

W160T: With the smallest LED light spot



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.

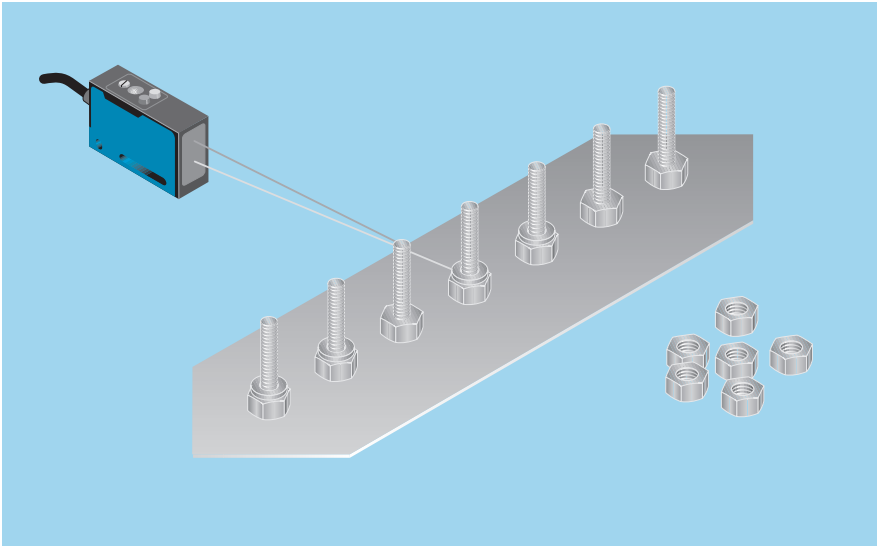
The W160T devices are especially successful in the application fields:

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

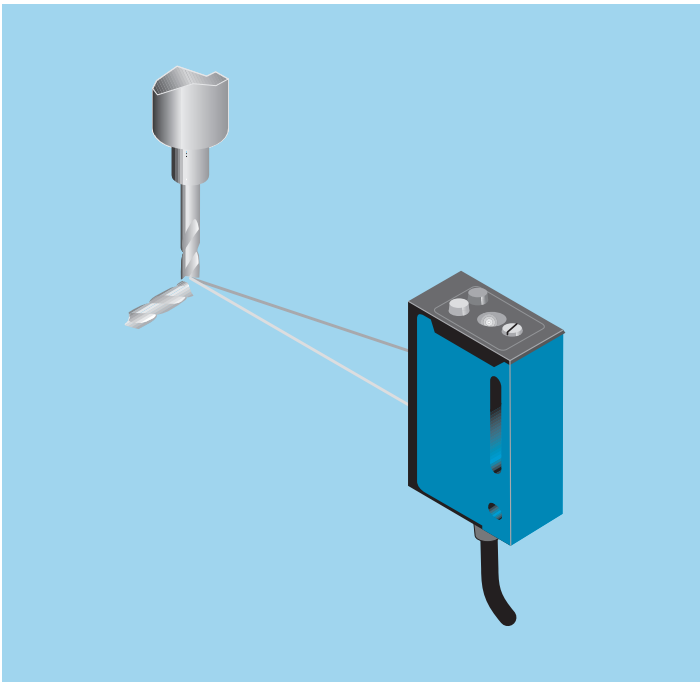
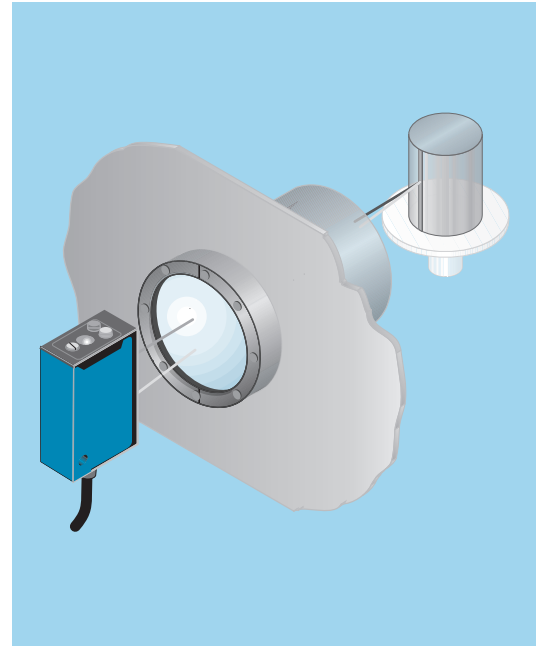
	BGS Photoelectric proximity switches
	Photoelectric proximity switches mark sensor
	Photoelectric proximity switches energetic
	Photoelectric reflex switches

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.

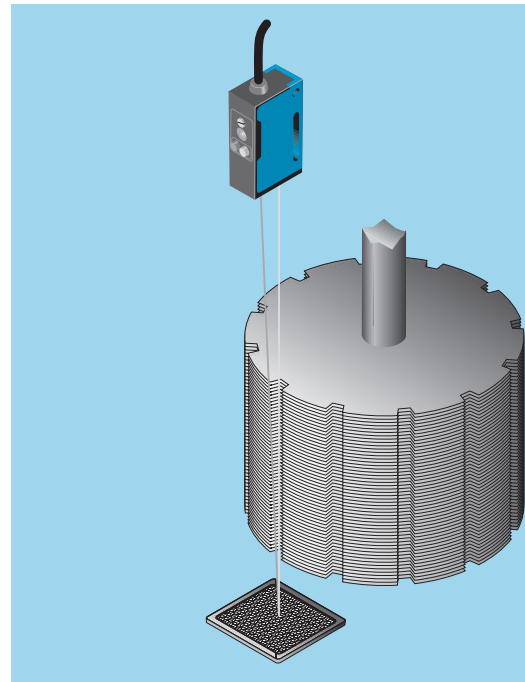
SICK



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

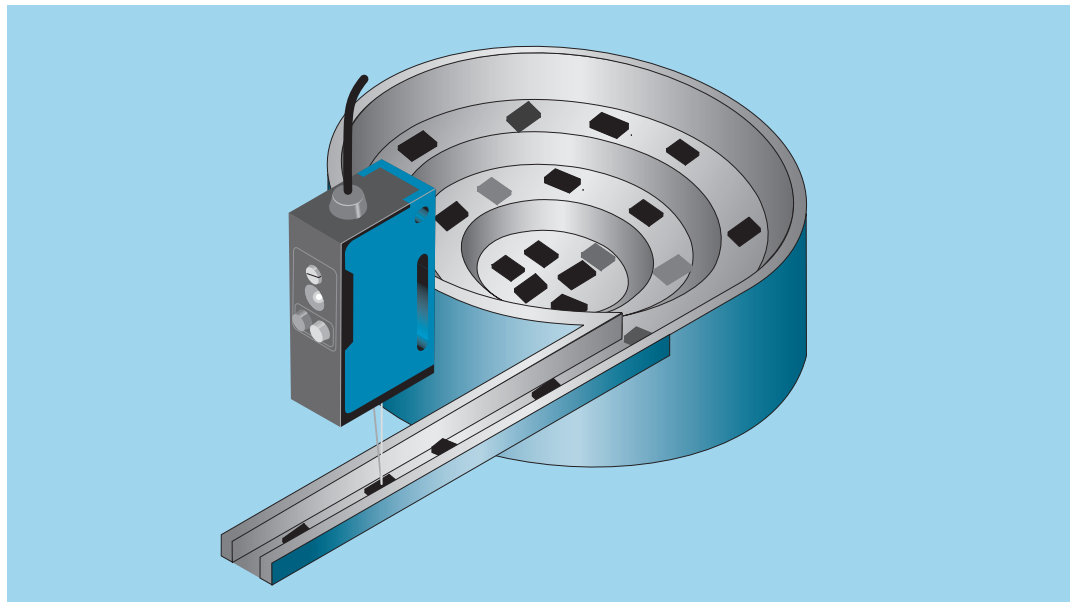


▲ Monitoring of tool imprints, e.g., in printed circuit board manufacturing. The WTB160T BGS detects the smallest drills reliably down to 0.3 mm diameter.

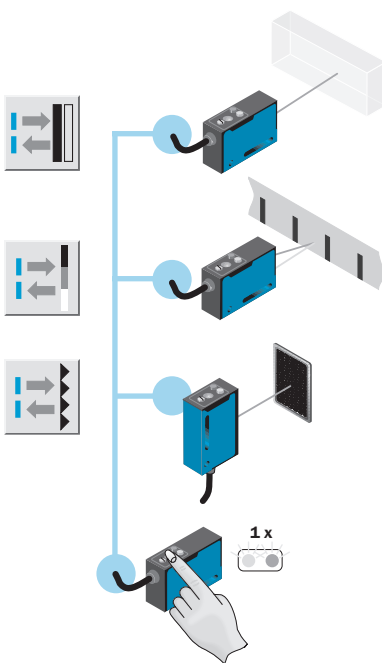
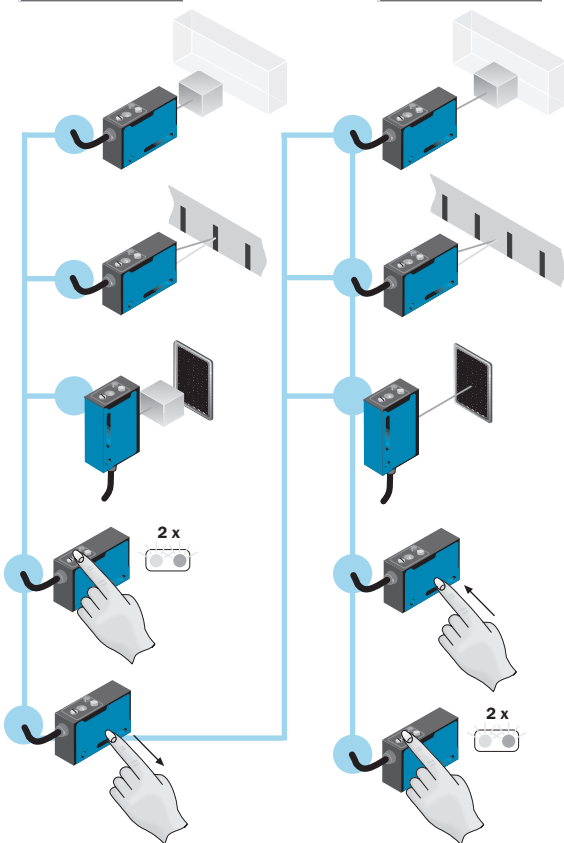
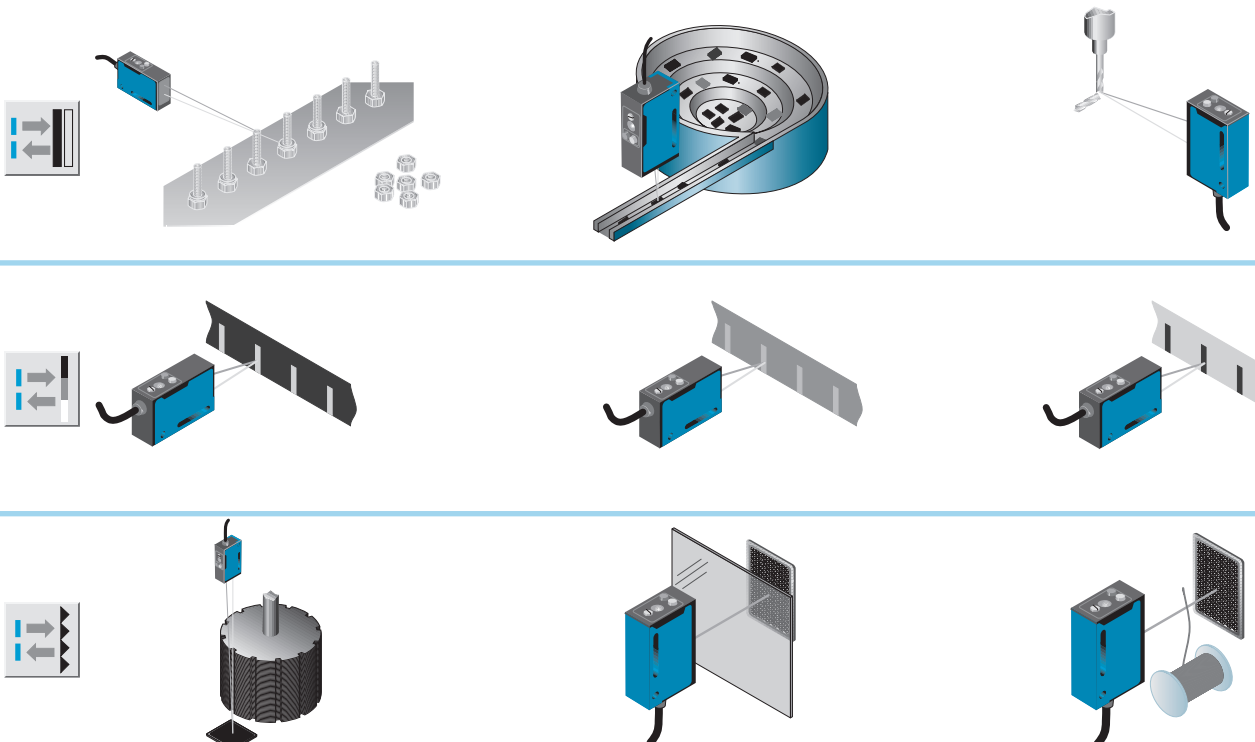


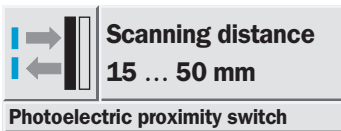
▲ The focused photoelectric proximity switch WTF160T checks the orientation of a groove in a vacuum chamber over a large distance.

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



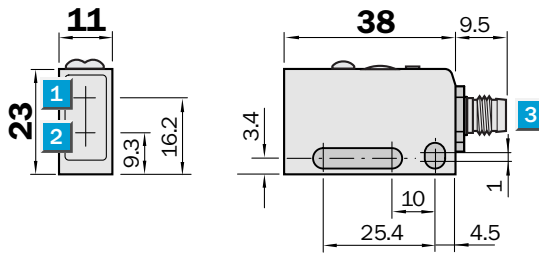
► The WTM160T Mark photoelectric proximity switch distinguishes the front and back sides of components in a vibration conveyor.

	Teach-in		
	1-point Teach-in:	2-point Teach-in:	Position Teach-in
Condition			
Teach-in			
Status	 Background will <i>just not</i> be detected.	 Dark mark will <i>just not</i> be detected.	 Reflector is detected <i>with reserve</i> .
	 Background will <i>just not</i> be detected.	 Dark mark will <i>just not</i> be detected.	 Reflector is detected <i>with reserve</i> .
	 Background will <i>just not</i> be detected.	 Dark mark will <i>just not</i> be detected.	 Reflector is detected <i>with reserve</i> .
Application			



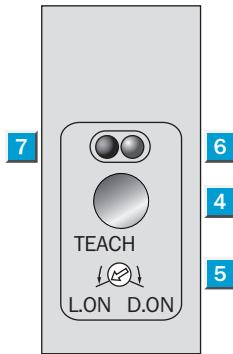
- Horizontal models
- Very small light spot to detect smallest objects
- Scanning distance adjustable via teach-in
- Precise background suppression
- LED indicator: function reserve

Dimensional drawing



Adjustments possible

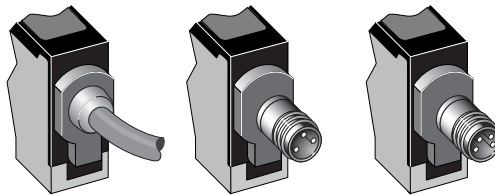
All types



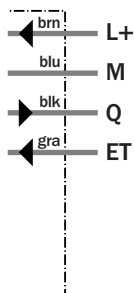
- 1 Centre of optical axis, receiver
- 2 Centre of optical axis, sender
- 3 Plug M8, 3/4-pin or connection cable
- 4 Teach-in button
- 5 Light/dark rotary switch:
L = light switching
D = dark switching
- 6 LED indicator orange: switching output active
- 7 LED indicator green: light reception with operating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

Connection type

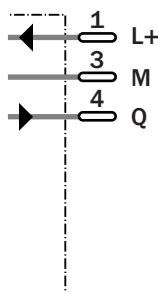
WTB160T-P212	WTB160T-P311	WTB160T-P412
WTB160T-N212	WTB160T-N311	WTB160T-N412



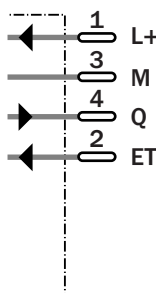
4 x 0.2 mm²



3-pin, M8



4-pin, M8



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

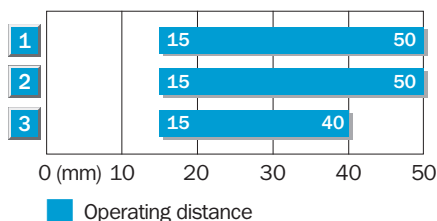
9) A = V_S connections reverse-polarity protected

B = Inputs and outputs reverse-polarity protected

C = Interference suppression

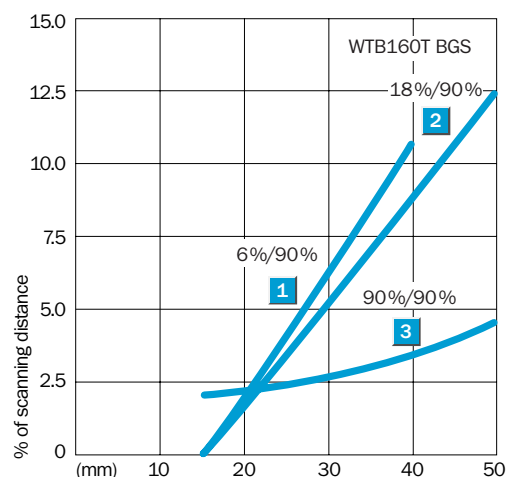
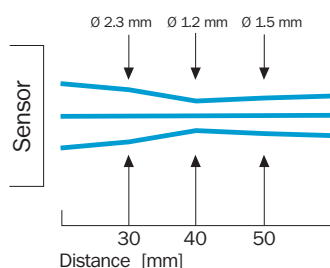
D = Outputs overcurrent and short-circuit protected

Scanning distance



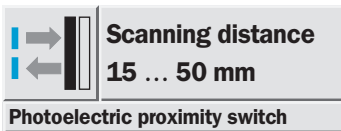
- 1 Scanning range on black, 6 % reflectance
- 2 Scanning range on grey, 18 % reflectance
- 3 Scanning range on white, 90 % reflectance

Light spot diameter WTB160T HGA



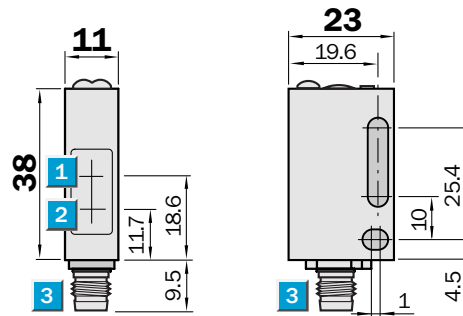
Order information

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



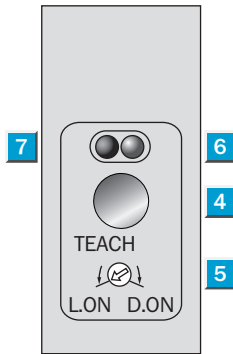
- Vertical models
- Very small light spot to detect smallest objects
- Scanning distance adjustable via teach-in
- Precise background suppression
- LED indicator: function reserve

Dimensional drawing



Adjustments possible

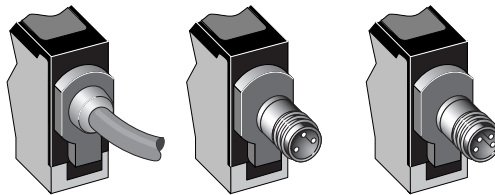
All types



- 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

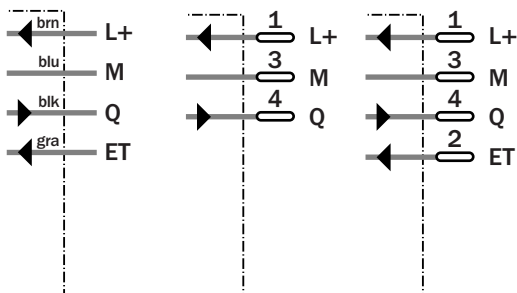
WTB160T-F212	WTB160T-F311	WTB160T-F412
WTB160T-E212	WTB160T-E311	WTB160T-E412



4 x 0.2 mm²

3-pin, M8

4-pin, M8



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

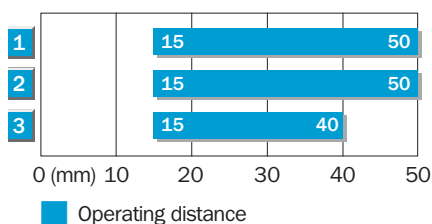
9) A = V_S connections reverse-polarity protected

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C = Interference suppression

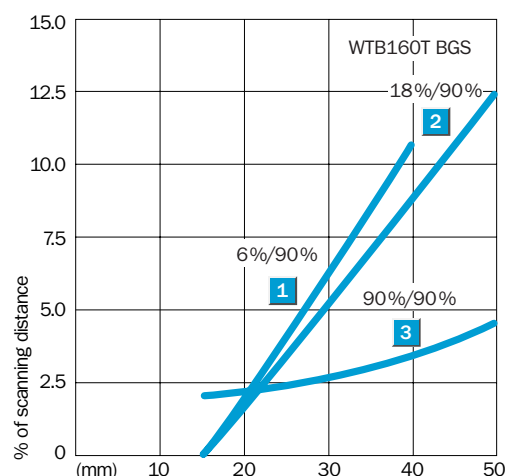
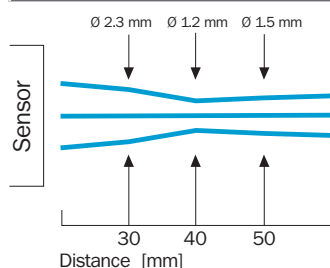
D = Outputs overcurrent and short-circuit protected

Scanning distance



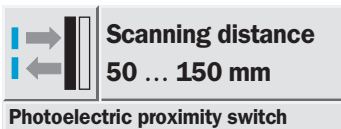
- 1 Scanning range on black, 6 % reflectance
- 2 Scanning range on grey, 18 % reflectance
- 3 Scanning range on white, 90 % reflectance

Light spot diameter WTB160T HGA



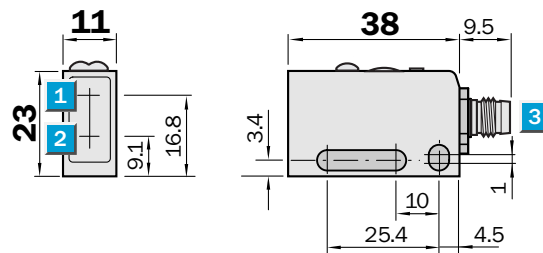
Order information

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



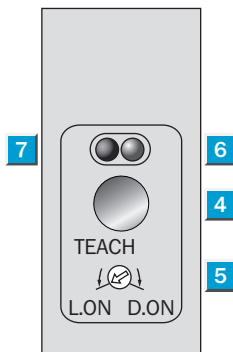
- Horizontal models
- Large scanning distance (150 mm)
- Scanning distance adjustable via teach-in
- Additional teach-in mode for shiny and structured surfaces
- LED indicator: function reserve

Dimensional drawing



Adjustments possible

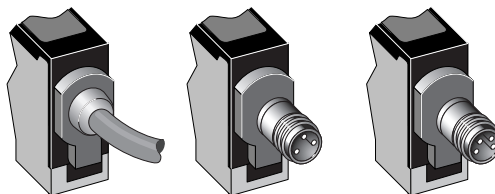
All types



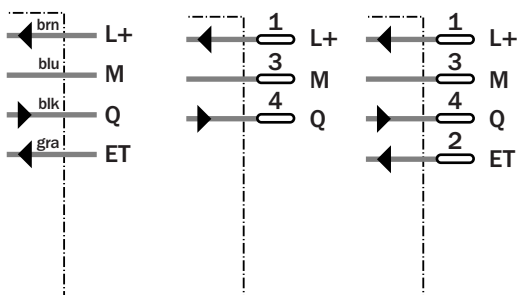
- 1 Centre of optical axis, receiver
- 2 Centre of optical axis, sender
- 3 Plug M8, 3/4-pin or connection cable
- 4 Teach-in button
- 5 Light/dark rotary switch:
L = light switching
D = dark switching
- 6 LED indicator orange: switching output active
- 7 LED indicator green: light reception with operating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

Connection type

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



4 x 0.2 mm²	3-pin, M8	4-pin, M8
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Accessories

Cables and connectors

Mounting systems *

* Mounting bracket included with delivery

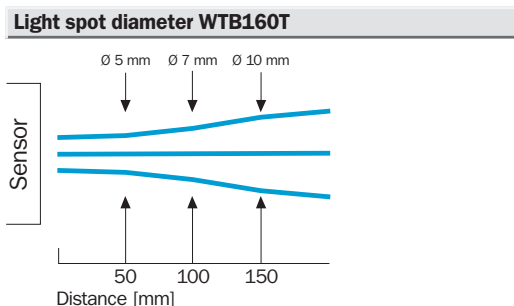
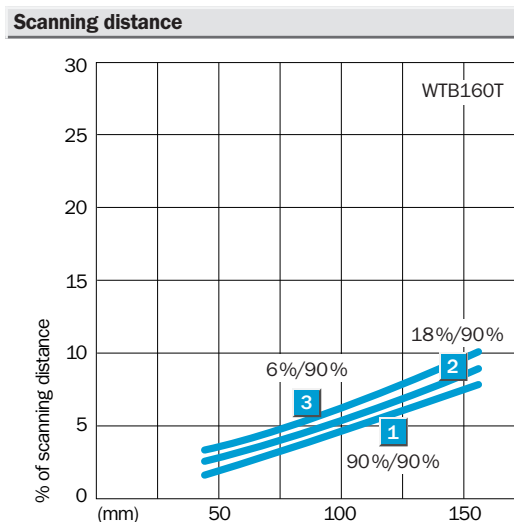
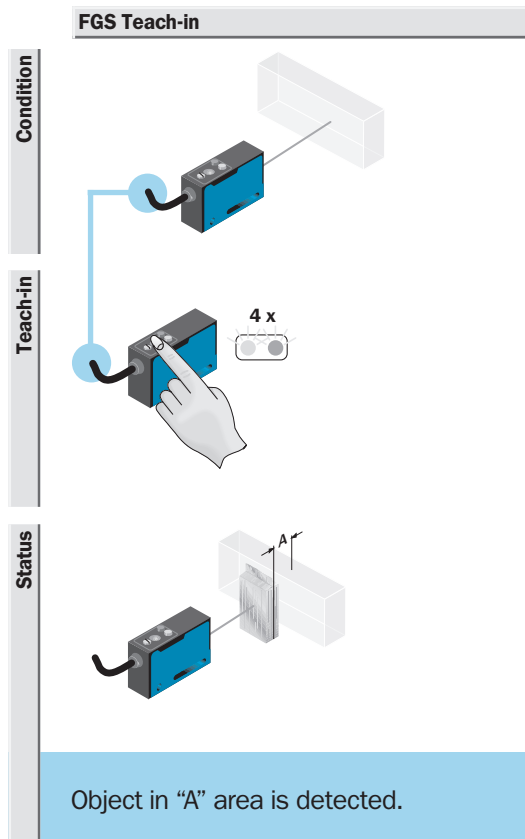
Technical data		WTB160T-	P232	P331	P432	N232	N331	432				
Scanning distance, max. typical	20 ... 150 mm ¹⁾											
Operating distance	50 ... 150 mm ¹⁾											
Adjustment of operating distance	Teach-in											
External Teach (ET)												
Light source ²⁾	LED, red light, 700 nm											
Light spot diameter	10 mm at 150 mm distance											
Supply voltage V_S	10 ... 30 V DC ³⁾											
Residual ripple ⁴⁾	$\pm 10\%$											
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 , $\varnothing$ 4.2 mm											
plug	M8, 3-pin											
plug	M8, 4-pin											
VDE protection class	II											
Circuit protection ⁹⁾	A, B, C, D											
Enclosure rating	IP 67 / IP 69K											
Ambient temperature	Operation $-25 \dots +55$ °C											
	Storage $-40 \dots +70$ °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

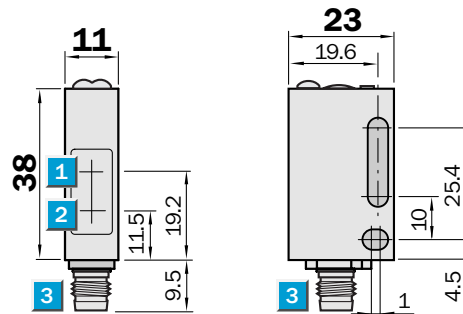


Order information	
Type	Order no.
WTB160T-P232	6021868
WTB160T-P331	6021867
WTB160T-P432	6021870
WTB160T-N232	6021872
WTB160T-N331	6021871
WTB160T-N432	6021874

	Scanning distance 50 ... 150 mm
Photoelectric proximity switch	

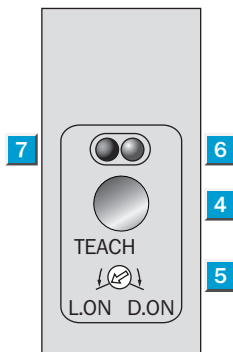
- Vertical models
- Large scanning distance (150 mm)
- Scanning distance adjustable via teach-in
- Additional teach-in mode for shiny and structured surfaces
- LED indicator: function reserve

Dimensional drawing



Adjustments possible

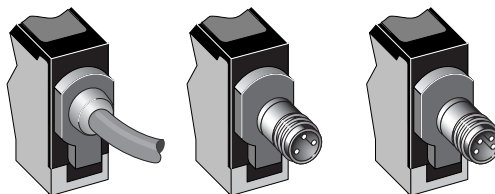
All types



- 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
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Connection type

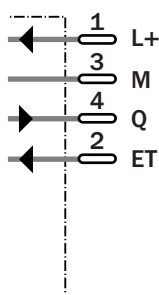
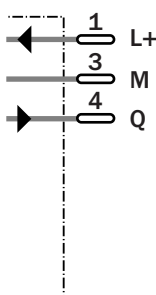
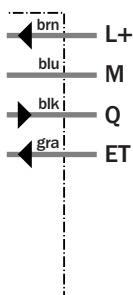
WTB160T-F232	WTB160T-F331	WTB160T-F432
WTB160T-E232	WTB160T-E331	WTB160T-E432



4 x 0.2 mm²

3-pin, M8

4-pin, M8



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⁾	$\pm 10\%$											
Current consumption ⁵⁾	$\leq 45\text{ mA}$											
Switching outputs	PNP, open collector: Q											
	NPN, open collector: Q											
Signal voltage PNP HIGH / LOW	$V_S - 1.8\text{ V}$ / approx. 0 V											
Signal voltage NPN HIGH / LOW	Approx. $V_S / < 1.8\text{ V}$											
Switching mode, adjustable	Light/dark switching per rotary switch											
Output current I_A max.	100 mA											
Response time ⁶⁾	$\leq 2.5\text{ ms}$											
Switching frequency max. ⁷⁾	200/s											
Connection type: cable	PVC, 2 m ⁸⁾ ; 4 x 0.2 mm ² , $\varnothing 4.2\text{ mm}$											
plug	M8, 3-pin											
plug	M8, 4-pin											
VDE protection class	II											
Circuit protection ⁹⁾	A, B, C, D											
Enclosure rating	IP 67 / IP 69K											
Ambient temperature	Operation $-25 \dots +55\text{ }^\circ\text{C}$											
	Storage $-40 \dots +70\text{ }^\circ\text{C}$											
Weight	With cable 2 m approx. 60 g											
	With plug M8 approx. 20 g											
Housing form	Vertical											
Housing material	Housing: PBT; Optic: PMMA											

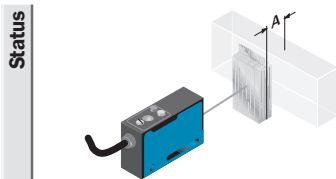
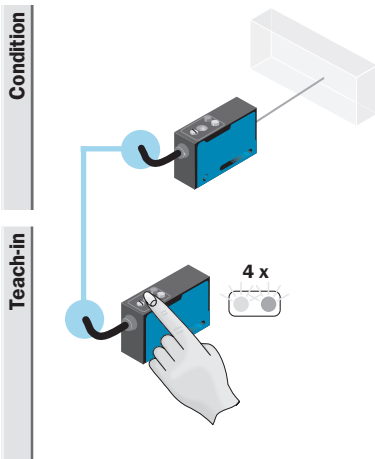
- ¹⁾ Object with 90% remission (with reference to standard white according to DIN 5033)
²⁾ Average service life 100,000 h at $T_A = +25\text{ }^\circ\text{C}$

- 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 $0\text{ }^\circ\text{C}$
⁹⁾ A = V_S connections reverse-polarity protected

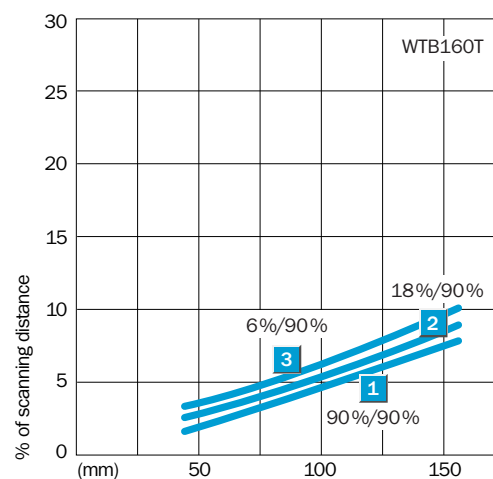
- B = Inputs and outputs reverse-polarity protected
C = Interference suppression
D = Outputs overcurrent and short-circuit protected

FGS Teach-in

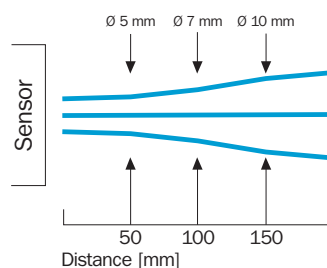


Object in "A" area is detected.

Scanning distance

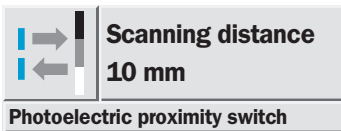


Light spot diameter WTB160T



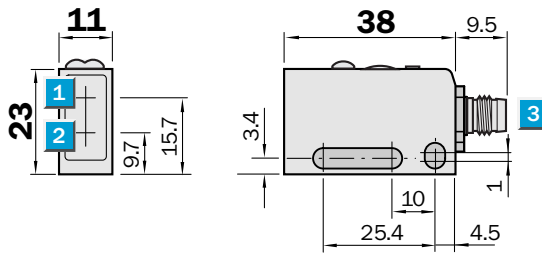
Order information

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



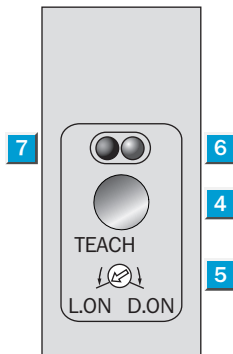
- Horizontal models
- Mark sensor
- Enclosure rating: IP 67
- Resolves ten gray levels
- LED indicator: function reserve

Dimensional drawing



Adjustments possible

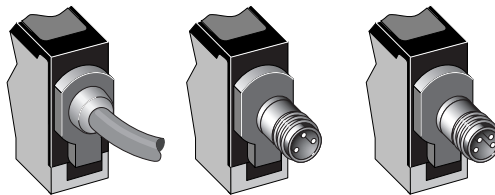
All types



- 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

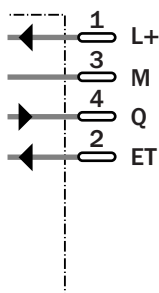
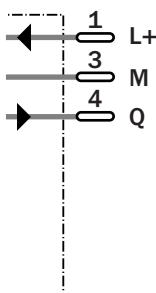
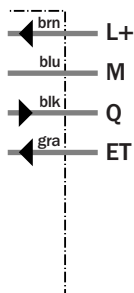
WTM160T-P292	WTM160T-P391	WTM160T-P492
WTM160T-N292	WTM160T-N391	WTM160T-N492



4 x 0.2 mm²

3-pin, M8

4-pin, M8



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	$V_S - 1.8 \text{ V}$ / approx. 0 V											
Signal voltage NPN HIGH / LOW	Approx. $V_S / < 1.8 \text{ V}$											
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 $T_A = + 25 \text{ °C}$
²⁾ Limit values, operation in short circuit protected network max. 8 A
³⁾ Must be within V_S tolerances

- ⁴⁾ Without load
⁵⁾ 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.

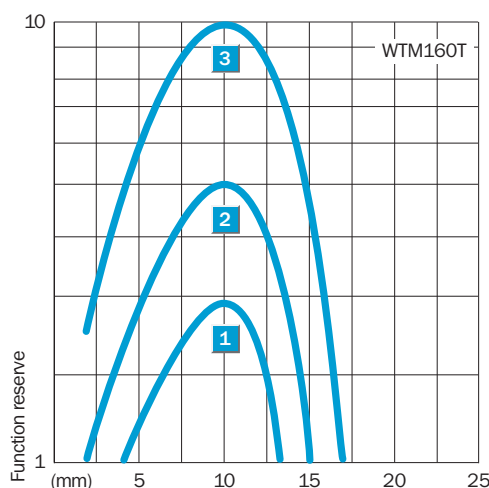
The following are not resolved:
33 N (25 %)/88 N (25 %),
33 N (25 %)/77 N (25 %),
33 N (25 %)/23 N (25 %),
43 N (50 %)/54 N (75 %),
43 N (25 %)/77 N (25 %),
43 N (25 %)/8 N (25 %),
54 N (50 %)/4 N (75 %), and
23 N (25 %)/77 N (25 %).

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 $\triangleq$ 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.

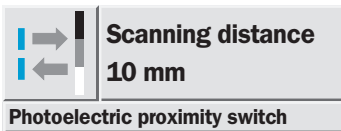
Scanning distance

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



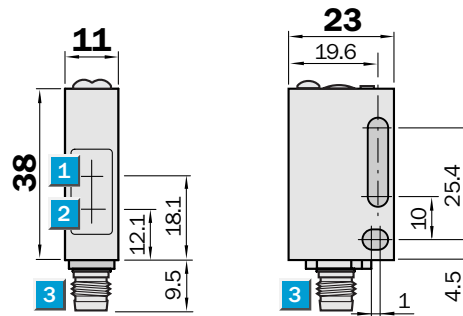
Order information

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



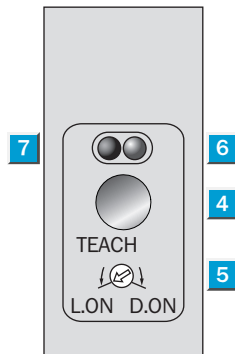
- Vertical models
- Mark sensor
- Enclosure rating: IP 67
- Resolves ten gray levels
- LED indicator: function reserve

Dimensional drawing



Adjustments possible

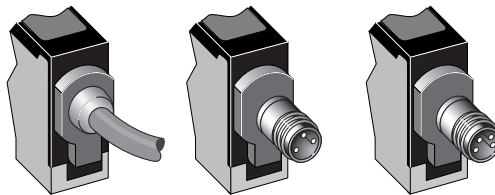
All types



- 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

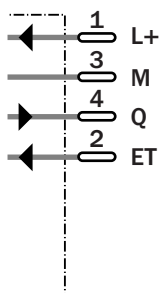
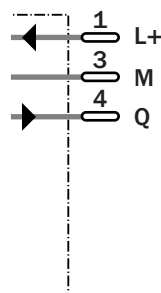
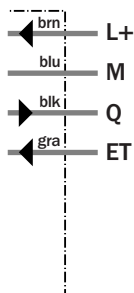
WTM160T-F292	WTM160T-F391	WTM160T-F492
WTM160T-E292	WTM160T-E391	WTM160T-E492



4 x 0.2 mm²

3-pin, M8

4-pin, M8



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	$V_S - 1.8 \text{ V}$ / approx. 0 V											
Signal voltage NPN HIGH / LOW	Approx. $V_S / < 1.8 \text{ V}$											
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 $T_A = + 25 \text{ °C}$
²⁾ Limit values, operation in short circuit protected network max. 8 A
³⁾ Must be within V_S tolerances

- ⁴⁾ Without load
⁵⁾ 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.

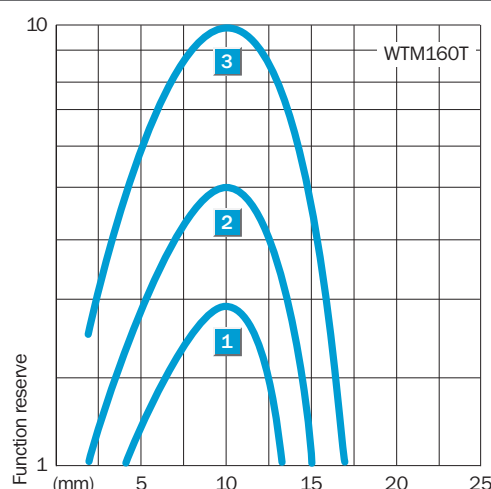
The following are not resolved:
33 N (25 %)/88 N (25 %),
33 N (25 %)/77 N (25 %),
33 N (25 %)/23 N (25 %),
43 N (50 %)/54 N (75 %),
43 N (25 %)/77 N (25 %),
43 N (25 %)/8 N (25 %),
54 N (50 %)/4 N (75 %), and
23 N (25 %)/77 N (25 %).

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 $\triangleq$ 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

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

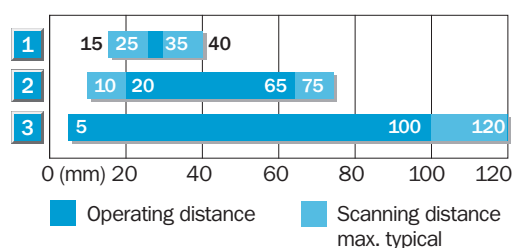
⁹⁾ A = V_S connections reverse-polarity protected

B = Inputs and outputs reverse-polarity protected

C = Interference suppression

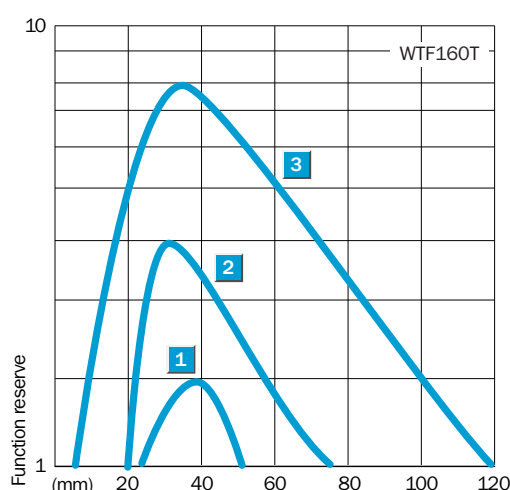
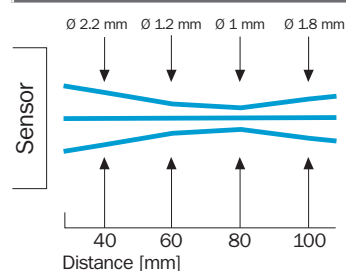
D = Outputs overcurrent and short-circuit protected

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



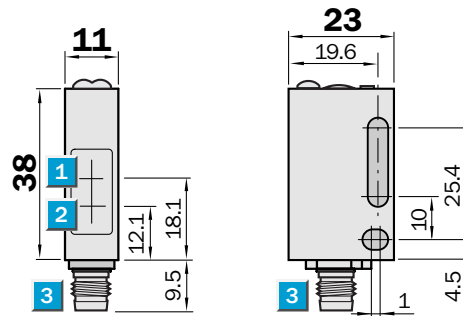
Order information

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	

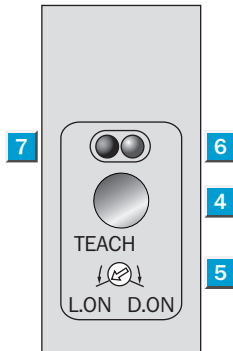
- Vertical models
- Detects small objects and contrast differences at a large distance (100 mm)
- Focused light beam
- LED indicator: function reserve

Dimensional drawing



Adjustments possible

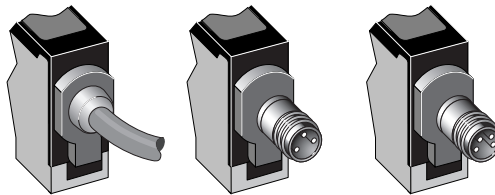
All types



- 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

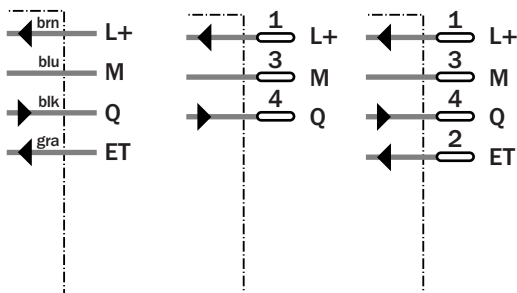
WTF160T-F212	WTF160T-F311	WTF160T-F412
WTF160T-E212	WTF160T-E311	WTF160T-E412



4 x 0.2 mm²

3-pin, M8

4-pin, M8



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 , 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 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

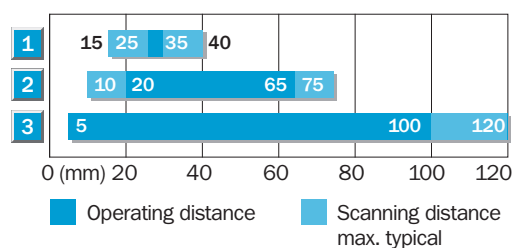
⁹⁾ A = V_S connections reverse-polarity
protected

B = Inputs and outputs reverse-
polarity protected

C = Interference suppression

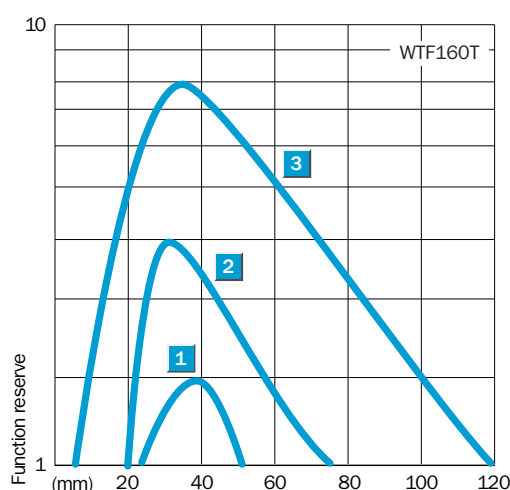
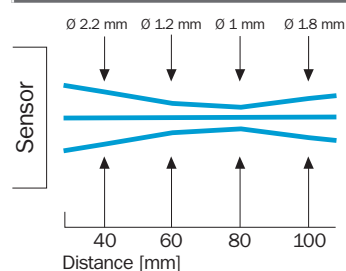
D = Outputs overcurrent and
short-circuit protected

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

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

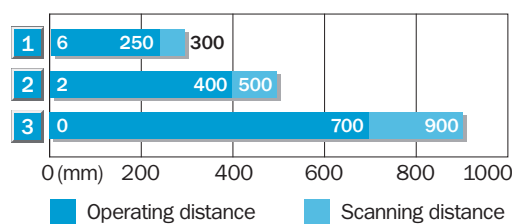
9) A = V_S connections reverse-polarity protected

B = Inputs and outputs reverse-polarity protected

C = Interference suppression

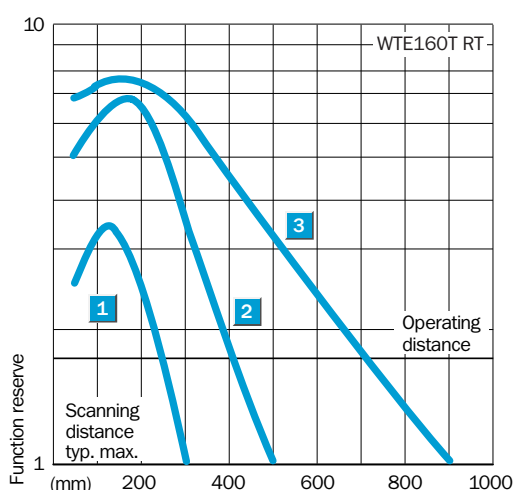
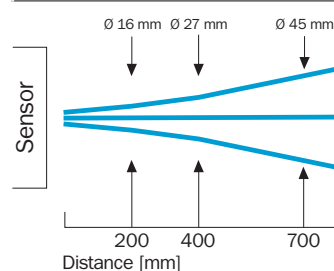
D = Outputs overcurrent and short-circuit protected

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



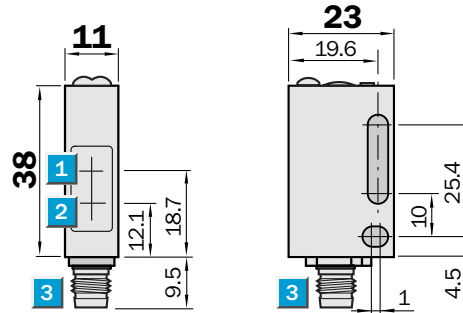
Order information

Type	Order no.
WTE160T-P232	6021884
WTE160T-P331	6021883
WTE160T-P432	6021886
WTE360T-N232	6021888
WTE160T-N331	6021887
WTE160T-N432	6021890

	Scanning distance 0 ... 900 mm
Photoelectric proximity switch	

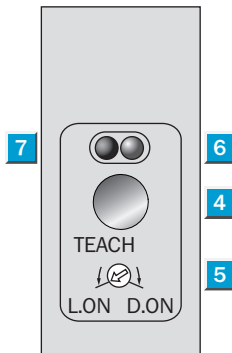
- Vertical models
- Large scanning distance
- Red light variant for standard applications
- LED indicator: function reserve

Dimensional drawing



Adjustments possible

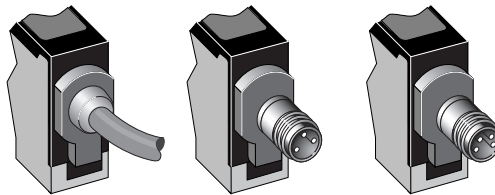
All types



- 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

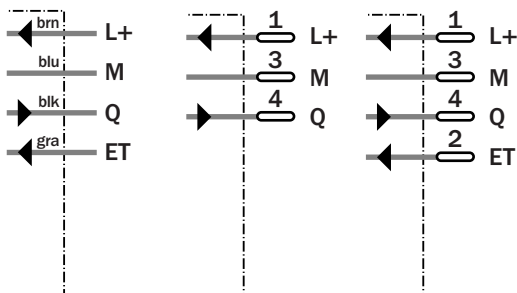
WTE160T-F232	WTE160T-F331	WTE160T-F432
WTE160T-E232	WTE160T-E331	WTE160T-E432



4 x 0.2 mm²

3-pin, M8

4-pin, M8



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) Bei Hell-Dunkel-Verhältnis 1:

8) 5 m are available on request, do not bend cable below 0 °C

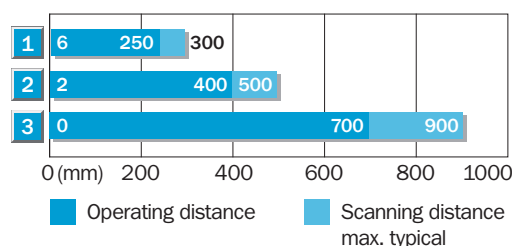
9) A = V_S connections reverse-polarity protected

B = Inputs and outputs reverse-polarity protected

C = Interference suppression

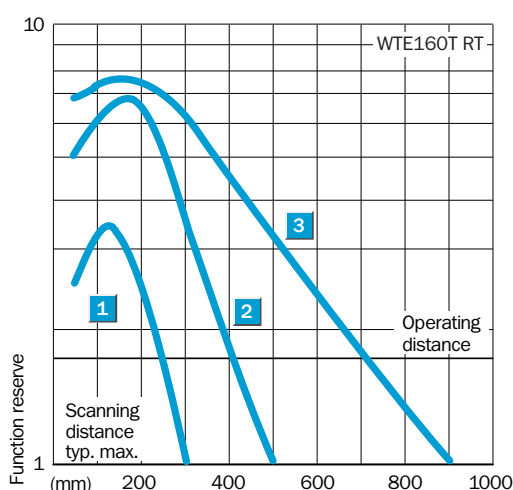
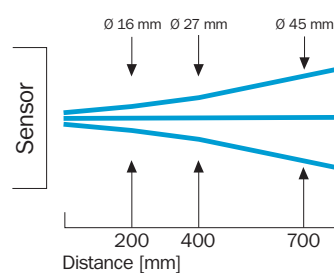
D = Outputs overcurrent and short-circuit protected

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



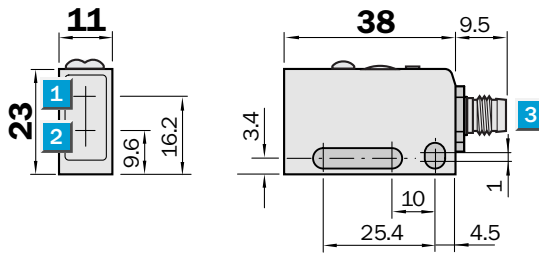
Order information

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	

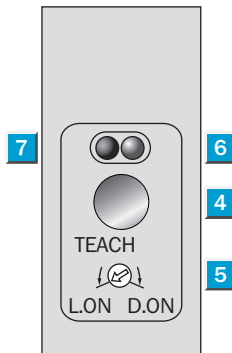
- Horizontal models
- Large scanning distance
- Infrared variant for objects with low reflectance
- LED indicator: function reserve

Dimensional drawing



Adjustments possible

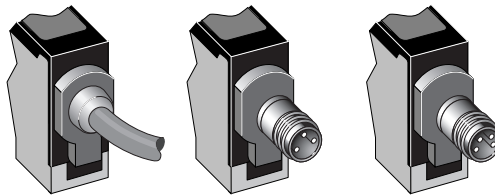
All types



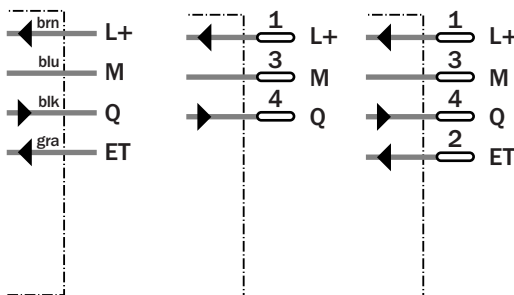
- 1 Centre of optical axis, receiver
- 2 Centre of optical axis, sender
- 3 Plug M8, 3/4-pin or connection cable
- 4 Teach-in button
- 5 Light/dark rotary switch:
L = light switching
D = dark switching
- 6 LED indicator orange: switching output active
- 7 LED indicator green: light reception with operating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

Connection type

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



4 x 0.2 mm ²	3-pin, M8	4-pin, M8
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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 source²⁾	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	$V_S - 1.8 \text{ V}$ / approx. 0 V											
Signal voltage NPN HIGH / LOW	Approx. $V_S / < 1.8 \text{ V}$											
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 $T_A = + 25 \text{ °C}$

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

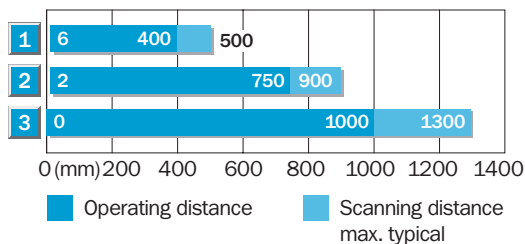
9) A = V_S connections reverse-polarity protected

B = Inputs and outputs reverse-polarity protected

C = Interference suppression

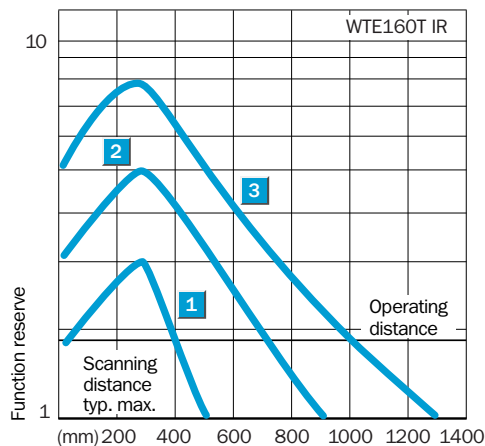
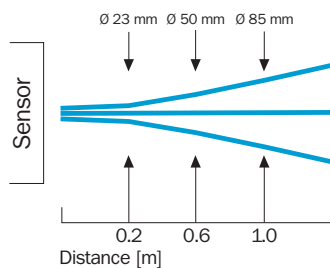
D = Outputs overcurrent and short-circuit protected

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



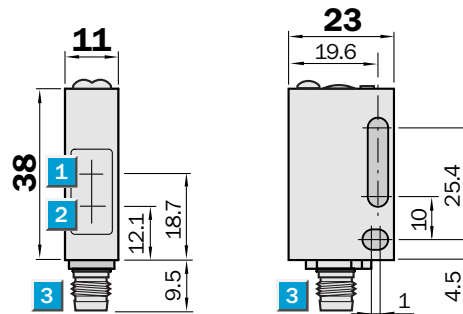
Order information

Type	Order no.
WTE160T-P262	6021900
WTE160T-P361	6021899
WTE160T-P462	6021902
WTE360T-N262	6021904
WTE160T-N361	6021903
WTE160T-N462	6021906

	Scanning distance 0 ... 1300 mm
Photoelectric proximity switch	

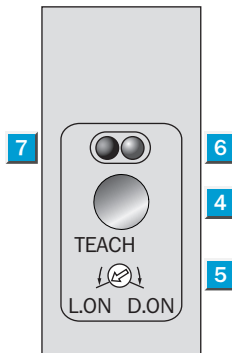
- Vertical models
- Large scanning distance
- Infrared variant for objects with low reflectance
- LED indicator: function reserve

Dimensional drawing



Adjustments possible

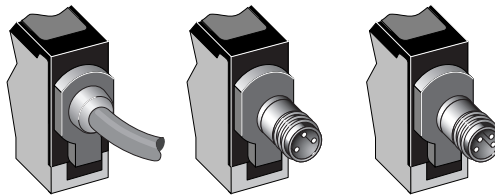
All types



- 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

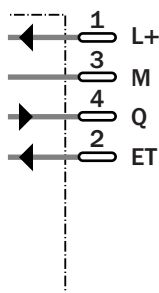
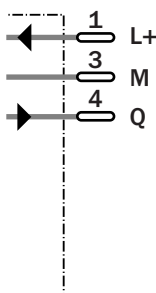
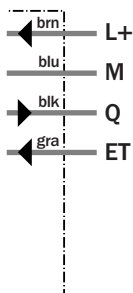
WTE160T-F262	WTE160T-F361	WTE160T-F462
WTE160T-E262	WTE160T-E361	WTE160T-E462



4 x 0.2 mm²

3-pin, M8

4-pin, M8



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

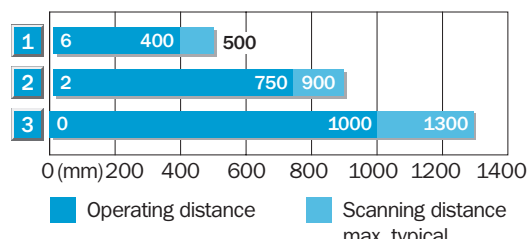
9) A = V_S connections reverse-polarity protected

B = Inputs and outputs reverse-polarity protected

C = Interference suppression

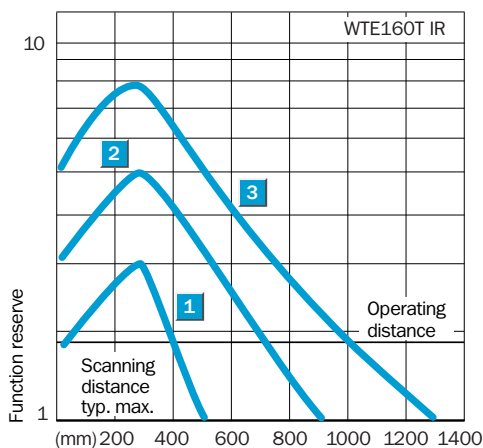
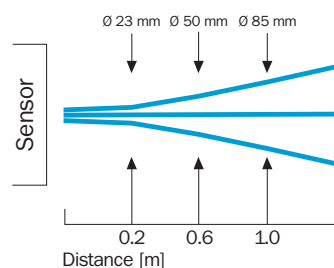
D = Outputs overcurrent and short-circuit protected

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



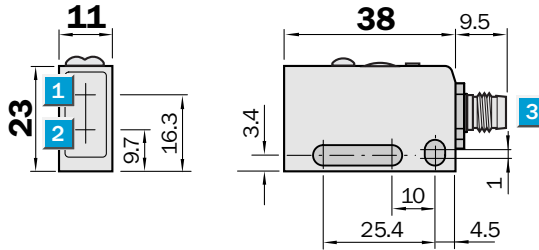
Order information

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	

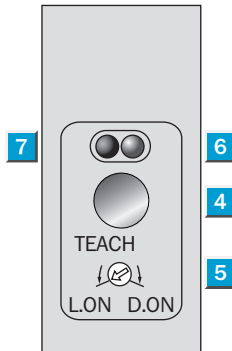
- Horizontal models
- Very small light spot
- Short response time
- Detection of transparent objects; min. attenuation 20%
- Detection of smallest objects
- LED indicator: function reserve

Dimensional drawing



Adjustments possible

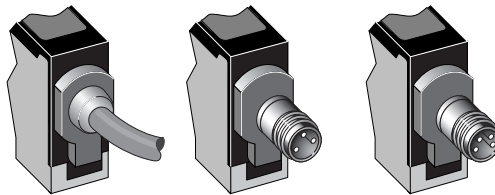
All types

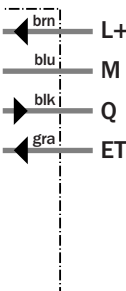
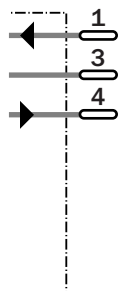
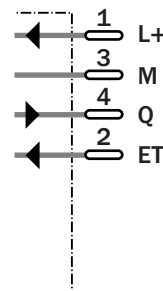


- 1 Centre of optical axis, receiver
- 2 Centre of optical axis, sender
- 3 Plug M8, 3/4-pin or connection cable
- 4 Teach-in button
- 5 Light/dark rotary switch:
L = light switching
D = dark switching
- 6 LED indicator orange: switching output active
- 7 LED indicator green: light reception with operating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

Connection type

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



4 x 0,2 mm ²	3-pin, M8	4-pin, M8
		



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	$V_S - 1.8 \text{ V}$ / 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⁾	≤ 0.2 ms											
Switching frequency max. ⁷⁾	2500/s											
Connection type: cable	PVC, 2 m ⁸⁾ ; 5 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											

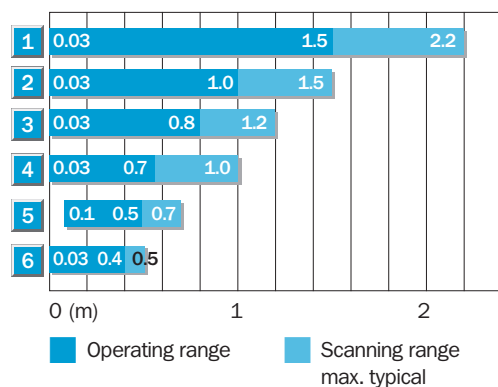
- 1) Average service life 100,000 h at $T_A = + 25 \text{ °C}$
 2) Detection of transparent objects
 3) Limit values, operation in short circuit protected network max. 8 A

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

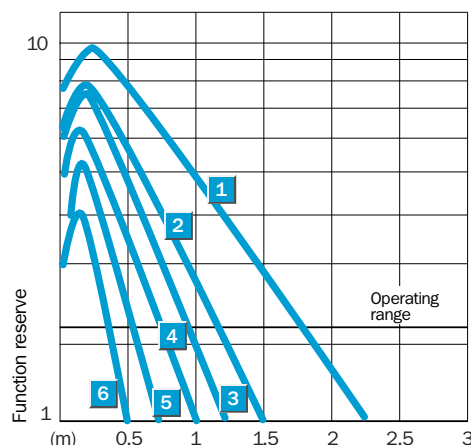
- 8) 5 m are available on request, do not bend cable below 0 °C
 9) A = V_S connections reverse-polarity protected

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

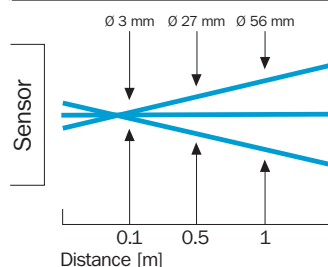
Scanning range and function reserve



	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



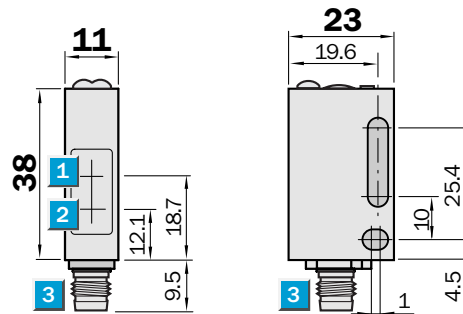
Order information

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

	Scanning range 2.2 m
Photoelectric reflex switch	

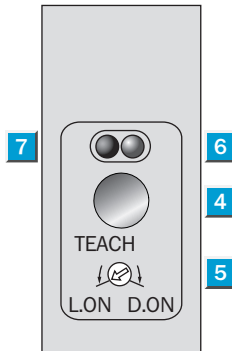
- Vertical models
- Very small light spot
- Short response time
- Detection of transparent objects; min. attenuation 20%
- Detection of smallest objects
- LED indicator: function reserve

Dimensional drawing



Adjustments possible

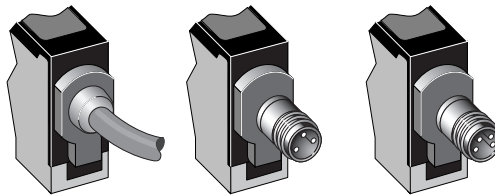
All types



- 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

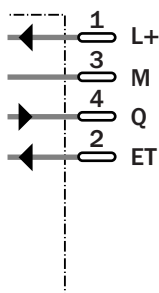
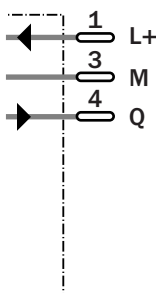
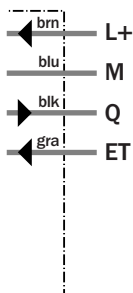
WL160T-F212	WL160T-F311	WL160T-F412
WL160T-E212	WL160T-E311	WL160T-E412



4 x 0.2 mm²

3-pin, M8

4-pin, M8



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	$V_S - 1.8 \text{ V}$ / 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⁾	≤ 0.2 ms											
Switching frequency max. ⁷⁾	2500/s											
Connection type: cable	PVC, 2 m ⁸⁾ ; 5 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											

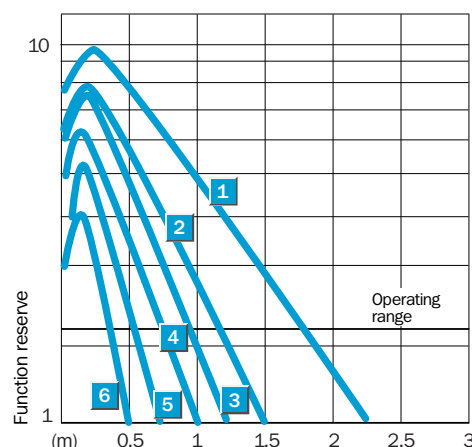
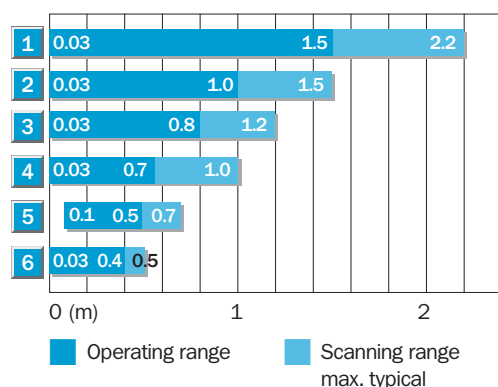
- 1) Average service life 100,000 h at $T_A = + 25 \text{ °C}$
 2) Detection of transparent objects
 3) Limit values, operation in short circuit protected network max. 8 A

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

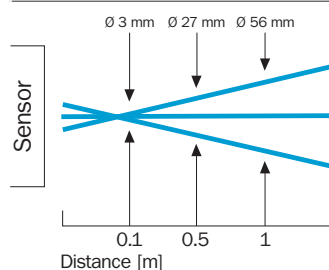
- 8) 5 m are available on request, do not bend cable below 0 °C
 9) A = V_S connections reverse-polarity protected

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

Scanning range and function reserve



Light spot diameter WL160T



Order information

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

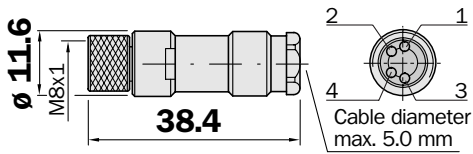
Reflector type	Operating range
1 PL80A	0.03 ... 1.5 m
2 P250/PL40/PL50A	0.03 ... 1.0 m
3 PL30A/31A	0.03 ... 0.8 m
4 PL20A	0.03 ... 0.7 m
5 Reflective tape Diamond Grade	0.1 ... 0.5 m
6 P45	0.03 ... 0.4 m

Dimensional drawings and order information

SENSICK screw-in system M8, 3- or 4-pin, enclosure rating IP 67

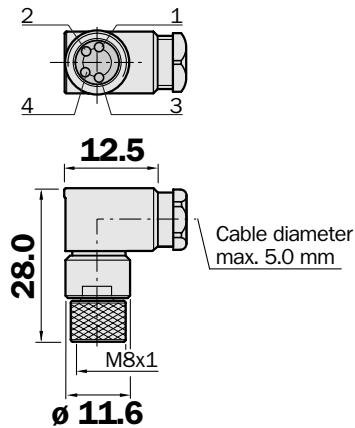
Female connector M8, 3- or 4-pin, straight

Type	Order no.	Contacts
DOS-0803-G	7902077	3
DOS-0804-G	6009974	4



Female connector M8, 3- or 4-pin, angled

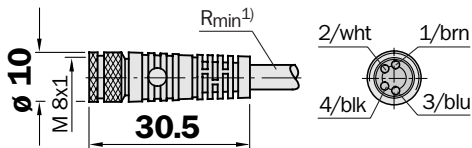
Type	Order no.	Contacts
DOS-0803-W	7902078	3
DOS-0804-W	6009975	4



Female connector M8, 3- or 4-pin, straight

3 x 0.34 mm² or 4 x 0.25 mm², sheath PVC

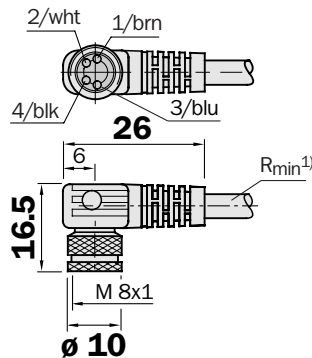
Type	Order no.	Contacts	Cable length
DOL-0803-G02M	6010785	3	2 m
DOL-0803-G05M	6022009	3	5 m
DOL-0803-G10M	6022011	3	10 m
DOL-0804-G02M	6009870	4	2 m
DOL-0804-G05M	6009872	4	5 m
DOL-0804-G10M	6010754	4	10 m



Female connector M8, 3- or 4-pin, angled

3 x 0.34 mm² or 4 x 0.25 mm², sheath PVC

Type	Order no.	Contacts	Cable length
DOL-0803-W02M	6008489	3	2 m
DOL-0803-W05M	6022010	3	5 m
DOL-0803-W10M	6022012	3	10 m
DOL-0804-W02M	6009871	4	2 m
DOL-0804-W05M	6009873	4	5 m
DOL-0804-W10M	6010755	4	10 m



¹⁾ Minimum bend radius in dynamic use
R_{min} = 20 x cable diameter

Dimensional drawings and order information

SENSICK screw-in system M8, 3- or 4-pin, enclosure rating IP 67

Female connector M8, 3- or 4-pin, straight

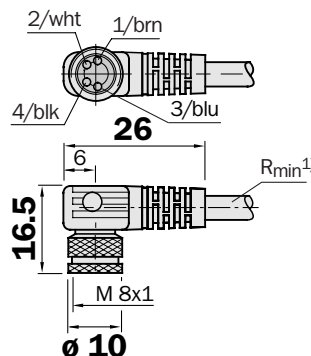
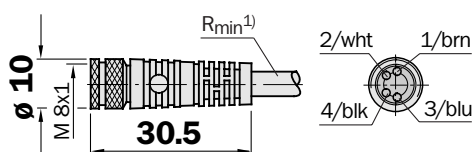
3/4 x 0.34 mm², sheath PUR halogen free

Type	Order no.	Contacts	Cable length
DOL-0803-G02MC	6025888	3	2 m
DOL-0803-G05MC	6025889	3	5 m
DOL-0803-G10MC	6025890	3	10 m
DOL-0804-G02MC	6025894	4	2 m
DOL-0804-G05MC	6025895	4	5 m
DOL-0804-G10MC	6025896	4	10 m

Female connector M8, 3- or 4-pin, right angle

3/4 x 0.34 mm², sheath PUR halogen free

Type	Order no.	Contacts	Cable length
DOL-0803-W02MC	6025891	3	2 m
DOL-0803-W05MC	6025892	3	5 m
DOL-0803-W10MC	6025893	3	10 m
DOL-0804-W02MC	6025897	4	2 m
DOL-0804-W05MC	6025898	4	5 m
DOL-0804-W10MC	6025899	4	10 m

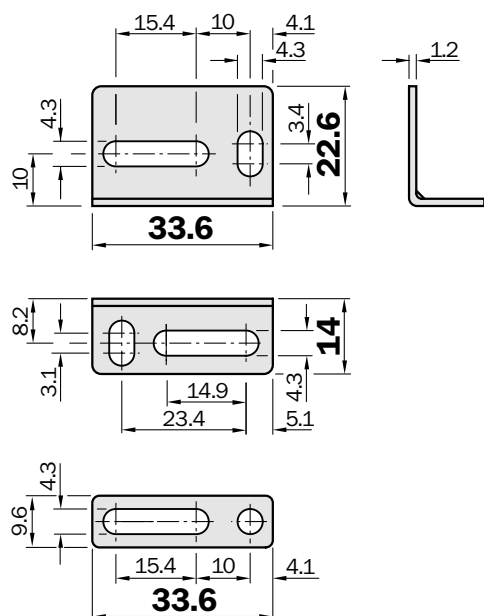


- ¹) Minimum bend radius in dynamic use
 $R_{min} = 20 \times \text{cable diameter}$

Mounting systems

Mounting brackets for W160 *

Type	Order no.
BEF-W160	5305197



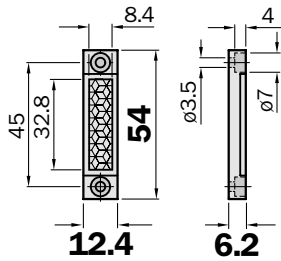
* Supplied with WL160T, WTB160T BGS, WTE160T, WTF160T and WTM160T Mark.

Dimensional drawings and order information

Plastic model for temperatures up to 65 °C

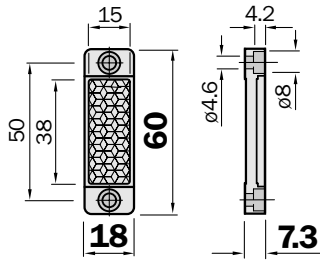
Reflector 8 x 30 mm²

Type	Order no.
P45	5308002



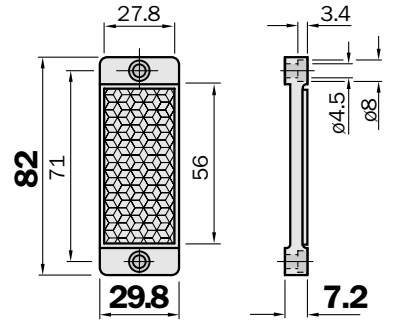
Reflector 20 x 40 mm²

Type	Order no.
PL20A	1012719



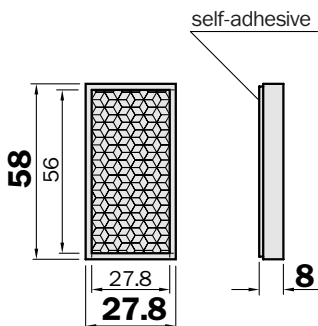
Reflector 30 x 50 mm²

Type	Order no.
PL30A	1002314



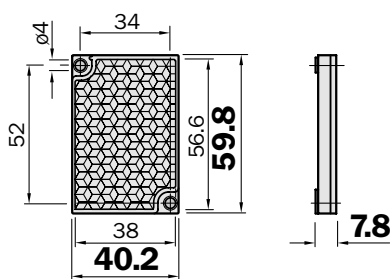
Reflector 30 x 50 mm²

Self-adhesive	Order no.
PL31A	1002315



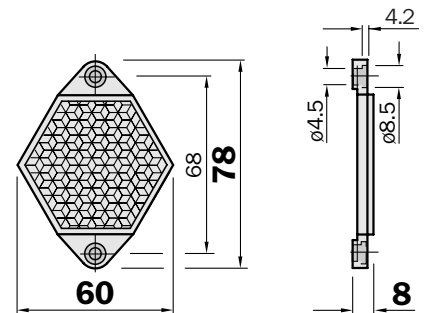
Reflector 40 x 60 mm²

Type	Order no.
PL40A	1012720



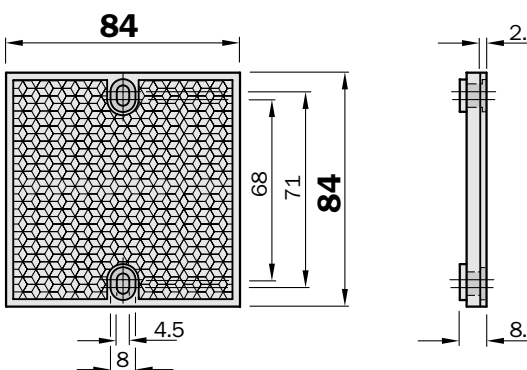
Reflector, hexagonal

Opening width 48 mm	Order no.
PL50A	1000132



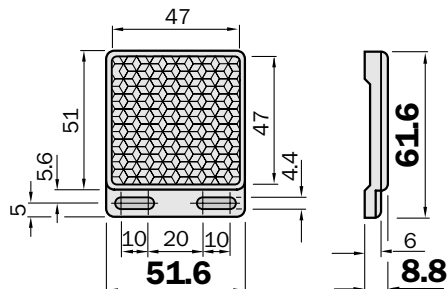
Reflector 80 x 80 mm²

Type	Order no.
PL80A	1003865



Reflector 47 x 47 mm²*)

Type	Order no.
P250	5304812



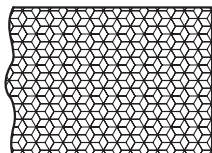
*) Included with delivery WL160T.

Dimensional drawings and order information

Plastic model for temperatures up to 65 °C

Reflective tape

Type	Order no.	
REF-DG-K	4019634	Cut to size
REF-DG	5304334	Sheet 749 x 914 mm



Universal bracket for rod mounting

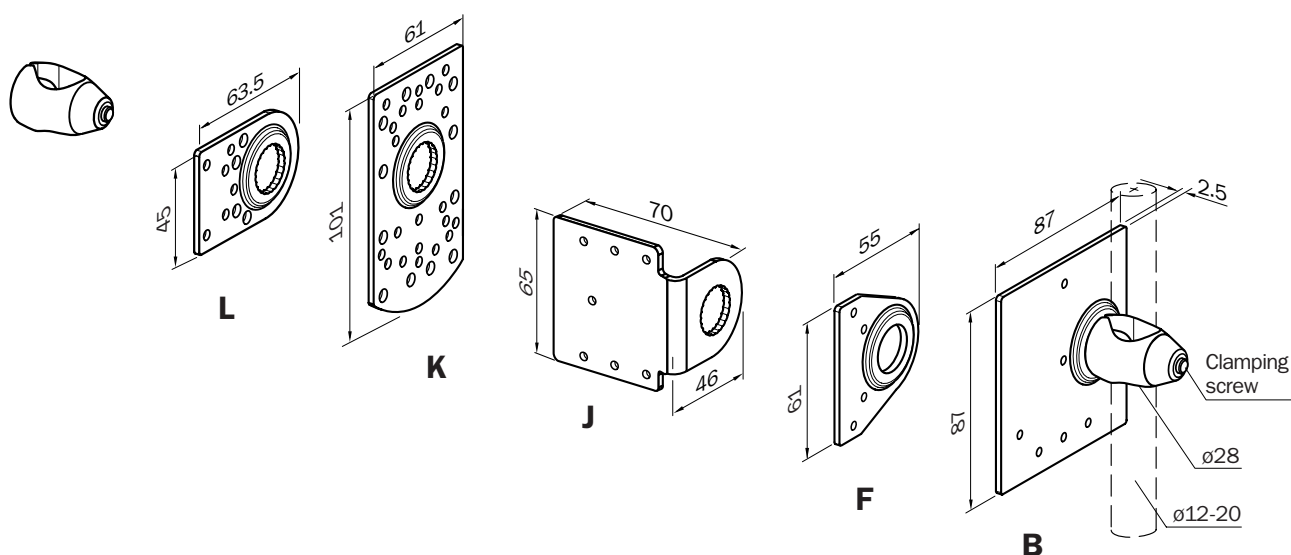


Plate	Type	Order no. ¹⁾	Sensors/reflectors
B	BEF-KHS-B01	2022459	P250, PL30A, PL40A, PL50A, PL80A, C110A
F	BEF-KHS-F01	2022463	W260, PL20A, P250
J	BEF-KHS-J01	2022719	PL20A, PL40A, PL50A, P250, C110A
K	BEF-KHS-K01	2022718	W11, W12-2, W12L-2, W14, W18-2, W23, W24-2, W27-2, W30, W32, W34, W36, KT2, KT5, KT10, CS, LUT3, DS60, PL20A, PL30A, PL40A, PL50A, PL80, A, P250, C110A
L	BEF-KHS-L01	2023057	W9-2, W140, W160, W250, P250
	BEF-KHS-KH1	2022726	Clamp bracket rod mounting without attachment plate and mounting material

¹⁾ Universal bracket and mounting screws included

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