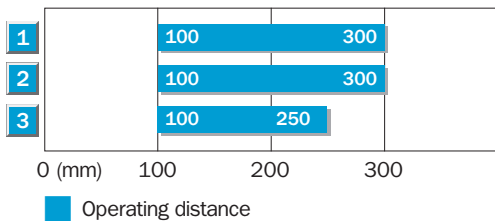
¹⁾ Object with 90% remission (based on standard white to DIN 5033)
²⁾ PNP: control wire > 7 V
NPN: control wire < 1.5 V

³⁾ Average service life 100,000 h at T_a = +25°C
⁴⁾ Limit values, operation in short-circuit protected network max. 8 A

⁵⁾ may not exceed or fall short of V_s tolerances
⁶⁾ without load
⁷⁾ Signal transit time with resistive load

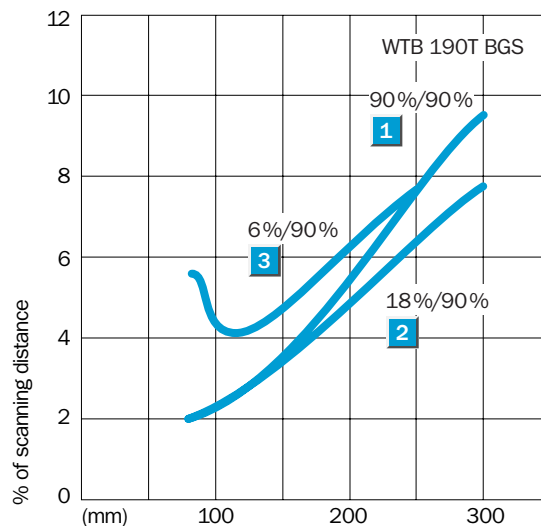
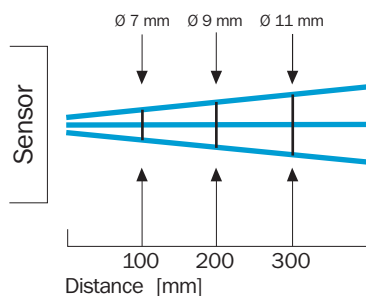
⁸⁾ with light/dark ratio 1:1
⁹⁾ do not bend below 0 °C

Operating distance



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

Light spot diameter



Ordering information

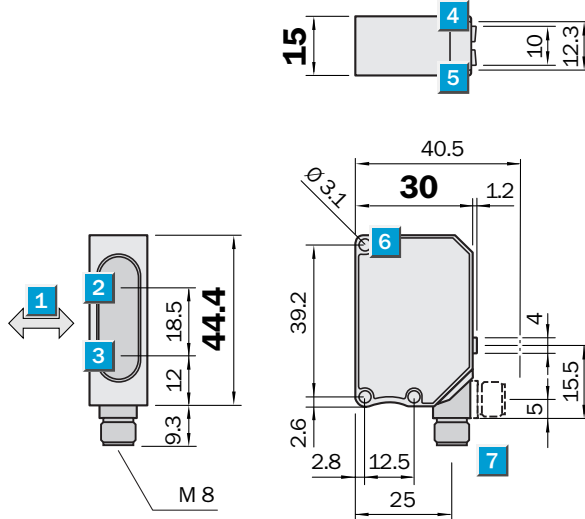
Type	Order no.
WTB190T-N162	6 022 839
WTB190T-N460	6 022 842
WTB190T-P162	6 022 843
WTB190T-P460	6 022 846

Scanning distance
30 ... 100 mm

Photoelectric proximity switch

- Precise background suppression
- Small light spot enabling fast and precise alignment
- Scanning range setting via Teach-in procedure
- Easily readable display with menu navigation enables convenient programming and parameterization

Dimensional drawing



Adjustments possible

- WTB190T-N132
- WTB190T-N430
- WTB190T-P132
- WTB190T-P430



- 1 Standard direction of the material being scanned
- 2 Centre of optical axis, receiver
- 3 Centre of optical axis, sender
- 4 LED indicator green: output active
- 5 LED indicator orange: light reception with operating reserve > 1.1 or without light reception
- 6 Mounting holes, Ø approx. 3.1 mm
- 7 Connection
- 8 Numerical display
- 9 Select mode button
- 10 Teach-in button

External Teach-in

Time	Teach mode
1.5 s - 3.8 s	1-point teach-in
4 s - 6.1 s	2-point teach-in
>6.3 s	Position teach-in



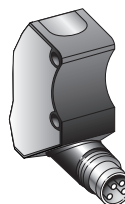
Connection type

- WTB190T-N132
- WTB190T-P132

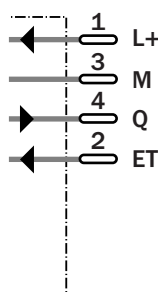
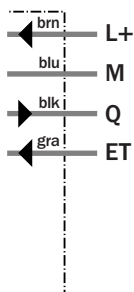
- WTB190T-N430
- WTB190T-P430



4 x 0.2 mm²



M8, 4-pin



See chapter Accessories

- Connector, M8, 4-pin
- Mounting systems

Technical specifications		WTB190T-	N132	N430	P132	P430						
Scanning distance typ. max.	30 ... 100 mm ¹⁾											
Operating distance	50 ... 100 mm ¹⁾											
Adjustment of operating distance	Teach-in: teach button & cable (ET) ²⁾											
Light source, light type	LED, Red light, 680 nm ³⁾											
Light spot diameter	4 mm at distance of 100 mm											
Supply voltage V _s	DC 10 ... 30 V ⁴⁾											
Ripple	± 10 % ⁵⁾											
Power consumption	60 mA ⁶⁾											
Switching outputs	NPN: open collector: Q PNP: open collector: Q											
Switching mode	Light/dark-switching, programmable											
Signal voltage PNP HIGH / LOW	V _s - 1.8 V / approx. 0 V											
Signal voltage NPN HIGH / LOW	Approx. V _s / < 1.8 V											
Output current I _a max	100 mA											
Response time	2.5 ms ⁷⁾											
Switching frequency	200 Hz ⁸⁾											
Time step	0...10 s, programmable											
Time type	Nor: normal Mode Ond: ON Delay Mode OFd: OFF Delay Mode											
Connection type	Cable, PVC, 2 m ⁹⁾ Connector, M8, 4-pin											
VDE protection class	⊠											
Circuit protection	V _s connections reverse-polarity protected / In-/outputs short-circuit protected / Interference pulse suppression / Outputs overcurrent and short-circuit protected											
Enclosure rating	IP 67											
Ambient temperature operation	-25 °C ... +55 °C											
Ambient temperature storage	-40 °C ... +70 °C											
Weight	Approx. 66 g Approx. 18 g											
Housing material	ABS / PMMA											

¹⁾ Object with 90% remission (based on standard white to DIN 5033)

²⁾ PNP: control wire > 7 V
NPN: control wire < 1.5 V

³⁾ Average service life 100,000 h at T_a = +25°C

⁴⁾ Limit values, operation in short-circuit protected network max. 8 A

⁵⁾ may not exceed or fall short of V_s tolerances

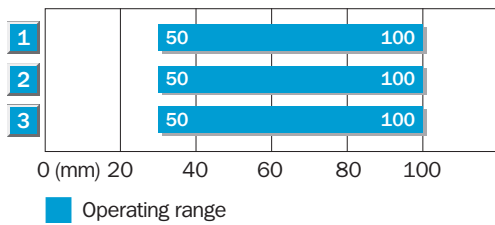
⁶⁾ without load

⁷⁾ Signal transit time with resistive load

⁸⁾ with light/dark ratio 1:1

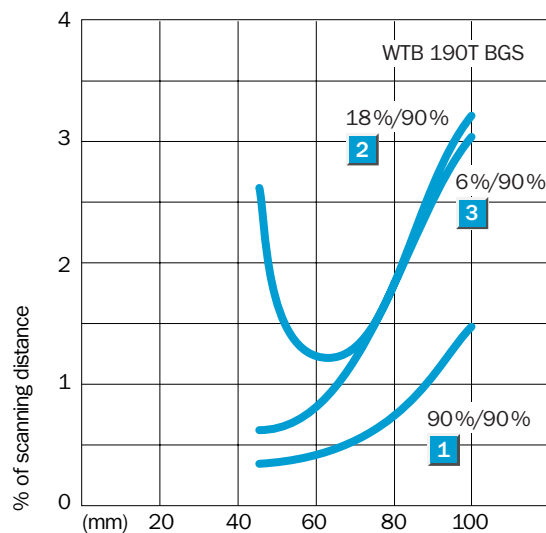
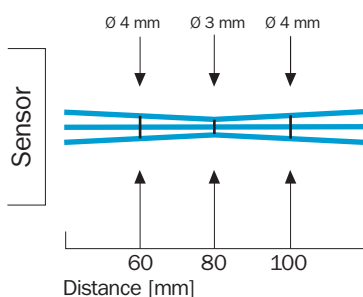
⁹⁾ do not bend below 0 °C

Operating distance



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

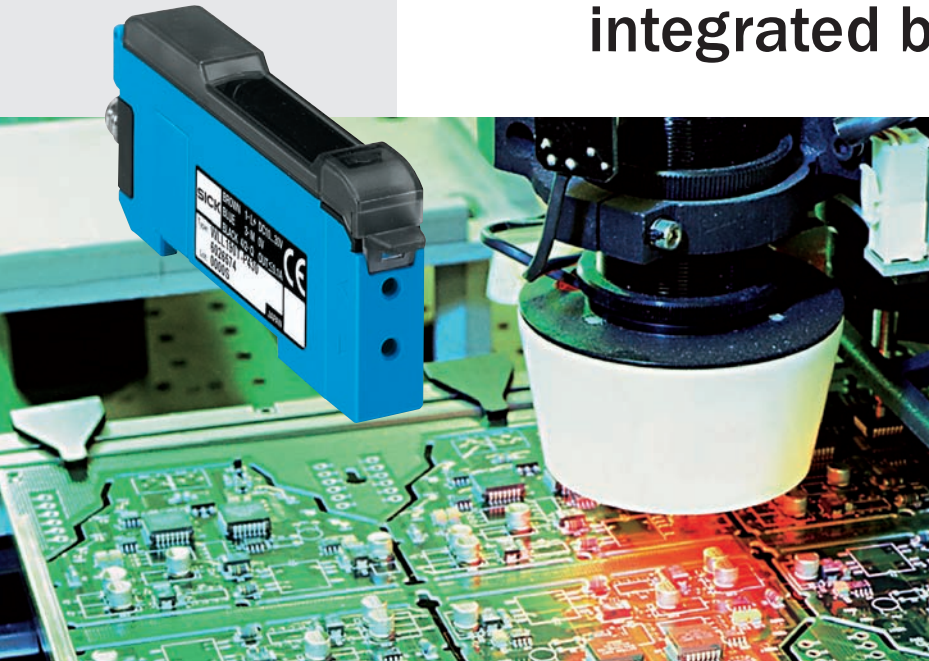
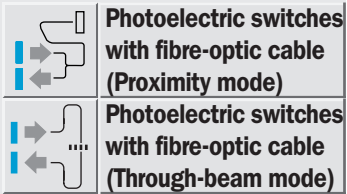
Light spot diameter



Ordering information

Type	Order no.
WTB190T-N132	6 022 831
WTB190T-N430	6 022 834
WTB190T-P132	6 022 835
WTB190T-P430	6 022 838

WLL 190T – High-End Sensor for maximum scanning ranges, numeric displays, integrated bus



sensitivity means that the WLL 190T offers reproducible system sensitivity.

Numeric displays, interactive prompts (monitoring)

The system parameters are defined by menu guidance. Online feedback: the current receiver values and the operating status are numerically displayed.

Integrated system bus, ONE for all

There is no need for master/slave units. The benefits:

- 8 fold interference protection through automatic internal synchronisation,
- Wire saving; the supply voltage V_S DC 10 ... 30 V is required only once (less wiring),
- Double pre-processing.

Applications focus on the following industries:

- Semiconductor/electronic assembly,
- assembly and handling technology,
- special purpose machines,
- packaging industry.

The WLL 190T offers many new benefits and features. Together with the extended fibre-optic cable series LL 3 it provides clever, variable fibre-optic cable solutions.

The highlights

Maximum scanning ranges

Through-beam fibre-optic cable LL 3: up to 1.30 m (with tip adapters up to 5 m);

Fibre-optic cable sensor LL 3: up to 300 mm (90 % remission).

Stable, reproducible switching point through Automatic Power Control (APC)

One like ALL: the sender diode is internally monitored and controlled. The uniform, factory-set



▲ **WLL 190T – with integrated Bus technology**

WLL 190T Series sensors already have integrated Bus technology. There is no need for separate Master or Slave units. Two Bus options are available: **Software-** and **Hardware-Bus** systems. The choice of options are simply coded and activated via a Bus plug (3-pin for Software-Bus systems and 5-pin for Hardware-Bus systems).

The advantages are:

- Up to 16 WLL 190T can be cascaded together.
- 8-way interference suppression is automatically active.
- Access to all software options.
- Using a Hardware-Bus system reduces the amount of wiring needed.

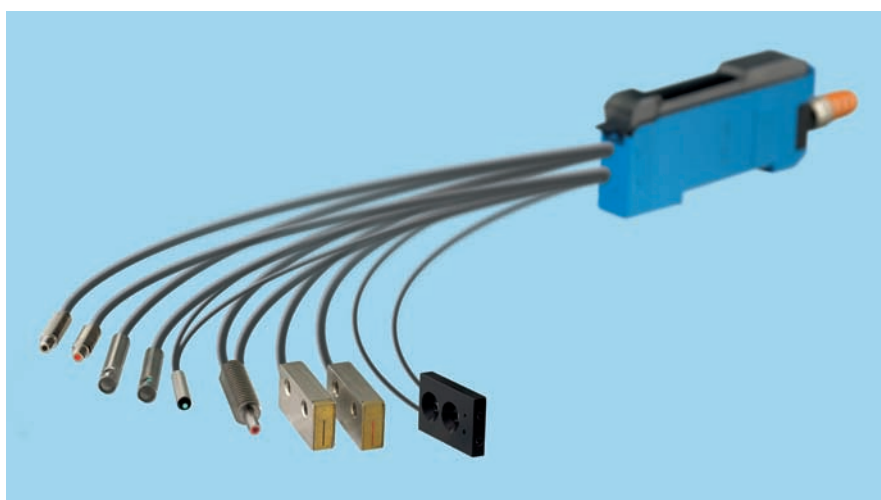
<i>nor</i>	“Normal” sensitivity
<i>GLAS</i>	Optimised for transparent objects, such as glass
<i>dyn</i>	Dynamic switching threshold
<i>Zone</i>	“Zone recognition” (window technology) for detecting marks
<i>APC</i>	APC – Automatic Power Control active
<i>cont</i>	Numeric counter function for setting the coincidence signal
<i>Func</i>	Functions: The entering of variable attributes of the unit, such as operating modes and response times
<i>SPEc</i>	Special features via the Software-Bus system: e.g. copying settings, Auto-0-Level



◀ **Software**

Securely and quickly programmed by pressing buttons and by menu guidance. The attributes of the unit and its parameters can be determined individually, directly on the sensor.

► **The WLL 190T fibre-optic cable photoelectric switch and the LL3 fibre-optic cable make a powerful team.**

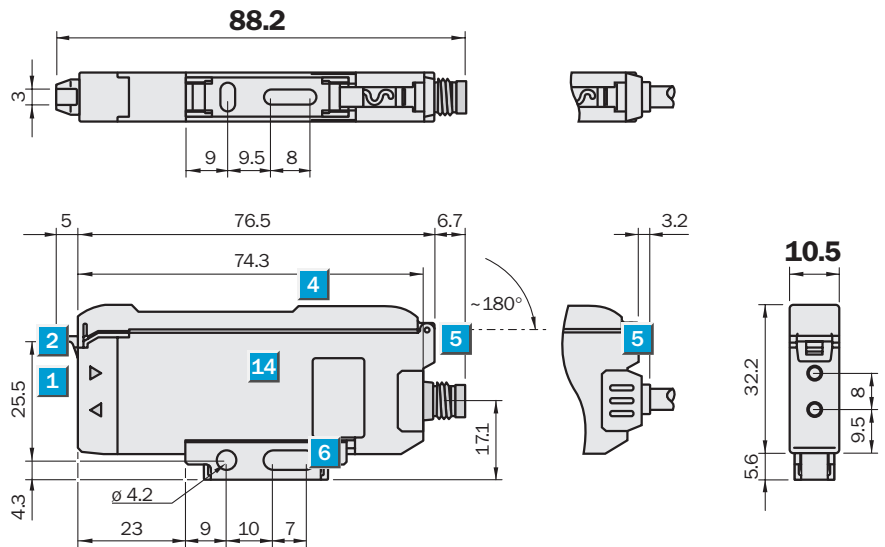
The properties and areas of application of the WLL 190T and LL3 complement each other. The fibre-optic cables of the LL3 Series are available in more than 80 options, ranging from universal to special purpose versions.



	Scanning range 1300 mm (5000 mm)
Through-beam system	
	Scanning distance 300 mm
Proximity system	

- LED red light
- Longest ranges
- Precise, stable switching point
- Numeric displays
- Interactive user prompting
- Appropriate for the LL 3 fibre-optic cable series

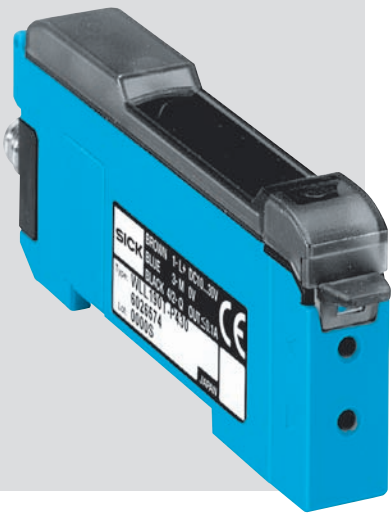
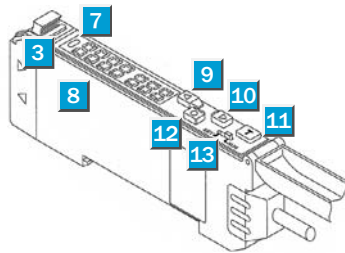
Dimensional drawing



Adjustments possible

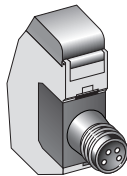
WLL 190T-P430	WLL 190T-N430
WLL 190T-P030	WLL 190T-N030
WLL 190T-P330	WLL 190T-N330

- 1** Sender LED, installation of LL 3 fibre-optic cable (sender fibre)
- 2** Receiver LED, installation of LL 3 fibre-optic cable (receiver fibre)
- 3** Locking of fibre-optic cables
- 4** Protective hood: can be folded out approx. 180°
- 5** M8 plug fixed or 1-wire cable or 3-wire cable replaceable (cables not included with delivery)
- 6** Mounting bracket included (see Accessories)
- 7** Indicator LED, yellow: lights up when switching output is active
- 8** Numeric display: 3-digit and 4-digit
green: current reception value, operating mode
red: Teach-in and function parameter
- 9** Step button > (manual switching threshold: higher; or next function parameter)
- 10** Step button < (manual switching threshold: lower; or previous function parameter)
- 11** "Teach-in" pushbutton
- 12** Mode/Enter button (programming button)
- 13** Operating mode selector switch:
"SET": active Teach-in-switching threshold
"RUN": sensor mode and function parameter selection
- 14** Protecting cap (on both sides). For "block installation" remove, takeup for BUS plug

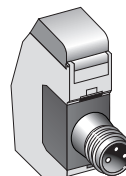


Connection types

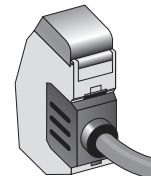
WLL 190T-P430	WLL 190T-P330	WLL 190T-P030
WLL 190T-N430	WLL 190T-N330	WLL 190T-N030



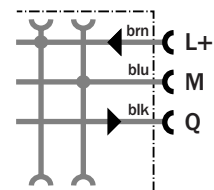
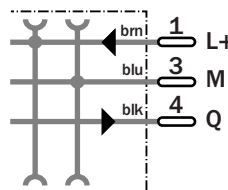
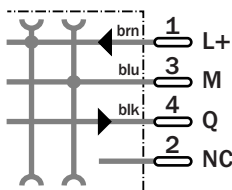
M8, 4-pin



M8, 3-pin



3-wire cable/1-wire cable



See chapter Accessories

- Cables and connectors
- Mounting systems
- Fibre-optic cable

Technical data		WLL 190T-	P430	N430	P030	N030	P330	N330				
Extras	"One WLL 190T for EVERYTHING": No separate master/slave device required											
LCD display	3-digit and 4-digit numeric display Each additionally in red and green											
Interactive user-prompting	System options can be selected menu-prompted Sensitivity setting per Teach-in											
Power indicator	Reception signal and operating mode											
Automatic Power Control	System sensitivity standardized ex works Constant sender power, internal control											
Internal BUS	Block installation 16 x WLL 190T 8 x anti-interference 16 x wire-saving Internal signal processing of two WLL 190T											
Single operation	All performances available											
Scanning range	Depending on fibre-optic cable LL 3 used											
Light source ¹⁾, light type	LED sender red (650 nm)											
Recommended operating range	0 ... 1300 mm (through-beam system) (with auxiliary lens 0 ... 5000 mm) ²⁾											
Recommended operating distance ³⁾	0 ... 300 mm ¹⁾ (proximity system) ²⁾											
Sensitivity setting ⁴⁾	5 optimization modes can be programmed Manual, per Teach-in button											
Precise correction	Step button >/< manual											
Light spot diameter LL 3	Depending on scanning range											
Dispersion angle fibre-optic cable LL3	Approx. 65° ⁴⁾											
Supply voltage V_S	10 ... 30 V DC ⁵⁾											
Residual ripple ⁷⁾	≤ 10 %											
Current consumption ⁸⁾	≤ 40 mA											
Switching outputs	Q: PNP Q: NPN											
Output current I_A max.	≤ 100 mA											
Switching type	Dark-/light-switching selectable											
Response time ⁹⁾	Selectable: 0.4 ms/1 ms/4 ms											
Switching frequency max. ¹⁰⁾	1250/s; 500/s; 125/s											
Time delay	Programmable 0 ms ... 9000 ms											
Time type, programmable	OFF/T _{OFF} /T _{ON} /ONE-SHOT											
Connection type System coupling	Suitable cable coupling ¹¹⁾ ; s. Accessories											
Plug	M8, 4-pin											
Plug	M8, 3-pin											
VDE protection class	□											
Enclosure rating ¹²⁾	IP 66											
Circuit protection ¹³⁾	A, B, C, D											
Ambient temperature ¹⁴⁾	Operation -25 °C ... +55 °C Storage -25 °C ... +70 °C											
Weight with system coupling	Approx. 20 g											
with M8 plug, 4-pin	Approx. 25 g											
with M8 plug, 3-pin	Approx. 25 g											
Housing material	ABS/PC											

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

²⁾ Ranges/scanning distances at response time 4 ms. Range reduction at short response time (see LL 3/WLL 190T Ranges Table)

³⁾ Object with 90 % remission (based on standard white DIN 5033); 500 x 500 mm

⁴⁾ Sensitivity setting

The following optimization modes can be programmed

a) Normal mode (default) – 4 alternatives
b) Dynamic Teach-in
c) Zone Teach-in (window technology)
d) Glass Teach-in (detection of transparent objects)

⁵⁾ Deviations see LL 3 data

⁶⁾ Limit values

⁷⁾ May not exceed or fall short of V_S tolerances

⁸⁾ Without load

⁹⁾ Signal transit time with resistive load

¹⁰⁾ With light/dark ratio 1:1, without time delay

¹¹⁾ Do not bend cable below 0 °C

¹²⁾ Only with correct adaptation of the LL 3 fibre-optic cable. Single-unit operation only. Optional BUS operation with side cover removed and BUS plugs contacted: IP 50

¹³⁾ A = V_S connections reverse-polarity protected

B = Inputs/outputs reverse-polarity protected



C = Interference pulse suppression

D = Outputs overcurrent and short-circuit protected

¹⁴⁾ Block installation of up to 3 switches: +55 °C

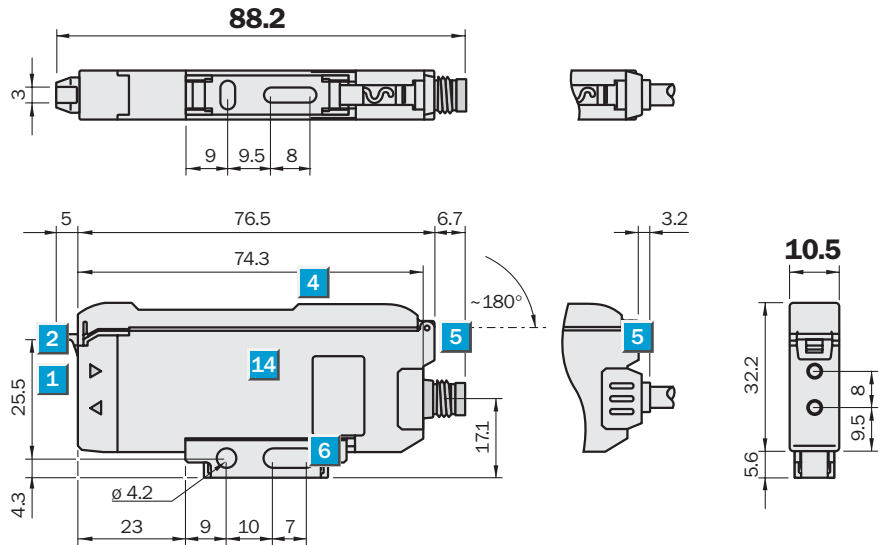
Block installation of 4 ... 11 switches: +50 °C

Block installation of more than 11 switches: +45 °C

	Scanning range 600 mm (3000 mm)
Through-beam system	
	Scanning distance 60 mm
Proximity system	

- LED green light
- For detection of marks
- Precise, stable switching point
- Numeric displays
- Interactive user prompting
- Appropriate for the LL 3 fibre-optic cable series

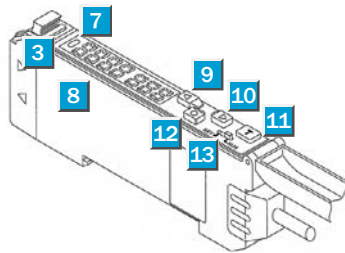
Dimensional drawing



Adjustments possible

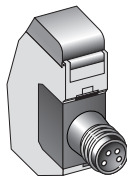
WLL 190T-P490	WLL 190T-N490
WLL 190T-P090	WLL 190T-N090
WLL 190T-P390	WLL 190T-N390

- 1 Sender LED, installation of LL 3 fibre-optic cable (sender fibre)
- 2 Receiver LED, installation of LL 3 fibre-optic cable (receiver fibre)
- 3 Locking of fibre-optic cables
- 4 Protective hood: can be folded out approx. 180°
- 5 M8 plug fixed or 1-wire cable or 3-wire cable replaceable (cables not included with delivery)
- 6 Mounting bracket included (see Accessories)
- 7 Indicator LED, yellow: lights up when switching output is active
- 8 Numeric display: 3-digit and 4-digit
green: current reception value, operating mode
red: Teach-in and function parameter
- 9 Step button > (manual switching threshold: higher; or next function parameter)
- 10 Step button < (manual switching threshold: lower; or previous function parameter)
- 11 "Teach-in" pushbutton
- 12 Mode/Enter button (programming button)
- 13 Operating mode selector switch:
"SET": active Teach-in-switching threshold
"RUN": sensor mode and function parameter selection
- 14 Protecting cap (on both sides). For "block installation" remove, takeup for BUS plug

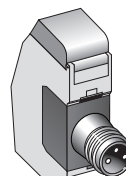


Connection types

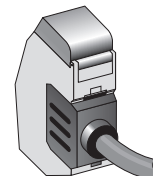
WLL 190T-P490	WLL 190T-P390	WLL 190T-P090
WLL 190T-N490	WLL 190T-N390	WLL 190T-N090



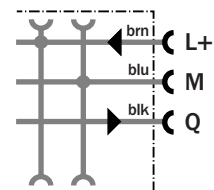
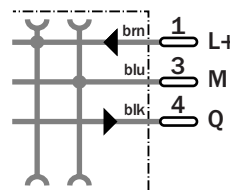
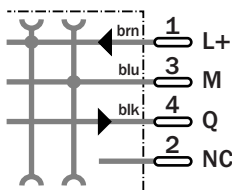
M8, 4-pin



M8, 3-pin



3-wire cable/1-wire cable



See chapter Accessories

- Cables and connectors
- Mounting systems
- Fibre-optic cable

Technical data		WLL 190T-	P490	N490	P090	N090	P390	N390				
Extras	"One WLL 190T for EVERYTHING": No separate master/slave device required											
LCD display	3-digit and 4-digit numeric display Each additionally in red and green											
Interactive user-prompting	System options can be selected menu-prompted Sensitivity setting per Teach-in											
Power indicator	Reception signal and operating mode											
Automatic Power Control	System sensitivity standardized ex works Constant sender power, internal control											
Internal BUS	Block installation 16 x WLL 190T 8 x anti-interference 16 x wire-saving Internal signal processing of two WLL 190T											
Single operation	All performances available											
Scanning range	Depending on fibre-optic cable LL 3 used											
Light source ¹⁾, light type	LED sender green (525 nm)											
Recommended operating range	0 ... 600 mm (through-beam system) (with auxiliary lens 0 ... 3000 mm) ²⁾											
Recommended operating distance³⁾	0 ... 60 mm ¹⁾ (proximity system) ²⁾											
Sensitivity setting ⁴⁾	5 optimization modes can be programmed Manual, per Teach-in button											
Precise correction	Step button >/< manual											
Light spot diameter LL 3	Depending on scanning range											
Dispersion angle fibre-optic cable LL3	Approx. 65° ⁵⁾											
Supply voltage V_S	10 ... 30 V DC ⁶⁾											
Residual ripple ⁷⁾	≤ 10 %											
Current consumption ⁸⁾	≤ 40 mA											
Switching outputs	Q: PNP Q: NPN											
Output current I_A max.	≤ 100 mA											
Switching type	Dark-/light-switching selectable											
Response time ⁹⁾	Selectable: 0.4 ms/1 ms/4 ms											
Switching frequency max. ¹⁰⁾	1250/s; 500/s; 125/s											
Time delay	Programmable 0 ms ... 9000 ms											
Time type, programmable	OFF/T _{OFF} /T _{ON} /ONE-SHOT											
Connection type System coupling	Suitable cable coupling ¹¹⁾ ; s. Accessories											
Plug	M8, 4-pin											
Plug	M8, 3-pin											
VDE protection class	□											
Enclosure rating ¹²⁾	IP 66											
Circuit protection ¹³⁾	A, B, C, D											
Ambient temperature ¹⁴⁾	Operation -25 °C ... +55 °C Storage -25 °C ... +70 °C											
Weight with system coupling	Approx. 20 g											
with M8 plug, 4-pin	Approx. 25 g											
with M8 plug, 3-pin	Approx. 25 g											
Housing material	ABS/PC											

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

²⁾ Ranges/scanning distances at response time 4 ms. Range reduction at short response time (see LL 3/ WLL 190T Ranges Table)

³⁾ Object with 90 % remission (based on standard white DIN 5033); 500 x 500 mm

⁴⁾ Sensitivity setting

The following optimization modes can be programmed

a) Normal mode (default) – 4 alternatives
b) Dynamic Teach-in
c) Zone Teach-in (window technology)
d) Glass Teach-in (detection of transparent objects)

⁵⁾ Deviations see LL 3 data

⁶⁾ Limit values

⁷⁾ May not exceed or fall short of V_S tolerances

⁸⁾ Without load

⁹⁾ Signal transit time with resistive load

¹⁰⁾ With light/dark ratio 1:1, without time delay

¹¹⁾ Do not bend cable below 0 °C

¹²⁾ Only with correct adaptation of the LL 3 fibre-optic cable. Single-unit operation only. Optional BUS operation with side cover removed and BUS plugs contacted: IP 50

¹³⁾ A = V_S connections reverse-polarity protected

B = Inputs/outputs reverse-polarity protected

C = Interference pulse suppression

D = Outputs overcurrent and short-circuit protected

¹⁴⁾ Block installation of up to 3 switches: +55 °C

Block installation of 4 ... 11 switches: +50 °C

Block installation of more than 11 switches: +45 °C

The WLL 190T System-bus – modules and accessories

WLL 190T already has the Bus-system integrated within it.

It is activated via a coded plug. There are no separate Master or Slave units needed, or programming tools of any kind. Two optional Bus-systems with staggered features can be chosen for each individual Bus-plug.

WLL 190T – Solo the HIGH LIGHTS

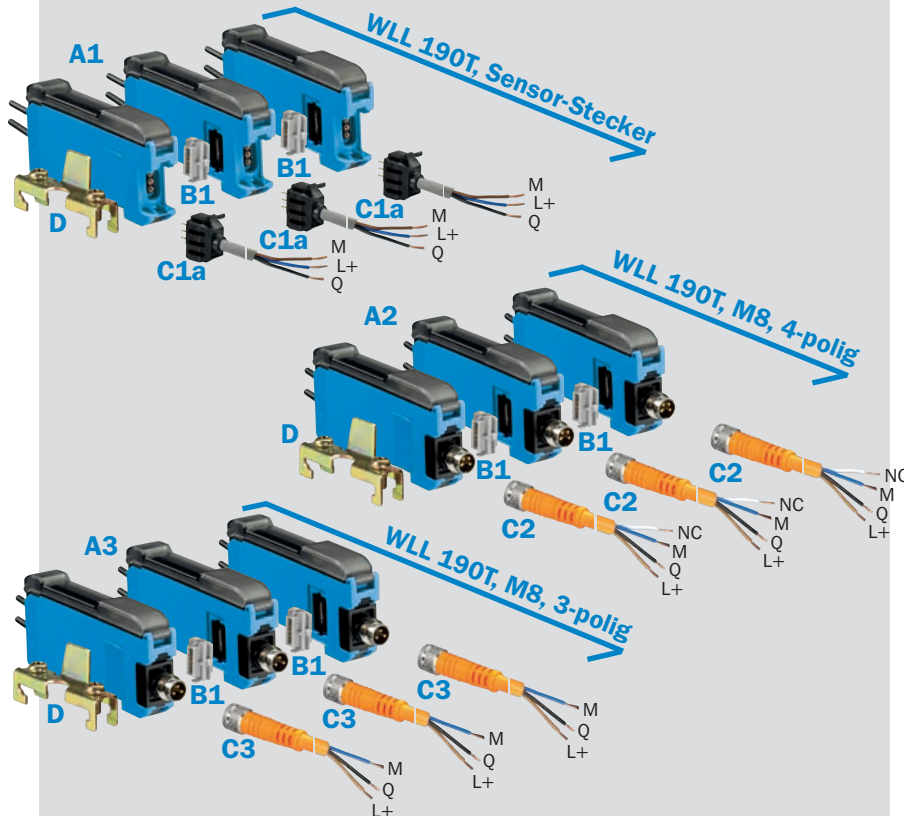
The WLL 190T “Solo Unit” already offers significantly enhanced system data:

- **Much greater ranges (~2 ... 3 x WLL 170T)**
Proximity system max. 1,300 mm (5,000 mm); Throughbeam system max. 300 mm
- **Simple, variable adjustment of the sensitivity setting**
- **ONE UNIT** for all requirements, due to freely selectable function settings
- **Monitoring**, i.e. numeric displays provide information and offer menu-guided programming
- **ONE UNIT** for all requirements, due to APC – Automatic Power Control. The constant transmission of data provides stabilised switching threshold levels
- **Enclosure rating IP 66** as a single stand-alone WLL 190T unit



The WLL 190T Software-Bus provided by a 3-pin Bus plug

- Access to further software functions
- Automatic 8-way interference suppression



The Software-Bus components (optionally up to 16 x WLL 190T units)

A: Sensor A1 or A2 or A3. We recommend that A1, A2 and A3 are not mixed together in a general structured arrangement.

B: Bus-plug, 3-pin (grey), only B1

C: Cable receptacle only C1, C2 or C3

D: End pieces, two

Selection of WLL 190 Bus-components

A WLL 190T Connection technology

A1 Sensor type WLL 190T, sensor plugs

Accessories: C1a and C1b

- WLL 190T-P030, PNP, LED red, order no. 6 026 572
- WLL 190T-N030, NPN, LED red, order no. 6 026 573
- WLL 190T-P090, PNP, LED green, order no. 6 026 585
- WLL 190T-N090, NPN, LED green, order no. 6 026 586

A2 Sensor type WLL 190T, M8, 4-pin

Accessories: C2

- WLL 190T-P430, PNP, LED red, order no. 6 026 574
- WLL 190T-N430, NPN, LED red, order no. 6 026 575
- WLL 190T-P490, PNP, LED green, order no. 6 026 587
- WLL 190T-N490, NPN, LED green, order no. 6 026 588

A3 Sensor type WLL 190T, M8, 3-pin

Accessories: C3

- WLL 190T-P330, PNP, LED red, order no. 6 026 576
- WLL 190T-N330, NPN, LED red, order no. 6 026 577
- WLL 190T-P390, PNP, LED green, order no. 6 026 589
- WLL 190T-N390, NPN, LED green, order no. 6 026 590

B Bus-plug

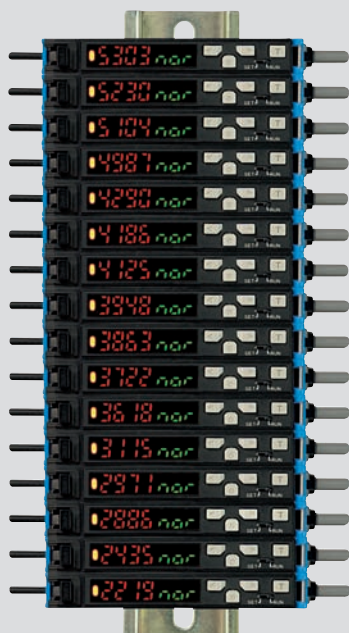
B1 Bus-plug, 3-pin, only for Software Bus

STE-WLL190-03P order no. 6 026 581

B2 Bus-plug, 5-pin, only for Hardware Bus

STE-WLL190-05P *) order no. 6 026 580

*) included in the “scope of supply” of cable receptacles C1b



“Wire-Saving” for a significant reduction in wiring due to the WLL 190T Hardware-Bus system

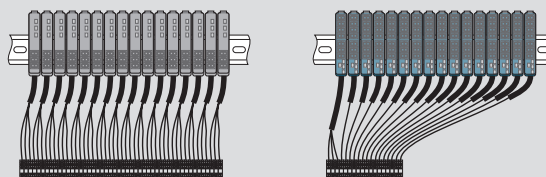
- The V_S voltage supply is only fed by a 3-core connecting cable (Master).
- Additional units (up to 15 x WLL 190T units) are connected via a single-core connecting cable (Slaves). This means only the Q output circuit is connected.
- All software options are also available.

Example of wire reduction:

16 conventionally wired photoelectric switches require 48 terminal connections.

16 wired WLL 190T units only need 18 terminal connections.

Savings: 30 terminals and associated wiring.



WLL 190T Accessories

C Cable receptacles

C1a For A1: $U_V + Q$, 3-core cable, WLL 190T sensor plug

DOL-LL1903-02M, cable length 2 m, order no. 6 026 578

DOL-LL1903-05M, cable length 5 m, order no. 6 028 379

C1b For A1: Q, single-core, WLL 190T sensor plug (only Wire-Saving)

DOL-LL1901-02M **, cable length 2 m, order no. 6 026 579

DOL-LL1901-05M **, cable length 5 m, order no. 6 028 380

C2 For A2: $U_V + Q$, 4-core, M8, 4-pin

DOL-0804-G02M, cable length 2 m, order no. 6 009 870

DOL-0804-G05M, cable length 5 m, order no. 6 009 872

C3 For A3: $U_V + Q$, 3-core, M8, 3-pin

DOL-0803-G02M, cable length 2 m, order no. 6 010 785

DOL-0803-G05M, cable length 5 m, order no. 6 022 009

D End pieces

D End pieces for mounting profile rail assembly

BF-EB01-W190 order no. 5 313 011

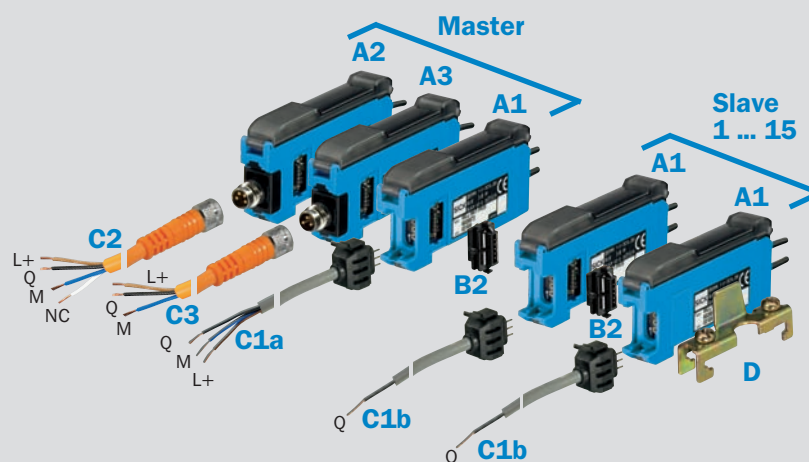
Please note:

- Do not mix 3-pin Bus-plug with 5-pin Bus-plugs
- Do not connect WLL 190T Bus components whilst electrically powered

**) included in the “scope of supply”: 5-pin Bus-plug (B2)

WLL 190T Hardware-Bus by means of 5-pin bus plug.

- “Wire-Saving” – considerable reduction in cost and effort in electrical wiring.
- All options of the Software-Bus available..



The Hardware-Bus components

A: Master sensor, max. one sensor, either A1 or A2 or A3.

Cable receptacles C1a, C2 or C3.

Slave sensors, max. 15, only A1 with C1b cable receptacles.

B: Bus-plug, 5-pin (black), only B2

D: End pieces, two

W 9-2: A Versatile, Complete and Compact Series

	Photoelectric proximity switches BGS
	Photoelectric proximity switches ener.
	Photoelectric proximity switches V



	Photoelectric reflex switches
	Through-beam photoelectric switches

Depending on the job, the most suitable sensor can be selected from the W 9-2 series.

Overview of the sensors:

WT 9-2, with adjustable background suppression,
max. scanning distance 250 mm,
WT 9-2, energetic,
max. scanning distance 450 mm,
WT 9-2, V model,
max. scanning distance 20 mm,
WL 9-2, basic model,
max. scanning range 4 m,
WL 9-2, Teach-in model,
max. scanning range 4 m,
WL 9-2, focus,
max. scanning range 0.4 m,
WS/WE 9-2,
max. scanning range 7 m.

There are multifaceted applications in the targeted main branches thanks to this great variety of products:

- Storage and handling engineering,
- Packaging industry,
- Electronics industry,
- Elevator construction.

The W 9-2 series is as versatile as the tasks in automation.

The standardized, compact housing model makes it possible to use high-performance sensors that operate reliably even in cramped mounting conditions. All W 9-2 models have red light transmitters as a standard feature. The sensor can be aligned on the object quickly and precisely using the visible light spot. In the models with Teach-in function, the sensor optimizes its sensitivity automatically to the given operating conditions at the push of a button.



▲ W 9-2 in warehousing and conveying technology; universally installed, secure, compact.

◀ W 9-2 highest variety of products referring to operating principle, features and connectors in one housing.

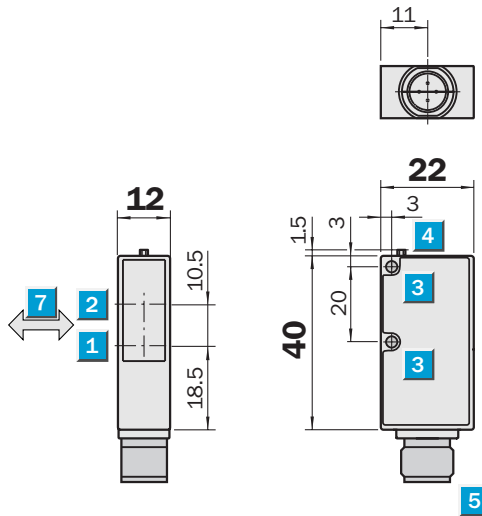


► W 9-2 in the packaging industry; high availability, easy to operate.

Scanning distance
30 ... 250 mm
 Photoelectric proximity switches

- Precise, easily adjustable background suppression
- Insensitive to ambient light sources
- Security against interference from other sensors installed adjacently
- Permissible ambient operating temperature -40 °C ... +60 °C
- Fast response times, enabling fast processes

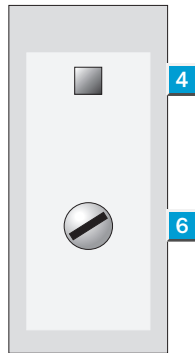
Dimensional drawing



Adjustments possible

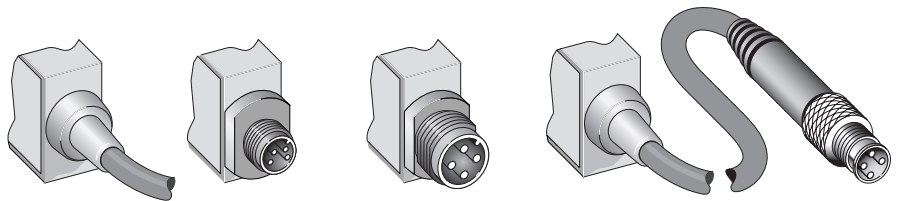
WT 9-2P 130	WT 9-2P 330
WT 9-2P 430	WT 9-2P 630
WT 9-2N 130	
WT 9-2N 430	

- 1 Axis of the sender optics
- 2 Axis of the receiver optics
- 3 Mounting hole Ø 3.2 mm
- 4 LED signal strength indicator
- 5 Plug M12 or M8, 4-pin, 2 m connection cable or 120 mm cable with plug M12, 4-pin
- 6 Scanning distance adjuster
- 7 Standard direction of the material to be scanned

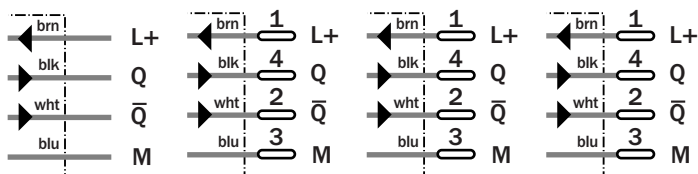


Connection types

WT 9-2P 130	WT 9-2P 330	WT 9-2P 430	WT 9-2P 630
WT 9-2N 130		WT 9-2N 430	



4 x 0.14 mm ²	4-pin, M8	4-pin, M12	4-pin, M12 with 120 mm cable
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See chapter Accessories

Cables and connectors
Mounting systems

Technical data		WT 9-2	P 130	P 430	N 130	N 430	P 330	P 630				
Scanning distance adjustable ¹⁾	30 ... 250 mm											
Scanning range	5 ... 250 mm											
Supply voltage V_S²⁾	10 ... 30 VDC											
Ripple ³⁾	$\leq 5 V_{pp}$											
Current consumption ⁴⁾	$\leq 40 \text{ mA}$											
Light source	LED, visible red light ⁵⁾											
Light spot diameter	15 x 15 mm at 200 mm											
Switching outputs Q and \bar{Q}	PNP											
	NPN											
Signal voltage HIGH	$V_S - 2.9 \text{ V}$											
	V_S											
Signal voltage LOW ⁶⁾	Approx. 0 V											
	$\leq 1.5 \text{ V}$											
Output current I_A max.	$\leq 100 \text{ mA}$											
Response time ⁷⁾	$\leq 333 \mu\text{s}$											
Switching frequency max. ⁸⁾	1500/s											
Connection types	Connection cable, 2 m											
	Cable, 120 mm, with plug M12, 4-pin											
	Plug M12, 4-pin											
	Plug M8, 4-pin											
VDE protection class M12⁹⁾	<input type="checkbox"/>											
VDE protection class M8	III											
Enclosure rating	IP 67, IP 69K											
Circuit protection ¹⁰⁾	A, B, C											
Ambient temperature T_A ¹¹⁾	Operation - 40 ... + 60 °C											
	Storage - 40 ... + 75 °C											
Weight												
with connection cable 2 m/120 mm	Approx. 80 g											
with equipment plug M12/M8, 4-pin	Approx. 20 g											

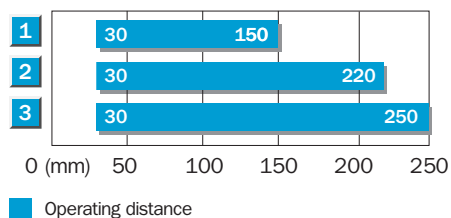
1) Object with 90% remission (referred to standard white DIN 5033)
 2) Limit values
 3) Must be within V_S tolerances
 4) Without load

5) Average service life at room temperature 100,000 h at $T_A = + 25 \text{ °C}$
 6) At $T_A = + 25 \text{ °C}$ and 100 mA output current

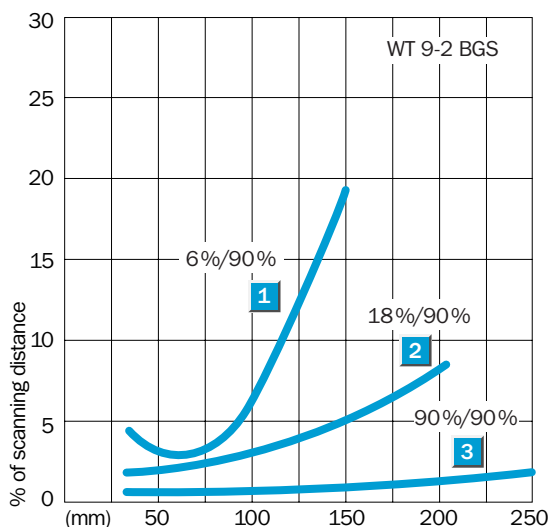
7) With resistive load
 8) With light/dark ratio 1:1
 9) Reference voltage 50 V

10) A = supply connections reverse polarity protected
 B = outputs short-circuit protected
 C = interference suppression
 11) Do not bend below 0 °C

Scanning distance




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



Order information

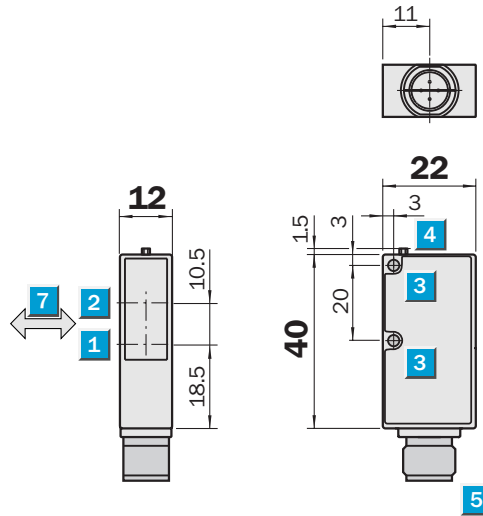
Type	Order no.
WT 9-2P 130	1 018 293
WT 9-2P 430	1 018 295
WT 9-2N 130	1 018 294
WT 9-2N 430	1 018 296
WT 9-2P 330	1 019 026
WT 9-2P 630	1 019 272


Scanning distance
30 ... 250 mm

Photoelectric proximity switches

- Precise, easily adjustable background suppression
- Insensitive to ambient light sources
- Security against interference from other sensors installed adjacently
- Permissible ambient operating temperature -40 °C ... +60 °C
- Fast response times, enabling fast processes

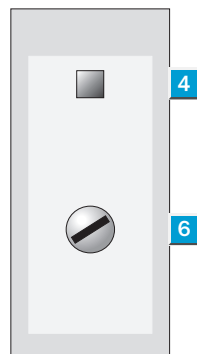
Dimensional drawing



Adjustments possible

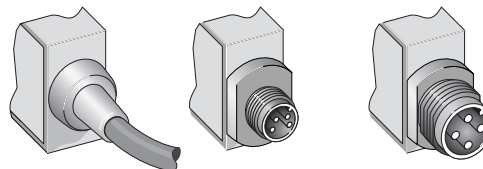
- WT 9-2P110
- WT 9-2P310
- WT 9-2P410

- 1** Axis of the sender optics
- 2** Axis of the receiver optics
- 3** Mounting hole \varnothing 3.2 mm
- 4** LED signal strength indicator
- 5** 2 m connection cable or plug M12, 4-pin
- 6** Scanning distance adjuster
- 7** Standard direction of the material to be scanned

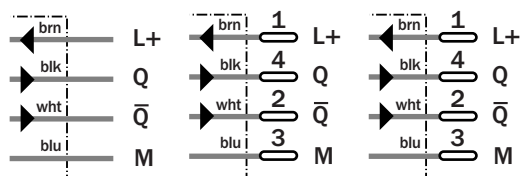


Connection types

- WT 9-2P110
- WT 9-2P310
- WT 9-2P410



- 4 x 0.14 mm²
- 4-pin, M8
- 4-pin, M12



See chapter Accessories

Cables and connectors
Mounting systems

Technical data		WT 9-2	P110	P310	P410						
Scanning distance, adjustable ¹⁾	30 ... 250 mm										
Scanning range	5 ... 30 mm und 10 ... 250 mm										
Supply voltage V_S²⁾	10 ... 30 VDC										
Ripple ³⁾	$\leq 5 V_{PP}$										
Current consumption ⁴⁾	≤ 30 mA										
Light source ⁵⁾	LED, infrared										
Light spot diameter	15 x 15 mm at a distance of 200 mm										
Switching outputs	PNP, Q und \bar{Q}										
Signal voltage HIGH	$V_S - 2.9$ V										
Signal voltage LOW ⁶⁾	Approx. 0 V										
Output current I_A max.	≤ 100 mA										
Response time ⁷⁾	≤ 500 μ s										
Switching frequency max. ⁸⁾	1000/s										
Connection technology	Connection cable, 2 m										
	Plug M 8, 4-pin										
	Plug M12, 4-pin										
VDE protection class ⁹⁾	<input type="checkbox"/>										
Protection type	IP 67, IP 69K										
Protection circuits ¹⁰⁾	A, B, C										
Ambient temperature ¹¹⁾	Operation $-40 \dots +60$ °C										
	Storage $-40 \dots +75$ °C										
Weight	with cable 2 m	Approx. 80 g									
	with M12 plug	Approx. 20 g									

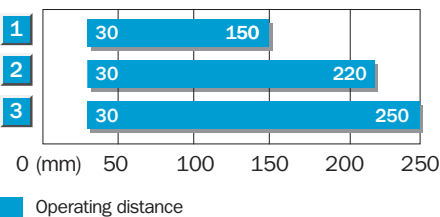
1) Object with 90% reflectance (referred to standard white DIN 5033)
 2) Limit values
 3) Must be within V_S tolerances
 4) Without load

5) Average service life at room temperature 100,000 h at $T_U = +25$ °C
 6) At $T_U = +25$ °C and 100 mA output current

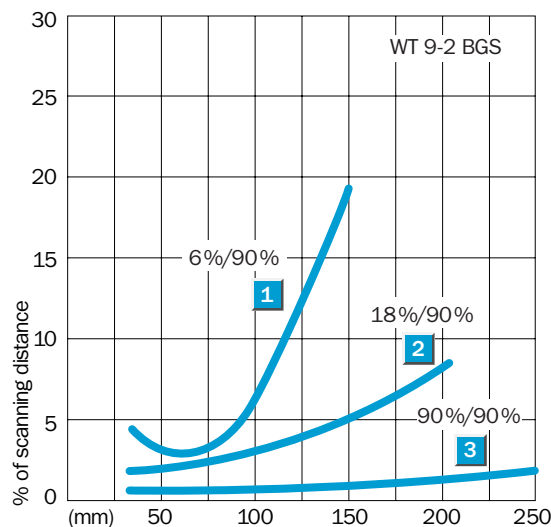
7) With resistive load
 8) With light/dark ratio 1:1
 9) Withstand voltage 50 V DC

10) A = supply connections reverse polarity protected
 B = outputs short-circuit protected
 C = interference suppression
 11) Do not distort cable below 0 °C

Scanning distance




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



Order information

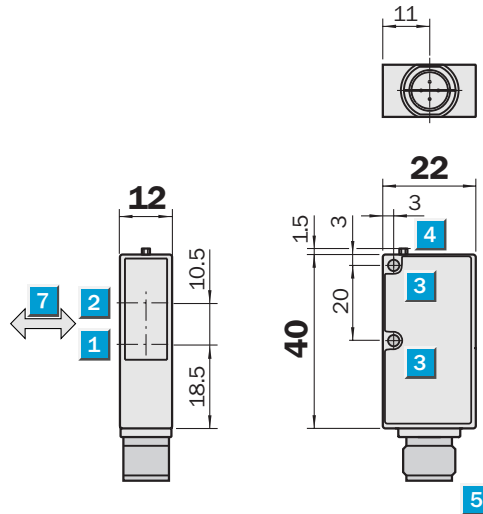
Type	Order no.
WT 9-2P110	1 018 577
WT 9-2P310	1 028 279
WT 9-2P410	1 019 668


Scanning distance
30 ... 500 mm

Photoelectric proximity switches

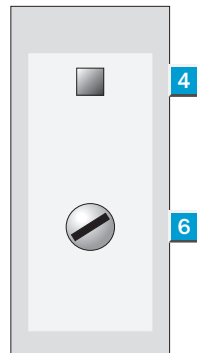
- Easily adjustable background blanking
- Insensitive to ambient light sources
- Security against interference from other sensors installed adjacently
- Permissible ambient operating temperature $-40\text{ }^{\circ}\text{C} \dots +60\text{ }^{\circ}\text{C}$
- Fast response times, enabling fast processes

Dimensional drawing



Adjustments possible

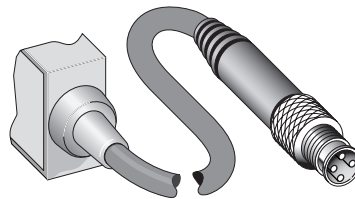
WT 9-2P620



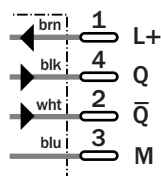
- 1 Axis of the receiver optics
- 2 Axis of the sender optics
- 3 Mounting hole $\varnothing 3.2\text{ mm}$
- 4 LED signal strength indicator
- 5 120 mm cable with plug M12, 4-pin
- 6 Scanning distance adjuster
- 7 Standard direction of the material to be scanned

Connection types

WT 9-2P620



4-pin, M12 with 120 mm cable



See chapter Accessories

Cables and connectors

Mounting systems

Technical data		WT 9-2	P620										
Scanning distance, adjustable ¹⁾	30 ... 500 mm												
Supply voltage V_S²⁾	10 ... 30 V DC												
Ripple ³⁾	$\leq 5 V_{PP}$												
Current consumption ⁴⁾	≤ 30 mA												
Light source ⁵⁾	LED, infrared												
Light spot diameter	15 x 15 mm at a distance of 200 mm												
Switching outputs	PNP, Q und \bar{Q}												
Signal voltage HIGH	$V_S - 2.9$ V												
Signal voltage LOW ⁶⁾	Approx. 0 V												
Output current I_A max.	≤ 100 mA												
Response time ⁷⁾	$\leq 333 \mu s$												
Switching frequency max. ⁸⁾	1500/s												
Connection technology	Cable, 120 mm, with plug M12, 4-pin												
VDE protection class ⁹⁾	<input type="checkbox"/>												
Protection type	IP 67, IP 69K												
Protection circuits ¹⁰⁾	A, B, C												
Ambient temperature ¹¹⁾	Operation $-40 \dots +60$ °C Storage $-40 \dots +75$ °C												
Weight with cable 120 mm	Approx. 80 g												
Housing material	ABS												

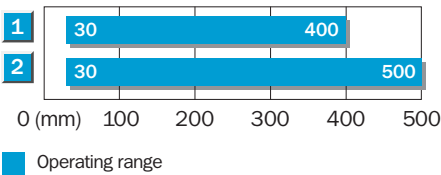
1) Object with 18% reflectance (referred to standard white DIN 5033)
 2) Limit values
 3) Must be within V_S tolerances
 4) Without load

5) Average service life temperature 100,000 h at $T_U = +25$ °C
 6) At $T_U = +25$ °C and 100 mA output current

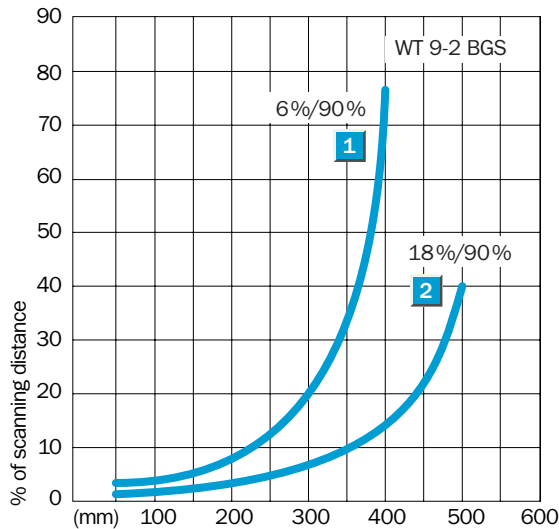
7) With resistive load
 8) With light/dark ratio 1:1
 9) Withstand voltage 50 V

10) A = Supply connections reverse polarity protected
 B = Outputs short-circuit protected
 C = Interference suppression
 11) Do not distort cable below 0 °C

Scanning distance



- 1 Scanning range on black, 6% remission
- 2 Scanning range on gray, 18% remission



Order information

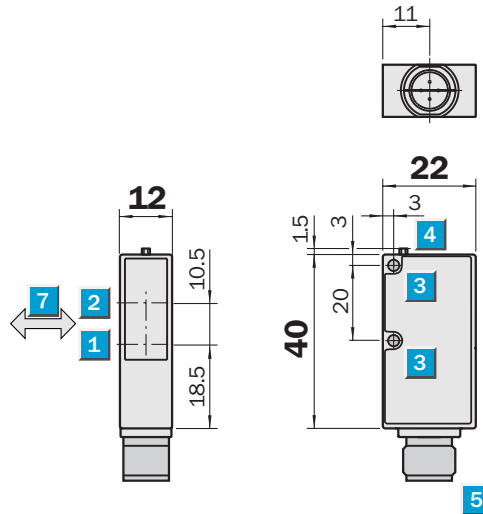
Type	Order no.
WT 9-2P620	1 019 711

Scanning distance
50 ... 1500 mm

Photoelectric proximity switches

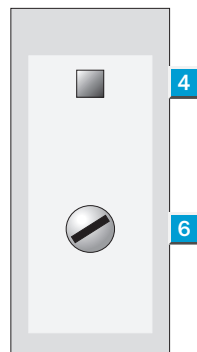
- Emitter LED IR
- Scanning distance adjustable
- Switching frequency 500/s
- 2 m connection cable or plug M12, 4-pin
- Outputs short-circuit protected
- Permissible ambient operating temperature $-40\text{ }^{\circ}\text{C} \dots +60\text{ }^{\circ}\text{C}$

Dimensional drawing



Adjustments possible

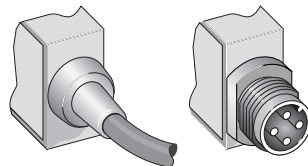
- WT 9-2P460
- WT 9-2P160
- WT 9-2N160



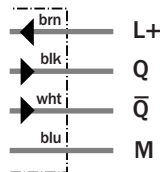
- 1 Axis of the receiver optics
- 2 Axis of the sender optics
- 3 Mounting hole $\varnothing 3.2\text{ mm}$
- 4 LED signal strength indicator
- 5 2 m connection cable or plug M12, 4-pin
- 6 Scanning distance adjuster
- 7 Standard direction of the material to be scanned

Connection types

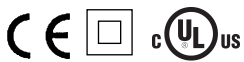
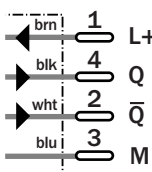
- WT 9-2P160
- WT 9-2P460
- WT 9-2N160



4 x 0.14 mm²



4-pin, M12



See chapter Accessories

- Cables and connectors
- Mounting systems

Technical data		WT 9-2	P160	P460	N160						
Scanning distance, adjustable ¹⁾	50 ... 1500 mm										
Supply voltage V_S²⁾	10 ... 30 V DC										
Ripple ³⁾	$\leq 5 V_{pp}$										
Current consumption ⁴⁾	$\leq 30 \text{ mA}$										
Light source ⁵⁾	LED, infrared										
Light spot diameter	600 mm at a distance of 1500 mm										
Switching outputs	PNP, Q und \bar{Q}										
	NPN, Q und \bar{Q}										
Signal voltage HIGH	$V_S - 2.9 \text{ V}$										
	V_S										
Signal voltage LOW ⁶⁾	Approx. 0 V										
	$< 2.9 \text{ V}$										
Output current $I_A \text{ max.}$	$\leq 100 \text{ mA}$										
Response time ⁷⁾	$\leq 1000 \mu\text{s}$										
Switching frequency max. ⁸⁾	500/s										
Connection technology	Connection cable, 2 m										
	Plug M12, 4-pin										
VDE protection class ⁹⁾	<input type="checkbox"/>										
Protection type	IP 67, IP 69K										
Protection circuits ¹⁰⁾	A, B, C										
Ambient temperature ¹¹⁾	Operation $-40 \dots +60 \text{ }^\circ\text{C}$										
	Storage $-40 \dots +75 \text{ }^\circ\text{C}$										
Weight with cable 2 m	Approx. 80 g										
with plug	Approx. 20 g										

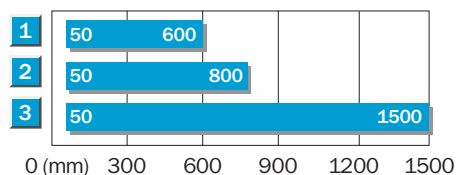
1) Object with 90% reflectance (referred to standard white DIN 5033)
 2) Limit values
 3) Must be within V_S tolerances
 4) Without load

5) Average service life at room temperature 100,000 h at $T_U = +25 \text{ }^\circ\text{C}$
 6) At $T_U = +25 \text{ }^\circ\text{C}$ and 100 mA output current

7) With resistive load
 8) With light/dark ratio 1:1
 9) Withstand voltage 50 V DC

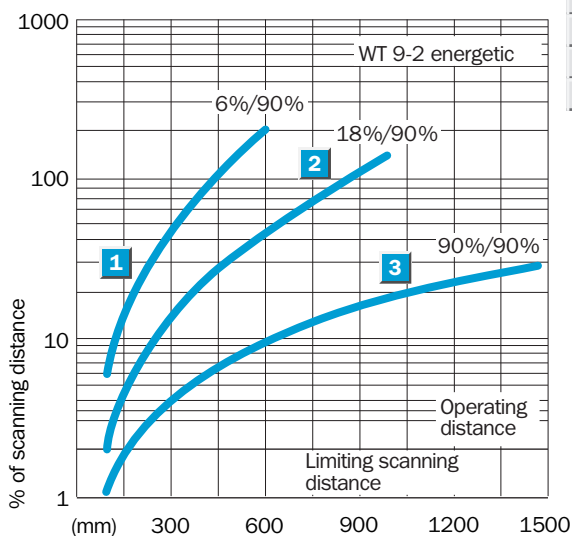
10) A = supply connections reverse polarity protected
 B = outputs short-circuit protected
 C = interference suppression
 11) Do not distort cable below 0 °C

Scanning distance




Operating distance

- 1 Scanning range on black, 6% remission
- 2 Scanning range on gray, 18% remission
- 3 Scanning range on white, 90% remission



Order information

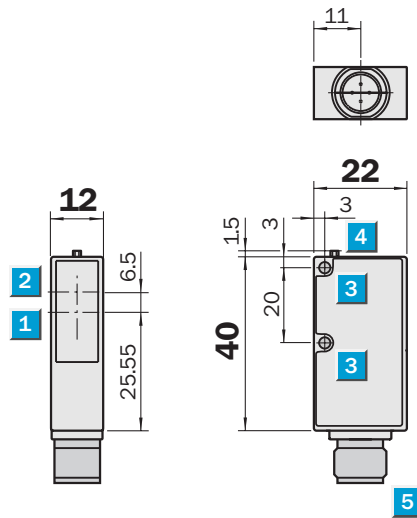
Type	Order no.
WT 9-2P160	1 019 097
WT 9-2P460	1 019 098
WT 9-2 N160	1 019 342

 **Scanning distance**
10 ... 450 mm

Photoelectric proximity switches

- Red-light emitter LED as alignment aid
- Adjustable scanning distance
- Switching frequency 800/s
- Outputs short-circuit protected
- Sensitivity adjustment using the Teach-in procedure
- Permissible ambient operating temperature -40 °C ... +60 °C

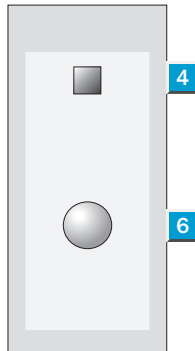
Dimensional drawing



Adjustments possible

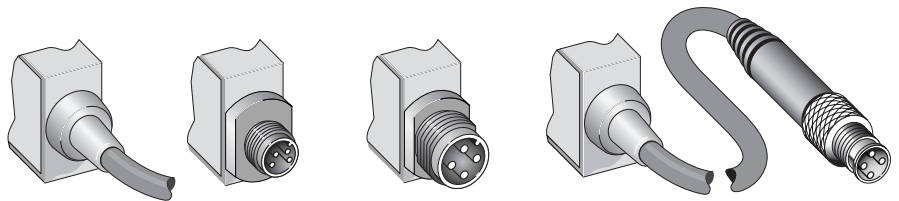
WT 9-2P 151	WT 9-2P 351
WT 9-2P 451	WT 9-2P 651
WT 9-2N 151	
WT 9-2N 451	

- 1 Axis of the receiver optics
- 2 Axis of the sender optics
- 3 Mounting hole \varnothing 3.2 mm
- 4 LED signal strength indicator
- 5 Plug M12 or M8, 4-pin, 2 m connection cable or 120 mm cable with plug M12, 4-pin
- 6 Teach-in button

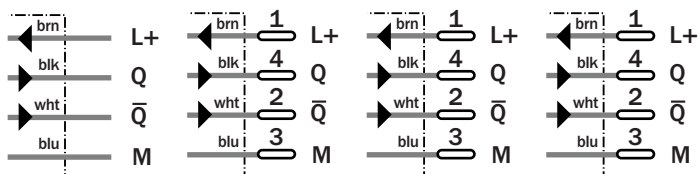


Connection types

WT 9-2P 151	WT 9-2P 351	WT 9-2P 451	WT 9-2P 651
WT 9-2N 151		WT 9-2N 451	



4 x 0.14 mm ²	4-pin, M8	4-pin, M12	4-pin, M12 with 120 mm cable
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See chapter Accessories

Cables and connectors
Mounting systems

Technical data		WT 9-2	P 151	P 451	N 151	N 451	P 351	P 651				
Scanning distance adjustable ¹⁾	10 ... 450 mm											
Supply voltage V_S²⁾	10 ... 30 V DC											
Ripple ³⁾	$\leq 5 V_{pp}$											
Current consumption ⁴⁾	≤ 30 mA											
Light source	LED, visible red light ⁵⁾											
Light spot diameter	80 x 80 mm at 500 mm											
Switching outputs Q and \bar{Q}	PNP											
	NPN											
Signal voltage HIGH	$V_S - 2.9$ V											
	V_S											
Signal voltage LOW ⁶⁾	Approx. 0 V											
	≤ 2.9 V											
Output current I_A max.	≤ 100 mA											
Response time ⁷⁾	≤ 625 μ s											
Switching frequency max. ⁸⁾	800/s											
Connection types	Connection cable, 2 m											
	Cable, 120 mm, with plug M12, 4-pin											
	Plug M12, 4-pin											
	Plug M8, 4-pin											
VDE protection class M12⁹⁾	<input type="checkbox"/>											
VDE protection class M8	III											
Enclosure rating	IP 67, IP 69K											
Circuit protection ¹⁰⁾	A, B, C											
Ambient temperature T_A ¹¹⁾	Operation - 40 ... + 60 °C											
	Storage - 40 ... + 75 °C											
Weight												
with connection cable 2 m/120 mm	Approx. 80 g											
with equipment plug M12/M8, 4-pin	Approx. 20 g											

1) Object with 90% remission (referred to standard white DIN 5033)
 2) Limit values
 3) Must be within V_S tolerances
 4) Without load

5) Average service life at room temperature 100,000 h at $T_A = + 25$ °C
 6) At $T_A = + 25$ °C and 100 mA output current

7) With resistive load
 8) With light/dark ratio 1:1
 9) Reference voltage 50 V

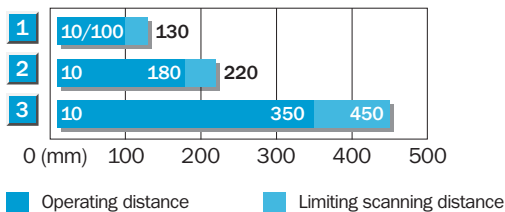
10) A = supply connections reverse polarity protected
 B = outputs short-circuit protected
 C = interference suppression
 11) Do not bend below 0 °C

Teach-in function

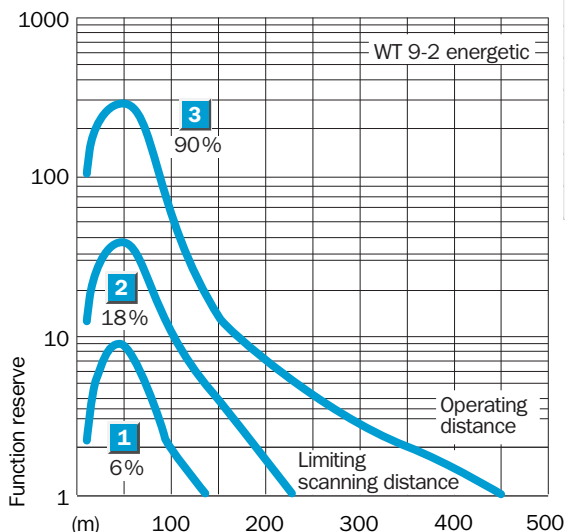
- **Programming via Teach-in button.**
- **Simple programming:**
Position object in the beam and push the button: finished;
LED confirms the Teach-in procedure.
- **Teach-in values can be stored.**

- **Two operating modes:**
Default setting: short Teach-in time (< 8 s); for standard applications; approx. double reserve via switching threshold; LED lights continuously.
Precise setting: long Teach-in time (> 8 s); for precise applications; small switching hysteresis; LED blinks.

Scanning distance



- 1 Scanning range on black, 6% remission
- 2 Scanning range on gray, 18% remission
- 3 Scanning range on white, 90% remission



Order information

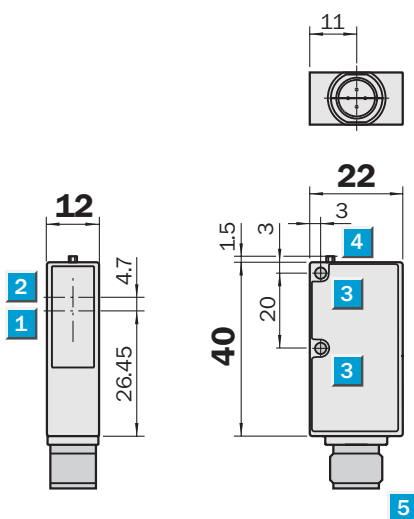
Type	Order no.
WT 9-2P 151	1 018 297
WT 9-2P 451	1 018 299
WT 9-2N 151	1 018 298
WT 9-2N 451	1 018 300
WT 9-2P 351	1 019 027
WT 9-2P 651	1 019 273

Scanning distance
10 ... 20 mm

Photoelectric proximity switches

- Red-light emitter LED as alignment aid
- Adjustable scanning distance
- Switching frequency 800/s
- Outputs short-circuit protected
- Sensitivity adjustment using the Teach-in procedure
- Permissible ambient operating temperature -40 °C ... +60 °C

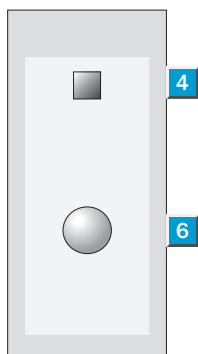
Dimensional drawing



Adjustments possible

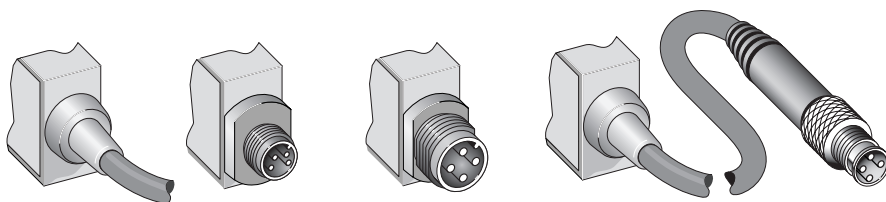
WT 9-2P 141	WT 9-2P 341
WT 9-2P 441	WT 9-2P 641
WT 9-2N 141	
WT 9-2N 441	

- 1 Axis of the receiver optics
- 2 Axis of the receiver optics
- 3 Mounting hole Ø 3.2 mm
- 4 LED signal strength indicator
- 5 Plug M12 or M8, 4-pin, 2 m connection cable or 120 mm cable with plug M12, 4-pin
- 6 Teach-in button



Connection types

WT 9-2P 141	WT 9-2P 341	WT 9-2P 441	WT 9-2P 641
WT 9-2N 141		WT 9-2N 441	



See chapter Accessories

Cables and connectors
Mounting systems

4 x 0.14 mm ²	4-pin, M8	4-pin, M12	4-pin, M12 with 120 mm cable

Technical data		WT 9-2	P 141	P 441	N 141	N 441	P 341	P 641				
Scanning distance adjustable ¹⁾	10 ... 20 mm											
Supply voltage V_S ²⁾	10 ... 30 VDC											
Ripple ³⁾	$\leq 5 V_{pp}$											
Current consumption ⁴⁾	$\leq 30 \text{ mA}$											
Light source	LED, visible red light ⁵⁾											
Light spot diameter	3 mm at 20 mm											
Switching outputs Q and \bar{Q}	PNP											
	NPN											
Signal voltage HIGH	$V_S - 2.9 \text{ V}$											
	V_S											
Signal voltage LOW ⁶⁾	Approx. 0 V											
	$\leq 2.9 \text{ V}$											
Output current I_A max.	$\leq 100 \text{ mA}$											
Response time ⁷⁾	$\leq 625 \mu\text{s}$											
Switching frequency max. ⁸⁾	800/s											
Connection types	Connection cable, 2 m											
	Cable, 120 mm, with plug M12, 4-pin											
	Plug M12, 4-pin											
	Plug M8, 4-pin											
VDE protection class M12 ⁹⁾	<input type="checkbox"/>											
VDE protection class M8	III											
Enclosure rating	IP 67, IP 69K											
Circuit protection ¹⁰⁾	A, B, C											
Ambient temperature T_A ¹¹⁾	Operation $- 40 \dots + 60 \text{ }^\circ\text{C}$											
	Storage $- 40 \dots + 75 \text{ }^\circ\text{C}$											
Weight												
with connection cable 2 m/120 mm	Approx. 80 g											
with equipment plug M12/M8, 4-pin	Approx. 20 g											

1) Object with 90% remission (referred to standard white DIN 5033)
 2) Limit values
 3) Must be within V_S tolerances
 4) Without load

5) Average service life at room temperature 100,000 h at $T_A = + 25 \text{ }^\circ\text{C}$
 6) At $T_A = + 25 \text{ }^\circ\text{C}$ and 100 mA output current

7) With resistive load
 8) With light/dark ratio 1:1
 9) Reference voltage 50 V

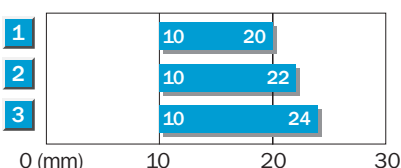
10) A = supply connections reverse polarity protected
 B = outputs short-circuit protected
 C = interference suppression
 11) Do not bend below 0 °C

Teach-in function

- **Programming via Teach-in button.**
- **Simple programming:**
Position object in the beam and push the button: finished;
LED confirms the Teach-in procedure.
- **Teach-in values can be stored.**

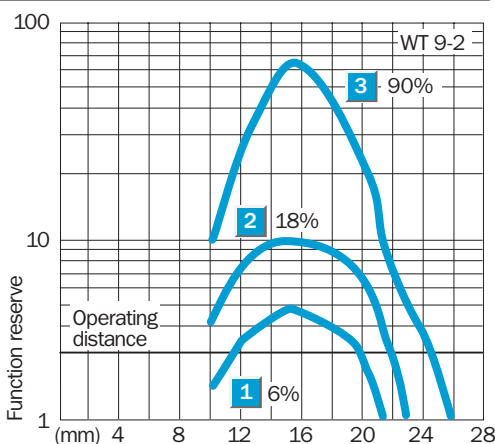
- **Two operating modes:**
Default setting: short Teach-in time (< 8 s);
for standard applications;
approx. double reserve via switching threshold;
LED lights continuously.
Precise setting: long Teach-in time (> 8 s);
for precise applications;
small switching hysteresis;
LED blinks.

Scanning distance




■ Operating distance

- 1 Scanning range on black, 6% remission
- 2 Scanning range on gray, 18% remission
- 3 Scanning range on white, 90% remission



Order information

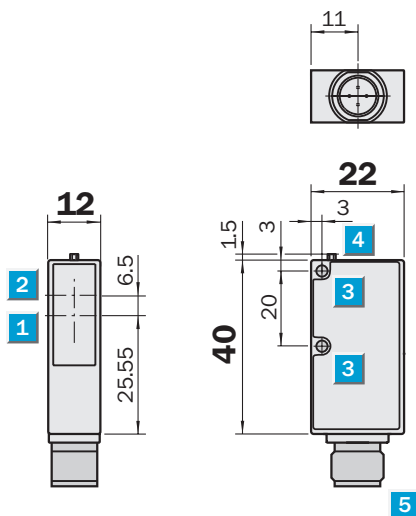
Type	Order no.
WT 9-2P 141	1 018 301
WT 9-2P 441	1 018 303
WT 9-2N 141	1 018 302
WT 9-2N 441	1 018 304
WT 9-2P 341	1 019 274
WT 9-2P 641	1 019 275


Scanning distance
10 ... 20 mm

Photoelectric proximity switches

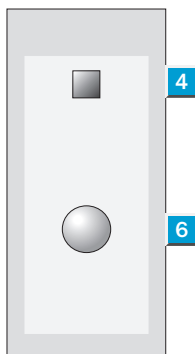
- Emitter LED IR
- Switching frequency 800/s
- Outputs short-circuit protected
- 120 mm cable with plug M12, 4-pin
- Scanning distance adjustment via Teach-in button
- Permissible ambient operating temperature -40 °C ... +60 °C

Dimensional drawing



Adjustments possible

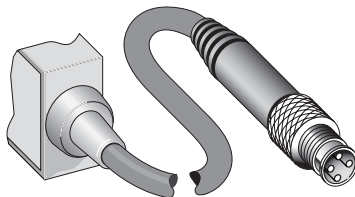
WT 9-2P671



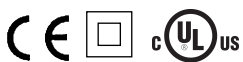
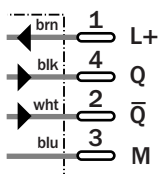
- 1 Axis of the receiver optics
- 2 Axis of the sender optics
- 3 Mounting hole \varnothing 3.2 mm
- 4 LED signal strength indicator
- 5 120 mm cable with plug M12, 4-pin
- 6 Teach-in button

Connection types

WT 9-2P671



4-pin, M12 with 120 mm cable



See chapter Accessories

Cables and connectors

Mounting systems

Technical data WT 9-2 P671

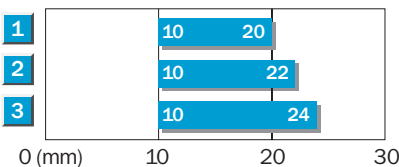
Scanning distance, teachable ¹⁾	10 ... 20 mm
Supply voltage V_S²⁾	10 ... 30 V DC
Ripple ³⁾	$\leq 5 V_{PP}$
Current consumption ⁴⁾	≤ 30 mA
Light source ⁵⁾	LED, infrared
Light spot diameter	3 mm at a distance of 20 mm
Switching outputs	PNP, Q und \bar{Q}
Signal voltage HIGH	$V_S - 2.9$ V
Signal voltage LOW ⁶⁾	Approx. 0 V
Output current I_A max.	≤ 100 mA
Response time ⁷⁾	≤ 625 μ s
Switching frequency max. ⁸⁾	800/s
Connection technology	Cable, 120 mm, with plug M12, 4-pin
VDE protection class ⁹⁾	<input type="checkbox"/>
Protection type	IP 67, IP 69K
Protection circuits ¹⁰⁾	A, B, C
Ambient temperature ¹¹⁾	Operation $-40 \dots +60$ °C Storage $-40 \dots +75$ °C
Weight with cable 120 mm	Approx. 80 g
Housing material	ABS

¹⁾ Object with 90% reflectance (referred to standard white DIN 5033)
²⁾ Limit values
³⁾ Must be within V_S tolerances
⁴⁾ Without load
⁵⁾ Average service life at room temperature 100,000 h at $T_U = +25$ °C
⁶⁾ At $T_U = +25$ °C and 100 mA output current
⁷⁾ With resistive load
⁸⁾ With light/dark ratio 1:1
⁹⁾ Withstand voltage 50 V DC
¹⁰⁾ A = supply connections reverse polarity protected
B = outputs short-circuit protected
C = interference suppression
¹¹⁾ Do not distort cable below 0 °C

Teach-in function

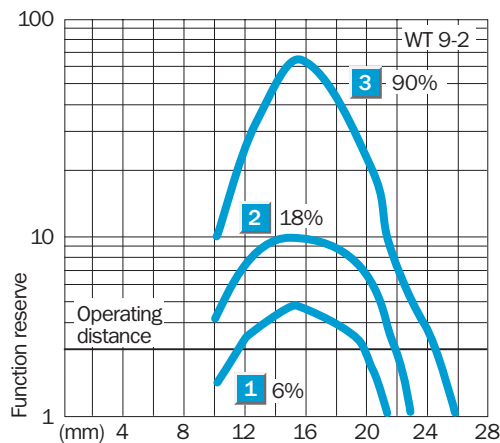
- **Programming via teach-in button.**
- **Simple programming:**
Position object in the beam and push the button: finished;
LED confirms the teach-in procedure.
- **Teach-in values can be stored.**
- **Two operating modes:**
Default setting: short teach-in time (< 8 s);
for standard applications;
approx. double reserve via switching threshold;
LED lights continuously.
Precise setting: long teach-in time (> 8 s);
for precise applications;
small switching hysteresis;
LED blinks.

Scanning distance




Operating distance

- 1 Scanning range on black, 6% remission
- 2 Scanning range on gray, 18% remission
- 3 Scanning range on white, 90% remission



Order information

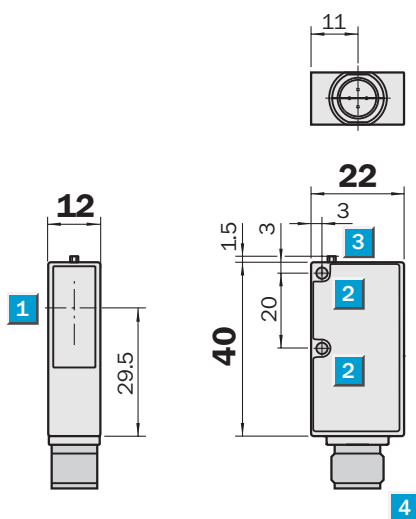
Type	Order no.
WT 9-2P671	1 019 656

 **Scanning range**
0 ... 4 m

Photoelectric reflex switches

- Red-light emitter LED as alignment aid
- Switching frequency 800/s
- Outputs short-circuit protected
- Permissible ambient operating temperature -40 °C ... +60 °C

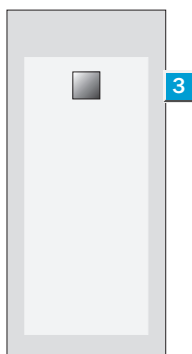
Dimensional drawing



No setting options

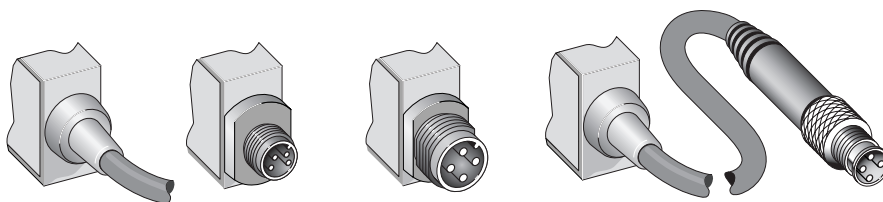
WL 9-2P 130	WL 9-2P 330
WL 9-2P 430	WL 9-2P 630
WL 9-2N 130	WL 9-2N 330
WL 9-2N 430	

- 1 Middle of optic axis
- 2 Mounting hole Ø 3.2 mm
- 3 LED signal strength indicator
- 4 Plug M12 or M8, 4-pin, 2 m connection cable or 120 mm cable with plug M12, 4-pin



Connection types

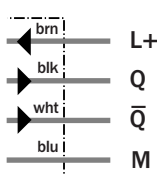
WL 9-2P 130	WL 9-2P 330	WL 9-2P 430	WL 9-2P 630
WL 9-2N 130	WL 9-2N 330	WL 9-2N 430	



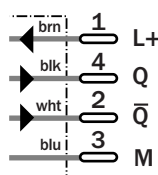
See chapter Accessories

Cables and connectors
Mounting systems
Reflectors

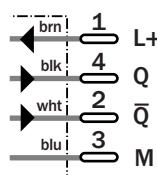
4 x 0.14 mm²



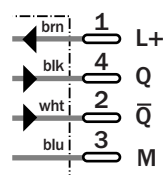
4-pin, M8



4-pin, M12



4-pin, M12 with 120 mm cable



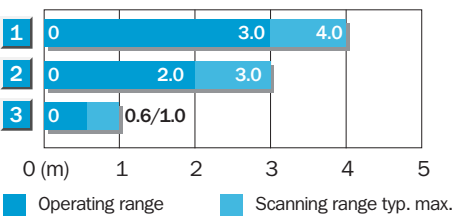
Technical data		WL 9-2	P 130	P 430	N 130	N 430	P 330	P 630	N 330			
Scanning range typ. max./on reflector	4 m/PL 80 A											
Supply voltage V_S¹⁾	10 ... 30 V DC											
Ripple ²⁾	$\leq 5 V_{pp}$											
Current consumption ³⁾	$\leq 30 \text{ mA}$											
Light source	LED, visible red light ⁴⁾											
Angle of dispersion	2.5°											
Light spot diameter	120 x 120 mm at 3 m											
Switching outputs Q and \bar{Q}	PNP											
	NPN											
Signal voltage HIGH	$V_S - 2.9 \text{ V}$											
	V_S											
Signal voltage LOW ⁵⁾	Approx. 0 V											
	$\leq 2.9 \text{ V}$											
Output current I_A max.	$\leq 100 \text{ mA}$											
Response time⁶⁾	$\leq 625 \mu\text{s}$											
Max. switching frequency⁷⁾	800/s											
Connection types	Connection cable, 2 m											
	Cable, 120 mm, with plug M12, 4-pin											
	Plug M12, 4-pin											
	Plug M8, 4-pin											
VDE protection class M12⁸⁾	<input type="checkbox"/>											
VDE protection class M8	III											
Enclosure rating	IP 67, IP 69K											
Circuit protection⁹⁾	A, B, C											
Ambient temperature T_A¹⁰⁾	Operation - 40 ... + 60 °C											
	Storage - 40 ... + 75 °C											
Weight												
with connection cable 2 m/120 mm	Approx. 80 g											
with equipment plug M12/M8, 4-pin	Approx. 20 g											

1) Limit values
 2) Must be within V_S tolerances
 3) Without load
 4) Average service life at room temperature 100,000 h at $T_A = + 25 \text{ °C}$

5) At $T_A = + 25 \text{ °C}$ and 100 mA output current
 6) With resistive load
 7) With light/dark ratio 1:1
 8) Reference voltage 50 V

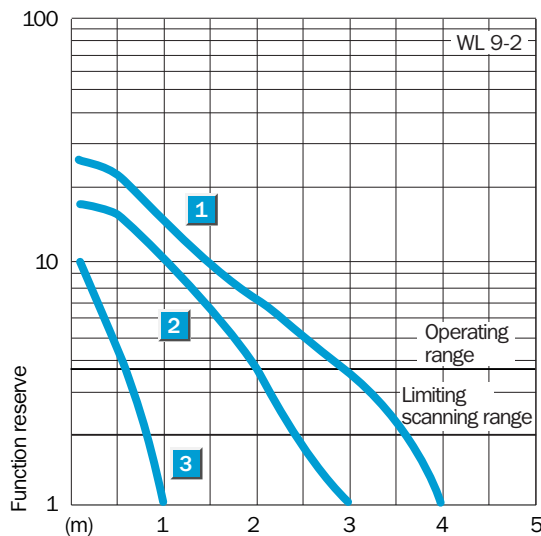
9) A = supply connections reverse polarity protected
 B = outputs short-circuit protected
 C = interference suppression
 10) Do not bend below 0 °C

Scanning range



Reflector type	Operating range
1 PL 80 A	0 ... 3 m
2 PL 40 A	0 ... 2 m
3 Reflective tape Diamond Grade*	0 ... 0.6 m

* 100 x 100 mm²



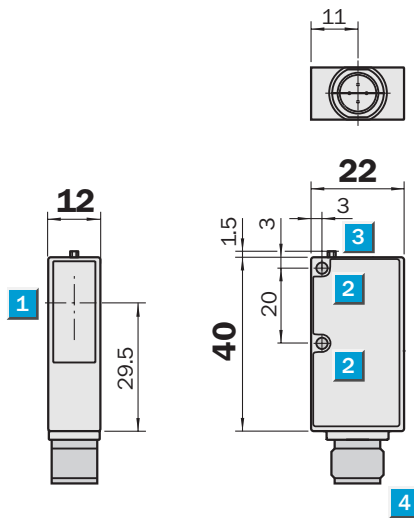
Order information

Type	Order no.
WL 9-2P 130	1 018 281
WL 9-2P 430	1 018 283
WL 9-2N 130	1 018 282
WL 9-2N 430	1 018 284
WL 9-2P 330	1 019 024
WL 9-2P 630	1 019 268
WL 9-2N 330	1 019 511

	Scanning range
	0 ... 4 m
Photoelectric reflex switches	

- Red-light emitter LED as alignment aid
- Switching frequency 800/s
- Outputs short-circuit protected
- Sensitivity adjustment using the Teach-in procedure
- Permissible ambient operating temperature $-40\text{ }^{\circ}\text{C} \dots +60\text{ }^{\circ}\text{C}$

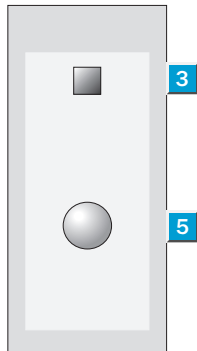
Dimensional drawing



Adjustments possible

WL 9-2P 131	WL 9-2P 331
WL 9-2P 431	WL 9-2P 631
WL 9-2N 131	
WL 9-2N 431	

- 1 Middle of optic axis
- 2 Mounting hole $\varnothing 3.2\text{ mm}$
- 3 LED signal strength indicator
- 4 Plug M12 or M8, 4-pin, 2 m connection cable or 120 mm cable with plug M12, 4-pin
- 5 Teach-in button



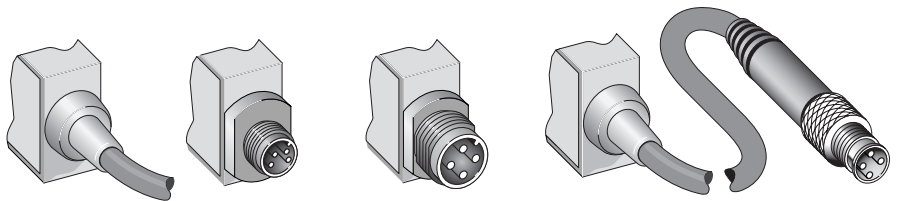
Connection types

WL 9-2P 131	WL 9-2P 331
WL 9-2N 131	

WL 9-2P 331	WL 9-2P 631

WL 9-2P 431	WL 9-2N 431

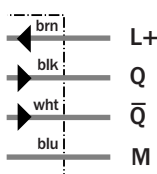
WL 9-2P 631



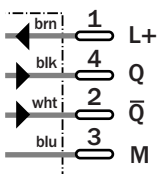
See chapter Accessories

Cables and connectors
Mounting systems
Reflectors

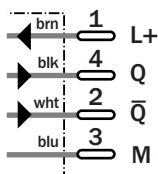
4 x 0.14 mm²



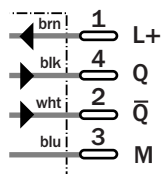
4-pin, M8



4-pin, M12



4-pin, M12 with 120 mm cable



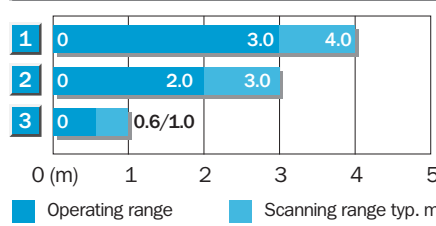
Technical data		WL 9-2	P 131	P 431	N 131	N 431	P 331	P 631				
Scanning range typ. max./on reflector	4 m/PL 80 A											
Supply voltage V_S¹⁾	10 ... 30 V DC											
Ripple ²⁾	$\leq 5 V_{pp}$											
Current consumption ³⁾	$\leq 30 \text{ mA}$											
Light source	LED, visible red light ⁴⁾											
Angle of dispersion	2.5°											
Light spot diameter	120 x 120 mm at 3 m											
Switching outputs Q and \bar{Q}	PNP											
	NPN											
Signal voltage HIGH	$V_S - 2.9 \text{ V}$											
	V_S											
Signal voltage LOW ⁵⁾	Approx. 0 V											
	$\leq 2.9 \text{ V}$											
Output current I_A max.	$\leq 100 \text{ mA}$											
Response time⁶⁾	$\leq 625 \mu\text{s}$											
Max. switching frequency⁷⁾	800/s											
Connection types	Connection cable, 2 m											
	Cable, 120 mm, with plug M12, 4-pin											
	Plug M12, 4-pin											
	Plug M8, 4-pin											
VDE protection class M12⁸⁾	<input type="checkbox"/>											
VDE protection class M8	III											
Enclosure rating	IP 67, IP 69K											
Circuit protection⁹⁾	A, B, C											
Ambient temperature T_A¹⁰⁾	Operation - 40 ... + 60 °C											
	Storage - 40 ... + 75 °C											
Weight												
with connection cable 2 m/120 mm	Approx. 80 g											
with equipment plug M12/M8, 4-pin	Approx. 20 g											

1) Limit values
 2) Must be within V_S tolerances
 3) Without load
 4) Average service life at room temperature 100,000 h at $T_A = + 25 \text{ °C}$
 5) At $T_A = + 25 \text{ °C}$ and 100 mA output current
 6) With resistive load
 7) With light/dark ratio 1:1
 8) Reference voltage 50 V
 9) A = supply connections reverse polarity protected
 B = outputs short-circuit protected
 C = interference suppression
 10) Do not bend below 0 °C

Teach-in function

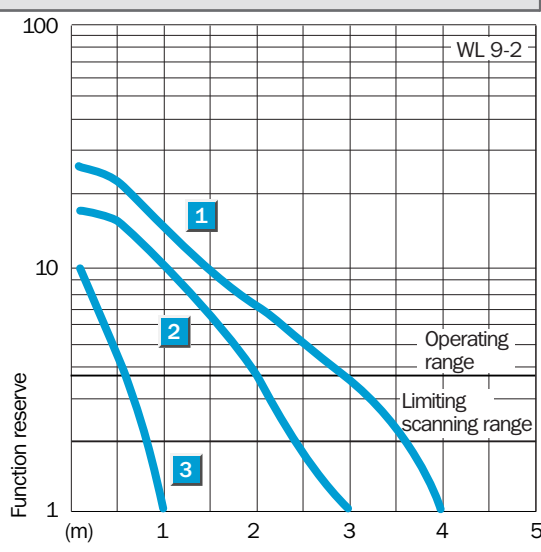
- Programming via Teach-in button.**
- Simple programming:**
Position reflector in the beam and push the button: finished;
LED confirms the Teach-in procedure.
- Teach-in values can be stored.**
- Two operating modes:**
Default setting: short Teach-in time (< 8 s); for standard applications;
 approx. double reserve via switching threshold;
 LED lights continuously.
Precise setting: long Teach-in time (> 8 s); for precise applications;
 small switching hysteresis;
 LED blinks.

Scanning range




Reflector type	Operating range
1 PL 80 A	0 ... 3 m
2 PL 40 A	0 ... 2 m
3 Reflective tape Diamond Grade*	0 ... 0.6 m

* 100 x 100 mm²



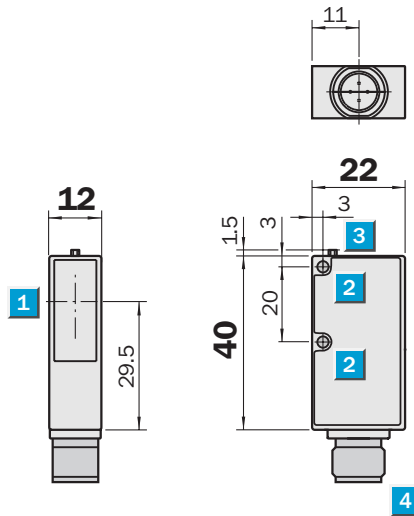
Order information

Type	Order no.
WL 9-2P 131	1 018 285
WL 9-2P 431	1 018 287
WL 9-2N 131	1 018 286
WL 9-2N 431	1 018 288
WL 9-2P 331	1 019 025
WL 9-2P 631	1 019 269

	Scanning range 60 ... 4000 mm
Photoelectric reflex switches	

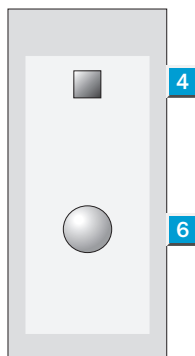
- Red-light emitter LED as alignment aid
- Switching frequency 800/s
- Outputs short-circuit protected
- Sensitivity adjustment using the Teach-in procedure
- Without polarisation filter
- Permissible ambient operating temperature -40 °C ... +60 °C

Dimensional drawing



Adjustments possible

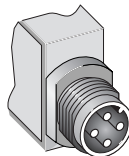
WL 9-2P481



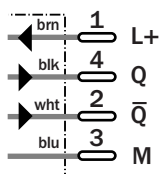
- | | |
|----------|------------------------------------|
| 1 | Axis of receiver optics |
| 2 | Axis of sender optics |
| 3 | Mounting hole \varnothing 3.2 mm |
| 4 | LED signal strength indicator |
| 5 | Plug M12, 4-pin |
| 6 | Teach-in button |

Connection types

WL 9-2P481



4-pin, M12



See chapter Accessories
Cables and connectors
Mounting systems
Reflectors

Technical data		WL 9-2	P481										
Scanning range/on reflector	4 m/PL 80 A												
	1 m/reflective tape												
Light source ¹⁾	LED, red light												
Light spot diameter	10 mm at a distance of 200 mm												
Teach-in function													
Supply voltage V_S ²⁾	10 ... 30 V DC												
Ripple ³⁾	< 5 V _{pp}												
Current consumption ⁴⁾	< 30 mA												
Switching outputs	PNP, Q and \bar{Q}												
Output current I_A max.	< 100 mA												
Response time ⁵⁾	< 625 μ s												
Switching frequency max. ⁶⁾	800/s												
Connection technology	Plug M12, 4-pin												
VDE protection class ⁷⁾	II												
Protection circuits ⁸⁾	A, B, C												
Protection type	IP 67, IP 69K												
Ambient temperature ⁹⁾	Operation -40 ... +60 °C												
	Storage -40 ... +75 °C												
Weight with plug	Approx.. 120 g												
Housing material	Plastic, ABS												

¹⁾ Average service life at room temperature 100,000 h at $T_U = +25$ °C
²⁾ Limit values
³⁾ Must be within V_S tolerances

⁴⁾ Without load
⁵⁾ With resistive load
⁶⁾ With light/dark ratio 1:1
⁷⁾ Withstand voltage 50 V DC

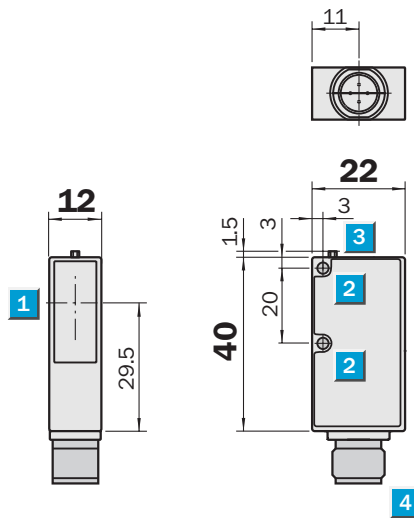
⁸⁾ A = supply connections reverse polarity protected
 B = outputs short-circuit protected
 C = interference suppression
⁹⁾ Do not distort cable below 0 °C

Teach-in function		Order information	
<ul style="list-style-type: none"> ■ Programming via Teach-in button. ■ Simple programming: Position object in the beam and push the button: finished; LED confirms the teach-in procedure. ■ Teach-in values can be stored. 	<ul style="list-style-type: none"> ■ Two operating modes: Default setting: short Teach-in time (< 8 s); for standard applications; approx. double reserve via switching threshold; LED lights continuously. Precise setting: long Teach-in time (> 8 s); for precise applications; small switching hysteresis; LED blinks. 	Type	Order no.
		WL 9-2P481	1 022 299

Scanning range
0 ... 0.4 m
 Photoelectric reflex switches

- LED light source, visible red light
- Switching frequency 800/s
- Outputs short-circuit protected
- Sensitivity adjustment using the Teach-in procedure
- Permissible ambient operating temperature $-40\text{ °C} \dots +60\text{ °C}$

Dimensional drawing

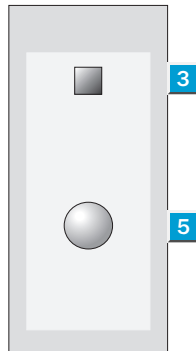


Adjustments possible

WL 9-2P 121	WL 9-2P 321
WL 9-2P 421	WL 9-2P 621
WL 9-2N 121	
WL 9-2N 421	

WL 9-2P 321	WL 9-2P 621
-------------	-------------

- 1 Middle of optic axis
- 2 Mounting hole $\varnothing 3.2\text{ mm}$
- 3 LED signal strength indicator
- 4 Plug M12 or M8, 4-pin, 2 m connection cable or 120 mm cable with plug M12, 4-pin
- 5 Teach-in button



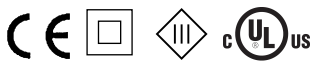
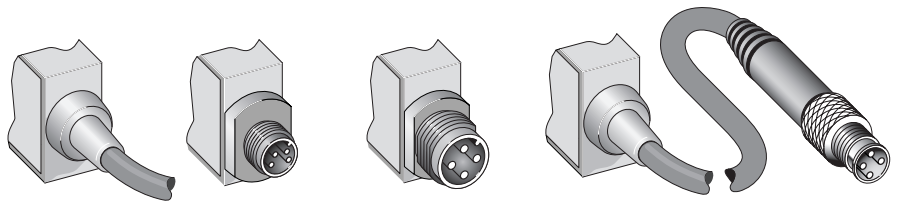
Connection types

WL 9-2P 121	WL 9-2P 321
WL 9-2N 121	

WL 9-2P 321	WL 9-2P 621
-------------	-------------

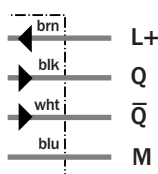
WL 9-2P 421	WL 9-2N 421
-------------	-------------

WL 9-2P 621

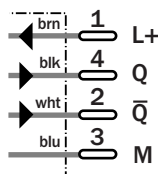


See chapter Accessories
Cables and connectors
Mounting systems
Reflectors

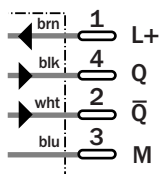
4 x 0.14 mm²



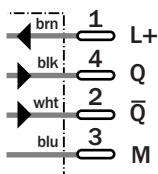
4-pin, M8



4-pin, M12



4-pin, M12 with 120 mm cable



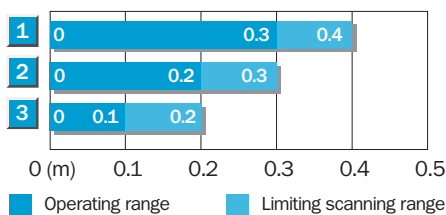
Technical data		WL 9-2	P 121	P 421	N 121	N 421	P 321	P 621				
Scanning range typ. max./on reflector	0.4 m/PL 80 A											
Supply voltage V_S¹⁾	10 ... 30 V DC											
Ripple ²⁾	$\leq 5 V_{pp}$											
Current consumption ³⁾	$\leq 30 \text{ mA}$											
Light source	LED, visible red light ⁴⁾											
Light spot diameter	1.5 x 1.5 mm at 35 mm											
Switching outputs Q and \bar{Q}	PNP											
	NPN											
Signal voltage HIGH	$V_S - 2.9 \text{ V}$											
	V_S											
Signal voltage LOW ⁵⁾	Approx. 0 V											
	$\leq 2.9 \text{ V}$											
Output current I_A max.	$\leq 100 \text{ mA}$											
Response time⁶⁾	$\leq 625 \mu\text{s}$											
Max. switching frequency⁷⁾	800/s											
Connection types	Connection cable, 2 m											
	Cable, 120 mm, with plug M12, 4-pin											
	Plug M12, 4-pin											
	Plug M8, 4-pin											
VDE protection class M12⁸⁾	<input type="checkbox"/>											
VDE protection class M8	III											
Enclosure rating	IP 67, IP 69K											
Circuit protection⁹⁾	A, B, C											
Ambient temperature T_A¹⁰⁾	Operation - 40 ... + 60 °C											
	Storage - 40 ... + 75 °C											
Weight												
with connection cable 2 m/120 mm	Approx. 80 g											
with equipment plug M12/M8, 4-pin	Approx. 20 g											

- 1) Limit values
- 2) Must be within V_S tolerances
- 3) Without load
- 4) Average service life at room temperature 100,000 h at $T_A = + 25 \text{ °C}$
- 5) At $T_A = + 25 \text{ °C}$ and 100 mA output current
- 6) With resistive load
- 7) With light/dark ratio 1:1
- 8) Reference voltage 50 V
- 9) A = supply connections reverse polarity protected
B = outputs short-circuit protected
C = interference suppression
- 10) Do not bend below 0 °C

Teach-in function

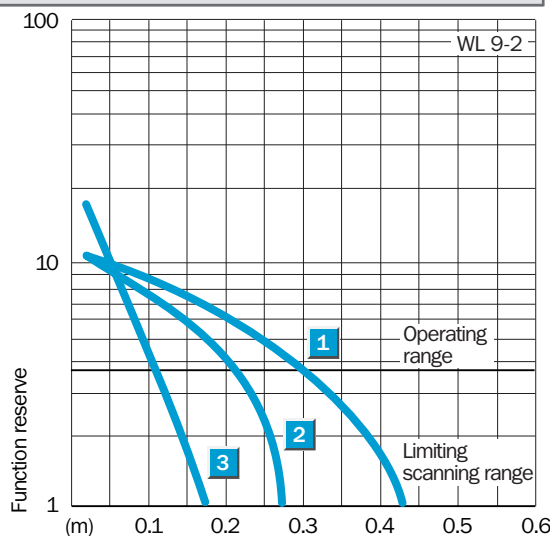
- **Programming via Teach-in button.**
- **Simple programming:**
Position reflector in the beam and push the button: finished;
LED confirms the Teach-in procedure.
- **Teach-in values can be stored.**
- **Two operating modes:**
Default setting: short Teach-in time (< 8 s);
for standard applications;
approx. double reserve via switching threshold;
LED lights continuously.
Precise setting: long Teach-in time (> 8 s);
for precise applications;
small switching hysteresis;
LED blinks.

Scanning range



Reflector type	Operating range
1 PL 80 A	0 ... 0.3 m
2 PL 40 A	0 ... 0.2 m
3 Reflective tape Diamond Grade*	0 ... 0.1 m

* 100 x 100 mm²



Order information

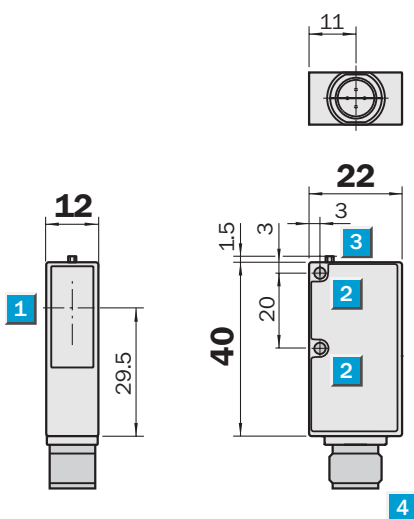
Type	Order no.
WL 9-2P 121	1 018 289
WL 9-2P 421	1 018 291
WL 9-2N 121	1 018 290
WL 9-2N 421	1 018 292
WL 9-2P 321	1 019 270
WL 9-2P 621	1 019 271

Scanning range
7 m

Through-beam photoelectric switches

- Red-light emitter LED as alignment aid
- Switching frequency 200/s
- Outputs short-circuit protected
- Test input
- Permissible ambient operating temperature -40 °C ... +60 °C

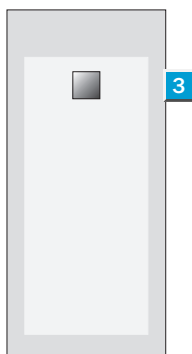
Dimensional drawing



No setting options

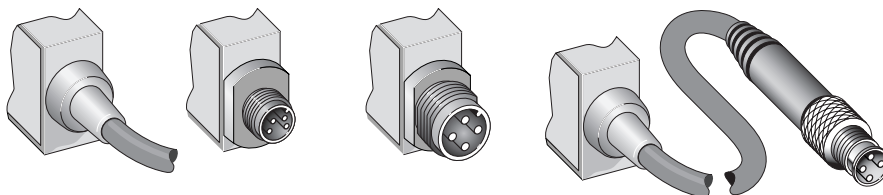
WS/WE 9-2P130	WS/WE 9-2P330
WS/WE 9-2P430	WS/WE 9-2P630
WS/WE 9-2N130	
WS/WE 9-2N430	

- 1 Middle of optic axis
- 2 Mounting hole Ø 3.2 mm
- 3 LED signal strength indicator
- 4 Plug M12 or M8, 4-pin, 2 m connection cable or 120 mm cable with plug M12, 4-pin



Connection types

WS/WE 9-2P 130	WS/WE 9-2P 330	WS/WE 9-2P 430	WS/WE 9-2P 630
WS/WE 9-2N 130		WS/WE 9-2N 430	



4 x 0.14 mm²

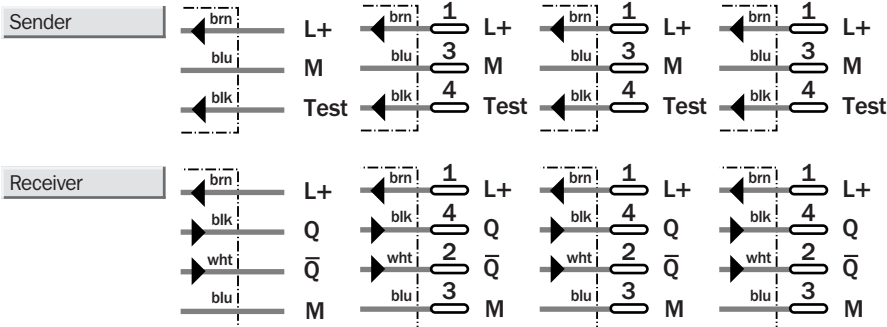
4-pin, M8

4-pin, M12

4-pin, M12 with 120 mm cable

See chapter Accessories

- Cables and connectors
- Mounting systems

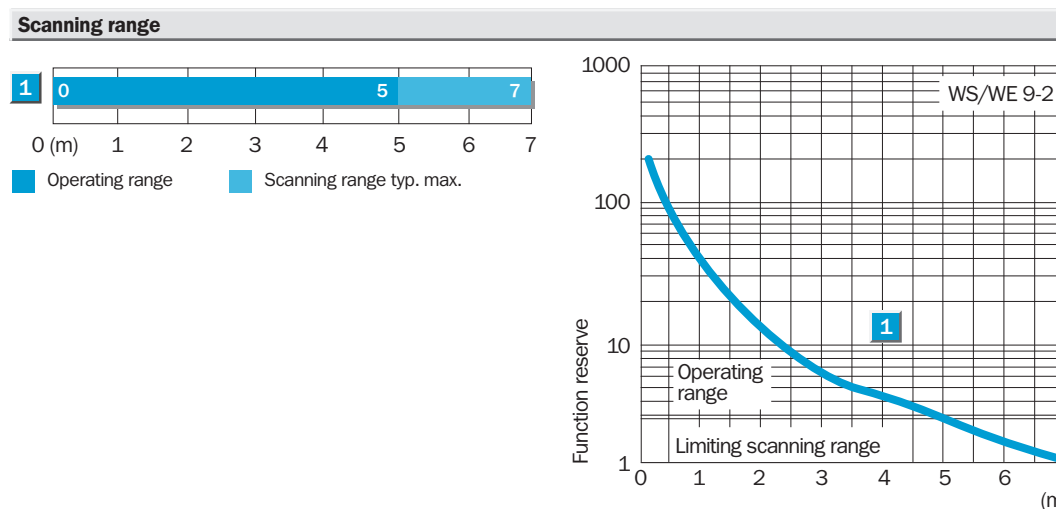


Technical data		WS/WE 9-2	P 130	P 430	N 130	N 430	P 330	P 630				
Scanning range typ. max.	7 m											
Suggested operating range	5 m											
Supply voltage V_S ¹⁾	10 ... 30 V DC											
Ripple ²⁾	$\leq 5 V_{pp}$											
Current consumption ³⁾	$\leq 15 \text{ mA (WE); } \leq 60 \text{ mA (WS)}$											
Light source	LED, visible red light ⁴⁾											
Angle of dispersion	2.5°											
Angle of reception	6°											
Light spot diameter	200 mm at a distance of 5 m											
Switching outputs Q and \bar{Q}	PNP											
	NPN											
Signal voltage HIGH	$V_S - 2.9 \text{ V}$											
	V_S											
Signal voltage LOW ⁵⁾	Approx. 0 V											
	$\leq 2.9 \text{ V}$											
Output current I_A max.	$\leq 100 \text{ mA}$											
Response time ⁶⁾	$\leq 2.5 \text{ ms}$											
Max. switching frequency ⁷⁾	200/s											
Test input TE	V_S or unswitched, sender active											
	0 V, sender inactive											
Connection types	Connection cable, 2 m											
	Cable, 120 mm, with plug M12, 4-pin											
	Plug M12, 4-pin											
	Plug M8, 4-pin											
VDE protection class M12 ⁸⁾	<input type="checkbox"/>											
VDE protection class M8	III											
Enclosure rating	IP 67, IP 69K											
Circuit protection ⁹⁾	A, B, C											
Ambient temperature T_A ¹⁰⁾	Operation - 40 ... + 60 °C											
	Storage - 40 ... + 75 °C											
Weight	with connection cable 2 m/120 mm	Approx. 80 g										
	with equipment plug M12/M8, 4-pin	Approx. 20 g										

1) Limit values
 2) Must be within V_S tolerances
 3) Without load
 4) Average service life at room temperature 100,000 h

5) At $T_A = + 25 \text{ °C}$ and 100 mA output current
 6) With resistive load
 7) With light/dark ratio 1:1
 8) Reference voltage 50 V

9) A = supply connections reverse polarity protected
 B = outputs short-circuit protected
 C = interference suppression
 10) Do not bend below 0 °C



Order Information	
Type	Order no.
WS/WE 9-2P 130	1 019 259
WS/WE 9-2P 430	1 019 261
WS/WE 9-2N 130	1 019 260
WS/WE 9-2N 430	1 019 262
WS/WE 9-2P 330	1 019 383
WS/WE 9-2P 630	1 019 382

W 11: Economic and Reliable

	Photoelectric proximity switch BGS
	Photoelectric proximity switch ener.
	Photoelectric reflex switch



All W11 sensors have visible red sender diodes as standard. This visible light spot allows the sensors to align with the object rapidly and reliably. The 4-pole M12 device plug or the 2 m cable are also included in the standard option, as well as the 800 Hz switching frequency or the short-circuit protected switching outputs. The WL11 UC photoelectric reflex switch probably offers today's most compact photoelectric switch with relay output.

The essential requirements of a sensor in standard applications are economy and reliability. Series

W11 fulfils these requirements.

W11 options:

- Photoelectric reflex switch WL11 with 7 m range,
- Photoelectric reflex switch WL11 "Glass detection" with maximum range 4 m,
- Photoelectric proximity switch with background suppression and maximum scanning distance 250 mm,
- Photoelectric proximity switch with foreground suppression and maximum scanning distance 100 mm,
- Energetic photoelectric proximity switch with maximum scanning distance 1000 mm.

The Series W11 sensors fulfil the test requirements of

ECOLAB

ECOLAB certifies that material resistance tests with cleaning agents and disinfectants in common use in the food-processing sector, were successfully completed.


Thanks to their reliability W11 sensors are routinely installed in typical application areas, such as the packaging industry, food and drinks, and the electronics and textile industries.

▼ Reliable detection of transparent objects like e.g. bottles with WL11G photoelectric reflex switch.



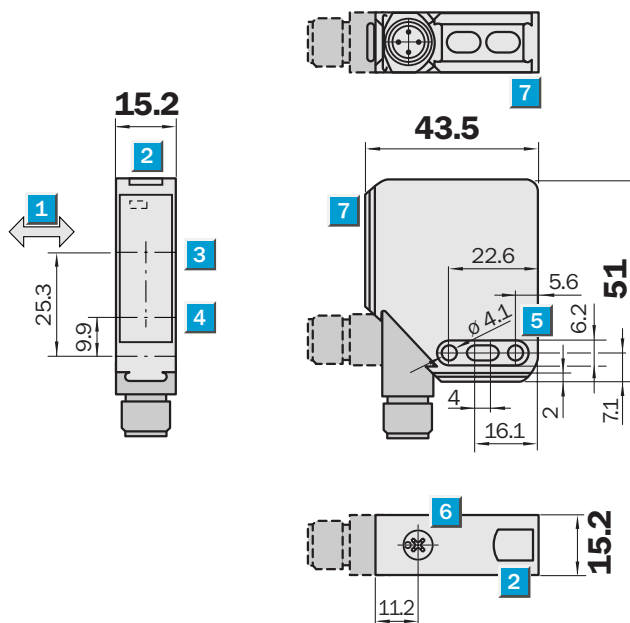
▲ WL11 Easy monitoring of doors and gates with WL11 photoelectric reflex switch.

◀ WL11 as trigger reflex switch. In presence of available products a bar code scanner is activated.

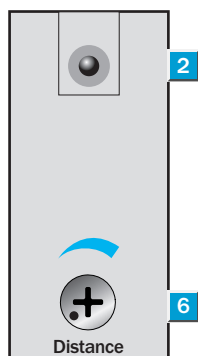

Scanning distance
 35 ... 100 mm
Photoelectric proximity switch

- Red light
- Insensitive to ambient light sources
- M12 plug rotatable by 90° or 2 m cable
- Adjustable foreground suppression
- ECOLAB material resistance tests

Dimensional drawing



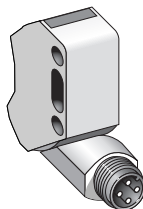
Adjustments possible



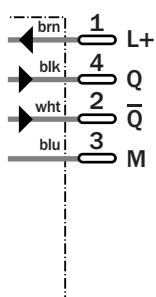
- 1 Standard direction of the material being scanned
- 2 LED signal strength indicator
- 3 Optical axis sender
- 4 Optical axis receiver
- 5 Mounting holes \varnothing 4.1 mm
- 6 Scanning distance adjuster
- 7 Dovetail

Connection type

WT11-P440



M12, 4-pin



See chapter Accessories
 Connector, M12, 4-pin
 Mounting systems

Technical specifications		WT11-	P440											
Operating distance	35 ... 100 mm													
Adjustment of operating distance	Potentiometer													
Light source, light type	LED, Red light ¹⁾													
Supply voltage V_s	10 ... 30 V DC ²⁾													
Ripple	$\leq 5 V_{ss}$ ³⁾													
Power consumption	$\leq 30 \text{ mA}$ ⁴⁾													
Switching outputs	PNP antivalent													
Output current I_a max	$< 100 \text{ mA}$													
Response time	$\leq 625 \mu\text{s}$ ⁵⁾													
Switching frequency	800 Hz ⁶⁾													
Connection type	Connector, M12, 4-pin													
VDE protection class	\square ⁷⁾													
Circuit protection	V_s connections reverse-polarity protected / Output Q and Q not short-circuit protected / Interference suppression													
Enclosure rating	IP 65													
Ambient temperature operation	-20 °C ... +60 °C													
Ambient temperature storage	-20 °C ... +75 °C													
Housing material	ABS													

¹⁾ Average service life 100,000 h at $T_a = +25 \text{ °C}$

²⁾ Limit values

³⁾ may not exceed or fall short of

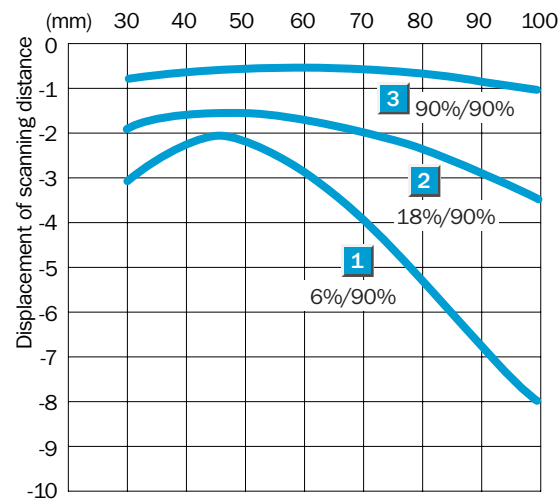
V_s tolerances
⁴⁾ without load

⁵⁾ Signal transit time with resistive load

⁶⁾ with light/dark ratio 1:1

⁷⁾ Reference voltage 50 V DC

Scanning distance



Order information

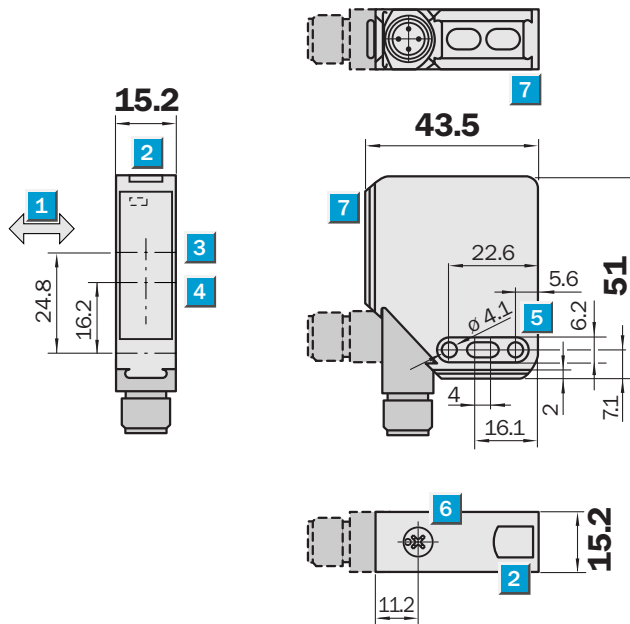
Type	Order No.
WT11-P440	1 022 049

Scanning distance
20 ... 250 mm

Photoelectric proximity switch

- Red light
- Insensitive to ambient light sources
- M12 plug rotatable by 90° or 2 m cable
- Adjustable background suppression
- ECOLAB material resistance tests

Dimensional drawing



Adjustments possible



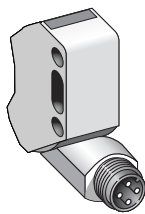
- 1 Standard direction of the material being scanned
- 2 LED signal strength indicator
- 3 Optical axis sender
- 4 Optical axis receiver
- 5 Mounting holes \varnothing 4.1 mm
- 6 Scanning distance adjuster
- 7 Dovetail



Connection type

WT11-N430
WT11-P430

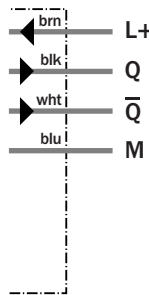
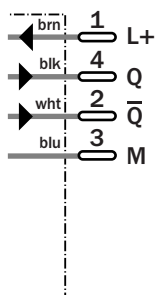
WT11-N130
WT11-P130



M12, 4-pin



4 x 0.25 mm²



See chapter Accessories
Connector, M12, 4-pin
Mounting systems

Technical specifications		WT11-	N130	N430	P130	P430						
Operating distance	20 ... 250 mm ¹⁾											
Adjustment of operating distance	Potentiometer											
Light source, light type	LED, Red light ²⁾											
Light spot diameter	Approx. 10 mm at 200 mm distance											
Supply voltage V_s	10 ... 30 V DC ³⁾											
Ripple	≤ 5 V _{ss} ⁴⁾											
Power consumption	≤ 40 mA ⁵⁾											
	≤ 30 mA ⁵⁾											
Switching outputs	NPN antivalent											
	PNP antivalent											
Output current I _a max	≤ 100 mA											
Response time	≤ 625 μs ⁶⁾											
Switching frequency	800 Hz ⁷⁾											
Connection type	Cable, PVC, 2 m ⁸⁾											
	Connector, M12, 4-pin											
VDE protection class	□ ⁹⁾											
Circuit protection	V _s connections reverse-polarity protected / Output Q and Q not short-circuit protected / Interference suppression											
Enclosure rating	IP 65											
Ambient temperature operation	-20 °C ... +60 °C											
Ambient temperature storage	-20 °C ... +75 °C											
Weight	Approx. 200 g											
	Approx. 120 g											
Housing material	ABS											

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

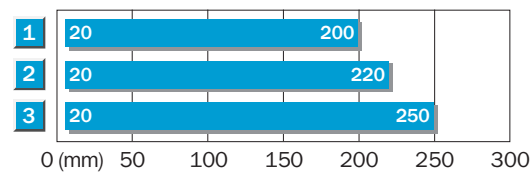
⁶⁾ Signal transit time with resistive load

⁷⁾ with light/dark ratio 1:1

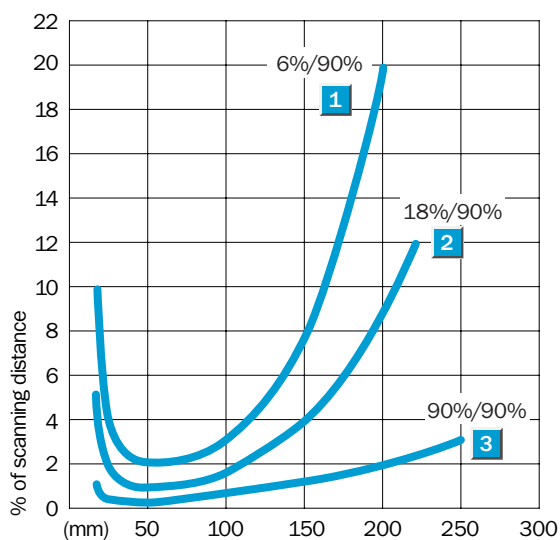
⁸⁾ do not bend below 0 °C

⁹⁾ Reference voltage 50 V DC

Scanning distance




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



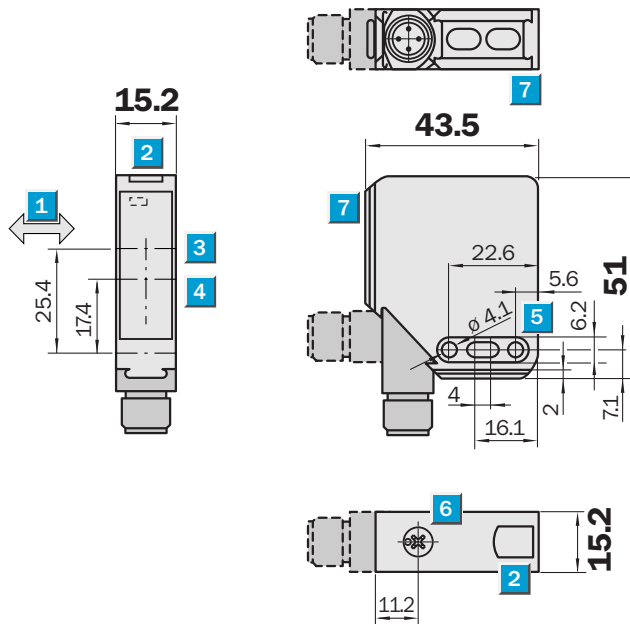
Order information

Type	Order No.
WT11-N130	1 018 684
WT11-N430	1 018 685
WT11-P130	1 018 683
WT11-P430	1 018 511

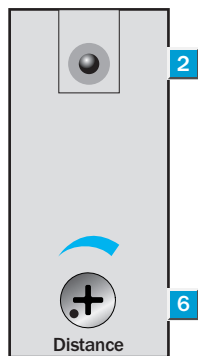

Scanning distance
10 ... 1,000 mm
Photoelectric proximity switch

- Red light
- Insensitive to ambient light sources
- M12 plug rotatable by 90° or 2 m cable
- Energetic proximity switch, adjustable
- ECOLAB material resistance tests

Dimensional drawing



Adjustments possible



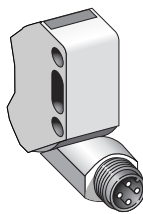
- 1 Standard direction of the material being scanned
- 2 LED signal strength indicator
- 3 Optical axis sender
- 4 Optical axis receiver
- 5 Mounting holes \varnothing 4.1 mm
- 6 Scanning distance adjuster
- 7 Dovetail



Connection type

WT11-N450
WT11-P450

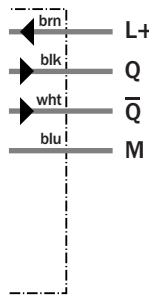
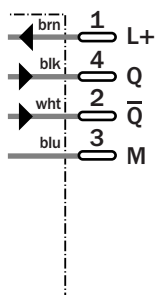
WT11-N150
WT11-P150



M12, 4-pin



4 x 0.25 mm²



See chapter Accessories
 Connector, M12, 4-pin
 Mounting systems

Technical specifications		WT11-	N150	N450	P150	P450						
Scanning distance typ. max.	10 ... 1,000 mm ¹⁾											
Operating distance	80 ... 700 mm ¹⁾											
Adjustment of operating distance	Potentiometer											
Light source, light type	LED, Red light ²⁾											
Light spot diameter	Approx. 30 mm at 600 mm distance											
Supply voltage V _s	10 ... 30 V DC ³⁾											
Ripple	≤ 5 V _{ss} ⁴⁾											
Power consumption	≤ 40 mA ⁵⁾											
	≤ 30 mA ⁵⁾											
Switching outputs	NPN antivalent											
	PNP antivalent											
Output current I _{a,max}	≤ 100 mA											
Response time	≤ 625 μs ⁶⁾											
Switching frequency	800 Hz ⁷⁾											
Connection type	Cable, PVC, 2 m ⁸⁾											
	Connector, M12, 4-pin											
VDE protection class	□ ⁹⁾											
Circuit protection	V _s connections reverse-polarity protected / Output Q and Q not short-circuit protected / Interference suppression											
Enclosure rating	IP 65											
Ambient temperature operation	-20 °C ... +60 °C											
Ambient temperature storage	-20 °C ... +75 °C											
Weight	Approx. 200 g											
	Approx. 120 g											
Housing material	ABS											

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

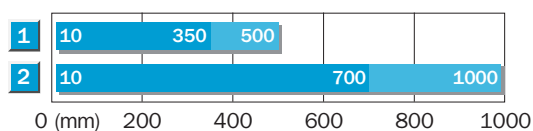
⁶⁾ Signal transit time with resistive load

⁷⁾ with light/dark ratio 1:1

⁸⁾ do not bend below 0 °C

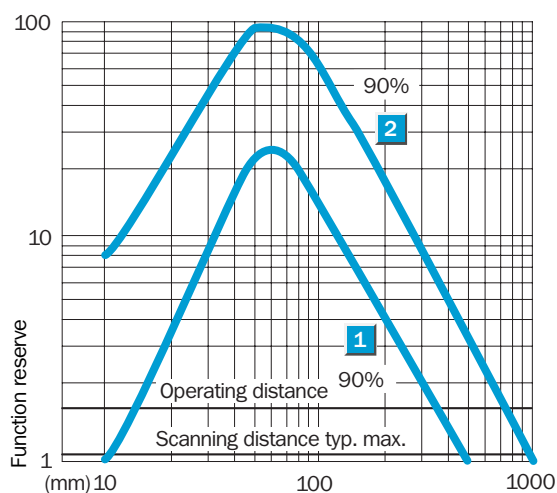
⁹⁾ Reference voltage 50 V DC

Scanning distance




■ Operating distance ■ Limiting scanning distance

1	Scanning distance on grey, 18 % remission
2	Scanning distance on white, 90 % remission



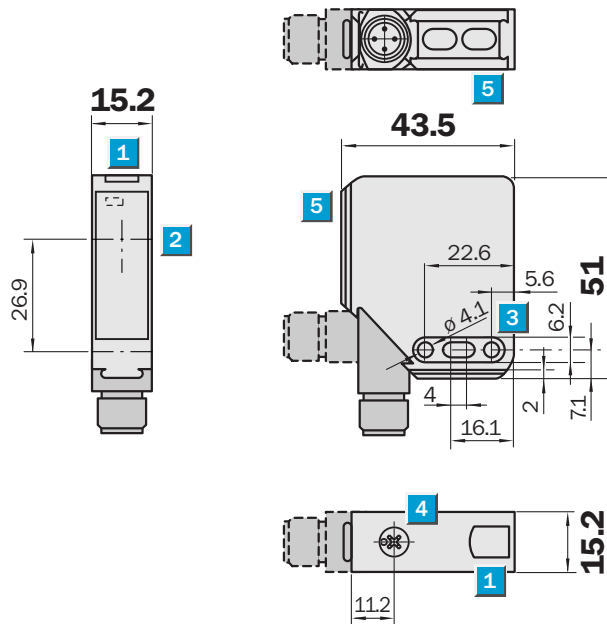
Order information

Type	Order No.
WT11-N150	1 018 688
WT11-N450	1 018 689
WT11-P150	1 018 686
WT11-P450	1 018 687


Scanning range
0 ... 7 m
Photoelectric reflex switch

- Red light
- Insensitive to ambient light sources
- M12 plug rotatable by 90° or 2 m cable
- Adjustable sensitivity
- ECOLAB material resistance tests

Dimensional drawing



Adjustments possible



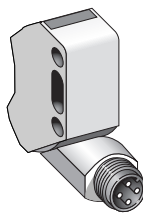
- 1 LED signal strength indicator
- 2 Middle of optical axis
- 3 Mounting holes \varnothing 4.1 mm
- 4 Sensitivity control
- 5 Dovetail



Connection type

WL11-N430
 WL11-P430

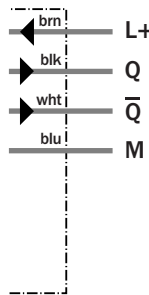
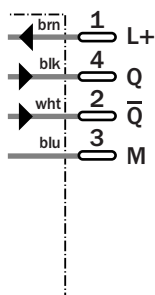
WL11-N130
 WL11-P130



M12, 4-pin



4 x 0.25 mm²



See chapter Accessories

- Mounting systems
- Reflectors

Technical specifications		WL11-	N130	N430	P130	P430
Scanning range typ. max.	0 ... 7 m					
Scanning range, recommended	0 ... 5 m					
Relating to	Reflector PL80A					
Sensitivity adjustment	Potentiometer					
Light source, light type	LED, Red light ¹⁾					
Light spot diameter	Approx. 80 mm at 3 m distance					
Supply voltage V _s	10 ... 30 V DC ²⁾					
Ripple	≤ 5 V _{SS} ³⁾					
Power consumption	≤ 40 mA ⁴⁾					
Switching outputs	NPN antivalent					
	PNP antivalent					
Output current I _a max	≤ 100 mA					
Response time	≤ 625 μs ⁵⁾					
Switching frequency	800 Hz ⁶⁾					
Connection type	Cable, PVC, 2 m ⁷⁾					
	Connector, M12, 4-pin					
VDE protection class	□ ⁸⁾					
Circuit protection	V _s connections reverse-polarity protected / Output Q and Q not short-circuit protected / Interference suppression					
Enclosure rating	IP 65					
Ambient temperature operation	-20 °C ... +60 °C					
Ambient temperature storage	-20 °C ... +75 °C					
Weight	Approx. 200 g					
	Approx. 120 g					
Housing material	ABS					

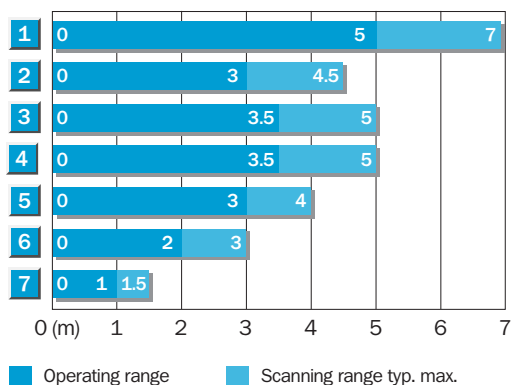
¹⁾ Average service life 100,000 h at T_a = +25 °C
²⁾ Limit values

³⁾ may not exceed or fall short of V_s tolerances
⁴⁾ without load

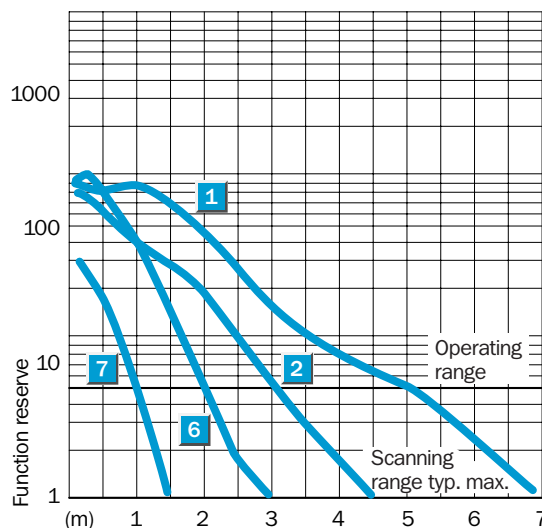
⁵⁾ Signal transit time with resistive load
⁶⁾ with light/dark ratio 1:1
⁷⁾ do not bend below 0 °C

⁸⁾ Reference voltage 50 V DC


Scanning range and operating reserve



Reflector type	Operating range
1	0 – 5.0 m
2	0 – 3.0 m
3	0 – 3.5 m
4	0 – 3.5 m
5	0 – 3.0 m
6	0 – 2.0 m
7	0 – 1.0 m

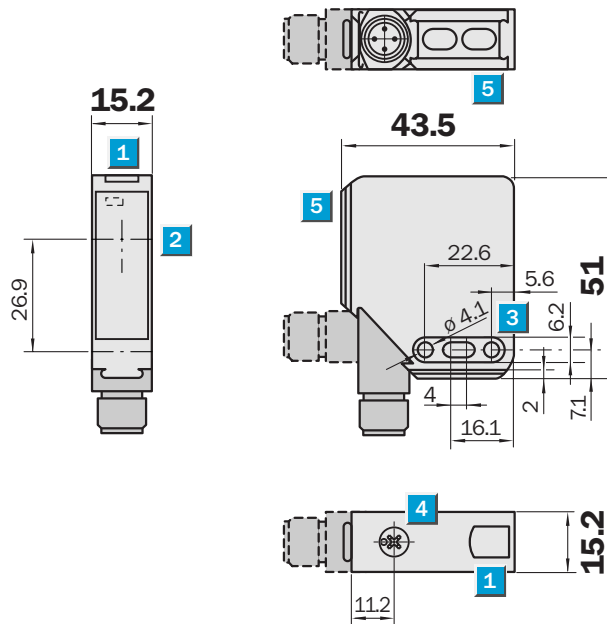


Order information	
Type	Order No.
WL11-N130	1 018 681
WL11-N430	1 018 682
WL11-P130	1 018 680
WL11-P430	1 018 510


Scanning range
0 ... 4 m
Photoelectric reflex switch

- Red light
- Insensitive to ambient light sources
- Detection of glass and transparent films
- Adjustable sensitivity
- ECOLAB material resistance tests

Dimensional drawing



Adjustments possible

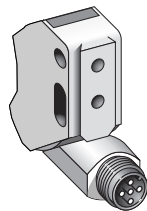


- 1 LED signal strength indicator
- 2 Middle of optical axis
- 3 Mounting holes Ø 4.1 mm
- 4 Sensitivity control
- 5 Dovetail

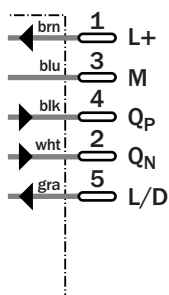


Connection type

WL11-B560



M12, 5-pin



See chapter Accessories

- Connector, M12, 5-pin
- Mounting systems
- Reflectors

Technical specifications		WL11-	B560											
Scanning range typ. max.	0 ... 4 m													
Scanning range, recommended	0 ... 3.5 m													
Relating to	Reflector PL80A													
Sensitivity adjustment	Potentiometer													
Light source, light type	LED, Red light ¹⁾													
Light spot diameter	30 mm at 1.5 m distance													
Supply voltage V_s	10 ... 30 V DC ²⁾													
Ripple	$\leq 5 V_{SS}$ ³⁾													
Power consumption	$\leq 30 \text{ mA}$ ⁴⁾													
Switching outputs	Transistor outputs Q_p and Q_n													
Switching mode	Light-/dark-switching, switchable													
Output current $I_{a,max}$	100 mA													
Response time	$< 625 \mu\text{s}$ ⁵⁾													
Switching frequency	800 Hz ⁶⁾													
Connection type	Connector, M12, 5-pin													
VDE protection class	□													
Circuit protection	V_s connections reverse-polarity protected / Output Q and Q not short-circuit protected / Interference suppression													
Enclosure rating	IP 65													
Ambient temperature operation	-20 °C ... +60 °C													
Ambient temperature storage	-20 °C ... +75 °C													
Housing material	ABS													

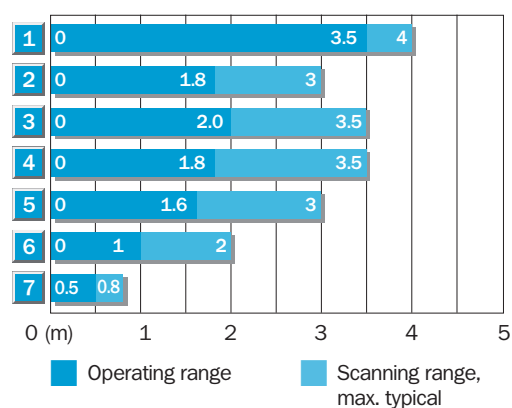
¹⁾ Average service life 100,000 h at $T_a = +25 \text{ °C}$

²⁾ Limit values
³⁾ may not exceed or fall short of

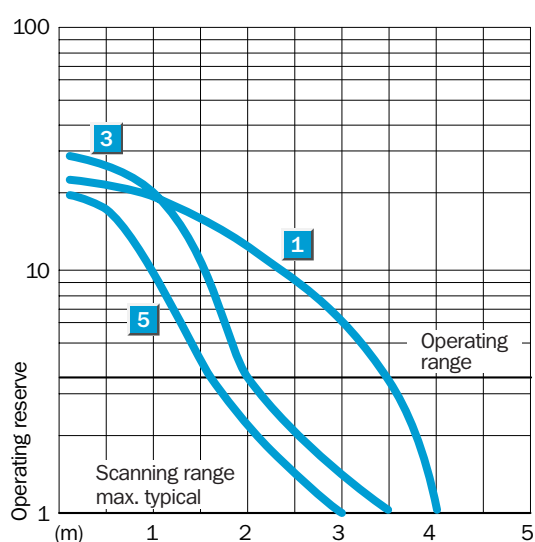
V_s tolerances
⁴⁾ without load

⁵⁾ Signal transit time with resistive load
⁶⁾ with light/dark ratio 1:1

Scanning range and operating reserve




Reflector type	Operating range
1 PL80A	0 ... 3.5 m
2 C110	0 ... 1.8 m
3 PL50A	0 ... 2.0 m
4 PL40A	0 ... 1.8 m
5 PL30A	0 ... 1.6 m
6 PL20A	0 ... 1.0 m
7 Reflective tape	0 ... 0.5 m



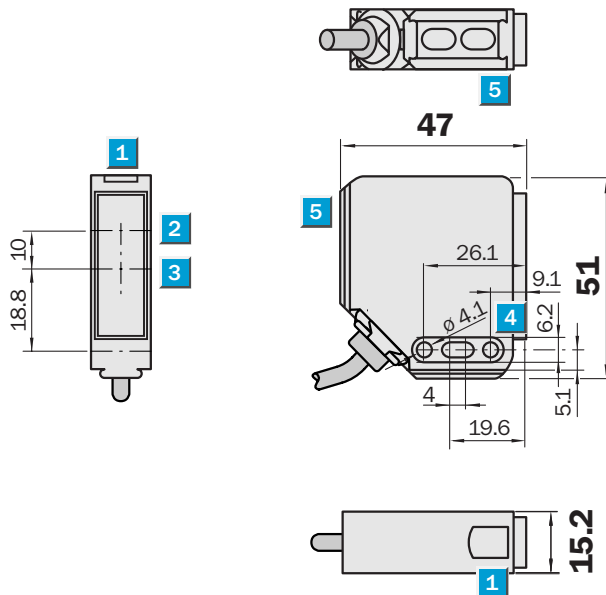
Order information

Type	Order No.
WL11-B560	1 019 704

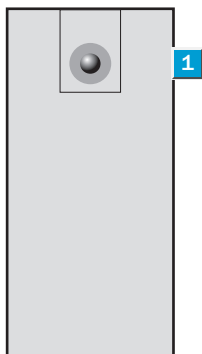

Scanning range
0.1 ... 7 m
Photoelectric reflex switch

- Red light
- Polarisation filter allowing detection of objects with reflective surfaces
- CE-emitted interference EN 61000-6-3 ("Residential and Industrial Areas")
- ECOLAB material resistance tests

Dimensional drawing



Adjustments possible

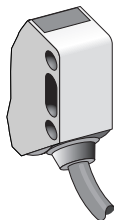


- 1 LED signal strength indicator
- 2 Middle of optic axis, sender
- 3 Middle of optic axis, receiver
- 4 Mounting holes \varnothing 4.1 mm
- 5 Dovetail

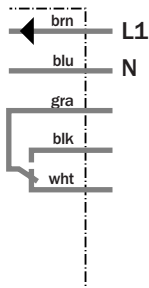


Connection type

WL11-R130



5 x 0.25 mm²



See chapter Accessories

- Mounting systems
- Reflectors

Technical specifications		WL11-	R130										
Scanning range typ. max.	0.1 ... 7 m												
Scanning range, recommended	0.1 ... 5 m												
Relating to	Reflector PL80A												
Light source, light type	LED, Red light ¹⁾												
Light spot diameter	Approx. 80 mm at 3 m distance												
Angle of dispersion	2 °												
Polarisation filter	✓												
Supply voltage V _s	24 ... 240 V DC / 24 ... 240 V AC ²⁾												
Switching outputs	Relay 1 x c/o, electrically isolated												
Max. switching voltage	AC 250 V AC / 120 V DC												
Switching current max.	3 A/250 V AC; 3A/30 V DC ³⁾												
Max. switching power	750 VA AC / 30 V DC												
Response time	≤ 25 ms ⁴⁾												
Switching frequency	20 Hz ⁵⁾												
Connection type	Cable, 2 m ⁶⁾												
VDE protection class	□ ⁷⁾												
Circuit protection	V _s connections reverse-polarity protected / Interference suppression												
Enclosure rating	IP 65												
Ambient temperature operation	-25 °C ... +55 °C												
Ambient temperature storage	-40 °C ... +70 °C												
Weight	Approx. 200 g												
Housing material	ABS, PMMA												

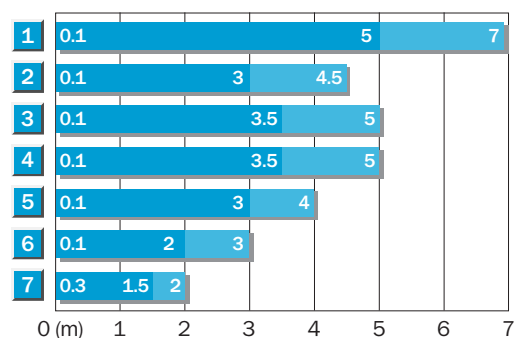
¹⁾ Average service life 100,000 h at T_a = +25 °C

²⁾ Tolerance: +10 %, -20 %
³⁾ Usage category to EN 60947-1,

AC-15, DC-13
⁴⁾ Signal transit time with resistive load

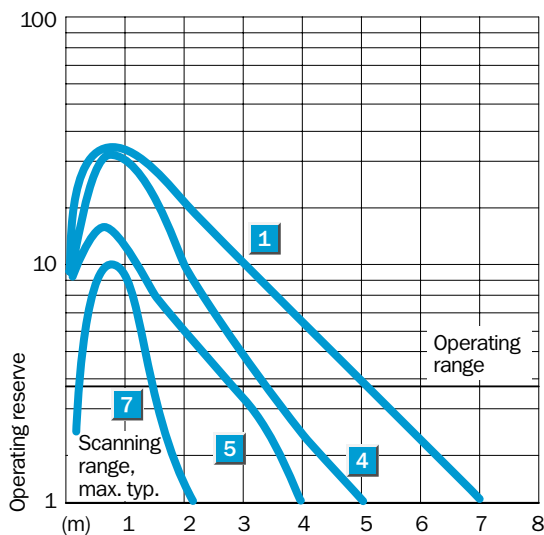
⁵⁾ with light/dark ratio 1:1
⁶⁾ do not bend below 0 °C
⁷⁾ Reference voltage 50 V DC

Scanning range and operating reserve



Operating range (light blue bar)
 Scanning range, max. typical (dark blue bar)

Reflector type	Operating range
1 PL 80 A	0.1 – 5.0 m
2 C 110	0.1 – 3.0 m
3 PL 50 A	0.1 – 3.5 m
4 PL 40 A	0.1 – 3.5 m
5 PL 30 A	0.1 – 3.0 m
6 PL 20 A	0.1 – 2.0 m
7 Reflective tape	0.3 – 1.5 m



Order information	
Type	Order No.
WL11-R130	1 026 232

W12-2: Fantastic performance – years of experience

	Photoelectric proximity switches, FGS
	Photoelectric proximity switches, BGS
	Photoelectric proximity switches, energetic



The WL12 G "glass photoelectric switch" designed for filling systems used in the beverage industry, represents more than just a technical advance. This intelligent sensor needs to be configured just once using the teach-in method and then it is able to adapt its switching threshold to increasing contamination continuously and fully automatically during operation. As a result, transparent objects, e.g. transparent films or filled PET mineral water bottles, can now be detected much more reliably.

Continual cleaning and realignment are, therefore, a thing of the past. Monitoring the flow of bottles, and bottle counting, has been made possible while simultaneously minimising maintenance requirements.

Further advantages:

- The Teflon-coated version for use in, for example, the beverage industry.
- IP 69K assures reliable operation even when high pressure cleaning equipment is being used.
- The Series W12-2 sensors fulfil the test requirements of



certifies that material resistance tests with cleaning agents and disinfectants in common use in the foodprocessing sector, were successfully completed.

	Photoelectric reflex switches
	Through-beam photoelectric switches
	Photoelectric switches with fibre-optic cable
Proximity mode	
	Photoelectric switches with fibre-optic cable
Through-beam mode	

The W12-2 series of photoelectric switches is in use all over the world. The key advantage for the user is the wealth of experience gained from the previous W12 series. The W12-2 series is backed by years of know-how gained from many thousands of applications.

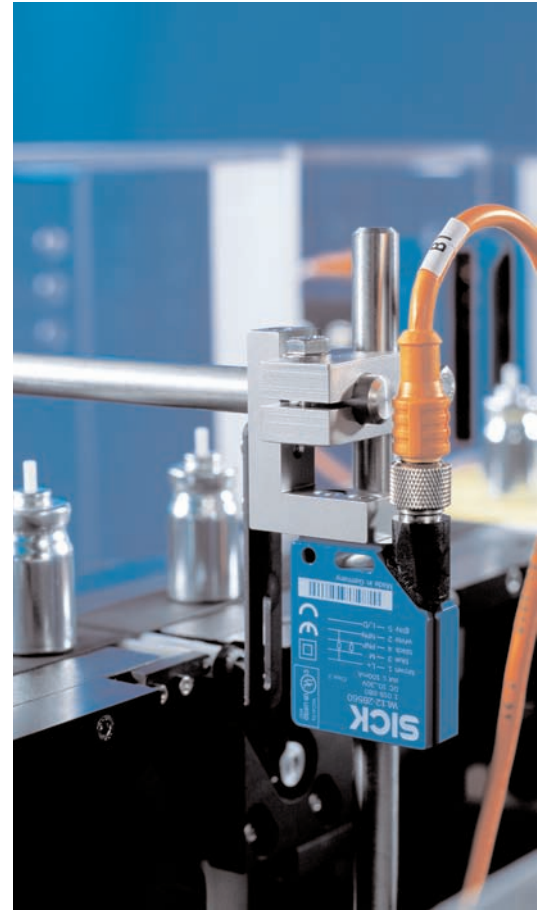
A sturdy metal housing protects the WT12-2 photoelectric proximity switch, the WL12-2 photoelectric reflex switch and the WS/WE12-2 through-beam photoelectric switch. Rotatable plugs provide flexibility of location and cable installation. Features such as foreground and background suppression, ASI interface, fibre-optic cable versions, insensitivity to ambient light and mutual interference when units are installed close together, are all device standards.

▼ WL12-2 photoelectric reflex switch monitors correct positioning in a construction process.

► Photoelectric proximity switches WT12-2 with background suppression detect product supply in a packaging machine.



► Photoelectric proximity switch WT12-2 with background suppression ensures correct set-up of coffee packages in fully-automatic packaging machines.



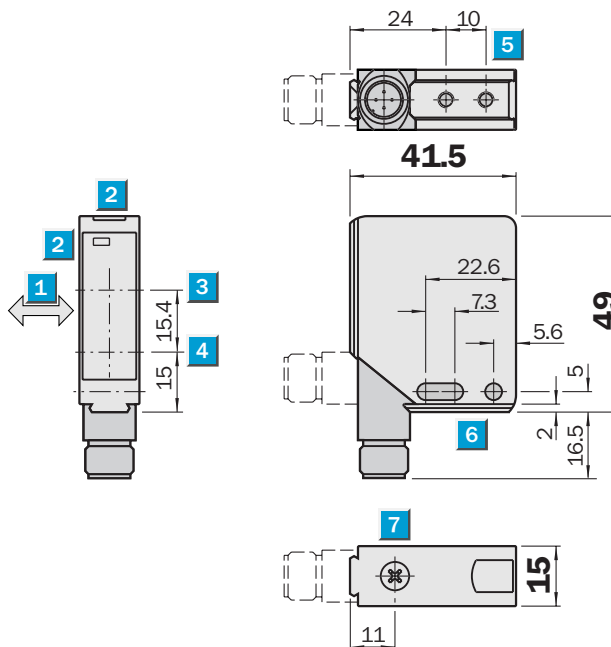
▲ Reliable detection of transparent objects like e.g. thin-walled PET bottles with WL12-2G photoelectric reflex switch.

Scanning distance
35 ... 100 mm

Photoelectric proximity switch

- Red light; consequently, fast alignment is possible
- Insensitive to external light sources, i.e., increased operating reliability
- M12 plug rotatable by 90°, or 2 m cable
- Adjustable foreground suppression; ideal for applications with critical surfaces

Dimensional drawing



Adjustments possible



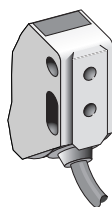
- 1 Standard direction of the material being scanned
- 2 LED signal strength indicator
- 3 Optical axis receiver
- 4 Optical axis sender
- 5 M4 threaded mounting hole - 4 mm deep
- 6 Mounting holes \varnothing 4.2 mm
- 7 Scanning distance adjustment



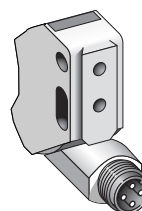
Connection type

WT12-2N140
WT12-2P140

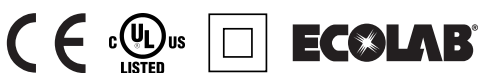
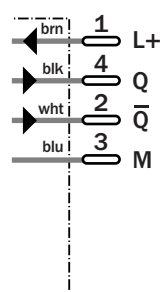
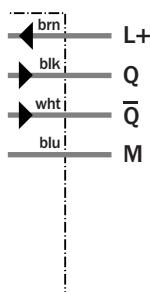
WT12-2N440
WT12-2P440



4 x 0.25 mm²



M12, 4-pin



See chapter Accessories

Connector, M12, 4-pin

Mounting systems

Technical data		WT12-2	N140	N440	P140	P440						
Operating distance	35 ... 100 mm											
Light source, light type	LED, Red light ¹⁾											
Light spot diameter	3 x 3 mm at 60 mm distance											
Supply voltage V_s	10 ... 30 V DC ²⁾											
Ripple	$\leq 5 V_{pp}$ ³⁾											
Power consumption	$\leq 40 \text{ mA}^4)$											
	$\leq 30 \text{ mA}^4)$											
Switching outputs	NPN antivalent											
	PNP antivalent											
Output current I_a max	$\leq 100 \text{ mA}$											
Response time	$\leq 330 \mu\text{s}^5)$											
Switching frequency	1,500 Hz ⁶⁾											
Connection type	Cable, 2 m ⁷⁾											
	Connector, M12, 4-pin											
VDE protection class	$\square^8)$											
Circuit protection	V_s connections reverse-polarity protected / Output Q and Q not short-circuit protected / Interference suppression											
Enclosure rating	IP 67, IP 69K											
Ambient temperature operation	-40 °C ... +60 °C											
Ambient temperature storage	-40 °C ... +75 °C											
Weight	Approx. 200 g											
	Approx. 120 g											
Housing material	Zinc die-cast ⁹⁾											

¹⁾ Average service life 100,000 h

at $T_a = +25 \text{ °C}$

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

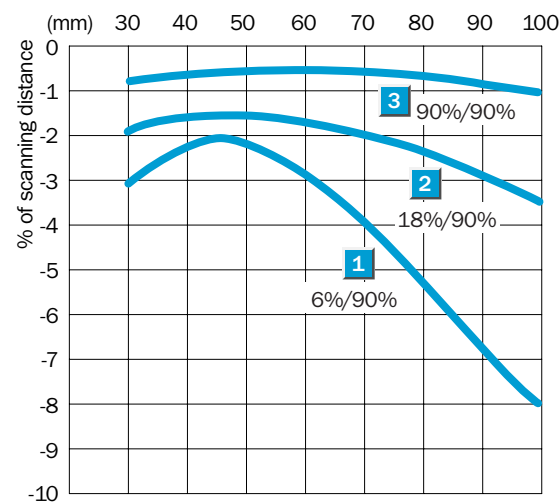
⁷⁾ do not bend below 0 °C

⁸⁾ Reference voltage 50 V DC

⁹⁾ Teflon-coated housing available

on request

Scanning distance



Order information

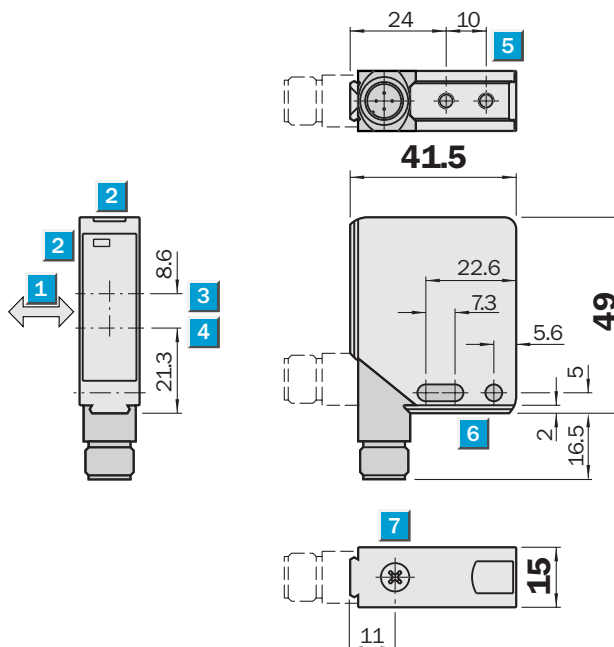
Type	Order no.
WT12-2N140	1 016 145
WT12-2N440	1 016 146
WT12-2P140	1 016 148
WT12-2P440	1 016 150

Scanning distance
20 ... 250 mm

Photoelectric proximity switch

- Red light; consequently, fast alignment is possible
- Insensitive to external light sources, i.e., increased operating reliability
- M12 plug rotatable by 90°, or 2 m/5 m cable
- Adjustable background suppression

Dimensional drawing



Adjustments possible



- 1 Standard direction of the material being scanned
- 2 LED signal strength indicator
- 3 Optical axis receiver
- 4 Optical axis sender
- 5 M4 threaded mounting hole - 4 mm deep
- 6 Mounting holes \varnothing 4.2 mm
- 7 Scanning distance adjustment



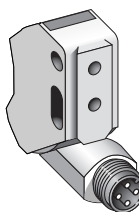
Connection type

WT12-2N130
WT12-2P130
WT12-2P830

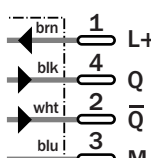
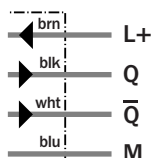
WT12-2N430
WT12-2P430



4 x 0.25 mm²

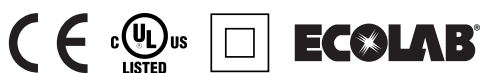


M12, 4-pin



See chapter Accessories

Connector, M12, 4-pin
Mounting systems



Technical data		WT12-2	N130	N430	N830	P130	P430	P830				
Operating distance	20 ... 250 mm											
Adjustment of operating distance	Potentiometer											
Light source, light type	LED, Red light ¹⁾											
Light spot diameter	10 mm at 200 mm distance											
	10 mm											
Supply voltage V_s	10 ... 30 V DC ²⁾											
Ripple	$\leq 5 V_{pp}$ ³⁾											
Power consumption	$\leq 40 \text{ mA}^4)$											
	$\leq 30 \text{ mA}^4)$											
Switching outputs	NPN antivalent											
	PNP antivalent											
Output current $I_{a,max}$	$\leq 100 \text{ mA}$											
Response time	$\leq 330 \mu\text{s}^5)$											
Switching frequency	1,500 Hz ⁶⁾											
Connection type	Cable, PVC, 2 m ⁷⁾											
	Connector, M12, 4-pin											
	Cable, PVC, 5 m ⁷⁾											
VDE protection class	$\square^8)$											
Circuit protection	V_s connections reverse-polarity protected / Output Q and Q not short-circuit protected / Interference suppression											
	V_s connections reverse-polarity protected / Output Q and Q not short-circuit protected / Interference suppression / Outputs overcurrent and short-circuit protected											
Enclosure rating	IP 67, IP 69K											
Ambient temperature operation	-40 °C ... +60 °C											
Ambient temperature storage	-40 °C ... +75 °C											
Weight	Approx. 200 g											
	Approx. 120 g											
	Approx. 280 g											
Housing material	Zinc die-cast ⁹⁾											

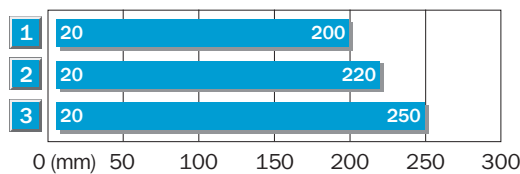
¹⁾ Average service life 100,000 h at $T_a = +25 \text{ °C}$
²⁾ Limit values

³⁾ may not exceed or fall short of V_s tolerances
⁴⁾ without load

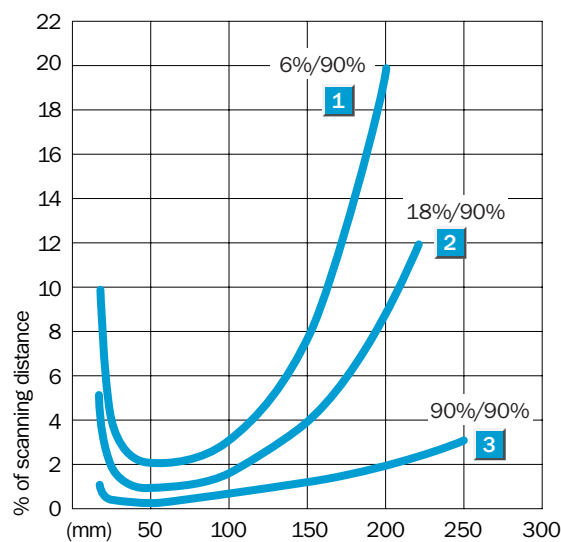
⁵⁾ Signal transit time with resistive load
⁶⁾ with light/dark ratio 1:1
⁷⁾ do not bend below 0 °C

⁸⁾ Reference voltage 50 V DC
⁹⁾ Teflon-coated housing available on request

Scanning distance



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



Order information	
Type	Order no.
WT12-2N130	1 016 122
WT12-2N430	1 016 125
WT12-2N830	1 016 123
WT12-2P130	1 016 129
WT12-2P430	1 016 134
WT12-2P830	1 016 130

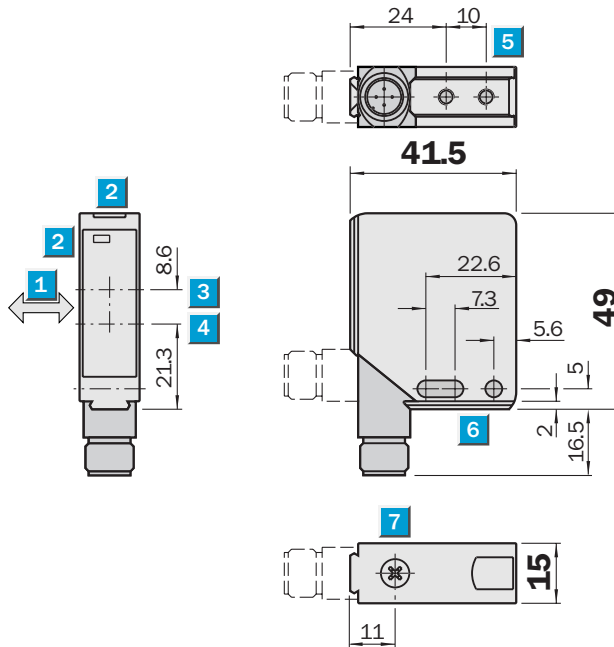
Scanning distance
20 ... 250 mm

Photoelectric proximity switch

- Red light; consequently, fast alignment is possible
- Insensitive to external light sources, i.e., increased operating reliability
- M12 plug rotatable by 90°
- With integrated AS-i chip
- Adjustable background suppression



Dimensional drawing



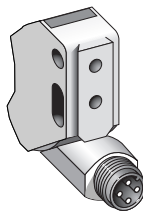
Adjustments possible



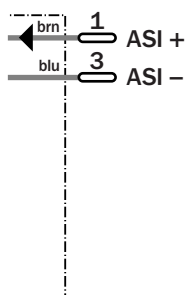
- 1 Standard direction of the material being scanned
- 2 LED signal strength indicator
- 3 Optical axis receiver
- 4 Optical axis sender
- 5 M4 threaded mounting hole - 4 mm deep
- 6 Mounting holes \varnothing 4.2 mm
- 7 Scanning distance adjustment

Connection type

WT12-2Z430



M12, 4-pin



See chapter Accessories
Connector, M12, 4-pin
Mounting systems

Technical data		WT12-2	Z430										
Operating distance	20 ... 250 mm												
Adjustment of operating distance	Potentiometer												
Light source, light type	LED, Red light ¹⁾												
Light spot diameter	10 mm at 200 mm distance												
Supply voltage V_s	26.5 ... 31.5 V DC ²⁾												
Power consumption	≤ 35 mA ³⁾												
Response time	≤ 330 μs ⁴⁾												
Switching frequency	1,500 Hz ⁵⁾												
Test input sender off	TE to 0 V												
Alarm output	Pre-failure signalling output												
Connection type	Connector, M12, 4-pin												
VDE protection class	□ ⁶⁾												
Circuit protection	V _s connections reverse-polarity protected / Output Q and Q not short-circuit protected / Interference suppression												
Enclosure rating	IP 67, IP 69K												
AS Interface profile	S 1.1												
Ambient temperature operation	-25 °C ... +60 °C												
Ambient temperature storage	-40 °C ... +75 °C												
Weight	Approx. 120 g												
Housing material	Zinc die-cast ⁷⁾												

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

²⁾ Limit values
³⁾ without load

⁴⁾ Signal transit time with resistive load
⁵⁾ with light/dark ratio 1:1

⁶⁾ Reference voltage 50 V DC
⁷⁾ Teflon-coated housing available on request

Assignment of data bits (Host level)

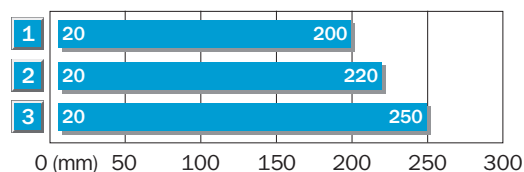
D ₀	Switching state	0 If light interrupted	Input
	Mode: light-switching	1 If light received	
D ₁	Alarm	0 Active	Input
		1 Inactive	
D ₂	NC	0	Input
		1	
D ₃	Test function	0 Sender ON	Output
		1 Sender OFF	

Assignment of parameter bits (Host level)

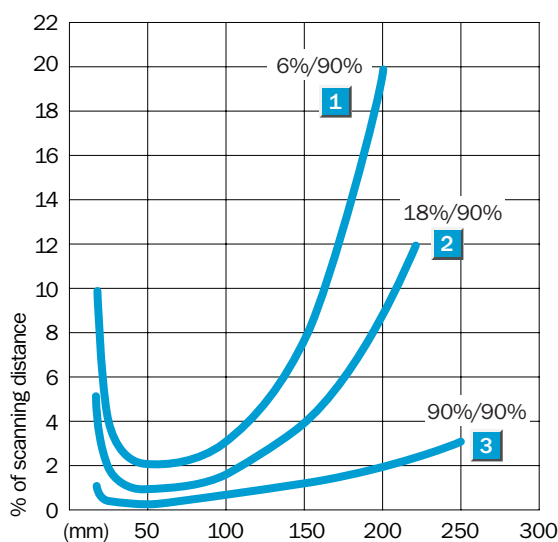
P ₀ *	NC	0	Parameter
		1	
P ₁ *	Light-/dark-switching	0 Dark-switching	Parameter
		1 Light-switching	
P ₂ *	NC	0	Parameter
		1	
P ₃ *	NC	0	Parameter
		1	

* Default setting = 1

Scanning distance



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



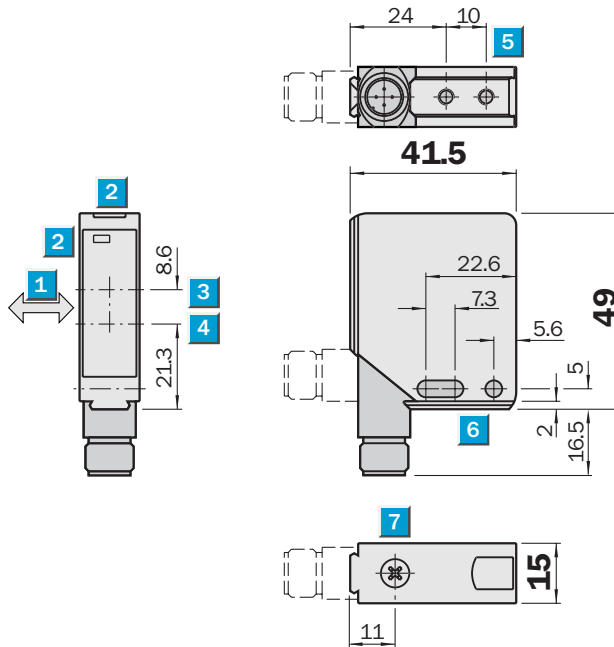
Order information	
Type	Order no.
WT12-2Z430	1 016 136

Scanning distance
20 ... 250 mm

Photoelectric proximity switch

- Infrared light
- Insensitive to external light sources, i.e., increased operating reliability
- M12 plug rotatable by 90°, or 2 m/3 m cable
- Adjustable background suppression

Dimensional drawing



Adjustments possible



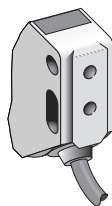
- 1 Standard direction of the material being scanned
- 2 LED signal strength indicator
- 3 Optical axis receiver
- 4 Optical axis send
- 5 M4 threaded mounting hole - 4 mm deep
- 6 Mounting holes \varnothing 4.2 mm
- 7 Scanning distance adjustment



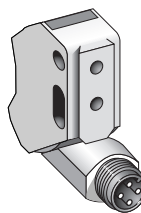
Connection type

- WT12-2N110
- WT12-2N710
- WT12-2P110
- WT12-2P710

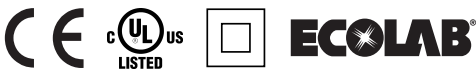
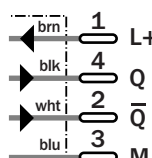
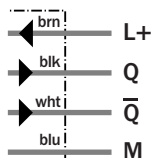
- WT12-2N410
- WT12-2P410



4 x 0.25 mm²



M12, 4-pin



See chapter Accessories

- Connector, M12, 4-pin
- Mounting systems

Technical data		WT12-2	N110	N410	N710	P110	P410	P710				
Operating distance	20 ... 250 mm											
Adjustment of operating distance	Potentiometer											
Light source, light type	LED, Infrared light ¹⁾											
Light spot diameter	10 mm ar 200 mm distance											
	10 mm at 200 mm distance											
Supply voltage V_s	10 ... 30 V DC ²⁾											
Ripple	≤ 5 V _{pp} ³⁾											
Power consumption	≤ 50 mA ⁴⁾											
	≤ 40 mA ⁴⁾											
Switching outputs	NPN antivalent											
	PNP antivalent											
Output current I _a max	≤ 100 mA											
Response time	≤ 330 μs ⁵⁾											
Switching frequency	1,500 Hz ⁶⁾											
Connection type	Cable, PVC, 2 m ⁷⁾											
	Connector, M12, 4-pin											
	Cable, PVC, 3 m ⁷⁾											
VDE protection class	□ ⁸⁾											
Circuit protection	V _s connections reverse-polarity protected / Output Q and Q not short-circuit protected / Interference suppression											
	V _s connections reverse-polarity protected / Output Q and Q not short-circuit protected / Interference suppression / Outputs overcurrent and short-circuit protected											
Enclosure rating	IP 67, IP 69K											
Ambient temperature operation	-40 °C ... +60 °C											
Ambient temperature storage	-40 °C ... +75 °C											
Weight	Approx. 200 g											
	Approx. 120 g											
	Approx. 250 g											
Housing material	Zinc die-cast ⁹⁾											

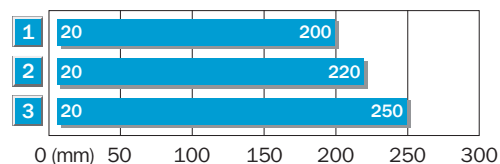
¹⁾ Average service life 100,000 h at T_a = +25 °C
²⁾ Limit values

³⁾ may not exceed or fall short of V_s tolerances
⁴⁾ without load

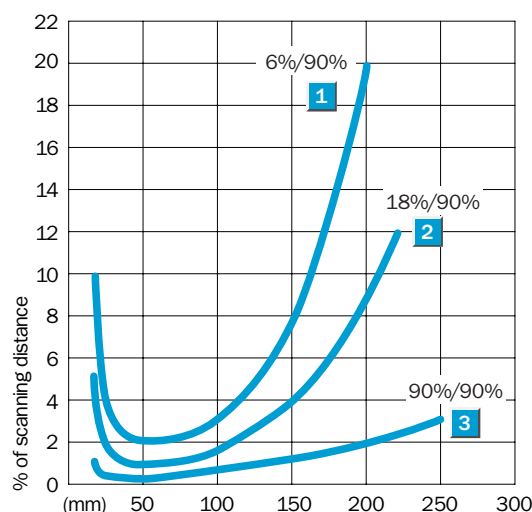
⁵⁾ Signal transit time with resistive load
⁶⁾ with light/dark ratio 1:1
⁷⁾ do not bend below 0 °C

⁸⁾ Reference voltage 50 V DC
⁹⁾ Teflon-coated housing available on request

Scanning distance



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



Order information

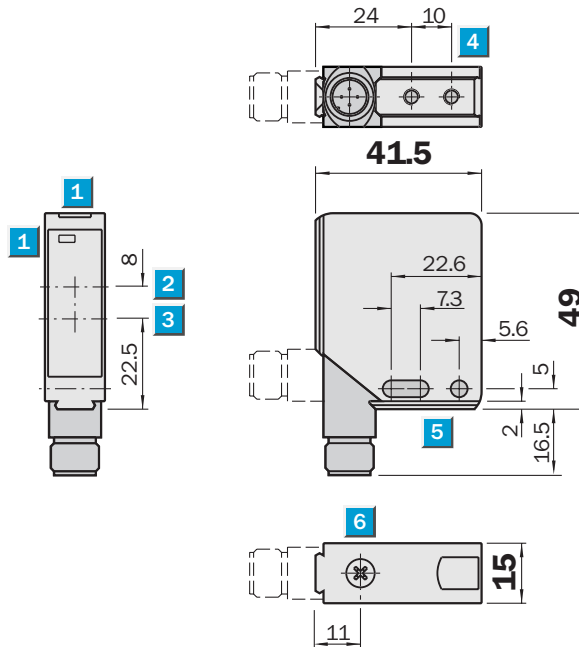
Type	Order no.
WT12-2N110	1 016 118
WT12-2N410	1 016 124
WT12-2N710	1 016 121
WT12-2P110	1 016 126
WT12-2P410	1 016 131
WT12-2P710	1 016 128

Scanning distance
10 ... 1,000 mm

Photoelectric proximity switch

- Red light; consequently, fast alignment is possible
- Insensitive to external light sources, i.e., increased operating reliability
- M12 plug rotatable by 90°, or 2 m cable
- Energetic proximity switch, scanning distance adjustable; ideal for standard applications

Dimensional drawing



Adjustments possible



- 1 LED signal strength indicator
- 2 Optical axis receiver
- 3 Optical axis sender
- 4 M4 threaded mounting hole - 4 mm deep
- 5 Mounting holes \varnothing 4.2 mm
- 6 Scanning distance adjustment



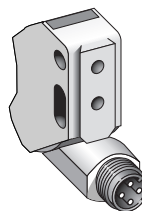
Connection type

WT12-2N150
WT12-2P150

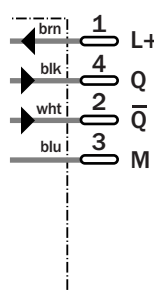
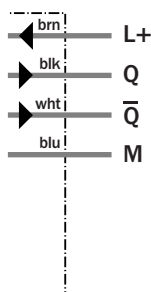
WT12-2N450
WT12-2P450



4 x 0.25 mm²



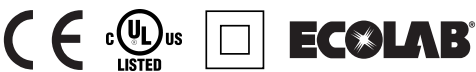
M12, 4-pin



See chapter Accessories

Connector, M12, 4-pin

Mounting systems



Technical data		WT12-2	N150	N450	P150	P450							
Scanning distance typ. max.	10 ... 1,000 mm												
Operating distance	80 ... 800 mm												
Adjustment of operating distance	Potentiometer												
Light source, light type	LED, Red light ¹⁾												
Light spot diameter	30 mm at 600 mm distance												
Supply voltage V_s	10 ... 30 V DC ²⁾												
Ripple	$\leq 5 V_{pp}$ ³⁾												
Power consumption	$\leq 40 mA$ ⁴⁾												
	$\leq 30 mA$ ⁴⁾												
Switching outputs	NPN antivalent												
	PNP antivalent												
Output current I_a max	$\leq 100 mA$												
Response time	$\leq 330 \mu s$ ⁵⁾												
Switching frequency	1,500 Hz ⁶⁾												
Connection type	Cable, 2 m ⁷⁾												
	Connector, M12, 4-pin												
VDE protection class	\square ⁸⁾												
Circuit protection	V_s connections reverse-polarity protected / Output Q and Q not short-circuit protected / Interference suppression												
Enclosure rating	IP 67, IP 69K												
Ambient temperature operation	-40 °C ... +60 °C												
Ambient temperature storage	-40 °C ... +75 °C												
Weight	Approx. 200 g												
	Approx. 120 g												
Housing material	Zinc die-cast ⁹⁾												

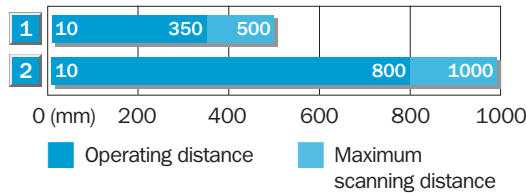
¹⁾ Average service life 100,000 h at $T_a = +25 \text{ °C}$
²⁾ Limit values

³⁾ may not exceed or fall short of V_s tolerances
⁴⁾ without load

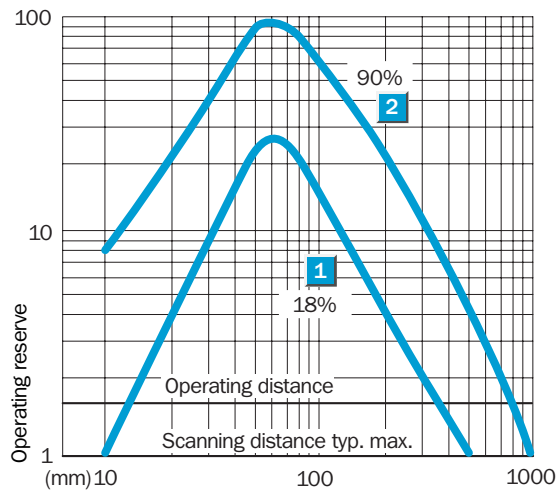
⁵⁾ Signal transit time with resistive load
⁶⁾ with light/dark ratio 1:1
⁷⁾ do not bend below 0 °C

⁸⁾ Reference voltage 50 V DC
⁹⁾ Teflon-coated housing available on request

Scanning distance



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



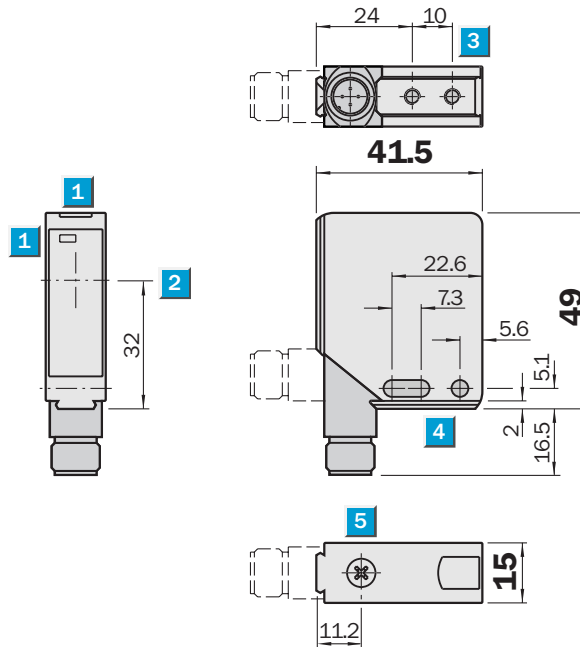
Order information	
Type	Order no.
WT12-2N150	1 016 138
WT12-2N450	1 016 139
WT12-2P150	1 016 140
WT12-2P450	1 016 142

Scanning range
0 ... 7 m

Photoelectric reflex switch

- Red light; consequently, fast alignment is possible
- Insensitive to external light sources, i.e., increased operating reliability
- M12 plug rotatable by 90°, or 2 m/3 m cable
- Adjustable sensitivity; optimum adaptation to application

Dimensional drawing



Adjustments possible



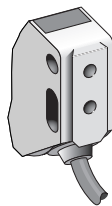
- 1 LED signal strength indicator
- 2 Centre of optical axis
- 3 M4 threaded mounting hole - 4 mm deep
- 4 Mounting holes \varnothing 4.2 mm
- 5 Sensitivity adjustment



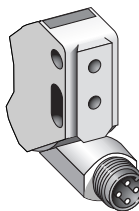
Connection type

- WL12-2N120
- WL12-2N130
- WL12-2N730
- WL12-2P120
- WL12-2P130

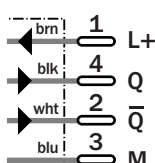
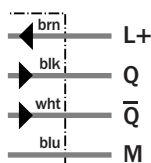
- WL12-2N420
- WL12-2N430
- WL12-2P420
- WL12-2P430



4 x 0.25 mm²

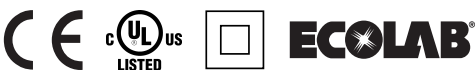


M12, 4-pin



See chapter Accessories

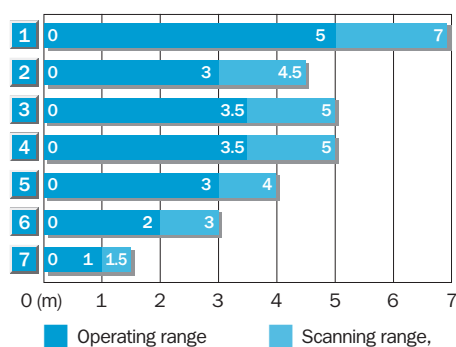
- Connector, M12, 4-pin
- Mounting systems
- Reflectors



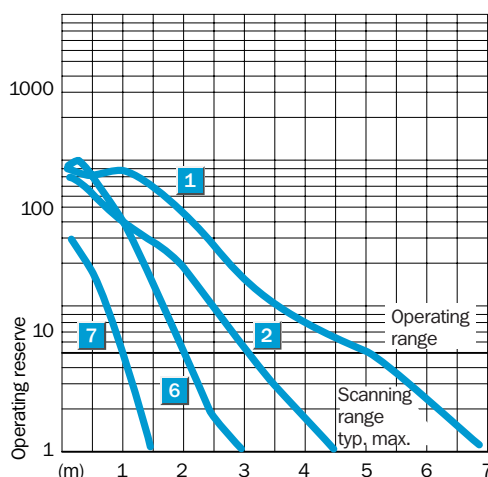
Technical data		WL12-2	N120	N130	N420	N430	N730	P120	P130	P420	P430	P730
Scanning range typ. max.	0 ... 2 m											
	0 ... 7 m											
Scanning range, recommended	0 ... 1 m											
	0 ... 5 m											
Relating to	Reflector PL80A ¹⁾											
	Reflector PL80A ²⁾											
Sensitivity adjustment	Potentiometer											
Light source, light type	LED, Red light ³⁾											
Light spot diameter	2 mm at 90 mm distance											
	80 mm at 3 m distance											
Polarisation filter	✓											
Supply voltage V_s	10 ... 30 V DC ⁴⁾											
Ripple	≤ 5 V _{pp} ⁵⁾											
Power consumption	≤ 40 mA ⁶⁾											
	≤ 30 mA ⁶⁾											
Switching outputs	NPN antivalent											
	PNP antivalent											
Output current I _a max	≤ 100 mA											
Response time	≤ 330 μs ⁷⁾											
Switching frequency	1,500 Hz ⁸⁾											
Connection type	Cable, 2 m ⁹⁾											
	Connector, M12, 4-pin											
	Cable, 3 m ⁹⁾											
VDE protection class	□ ¹⁰⁾											
Circuit protection	V _s connections reverse-polarity protected / Output Q and Q not short-circuit protected / Interference suppression											
Enclosure rating	IP 67, IP 69K											
Ambient temperature operation	-40 °C ... +60 °C											
Ambient temperature storage	-40 °C ... +75 °C											
Weight	Approx. 200 g											
	Approx. 120 g											
	Approx. 230 g											
Housing material	Zinc die-cast ¹¹⁾											

1) Focus = 90 mm
 2) Focus = infinite
 3) Average service life 100,000 h at T_a = +25 °C
 4) Limit values
 5) may not exceed or fall short of V_s tolerances
 6) without load
 7) Signal transit time with resistive load
 8) with light/dark ratio 1:1
 9) do not bend below 0 °C
 10) Reference voltage 50 V DC
 11) Teflon-coated housing available on request

Scanning range and operating reserve



Reflector type	Operating range
1 PL 80 A	0 ... 5.0 m
2 C 110	0 ... 3.0 m
3 PL 50 A	0 ... 3.5 m
4 PL 40 A	0 ... 3.5 m
5 PL 30 A	0 ... 3.0 m
6 PL 20 A	0 ... 2.0 m
7 Reflective tape	0 ... 1.0 m



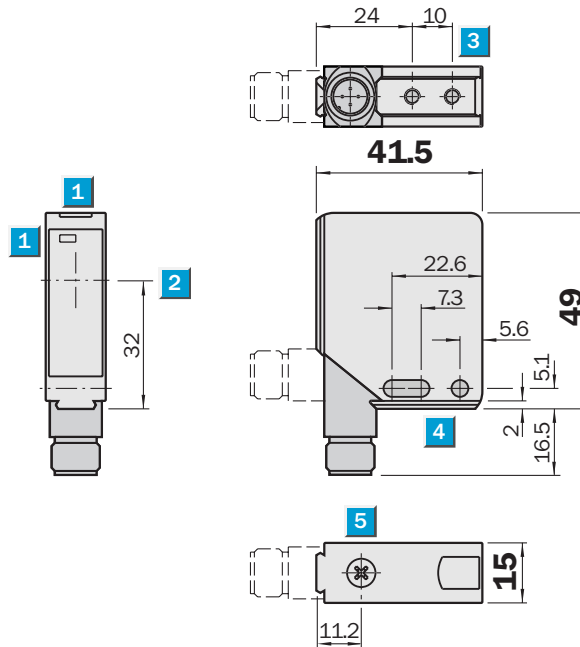
Order information	
Type	Order no.
WL12-2N120	1 016 084
WL12-2N130	1 016 085
WL12-2N420	1 016 091
WL12-2N430	1 016 092
WL12-2N730	1 016 088
WL12-2P120	1 016 095
WL12-2P130	1 016 096
WL12-2P420	1 016 101
WL12-2P430	1 016 102
WL12-2P730	1 016 098

Scanning range
0 ... 7 m

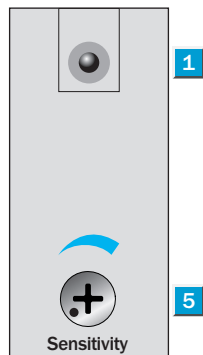
Photoelectric reflex switch

- Red light; consequently, fast alignment is possible
- Insensitive to external light sources, i.e., increased operating reliability
- M12 plug rotatable by 90°, or 2 m cable
- Adjustable sensitivity; optimum adaptation to application

Dimensional drawing



Adjustments possible



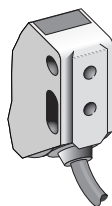
- 1 LED signal strength indicator
- 2 Centre of optical axis
- 3 M4 threaded mounting hole - 4 mm deep
- 4 Mounting holes \varnothing 4.2 mm
- 5 Sensitivity adjustment



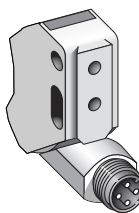
Connection type

- WL12-2N180
- WL12-2N190
- WL12-2N490
- WL12-2P180
- WL12-2P190

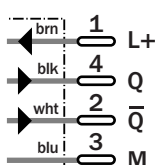
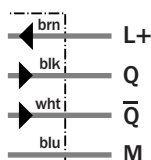
- WL12-2N480
- WL12-2P480
- WL12-2P490



4 x 0.25 mm²

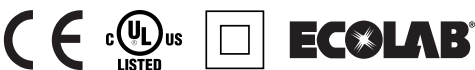


M12, 4-pin



See chapter Accessories

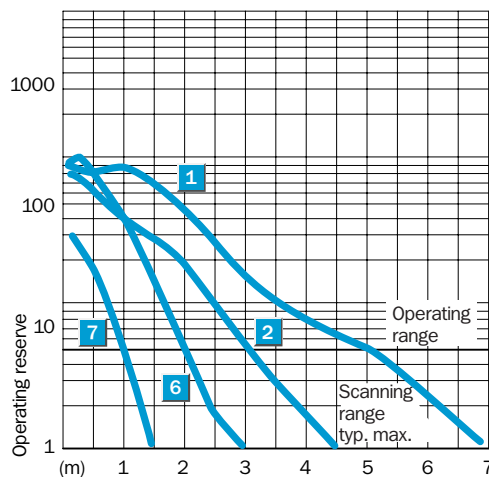
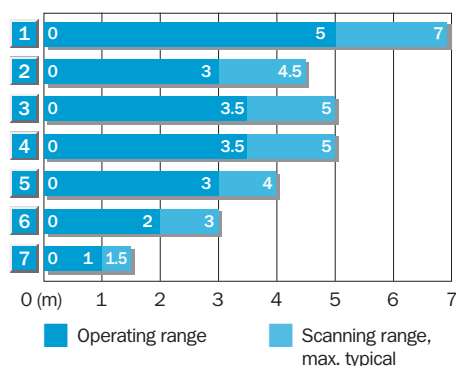
- Connector, M12, 4-pin
- Mounting systems
- Reflectors



Technical data		WL12-2	N180	N190	N480	N490	P180	P190	P480	P490
Scanning range typ. max.	0 ... 7 m									
	0 ... 2 m									
Scanning range, recommended	0 ... 5 m									
	0 ... 1 m									
Relating to	Reflector PL80A ¹⁾									
	Reflector PL80A ²⁾									
Sensitivity adjustment	Potentiometer									
Light source, light type	LED, Red light ³⁾									
Light spot diameter	80 mm at 3 m distance									
	2 mm at 90 mm distance									
Supply voltage V_s	10 ... 30 V DC ⁴⁾									
Ripple	≤ 5 V _{pp} ⁵⁾									
Power consumption	≤ 40 mA ⁶⁾									
	≤ 30 mA ⁶⁾									
Switching outputs	NPN antivalent									
	PNP antivalent									
Output current I _a max	100 mA									
Response time	≤ 330 μs ⁷⁾									
Switching frequency	1,500 Hz ⁸⁾									
Connection type	Cable, 2 m ⁹⁾									
	Connector, M12, 4-pin									
VDE protection class	□ ¹⁰⁾									
Circuit protection	V _s connections reverse-polarity protected / Output Q and Q not short-circuit protected / Interference suppression									
Enclosure rating	IP 67, IP 69K									
Ambient temperature operation	-40 °C ... +60 °C									
Ambient temperature storage	-40 °C ... +75 °C									
Weight	Approx. 200 g									
	Approx. 120 g									
Housing material	Zinc die-cast ¹¹⁾									

1) Focus = infinite
 2) Focus = 90 mm
 3) Average service life 100,000 h at T_a = +25 °C
 4) Limit values may not exceed or fall short of V_s tolerances without load
 5) Limit values may not exceed or fall short of V_s tolerances without load
 6) without load
 7) Signal transit time with resistive load with light/dark ratio 1:1
 8) with light/dark ratio 1:1
 9) do not bend below 0 °C
 10) Reference voltage 50 V DC
 11) Teflon-coated housing available on request

Scanning range and operating reserve



Reflector type	Operating range
1 PL 80 A	0 ... 5.0 m
2 C 110	0 ... 3.0 m
3 PL 50 A	0 ... 3.5 m
4 PL 40 A	0 ... 3.5 m
5 PL 30 A	0 ... 3.0 m
6 PL 20 A	0 ... 2.0 m
7 Reflective tape	0 ... 1.0 m

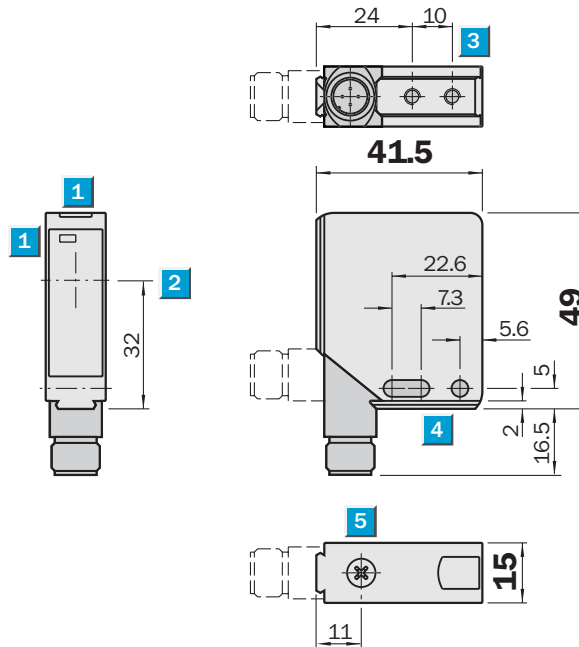
Order information	
Type	Order no.
WL12-2N180	1 016 089
WL12-2N190	1 016 090
WL12-2N480	1 016 093
WL12-2N490	1 016 094
WL12-2P180	1 016 099
WL12-2P190	1 016 100
WL12-2P480	1 016 106
WL12-2P490	1 016 107

Scanning range
0 ... 7 m

Photoelectric reflex switch

- Red light; consequently, fast alignment is possible
- Insensitive to external light sources, i.e., increased operating reliability
- M12 plug rotatable by 90°
- Integrated AS-i chip
- Adjustable sensitivity; optimum adaptation to application

Dimensional drawing



Adjustments possible

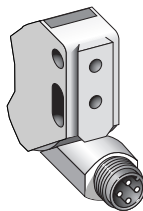


- 1 LED signal strength indicator
- 2 Centre of optical axis
- 3 M4 threaded mounting hole - 4 mm deep
- 4 Mounting holes \varnothing 4.2 mm
- 5 Sensitivity adjustment

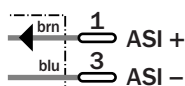


Connection type

WL12-2Z430



M12, 4-pin



See chapter Accessories

Connector, M12, 4-pin

Mounting systems

Technical data		WL12-2	Z430								
Scanning range typ. max.	0 ... 7 m										
Scanning range, recommended	0 ... 5 m										
Relating to	Reflector PL80A										
Sensitivity adjustment	Potentiometer										
Light source, light type	LED, Red light ¹⁾										
Light spot diameter	80 mm at 3 m distance										
Polarisation filter	✓										
Supply voltage V _s	26.5 ... 31.6 V DC ²⁾										
Power consumption	≤ 35 mA ³⁾										
Response time	≤ 330 μs ⁴⁾										
Switching frequency	1,500 Hz ⁵⁾										
Test input sender off	TE to 0 V										
Alarm output	Pre-failure signalling output										
Connection type	Connector, M12, 4-pin										
VDE protection class	□ ⁶⁾										
Circuit protection	V _s connections reverse-polarity protected / Interference suppression										
Enclosure rating	IP 67, IP 69K										
AS Interface profile	S 1.1										
Ambient temperature operation	-25 °C ... +60 °C										
Ambient temperature storage	-40 °C ... +75 °C										
Weight	Approx. 120 g										
Housing material	Zinc die-cast ⁷⁾										

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

²⁾ Limit values
³⁾ without load

⁴⁾ Signal transit time with resistive load
⁵⁾ with light/dark ratio 1:1

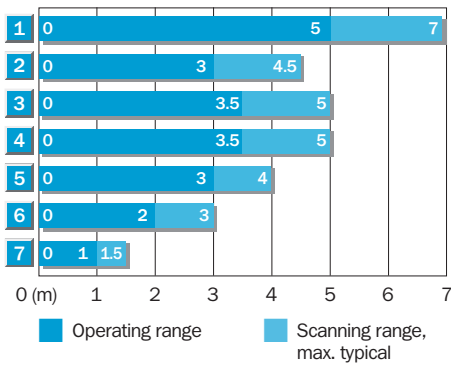
⁶⁾ Reference voltage 50 V DC
⁷⁾ Teflon-coated housing available on request

Assignment of data bits		(Host level)	
D ₀	Switching state	0 If light interrupted	Input
	Mode: light-switching	1 If light received	
D ₁	Alarm	0 Active	Input
		1 Inactive	
D ₂	NC	0	Input
		1	
D ₃	Test function	0 Sender ON	Output
		1 Sender OFF	

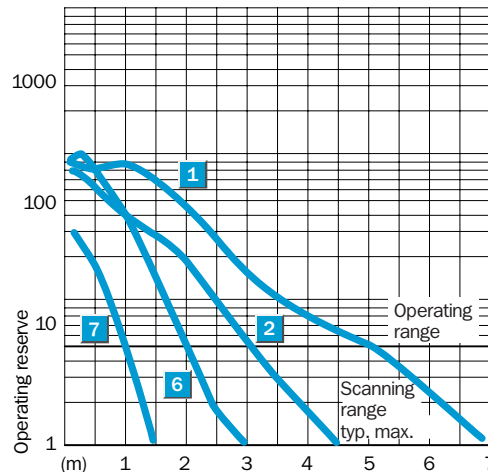
Assignment of parameter bits		(Host level)	
P ₀ *	NC	0	Parameter
		1	
P ₁ *	Light-/dark-switching	0 Dark-switching	Parameter
		1 Light-switching	
P ₂ *	NC	0	Parameter
		1	
P ₃ *	NC	0	Parameter
		1	

* Default setting = 1

Scanning range and operating reserve



Reflector type	Operating range
1 PL 80 A	0 ... 5.0 m
2 C 110	0 ... 3.0 m
3 PL 50 A	0 ... 3.5 m
4 PL 40 A	0 ... 3.5 m
5 PL 30 A	0 ... 3.0 m
6 PL 20 A	0 ... 2.0 m
7 Reflective tape	0 ... 1.0 m



Order information	
Type	Order no.
WL12-2Z430	1 016 108

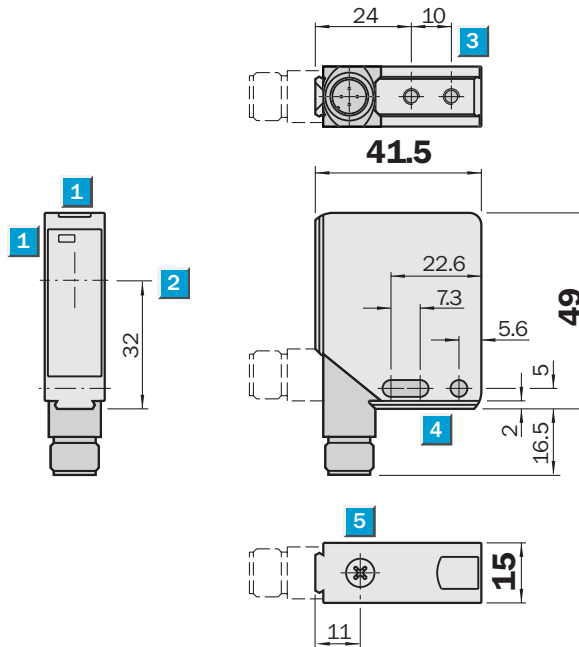
Scanning range
0 ... 3 m

Photoelectric reflex switch

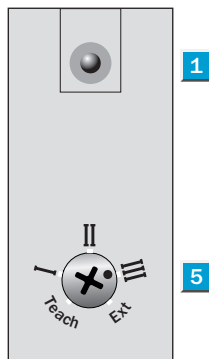
- Red light; consequently, fast alignment is possible
- Reliable detection of transparent objects
- Innovative microprocessor technology allows continuous adaptation of the switching threshold on contamination
- Operating range can be preselected via rotary switch or external cable



Dimensional drawing



Adjustments possible

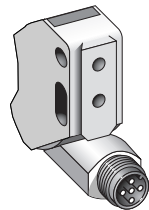


- 1 LED signal strength indicator
- 2 Centre of optical axis
- 3 M4 threaded mounting hole - 4 mm deep
- 4 Mounting holes \varnothing 4.2 mm
- 5 Function selector

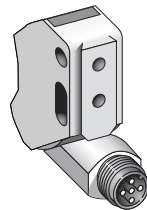
Connection type

WL12G-N530
WL12G-P510
WL12G-P530

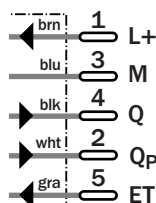
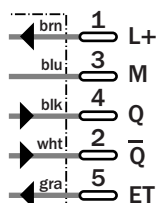
WL12G-V530
WL12G-W530



M12, 5-pin



M12, 5-pin



See chapter Accessories

- Connector, M12, 5-pin
- Mounting systems
- Reflectors

Technical data		WL12G	N530	G510	P530	V530	W530					
Scanning range typ. max.	0 ... 3 m											
Scanning range, recommended	0 ... 2.7 m											
Relating to	Reflector PL80A											
Sensitivity adjustment	Potentiometer											
Light source, light type	LED, Red light ¹⁾											
	LED, Infrared light											
Light spot diameter	Approx. 8 x 13 mm at 200 mm distance											
Polarisation filter	✓											
Supply voltage V_s	10 ... 30 V DC ²⁾											
Ripple	$\leq 5 V_{pp}$ ³⁾											
Power consumption	$\leq 65 \text{ mA}$ ⁴⁾											
Switching outputs	NPN antivalent											
	PNP antivalent											
	PNP, Q and plausibility output											
	NPN, Q and plausibility output											
Switching mode	Light-switching											
Output current I_a max	100 mA											
	$\leq 100 \text{ mA}$											
Response time	$\leq 0.5 \text{ ms}$ ⁵⁾											
Switching frequency	1,000 Hz ⁶⁾											
Connection type	Connector, M12, 5-pin											
VDE protection class	□ ⁷⁾											
Circuit protection	V_s connections reverse-polarity protected / Output Q and Q not short-circuit protected / Interference suppression											
Enclosure rating	IP 67, IP 69K											
Ambient temperature operation	-25 °C ... +60 °C											
Ambient temperature storage	-40 °C ... +75 °C											
Weight	Approx. 120 g											
Housing material	Zinc die-cast ⁸⁾											

¹⁾ Average service life 100,000 h at $T_a = +25 \text{ °C}$
²⁾ Limit values

³⁾ May not exceed or fall short of V_s tolerances without load

⁵⁾ Signal transit time with resistive load
⁶⁾ with light/dark ratio 1:1
⁷⁾ Reference voltage 50 V DC

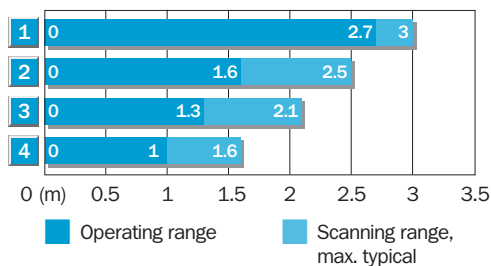
⁸⁾ Teflon-coated housing available on request

Operating range setting Set via rotary switch on device or via ET cable (+ V_s to ET)

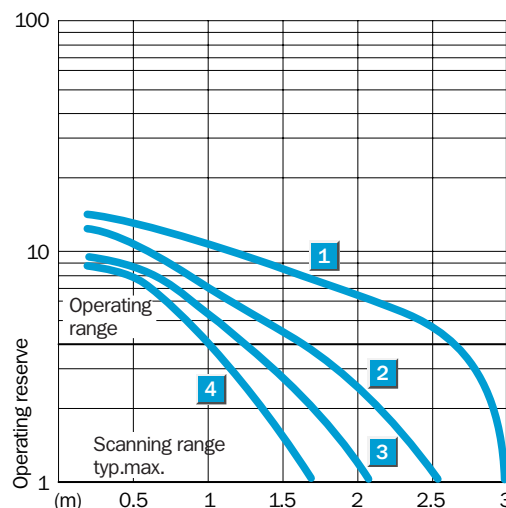
Mode I : 50 ms *	Mode II : 150 ms *	Mode III : 250 ms *
Switches at signal attenuation > 10%	Switches at signal attenuation > 18%	Switches at signal attenuation > 40%
Clean PET bottles	Clear-glass bottles	Coloured glass or non-transparent objects

* Pulse duration via ET (control cable), duration set via rotary switch approx. 2 s

Scanning range and operating reserve



Reflector type	Operating range
1 PL 80 A	0 ... 2.7 m
2 PL 40 A	0 ... 1.6 m
3 PL 30 A	0 ... 1.3 m
4 PL 20 A	0 ... 1.0 m



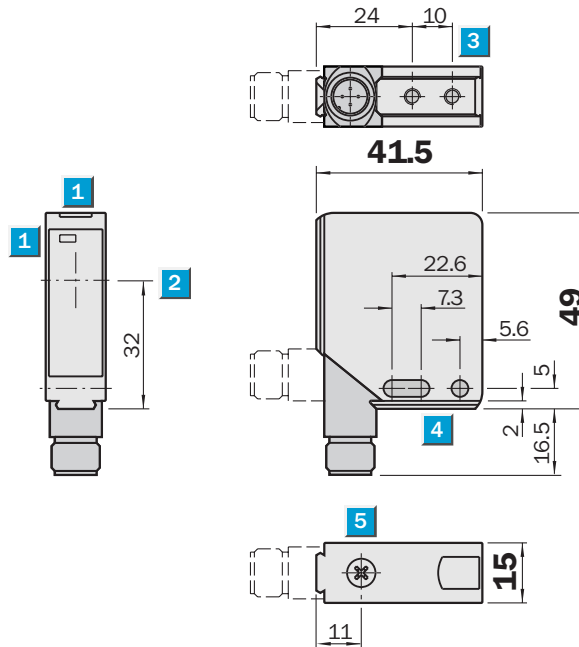
Order information	
Type	Order no.
WL12G-N530	1 016 309
WL12G-P510	1 016 738
WL12G-P530	1 016 289
WL12G-V530	1 016 310
WL12G-W530	1 016 311

Scanning range
0 ... 4 m

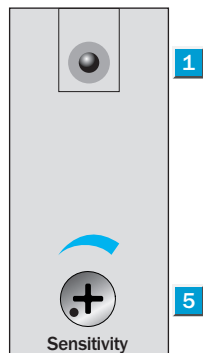
Photoelectric reflex switch

- Red light; consequently, fast alignment is possible
- Insensitive to external light sources, i.e., increased operating reliability
- Detection of glass and transparent films
- Adjustable sensitivity, optimum adaptation to application

Dimensional drawing



Adjustments possible



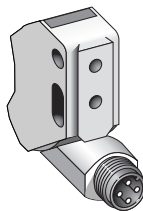
- 1 LED signal strength indicator
- 2 Centre of optical axis
- 3 M4 threaded mounting hole - 4 mm deep
- 4 Mounting holes \varnothing 4.2 mm
- 5 Sensitivity adjustment



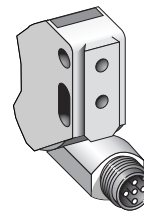
Connection type

WL12-2P460

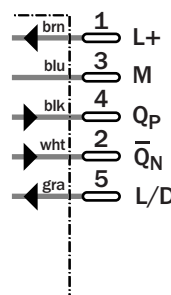
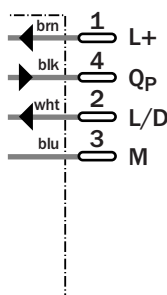
WL12-2B560



M12, 4-pin



M12, 5-pin



See chapter Accessories

Connector, M12, 4-pin

Connector, M12, 5-pin

Mounting systems

Reflectors

Technical data		WL12-2	B560	P460								
Scanning range typ. max.	0 ... 4 m											
Scanning range, recommended	0 ... 3.5 m											
Relating to	Reflector PL80A											
Sensitivity adjustment	Potentiometer											
Light source, light type	LED, Red light ¹⁾											
Light spot diameter	30 mm at 1.5 m distance											
Angle of dispersion	Approx. 1.5 °											
Polarisation filter	✓											
Supply voltage V_s	10 ... 30 V DC ²⁾											
Ripple	≤ 5 V _{pp} ³⁾											
Power consumption	≤ 30 mA ⁴⁾											
Switching outputs	Transistor outputs Qp and Qn											
	PNP antivalent											
Switching mode	Light-/dark-switching, switchable ⁵⁾											
Output current I _a max	100 mA											
Response time	≤ 330 μs ⁶⁾											
Switching frequency	1,500 Hz ⁷⁾											
Connection type	Connector, M12, 5-pin											
	Connector, M12, 4-pin											
VDE protection class	□ ⁸⁾											
Circuit protection	V _s connections reverse-polarity protected / Output QP and QN short-circuit protected / Interference suppression											
Enclosure rating	IP 67, IP 69K											
Ambient temperature operation	-40 °C ... +60 °C											
Ambient temperature storage	-40 °C ... +75 °C											
Weight	Approx. 120 g											
Housing material	Zinc die-cast ⁹⁾											

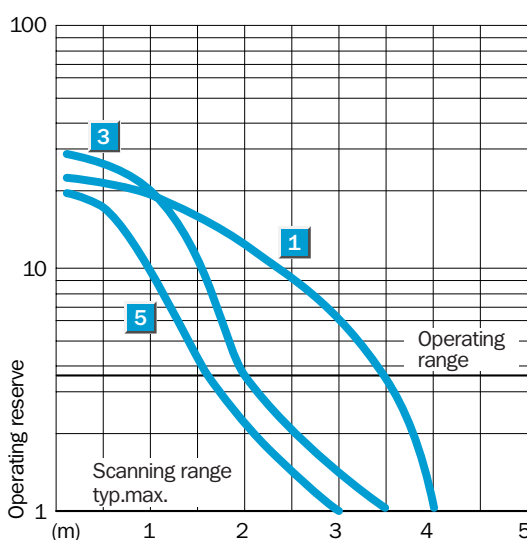
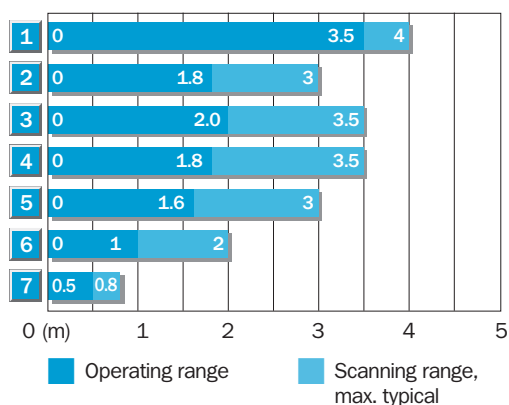
1) Average service life 100,000 h at T_a = +25 °C
 2) Limit values
 3) may not exceed or fall short of

V_s tolerances
 4) without load
 5) Control cable 0 V or open-circuited = light-switching. Control cable

V_s = dark-switching
 6) Signal transit time with resistive load
 7) with light/dark ratio 1:1
 8) Reference voltage 50 V DC

9) Teflon-coated housing available on request

Scanning range and operating reserve



Reflector type	Operating range	
1	PL 80 A	0 ... 3.5 m
2	C 110	0 ... 1.8 m
3	PL 50 A	0 ... 2.0 m
4	PL 40 A	0 ... 1.8 m
5	PL 30 A	0 ... 1.6 m
6	PL 20 A	0 ... 1.0 m
7	Reflective tape	0 ... 0.5 m

Order information	
Type	Order no.
WL12-2B560	1 016 080
WL12-2P460	1 016 105

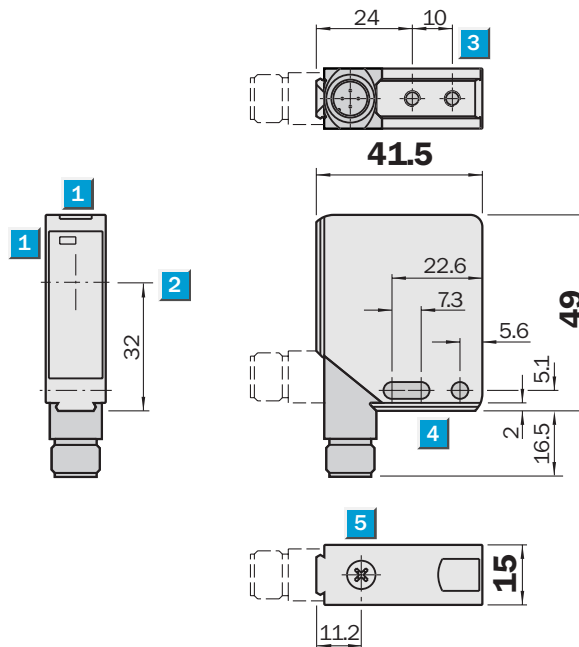


Scanning range
0 ... 20 m

Through-beam photoelectric switch

- Red light; consequently, fast alignment is possible
- Insensitive to external light sources, i.e., increased operating reliability
- M12 plug rotatable by 90°, or 2 m cable
- Adjustable sensitivity; optimum adaptation to application

Dimensional drawing



Adjustments possible



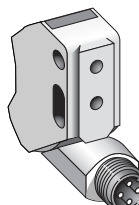
- 1 LED signal strength indicator
- 2 Centre of optical axis
- 3 M4 threaded mounting hole - 4 mm deep
- 4 Mounting holes \varnothing 4.2 mm
- 5 Sensitivity adjustment



Connection type

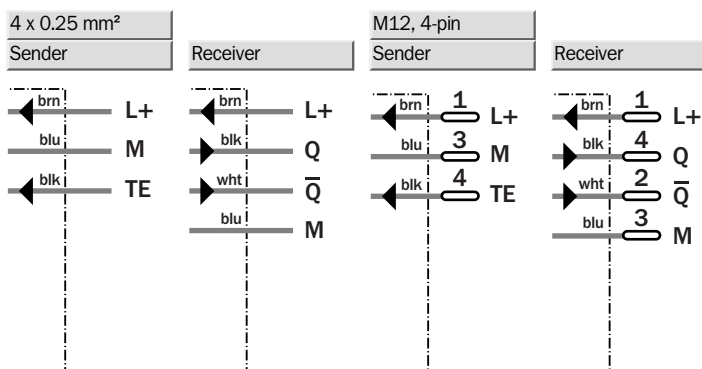
WS/WE12-2N130
WS/WE12-2P130

WS/WE12-2N430
WS/WE12-2P430



See chapter Accessories

- Connector, M12, 4-pin
- Masks
- Mounting systems



Technical data		WS/WE12-2	N130	N430	P130	P430						
Scanning range typ. max.	0 ... 20 m											
Scanning range, recommended	0 ... 15 m											
Sensitivity adjustment	Potentiometer											
Light source, light type	LED, Red light ¹⁾											
Light spot diameter	Approx. 500 mm at 15 m distance											
Angle of dispersion	1.5 °											
Supply voltage V_s	10 ... 30 V DC ²⁾											
Ripple	$\leq 5 V_{pp}$ ³⁾											
Power consumption, sender	$\leq 30 \text{ mA}^4)$											
Power consumption, receiver	$\leq 25 \text{ mA}^4)$											
	$\leq 15 \text{ mA}^4)$											
Switching outputs	NPN antivalent											
	PNP antivalent											
Output current I_a max	100 mA											
Response time	$\leq 330 \mu\text{s}^5)$											
Switching frequency	1,500 Hz ⁶⁾											
Test input sender off	TE to 0 V											
Connection type	Cable, 2 m ⁷⁾											
	Connector, M12, 4-pin											
VDE protection class	$\square^8)$											
Circuit protection	V_s connections reverse-polarity protected / Output Q and Q not short-circuit protected / Interference suppression											
Enclosure rating	IP 67, IP 69K											
Ambient temperature operation	-40 °C ... +60 °C											
Ambient temperature storage	-40 °C ... +75 °C											
Weight	Approx. 200 g											
	Approx. 120 g											
Housing material	Zinc die-cast ⁹⁾											

¹⁾ Average service life 100,000 h

at $T_a = +25 \text{ °C}$

²⁾ Limit values

³⁾ may not exceed or fall short of

V_s tolerances

⁴⁾ without load

⁵⁾ Signal transit time with resistive load

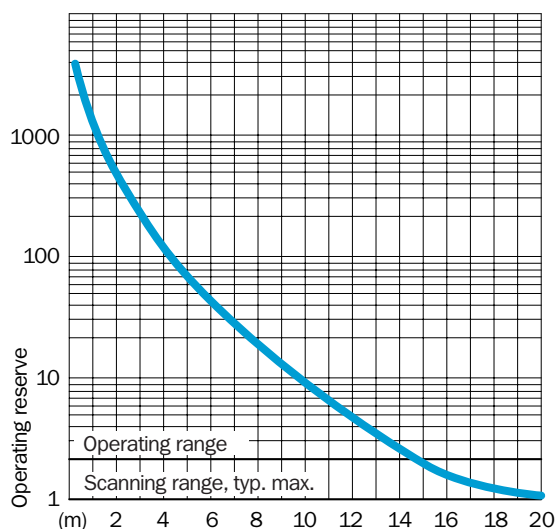
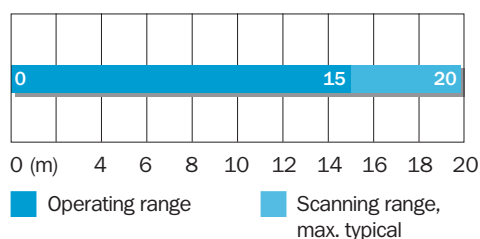
⁶⁾ with light/dark ratio 1:1

⁷⁾ do not bend below 0 °C

⁸⁾ Reference voltage 50 V DC

⁹⁾ Teflon-coated housing available on request

Scanning range and operating reserve



Order information

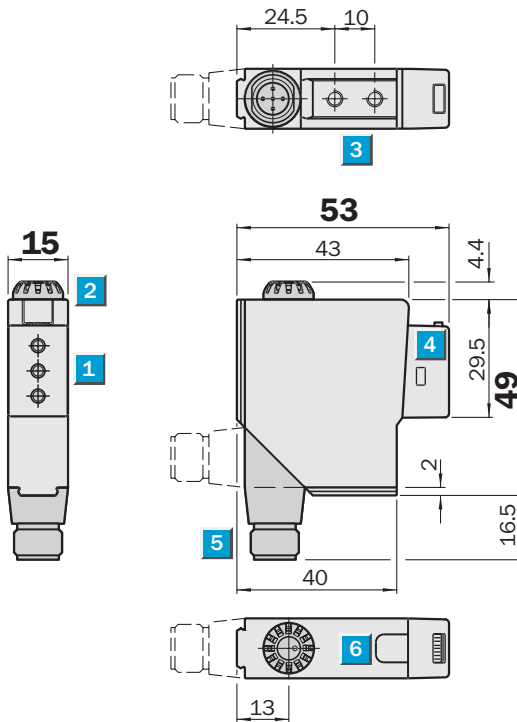
Type	Order no.
WS/WE12-2N130	1 016 154
WS/WE12-2N430	1 016 155
WS/WE12-2P130	1 016 156
WS/WE12-2P430	1 016 157

	Scanning distance 0 ... 280 mm
	Scanning range 0 ... 300 mm
Proximity switch with fibre optic cables	

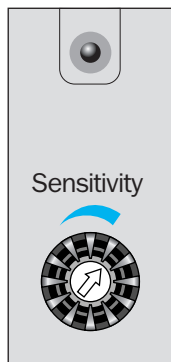
- Red, infrared or green light
- Plug-in fibre-optic cables
- Switch-selectable light-/dark-switching
- Adjustable sensitivity



Dimensional drawing



Adjustments possible

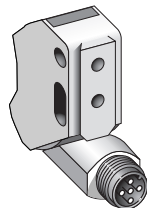


- 1 Connector for fibre-optic cable
- 2 Sensitivity control
- 3 M4 threaded mounting hole - 4 mm deep
- 4 Adapter
- 5 Plug not rotatable. Plug facing backwards on request
- 6 LED signal strength indicator

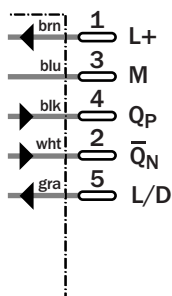


Connection type

WLL12-B5181
WLL12-B5281
WLL12-B5381
WLL12-B5481



M12, 5-pin



See chapter Accessories

- Adapter for fibre-optic cables
- Connector, M12, 5-pin
- Fibre-optic cables
- Mounting systems

Technical data		WLL12-B	5181	5281	5381	5481						
Scanning distance typ. max.	0 ... 280 mm ¹⁾											
	0 ... 60 mm ¹⁾											
Fibre-optic cable (proximity system)	LM/LT											
Scanning range typ. max.	0 ... 200 mm											
	0 ... 300 mm											
	0 ... 20 mm											
Fibre-optic cable (through-beam system)	LM/LT											
Light source, light type	LED, Red light ²⁾											
	LED, Infrared light ²⁾											
	LED, Green light ²⁾											
Supply voltage V_s	10 ... 30 V DC ³⁾											
Ripple	≤ 5 V _{pp} ⁴⁾											
Power consumption	≤ 35 mA ⁵⁾											
Switching outputs	PNP: Q/NPN: Q											
Switching mode	Light/dark-switching, switchable											
Output current I _{a,max}	100 mA											
Response time	360 μs ⁶⁾											
Switching frequency	1,300 Hz ⁷⁾											
Connection type	Connector, M12, 5-pin											
VDE protection class	□ ⁸⁾											
Circuit protection	V _s connections reverse-polarity protected / Output Q and Q not short-circuit protected / Interference suppression											
Enclosure rating	IP 67											
Ambient temperature operation	-25 °C ... +60 °C											
Ambient temperature storage	-25 °C ... +70 °C											
Weight	Approx. 130 g											
Housing material	Zinc die-cast											

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⁾ Reference voltage 50 V DC


Order information

Type	Order no.
WLL12-B5181	1 011 677
WLL12-B5281	1 011 687
WLL12-B5381	1 011 688
WLL12-B5481	1 011 965

W 14-2: Economic Solution for Standard Applications

	Photoelectric proximity switch BGB
	Photoelectric proximity switch energetic
	Photoelectric reflex switch



	Through-beam photoelectric switches
--	-------------------------------------

Teach-in function as well as the WL 14-2 photoelectric reflex switch and the WS/WE 14-2 through-beam photoelectric switch.

The ranges:

- WS/WE 14-2 through-beam photoelectric switch: 15 m,
- WL 14-2 photoelectric reflex switch: 6 m (PL 80 A), with polarizing filter,
- WT 14-2 photoelectric proximity switch with adjustable background blanking:
 - 80 ... 500 mm (infrared),
 - 50 ... 250 mm (red light),
- WT 14-2 Photoelectric proximity switch energetic with Teach-in function: 300 ... 1500 mm.

Detect and count conveyed objects in standard applications reliably and economically – and do it at economical prices – these are the two pivotal demands of market puts on a sensor for standard applications. The new W 14-2 photoelectric switch series fulfills these requirements market for standard sensors both from a technological and economical standpoint.

These sensors are used traditionally:

- Conveyor engineering,
- The packaging industry,
- Automation technology.

A choice of sensing techniques are available to handle your jobs with the photoelectric proximity switch with adjustable background blanking or energetic with

► WL 14-2 in the standard application package detection: the production process runs smoothly.


▼ In an empty bottle store, the WL 14-2 monitors the empty drinks crates and thus optimises the returns process.



▲ WT 14-2 reliably detects the pallet foot and monitors the correct transfer of goods in a warehouse.

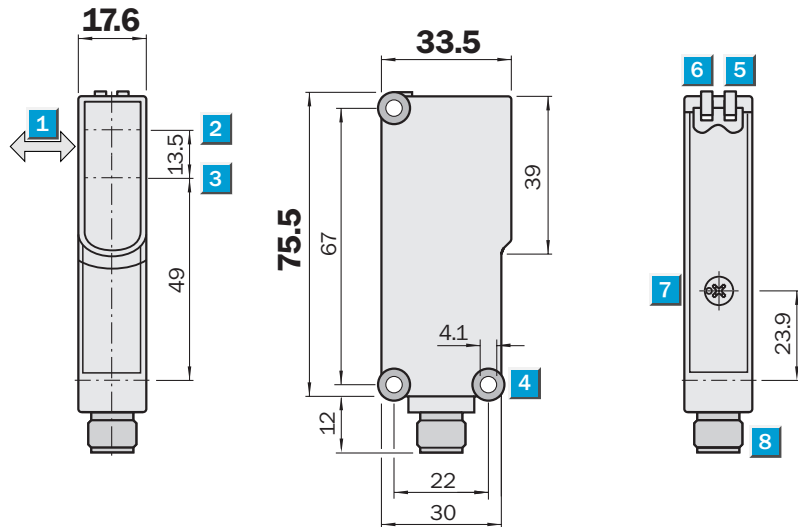


◀ WT 14-2 detects the package flow on a fully-automatic packaging line.


Scanning distance
 80 ... 500 mm
 Photoelectric proximity switch

- Infrared light
- Background blanking, adjustable
- Sturdy plastic housing

Dimensional drawing



Adjustments possible

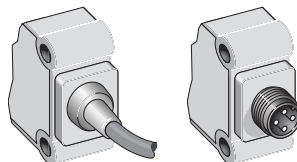
All types



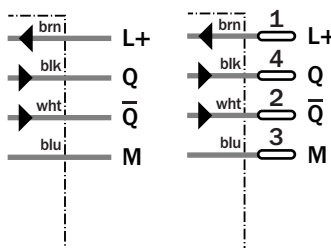
- 1 Standard direction of the material being scanned
- 2 Optical axis sender
- 3 Optical axis receiver
- 4 Mounting hole \varnothing 4.1 mm
- 5 LED indicator, yellow; status of received light beam
- 6 LED indicator, green; power on
- 7 Scanning distance adjustment, Poti 4 turn
- 8 Plug M12, 4-pin or 2 m cable

Connection type

WT14-2P122	WT14-2P422
WT14-2N122	WT14-2N422



4 x 0.25 mm ²	4-pin, M12
--------------------------	------------



See chapter Accessories

Cables and connectors

Mounting systems

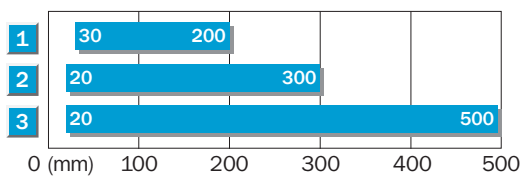
Technical data		WT14-2	P122	P422	N122	N422							
Scanning distance , adjustable ¹⁾	80 ... 500 mm, 90 % remission												
Visible range ¹⁾	20 ... 500 mm												
Adjustment	Via potentiometer, 4 turn												
Light source ²⁾, light type	LED, infrared light												
Light spot diameter	14 mm at 300 mm												
Supply voltage V_S	10 ... 30 V DC ³⁾												
Residual ripple ⁴⁾	< 5 V _{PP}												
Current consumption ⁵⁾	< 30 mA												
Output current I_A max.	< 100 mA												
Switching outputs	PNP, antivalent												
	NPN, antivalent												
Response time ⁶⁾	< 2.5 ms												
Max. switching frequency ⁷⁾	200/s												
Connection type	Cable ⁸⁾ PVC, 2 m, 4-wire												
	M12 plug, 4-pin												
VDE protection class ⁹⁾	<input type="checkbox"/>												
Circuit protection ¹⁰⁾	A, B, C, D												
Enclosure rating	IP 65												
Ambient temperature	Operation -25 °C ... +60 °C												
	Storage -40 °C ... +70 °C												
Weight	with cable	Approx. 120 g											
	with plug	Approx. 40 g											
Housing material	ABS												

- ¹⁾ Object with 90 % remission (based on standard white DIN 5033)
- ²⁾ Average service life 100,000 h at T_A = +25 °C
- ³⁾ Limit values; operation in short-circuit protected network max. 8 A
- 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 = Outputs Q and \bar{Q} short-circuit protected
 C = Interference pulse suppression
 D = Operation in short-circuit protected network max. 8A

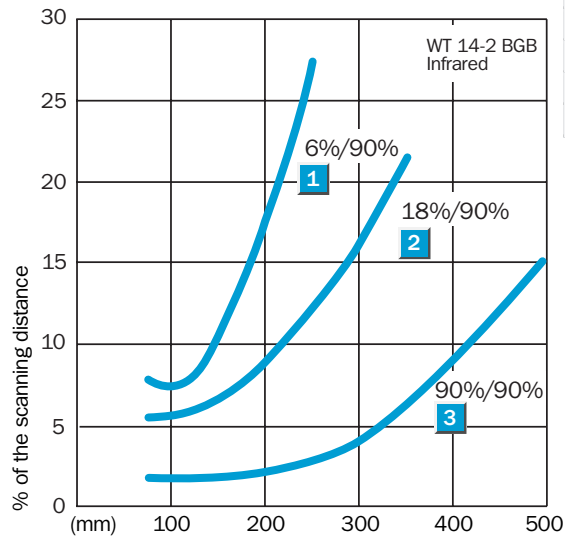
Adjustment via potentiometer

1. Position the object in the path of the beam.
2. By rotating the potentiometer to the right until the yellow LED illuminates continuously = object is positively detected.
3. If necessary, fine adjustments to the scanning distance can be made to suit the conditions of the application: minimal rotation of the potentiometer to the right = scanning distance will be increased, minimal rotation of the potentiometer to the left = scanning distance will be decreased.

Scanning distance




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



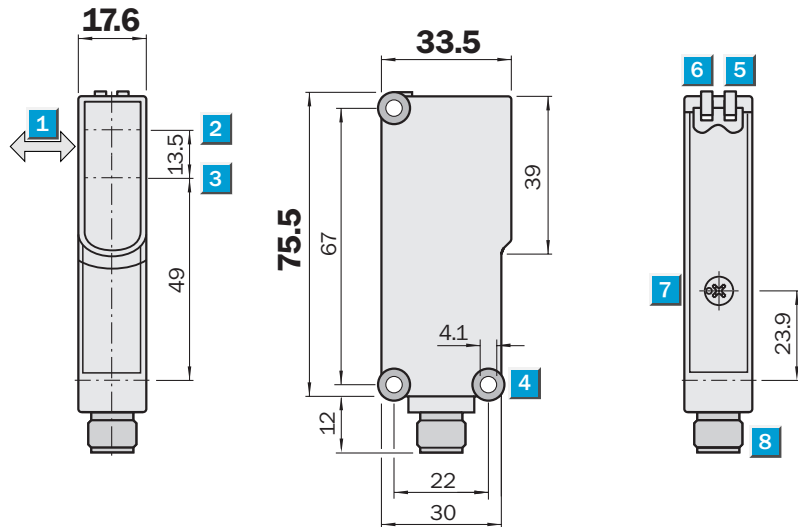
Order information

Type	Order no.
WT14-2P122	1 026 051
WT14-2P422	1 026 052
WT14-2N122	1 026 053
WT14-2N422	1 026 054


Scanning distance
 50 ... 250 mm
 Photoelectric proximity switch

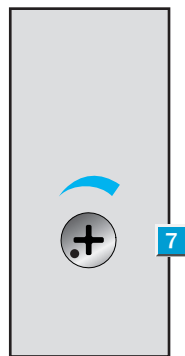
- Red light
- Background blanking, adjustable
- Sturdy plastic housing

Dimensional drawing



Adjustments possible

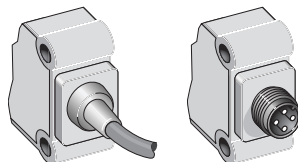
All types



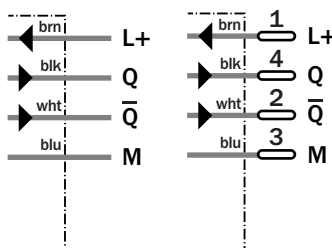
- 1 Standard direction of the material being scanned
- 2 Optical axis sender
- 3 Optical axis receiver
- 4 Mounting hole \varnothing 4.1 mm
- 5 LED indicator, yellow; status of received light beam
- 6 LED indicator, green; power on
- 7 Scanning distance adjustment, Poti 4 turn
- 8 Plug M12, 4-pin or 2 m cable

Connection type

WT14-2P132	WT14-2P432
WT14-2N132	WT14-2N432



4 x 0.25 mm ²	4-pin, M12
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See chapter Accessories

Cables and connectors
Mounting systems

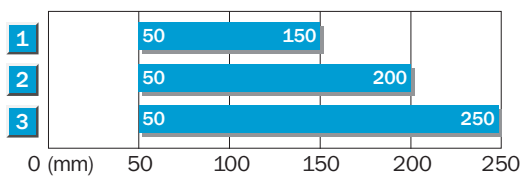
Technical data		WT14-2	P132	P432	N132	N432						
Scanning distance , adjustable ¹⁾	50 ... 250 mm, 90 % remission											
Visible range ¹⁾	20 ... 250 mm											
Adjustment	Via potentiometer, 4 turn											
Light source ²⁾, light type	LED, red light											
Light spot diameter	10 mm at 250 mm											
Supply voltage V_S	10 ... 30 V DC ³⁾											
Residual ripple ⁴⁾	< 5 V _{pp}											
Current consumption ⁵⁾	< 25 mA											
Output current I _A max.	< 100 mA											
Switching outputs	PNP, antivalent											
	NPN, antivalent											
Response time ⁶⁾	< 2.5 ms											
Max. switching frequency ⁷⁾	200/s											
Connection type	Cable ⁸⁾ PVC, 2 m, 4-wire											
	M12 plug, 4-pin											
VDE protection class ⁹⁾	<input type="checkbox"/>											
Circuit protection ¹⁰⁾	A, B, C, D											
Enclosure rating	IP 65											
Ambient temperature	Operation -25 °C ... +60 °C											
	Storage -40 °C ... +70 °C											
Weight	with cable	Approx. 120 g										
	with plug	Approx. 40 g										
Housing material	ABS											

- 1) Object with 90 % remission (based on standard white DIN 5033)
- 2) Average service life 100,000 h at T_A = +25 °C
- 3) Limit values; operation in short-circuit protected network max. 8 A
- 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 = Outputs Q and \bar{Q} short-circuit protected
 C = Interference pulse suppression
 D = Operation in short-circuit protected network max. 8A

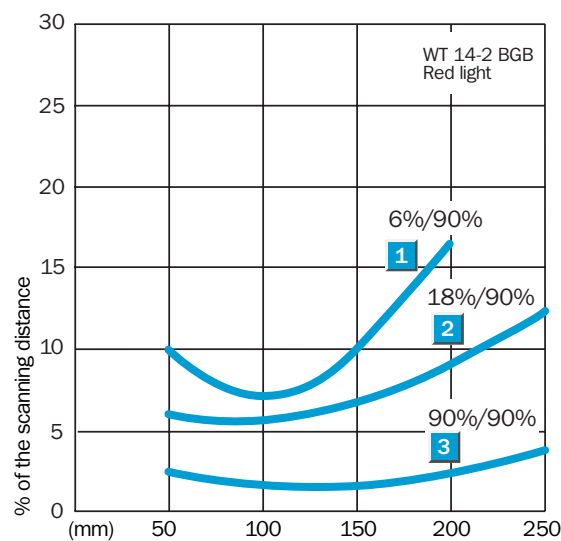
Adjustment via potentiometer

1. Position the object in the path of the beam.
2. By rotating the potentiometer to the right until the yellow LED illuminates continuously = object is positively detected.
3. If necessary, fine adjustments to the scanning distance can be made to suit the conditions of the application:
 minimal rotation of the potentiometer to the right = scanning distance will be increased,
 minimal rotation of the potentiometer to the left = scanning distance will be decreased.

Scanning distance




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



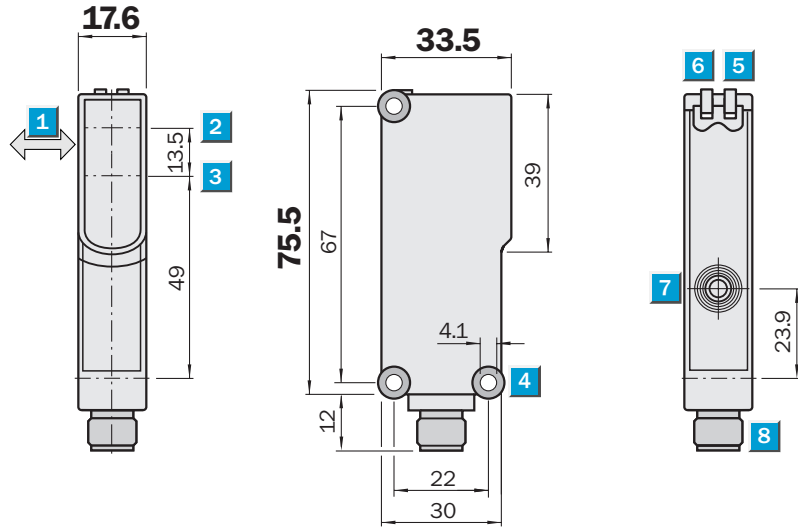
Order information

Type	Order no.
WT14-2P132	1 026 055
WT14-2P432	1 026 056
WT14-2N132	1 026 072
WT14-2N432	1 026 057


Scanning distance
300 ... 1500 mm
 Photoelectric proximity switch

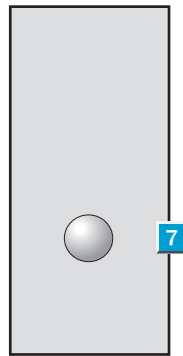
- Infrared light
- Energetic proximity switch
- Teach-in function
- Sturdy plastic housing

Dimensional drawing



Adjustments possible

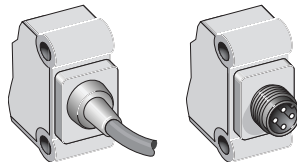
All types



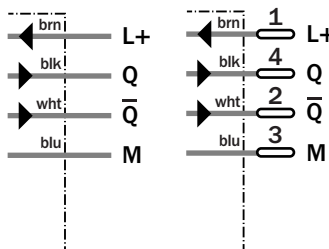
- 1 Standard direction of the material being scanned
- 2 Optical axis sender
- 3 Optical axis receiver
- 4 Mounting hole Ø 4.1 mm
- 5 LED indicator, yellow; status of received light beam
- 6 LED indicator, green; power on
- 7 Teach-in button
- 8 Plug M12, 4-pin or 2 m cable

Connection type

WT14-2P111	WT14-2P411
WT14-2N111	WT14-2N411



4 x 0.25 mm ²	4-pin, M12
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See chapter Accessories
Cables and connectors
Mounting systems

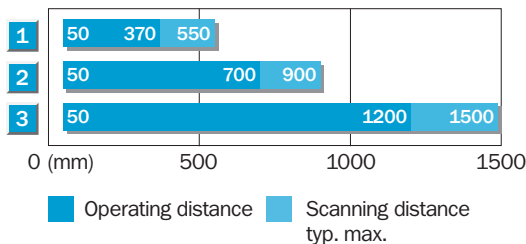
Technical data		WT14-2	P111	P411	N111	N411						
Scanning distance , adjustable ¹⁾	300 ... 1500 mm, 90 % remission											
Adjustment	Teach-in button											
Light source ²⁾ , light type	LED, infrared light											
Light spot diameter	56 mm at 1000 mm											
Supply voltage V _S	10 ... 30 V DC ³⁾											
Residual ripple ⁴⁾	< 5 V _{pp}											
Current consumption ⁵⁾	≤ 55 mA											
Output current I _A max.	< 100 mA											
Switching outputs	PNP, antivalent											
	NPN, antivalent											
Response time ⁶⁾	≤ 2.5 ms											
Max. switching frequency ⁷⁾	200/s											
Connection type	Cable ⁸⁾ PVC, 2 m, 4-wire											
	M12 plug, 4-pin											
VDE protection class ⁹⁾	<input type="checkbox"/>											
Circuit protection ¹⁰⁾	A, B, C, D											
Enclosure rating	IP 65											
Ambient temperature	Operation -25 °C ... +60 °C											
	Storage -40 °C ... +70 °C											
Weight	with cable	Approx. 120 g										
	with plug	Approx. 40 g										
Housing material	ABS											

- ¹⁾ Object with 90 % remission (based on standard white DIN 5033)
- ²⁾ Average service life 100,000 h at T_A = +25 °C
- ³⁾ Limit values; operation in short-circuit protected network max. 8 A
- 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 = Outputs Q and \bar{Q} short-circuit protected
 C = Interference pulse suppression
 D = Operation in short-circuit protected network max. 8 A

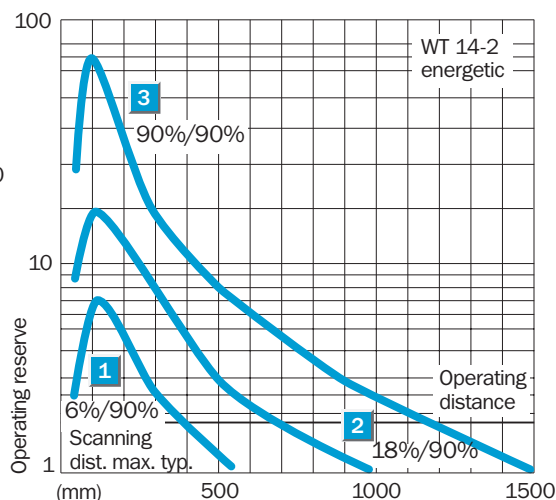
Teach-in function

- **Programming via Teach-in button.**
- **Simple programming:**
 position object in light beam,
 press button, finished;
 LED confirms the successful Teach-in procedure.
- **Teach-in value is stored.**
- **Two operating modes:**
Default setting: short Teach-in time (< 6 s),
 For standard applications;
 Approx. double reserve via switching threshold;
 LED lights.
Precise setting: long Teach-in time (> 8 s);
 For precise applications;
 Slight reserve via switching threshold;
 LED blinks when operating reserve > 2 (see graphic).

Scanning distance




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



Order information

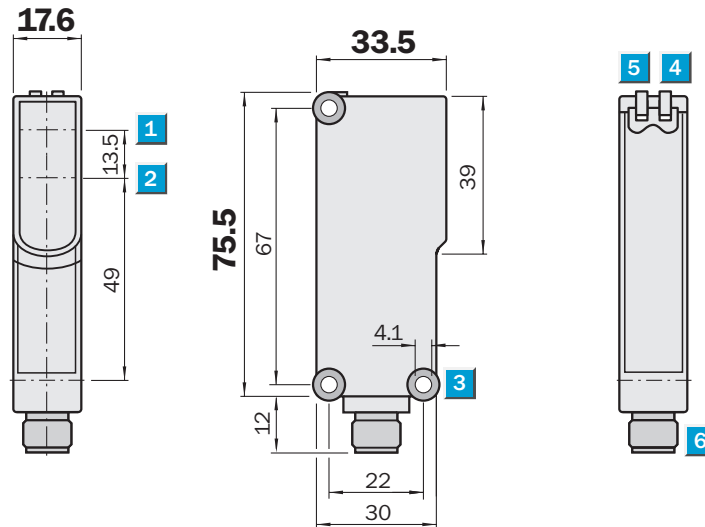
Type	Order no.
WT14-2P111	1 026 058
WT14-2P411	1 026 059
WT14-2N111	1 026 060
WT14-2N411	1 026 062


Scanning range
6 m

Photoelectric reflex switch

- Red light
- Polarisation filter which permits the reliable detection of objects with shiny surfaces
- Sturdy plastic housing

Dimensional drawing

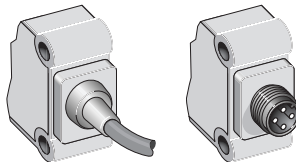


- 1 Optical axis sender
- 2 Optical axis receiver
- 3 Mounting holes \varnothing 4.1 mm
- 4 LED indicator, yellow; status of received light beam
- 5 LED indicator, green; power on
- 6 Plug M12, 4-pin or 2 m cable

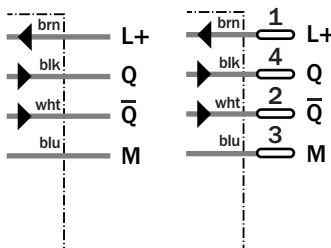


Connection type

WL14-2P130	WL14-2P430
WL14-2N130	WL14-2N430



4 x 0.25 mm² 4-pin, M12



See chapter Accessories

- Cables and connectors
- Mounting systems
- Reflectors

Technical data		WL14-2	P130	P430	N130	N430							
Scanning range , typ. max./on reflector	6 m/PL 80 A												
Light source ¹⁾ , light type	LED, red light												
Opening angle	2°												
Light spot diameter	140 mm at 4 m												
Polarising filter	Yes												
Supply voltage V _S	10 ... 30 V DC ²⁾												
Residual ripple ³⁾	≤ 5 V _{PP}												
Current consumption ⁴⁾	≤ 35 mA												
Output current I _A max.	< 100 mA												
Switching outputs	PNP, antivalent												
	NPN, antivalent												
Response time ⁵⁾	≤ 2.5 ms												
Max. switching frequency ⁶⁾	200/s												
Connection type	Cable ⁷⁾ PVC, 2 m, 4-wire												
	M12 plug, 4-pin												
VDE protection class ⁸⁾	<input type="checkbox"/>												
Circuit protection ⁹⁾	A, B, C												
Enclosure rating	IP 65												
Ambient temperature	Operation -25 °C ... +60 °C												
	Storage -40 °C ... +70 °C												
Weight	with cable	Approx. 120 g											
	with plug	Approx. 40 g											
Housing material	ABS												

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

²⁾ Limit values; operation in short-circuit protected network max. 8 A

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

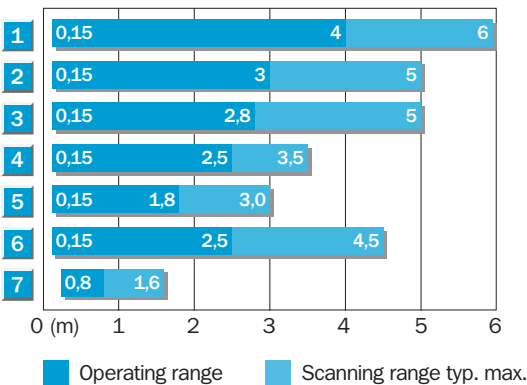
⁸⁾ Reference voltage 50 V DC

⁹⁾ A = V_S connections reverse-polarity protected

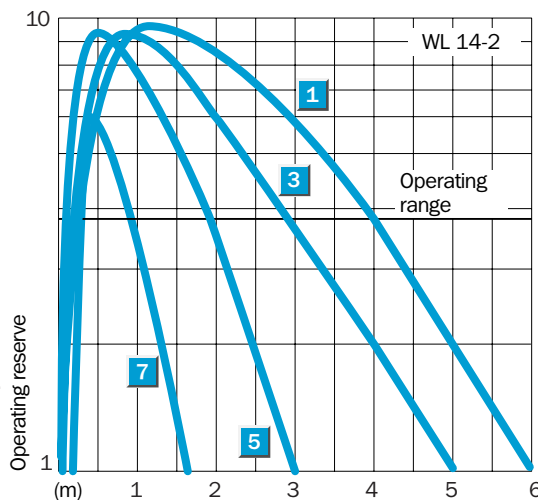
B = Outputs Q and \bar{Q} short-circuit protected

C = Interference pulse suppression

Scanning range



Reflector type	Operating range
1 PL 80 A	0,15 ... 4 m
2 PL 50 A	0,15 ... 3 m
3 PL 40 A	0,15 ... 2,8 m
4 PL 30 A	0,15 ... 2,5 m
5 PL 20 A	0,15 ... 1,8 m
6 C 110	0,15 ... 2,5 m
7 Reflective tape Diamond Grade	0,3 ... 0,8 m



Order information

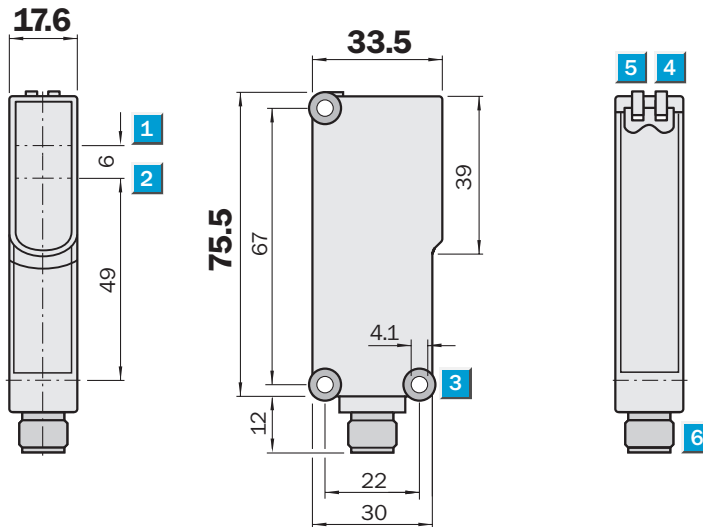
Type	Order no.
WL14-2P130	1 026 050
WL14-2P430	1 026 049
WL14-2N130	1 026 047
WL14-2N430	1 026 048

Scanning range
15 m

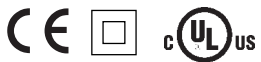
Through-beam photoelectric switches

- Red light
- Test input for system diagnostics
- Sturdy plastic housing

Dimensional drawing

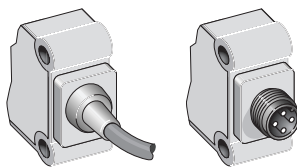


- 1 Optical axis sender (only WS)
- 2 Optical axis receiver (only WE)
- 3 Mounting holes Ø 4.1 mm
- 4 LED indicator, yellow; status of received light beam
- 5 LED indicator, green; power on
- 6 Plug M12, 4-pin or 2 m cable

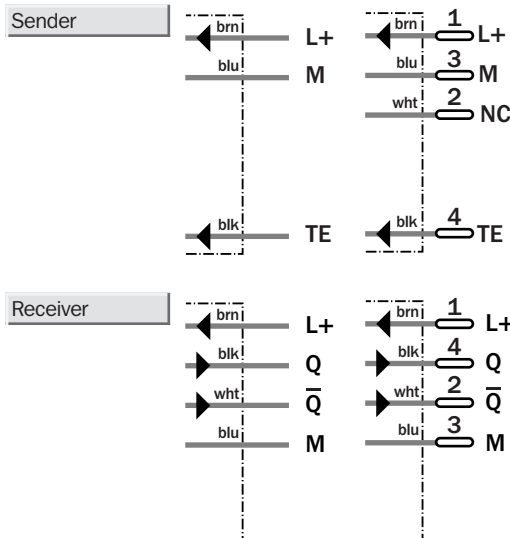


Connection type

WS/WE14-2P130	WS/WE14-2P430
WS/WE14-2N130	WS/WE14-2N430



3/4 x 0.25 mm² 4-pin, M12



See chapter Accessories

- Cables and connectors
- Mounting systems

Technical data		WS/WE14-2	P130	P430	N130	N430						
Scanning range, typ. max.	0 ... 15 m											
Light source ¹⁾ , light type	LED, red light											
Light spot diameter	300 mm at 10 m											
Supply voltage V_S	10 ... 30 V DC ²⁾											
Residual ripple ³⁾	$\leq 5 V_{PP}$											
Current consumption ⁴⁾	≤ 60 mA											
Sender	≤ 35 mA											
Receiver	≤ 25 mA											
Output current I_A max.	< 100 mA											
Switching outputs	PNP, antivalent											
	NPN, antivalent											
Response time ⁵⁾	≤ 2.5 ms											
Max. switching frequency ⁶⁾	200/s											
Test input »TE« sender off	TE to 0 V											
Connection type	Cable ⁷⁾ PVC, 2 m, 3-/4-wire											
	M12 plug, 4-pin											
VDE protection class ⁸⁾	<input type="checkbox"/>											
Circuit protection ⁹⁾	A, B, C											
Enclosure rating	IP 65											
Ambient temperature	Operation	-25 °C ... +60 °C										
	Storage	-40 °C ... +70 °C										
Weight	with cable	Approx. 120 g										
	with plug	Approx. 40 g										
Housing material	ABS											

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

²⁾ Limit values; operation in short-circuit protected network max. 8 A

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

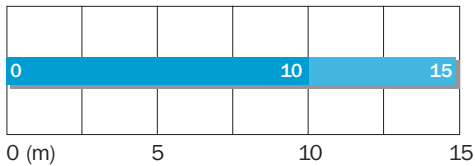
⁸⁾ Reference voltage 50 V DC

⁹⁾ A = V_S connections reverse-polarity protected

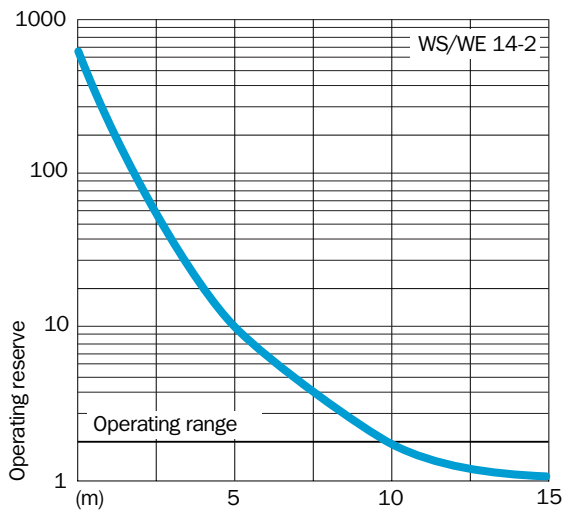
B = Outputs Q and \bar{Q} short-circuit protected

C = Interference pulse suppression

Scanning range and operating reserve






■ Operating range ■ Scanning range typ. max.



Order information

Type	Order no.
WS/WE14-2P130	1 026 430
WS/WE14-2P430	1 026 431
WS/WE14-2N130	1 026 432
WS/WE14-2N430	1 026 433

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

W18-3: Incorporated application know-how, expanded functionality, high level of equipment availability



In Automation Technology, customers demand optical sensors, which can reliably solve complex applications, which are capable of operating at high processing speeds and which provide a high level of in-service availability under arduous operating conditions. The W18-3 Series is recommended. The W18-3 Series is the result of a vast amount of experience and many years of knowledge gathered from thousands of applications, from which the user can now benefit. Depending upon the task required, the most appropriate sensor can be selected:

With precision background suppression, the WT18-3 Series is ideal for demanding applications. The scanning distance can be simply and quickly adjusted, either via conventional potentiometer or via double Teach buttons, with fine adjustment option. WL18-3, using an auto-collimation optical principle, are designed to optically focus upon the object in a reliable manner and utilising a visually defined small red spot of light.

WS/WE18-3 – ideal for applications where greater system reserve is required.

Further advantage:

- The series W18-3 sensors fulfil the test requirements of

ECOLAB®

The main target industries for the W18-3 Series are:

- Packaging industry,
- Food and confectionery industry,
- Storage and conveying,
- Wood processing.

▼ In a picking warehouse, the goods containers are reliably detected by WT18-3, thus ensuring correct goods throughput.



◀ WT18-3 detects the position of a load carrier in front of the shelf bay and optimises the flow of goods in a high-bay warehouse.



▼ From dark to light: WT18-3 reliably monitors the material supply in a spinning machine.



▶ WT18-3 safely detects the shiny coffee packets on a fully-automatic packaging line.

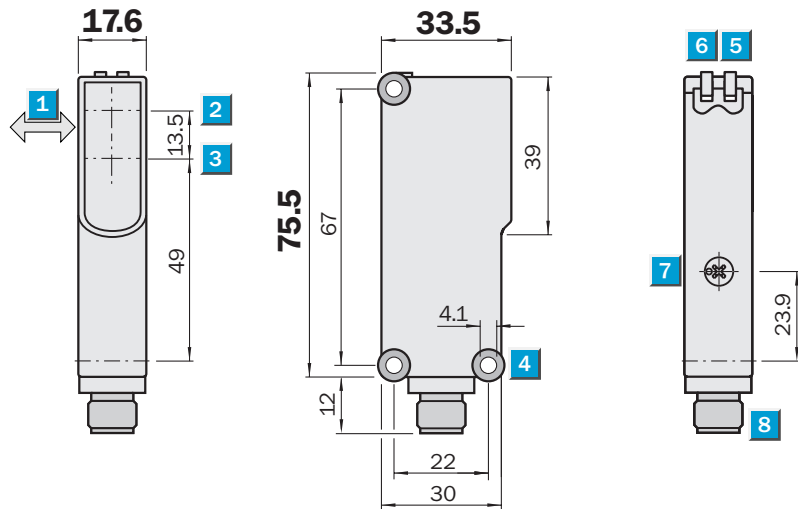


▲ WL18-3 detects the transport hanger and thus enables the smooth throughput of the garments to be washed in a fully-automatic laundry.

	Scanning distance 50 ... 600 mm
Photoelectric proximity switches	

- Precise background suppression; suitable for high demanding applications
- Scanning range adjustable via potentiometer
- Insensitive to external light sources (HF lamps)
- Operation reliability with equipment facing each other
- Permissible ambient operating temperature -40 °C ... +60 °C

Dimensional drawing



Adjustments possible

All types

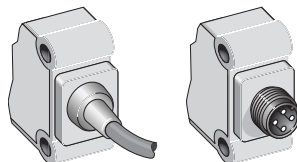


- 1** Standard direction of the material being scanned
- 2** Optical axis sender
- 3** Optical axis receiver
- 4** Mounting hole Ø 4.1 mm
- 5** LED indicator, yellow; status of received light beam
- 6** LED indicator, green; power on
- 7** Scanning distance adjustment, Poti 4 turn
- 8** Plug M12, 4-pin or 2 m cable

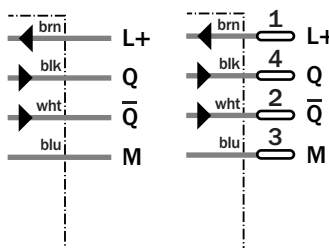


Connection types

WT18-3P130	WT18-3P430
WT18-3N130	WT18-3N430



4 x 0.25 mm ²	4-pin, M12
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See chapter Accessories
Connectors
Mounting systems

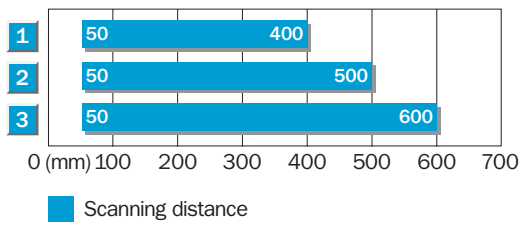
Technical data		WT18-3	P130	P430	N130	N430							
Scanning distance, adjustable¹⁾	50 ... 600 mm, 90 % remission												
Visible range¹⁾	10 ... 600 mm												
Adjustment	Poti, 4 turn												
Light source²⁾, light type	LED, visible red light												
Light spot diameter	15 mm at 300 mm												
Supply voltage V_S	10 ... 30 V DC ³⁾												
Residual ripple ⁴⁾	< 5 V _{PP}												
Current consumption ⁵⁾	< 40 mA												
Output current I _A max.	< 100 mA												
Switching outputs	PNP, antivalent												
	NPN, antivalent												
Response time ⁶⁾	< 700 μs												
Switching frequency max. ⁷⁾	700/s												
Connection types	Cable ⁸⁾ , 2 m, 4 wire												
	M12 plug, 4-pin												
VDE protection class cable⁹⁾	<input type="checkbox"/>												
Circuit protection¹⁰⁾	A, B, C												
Enclosure rating	IP 67												
Ambient temperature	Operation -40 °C ... +60 °C												
	Storage -40 °C ... +75 °C												
Weight	With cable, 2 m, approx. 120 g												
	With M12 plug, approx. 40 g												
Housing material	ABS												

- 1) Object with 90 % remission (according to standard white DIN 5033)
- 2) Average service life 100,000 h at T_A = +25 °C
- 3) Limit values; Operation in short-circuit protected network max. 8 A
- 4) Must be within 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 connection reverse-polarity protected
B = Outputs short-circuit protected
C = Interference pulse suppression

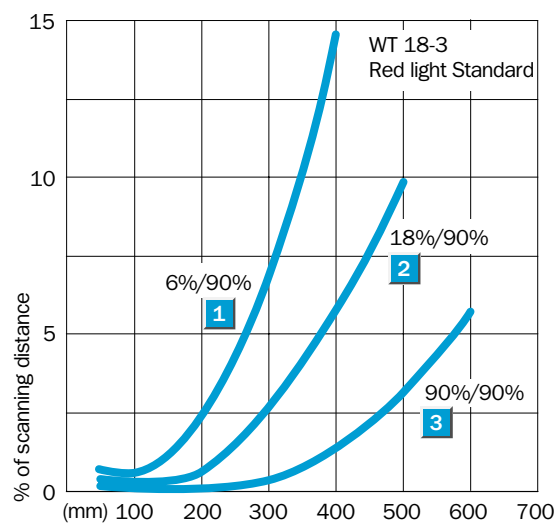
Adjustment via Poti

- Position the object in the path of the beam.
- By rotating the potentiometer to the right until the yellow LED illuminates continuously = object is positively detected.
- If necessary, fine adjustments to the scanning distance can be made to suit the conditions of the application: minimal rotation of the potentiometer to the right = scanning distance will be increased, minimal rotation of the potentiometer to the left = scanning distance will be decreased.

Scanning distance




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



Order information

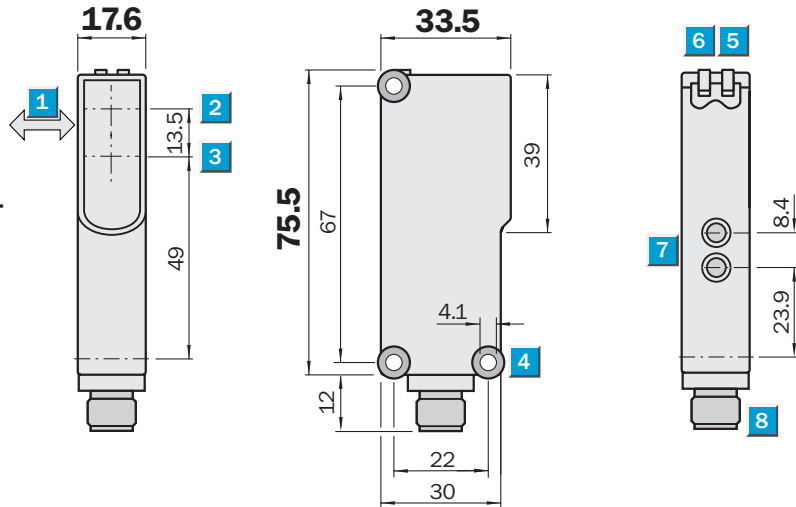
Type	Order no.
WT18-3P130	1025895
WT18-3P430	1025896
WT18-3N130	1025897
WT18-3N430	1025898

 **Scanning distance**
50 ... 600 mm

Photoelectric proximity switches

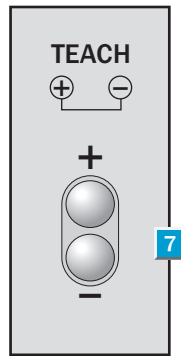
- Precise background suppression; suitable for high demanding applications
- Scanning range adjustable by a Teach-in process using double Teach buttons
- Insensitive to external light sources (HF lamps)
- Operation reliability with equipment facing each other
- Permissible ambient operating temperature -40 °C ... +60 °C

Dimensional drawing



Adjustments possible

All types

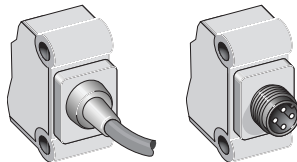


- 1** Standard direction of the material being scanned
- 2** Optical axis sender
- 3** Optical axis receiver
- 4** Mounting hole Ø 4.1 mm
- 5** LED indicator, yellow; status of received light beam
- 6** LED indicator, green; power on
- 7** Scanning distance adjustment, double Teach button
- 8** Plug M12, 4-pin or 2 m cable

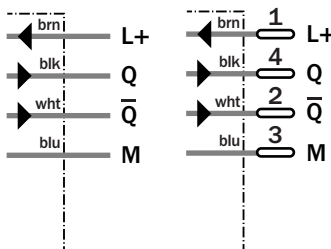


Connection types

WT18-3P131	WT18-3P431
	WT18-3N431



4 x 0.25 mm ²	4-pin, M12
--------------------------	------------



See chapter Accessories

Connectors
Mounting systems

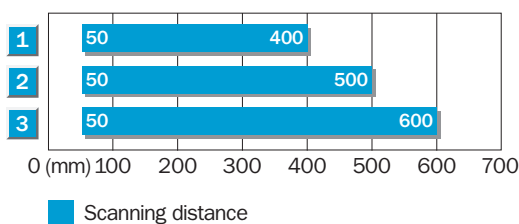
Technical data		WT18-3	P131	P431	N431							
Scanning distance, adjustable ¹⁾	50 ... 600 mm, 90 % remission											
Visible range ¹⁾	10 ... 600 mm											
Adjustment	Teach-in, via double Teach buttons											
Fine adjustment	Manuel via „+“ and „-“ button											
Light source ²⁾ , light type	LED, visible red light											
Light spot diameter	15 mm at 300 mm											
Supply voltage V _S	10 ... 30 V DC ³⁾											
Residual ripple ⁴⁾	< 5 V _{pp}											
Current consumption ⁵⁾	< 40 mA											
Output current I _A max.	< 100 mA											
Switching outputs	PNP, antivalent											
	NPN, antivalent											
Response time ⁶⁾	< 700 μs											
Switching frequency max. ⁷⁾	700/s											
Connection types	Cable ⁸⁾ , 2 m, 4 wire											
	M12 plug, 4-pin											
VDE protection class cable ⁹⁾	<input type="checkbox"/>											
Circuit protection ¹⁰⁾	A, B, C											
Enclosure rating	IP 67											
Ambient temperature	Operation -40 °C ... +60 °C											
	Storage -40 °C ... +75 °C											
Weight	With cable, 2 m, approx. 120 g											
	With M12 plug, approx. 40 g											
Housing material	ABS											

- 1) Object with 90 % remission (according to standard white DIN 5033)
- 2) Average service life 100,000 h at T_A = +25 °C
- 3) Limit values; Operation in short-circuit protected network max. 8 A
- 4) Must be within 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 connection reverse-polarity protected
B = Outputs short-circuit protected
C = Interference pulse suppression

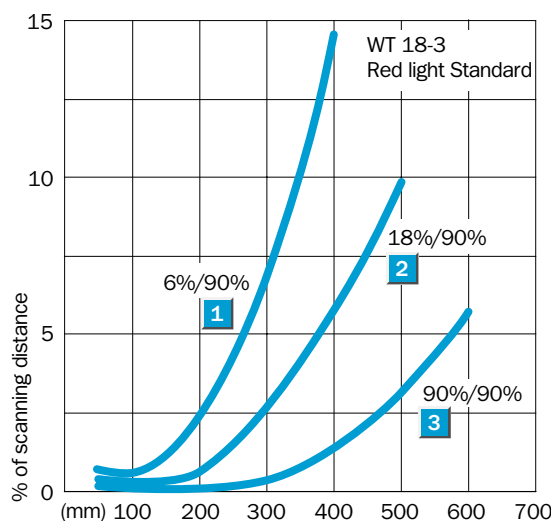
Teach-in procedure via the double Teach buttons

1. Position the object in the path of the beam.
2. Press both buttons simultaneously (**for approx. 2 seconds**) until the yellow LED flashes = object in focus.
In the event of button activation of less than 2 seconds, the Teach command is not effective, therefore providing no protection against further unwanted manipulation.
3. Release buttons; yellow LED illuminates continuously = object is positively detected.
4. Fine adjustments can be made to the scanning distance, when required by the application:
Pressing the „+“ button (**approx. 0.5 sec**) = scanning distance will be increased.
Pressing the „-“ button (**approx. 0.5 sec**) = scanning distance will be decreased.
In the event of button activation less than 0.5 sec, no change to the scanning distance is made.
Upon activation of the button, the yellow LED flashes.
5. The Teach-in scanning distance is stored in the memory.


Scanning distance



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



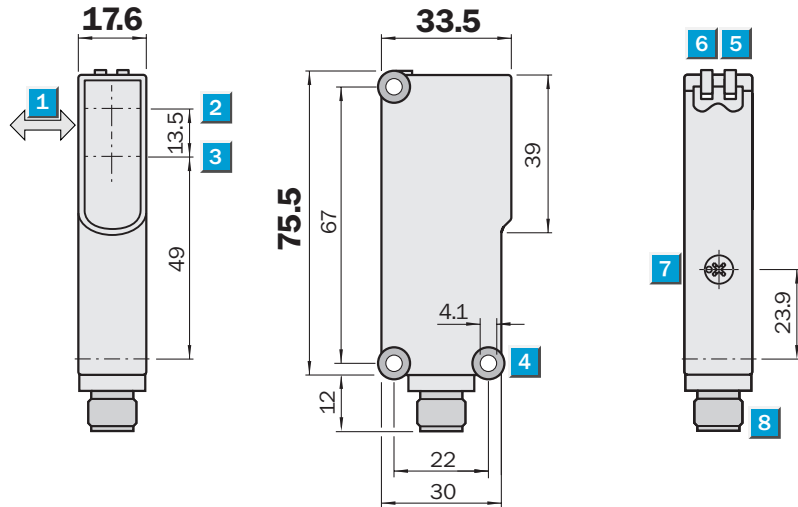
Order information	
Type	Order no.
WT18-3P131	1026034
WT18-3P431	1026032
WT18-3N431	1026035

 **Scanning distance**
50 ... 700 mm

Photoelectric proximity switches

- Precise background suppression; suitable for high demanding applications
- Scanning range adjustable via potentiometer
- Insensitive to external light sources (HF lamps)
- Operation reliability with equipment facing each other
- Permissible ambient operating temperature -40 °C ... +60 °C

Dimensional drawing



Adjustments possible

All types

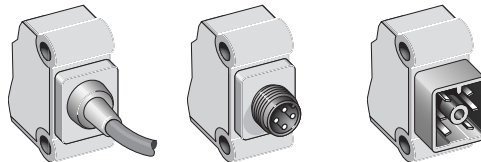


- 1 Standard direction of the material being scanned
- 2 Optical axis sender
- 3 Optical axis receiver
- 4 Mounting hole Ø 4.1 mm
- 5 LED indicator, yellow; status of received light beam
- 6 LED indicator, green; power on
- 7 Scanning distance adjustment, Poti 4 turn
- 8 Plug M12, 4-pin or 2 m cable or cubic plug, 6-pin



Connection types

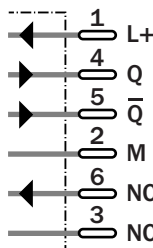
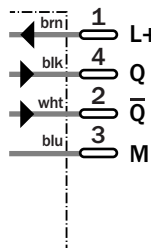
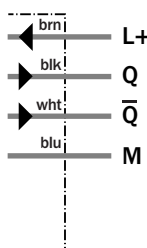
WT18-3P110	WT18-3P410	WT18-3P610
WT18-3N110	WT18-3N410	WT18-3N610



4 x 0.25 mm²

4-pin, M12

6-pin



See chapter Accessories

Connectors

Mounting systems

Technical data		WT18-3	P110	P410	P610	N110	N410	N610				
Scanning distance, adjustable ¹⁾	50 ... 700 mm, 90 % remission											
Visible range ¹⁾	10 ... 700 mm											
Adjustment	Poti, 4 turn											
Light source ²⁾ , light type	LED, infrared light											
Light spot diameter	20 mm at 400 mm											
Supply voltage V _S	10 ... 30 V DC ³⁾											
Residual ripple ⁴⁾	< 5 V _{SS}											
Current consumption ⁵⁾	< 55 mA											
Output current I _A max.	< 100 mA											
Switching outputs	PNP, antivalent											
	NPN, antivalent											
Response time ⁶⁾	< 700 μs											
Switching frequency max. ⁷⁾	700/s											
Connection types	Cable ⁸⁾ , 2 m, 4 wire											
	M12 plug, 4-pin											
	Cubic plug, 6-pin											
VDE protection class cable ⁹⁾	<input type="checkbox"/>											
Circuit protection ¹⁰⁾	A, B, C											
Enclosure rating	IP 67											
	IP 65											
Ambient temperature	Operation -40 °C ... +60 °C											
	Storage -40 °C ... +75 °C											
Weight	With cable, 2 m, approx. 120 g											
	With M12 plug, approx. 40 g											
	With cubic plug, approx. 40 g											
Housing material	ABS											

1) Object with 90 % remission (according to standard white DIN 5033)
 2) Average service life 100,000 h at T_A = +25 °C

3) Limit values; Operation in short-circuit protected network max. 8 A
 4) Must be within V_S tolerances
 5) Without load

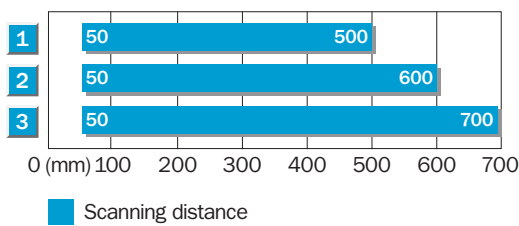
6) Signal transit time with resistive load
 7) With light/dark ratio 1:1
 8) Do not bend below 0 °C
 9) Reference voltage 50 V DC

10) A = V_S connection reverse-polarity protected
 B = Outputs short-circuit protected
 C = Interference pulse suppression

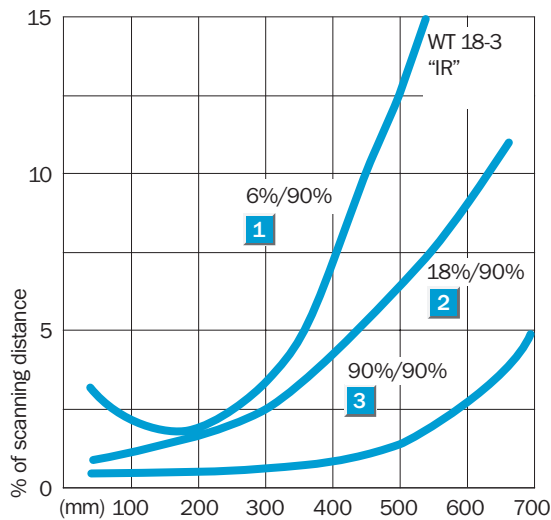
Adjustment via Poti

1. Position the object in the path of the beam.
2. By rotating the potentiometer to the right until the yellow LED illuminates continuously = object is positively detected.
3. If necessary, fine adjustments to the scanning distance can be made to suit the conditions of the application: minimal rotation of the potentiometer to the right = scanning distance will be increased, minimal rotation of the potentiometer to the left = scanning distance will be decreased.

Scanning distance




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



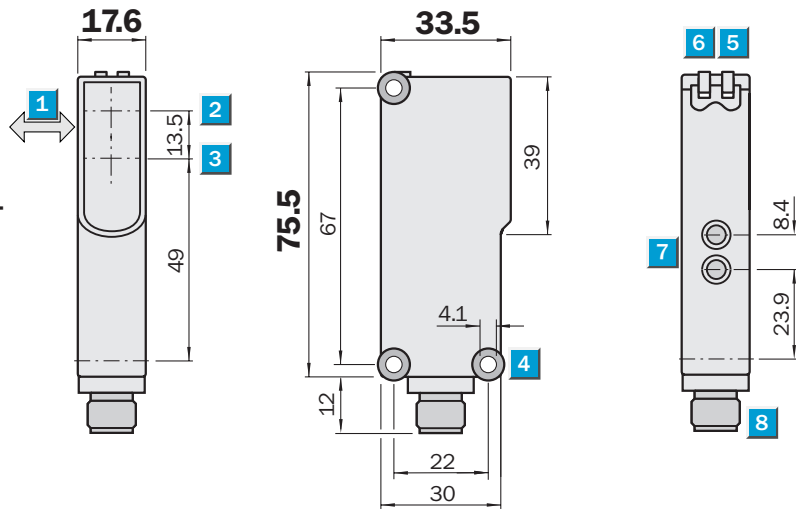
Order information

Type	Order no.
WT18-3P110	1025887
WT18-3P410	1025889
WT18-3P610	1025890
WT18-3N110	1025891
WT18-3N410	1025893
WT18-3N610	1025894


Scanning distance
 50 ... 700 mm
 Photoelectric proximity switches

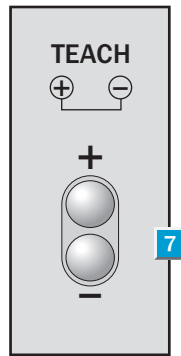
- Precise background suppression; suitable for high demanding applications
- Scanning range adjustable by a Teach-in process using double Teach buttons
- Insensitive to external light sources (HF lamps)
- Operation reliability with equipment facing each other
- Permissible ambient operating temperature $-40\text{ }^{\circ}\text{C} \dots +60\text{ }^{\circ}\text{C}$

Dimensional drawing



Adjustments possible

All types



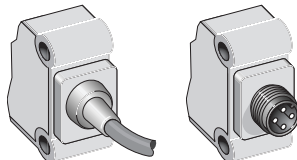
- 1 Standard direction of the material being scanned
- 2 Optical axis sender
- 3 Optical axis receiver
- 4 Mounting hole \varnothing 4.1 mm
- 5 LED indicator, yellow; status of received light beam
- 6 LED indicator, green; power on
- 7 Scanning distance adjustment, double Teach button
- 8 Plug M12, 4-pin or 2 m cable



Connection types

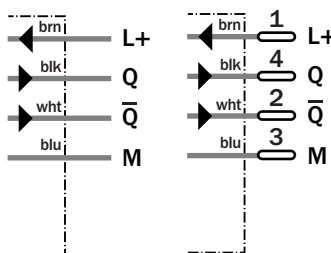
WT18-3P111

WT18-3P411



4 x 0.25 mm²

4-pin, M12



See chapter Accessories

Connectors

Mounting systems

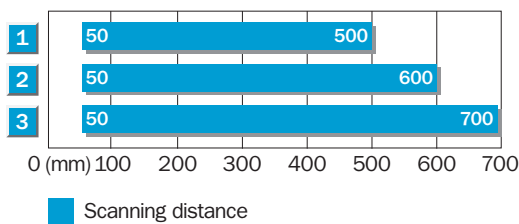
Technical data		WT18-3	P111	P411							
Scanning distance , adjustable ¹⁾	50 ... 700 mm, 90 % remission										
Visible range ¹⁾	10 ... 700 mm										
Adjustment	Teach-in, via double Teach buttons										
Fine adjustment	Manuel via „+“ and „-“ button										
Light source ²⁾ , light type	LED, infrared light										
Light spot diameter	20 mm at 400 mm										
Supply voltage V _S	10 ... 30 V DC ³⁾										
Residual ripple ⁴⁾	< 5 V _{SS}										
Current consumption ⁵⁾	< 55 mA										
Output current I _A max.	< 100 mA										
Switching outputs	PNP, antivalent										
	NPN, antivalent										
Response time ⁶⁾	< 700 μs										
Switching frequency max. ⁷⁾	700/s										
Connection types	Cable ⁸⁾ , 2 m, 4 wire										
	M12 plug, 4-pin										
VDE protection class cable ⁹⁾	<input type="checkbox"/>										
Circuit protection ¹⁰⁾	A, B, C										
Enclosure rating	IP 67										
Ambient temperature	Operation -40 °C ... +60 °C										
	Storage -40 °C ... +75 °C										
Weight	With cable, 2 m, approx. 120 g										
	With M12 plug, approx. 40 g										
Housing material	ABS										

1) Object with 90 % remission (according to standard white DIN 5033)
 2) Average service life 100,000 h at T_A = +25 °C
 3) Limit values; Operation in short-circuit protected network max. 8 A
 4) Must be within 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 connection reverse-polarity protected
 B = Outputs short-circuit protected
 C = Interference pulse suppression

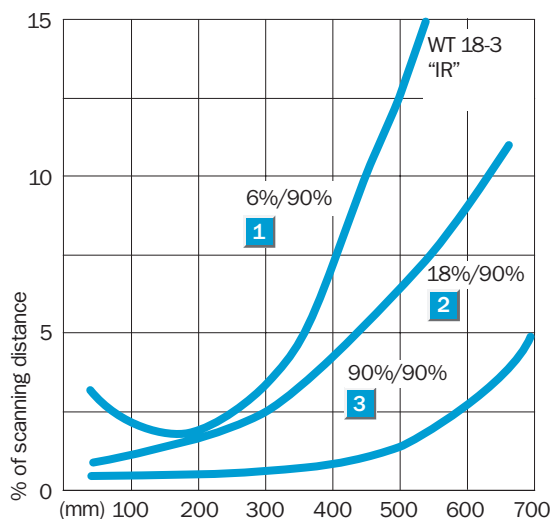
Teach-in procedure via the double Teach buttons

1. Position the object in the path of the beam.
2. Press both buttons simultaneously (**for approx. 2 seconds**) until the yellow LED flashes = object in focus.
 In the event of button activation of less than 2 seconds, the Teach command is not effective, therefore providing no protection against further unwanted manipulation.
3. Release buttons; yellow LED illuminates continuously = object is positively detected.
4. Fine adjustments can be made to the scanning distance, when required by the application:
 Pressing the „+“ button (**approx. 0.5 sec**) = scanning distance will be increased.
 Pressing the „-“ button (**approx. 0.5 sec**) = scanning distance will be decreased.
 In the event of button activation less than 0.5 sec, no change to the scanning distance is made.
 Upon activation of the button, the yellow LED flashes.
5. The Teach-in scanning distance is stored in the memory.


Scanning distance



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



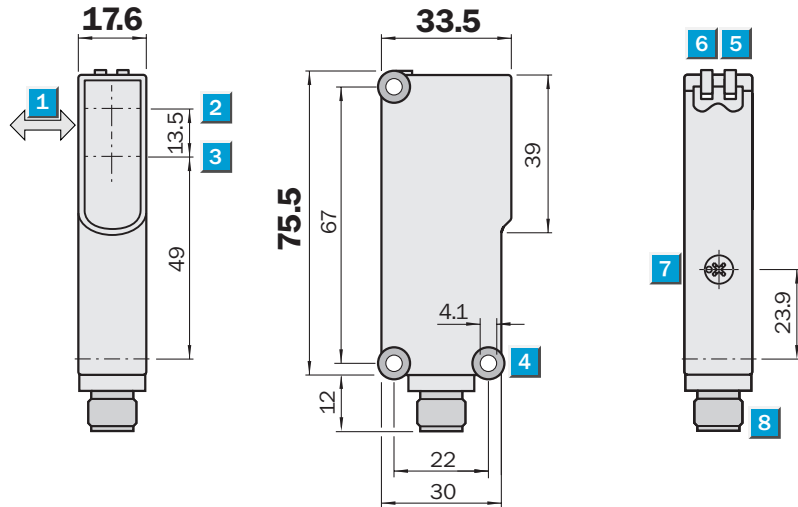
Order information	
Type	Order no.
WT18-3P111	1026033
WT18-3P411	1026031

 **Scanning distance**
50 ... 1000 mm

Photoelectric proximity switches

- Precise background suppression; suitable for high demanding applications
- Scanning range adjustable via potentiometer
- Insensitive to external light sources (HF lamps)
- Operation reliability with equipment facing each other
- Permissible ambient operating temperature $-40\text{ }^{\circ}\text{C} \dots +60\text{ }^{\circ}\text{C}$

Dimensional drawing



Adjustments possible

All types



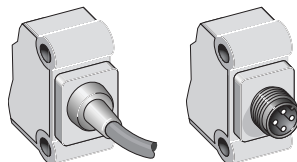
- 1 Standard direction of the material being scanned
- 2 Optical axis sender
- 3 Optical axis receiver
- 4 Mounting hole \varnothing 4.1 mm
- 5 LED indicator, yellow; status of received light beam
- 6 LED indicator, green; power on
- 7 Scanning distance adjustment, Poti 4 turn
- 8 Plug M12, 4-pin or 2 m cable



Connection types

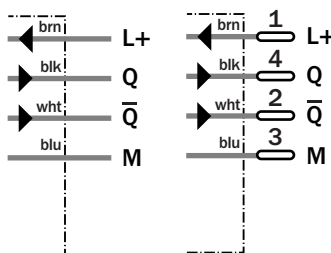
WT18-3P120

WT18-3P420



4 x 0.25 mm²

4-pin, M12



See chapter Accessories

Connectors

Mounting systems

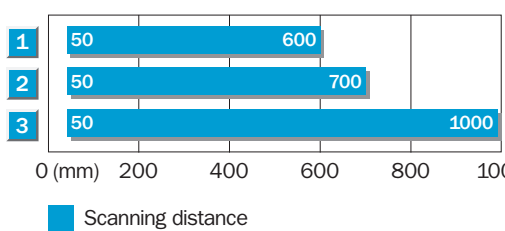
Technical data		WT18-3	P120	P420								
Scanning distance, adjustable ¹⁾	50 ... 1000 mm, 90 % remission											
Visible range ¹⁾	10 ... 1000 mm											
Adjustment	Poti, 4 turn											
Light source ²⁾ , light type	LED, infrared light											
Light spot diameter	30 mm at 600 mm											
Supply voltage V _S	10 ... 30 V DC ³⁾											
Residual ripple ⁴⁾	< 5 V _{SS}											
Current consumption ⁵⁾	< 55 mA											
Output current I _A max.	< 100 mA											
Switching outputs	PNP, antivalent											
Response time ⁶⁾	< 700 μs											
Switching frequency max. ⁷⁾	700/s											
Connection types	Cable ⁸⁾ , 2 m, 4 wire											
	M12 plug, 4-pin											
VDE protection class cable ⁹⁾	<input type="checkbox"/>											
Circuit protection ¹⁰⁾	A, B, C											
Enclosure rating	IP 67											
Ambient temperature	Operation -40 °C ... +60 °C											
	Storage -40 °C ... +75 °C											
Weight	With cable, 2 m, approx. 120 g											
	With M12 plug, approx. 40 g											
Housing material	ABS											

- 1) Object with 90 % remission (according to standard white DIN 5033)
- 2) Average service life 100,000 h at T_A = +25 °C
- 3) Limit values; Operation in short-circuit protected network max. 8 A
- 4) Must be within 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 connection reverse-polarity protected
B = Outputs short-circuit protected
C = Interference pulse suppression

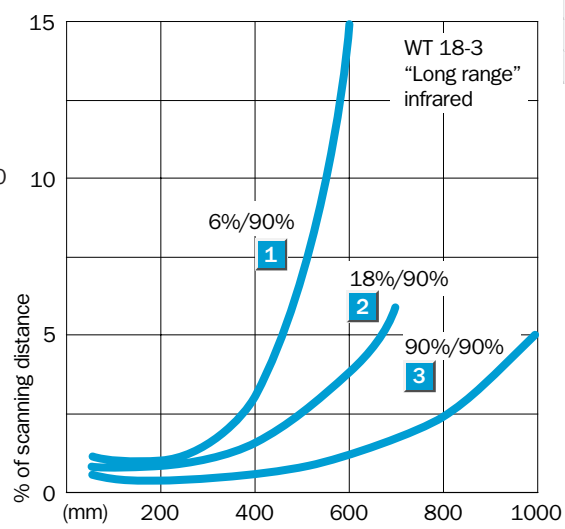
Adjustment via Poti

1. Position the object in the path of the beam.
2. By rotating the potentiometer to the right until the yellow LED illuminates continuously = object is positively detected.
3. If necessary, fine adjustments to the scanning distance can be made to suit the conditions of the application: minimal rotation of the potentiometer to the right = scanning distance will be increased, minimal rotation of the potentiometer to the left = scanning distance will be decreased.


Scanning distance



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

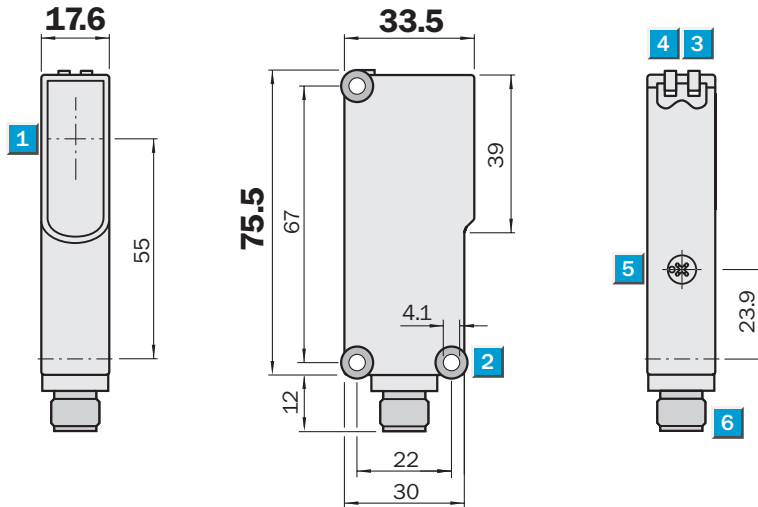


Order information	
Type	Order no.
WT18-3P120	1025904
WT18-3P420	1025905


Scanning range
 7 m
 Photoelectric reflex switches

- Autocollimation optics; reliable target detection
- Insensitive to external light sources (HF lamps)
- Operation reliability with equipment facing each other
- Permissible ambient operating temperature $-40\text{ }^{\circ}\text{C} \dots +60\text{ }^{\circ}\text{C}$
- Test input for system diagnosis (optional)

Dimensional drawing



Adjustments possible

All types

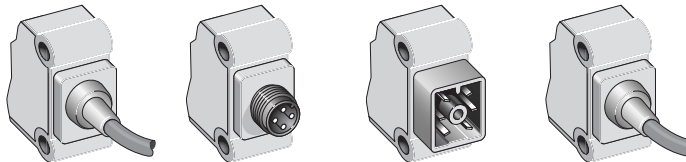


- 1** Middle of optical axis
- 2** Mounting holes $\varnothing 4.1\text{ mm}$
- 3** Status indicator LED, yellow, status of received light beam
- 4** Status indicator LED, green; power on
- 5** Sensitivity control; Poti 270°
- 6** Plug M12, 4-pin or cable 2 m or cubic plug 6 pin



Connection types

WL18-3P130	WL18-3P430	WL18-3P630	WL18-3P730
WL18-3N130	WL18-3N430	WL18-3N630	WL18-3N730

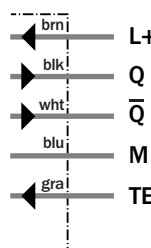
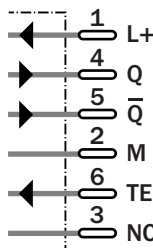
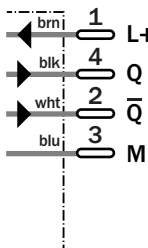
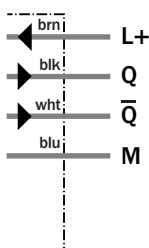


4 x 0.25 mm²

4-pin, M12

6-pin

5 x 0.25 mm²



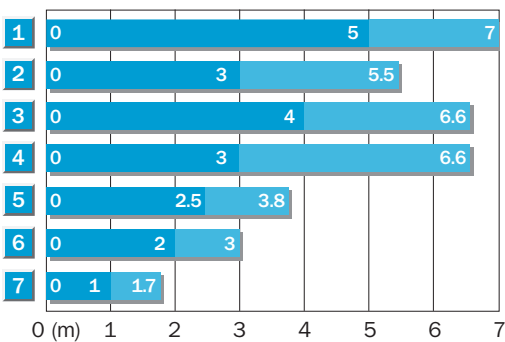
See chapter Accessories

- Connectors
- Reflectors
- Mounting systems

Technical data		WL18-3	P130	P430	P630	P730	N130	N430	N630	N730
Scanning range , max. typ./on reflector	7 m/PL80A									
Sensitivity	Adjustable, via Poti, 270°									
Light source ¹⁾, light type	LED, visible red light									
Angle of dispersion	4°									
Light spot diameter	40 mm at 2 m									
Polarising filter	Yes									
Supply voltage V_S	10 ... 30 V DC ²⁾									
Residual ripple ⁴⁾	< 5 V _{pp}									
Current consumption ⁵⁾	< 40 mA									
Output current I_A max.	< 100 mA									
Switching outputs	PNP, antivalent									
	NPN, antivalent									
Response time ⁵⁾	500 µs									
Switching frequency max. ⁶⁾	1000/s									
Test input »TE«	PNP: Sender off; TE to 0 V									
	NPN: Sender off; TE to V+									
Connection types	Cable ⁷⁾ , 2 m, 4 wire									
	M12 plug, 4-pin									
	Cubic plug, 6-pin									
	Cable, 2 m, 5 wire									
VDE protection class cable ⁸⁾	<input type="checkbox"/>									
Circuit protection ⁹⁾	A, B, C									
Enclosure rating	IP 67									
	IP 65									
Ambient temperature	Operation -40 °C ... +60 °C									
	Storage -40 °C ... +75 °C									
Weight	With cable, 2 m, approx. 120 g									
	With M12 plug, approx. 40 g									
	With cubic plug, ca. 40 g									
Housing material	ABS									

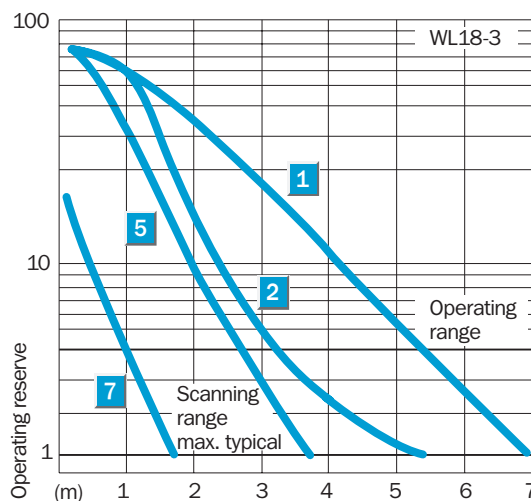
1) Average service life 100,000 h at $T_A = +25 °C$
 2) Limit values; Operation in short-circuit protected network max. 8 A
 3) Must be within V_S tolerances
 4) Without load
 5) Signal transit time with resistive load
 6) With light/dark ratio 1:1
 7) Do not bend below 0 °C
 8) Reference voltage 50 V DC
 9) A = V_S connection reverse-polarity protected
 B = Outputs short-circuit protected
 C = Interference pulse suppression

Scanning range




■ Operating range ■ Scanning range, max. typical

Reflector type	Operating range
1 PL 80 A	0 ... 5.0 m
2 C 110	0 ... 3.0 m
3 PL 50 A	0 ... 4.0 m
4 PL 40 A	0 ... 3.0 m
5 PL 30 A	0 ... 2.5 m
6 PL 20 A	0 ... 2.0 m
7 Reflective tape Diamond Grade	0 ... 1.0 m



Order information

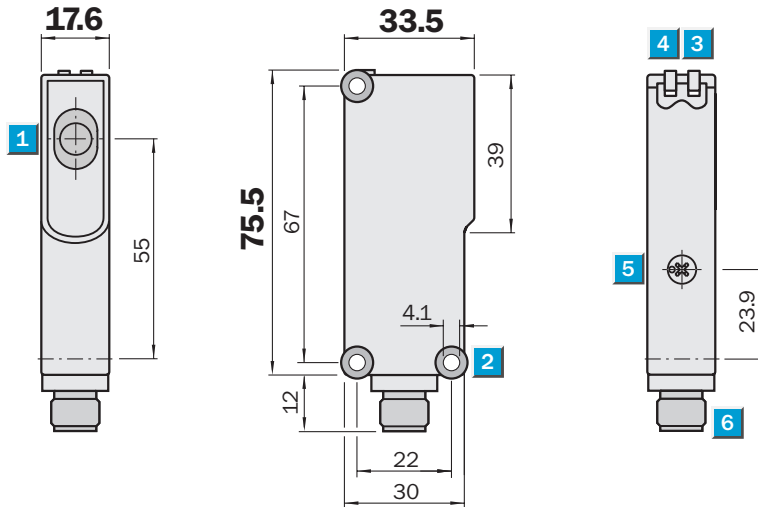
Type	Order no.
WL18-3P130	1025909
WL18-3P430	1025911
WL18-3P630	1025912
WL18-3P730	1026029
WL18-3N130	1025913
WL18-3N430	1025915
WL18-3N630	1025916
WL18-3N730	1026030

 **Scanning range**
7 m

Photoelectric reflex switches

- Autocollimation optics; reliable target detection
- Insensitive to external light sources (HF lamps)
- Operation reliability with equipment facing each other
- Permissible ambient operating temperature $-40\text{ °C} \dots +60\text{ °C}$
- Test input for system diagnosis (optional)

Dimensional drawing



Adjustments possible

All types



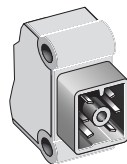
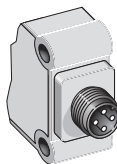
- 1 Middle of optical axis
- 2 Mounting holes $\varnothing 4.1\text{ mm}$
- 3 Status indicator LED, yellow, status of received light beam
- 4 Status indicator LED, green; power on
- 5 Sensitivity control; Poti 270°
- 6 Plug M12, 4-pin or cubic plug 6-pin



Connection types

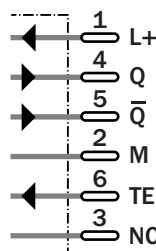
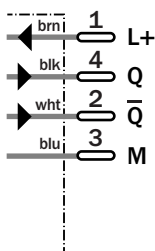
WL18-3P480

WL18-3P680



4-pin, M12

6-pin



See chapter Accessories

Connectors

Reflectors

Mounting systems

Technical data		WL18-3	P480	P680								
Scanning range , max. typ./on reflector	7 m/PL80A											
Sensitivity	Adjustable, via Poti, 270°											
Light source ¹⁾ , light type	LED, visible red light											
Angle of dispersion	1,8°											
Light spot diameter	40 mm at 2 m											
Polarising filter	No											
Supply voltage V _S	10 ... 30 V DC ²⁾											
Residual ripple ⁴⁾	< 5 V _{pp}											
Current consumption ⁵⁾	< 40 mA											
Output current I _A max.	< 100 mA											
Switching outputs	PNP, antivalent											
Response time ⁵⁾	500 μs											
Switching frequency max. ⁶⁾	1000/s											
Test input »TE«	PNP: Sender off; TE to 0 V											
Connection types	M12 plug, 4-pin											
	Cubic plug, 6-pin											
VDE protection class cable ⁷⁾	<input type="checkbox"/>											
Circuit protection ⁸⁾	A, B, C											
Enclosure rating	IP 67											
	IP 65											
Ambient temperature	Operation -40 °C ... +60 °C											
	Storage -40 °C ... +75 °C											
Weight	With M12 plug, approx. 40 g											
	With cubic plug, ca. 40 g											
Housing material	ABS											

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

2) Limit values; Operation in short-circuit protected network max. 8 A

3) Must be within 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

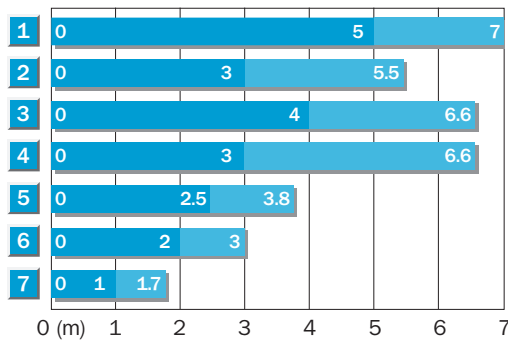
8) Reference voltage 50 V DC

9) A = V_S connection reverse-polarity protected

B = Outputs short-circuit protected

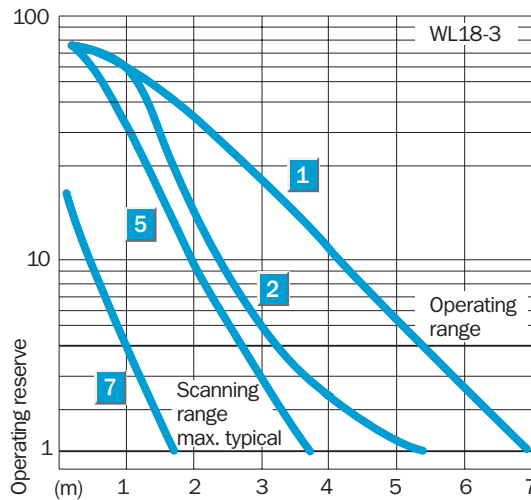
C = Interference pulse suppression

Scanning range



■ Operating range ■ Scanning range, max. typical

Reflector type	Operating range
1 PL 80 A	0 ... 5.0 m
2 C 110	0 ... 3.0 m
3 PL 50 A	0 ... 4.0 m
4 PL 40 A	0 ... 3.0 m
5 PL 30 A	0 ... 2.5 m
6 PL 20 A	0 ... 2.0 m
7 Reflective tape Diamond Grade	0 ... 1.0 m



Order information

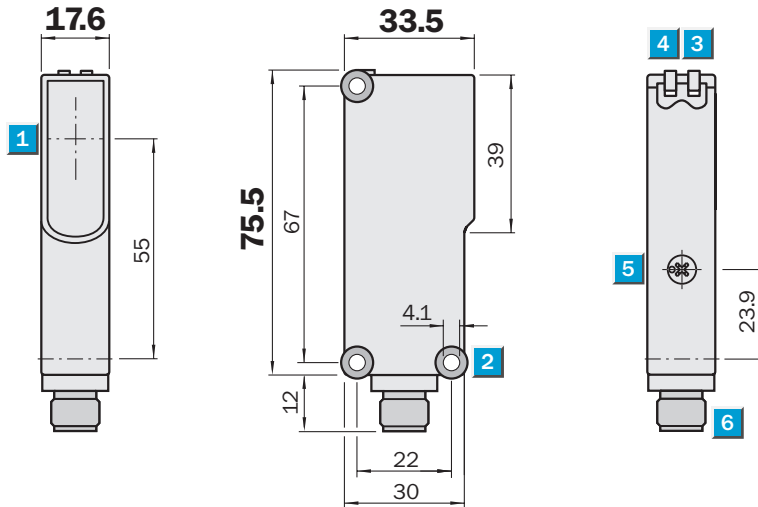
Type	Order no.
WL18-3P480	1025917
WL18-3P680	1025918

Scanning range
20 m

Through-beam photoelectric switches

- Insensitive to external light sources (HF lamps)
- Permissible ambient operating temperature -40 °C ... +60 °C
- Test input; for device diagnosis
- Rugged plastic housing

Dimensional drawing



Adjustments possible

All types



- 1 Middle of optical axis
- 2 Mounting holes \varnothing 4.1 mm
- 3 Status indicator LED, yellow, status of received light beam
- 4 Status indicator LED, green; power on
- 5 Sensitivity control; Potentiometer 270° on WE
- 6 Plug M12, 4-pin or cable 2 m or cubic plug 6-pin

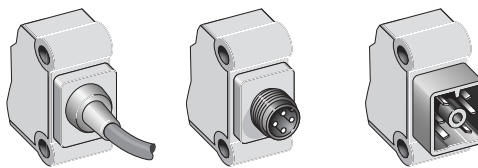


Connection types

WS/WE18-3P130
WS/WE18-3N130

WS/WE18-3P430

WS/WE18-3P630
WS/WE18-3N630

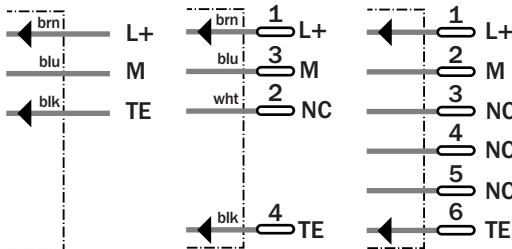


3 x 0.25 mm²

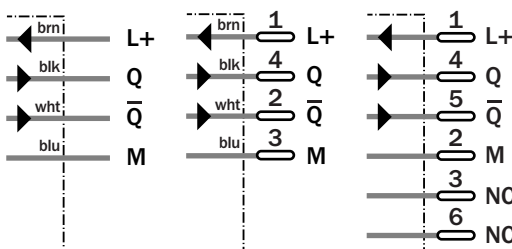
4-pin, M12

6-pin

Sender

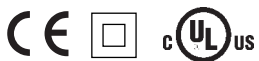


Receiver



See chapter Accessories

- Connectors
- Mounting systems



Technical data		WS/WE18-3	P130	P430	P630	N130	N630						
Scanning range , max. typ.	0 ... 20 m												
Sensitivity	Adjustable, via Poti, 270°												
Light source ¹⁾ , light type	LED, visible red light												
Light spot diameter	450 mm at 15 m												
Angle of dispersion	Approx. 1,5°												
Angle of reception	Approx. 2°												
Supply voltage V_S	10 ... 30 V DC ²⁾												
Residual ripple ⁴⁾	< 5 V_{pp}												
Current consumption ⁴⁾	Sender < 45 mA Receiver < 35 mA												
Output current I_A max.	< 100 mA												
Switching outputs	PNP, antivalent NPN, antivalent												
Response time ⁵⁾	500 μs												
Switching frequency max. ⁶⁾	1000/s												
Test input »TE« Sender off	TE to 0 V (WS)												
Connection types	Cable ⁷⁾ , 2 m, 4 wire M12 plug, 4-pin Cubic plug, 6-pin												
VDE protection class cable ⁸⁾	<input type="checkbox"/>												
Circuit protection ⁹⁾	A, B, C												
Enclosure rating	IP 67 IP 65												
Ambient temperature	Operation -40 °C ... +60 °C Storage -40 °C ... +75 °C												
Weight	With cable, 2 m, approx. 120 g With M12 plug, approx. 40 g With cubic plug, ca. 40 g												
Housing material	ABS												

¹⁾ Average service life 100,000 h at $T_A = +25\text{ °C}$

²⁾ Limit values; Operation in short-circuit protected network max. 8 A

³⁾ Must be within 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

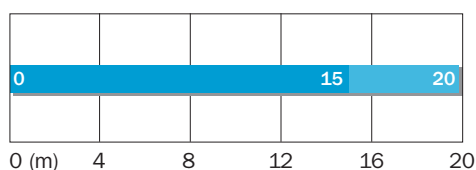
⁸⁾ Reference voltage 50 V DC

⁹⁾ A = V_S connection reverse-polarity protected

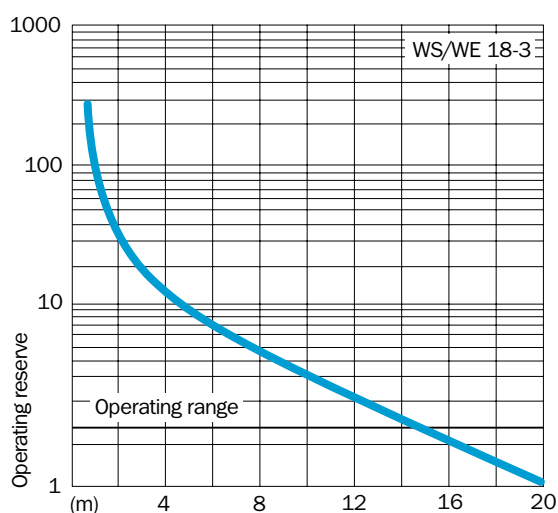
B = Outputs short-circuit protected

C = Interference pulse suppression

Scanning range and operating reserve



■ Operating range ■ Scanning range, max. typical



Order information

Type	Order no.
WS/WE18-3P130	1025922
WS/WE18-3P430	1025923
WS/WE18-3P630	1025924
WS/WE18-3N130	1025925
WS/WE18-3N630	1025926