




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:

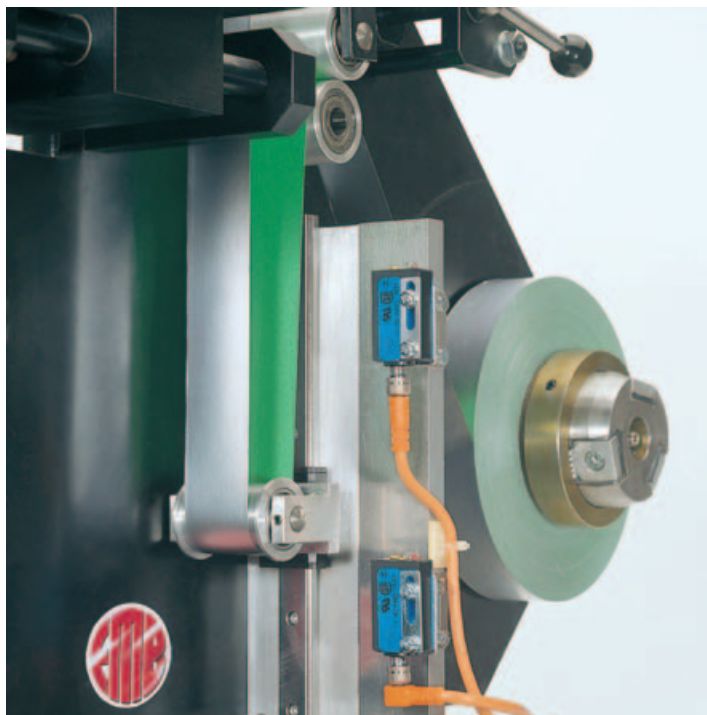
- Through-beam photoelectric switch WS/WE160: 15 m, 3 slotted masks as accessory,
- Photoelectric reflex switch WL160: 6.5 m (PL80 A), with polarizing filter,
- Photoelectric proximity switch WT160: energetic: scanning distance to 1000 mm (90% reflectance), for standard scanning jobs,
- With focussed 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.

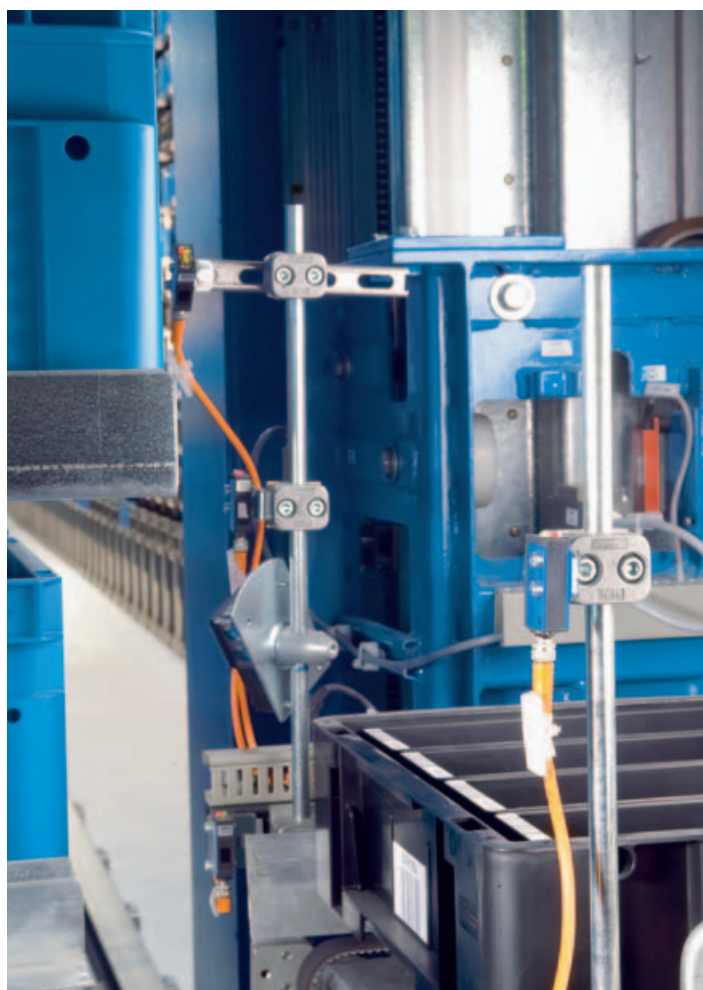
	Through-beam photoelectric switches
	With fibre optic cables (through-beam)
	With fibre optic cables (proximity)

► 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.

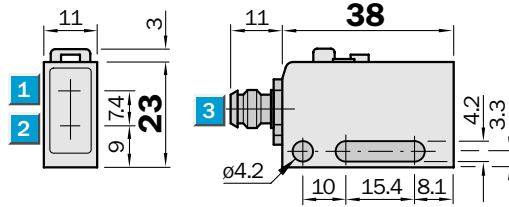


Scanning distance
4 ... 60 mm

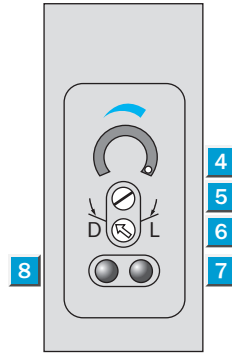
Photoelectric proximity switch

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

Dimensional drawing



Adjustments possible

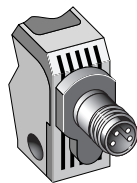


- 1 Centre of optical axis, receiver
- 2 Centre of optical axis, sender
- 3 Connector
- 4 Scaling 270°
- 5 Sensitivity adjuster
- 6 Light/dark rotary switch:
L = light switching
D = dark switching
- 7 LED indicator orange: switching output active
- 8 LED indicator green: light reception with operating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

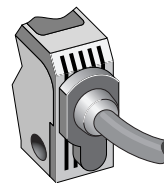
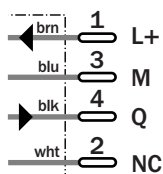


Connection type

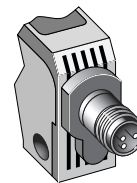
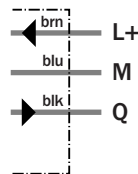
WT160-E410	WT160-E112	WT160-E310
WT160-F410	WT160-F112	WT160-F310



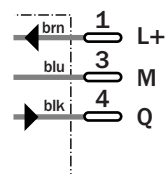
M8, 4-pin



3 x 0.2 mm²



M8, 3-pin



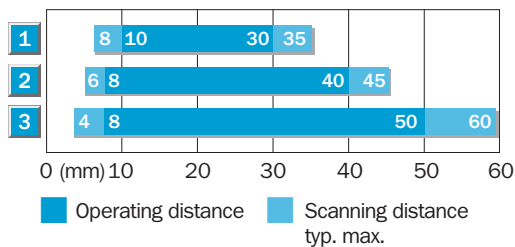
See chapter Accessories

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

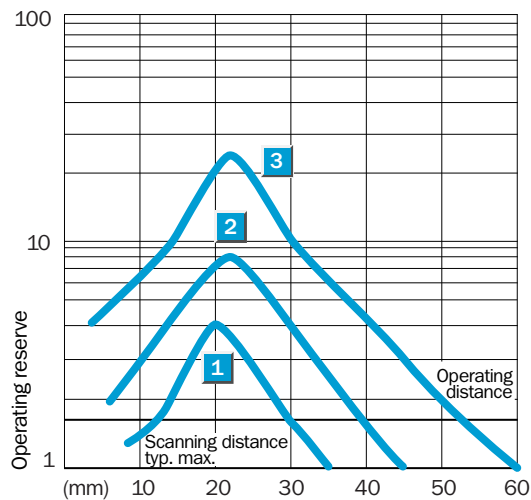
Technical specifications		WT160-	E112	E310	E410	F112	F310	F410				
Scanning distance typ. max.	4 ... 60 mm ¹⁾											
Operating distance	8 ... 50 mm ¹⁾											
Adjustment of operating distance	Potentiometer, 2 rotations											
Light source, light type	LED, red light, 680 nm ²⁾											
Light 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



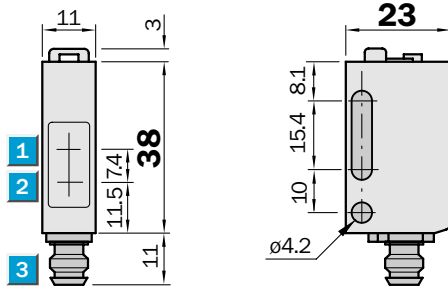
Ordering information	
Type	Order no.
WT160-E112	6 022 775
WT160-E310	6 022 779
WT160-E410	6 022 780
WT160-F112	6 022 783
WT160-F310	6 022 787
WT160-F410	6 022 788

Scanning distance
4 ... 60 mm

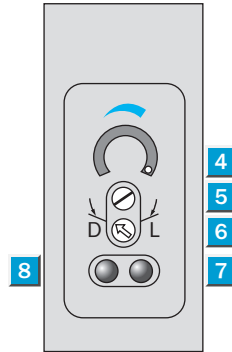
Photoelectric proximity switch

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

Dimensional drawing



Adjustments possible

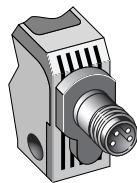


- 1 Centre of optical axis, receiver
- 2 Centre of optical axis, sender
- 3 Connector
- 4 Scaling 270°
- 5 Sensitivity adjuster
- 6 Light/dark rotary switch:
L = light switching
D = dark switching
- 7 LED indicator orange: switching output active
- 8 LED indicator green: light reception with operating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

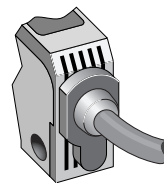
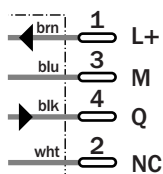


Connection type

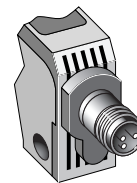
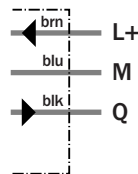
WT160-E420	WT160-E122	WT160-E320
WT160-F420	WT160-F122	WT160-F320



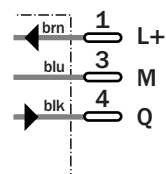
M8, 4-pin



3 x 0.2 mm²



M8, 3-pin



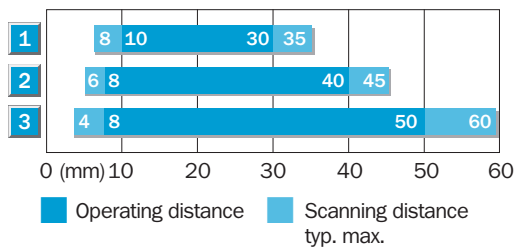
See chapter Accessories

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

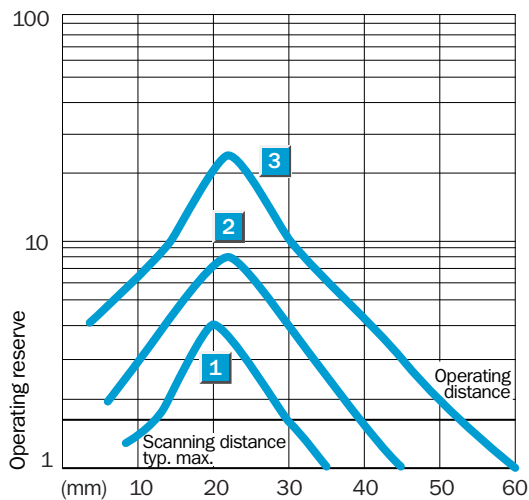
Technical specifications		WT160-	E122	E320	E420	F122	F320	F420				
Scanning distance typ. max.	4 ... 60 mm ¹⁾											
Operating distance	8 ... 50 mm ¹⁾											
Adjustment of operating distance	Potentiometer, 2 rotations											
Light source, light type	LED, red light, 680 nm ²⁾											
Light 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



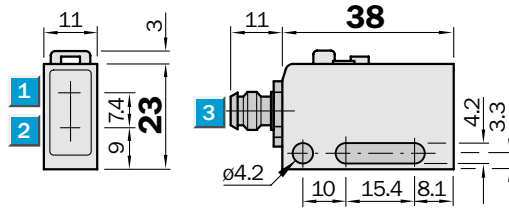
Ordering information	
Type	Order no.
WT160-E122	6 022 777
WT160-E320	6 022 781
WT160-E420	6 022 782
WT160-F122	6 022 785
WT160-F320	6 022 789
WT160-F420	6 022 790

Scanning distance
0 ... 1,000 mm

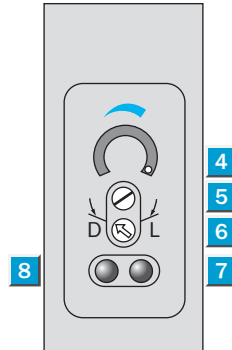
Photoelectric proximity switch

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

Dimensional drawing



Adjustments possible

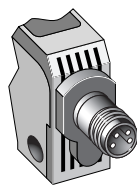


- 1 Centre of optical axis, receiver
- 2 Centre of optical axis, sender
- 3 Connector
- 4 Scaling 270°
- 5 Sensitivity adjuster
- 6 Light/dark rotary switch:
L = light switching
D = dark switching
- 7 LED indicator orange: switching output active
- 8 LED indicator green: light reception with operating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

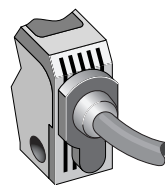
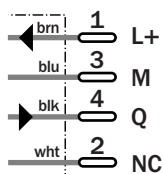


Connection type

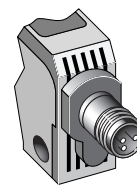
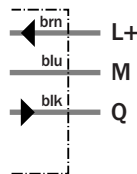
WT160-E470	WT160-E172	WT160-E370
WT160-F470	WT160-F172	WT160-F370



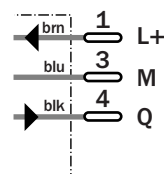
M8, 4-pin



3 x 0.2 mm²



M8, 3-pin



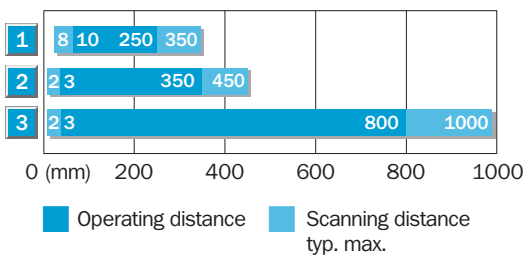
See chapter Accessories

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

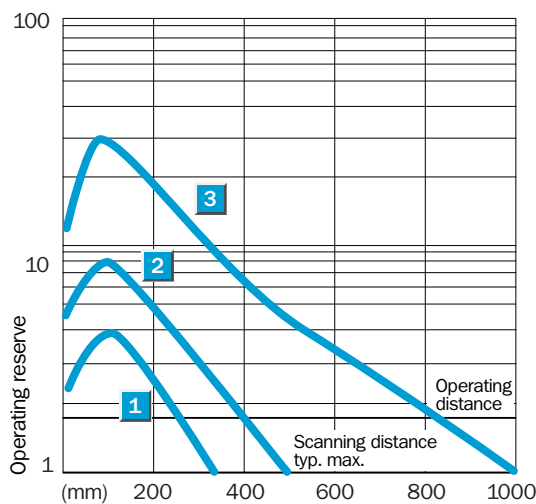
Technical specifications		WT160-	E172	E370	E470	F172	F370	F470				
Scanning distance typ. max.	0 ... 1,000 mm ¹⁾											
Operating distance	0 ... 800 mm ¹⁾											
Adjustment of operating distance	Potentiometer, 2 rotations											
Light source, light type	LED, red light, 680 nm ²⁾											
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

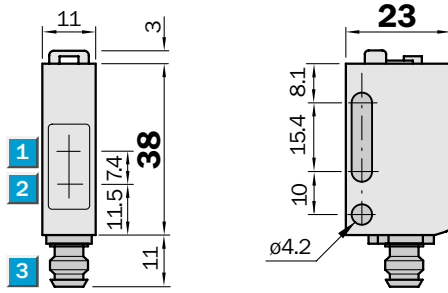


Ordering information	
Type	Order no.
WT160-E172	6 022 807
WT160-E370	6 022 811
WT160-E470	6 022 812
WT160-F172	6 022 815
WT160-F370	6 022 819
WT160-F470	6 022 820

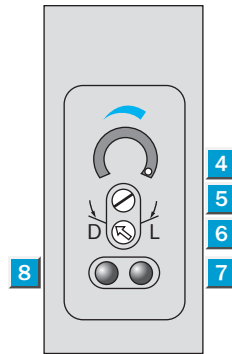

Scanning distance
0 ... 1,000 mm
Photoelectric proximity switch

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

Dimensional drawing



Adjustments possible

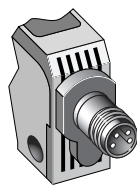


- 1 Centre of optical axis, receiver
- 2 Centre of optical axis, sender
- 3 Connector
- 4 Scaling 270°
- 5 Sensitivity adjuster
- 6 Light/dark rotary switch:
L = light switching
D = dark switching
- 7 LED indicator orange: switching output active
- 8 LED indicator green: light reception with operating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

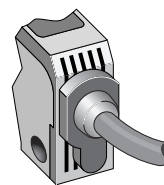
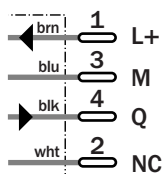


Connection type

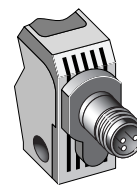
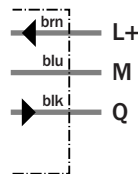
WT160-E480	WT160-E182	WT160-E380
WT160-F480	WT160-F182	WT160-F380



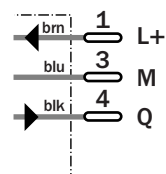
M8, 4-pin



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											

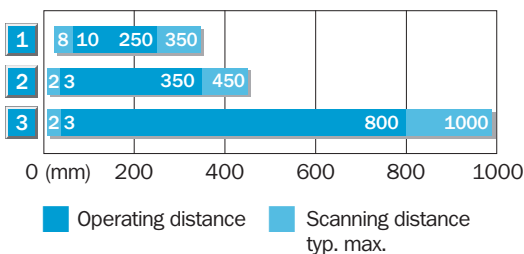
¹⁾ Object with 90 % remission (based on standard white to DIN 5033)
²⁾ Average service life 100,000 h

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

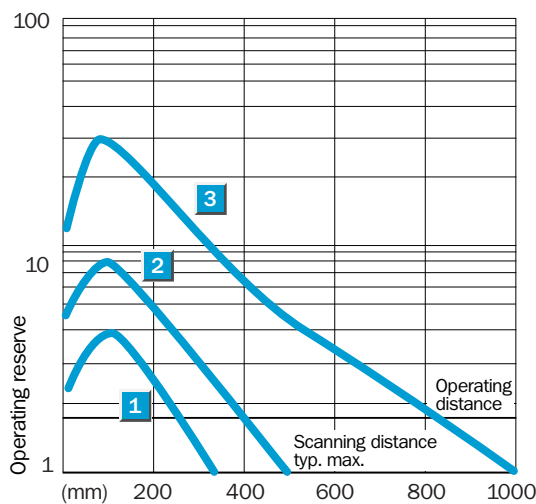
network max. 8 A
⁴⁾ may not exceed or fall short of V_s tolerances

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

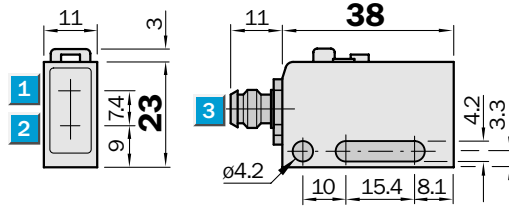
Type	Order no.
WT160-E182	6 022 809
WT160-E380	6 022 813
WT160-E480	6 022 814
WT160-F182	6 022 817
WT160-F380	6 022 821
WT160-F480	6 022 822

Scanning distance
0 ... 115 mm

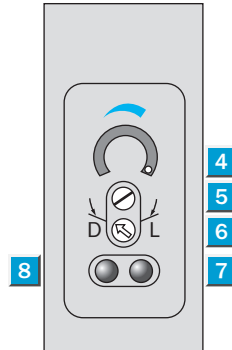
Photoelectric proximity switch

- 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

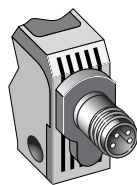


- 1 Centre of optical axis, receiver
- 2 Centre of optical axis, sender
- 3 Connector
- 4 Scaling 270°
- 5 Sensitivity adjuster
- 6 Light/dark rotary switch:
L = light switching
D = dark switching
- 7 LED indicator orange: switching output active
- 8 LED indicator green: light reception with operating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

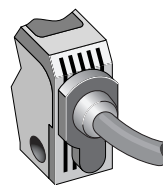
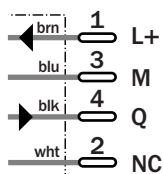


Connection type

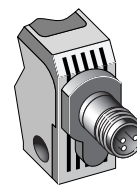
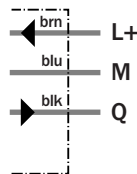
WT160-E450	WT160-E152	WT160-E350
WT160-F450	WT160-F152	WT160-F350



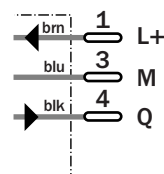
M8, 4-pin



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											

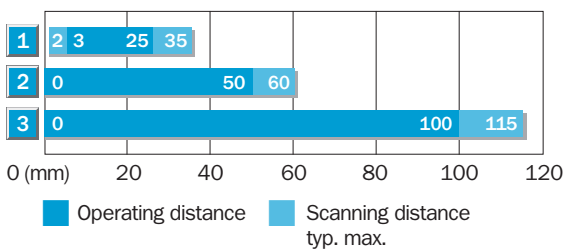
¹⁾ Object with 90 % remission (based on standard white to DIN 5033)
²⁾ Average service life 100,000 h

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

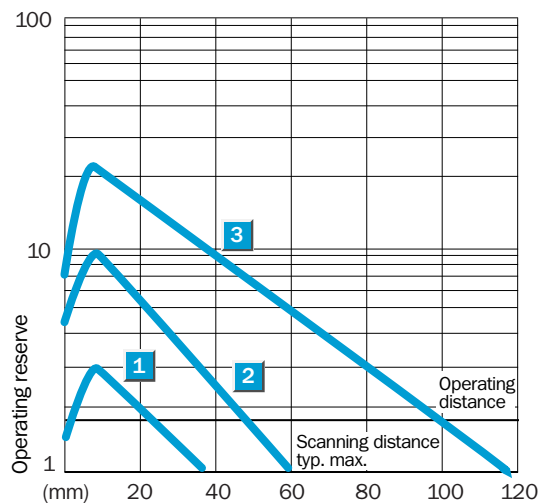
network max. 8 A
⁴⁾ may not exceed or fall short of V_s tolerances

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



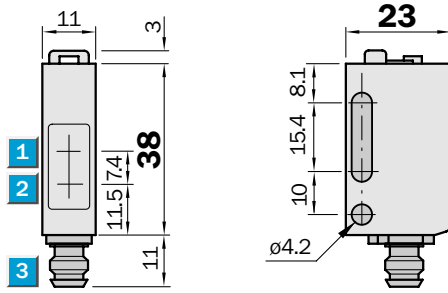
Ordering information

Type	Order no.
WT160-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

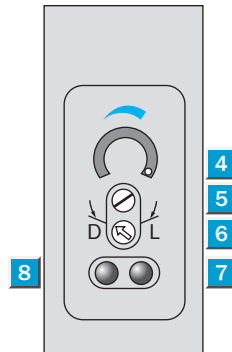

Scanning distance
0 ... 115 mm
Photoelectric proximity switch

- 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

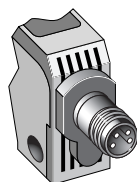


- 1 Centre of optical axis, receiver
- 2 Centre of optical axis, sender
- 3 Connector
- 4 Scaling 270°
- 5 Sensitivity adjuster
- 6 Light/dark rotary switch:
L = light switching
D = dark switching
- 7 LED indicator orange: switching output active
- 8 LED indicator green: light reception with operating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

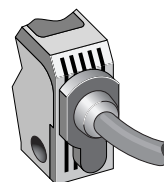
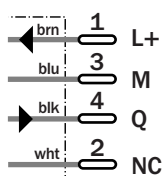


Connection type

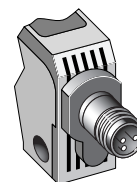
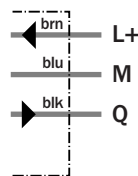
WT160-E460	WT160-E162	WT160-E360
WT160-F460	WT160-F162	WT160-F360



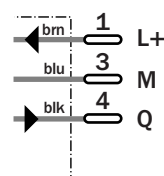
M8, 4-pin



3 x 0.2 mm²



M8, 3-pin



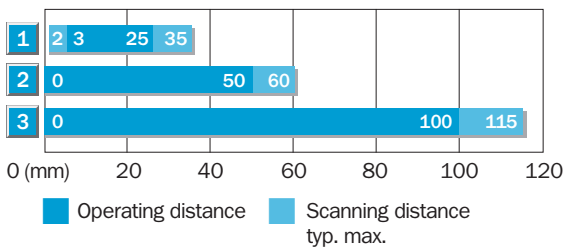
See chapter Accessories

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

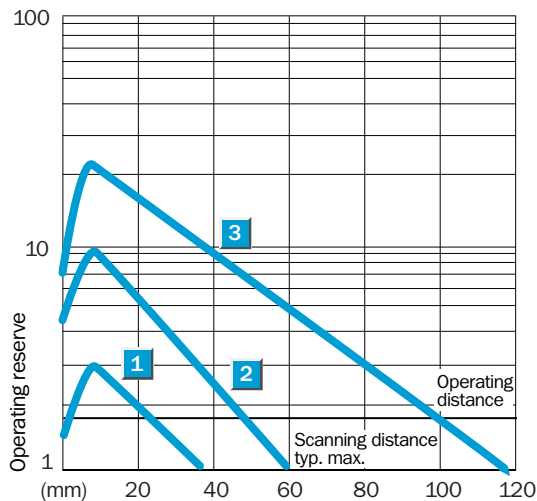
Technical specifications		WT160-	E162	E360	E460	F162	F360	F460				
Scanning distance typ. max.	0 ... 115 mm ¹⁾											
Operating distance	0 ... 100 mm ¹⁾											
Adjustment of operating distance	Potentiometer, 2 rotations											
Light source, light type	LED, red light, 680 nm ²⁾											
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
³⁾ at T_a = +25 °C ⁴⁾ Limit values, reverse-polarity protected operation in short-circuit protected ⁵⁾ network max. 8 A ⁶⁾ without load
⁷⁾ may not exceed or fall short of V_s tolerances 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



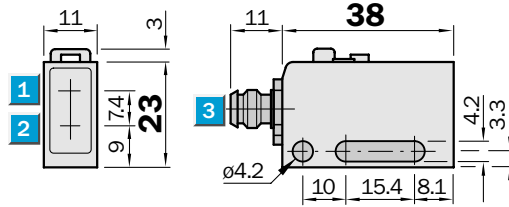
Ordering information	
Type	Order no.
WT160-E162	6 022 793
WT160-E360	6 022 797
WT160-E460	6 022 798
WT160-F162	6 022 801
WT160-F360	6 022 805
WT160-F460	6 022 806

Scanning range
0.01 ... 6.5 m

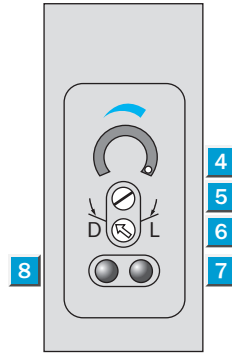
Photoelectric reflex switch

- 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

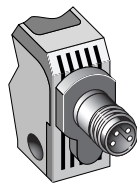


- 1 Centre of optical axis, receiver
- 2 Centre of optical axis, sender
- 3 Connector
- 4 Scaling 270°
- 5 Sensitivity adjuster
- 6 Light/dark rotary switch:
L = light switching
D = dark switching
- 7 LED indicator orange: switching output active
- 8 LED indicator green: light reception with operating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

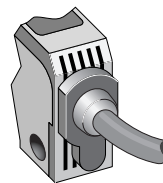
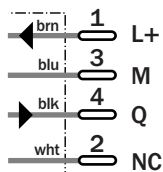


Connection type

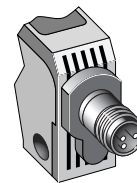
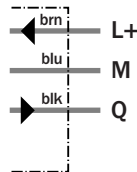
WL160-E430	WL160-E132	WL160-E330
WL160-F430	WL160-F132	WL160-F330



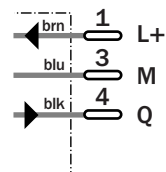
M8, 4-pin



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

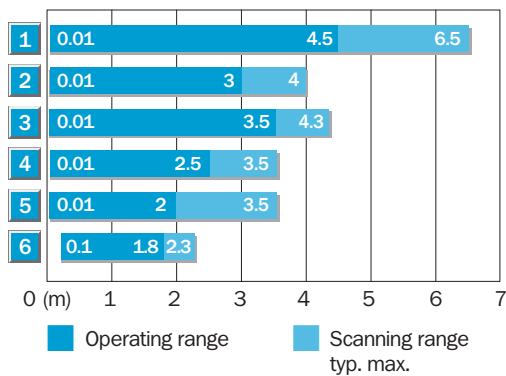
⁶⁾ with light/dark ratio 1:1 ⁷⁾ do not bend below 0 °C

²⁾ Limit values, reverse-polarity protected

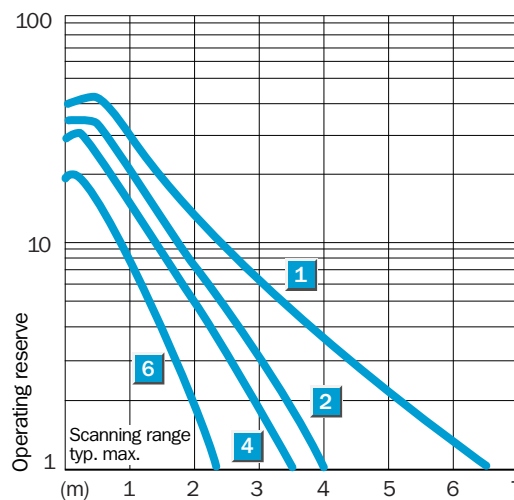
³⁾ may not exceed or fall short of

⁵⁾ Signal transit time with resistive load

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

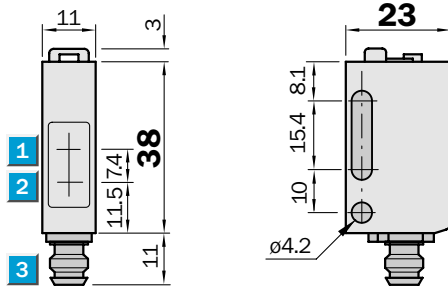
Type	Order no.
WL160-E132	6 022 759
WL160-E330	6 022 763
WL160-E430	6 022 764
WL160-F132	6 022 767
WL160-F330	6 022 771
WL160-F430	6 022 772

Scanning range
0.01 ... 6.5 m

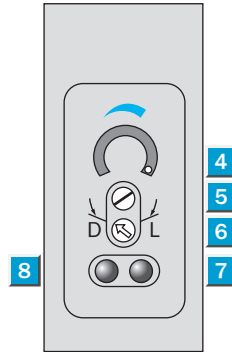
Photoelectric reflex switch

- 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

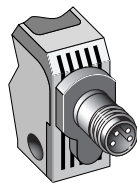


- 1 Centre of optical axis, receiver
- 2 Centre of optical axis, sender
- 3 Connector
- 4 Scaling 270°
- 5 Sensitivity adjuster
- 6 Light/dark rotary switch:
L = light switching
D = dark switching
- 7 LED indicator orange: switching output active
- 8 LED indicator green: light reception with operating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

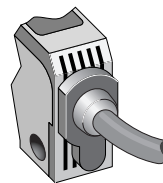
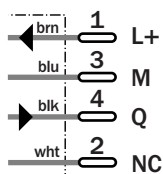


Connection type

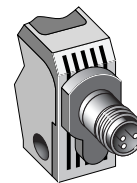
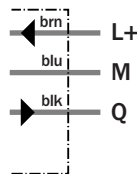
WL160-E440	WL160-E142	WL160-E340
WL160-F440	WL160-F142	WL160-F340



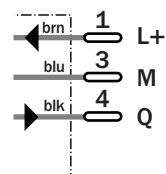
M8, 4-pin



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

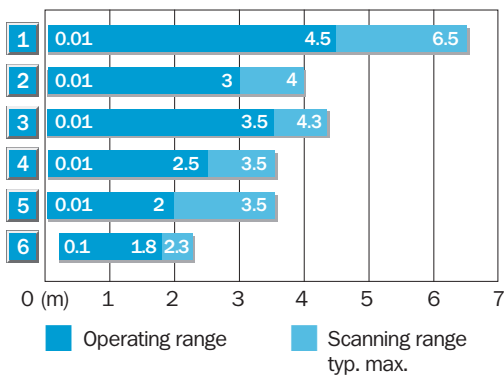
⁶⁾ with light/dark ratio 1:1

⁷⁾ do not bend below 0 °C

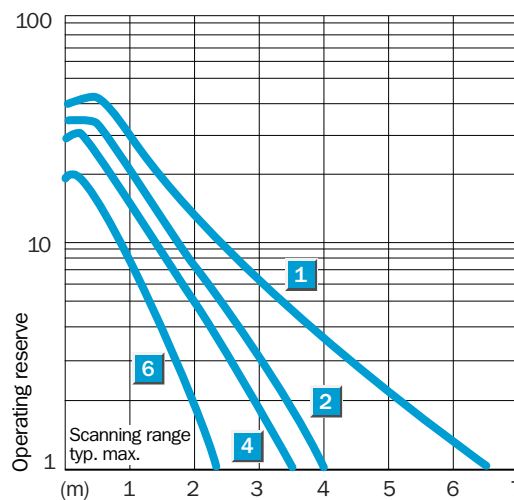
²⁾ Limit values, reverse-polarity protected

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

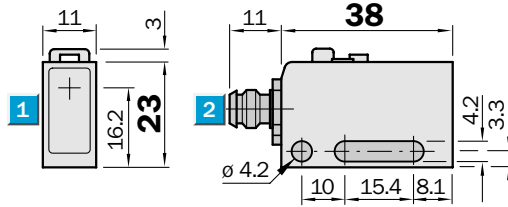


Scanning range
0 ... 15 m

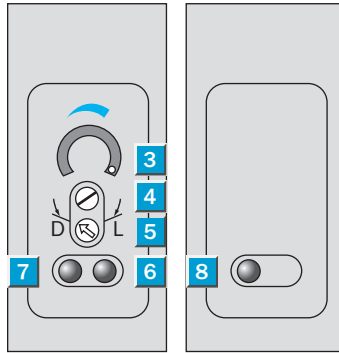
Through-beam photoelectric switch

- 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

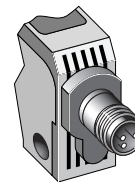
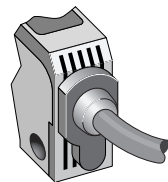
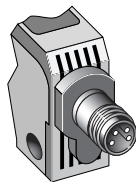


Connection type

WS/WE160-E430
WS/WE160-F430

WS/WE160-E132
WS/WE160-F132

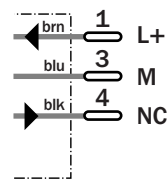
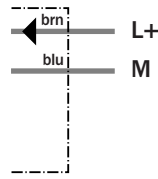
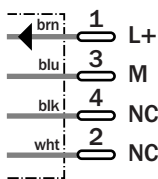
WS/WE160-E330
WS/WE160-F330



Sender M8, 4-pin

2 x 0.2 mm²

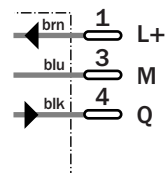
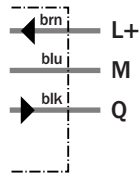
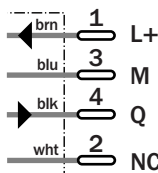
M8, 3-pin



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

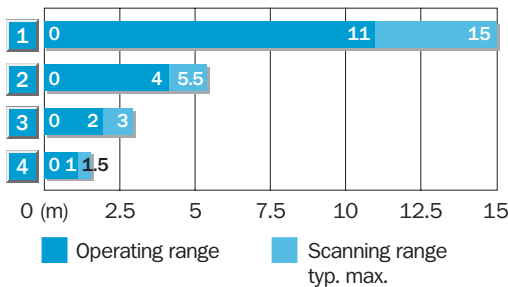
³⁾ may not exceed or fall short of

V_s tolerances
⁴⁾ without load

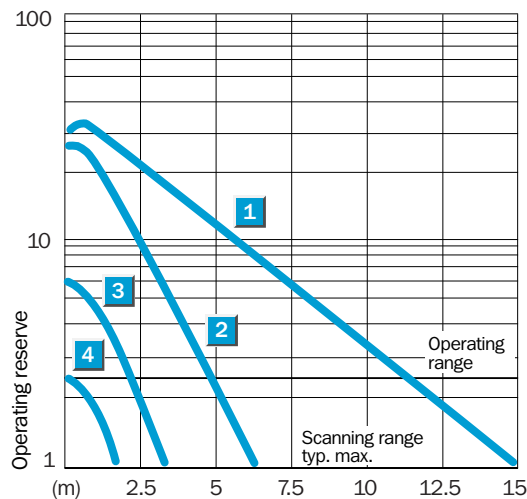
⁵⁾ Signal transit time with resistive load

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

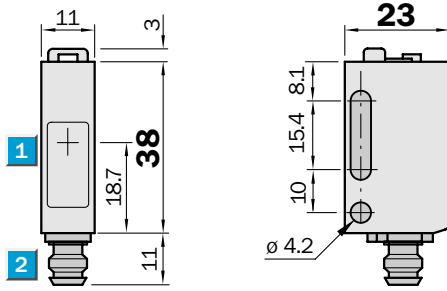
Type	Order no.
WS/WE160-E132	6 022 743
WS/WE160-E330	6 022 747
WS/WE160-E430	6 022 748
WS/WE160-F132	6 022 751
WS/WE160-F330	6 022 755
WS/WE160-F430	6 022 756

Scanning range
0 ... 15 m

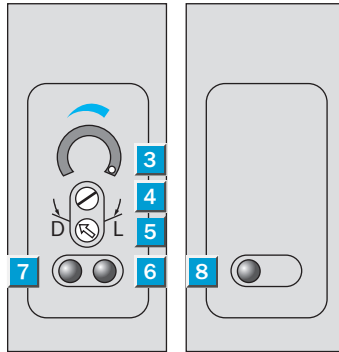
Through-beam photoelectric switch

- 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



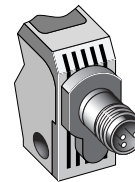
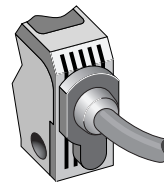
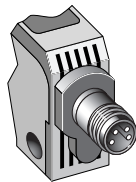
Sender/receiver



- 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

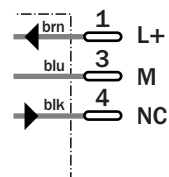
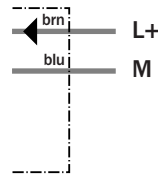
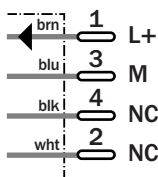
WS/WE160-E440	WS/WE160-E142	WS/WE160-E340
WS/WE160-F440	WS/WE160-F142	WS/WE160-F340



Sender M8, 4-pin

2 x 0.2 mm²

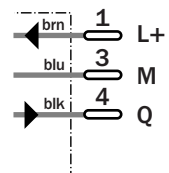
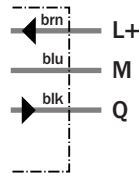
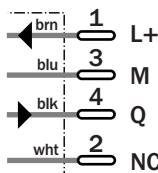
M8, 3-pin



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

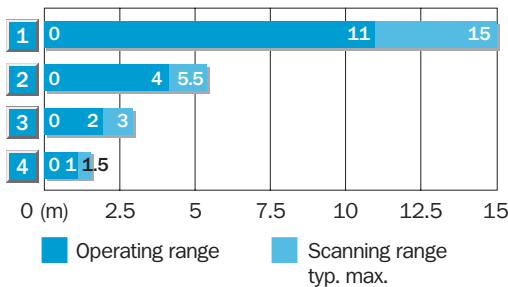
⁴⁾ without load

⁵⁾ Signal transit time with resistive load

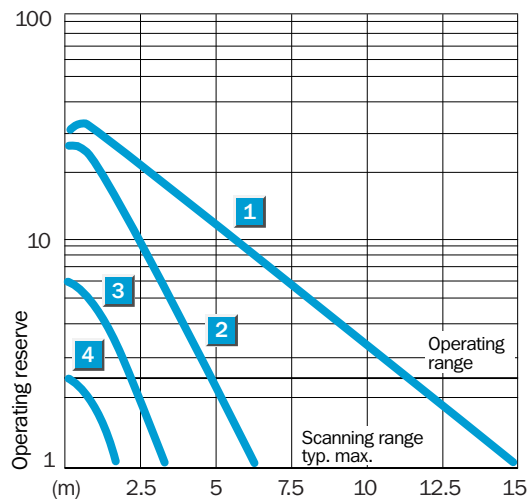
⁶⁾ with light/dark ratio 1:1

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



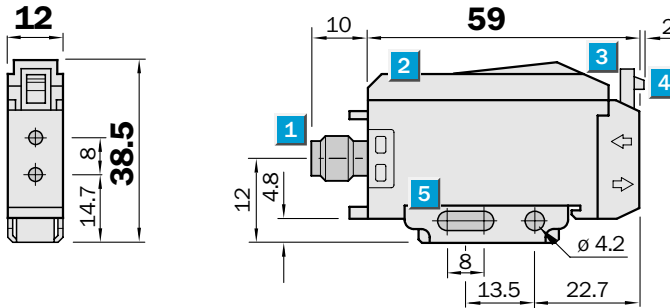
Ordering information

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

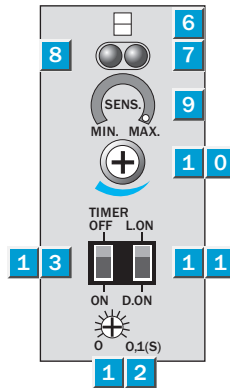
	Scanning distance 0 ... 70
	Scanning range 0 ... 2.000 mm
Proximity switch with fibre optic cables	

- 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

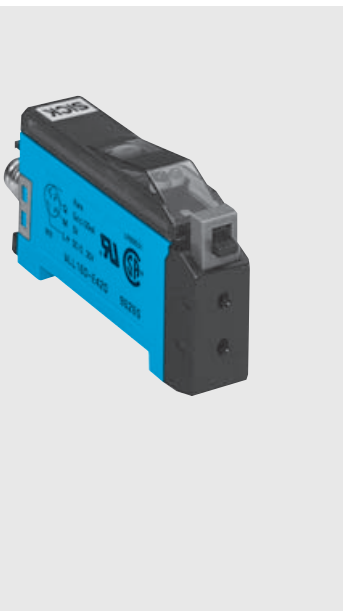
Dimensional drawing



Adjustments possible



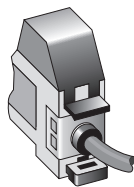
- 1 Connector
- 2 Protective hood
- 3 Locking the fiber-optic cables (press down)
- 4 Releasing the fiber-optic cables (press lug)
- 5 Mounting bracket (included in delivery)
- 6 Indication of correct fiber-optic cable mounting
- 7 LED indicator red (lights when switching threshold is exceeded)
- 8 LED 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



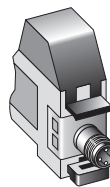
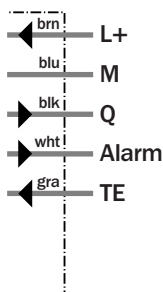
Connection type

WLL160-E122
WLL160-F122

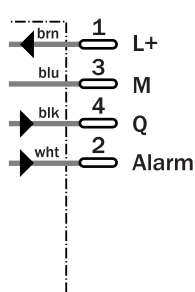
WLL160-E420
WLL160-F420



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

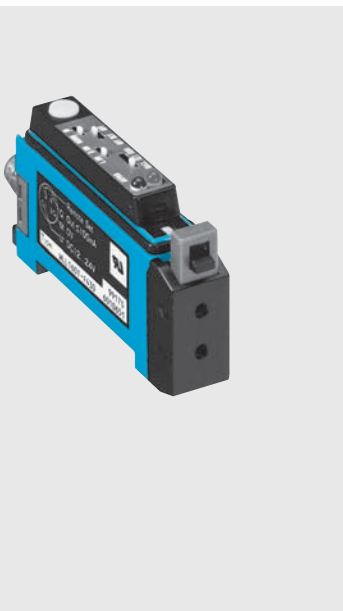
⁹⁾ do not bend below 0 °C

Ordering information

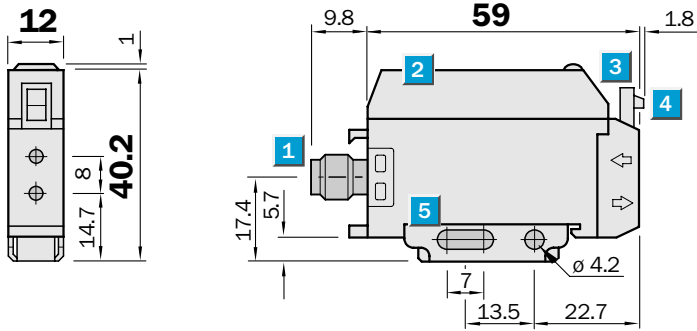
Type	Order no.
WLL160-E122	6 009 981
WLL160-E420	6 009 982
WLL160-F122	6 009 989
WLL160-F420	6 009 990

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

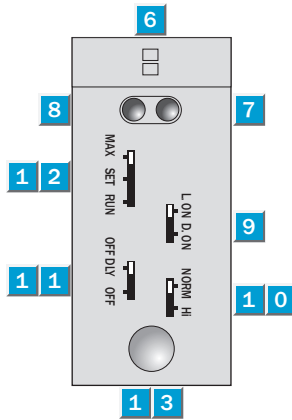
- Automatic setting of the switching threshold and hysteresis with Teach-In per push button or via external control wire ET
- Large selection of LL3 plastic fiber-optic cables
- Switching frequency 830/s or 1660/s, switchable



Dimensional drawing



Adjustments possible



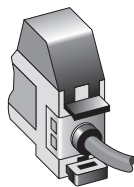
- 1 Connector
- 2 Protective hood
- 3 Lock the fiber-optic cables (press down)
- 4 Release the fiber-optic cables (press lug)
- 5 Mounting bracket, supplied with equipment
- 6 Indication of correct fiber-optic cable mounting
- 7 LED signal strength indicator, red (lights when switching threshold is exceeded)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



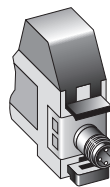
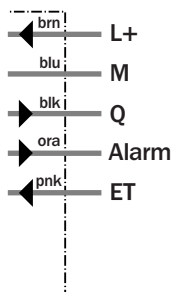
Connection type

WLL160T-E132
WLL160T-F132

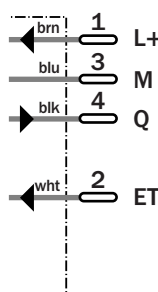
WLL160T-E430
WLL160T-F430



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