

# W140-2: Miniature Photoelectric Switch Series with Large Scanning Ranges

	<b>BGS Photoelectric proximity switches</b>
	<b>Energ. Photoelectric proximity switches</b>
	<b>Photoelectric reflex switches</b>



	<b>Through-beam photoelectric switches</b>
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- Photoelectric proximity switch with adjustable scanning distance and background suppression (BGS): Scanning distance = adjustable up to 500 mm

The integrated W140-2 electronics has parameters comparable with the "big ones" and convenient W140-2 details simplify handling for mounting, operation startup and maintenance, for example:

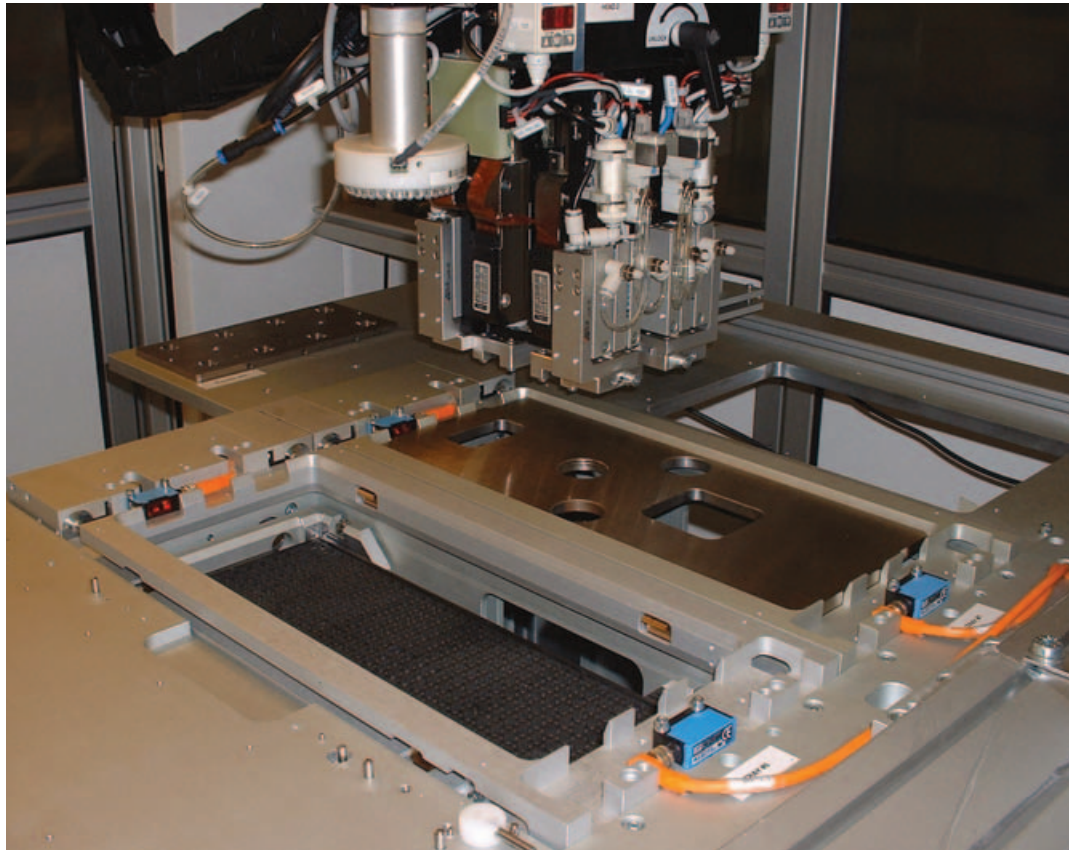
- Sensitivity/scanning distance adjustment,
- Operating reserve display,
- Optional connection cable or M8 plug, 3 pin or 4 pin.

**T**he W140-2 is a complete photoelectric switch series in miniature housing. It especially provides extensive scanning ranges for challenging requirements. The W140-2 highlights:

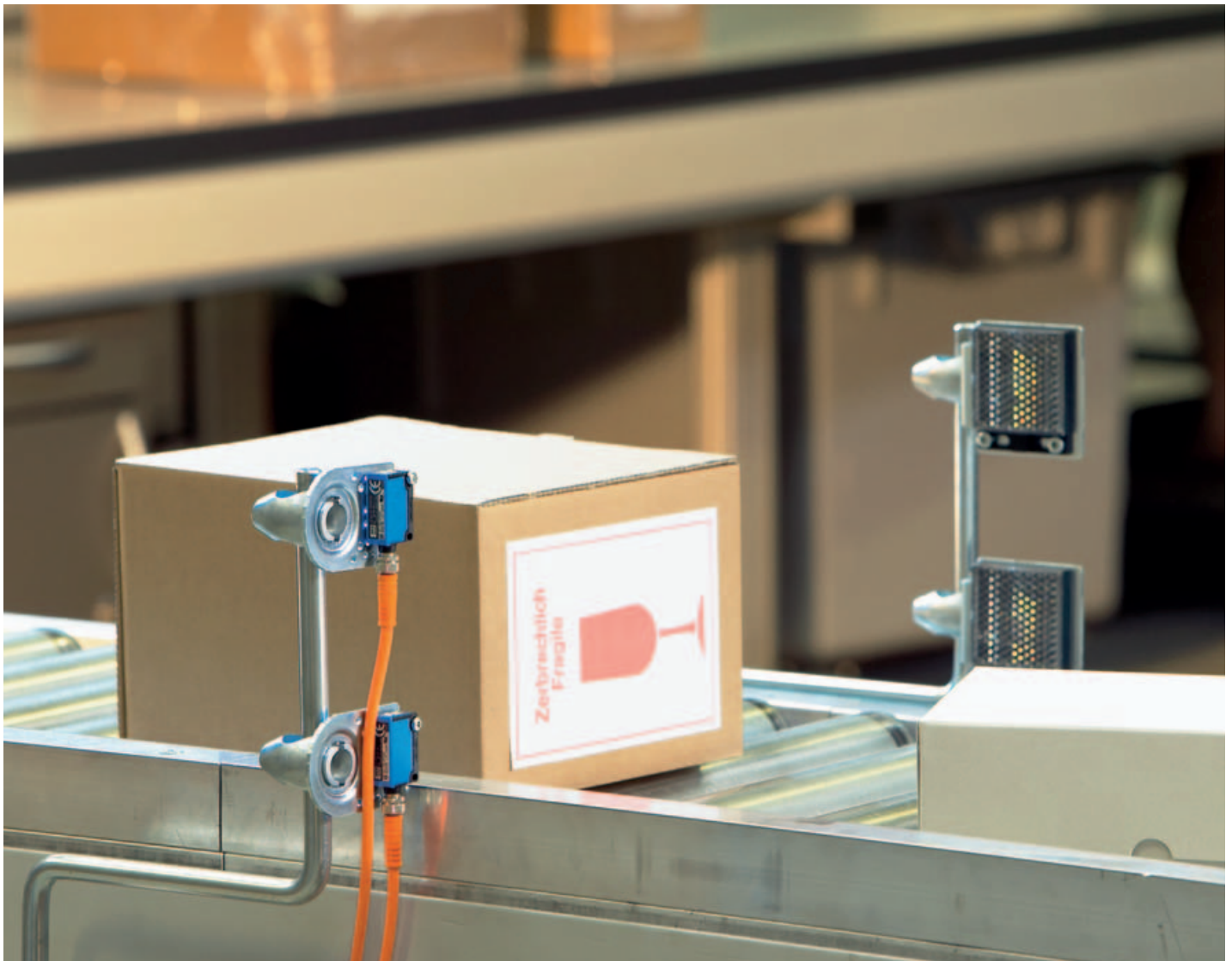
- Through-beam photoelectric switch: Scanning range = 16 m. Accessories: Slotted masks, polarisation filter tip adapters
- Photoelectric reflex switch with polarisation filter: Scanning range = 6.5 m (PL 80 A)
- Energetic photoelectric proximity switch: Scanning distance = 1000 mm; for standard scanning jobs

The M8 plug model especially provides an extremely simple solution for the island technologies being used increasingly these days. Distributor boxes for plug modules or bus systems: plug W140-2 and play. All this and more make the W140-2 very interesting for the branches storage and conveyor technology, electronic- and semiconductor industry, packaging machines, and mounting and handling technology.

► WTB140 photoelectric proximity switch checks the presence of components in an assembling machine.



▼ Using two WL140-2, packages can be sorted by size.



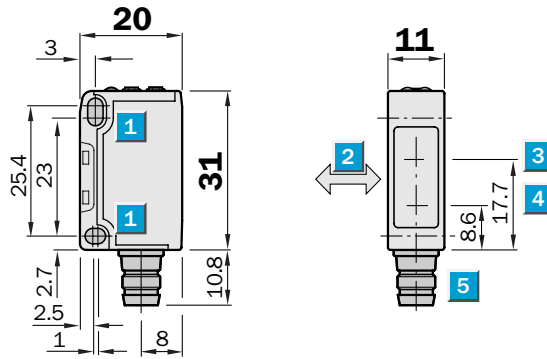
**Scanning distance**  
2 ... 500 mm

Photoelectric proximity switch

- With background suppression (BGS), consequently reliable detection of dark objects in front of a light background
- Scanning distance adjustable via potentiometer
- Red light as alignment aid
- Optionally with off delay  $t_{OFF} = 0 \dots 100 \text{ ms}$



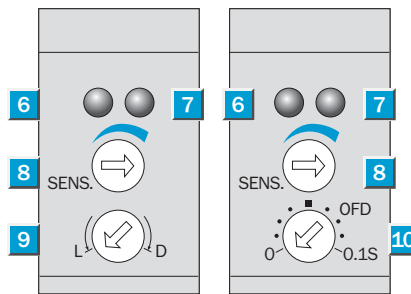
**Dimensional drawing**



**Adjustments possible**

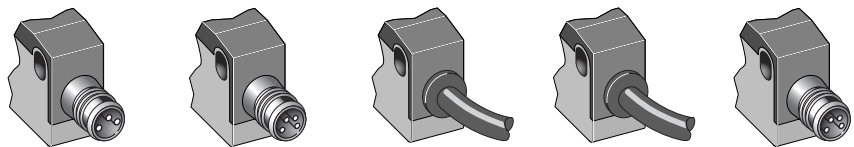
WTB140-N132	WTB140-N122
WTB140-N330	WTB140-N420
WTB140-N430	WTB140-P122
WTB140-P132	WTB140-P420
WTB140-P330	
WTB140-P430	

- 1** Mounting hole  $\varnothing 3.2 \text{ mm}$  for M3
- 2** Standard direction of the material to be scanned
- 3** Optics center, receiver
- 4** Optics center, transmitter
- 5** Connector
- 6** Green LED indicator: light reception with operating reserve  $>1.1$
- 7** Orange LED indicator: switching output active
- 8** Scanning distance control (5 turns)
- 9** Light/dark rotary switch:  
L = light switching, D = dark switching
- 10** OFD, selector switch ( $270^\circ$ ) off delay  $t_{OFF}$  ;  
 $t = 0 \text{ s (OFF)} \dots 0.1 \text{ s}$

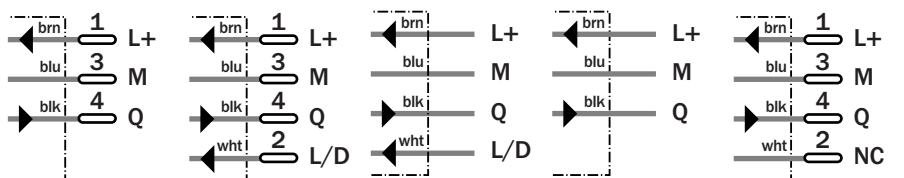


**Connection type**

WTB140-N330	WTB140-N420	WTB140-N122	WTB140-N132	WTB140-N430
WTB140-P330	WTB140-P420	WTB140-P122	WTB140-P132	WTB140-P430



M8, 3-pin	M8, 4-pin	4 x 0.18 mm <sup>2</sup>	3 x 0.18 mm <sup>2</sup>	M8, 4-pin
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**See chapter Accessories**

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

Technical specifications		WTB140-	N122	N132	N330	N420	N430	P122	P132	P330	P420	P430
Scanning distance typ. max.	2 ... 500 mm <sup>1)</sup>											
Operating distance	15 ... 500 mm <sup>1)</sup>											
Adjustment of operating distance	Potentiometer, 5 revolutions											
Light source, light type	LED, Red light, 680 nm <sup>2)</sup>											
Light spot diameter	Approx. 15 mm at 200 mm distance											
Angle of dispersion	Approx. 4.3 °											
Supply voltage V <sub>s</sub>	DC 10 ... 30 V <sup>3)</sup>											
Ripple	± 10 % <sup>4)</sup>											
Power consumption	≤ 30 mA <sup>5)</sup>											
Switching outputs	NPN: open collector: Q											
	PNP: open collector: Q											
Switching mode	Light-/dark-switching via L/D control cable											
	Light-/dark-switching via rotary switch											
Signal voltage PNP HIGH / LOW	V <sub>s</sub> - 1.8 V / approx. 0 V											
Signal voltage NPN HIGH / LOW	Approx. V <sub>s</sub> / < 1.8 V											
Output current I <sub>a</sub> max	100 mA											
Response time	≤ 0.5 ms <sup>6)</sup>											
Switching frequency	1,000 Hz <sup>7)</sup>											
Time delay	Selectable: 0 ... 100 ms											
Time type	t <sub>OFF</sub> (off delay)											
Connection type	Cable, PVC, 2 m <sup>8)</sup>											
	Connector, M8, 3-pin											
	Connector, M8, 4-pin											
VDE protection class	□ <sup>9)</sup>											
Circuit protection	V <sub>s</sub> connections reverse-polarity protected / In-/outputs short-circuit protected / Interference suppression / Outputs overcurrent and short-circuit protected											
Enclosure rating	IP 67											
Ambient temperature operation	-25 °C ... +55 °C											
Ambient temperature storage	-40 °C ... +70 °C											
Weight	Approx. 53 g											
	Approx. 9 g											
Housing material	PBT, PC											

<sup>1)</sup> Object with 90% remission (based on standard white to DIN 5033). Scanning distance control set to MAX

<sup>2)</sup> Average service life 100,000 h at

T<sub>a</sub> = +25°C

<sup>3)</sup> Limit values, operation in short-circuit protected network max. 8 A

<sup>4)</sup> may not exceed or fall short of

V<sub>s</sub> tolerances

<sup>5)</sup> without load

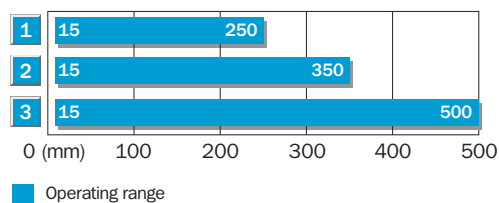
<sup>6)</sup> Signal transit time with resistive load

<sup>7)</sup> with light/dark ratio 1:1

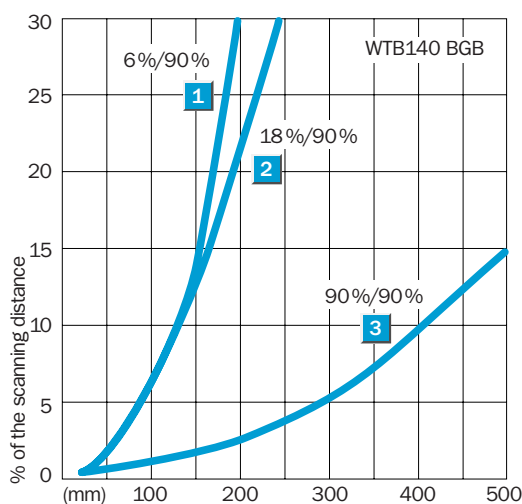
<sup>8)</sup> do not bend below 0 °C

<sup>9)</sup> Reference voltage 50 V DC

Scanning distance




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



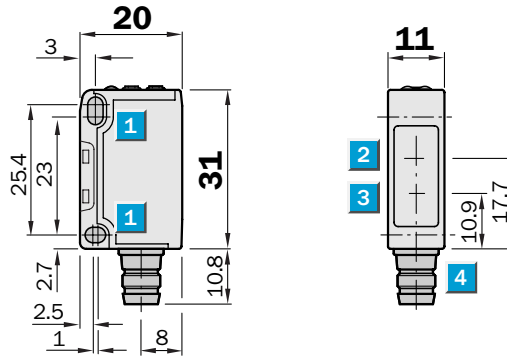
Ordering information

Type	Order no.
WTB140-N122	6 012 628
WTB140-N132	6 012 636
WTB140-N330	6 012 638
WTB140-N420	6 012 631
WTB140-N430	6 012 639
WTB140-P122	6 012 632
WTB140-P132	6 012 640
WTB140-P330	6 012 642
WTB140-P420	6 012 635
WTB140-P430	6 012 643

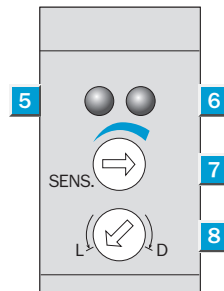

**Scanning distance**  
**0 ... 1,000 mm**  
**Photoelectric proximity switch**

- Energetic photoelectric switch for standard applications
- Adjustable switching point
- Red light as alignment aid
- LED indicator: operating reserve

### Dimensional drawing



### Adjustments possible

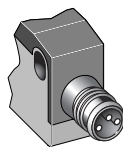


- 1 Mounting hole  $\varnothing$  3.2 mm for M3
- 2 Optics center, receiver
- 3 Optics center, transmitter
- 4 Connector
- 5 Green LED indicator: light reception with operating reserve  $>1.1$  and  $<0.9$
- 6 Orange LED indicator: switching output active
- 7 Sensitivity setting (270 °)
- 8 Light/dark rotary switch: L = light switching, D = dark switching

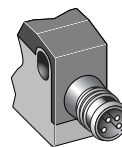
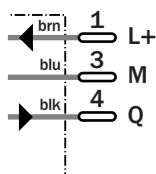


### Connection type

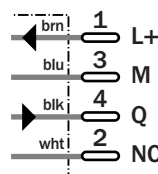
WTE140-2N330	WTE140-2N430	WTE140-2N132
WTE140-2P330	WTE140-2P430	WTE140-2P132



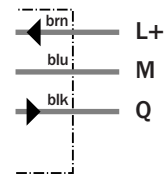
M8, 3-pin



M8, 4-pin



3 x 0.18 mm<sup>2</sup>



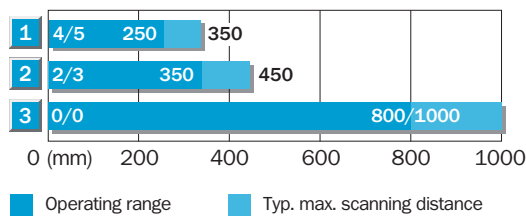
### See chapter Accessories

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

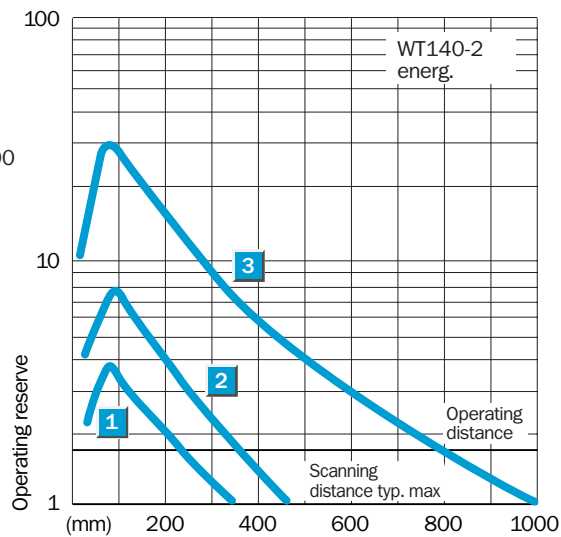
Technical specifications		WTE140-2	N132	N330	N430	P132	P330	P430				
Scanning distance typ. max.	0 ... 1,000 mm <sup>1)</sup>											
Operating distance	0 ... 800 mm <sup>1)</sup>											
Adjustment of operating distance	Potentiometer											
Light source, light type	LED, Red light, 680 nm <sup>2)</sup>											
Light spot diameter	Approx. 50 mm at 300 mm distance											
Angle of dispersion	Approx. 9.6 °											
Supply voltage V <sub>s</sub>	DC 10 ... 30 V <sup>3)</sup>											
Ripple	± 10 % <sup>4)</sup>											
Power consumption	≤ 30 mA <sup>5)</sup>											
Switching outputs	NPN: open collector: Q											
	PNP: open collector: Q											
Switching mode	Light-/dark-switching via rotary switch											
Signal voltage PNP HIGH / LOW	V <sub>s</sub> - 1.8 V / approx. 0 V											
Signal voltage NPN HIGH / LOW	Approx. V <sub>s</sub> / < 1.8 V											
Output current I <sub>a</sub> max	100 mA											
Response time	≤ 0.5 ms <sup>6)</sup>											
Switching frequency	1,000 Hz <sup>7)</sup>											
Connection type	Cable, PVC, 2 m <sup>8)</sup>											
	Connector, M8, 3-pin											
	Connector, M8, 4-pin											
VDE protection class	□ <sup>9)</sup>											
Circuit protection	V <sub>s</sub> connections reverse-polarity protected / In-/outputs short-circuit protected / Interference suppression / Outputs overcurrent and short-circuit protected											
Enclosure rating	IP 67											
Ambient temperature operation	-25 °C ... +55 °C											
Ambient temperature storage	-40 °C ... +70 °C											
Weight	Approx. 53 g											
	Approx. 9 g											
Housing material	PBT, PC											

1) Object with 90% remission (based on standard white to DIN 5033)  
 2) Average service life 100,000 h at T<sub>a</sub> = +25°C  
 3) Limit values, operation in short-circuit protected network max. 8 A  
 4) may not exceed or fall short of V<sub>s</sub> tolerances  
 5) without load  
 6) Signal transit time with resistive load  
 7) with light/dark ratio 1:1  
 8) do not bend below 0 °C  
 9) Reference voltage 50 V DC

**Scanning distance**




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



Ordering information	
Type	Order no.
WTE140-2N132	6 024 800
WTE140-2N330	6 024 802
WTE140-2N430	6 024 803
WTE140-2P132	6 024 804
WTE140-2P330	6 024 806
WTE140-2P430	6 024 807

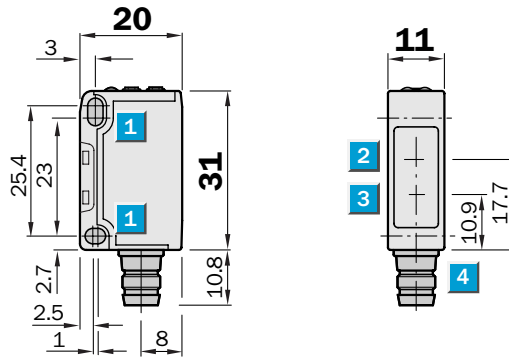
# Photoelectric reflex switch, WL140-2, red light - DC


**Scanning range**  
**0.01 ... 6.5 m**

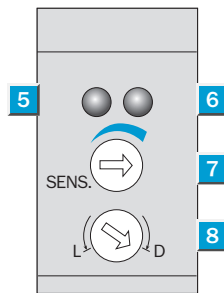
Photoelectric reflex switch

- Polarisation filter for detection of objects with shiny surfaces
- Also suitable for "Diamond Grade" reflective tape
- Red light as alignment aid
- LED indicator: operating reserve

## Dimensional drawing



## Adjustments possible

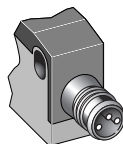


- 1 Mounting hole  $\varnothing$  3.2 mm for M3
- 2 Optics center, receiver
- 3 Optics center, transmitter
- 4 Connector
- 5 Green LED indicator: light reception with operating reserve  $>1.1$  and  $<0.9$
- 6 Orange LED indicator: switching output active
- 7 Sensitivity setting ( $270^\circ$ )
- 8 Light/dark rotary switch: L = light switching, D = dark switching

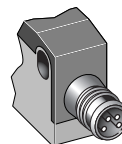
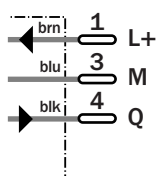


## Connection type

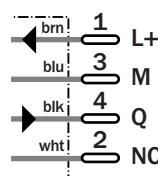
WL140-2N330	WL140-2N430	WL140-2N132
WL140-2P330	WL140-2P430	WL140-2P132



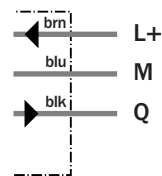
M8, 3-pin



M8, 4-pin



3 x 0.18 mm<sup>2</sup>



## See chapter Accessories

- Connector, M8, 3-pin
- Connector, M8, 4-pin
- Mounting systems
- Reflectors <sup>\*)</sup>

<sup>\*)</sup> Reflector P45 included with delivery

Technical specifications		WL140-2	N132	N330	N430	P132	P330	P430				
<b>Scanning range typ. max.</b>	0.01 ... 6.5 m											
<b>Scanning range, recommended</b>	0.01 ... 5 m											
Relating to	Reflector PL 80 A											
Sensitivity adjustment	Potentiometer											
<b>Light source, light type</b>	LED, Red light, 680 nm <sup>1)</sup>											
Light spot diameter	Approx. 250 mm at 2.5 m distance											
Angle of dispersion	Approx. 5.8 °											
Polarisation filter	✓											
<b>Supply voltage V<sub>s</sub></b>	DC 10 ... 30 V <sup>2)</sup>											
Ripple	± 10 % <sup>3)</sup>											
Power consumption	≤ 30 mA <sup>4)</sup>											
<b>Switching outputs</b>	NPN: open collector: Q											
	PNP: open collector: Q											
Switching mode	Light-/dark-switching via rotary switch											
Signal voltage PNP HIGH / LOW	V <sub>s</sub> - 1.8 V / approx. 0 V											
Signal voltage NPN HIGH / LOW	Approx. V <sub>s</sub> / < 1.8 V											
Output current I <sub>a</sub> max	100 mA											
Response time	≤ 0.5 ms <sup>5)</sup>											
Switching frequency	1,000 Hz <sup>6)</sup>											
<b>Connection type</b>	Cable, PVC, 2 m <sup>7)</sup>											
	Connector, M8, 3-pin											
	Connector, M8, 4-pin											
<b>VDE protection class</b>	□ <sup>8)</sup>											
<b>Circuit protection</b>	V <sub>s</sub> connections reverse-polarity protected / In-/outputs short-circuit protected / Interference suppression / Outputs overcurrent and short-circuit protected											
<b>Enclosure rating</b>	IP 67											
<b>Ambient temperature operation</b>	-25 °C ... +55 °C											
<b>Ambient temperature storage</b>	-40 °C ... +70 °C											
<b>Weight</b>	Approx. 53 g											
	Approx. 9 g											
<b>Housing material</b>	PBT, PMMA											

<sup>1)</sup> Average service life 100,000 h at T<sub>a</sub> = +25 °C

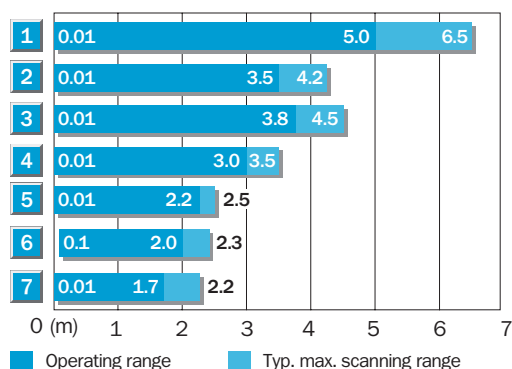
<sup>2)</sup> Limit values, operation in short-circuit

protected network max. 8 A  
<sup>3)</sup> may not exceed or fall short of

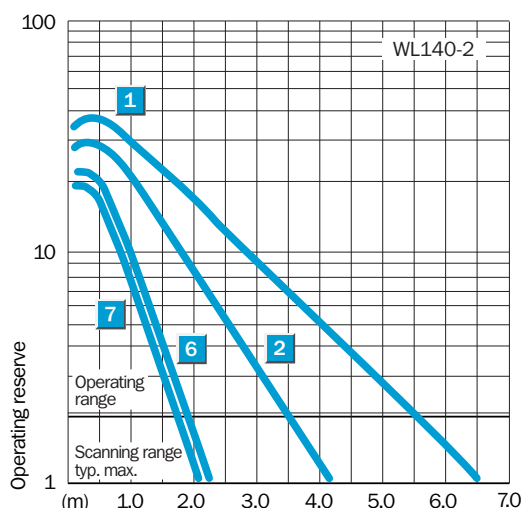
V<sub>s</sub> tolerances  
<sup>4)</sup> without load  
<sup>5)</sup> Signal transit time with resistive load

<sup>6)</sup> with light/dark ratio 1:1  
<sup>7)</sup> do not bend below 0 °C  
<sup>8)</sup> Reference voltage 50 V DC

**Scanning range and operating reserve**



Reflector type	Operating range
1 PL 80 A	0.01 ... 5.0 m
2 P 250	0.01 ... 3.5 m
3 PL 50 A/PL 40 A	0.01 ... 3.8 m
4 PL 30 A/PL 31 A	0.01 ... 3.0 m
5 PL 20 A	0.01 ... 2.2 m
6 Reflective tape Diamond Grade	0.1 ... 2.0 m (100 x 100 mm <sup>2</sup> )
7 P 45	0.01 ... 1.7 m



Ordering information	
Type	Order no.
WL140-2N132	6 024 792
WL140-2N330	6 024 794
WL140-2N430	6 024 795
WL140-2P132	6 024 796
WL140-2P330	6 024 798
WL140-2P430	6 024 799



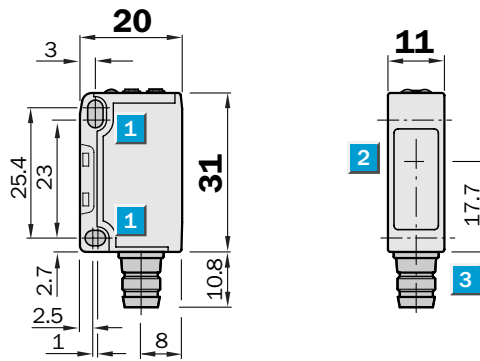
**Scanning range**  
0 ... 16 m

Through-beam photoelectric switch

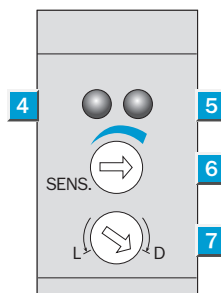
- Polarisation filter (accessories), consequently no mutual interference when mounted in pairs
- Slotted masks (accessories) for detecting small parts or positioning jobs
- Sensitivity adjustable
- Red light as alignment aid
- LED indicator: operating reserve



### Dimensional drawing



### Adjustments possible



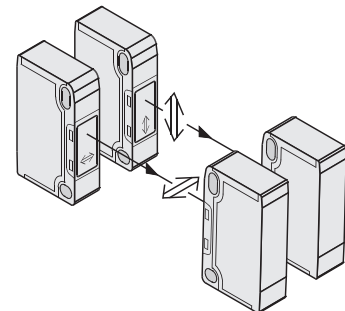
- 1 Mounting hole  $\varnothing$  3.2 mm for M3
- 2 Optics center transmitter, WS140-2  
Optics receiver transmitter, WE140-2
- 3 Connector
- 4 Green LED indicator: light reception with operating reserve  $> 1.1$  and  $< 0.9$  (WE140-2)
- 5 Orange LED indicator: Switching output active
- 6 Sensitivity setting ( $270^\circ$ , WE140-2)
- 7 Light/dark rotary switch: L = light switching, D = dark switching (WE140-2)

### WS/WE140-2 mounting in pairs

No mutual interference thanks to use of polarisation filter tip adapters BL-140-POLF e.g.

Pair 1: BL-140-POLF with polarisation level

Pair 2: BL-140-POLF with polarisation level

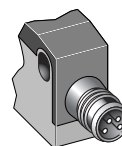
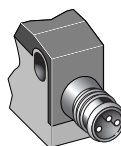


### Connection type

WS/WE140-2N330  
WS/WE140-2P330

WS/WE140-2N430  
WS/WE140-2P430

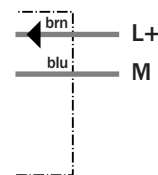
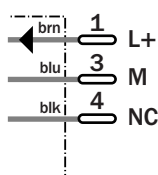
WS/WE140-2N132  
WS/WE140-2P132



Sender M8, 3-pin

Sender M8, 4-pin

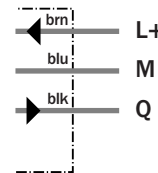
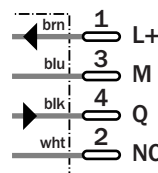
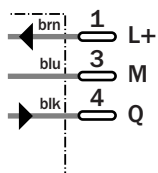
Sender 2 x 0.18 mm<sup>2</sup>



Receiver M8, 3-pin

Receiver M8, 4-pin

Receiver 3 x 0.18 mm<sup>2</sup>



### See chapter Accessories

- Connector, M8, 3-pin
- Connector, M8, 4-pin
- Masks
- Mounting systems
- Polarisation filters

Technical specifications		WS/WE140-2	N132	N330	N430	P132	P330	P430				
<b>Scanning range typ. max.</b>	0 ... 16 m											
<b>Scanning range, recommended</b>	0 ... 13 m											
Sensitivity adjustment	Potentiometer											
<b>Light source, light type</b>	LED, Red light, 680 nm <sup>1)</sup>											
Light spot diameter	Approx. 1700 mm at 13 m distance											
Angle of dispersion	Approx. 7.6 °											
Angle of reception	Approx. 15 °											
<b>Supply voltage V<sub>s</sub></b>	DC 10 ... 30 V <sup>2)</sup>											
Ripple	± 10 % <sup>3)</sup>											
Power consumption, sender	≤ 15 mA <sup>4)</sup>											
Power consumption, receiver	≤ 20 mA <sup>4)</sup>											
<b>Switching outputs</b>	NPN: open collector: Q											
	PNP: open collector: Q											
Switching mode	Light-/dark-switching via rotary switch											
Signal voltage PNP HIGH / LOW	V <sub>s</sub> - 1.8 V / approx. 0 V											
Signal voltage NPN HIGH / LOW	Approx. V <sub>s</sub> / < 1.8 V											
Output current I <sub>a</sub> max	100 mA											
Response time	≤ 0.5 ms <sup>5)</sup>											
Switching frequency	1,000 Hz <sup>6)</sup>											
<b>Connection type</b>	Cable, PVC, 2 m <sup>7)</sup>											
	Connector, M8, 3-pin											
	Connector, M8, 4-pin											
<b>VDE protection class</b>	□ <sup>8)</sup>											
<b>Circuit protection</b>	V <sub>s</sub> connections reverse-polarity protected / In-/outputs short-circuit protected (only WE140-2) / Interference suppression (only WE140-2) / Outputs overcurrent and short-circuit protected (only WE140-2)											
<b>Enclosure rating</b>	IP 67											
<b>Ambient temperature operation</b>	-25 °C ... +55 °C											
<b>Ambient temperature storage</b>	-40 °C ... +70 °C											
<b>Weight</b>	Approx. 53 g											
	Approx. 9 g											
<b>Housing material</b>	PBT, PC											

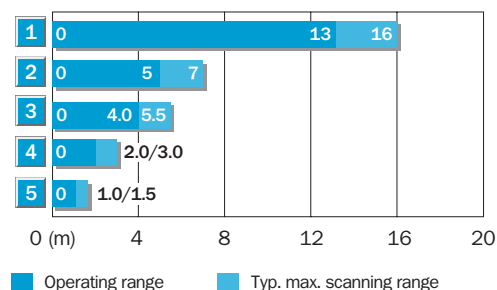
<sup>1)</sup> Average service life 100,000 h at T<sub>a</sub> = +25 °C  
<sup>2)</sup> Limit values, operation in short-circuit

protected network max. 8 A  
<sup>3)</sup> may not exceed or fall short of

V<sub>s</sub> tolerances  
<sup>4)</sup> without load  
<sup>5)</sup> Signal transit time with resistive load

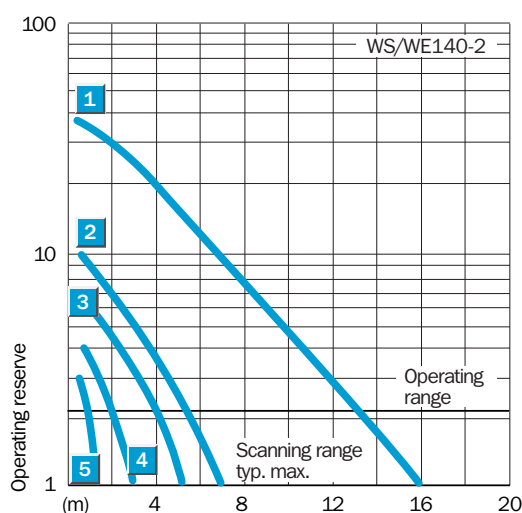
<sup>6)</sup> with light/dark ratio 1:1  
<sup>7)</sup> do not bend below 0 °C  
<sup>8)</sup> Reference voltage 50 V DC

**Scanning range and operating reserve**



Scanning range reduction when slotted masks are used

1	Without masks/polarizing filter
2	With polarizing filter tip adapter
3	With slotted mask, width 2.0 mm
4	With slotted mask, width 1.0 mm
5	With slotted mask, width 0.5 mm



**Ordering information**

Type	Order no.
WS/WE140-2N132	6 024 784
WS/WE140-2N330	6 024 786
WS/WE140-2N430	6 024 787
WS/WE140-2P132	6 024 788
WS/WE140-2P330	6 024 790
WS/WE140-2P430	6 024 791