

# W 160T: With the smallest LED light spot



WTM 160T “Mark”, the spot sensor for fast detection of color contrasts. It resolves ten gray levels and color changes in the spectral range HKS 33 N to 88 N.

WTB 160T “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.

WL 160T, the photoelectric reflex switch with red light and 1 m scanning range is ideal for detecting smaller and (semi-)transparent objects.

WTF 160T “Focus”, an energetic scanner with focused light beam for detecting contrasts and smaller parts over larger distances.

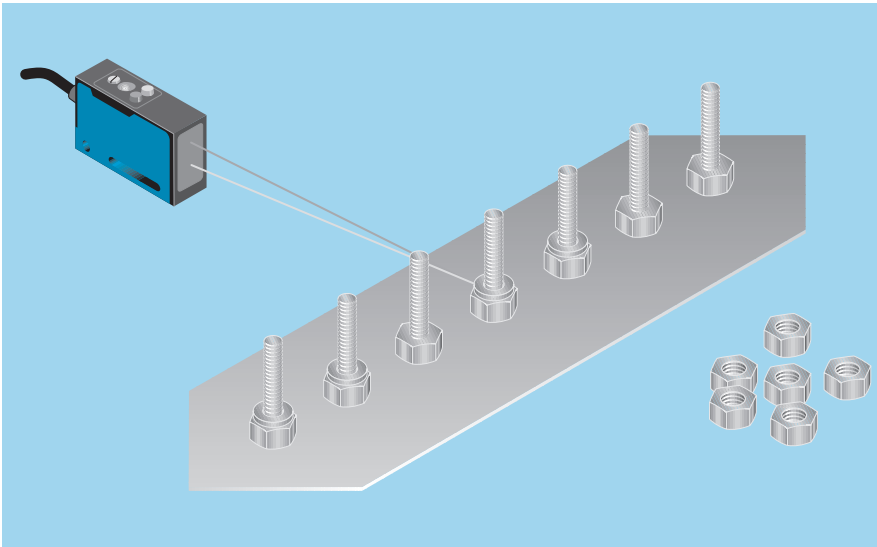
WTE 160T “Energetic”, an energetic scanner with large scanning ranges, available in infrared and red light models.

The W 160T devices are especially successful in the application fields:

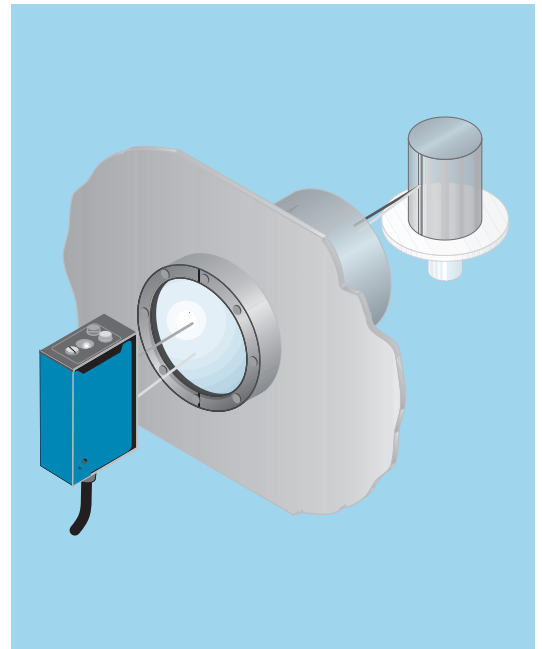
- Electronics and semiconductor manufacturing
- Packaging and graphic arts industries
- Assembly and handling (Pick & Place)
- Special mechanical engineering tasks
- Conveyor systems

**S**ystem 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 W 160T even fits in small spaces thanks to its compact design. This makes it especially easy to mount. All W 160T variants are available in two housing models with axial or 90° light emission.

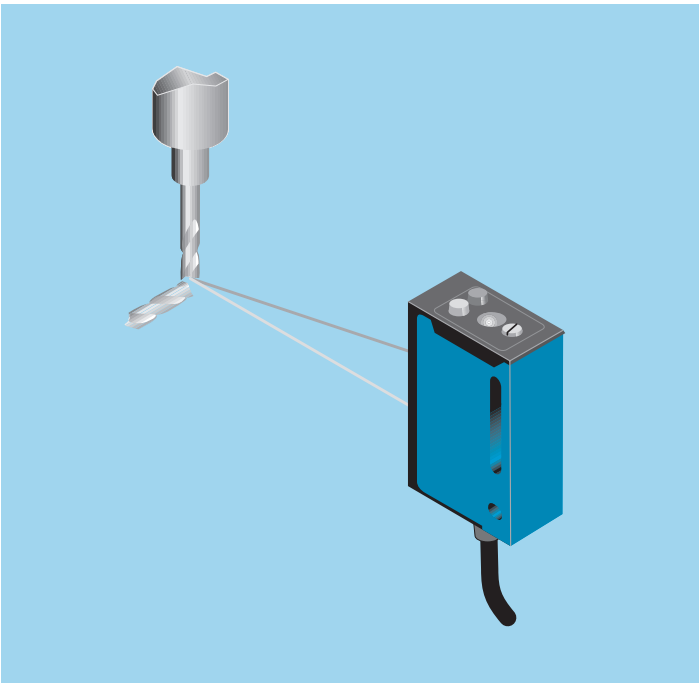
	<b>BGS Photoelectric proximity switches</b>
	<b>Photoelectric proximity switches mark sensor</b>
	<b>Photoelectric proximity switches energetic</b>
	<b>Photoelectric reflex switches</b>



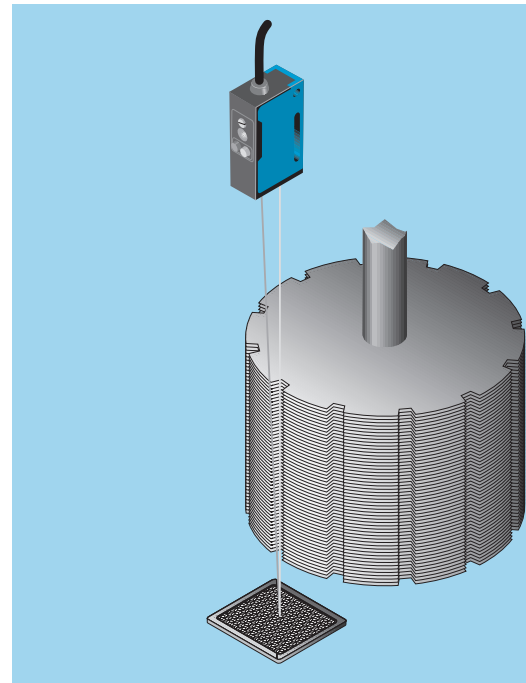
▲ WTB 160T BGS detects the presence of washers, gasket rings and o-rings.



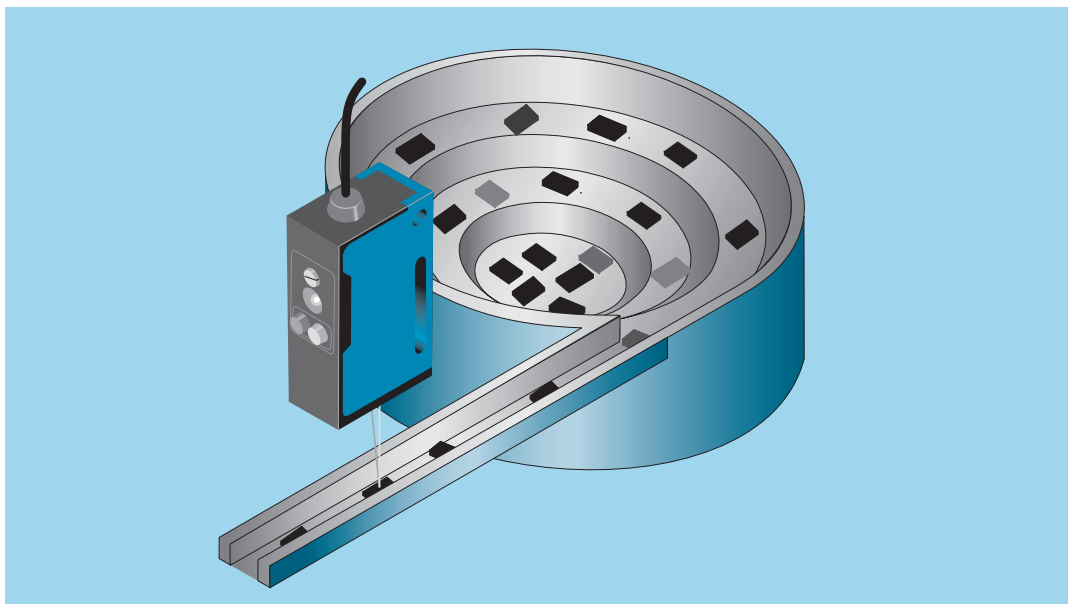
▲ The focused photoelectric proximity switch WTF 160T checks the orientation of a groove in a vacuum chamber over a large distance.



▲ Monitoring of tool imprints, e.g., in printed circuit board manufacturing. The WTB 160T BGS detects the smallest drills reliably down to 0.3 mm diameter.



◀ The WL 160T photoelectric proximity switch detects the position of bundles of sheet metal and individual sheets of a rotor.



► The WTM 160T Mark photoelectric proximity switch distinguishes the front and back sides of components in a vibration conveyor.

Condition

Teach-in

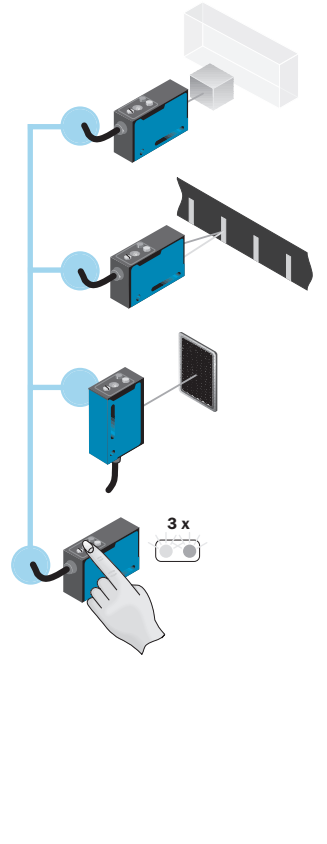
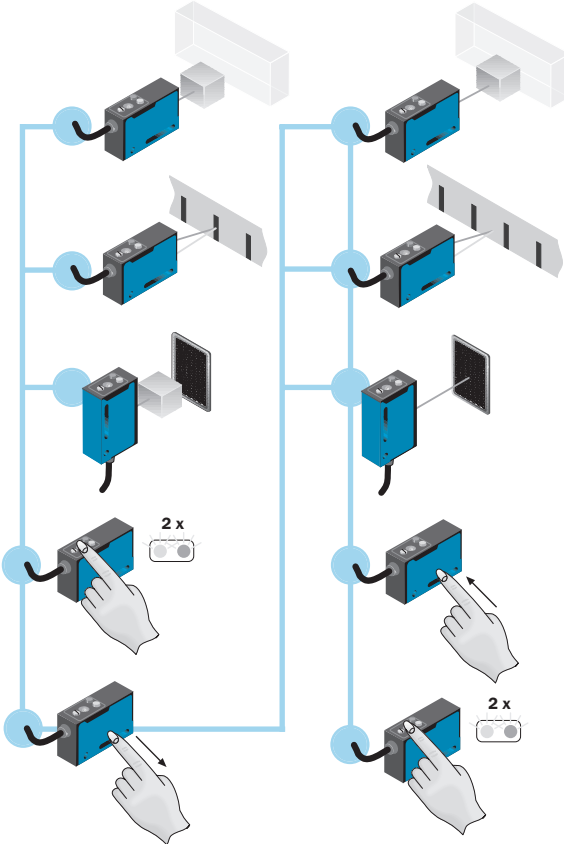
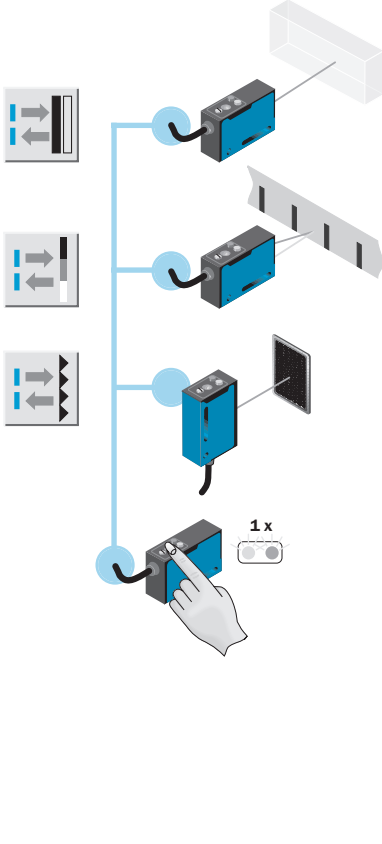
Status

Application

1-point Teach-in:

2-point Teach-in:

Position Teach-in



Background will *just not* be detected.

Sensitivity aligned to the center between the two Teach-in points.

Object will *just* be detected.

Dark mark will *just not* be detected.

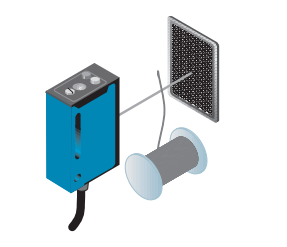
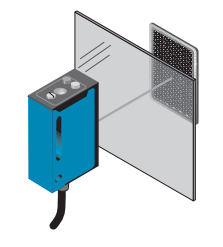
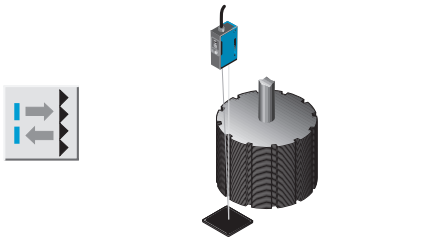
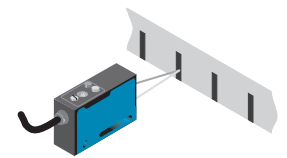
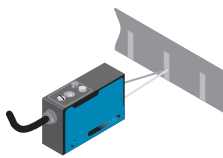
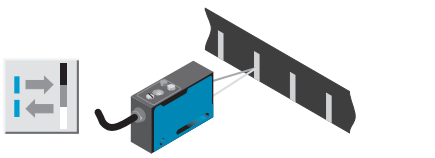
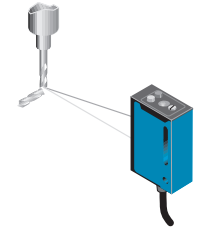
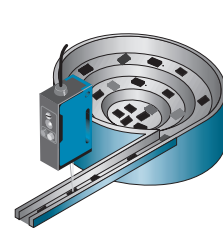
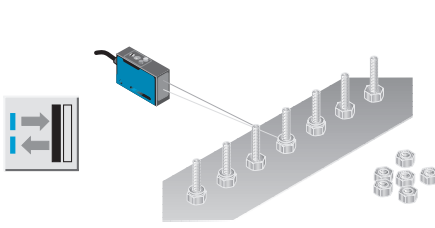
Sensitivity aligned to the center between the two Teach-in points.


Light mark will *just* be detected.

Reflector is detected *with reserve*.

Sensitivity aligned to the center between the two Teach-in points.

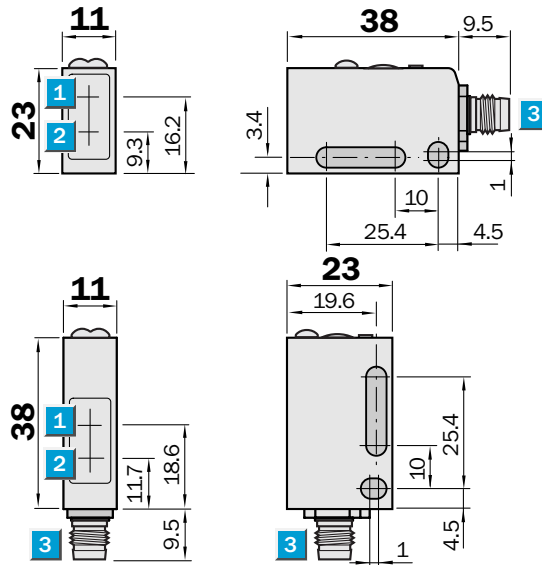
Reflector is detected *without reserve*.




**Scanning distance**  
**15 ... 50 mm**  
**Photoelectric proximity switch**

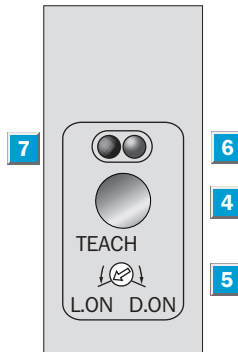
- Very small light spot
- Precise background suppression and great sensitivity
- Detects the smallest objects
- LED indicator: function reserve

### Dimension illustration



### Setting options

All types

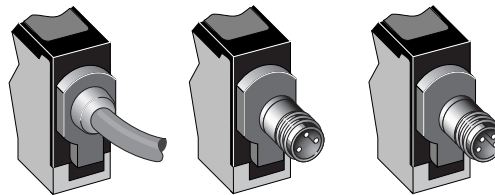


- 1** Optics center, receiver
- 2** Optics center, transmitter
- 3** Plug 3 pin/4 pin, M 8 or connection cable
- 4** Teach-in button
- 5** Light/dark rotary switch:  
L = light switching  
D = dark switching
- 6** Orange LED indicator: switching output active
- 7** Green LED indicator: light reception with operating reserve > 1.1



### Connection type

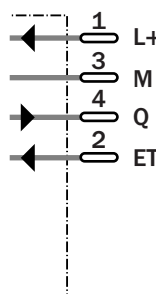
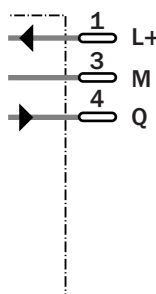
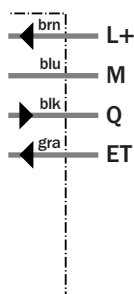
WTB 160T-P 212	WTB 160T-P 311	WTB 160T-P 412
WTB 160T-N 212	WTB 160T-N 311	WTB 160T-N 412
WTB 160T-F 212	WTB 160T-F 311	WTB 160T-F 412
WTB 160T-E 212	WTB 160T-E 311	WTB 160T-E 412



4 x 0.2 mm<sup>2</sup>

3 pin, M8

4 pin, M8



### Accessories

- Connectors
- Mounting systems



Technical data		WTB 160T-		P <sup>1)/F<sup>2)</sup></sup>	P <sup>1)/F<sup>2)</sup></sup>	P <sup>1)/F<sup>2)</sup></sup>	N <sup>1)/E<sup>2)</sup></sup>	N <sup>1)/E<sup>2)</sup></sup>	N <sup>1)/E<sup>2)</sup></sup>				
				212	311	412	212	311	412				
<b>Scanning distance</b>	15 ... 50 mm <sup>3)</sup>												
<b>Sensitivity control</b>	External Teach (ET)												
<b>Light source</b> <sup>4)</sup>	LED, red light												
<b>Supply voltage</b> V <sub>s</sub>	10...30 V DC <sup>5)</sup>												
Ripple <sup>6)</sup>	± 10 %												
Current consumption <sup>7)</sup>	≤ 40 mA												
<b>Switching outputs</b>	PNP, open collector: Q												
	NPN, open collector: Q												
Output current I <sub>A</sub> max.	100 mA												
Light receiver, switching type	Light/dark switching per rotary switch												
Response time <sup>8)/switching freq. max.<sup>9)</sup></sup>	≤ 0.7 ms / 550/s												
<b>Connection type:</b> cable	PVC, 2 m <sup>10)</sup> ; 4 x 0.2 mm <sup>2</sup> , Ø 4.2 mm												
	plug												
	plug												
<b>VDE protection class</b>	III												
Circuit protection <sup>11)</sup>	A, B, C, D												
<b>Enclosure rating</b>	IP 67												
<b>Ambient temperature</b>	Operation -25...+55 °C												
	Storage -40...+70 °C												
<b>Weight</b>	With cable 2/5 m approx. 60 g												
	With plug approx. 20 g												
<b>Housing material</b>	Housing: PBT; Optic: PMMA												

- <sup>1)</sup> Housing form: horizontal
- <sup>2)</sup> Housing form: vertical
- <sup>3)</sup> Object with 90% reflectance (with reference to standard white according to DIN 5033)
- <sup>4)</sup> Average service life 100,000 h at T<sub>U</sub> = +25 °C
- <sup>5)</sup> Limit values
- <sup>6)</sup> Must be within V<sub>s</sub> tolerances
- <sup>7)</sup> Without load
- <sup>8)</sup> With resistive load
- <sup>9)</sup> With light/dark ratio 1:1
- <sup>10)</sup> 5 m are available on request, do not bend cable below 0 °C
- <sup>11)</sup> A = V<sub>s</sub> connections reverse-polarity protected  
 B = Inputs and outputs reverse-polarity protected  
 C = Interference suppression  
 D = Outputs overcurrent and short-circuit protected

Scanning distance	Order information																										
<p>1 Scanning range on white, 90 % reflectance</p> <p>2 Scanning range on grey, 18 % reflectance</p> <p>3 Scanning range on black, 6 % reflectance</p>	<table border="1"> <thead> <tr> <th>Type</th> <th>Order no.</th> </tr> </thead> <tbody> <tr><td>WTB 160T-P 212</td><td>6 020 895</td></tr> <tr><td>WTB 160T-P 311</td><td>6 021 318</td></tr> <tr><td>WTB 160T-P 412</td><td>6 020 991</td></tr> <tr><td>WTB 160T-N 212</td><td>6 020 894</td></tr> <tr><td>WTB 160T-N 311</td><td>6 021 319</td></tr> <tr><td>WTB 160T-N 412</td><td>6 020 947</td></tr> <tr><td>WTB 160T-F 212</td><td>6 020 952</td></tr> <tr><td>WTB 160T-F 311</td><td>6 021 316</td></tr> <tr><td>WTB 160T-F 412</td><td>6 021 158</td></tr> <tr><td>WTB 160T-E 212</td><td>6 020 951</td></tr> <tr><td>WTB 160T-E 311</td><td>6 021 317</td></tr> <tr><td>WTB 160T-E 412</td><td>6 021 157</td></tr> </tbody> </table>	Type	Order no.	WTB 160T-P 212	6 020 895	WTB 160T-P 311	6 021 318	WTB 160T-P 412	6 020 991	WTB 160T-N 212	6 020 894	WTB 160T-N 311	6 021 319	WTB 160T-N 412	6 020 947	WTB 160T-F 212	6 020 952	WTB 160T-F 311	6 021 316	WTB 160T-F 412	6 021 158	WTB 160T-E 212	6 020 951	WTB 160T-E 311	6 021 317	WTB 160T-E 412	6 021 157
Type	Order no.																										
WTB 160T-P 212	6 020 895																										
WTB 160T-P 311	6 021 318																										
WTB 160T-P 412	6 020 991																										
WTB 160T-N 212	6 020 894																										
WTB 160T-N 311	6 021 319																										
WTB 160T-N 412	6 020 947																										
WTB 160T-F 212	6 020 952																										
WTB 160T-F 311	6 021 316																										
WTB 160T-F 412	6 021 158																										
WTB 160T-E 212	6 020 951																										
WTB 160T-E 311	6 021 317																										
WTB 160T-E 412	6 021 157																										

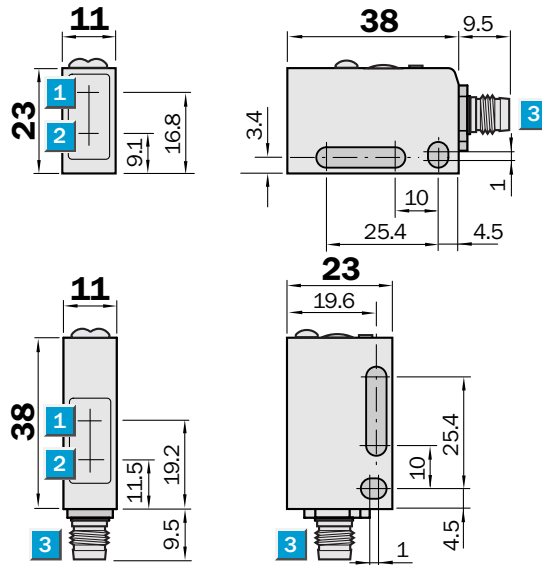


**Scanning distance**  
50 ... 150 mm

Photoelectric proximity switch

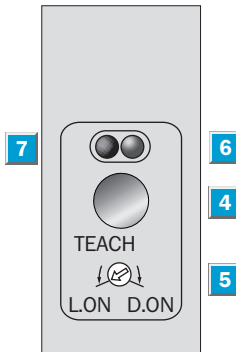
- Large scanning distance (150 mm)
- Additional Teach-in mode for shiny and structured surfaces
- LED indicator: function reserve

### Dimension illustration



### Setting options

All types

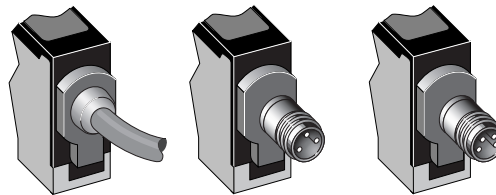


- 1 Optics center, receiver
- 2 Optics center, transmitter
- 3 Plug 3 pin/4 pin, M 8 or connection cable
- 4 Teach-in button
- 5 Light/dark rotary switch:  
L = light switching  
D = dark switching
- 6 Orange LED indicator: switching output active
- 7 Green LED indicator: light reception with operating reserve > 1.1



### Connection type

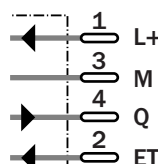
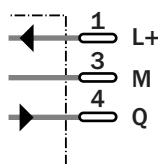
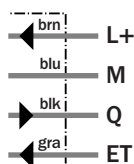
WTB 160T-P 232	WTB 160T-P 331	WTB 160T-P 432
WTB 160T-N 232	WTB 160T-N 331	WTB 160T-N 432
WTB 160T-F 232	WTB 160T-F 331	WTB 160T-F 432
WTB 160T-E 232	WTB 160T-E 331	WTB 160T-E 432



4 x 0.2 mm<sup>2</sup>

3 pin, M8

4 pin, M8



### Accessories

- Connectors
- Mounting systems



Technical data		WTB 160T-		P <sup>1)/F<sup>2)</sup></sup>	P <sup>1)/F<sup>2)</sup></sup>	P <sup>1)/F<sup>2)</sup></sup>	N <sup>1)/E<sup>2)</sup></sup>	N <sup>1)/E<sup>2)</sup></sup>	N <sup>1)/E<sup>2)</sup></sup>				
				232	331	432	232	331	432				
<b>Scanning distance</b>	50 ... 150 mm <sup>3)</sup>												
<b>Sensitivity control</b>	External Teach (ET)												
<b>Light source</b> <sup>4)</sup>	LED, red light												
<b>Supply voltage</b> V <sub>s</sub>	10...30 V DC <sup>5)</sup>												
Ripple <sup>6)</sup>	± 10 %												
Current consumption <sup>7)</sup>	≤ 45 mA												
<b>Switching outputs</b>	PNP, open collector: Q												
	NPN, open collector: Q												
Output current I <sub>A</sub> max.	100 mA												
Light receiver, switching type	Light/dark switching per rotary switch												
Response time <sup>8)/switching freq. max.<sup>9)</sup></sup>	≤ 2.5 ms / 200/s												
<b>Connection type:</b> cable	PVC, 2 m <sup>10)</sup> ; 4 x 0.2 mm <sup>2</sup> , Ø 4.2 mm												
	plug												
	plug												
<b>VDE protection class</b>	III												
Circuit protection <sup>11)</sup>	A, B, C, D												
<b>Enclosure rating</b>	IP 67												
<b>Ambient temperature</b>	Operation - 25...+ 55 °C												
	Storage - 40 ...+ 70 °C												
<b>Weight</b>	With cable 2/5 m approx. 60 g												
	With plug approx. 20 g												
<b>Housing material</b>	Housing: PBT; Optic: PMMA												

1) Housing form: horizontal  
 2) Housing form: vertical  
 3) Object with 90% reflectance (with reference to standard white according to DIN 5033)

4) Average service life 100,000 h at T<sub>U</sub> = +25 °C  
 5) Limit values  
 6) Must be within V<sub>s</sub> tolerances  
 7) Without load

8) With resistive load  
 9) With light/dark ratio 1:1  
 10) 5 m are available on request, do not bend cable below 0 °C

11) A = V<sub>s</sub> connections reverse-polarity protected  
 B = Inputs and outputs reverse-polarity protected  
 C = Interference suppression  
 D = Outputs overcurrent and short-circuit protected

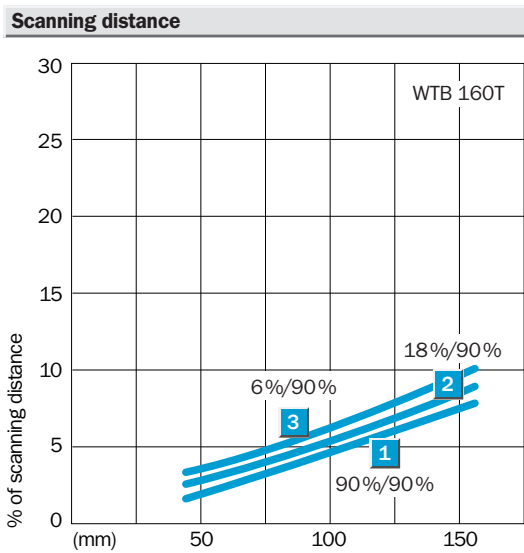
**FGS Teach-in**

**Condition**

**Teach-in**

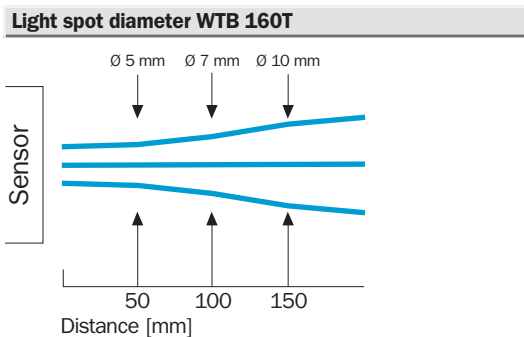
**Status**

Object in "A" area is detected.



**Order information**

Type	Order no.
WTB 160T-P 232	6 021 868
WTB 160T-P 331	6 021 867
WTB 160T-P 432	6 021 870
WTB 160T-N 232	6 021 872
WTB 160T-N 331	6 021 871
WTB 160T-N 432	6 021 874
WTB 160T-F 232	6 021 860
WTB 160T-F 331	6 021 859
WTB 160T-F 432	6 021 862
WTB 160T-E 232	6 021 864
WTB 160T-E 331	6 021 863
WTB 160T-E 432	6 021 866

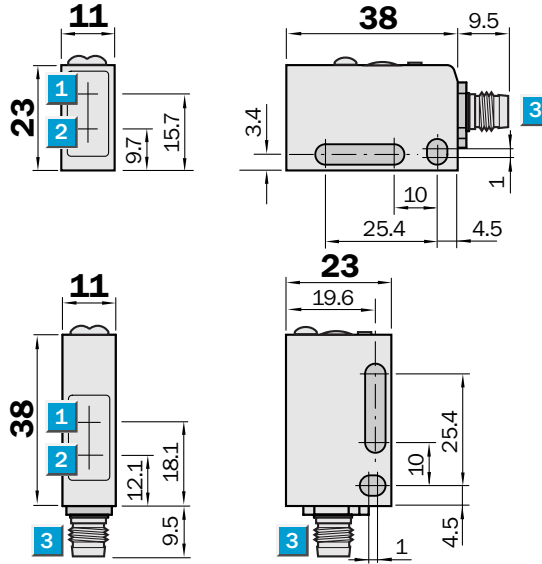




**Scanning distance**  
**10 mm**  
**Photoelectric proximity switch**

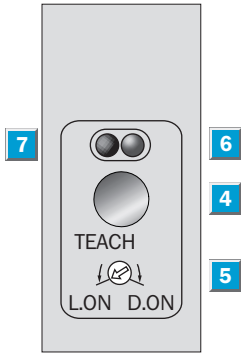
- Mark sensor
- Enclosure rating: IP 67
- Resolves ten gray levels
- LED indicator: function reserve

### Dimension illustration



### Setting options

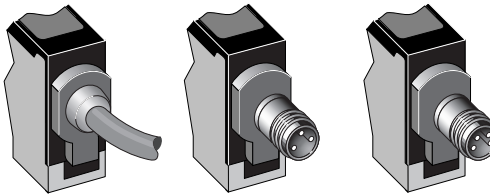
All types



- 1 Optics center, receiver
- 2 Optics center, transmitter
- 3 Plug 3 pin/4 pin, M 8 or connection cable
- 4 Teach-in button
- 5 Light/dark rotary switch:  
L = light switching  
D = dark switching
- 6 Orange LED indicator: switching output active
- 7 Green LED indicator: light reception with operating reserve > 1.1

### Connection type

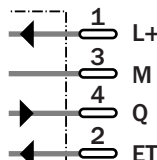
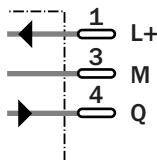
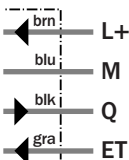
WTM 160T-P 292	WTM 160T-P 391	WTM 160T-P 492
WTM 160T-N 292	WTM 160T-N 391	WTM 160T-N 492
WTM 160T-F 292	WTM 160T-F 391	WTM 160T-F 492
WTM 160T-E 292	WTM 160T-E 391	WTM 160T-E 492



4 x 0.2 mm<sup>2</sup>

3 pin, M8

4 pin, M8



### Accessories

- Connectors
- Mounting systems



Technical data		WTM 160T-									
		P <sup>1</sup> /F <sup>2</sup>	P <sup>1</sup> /F <sup>2</sup>	P <sup>1</sup> /F <sup>2</sup>	N <sup>1</sup> /E <sup>2</sup>	N <sup>1</sup> /E <sup>2</sup>	N <sup>1</sup> /E <sup>2</sup>				
		292	391	492	292	391	492				
<b>Scanning distance</b>	10 ± 2 mm										
<b>Sensitivity control</b>	External Teach (ET)										
<b>Light source<sup>3)</sup></b>	LED, green light										
Light spot diameter	Approx. 2 x 5 mm at 10 mm distance										
Transmitter dispersion angle	Focused, Focus 10 mm										
<b>Supply voltage V<sub>s</sub></b>	10...30 V DC <sup>4)</sup>										
Ripple <sup>5)</sup>	± 10 %										
Current consumption <sup>6)</sup>	≤ 40 mA										
<b>Switching outputs</b>	PNP, open collector: Q										
	NPN, open collector: Q										
Output current I <sub>A</sub> max.	100 mA										
Light receiver, switching type	Light/dark switching per rotary switch										
Response time <sup>7)</sup> /switching freq. max. <sup>8)</sup>	≤ 0.2 ms / 2500/s										
<b>Connection type:</b> cable	PVC, 2 m <sup>9)</sup> ; 4 x 0.2 mm <sup>2</sup> , ø 4.2 mm										
plug	3 pin, M8										
plug	4 pin, M8										
<b>VDE protection class</b>	III										
Circuit protection <sup>10)</sup>	A, B, C, D										
<b>Enclosure rating</b>	IP 67										
<b>Ambient temperature</b>	Operation - 25...+ 55 °C										
	Storage - 40...+ 70 °C										
<b>Weight</b>	With cable 2/5 m approx. 60 g										
	With plug approx. 20 g										
<b>Housing material</b>	Housing: PBT; Optic: PMMA										

<sup>1)</sup> Housing form: horizontal  
<sup>2)</sup> Housing form: vertical  
<sup>3)</sup> Average service life 100,000 h at T<sub>U</sub> = +25 °C

<sup>4)</sup> Limit values  
<sup>5)</sup> Must be within V<sub>s</sub> tolerances  
<sup>6)</sup> Without load  
<sup>7)</sup> With resistive load

<sup>8)</sup> With light/dark ratio 1:1  
<sup>9)</sup> 5 m are available on request, do not bend cable below 0 °C  
<sup>10)</sup> A = V<sub>s</sub> connections reverse-polarity protected

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

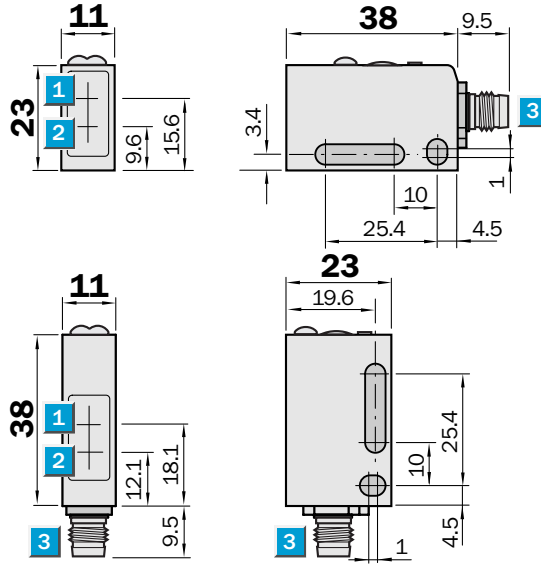
Color detection			
Detection of color changes in the spectral range HKS <sup>11)</sup> 33 N (violet) to 88 N (black) from 25 % to 100 %. The orange LED or the green and orange LEDs light when there is detection.	The following are not resolved: 33 N (25 %)/88 N (25 %), 33 N (25 %)/77 N (25 %), 33 N (25 %)/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	<sup>11)</sup> HKS $\hat{=}$ Hostmann-Steinberg, K+E printing inks, Schminke & Co. HKS colors are printing inks, which were developed by the above-mentioned companies, to guarantee the precise reproducibility of a color. They are standard in the graphic arts industry. HKS-N stands for uncoated paper in offset and letterpress printing with a color spectrum of 1 (yellow) to 97 (black). The color scale is available from SICK upon request. Order no.: 8 006 387.

Scanning distance		Order information	
<b>1</b>	Scanning range on white, 90 % reflectance	<b>Type</b>	<b>Order no.</b>
<b>2</b>	Scanning range on grey, 18 % reflectance	WTM 160T-P 292	6 020 493
<b>3</b>	Scanning range on black, 6 % reflectance	WTM 160T-P 391	6 021 506
		WTM 160T-P 492	6 020 495
		WTM 160T-N 292	6 020 492
		WTM 160T-N 391	6 021 382
		WTM 160T-N 492	6 020 494
		WTM 160T-F 292	6 020 671
		WTM 160T-F 391	6 021 351
		WTM 160T-F 492	6 020 785
		WTM 160T-E 292	6 020 667
		WTM 160T-E 391	6 021 505
		WTM 160T-E 492	6 020 695

**Scanning distance**  
 5 ... 100 mm  
**Photoelectric proximity switch**

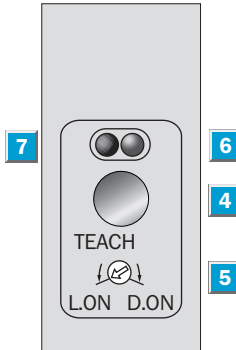
- Detects small objects and contrast differences at a large distance (100 mm)
- Focused light beam
- LED indicator: function reserve

### Dimension illustration



### Setting options

All types

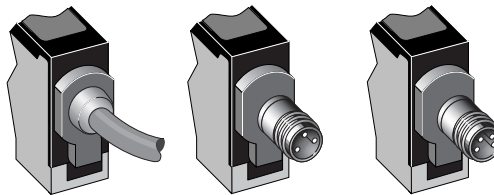


- 1** Optics center, receiver
- 2** Optics center, transmitter
- 3** Plug 3 pin/4 pin, M 8 or connection cable
- 4** Teach-in button
- 5** Light/dark rotary switch:  
L = light switching  
D = dark switching
- 6** Orange LED indicator: switching output active
- 7** Green LED indicator: light reception with operating reserve > 1.1



### Connection type

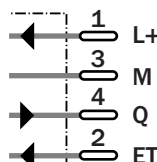
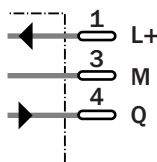
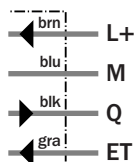
WTF 160T-P 212	WTF 160T-P 311	WTF 160T-P 412
WTF 160T-N 212	WTF 160T-N 311	WTF 160T-N 412
WTF 160T-F 212	WTF 160T-F 311	WTF 160T-F 412
WTF 160T-E 212	WTF 160T-E 311	WTF 160T-E 412



4 x 0.2 mm<sup>2</sup>

3 pin, M8

4 pin, M8



### Accessories

- Connectors
- Mounting systems



Technical data		WTF 160T-									
		P <sup>1</sup> /F <sup>2</sup>	P <sup>1</sup> /F <sup>2</sup>	P <sup>1</sup> /F <sup>2</sup>	N <sup>1</sup> /E <sup>2</sup>	N <sup>1</sup> /E <sup>2</sup>	N <sup>1</sup> /E <sup>2</sup>				
		212	311	412	212	311	412				
<b>Scanning distance</b>	5 ... 100 mm <sup>3)</sup>										
<b>Sensitivity control</b>	External Teach (ET)										
<b>Light source</b> <sup>4)</sup>	LED, red light										
<b>Supply voltage</b> V <sub>s</sub>	10...30 V DC <sup>5)</sup>										
Ripple <sup>6)</sup>	± 10 %										
Current consumption <sup>7)</sup>	≤ 40 mA										
<b>Switching outputs</b>	PNP, open collector: Q										
	NPN, open collector: Q										
Output current I <sub>A</sub> max.	100 mA										
Light receiver, switching type	Light/dark switching per rotary switch										
Response time <sup>8)</sup> /switching freq. max. <sup>9)</sup>	≤ 0.5 ms / 1000/s										
<b>Connection type:</b> cable	PVC, 2 m <sup>10)</sup> ; 4 x 0.2 mm <sup>2</sup> , ø 4.2 mm										
	plug										
	plug										
<b>VDE protection class</b>	III										
Circuit protection <sup>11)</sup>	A, B, C, D										
<b>Enclosure rating</b>	IP 67										
<b>Ambient temperature</b>	Operation -25...+55 °C										
	Storage -40...+70 °C										
<b>Weight</b>	With cable 2/5 m approx. 60 g										
	With plug approx. 20 g										
<b>Housing material</b>	Housing: PBT; Optic: PMMA										

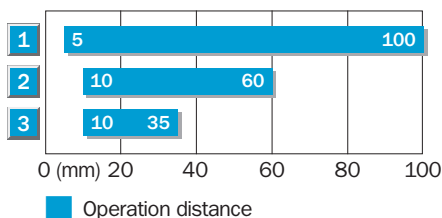
1) Housing form: horizontal  
 2) Housing form: vertical  
 3) Object with 90% reflectance  
 (with reference to standard white according to DIN 5033)

4) Average service life 100,000 h at T<sub>U</sub> = +25 °C  
 5) Limit values  
 6) Must be within V<sub>s</sub> tolerances  
 7) Without load

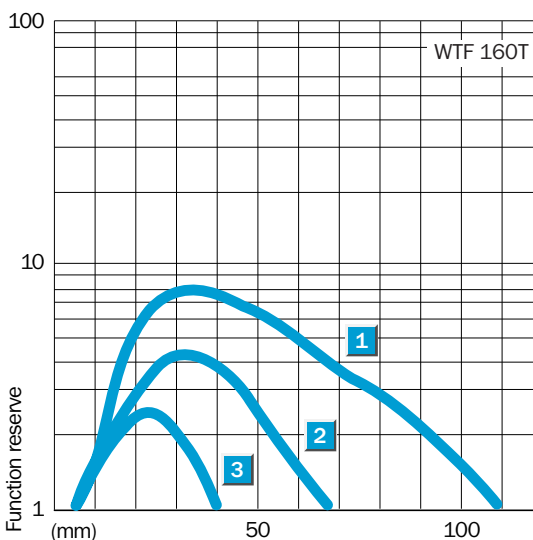
8) With resistive load  
 9) With light/dark ratio 1:1  
 10) 5 m are available on request, do not bend cable below 0 °C

11) A = V<sub>s</sub> connections reverse-polarity protected  
 B = Inputs and outputs reverse-polarity protected  
 C = Interference suppression  
 D = Outputs overcurrent and short-circuit protected

**Scanning distance**



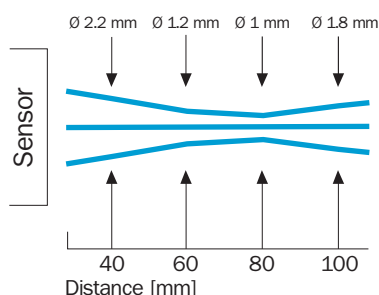
- 1 Scanning range on white, 90 % reflectance
- 2 Scanning range on grey, 18 % reflectance
- 3 Scanning range on black, 6 % reflectance



**Order information**

Type	Order no.
WTF 160T-P 212	6 021 135
WTF 160T-P 311	6 020 942
WTF 160T-P 412	6 021 237
WTF 160T-N 212	6 021 286
WTF 160T-N 311	6 021 272
WTF 160T-N 412	6 021 290
WTF 160T-F 212	6 021 708
WTF 160T-F 311	6 021 700
WTF 160T-F 412	6 021 722
WTF 160T-E 212	6 020 411
WTF 160T-E 311	6 020 391
WTF 160T-E 412	6 020 934

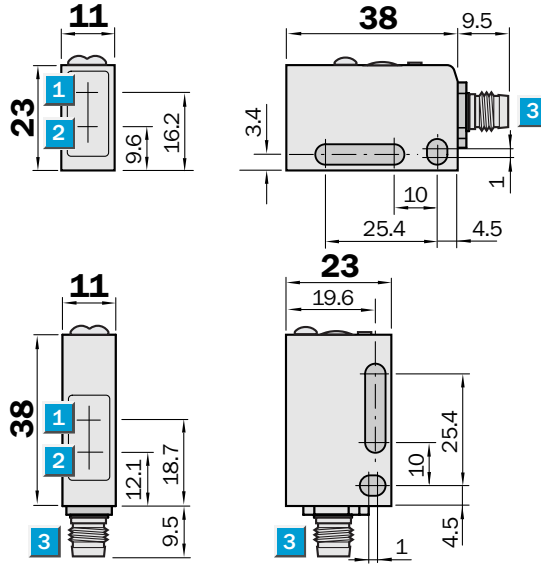
**Light spot diameter WTF 160T**



**Scanning distance**  
 0 ... 700 mm  
 Photoelectric proximity switch

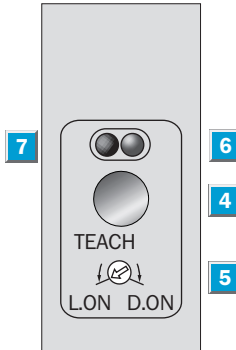
- Large scanning distance
- Red light variant for standard applications
- LED indicator: function reserve

### Dimension illustration



### Setting options

All types

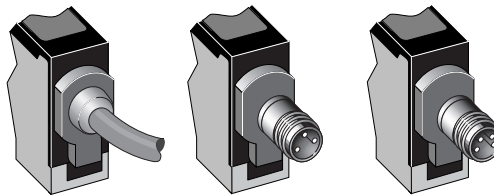


- 1 Optics center, receiver
- 2 Optics center, transmitter
- 3 Plug 3 pin/4 pin, M 8 or connection cable
- 4 Teach-in button
- 5 Light/dark rotary switch:  
L = light switching  
D = dark switching
- 6 Orange LED indicator: switching output active
- 7 Green LED indicator: light reception with operating reserve > 1.1



### Connection type

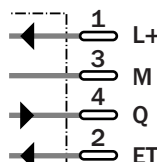
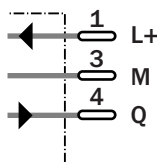
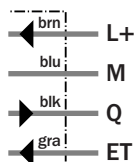
WTE 160T-P 232	WTE 160T-P 331	WTE 160T-P 432
WTE 160T-N 232	WTE 160T-N 331	WTE 160T-N 432
WTE 160T-F 232	WTE 160T-F 331	WTE 160T-F 432
WTE 160T-E 232	WTE 160T-E 331	WTE 160T-E 432



4 x 0.2 mm<sup>2</sup>

3 pin, M8

4 pin, M8



### Accessories

- Connectors
- Mounting systems



Technical data		WTE 160T-									
		P <sup>1</sup> /F <sup>2</sup>	P <sup>1</sup> /F <sup>2</sup>	P <sup>1</sup> /F <sup>2</sup>	N <sup>1</sup> /E <sup>2</sup>	N <sup>1</sup> /E <sup>2</sup>	N <sup>1</sup> /E <sup>2</sup>				
		232	331	432	232	331	432				
<b>Scanning distance</b>	0 ... 700 mm <sup>3)</sup>										
<b>Sensitivity control</b>	External Teach (ET)										
<b>Light source</b> <sup>4)</sup>	LED, red light										
<b>Supply voltage</b> V <sub>s</sub>	10...30 V DC <sup>5)</sup>										
Ripple <sup>6)</sup>	± 10 %										
Current consumption <sup>7)</sup>	≤ 40 mA										
<b>Switching outputs</b>	PNP, open collector: Q										
	NPN, open collector: Q										
Output current I <sub>A</sub> max.	100 mA										
Light receiver, switching type	Light/dark switching per rotary switch										
Response time <sup>8)</sup> /switching freq. max. <sup>9)</sup>	≤ 0.5 ms / 1000/s										
<b>Connection type:</b> cable	PVC, 2 m <sup>10)</sup> ; 4 x 0.2 mm <sup>2</sup> , Ø 4.2 mm										
	plug										
	plug										
<b>VDE protection class</b>	III										
Circuit protection <sup>11)</sup>	A, B, C, D										
<b>Enclosure rating</b>	IP 67										
<b>Ambient temperature</b>	Operation -25...+55 °C										
	Storage -40...+70 °C										
<b>Weight</b>	With cable 2/5 m approx. 60 g										
	With plug approx. 20 g										
<b>Housing material</b>	Housing: PBT; Optic: PMMA										

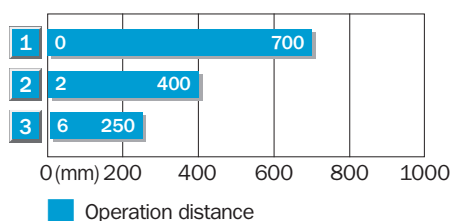
1) Housing form: horizontal  
 2) Housing form: vertical  
 3) Object with 90% reflectance  
 (with reference to standard white according to DIN 5033)

4) Average service life 100,000 h at T<sub>U</sub> = +25 °C  
 5) Limit values  
 6) Must be within V<sub>s</sub> tolerances  
 7) Without load

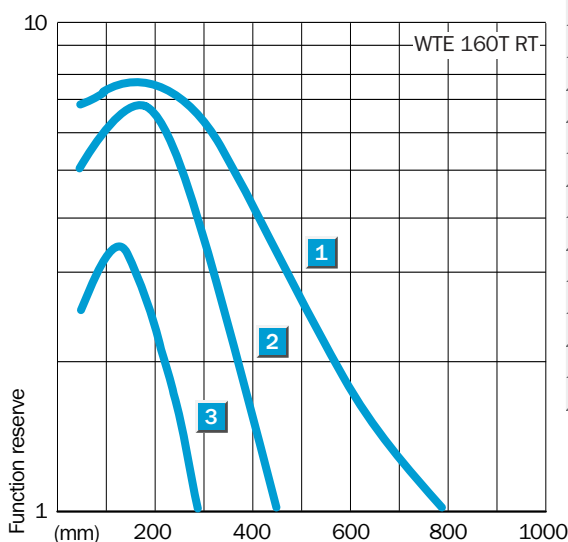
8) With resistive load  
 9) With light/dark ratio 1:1  
 10) 5 m are available on request, do not bend cable below 0 °C

11) A = V<sub>s</sub> connections reverse-polarity protected  
 B = Inputs and outputs reverse-polarity protected  
 C = Interference suppression  
 D = Outputs overcurrent and short-circuit protected

**Scanning distance**



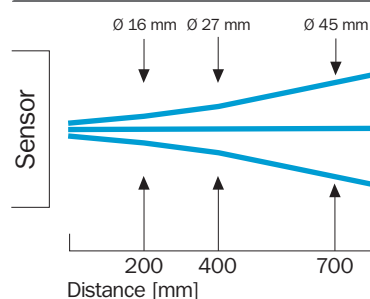
- 1 Scanning range on white, 90 % reflectance
- 2 Scanning range on grey, 18 % reflectance
- 3 Scanning range on black, 6 % reflectance



**Order information**

Type	Order no.
WTE 160T-P 232	6 021 884
WTE 160T-P 331	6 021 883
WTE 160T-P 432	6 021 886
WTE 360T-N 232	6 021 888
WTE 160T-N 331	6 021 887
WTE 160T-N 432	6 021 890
WTE 160T-F 232	6 021 876
WTE 160T-F 331	6 021 875
WTE 160T-F 432	6 021 878
WTE 160T-E 232	6 021 880
WTE 160T-E 331	6 021 879
WTE 160T-E 432	6 021 882

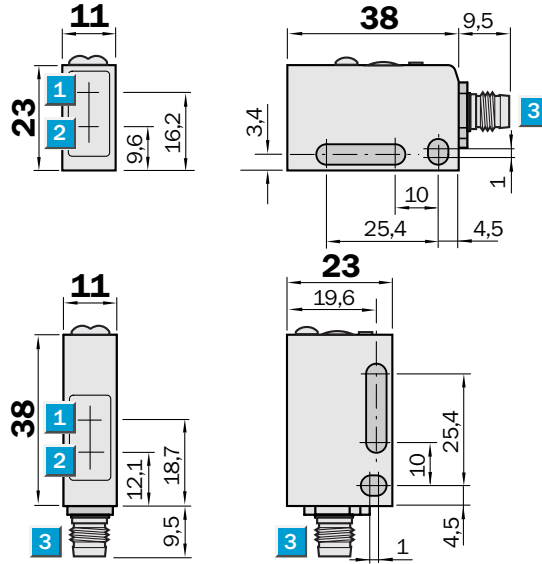
**Light spot diameter WTE 160T R**



**Scanning distance**  
 0 ... 1 m  
 Photoelectric proximity switch

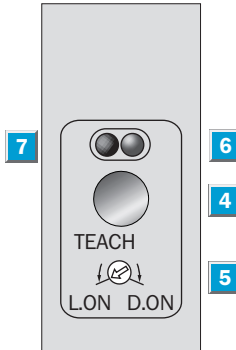
- Large scanning distance
- Infrared variant for objects with low reflectance
- LED indicator: function reserve

**Dimension illustration**



**Setting options**

All types

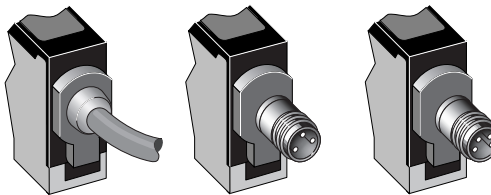


- 1 Optics center, receiver
- 2 Optics center, transmitter
- 3 Plug 3 pin/4 pin, M 8 or connection cable
- 4 Teach-in button
- 5 Light/dark rotary switch:  
L = light switching  
D = dark switching
- 6 Orange LED indicator: switching output active
- 7 Green LED indicator: light reception with operating reserve > 1.1



**Connection type**

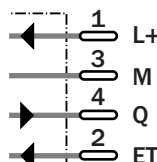
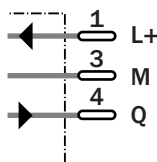
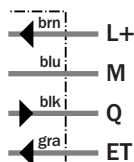
WTE 160T-P 262	WTE 160T-P 361	WTE 160T-P 462
WTE 160T-N 262	WTE 160T-N 361	WTE 160T-N 462
WTE 160T-F 262	WTE 160T-F 361	WTE 160T-F 462
WTE 160T-E 262	WTE 160T-E 361	WTE 160T-E 462



4 x 0.2 mm<sup>2</sup>

3 pin, M8

4 pin, M8



**Accessories**

- Connectors
- Mounting systems



Technical data		WTE 160T-		P <sup>1)/F<sup>2)</sup></sup>	P <sup>1)/F<sup>2)</sup></sup>	P <sup>1)/F<sup>2)</sup></sup>	N <sup>1)/E<sup>2)</sup></sup>	N <sup>1)/E<sup>2)</sup></sup>	N <sup>1)/E<sup>2)</sup></sup>				
				262	361	462	262	361	462				
<b>Scanning distance</b>	0...1 m <sup>3)</sup>												
<b>Sensitivity control</b>	External Teach (ET)												
<b>Light source<sup>4)</sup>, Lichtart</b>	LED, infrared light												
<b>Supply voltage V<sub>s</sub></b>	10...30 V DC <sup>5)</sup>												
Ripple <sup>6)</sup>	± 10 %												
Current consumption <sup>7)</sup>	≤ 40 mA												
<b>Switching outputs</b>	PNP, open collector: Q												
	NPN, open collector: Q												
Output current I <sub>A</sub> max.	100 mA												
Light receiver, switching type	Light/dark switching per rotary switch												
Response time <sup>8)/switching freq. max.<sup>9)</sup></sup>	≤ 0.5 ms / 1000/s												
<b>Connection type:</b> cable	PVC, 2 m <sup>10)</sup> ; 4 x 0.2 mm <sup>2</sup> , ø 4.2 mm												
	plug												
	plug												
<b>VDE protection class</b>	III												
Circuit protection <sup>11)</sup>	A, B, C, D												
<b>Enclosure rating</b>	IP 67												
<b>Ambient temperature</b>	Operation -25...+55 °C												
	Storage -40...+70 °C												
<b>Weight</b>	With cable 2/5 m approx. 60 g												
	With plug approx. 20 g												
<b>Housing material</b>	Housing: PBT; Optic: PMMA												

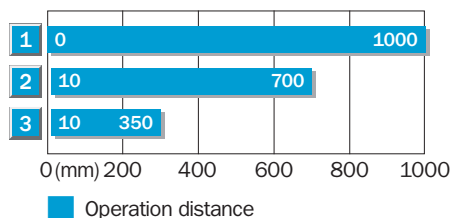
1) Housing form: horizontal  
 2) Housing form: vertical  
 3) Object with 90% reflectance (with reference to standard white according to DIN 5033)

4) Average service life 100,000 h at T<sub>U</sub> = +25 °C  
 5) Limit values  
 6) Must be within V<sub>s</sub> tolerances  
 7) Without load

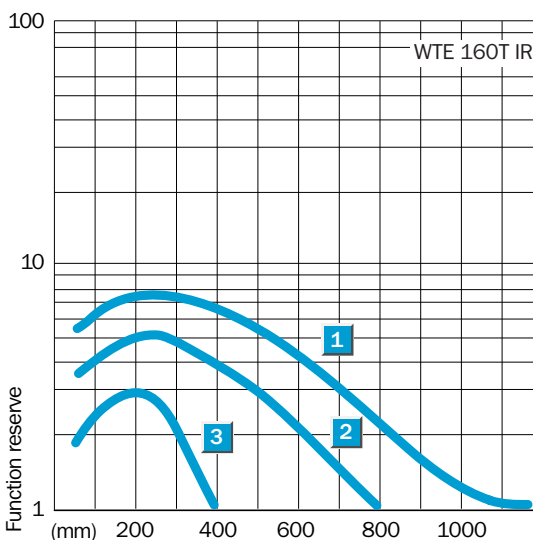
8) With resistive load  
 9) With light/dark ratio 1:1  
 10) 5 m are available on request, do not bend cable below 0 °C

11) A = V<sub>s</sub> connections reverse-polarity protected  
 B = Inputs and outputs reverse-polarity protected  
 C = Interference suppression  
 D = Outputs overcurrent and short-circuit protected

**Tastweite**



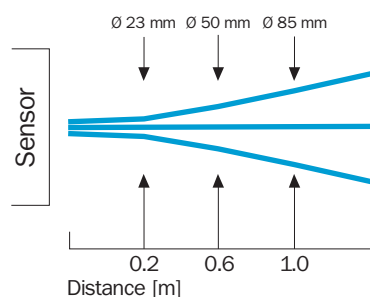
- 1 Scanning range on white, 90 % reflectance
- 2 Scanning range on grey, 18 % reflectance
- 3 Scanning range on black, 6 % reflectance




**Order information**

Type	Order no.
WTE 160T-P 262	6 021 900
WTE 160T-P 361	6 021 899
WTE 160T-P 462	6 021 902
WTE 360T-N 262	6 021 904
WTE 160T-N 361	6 021 903
WTE 160T-N 462	6 021 906
WTE 160T-F 262	6 021 892
WTE 160T-F 361	6 021 891
WTE 160T-F 462	6 021 894
WTE 160T-E 262	6 021 896
WTE 160T-E 361	6 021 895
WTE 160T-E 462	6 021 898

**Light spot diameter WTE 160T IR**

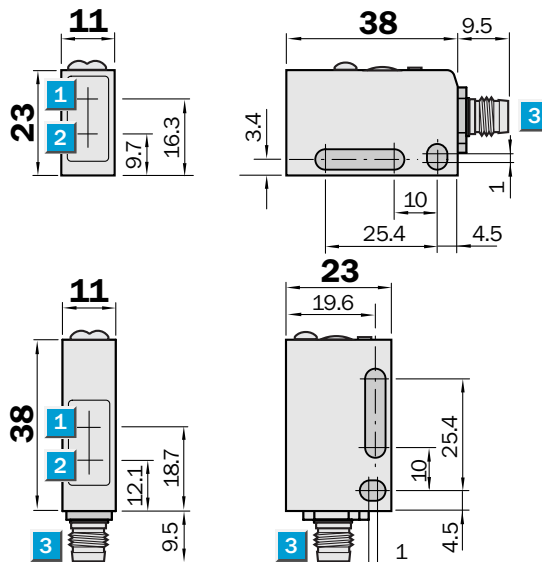





**Scanning range**  
**1 m**  
**Photoelectric reflex switch**

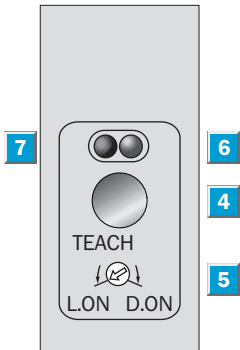
- Very small light spot
- Short response time
- Detection of (semi-)transparent objects
- Detction of smallest objects
- LED indicator: function reserve

**Dimension illustration**



**Setting options**

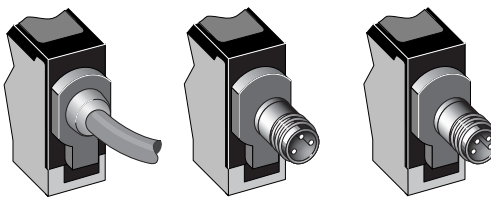
All types



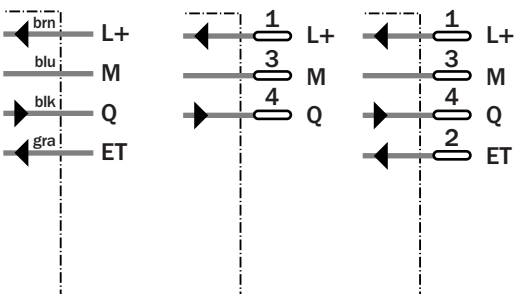
- 1 Optics center, receiver
- 2 Optics center, transmitter
- 3 Plug 3 pin/4 pin, M 8 or connection cable
- 4 Teach-in button
- 5 Light/dark rotary switch:  
L = light switching  
D = dark switching
- 6 Orange LED indicator: switching output active
- 7 Green LED indicator: light reception with operating reserve > 1.1

**Connection type**

WL 160T-P212	WL 160T-P311	WL 160T-P412
WL 160T-N212	WL 160T-N311	WL 160T-N412
WL 160T-F212	WL 160T-F311	WL 160T-F412
WL 160T-E212	WL 160T-E311	WL 160T-E412



4 x 0.2 mm<sup>2</sup>      3 pin, M8      4 pin, M8



**Accessories**

Connectors
Mounting systems*
Reflectors

\* included with delivery

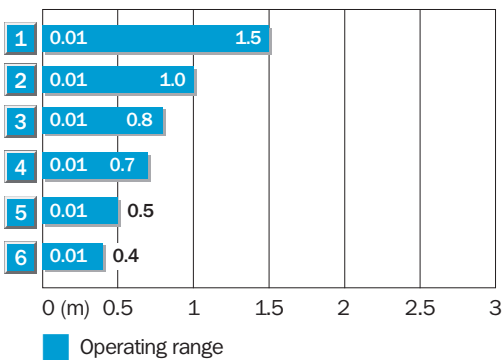
Technical data		WL 160T-									
		P <sup>1</sup> /F <sup>2</sup>	P <sup>1</sup> /F <sup>2</sup>	P <sup>1</sup> /F <sup>2</sup>	N <sup>1</sup> /E <sup>2</sup>	N <sup>1</sup> /E <sup>2</sup>	N <sup>1</sup> /E <sup>2</sup>				
		212	311	412	212	311	412				
<b>Scanning range</b>	0.01 ... 1.0 m/P 250 (included)										
<b>Sensitivity control</b>	External Teach (ET)										
<b>Light source<sup>3)</sup></b>	LED, red light with polarizing filter										
<b>Supply voltage V<sub>s</sub></b>	10...30 V DC <sup>4)</sup>										
Ripple <sup>5)</sup>	± 10 %										
Current consumption <sup>6)</sup>	≤ 40 mA										
<b>Switching outputs</b>	PNP, open collector: Q										
	NPN, open collector: Q										
Output current I <sub>A</sub> max.	100 mA										
Light receiver, switching type	Light/dark switching per rotary switch										
Response time <sup>7)</sup> /switching freq. max. <sup>8)</sup>	≤ 0.2 ms / 2500/s										
<b>Connection type:</b> cable	PVC, 2 m <sup>9)</sup> ; 5 x 0.2 mm <sup>2</sup> , ø 4.2 mm										
	plug										
	plug										
<b>VDE protection class</b>	III										
Circuit protection <sup>10)</sup>	A, B, C, D										
<b>Enclosure rating</b>	IP 67										
<b>Ambient temperature</b>	Operation - 25...+ 55 °C										
	Storage - 40...+ 70 °C										
<b>Weight</b>	With cable 2/5 m approx. 60 g										
	With plug approx. 20 g										
<b>Housing material</b>	Housing: PBT; Optic: PMMA										

1) Housing form: horizontal  
 2) Housing form: vertical  
 3) Average service life 100,000 h at T<sub>U</sub> = +25 °C  
 4) Limit values

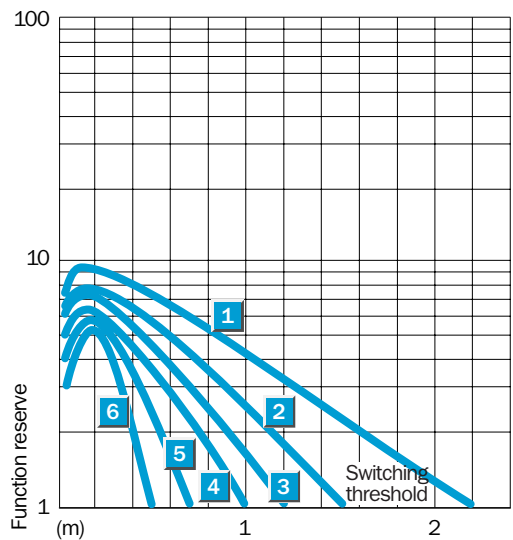
5) Must be within V<sub>s</sub> tolerances  
 6) Without load  
 7) With resistive load  
 8) With light/dark ratio 1:1  
 9) 5 m are available on request, do not bend cable below 0 °C

10) A = V<sub>s</sub> 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**



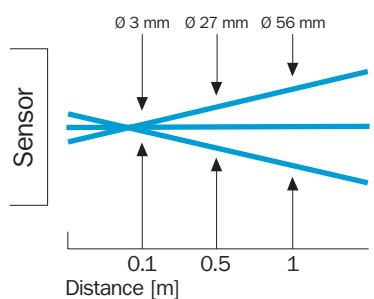
Reflector type	Operating range
1 PL80 A	0.01... 1.5 m
2 P250/PL40/50 A	0.01... 1.0 m
3 PL30 A/31 A	0.01... 0.8 m
4 PI 20 A	0.01... 0.7 m
5 Reflexionsfolie Diamond Grade	0.01... 0.5 m
6 P 45	0.01... 0.4 m



**Order information**

Type	Order no.
WL 160T-P212	6 020 481
WL 160T-P311	6 021 479
WL 160T-P412	6 020 483
WL 160T-N212	6 020 480
WL 160T-N311	6 021 515
WL 160T-N412	6 020 482
WL 160T-F212	6 020 487
WL 160T-F311	6 021 387
WL 160T-F412	6 020 489
WL 160T-E212	6 020 486
WL 160T-E311	6 021 438
WL 160T-E412	6 020 488

**Light spot diameter WL 160T**



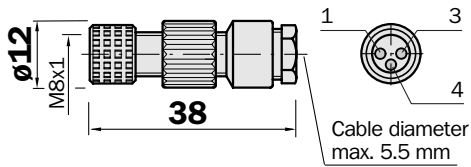
Dimension illustrations and ordering information

■ Contact assignment according to EN 50044

SENSICK circular screwing system M 8, 3 pin/4 pin, Enclosure rating IP 67

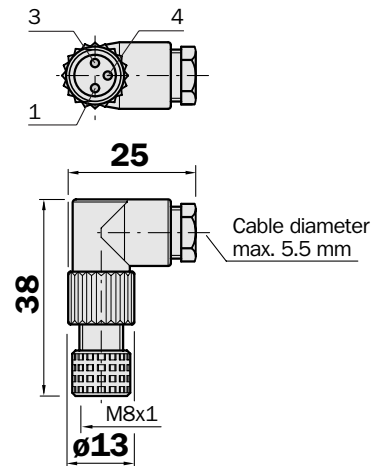
M 8 Cable receptacles, 3 pin, straight

Type	Order no.
DOS-0803-G	7 902 077



M 8 Cable receptacles, 3 pin, angled

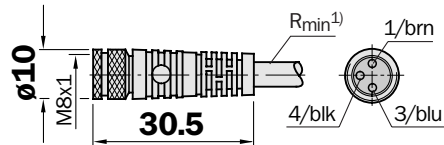
Type	Order no.
DOS-0803-W	7 902 078



M 8 Cable receptacles, 3 pin, straight

Cable diameter 5 mm, 3 x 0.34 mm<sup>2</sup>, PVC coating

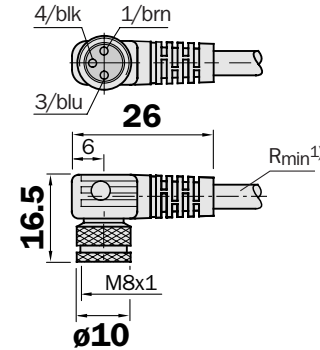
Type	Order no.	Cable length
DOL-0803-G02M	6 010 785	2 m
DOL-0803-G05M	6 022 009	5 m
DOL-0803-G10M	6 022 011	10 m



M 8 Cable receptacles, 3 pin, angled

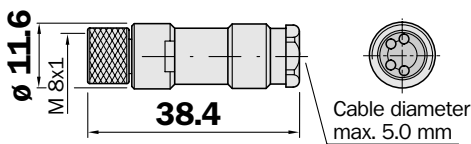
Cable diameter 5 mm, 3 x 0.34 mm<sup>2</sup>, PVC coating

Type	Order no.	Cable length
DOL-0803-W02M	6 008 489	2 m
DOL-0803-W05M	6 022 010	5 m
DOL-0803-W10M	6 022 012	10 m



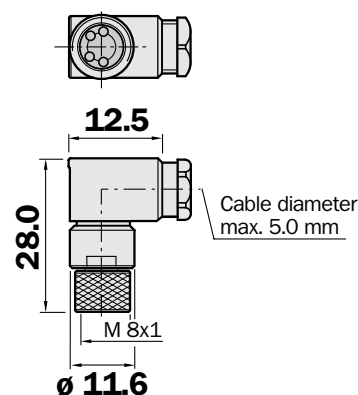
M 8 Cable receptacles, 4 pin, straight

Type	Order no.
DOS-0804-G	6 009 974



M 8 Cable receptacles, 4 pin, angled

Type	Order no.
DOS-0804-W	6 009 975

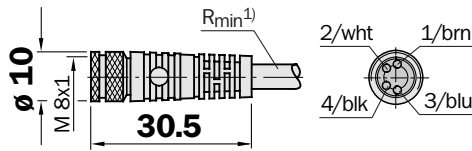


Dimension illustrations and ordering information

M 8 Cable receptacles, 4 pin, straight

Cable diameter 5 mm, 4 x 0.25 mm<sup>2</sup>, coating PVC

Type	Order no.	Cable length
DOL-0804-G02M	6 009 870	2 m
DOL-0804-G05M	6 009 872	5 m
DOL-0804-G10M	6 010 754	10 m

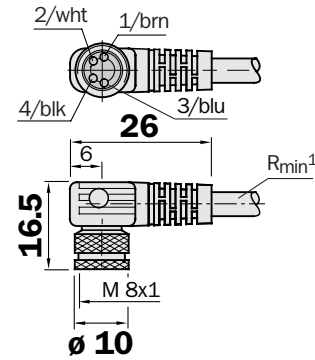


1) Minimum bending radius with dynamic use  
 $R_{min} = 20 \times \text{cable diameter}$

M 8 Cable receptacles, 4 pin, angled

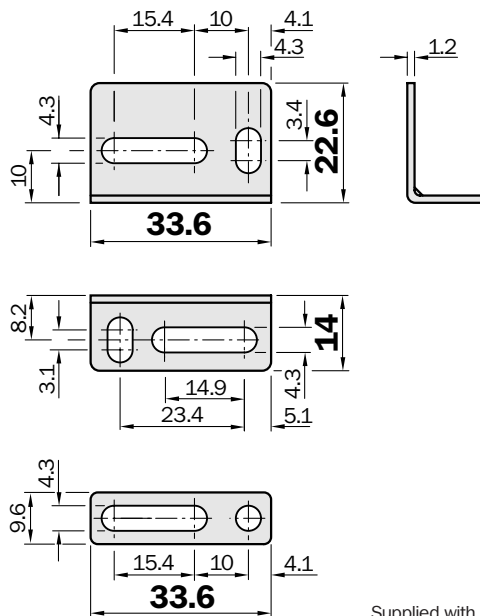
Cable diameter 5 mm, 4 x 0.25 mm<sup>2</sup>, coating PVC

Type	Order no.	Cable length
DOL-0804-W02M	6 009 871	2 m
DOL-0804-W05M	6 009 873	5 m
DOL-0804-W10M	6 010 755	10 m



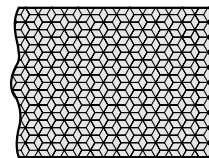
Mounting brackets for W 160

Type	Order no.
BEF-W 160	5 305 197



Reflective tape

Type	Order no.	
REF-DG-K	4 019 634	Ready-made
REF-DG	5 304 334	Sheet 749 x 914 mm

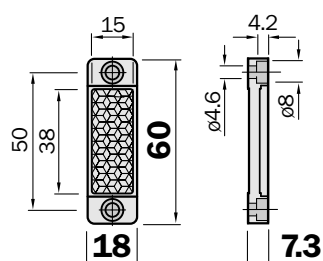


Supplied with WL 160T, WTB 160T BGS, WTE 160T, WTF 160T and WTM 160T Mark.

Plastic model for temperatures up to 65 °C

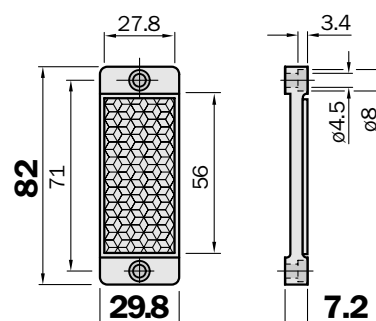
Reflector 20 x 40 mm

Type	Order no.
PL 20 A	1 012 719



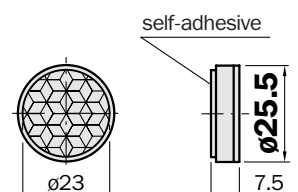
Reflector 30 x 50 mm

Type	Order no.
PL 30 A	1 002 314



Reflector 30 x 50 mm

Self-adhesive	
Type	Order no.
PL 31 A	1 002 315

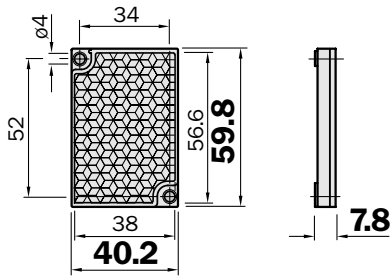


## Dimension illustrations and ordering information

### Reflector 40 x 60 mm

Self-adhesive

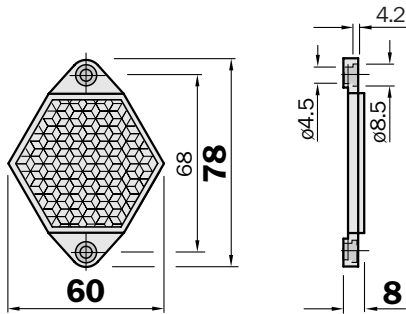
Type	Order no.
PL 40 A	1 012 720



### Reflector, hexagonal

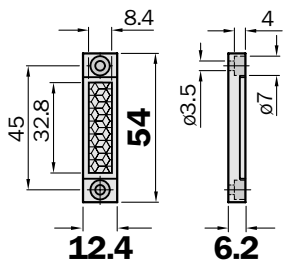
Opening width 48 mm

Type	Order no.
PL 50 A	1 000 132



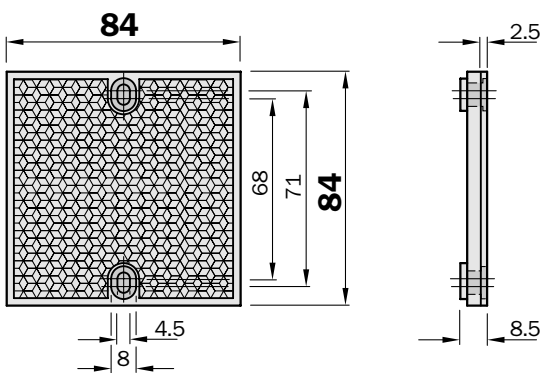
### Reflector 8 x 30 mm

Type	Order no.
P 45	5 308 002



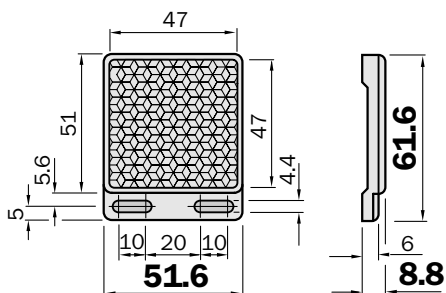
### Reflector 80 x 80

Type	Order no.
PL 80 A	1 003 865



### Reflector 47 x 47 mm

Type	Order no.
PL 250	5 304 812



Supplied with WL 160T.

Dimension illustrations and ordering information

Universal bracket for rod mounting

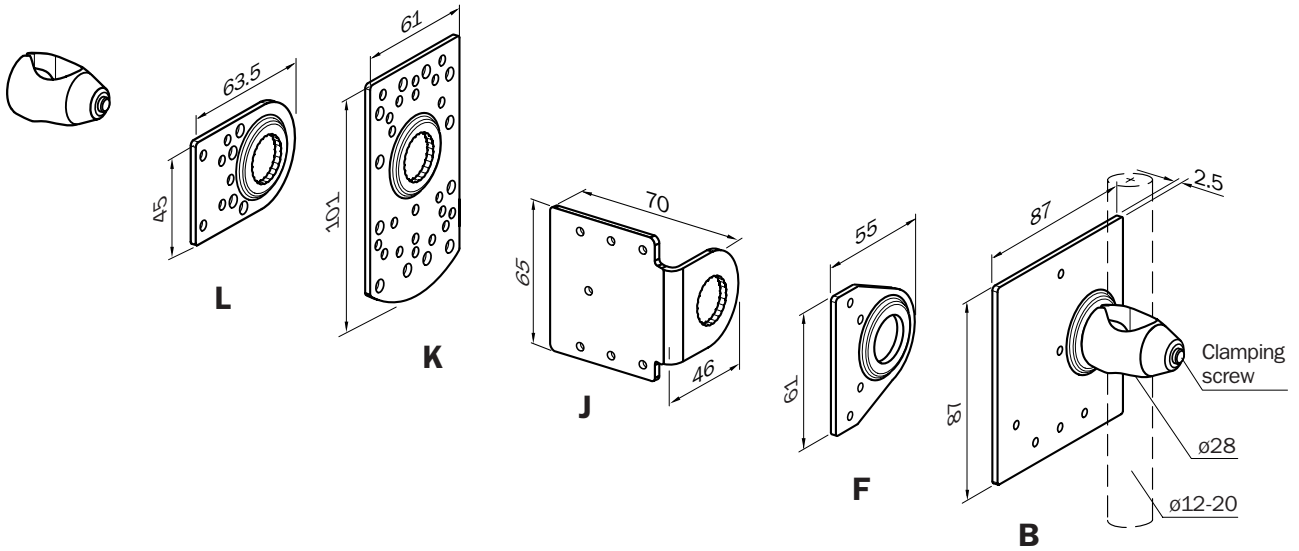


Plate	Type	Order no. <sup>1)</sup>	Sensors/reflectors
<b>B</b>	BEF-KHS-B01	2 022 459	P 250, PL 30 A, PL 40 A, PL 50 A, PL 80 A, C 110
<b>F</b>	BEF-KHS-F01	2 022 463	W 260, PL 20 A, P 250
<b>J</b>	BEF-KHS-J01	2 022 719	PL 20 A, PL 40 A, PL 50 A, P 250, C 110
<b>K</b>	BEF-KHS-K01	2 022 718	W 11, W 12-2, W 12L-2, W 14, W 18-2, W 23, W 24-2, W 27-2, W 30, W 32, W 34, W 36, KT 2, KT 5, KT 10, CS, LUT 3, DS 60, PL 20 A, PL 30 A, PL 40 A, PL 50 A, PL 80, A, P 250, C 110
<b>L</b>	BEF-KHS-L01	2 023 057	W 9-2, W 140, W 160, W 250, P 250
	BEF-KHS-KH1	2 022 726	Clamp bracket rod mounting without attachment plate and mounting material

<sup>1)</sup> Universal bracket and mounting screws included

Contact:

**Australia**

Phone +61 3 94 97 41 00  
0 08 33 48 02 – toll free  
Fax +61 3 94 97 11 87

**Austria**

Phone +43 2 23 66 22 88-0  
Fax +43 2 23 66 22 88-5

**Belgium/Luxembourg**

Phone +32 24 66 55 66  
Fax +32 24 63 35 07

**Brazil**

Phone +55 11 55 61 26 83  
Fax +55 11 5 35 41 53

**China/Hong Kong**

Phone +8 52 27 63 69 66  
Fax +8 52 27 63 63 11

**Czech Republic**

Phone +42 02 57 81 05 61  
Fax +42 02 57 81 05 59

**Denmark**

Phone +45 45 82 64 00  
Fax +45 45 82 64 01

**Finland**

Phone +3 58 9-7 28 85 00  
Fax +3 58 9-72 88 50 55

**France**

Phone +33 1-64 62 35 00  
Fax +33 1-64 62 35 77

**Germany**

Phone +49 76 81 2 02-0  
Fax +49 76 81 2 02-36 09

**Great Britain**

Phone +44 17 27-83 11 21  
Fax +44 17 27-85 67 67

**Italy**

Phone +390 2-92 14 20 62  
Fax +390 2-92 14 20 67

**Japan**

Phone +813 33 58-13 41  
Fax +813 33 58-05 86

**Netherlands**

Phone +31 3 02 29 25 44  
Fax +31 3 02 29 39 94

**Norway**

Phone +47 67 56 75 00  
Fax +47 67 56 66 10

**Poland**

Phone +48 2 26 44-83 45  
Fax +48 2 26 44-83 42

**Singapore**

Phone +65 7 44 37 32  
Fax +65 8 41 77 47

**Spain**

Phone +34 9 34 80 31 00  
Fax +34 9 34 73 44 69

**Sweden**

Phone +46 8-6 80 64 50  
Fax +46 8-7 10 18 75

**Switzerland**

Phone +41 4 16 19 29 39  
Fax +41 4 16 19 29 21

**Taiwan**

Phone +88 62 23 65 62 92  
Fax +88 62 23 68 73 97

**USA**

Phone +1 952 9 41-67 80  
Fax +1 952 9 41-92 87

Representatives and agencies  
in all major industrial nations.

The SICK logo consists of the word "SICK" in a bold, blue, sans-serif font. The letters are closely spaced and have a slight shadow effect.