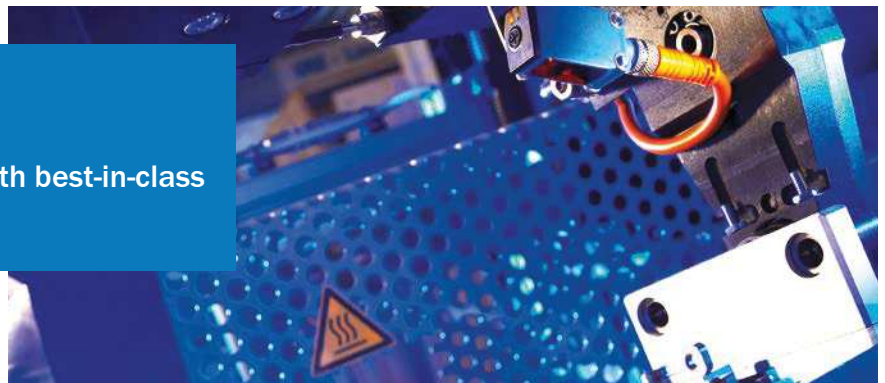


Photoelectric sensor family with best-in-class performance



F



### Product description

The W4S-3 family of photoelectric sensors offers best-in-class performance in a slim housing design. Universal use of the latest SIRIC® and PinPoint LED technologies provide maximum reliability in the detection of all objects, including

transparent and shiny objects like blisters, e-cards and aluminum cans. Optical axes on the flat side enable simple, space-saving integration in the machine environment – even without separate mounting brackets.

### At a glance

- Best background suppression sensor in its class
- Universal use of PinPoint LED technology in all models
- BGS proximity sensor with laser-like light spot for precise detection tasks
- Reliable setting via 5-turn potentiometer, teach-in pushbutton, teach-in via cable or IO-Link
- Flexible sensor settings, monitoring, advanced diagnostics, and visualization thanks to IO-Link

### Your benefits

- Application versatility due to reliable detection of shiny, transparent or jet-black objects
- Very quick and easy alignment due to the highly visible, intense PinPoint LED light spot
- Rugged mounting system with M3 threaded metal inserts reduces maintenance costs due to a long service life
- Background suppression sensors with a laser-like light spot reduce costs and installation of additional protective measures by replacing laser sensors
- IO-Link provides easy data access from the PLC
- Quick and easy configuration
- Quick and easy integration using function blocks

### Additional information

- Detailed technical data . . . . . F-261
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- Bar diagrams . . . . . F-268
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- Recommended accessories . . . . F-270

→ [www.mysick.com/en/W4S-3](http://www.mysick.com/en/W4S-3)

For more information, just enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples and much more.



## Detailed technical data

## Features

	WTB4S-3	WL4S-3	WSE4S-3
Sensor principle	Photoelectric proximity sensor	Photoelectric retro-reflective sensor	Through-beam photoelectric sensor
Detection principle	Background suppression	Autocollimation	-
Dimensions (W x H x D)	12.2 mm x 41.8 mm x 17.3 mm		
Housing design (light emission)	Rectangular		
Sensing range max.	4 mm ... 180 mm <sup>1)</sup> (depending on type)	0 m ... 5 m <sup>2)</sup> (depending on type)	0 m ... 5 m
Sensing range	10 mm ... 180 mm <sup>1)</sup> (depending on type)	0 m ... 3 m <sup>2)</sup> (depending on type)	0 m ... 4.5 m
Type of light	Visible red light		
Light source <sup>3)</sup>	PinPoint LED <sup>2,0</sup>		
Wave length	650 nm / 660 nm (depending on type)	650 nm	
Adjustment	Potentiometer, 5 turns, Cable, Single teach-in button (depending on type)	Single teach-in button	-

<sup>1)</sup> Object with 90 % reflectance (referred to standard white, DIN 5033)

<sup>2)</sup> PL80A.

<sup>3)</sup> Average service life of 100,000 h at T<sub>A</sub> = +25 °C.

## Mechanics/electronics

	WTB4S-3	WL4S-3	WSE4S-3
Supply voltage <sup>1)</sup>	10 V DC ... 30 V DC		
Ripple <sup>2)</sup>	< 5 V <sub>pp</sub>		
Power consumption	≤ 20 mA <sup>3)</sup>		≤ 20 mA <sup>4)5)</sup>
Output type	PNP / NPN (depending on type)		
Output function	Complementary		-
Switching mode	Light switching / Dark-switching / Light/dark-switching (depending on type)		
Output current I <sub>max.</sub>	≤ 100 mA		
Response time <sup>6)</sup>	< 0.5 ms		
With IO-Link <sup>8)</sup>	< 0.65 ms	-	
Switching frequency <sup>7)</sup>	1,000 Hz		
Connection type	Cable, 2 m <sup>9)</sup> / Male connector, M8 / Cable with connector, M12, 150 mm <sup>9)</sup> (depending on type)		
Circuit protection	A <sup>10)</sup> , C <sup>11)</sup> , D <sup>12)</sup>		
Protection class	III		
Weight	30 g		40 g
Polarisation filter	-	✓	-
IO-Link	-/✓ (COM2)	-	
Housing material	ABS		
Optics material	PMMA		

	WTB4S-3	WL4S-3	WSE4S-3
Enclosure rating	IP 66, IP 67		
Test input sender off	-		"Test" to 0 V
Ambient operating temperature	-40 °C ... +60 °C		
Ambient storage temperature	-40 °C ... +75 °C		

- <sup>1)</sup> Limit values.
- <sup>2)</sup> May not exceed or fall short of  $V_s$  tolerances.
- <sup>3)</sup> Without load.
- <sup>4)</sup> Sender.
- <sup>5)</sup> Receiver.
- <sup>6)</sup> Signal transit time with resistive load.
- <sup>7)</sup> With light/dark ratio 1:1.
- <sup>8)</sup> With light/dark ratio 1:1 in switching mode. Different values possible in COM2 mode.
- <sup>9)</sup> Do not bend below 0 °C.
- <sup>10)</sup> A =  $V_s$  connections reverse-polarity protected.
- <sup>11)</sup> C = interference suppression.
- <sup>12)</sup> D = outputs overcurrent and short-circuit protected.

## Ordering information

Other models available at [www.mysick.com/en/W4S-3](http://www.mysick.com/en/W4S-3)

### WTB4S-3

- **Sensor principle:** photoelectric proximity sensor
- **Detection principle:** background suppression

Sensing range max. <sup>1)</sup>	Light spot size (distance)	Output type	Adjustment	Switching mode	Connection	Con- nection diagram	Model name	Part no.
4 mm ... 120 mm	Ø 2.5 mm (50 mm)	PNP	Potentiometer, 5 turns	Light switching	Cable, 3-wire, 2 m, PVC	Cd-043	WTB4S-3P1331	1042059
					Connector M8, 3-pin	Cd-045	WTB4S-3P2131	1042056
				Dark-switching	Connector M8, 3-pin	Cd-045	WTB4S-3F2131	1042060
				Light/dark-switching	Connector M8, 4-pin	Cd-083	WTB4S-3P2231	1042057
			Single teach-in button	Light switching	Cable, 3-wire, 2 m, PVC	Cd-043	WTB4S-3P1332	1052284
					Connector M8, 3-pin	Cd-045	WTB4S-3P2132	1042053
			Light/dark-switching	Connector M8, 4-pin	Cd-083	WTB4S-3P2232	1054282	
		Cable, Single teach-in button <sup>2)</sup>	Light switching	Connector M8, 4-pin	Cd-092	WTB4S-3P2234	1042050	
		NPN	Potentiometer, 5 turns	Light switching	Cable, 3-wire, 2 m, PVC	Cd-043	WTB4S-3N1331	1042062
					Connector M8, 3-pin	Cd-045	WTB4S-3N2131	1042061
				Dark-switching	Cable, 3-wire, 2 m, PVC	Cd-043	WTB4S-3E1331	1042064
				Light/dark-switching	Cable, 4-wire, 2 m, PVC	Cd-094	WTB4S-3N1131	1042063
			Single teach-in button	Light switching	Cable, 3-wire, 2 m, PVC	Cd-043	WTB4S-3N1332	1042055
					Cable, 4-wire, 2 m, PVC	Cd-094	WTB4S-3N1132	1051563
Cable, Single teach-in button <sup>2)</sup>	Light switching		Cable, 4-wire, 2 m, PVC	Cd-093	WTB4S-3N1134	1042052		
Single teach-in button	Light/dark-switching	Connector M8, 4-pin	Cd-083	WTB4S-3N2232	1051872			

- <sup>1)</sup> Object with 90 % reflectance (referred to standard white, DIN 5033)
- <sup>2)</sup> External teach-in: pulse > 2 s with voltage  $U_v$  with PNP and M with NPN.

Sensing range max. <sup>1)</sup>	Light spot size (distance)	Output type	Adjustment	Switching mode	Connection	Con- nection diagram	Model name	Part no.
4 mm ... 180 mm	Ø 6.5 mm (150 mm)	PNP	Potentiometer, 5 turns	Light switching	Cable, 3-wire, 2 m, PVC	Cd-043	WTB4S-3P1361	1042043
					Connector M8, 3-pin	Cd-045	WTB4S-3P2161	1042040
				Dark-switching	Connector M8, 3-pin	Cd-045	WTB4S-3F2161	1042044
			Light/dark- switching	Connector M8, 4-pin	Cd-083	WTB4S-3P2261	1042041	
		NPN	Potentiometer, 5 turns	Light switching	Cable, 3-wire, 2 m, PVC	Cd-043	WTB4S-3N1361	1042046
					Connector M8, 3-pin	Cd-045	WTB4S-3N2161	1042045
Dark-switching	Cable, 3-wire, 2 m, PVC			Cd-043	WTB4S-3E1361	1042047		

<sup>1)</sup> Object with 90 % reflectance (referred to standard white, DIN 5033)

<sup>2)</sup> External teach-in: pulse > 2 s with voltage U<sub>v</sub> with PNP and M with NPN.

### WTB4S-3 health output

- **Sensor principle:** photoelectric proximity sensor
- **Detection principle:** background suppression

Sensing range max. <sup>1)</sup>	Light spot size (distance)	Output type	Adjustment	Switching mode	Connection	Con- nection diagram	Model name	Part no.
4 mm ... 120 mm	Ø 2.5 mm (50 mm)	NPN	Potentiometer, 5 turns	Light switching	Cable, 3-wire, 2 m, PVC	Cd-043	WTB4S-3W1331	1050573

<sup>1)</sup> Object with 90 % reflectance (referred to standard white, DIN 5033)



### WTB4SC-3 IO-Link

- **Sensor principle:** photoelectric proximity sensor
- **Detection principle:** background suppression
- **Light spot size (distance):** Ø 6.5 mm (150 mm)
- **Output type):** PNP
- **Switching mode:** light/dark-switching (parametrisable via IO-Link)

Sensing range max. <sup>1)</sup>	Adjust- ment	IO-Link	Advanced functions	Connection	Con- nection diagram	Model name	Part no.
4 mm ... 180 mm	Cable, Single teach-in button	Standard functions	-	Connector M8, 4-pin	Cd-098	WTB4SC-3P2262	1042033
		Standard functions, advanced function	Timer, False Tripping Suppression (Debouncing)			WTB4SC-3P2262A70	1067756
			High-Speed Counter, False Tripping Suppression (Debouncing)			WTB4SC-3P2262A71	1067757
			Time Stamp, False Tripping Suppression (Debouncing)			WTB4SC-3P2262A91	1067758

<sup>1)</sup> Object with 90 % reflectance (referred to standard white, DIN 5033)

WL4S-3

- **Sensor principle:** photoelectric retro-reflective sensor
- **Detection principle:** autocollimation

Sensing range max. <sup>1)</sup>	Light spot size (distance)	Output type	Adjustment	Switching mode	Connection	Con-nection diagram	Model name	Part no.		
0 m ... 4 m	Ø 45 mm (1.5 m)	PNP	-	Light switching	Connector M8, 3-pin	Cd-045	WL4S-3P2130	1042069		
				Dark-switching	Cable, 3-wire, 2 m, PVC	Cd-043	WL4S-3F1330	1042068		
					Connector M8, 3-pin	Cd-045	WL4S-3F2130	1042065		
		Light/dark-switching		Connector M8, 4-pin	Cd-083	WL4S-3P2230	1042066			
		NPN		-	-	Light switching	Cable, 3-wire, 2 m, PVC	Cd-043	WL4S-3N1330	1042073
						Dark-switching	Cable, 3-wire, 2 m, PVC	Cd-043	WL4S-3E1330	1042072
Connector M8, 3-pin	Cd-045		WL4S-3E2130				1042071			
0 m ... 5 m	Ø 45 mm (1.5 m)	PNP	Single teach-in button	Light switching	Connector M8, 3-pin	Cd-045	WL4S-3P2132	1042077		
				Dark-switching	Cable, 3-wire, 2 m, PVC	Cd-043	WL4S-3F1332	1042076		
					Connector M8, 3-pin	Cd-045	WL4S-3F2132	1042074		
				Light/dark-switching	Connector M8, 4-pin	Cd-083	WL4S-3P2232	1042078		
		NPN	Single teach-in button	-	Light switching	Cable, 3-wire, 2 m, PVC	Cd-043	WL4S-3N1332	1042082	
						Cable, 3-wire, 2 m, PVC	Cd-043	WL4S-3E1332	1042081	
					Dark-switching	Connector M8, 3-pin	Cd-045	WL4S-3E2132	1042080	
						Cable, 4-wire, 2 m, PVC	Cd-107	WL4S-3W1132	1042083	

<sup>1)</sup> PL80A.



 WL4S-3 IO-Link

- **Sensor principle:** photoelectric retro-reflective sensor
- **Detection principle:** autocollimation
- **Light spot size:** Ø 2 mm (20 mm)
- **Output type:** PNP
- **Switching mode:** light/dark-switching
- **Switching frequency:** 2,000 Hz
- **Response time:** 0.25 ms

Sensing range max. <sup>1)</sup>	Adjust-ment	IO-Link	Advanced functions	Connection	Con-nection diagram	Model name	Part no.
0 mm ... 70 mm	Cable, single teach-in button	Standard functions	-	Connector M8, 4-pin	Cd-098	WL4SC-3P2232	1065315
		Standard functions, Advanced functions	Timer, False Tripping Suppression (Debouncing)			WL4SC-3P2232A70	1067760
			High-Speed Counter, False Tripping Suppression (Debouncing)			WL4SC-3P2232A71	1067761
			Time Stamp, False Tripping Suppression (Debouncing)			WL4SC-3P2232A91	1067762

<sup>1)</sup> PL80A.

### WL4S-3 health output

- **Sensor principle:** photoelectric retro-reflective sensor
- **Detection principle:** autocollimation

Sensing range max. <sup>1)</sup>	Light spot size (distance)	Output type	Adjustment	Switching mode	Connection	Con-nection diagram	Model name	Part no.
0 m ... 5 m	Ø 45 mm (1.5 m)	PNP	Single teach-in button	Dark-switching	Connector M8, 4-pin	Cd-107	WL4S-3V2232	1042079

<sup>1)</sup> PL80A.

### WSE4S-3

- **Sensor principle:** through-beam photoelectric sensor

Sensing range max.	Light spot size (distance)	Output type	Switching mode	Connection	Con-nection diagram	Model name	Part no.
0 m ... 5 m	Ø 50 mm (2 m)	PNP	Light switching	Connector M8, 3-pin	Cd-069	WSE4S-3P2130	1052892
			Dark-switching	Cable, 3-wire, 2 m, PVC	Cd-061	WSE4S-3F1330	1052879
				Connector M8, 3-pin	Cd-069	WSE4S-3F2130	1052890
		NPN	Light switching	Cable, 3-wire, 2 m, PVC	Cd-061	WSE4S-3N1330	1052872
			Dark-switching	Cable, 3-wire, 2 m, PVC	Cd-061	WSE4S-3E1330	1052867
				Connector M8, 3-pin	Cd-069	WSE4S-3E2130	1052876



### WSE4S-3, IO-Link

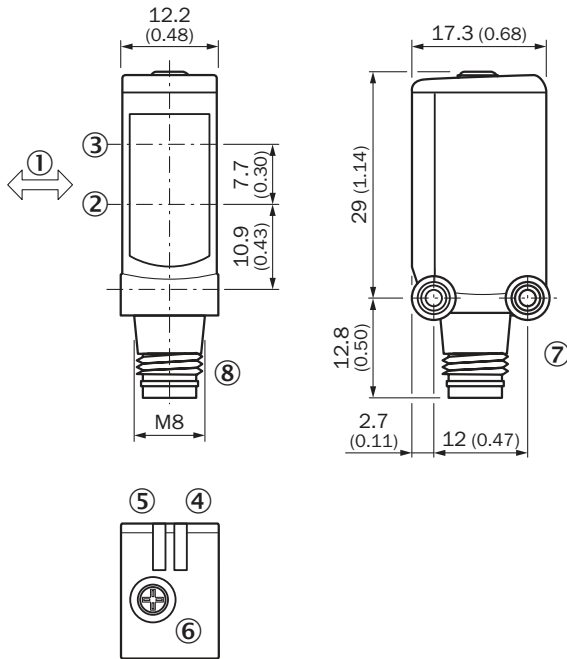
- **Sensor principle:** through-beam photoelectric sensor
- **Light spot size:** Ø 50 mm (2 m)
- **Output type:** PNP
- **Switching mode:** light/dark-switching
- **Connection:** connector M8, 4-pin

Sensing range max.	IO-Link	Advanced functions	Connection	Con-nection diagram	Model name	Part no.
0 m ... 5 m	Standard functions	-	Connector M8, 4-pin	Cd-268	WSE4SC-3P2230	1067767
	Standard functions, Advanced functions	Timer, False Tripping Suppression (Debouncing)			WSE4SC-3P2230A70	1067768
		High-Speed Counter, False Tripping Suppression (Debouncing)			WSE4SC-3P2230A71	1067769
		Time Stamp, False Tripping Suppression (Debouncing)			WSE4SC-3P2230A91	1067770

Dimensional drawings

Dimensions in mm (inch)

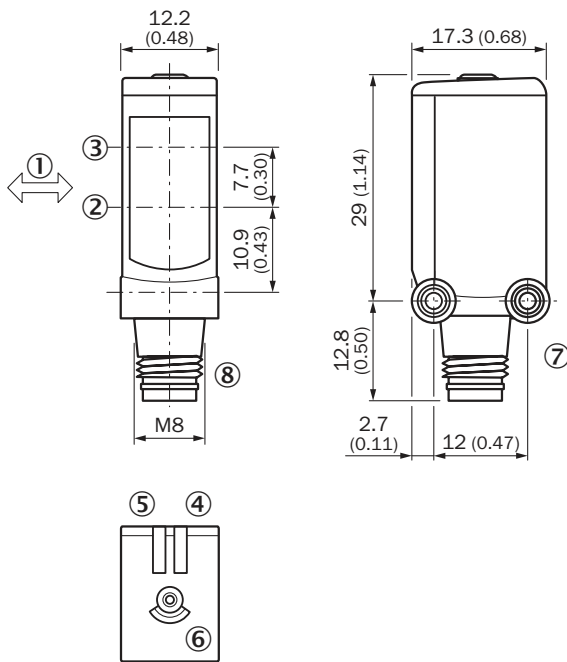
WTB4S-3, potentiometer



- ① Standard direction of the material being detected
- ② Optical axis receiver
- ③ Optical axis sender
- ④ Status indicator LED green: power on
- ⑤ Status indicator LED, yellow: Status of received light beam
- ⑥ Potentiometer
- ⑦ Threaded mounting hole M3
- ⑧ Connection

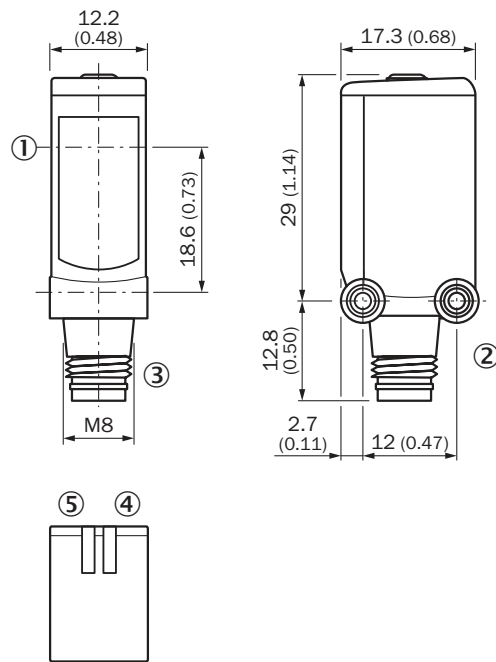
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WTB4S-3, Single teach-in button



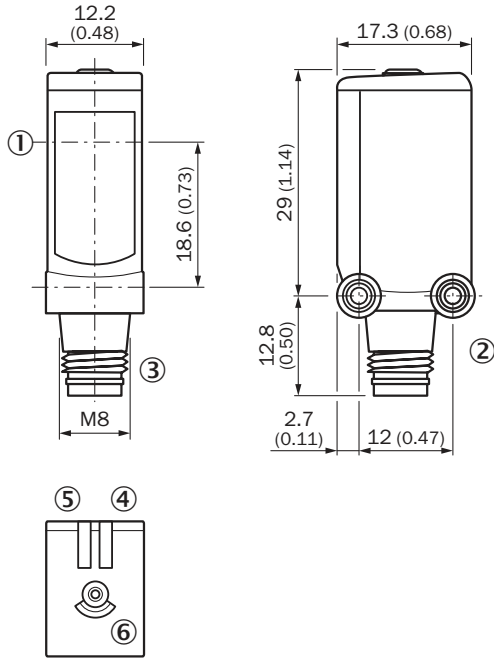
- ① Standard direction of the material being detected
- ② Optical axis receiver
- ③ Optical axis sender
- ④ Status indicator LED green: power on
- ⑤ Status indicator LED, yellow: Status of received light beam
- ⑥ Teach-in button
- ⑦ Threaded mounting hole M3
- ⑧ Connection

WL4S-3, WSE4S-3, potentiometer



- ① Center of optical axis
- ② Threaded mounting hole M3
- ③ Connection
- ④ Status indicator LED green: power on
- ⑤ Status indicator LED, yellow: Status of received light beam

**WL4S-3, WLG4S-3, single teach-in button**

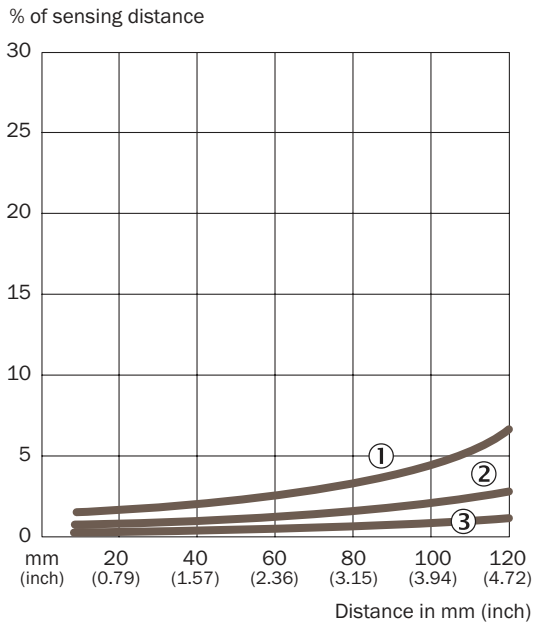


- ① Center of optical axis
- ② Threaded mounting hole M3
- ③ Connection
- ④ Status indicator LED green: power on
- ⑤ LED indicator orange: status of received light beam
- ⑥ Teach-in button

**Characteristic curves**

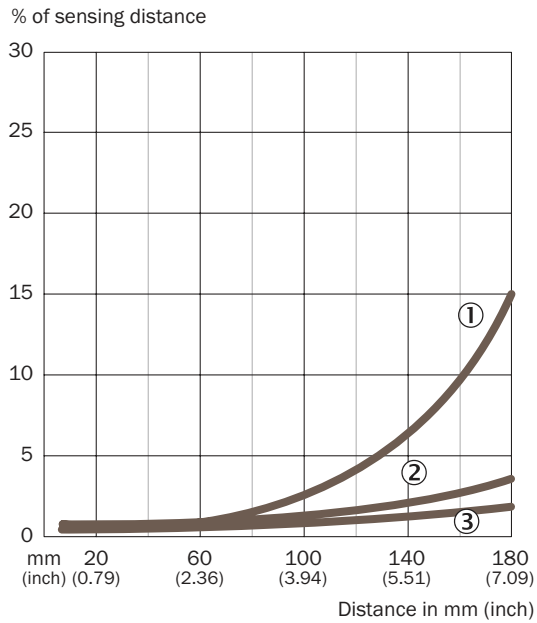
**Black-white shift**

**WTB4S-3, 120 mm**



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

**WTB4S-3, 180 mm**



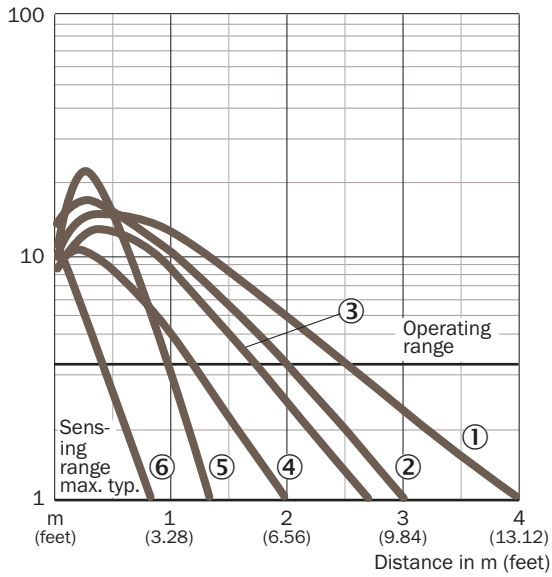
- ① Sensing range on black, 6 % remission
- ② Sensing range on gray, 18 % remission
- ③ Sensing range on white, 90 % remission



Operating reserve

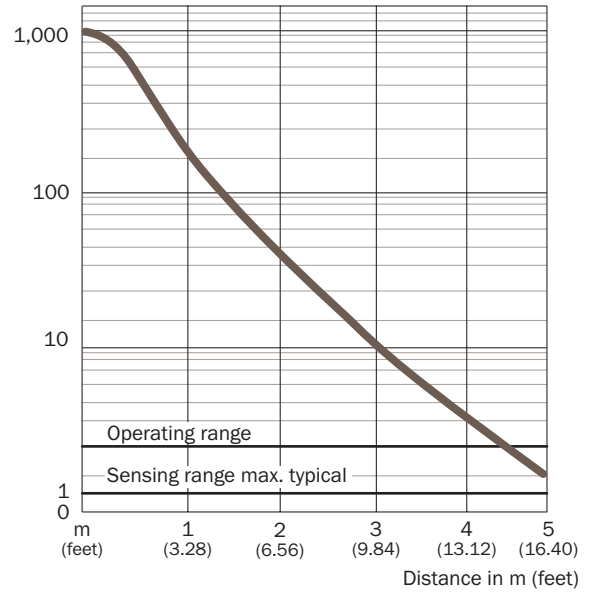
**WL4S-3**

Operating reserve



**WSE4S-3**

Operating reserve

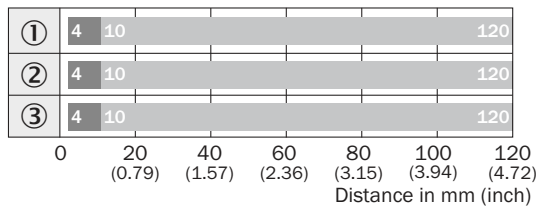


- ① PL80A
- ② P250F
- ③ PL40A
- ④ PL20F
- ⑤ PL10F
- ⑥ REF-IRF-56

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Bar diagrams

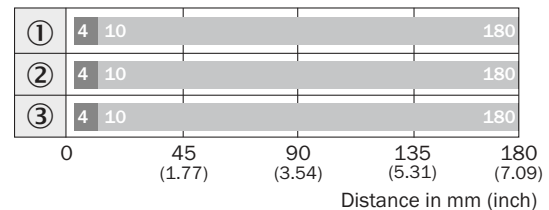
**WTB4S-3, 120 mm**



■ Sensing range max.    ■ Sensing range

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

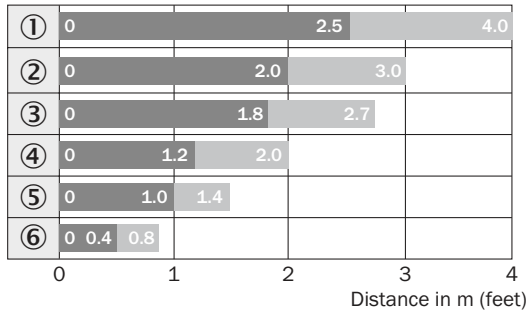
**WTB4S-3, 180 mm**



■ Sensing range max.    ■ Sensing range

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

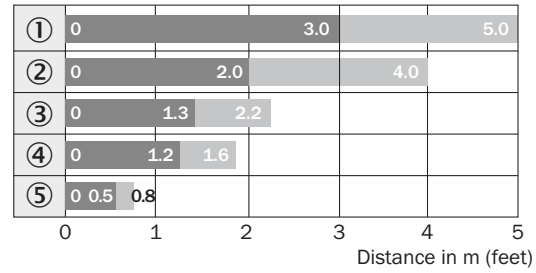
**WL4S-3, 4 m**



■ Sensing range    ■ Sensing range max.

- ① PL80A
- ② P250F
- ③ PL40A
- ④ PL20F
- ⑤ PL10F
- ⑥ REF-IRF-56

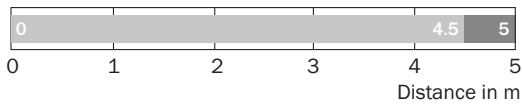
**WL4S-3, 5 m**



■ Sensing range    ■ Sensing range max.

- ① PL80A
- ② PL40A
- ③ PL20A
- ④ PL10F
- ⑤ REF-IRF-56

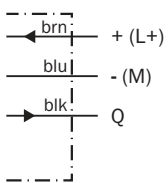
**WSE4S-3**



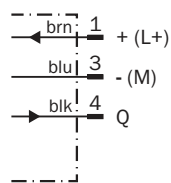
■ Sensing range typ. max    ■ Sensing range

**Connection diagram**

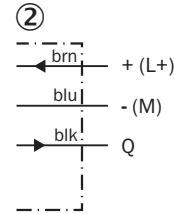
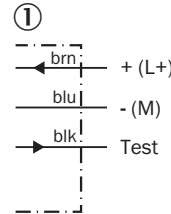
**Cd-043**



**Cd-045**

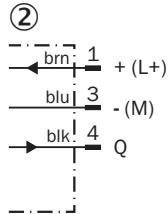
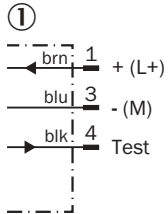


**Cd-061**



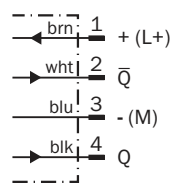
- ① Sender
- ② Receiver

**Cd-069**

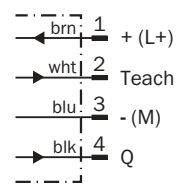


- ① Sender
- ② Receiver

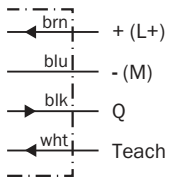
**Cd-083**



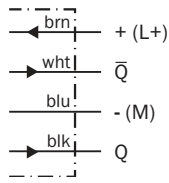
**Cd-092**



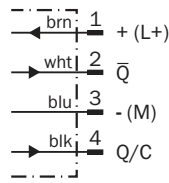
**Cd-093**



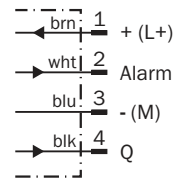
**Cd-094**



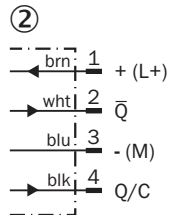
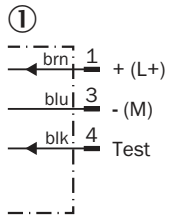
**Cd-098**



**Cd-107**



**Cd-268**



- ① Sender
- ② Receiver

**Recommended accessories**

Plug connectors and cables

**Connecting cable (female connector-open), PVC**

- Cable material: PVC
- Connector material: TPU


Figure	Connection type head A	Connection type head B	Connecting cable	Enclosure rating	Model name	Part no.
	Female connector, M8, 3-pin, straight	Cable, open conductor heads	2 m, 3-wire	IP 67	DOL-0803-G02M	6010785
			5 m, 3-wire	IP 67	DOL-0803-G05M	6022009
	Female connector, M8, 3-pin, angled	Cable, open conductor heads	2 m, 3-wire	IP 67	DOL-0803-W02M	6008489
			5 m, 3-wire	IP 67	DOL-0803-W05M	6022010
	Female connector, M8, 4-pin, straight	Cable, open conductor heads	2 m, 4-wire	IP 67	DOL-0804-G02M	6009870
			5 m, 4-wire	IP 67	DOL-0804-G05M	6009872
	Female connector, M8, 4-pin, angled	Cable, open conductor heads	2 m, 4-wire	IP 67	DOL-0804-W02M	6009871
			5 m, 4-wire	IP 67	DOL-0804-W05M	6009873
	Female connector, M12, 4-pin, straight	Cable, open conductor heads	2 m, 4-wire	IP 67	DOL-1204-G02M	6009382
			5 m, 4-wire	IP 67	DOL-1204-G05M	6009866
	Female connector, M12, 4-pin, angled	Cable, open conductor heads	2 m, 4-wire	IP 67	DOL-1204-W02M	6009383
			5 m, 4-wire	IP 67	DOL-1204-W05M	6009867

Universal bar clamp systems

Figure	Material	Description	Model name	Part no.
	Zinc plated steel (sheet), Diecast zinc (clamp)	Plate N08 for universal clamp bracket	BEF-KHS-N08	2051607






Device protection (mechanical)

**Protective housing/tubes**

Figure	Material	Description	Model name	Part no.
	Stainless steel 1.4571	Safety bracket for floor mounting	BEF-SW-W4S	2051497


Reflectors

**Angular**


Figure	Material	Description	Model name	Part no.
	PMMA/ABS	Rectangular, screw connection, 47 mm x 47 mm	P250	5304812
		Rectangular, screw connection, 38 mm x 15 mm	PL20A	1012719
		Rectangular, screw connection, 56 mm x 28 mm	PL30A	1002314
		Rectangular, screw connection, 37 mm x 56 mm	PL40A	1012720
		Rectangular, screw connection, 80 mm x 80 mm	PL80A	1003865

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**Fine triple reflectors**

Figure	Material	Description	Model name	Part no.
	PMMA/ABS	Fine triple, screw connection, suitable for laser sensors, 18 mm x 18 mm	PL10F	5311210

**Reflective tape**

Figure	Description	Model name	Part no.
	Self-adhesive, 50 mm x 60 mm	REF-IRF-56	5314244

**Round**

Figure	Material	Description	Model name	Part no.
	PMMA/ABS	Round, plugable for metal plates	PL22-3	1004488

→ For additional accessories, please see page L-861