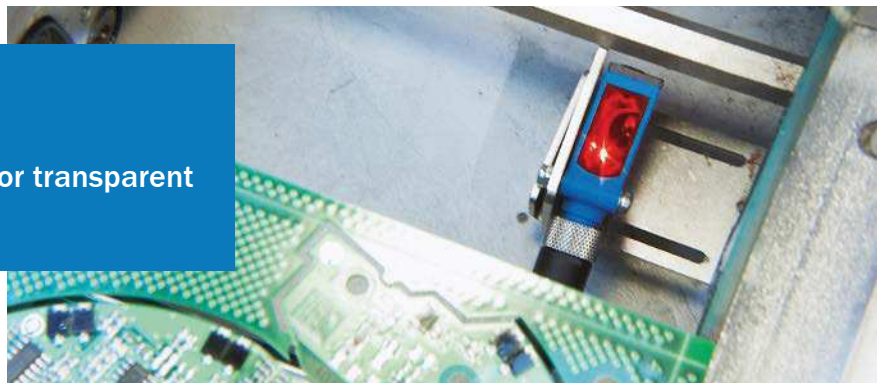


Laser precision for very small or transparent objects



F

IO-Link

SIRIC®








SIRIC®
optical ASIC
invented by SICK

ECOLAB

IO-Link

Additional information

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Product description

Maximum performance for handling demanding detection tasks involving tiny objects. With its precise laser light spot, the W4SL-3 miniature product family sets new standards by providing high optical light immunity from undesired background reflections and immunity to ambient light – even from modern energy-saving lamps. The combination of SICK’s proprietary laser and SIRIC®

technologies reduces incorrect switching to minimize machine downtime, reducing the variety of devices and saving on storage costs. The photoelectric sensors also provide an IO-Link interface for initial system performance diagnostics. Furthermore, IO-Link permits the integration of additional functions such as meters directly into the sensor. There is no need for complex control programming.

At a glance

- Precise laser light spot, laser class 1
- Teach-in pushbutton can be switched between detection of transparent and non-transparent objects
- Sensing ranges between 25 mm and 60 mm
- Latest SIRIC® and laser technologies with second emitter LED to provide outstanding background suppression and ambient light immunity
- Choice of adjustment via teach-in button, potentiometer, cable, or IO-Link

Your benefits

- Precise laser light spot for highly accurate switching behavior
- High optical ambient light immunity reduces incorrect switching and thus machine downtime, even when modern energy-saving lamps are used
- The highest degree of machine design flexibility BGS (background suppression) eliminates the effect of undesired background reflections. In addition, autocollimation allows detection through small drilled holes
- One device for detecting both transparent objects and the smallest non-transparent objects, thus reducing the variety of sensors and saving on storage costs
- IO-Link facilitates initial system performance diagnostics and uses additional sensor functions (optional) to reduce complex control programming

→ www.mysick.com/en/W4SL-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

	WTB4SL-3	WL4SL-3	WSE4SL-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		
Mounting hole	M3		
Sensing range max.	25 mm ... 300 mm ¹⁾	0 m ... 12 m ²⁾	0 m ... 60 m
Sensing range	25 mm ... 300 mm ¹⁾	0 m ... 8 m ²⁾	0 m ... 50 m
Type of light	Visible red light		
Light source ³⁾	Laser		
Light spot size (distance)	Ø 1 mm (170 mm)	Ø 1 mm (500 mm)	
Wave length	650 nm		
Laser class ⁴⁾	1		
Adjustment	Potentiometer, 5 turns	Single teach-in button / Cable, Single teach-in button ⁵⁾ (depending on type)	Single teach-in button
Special feature	-	IO-Link	-

¹⁾ Object with 90 % reflectance (referred to standard white, DIN 5033)

²⁾ PL80A.

³⁾ Average service life 50,000 h at T_A = +25 °C.

⁴⁾ EN60825-1:2008-05 & IEC 60825-1:2007-03 / CDRH 21 CFR 1040.10 & 1040.11

⁵⁾ Adjustment via cable (ET): white cable or PIN2 according to the desired sensitivity > 2 ... < 8 s or put > 8 s on L+ (PNP) or on M (NPN)

Mechanics/electronics

	WTB4SL-3	WL4SL-3	WSE4SL-3
Supply voltage ¹⁾	10 V DC ... 30 V DC		
Ripple ²⁾	< 5 V _{pp}		
Power consumption ³⁾	≤ 30 mA		
Output type	PNP / NPN (depending on type)		
Output function	Complementary		
Switching mode	Light/dark-switching ⁴⁾ / Dark-switching ⁵⁾ (depending on type)		
Output current I _{max.}	≤ 100 mA		
Response time ⁶⁾	≤ 0.5 ms		
Switching frequency ⁷⁾	1,000 Hz		
Connection type	Cable, 2 m ⁸⁾ / Male connector, M8 / Cable with connector, M8, 120 mm ⁸⁾ (depending on type)		
Circuit protection	A ⁹⁾ , B ¹⁰⁾ , C ¹¹⁾		
Protection class	III		
Weight	100 g		
Polarisation filter	-	✓	-
IO-Link	-	-/✓ (COM2) (depending on type)	-
Housing material	Bayblend		
Optics material	PMMA		

	WTB4SL-3	WL4SL-3	WSE4SL-3
Enclosure rating	IP 66, IP 67		
Ambient operating temperature	-10 °C ... +50 °C		
Ambient operating temperature extended ^{12) 13)}	-30 °C ... +55 °C		
Ambient storage temperature	-30 °C ... +70 °C		

¹⁾ Limit values, operation in short-circuit protected network max. 8 A.

²⁾ May not exceed or fall short of V_S tolerances.

³⁾ Without load.

⁴⁾ Q = light-switching.

⁵⁾ Q = dark-switching.

⁶⁾ Signal transit time with resistive load.

⁷⁾ With light/dark ratio 1:1.

⁸⁾ Do not bend below 0 °C.

⁹⁾ A = V_S connections reverse-polarity protected.

¹⁰⁾ B = inputs and output reverse-polarity protected.

¹¹⁾ C = interference suppression.

¹²⁾ As of $T_a = 50$ °C, a max. supply voltage $V_{max.} = 24$ V and a max. load current $I_{max.} = 50$ mA is permitted.

¹³⁾ Using the sensor below $T_a = -10$ °C is possible, if the sensor is turned on at $T_a > -10$ °C, then the environment cools down and the sensor is not disconnected from the supply voltage during the whole time. It is not allowed to turn on the sensor below $T_a = -10$ °C.

Ordering information

Other models available at www.mysick.com/en/W4SL-3

WTB4SL-3

- **Sensor principle:** photoelectric proximity sensor

Sensing range max. ¹⁾	Output type	Switching mode	Adjustment	Connection	Connection diagram	Model name	Part no.
25 mm ... 300 mm	PNP	Light/dark-switching ²⁾	Potentiometer, 5 turns	Cable, 4-wire, 2 m, PVC	Cd-094	WTB4SL-3P1161	1058239
				Connector M8, 4-pin	Cd-083	WTB4SL-3P2261	1058237
				Cable with connector M8, 4-pin, 120 mm, PVC	Cd-083	WTB4SL-3P3261	1058238
	NPN	Light/dark-switching ²⁾	Potentiometer, 5 turns	Cable, 4-wire, 2 m, PVC	Cd-094	WTB4SL-3N1161	1058242
				Connector M8, 4-pin	Cd-083	WTB4SL-3N2261	1058240
				Cable with connector M8, 4-pin, 120 mm, PVC	Cd-083	WTB4SL-3N3261	1058241

¹⁾ Object with 90 % reflectance (referred to standard white, DIN 5033)

²⁾ Q = light-switching.

WL4SL-3

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

Sensing range max. ¹⁾	Output type	Switching mode	Adjustment	Connection	Connection diagram	Model name	Part no.
0 m ... 12 m	PNP	Light/dark-switching ²⁾	Single teach-in button	Connector M8, 4-pin	Cd-083	WL4SL-3P2232	1061561
				Cable with connector M8, 4-pin, 120 mm, PVC	Cd-083	WL4SL-3P3232	1061563
		Dark-switching ³⁾	Cable, Single teach-in button ⁴⁾	Connector M8, 4-pin	Cd-195	WL4SL-3F2234	1061562
				Cable with connector M8, 4-pin, 120 mm, PVC	Cd-195	WL4SL-3F3234	1061564
	NPN	Light/dark-switching ²⁾	Single teach-in button	Cable, 4-wire, 2 m, PVC	Cd-094	WL4SL-3N1132	1061565
				Cable, 4-wire, 2 m, PVC	Cd-212	WL4SL-3E1134	1061566

¹⁾ PL80A.

²⁾ Q = light-switching.

³⁾ Q = dark-switching.

⁴⁾ Adjustment via cable (ET): white cable or PIN2 according to the desired sensitivity > 2 ... < 8 s or put > 8 s on L+ (PNP) or on M (NPN)

WL4SL-3, IO-Link

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

Sensing range max. ¹⁾	Output type	Switching mode	Adjustment	IO-Link	Connection	Connection diagram	Model name	Part no.
0 m ... 12 m	PNP	Light/dark-switching ²⁾	Single teach-in button	✓	Connector M8, 4-pin	Cd-083	WL4SLC-3P2232	1061569

¹⁾ PL80A.

²⁾ Q = light-switching.

WSE4SL-3

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

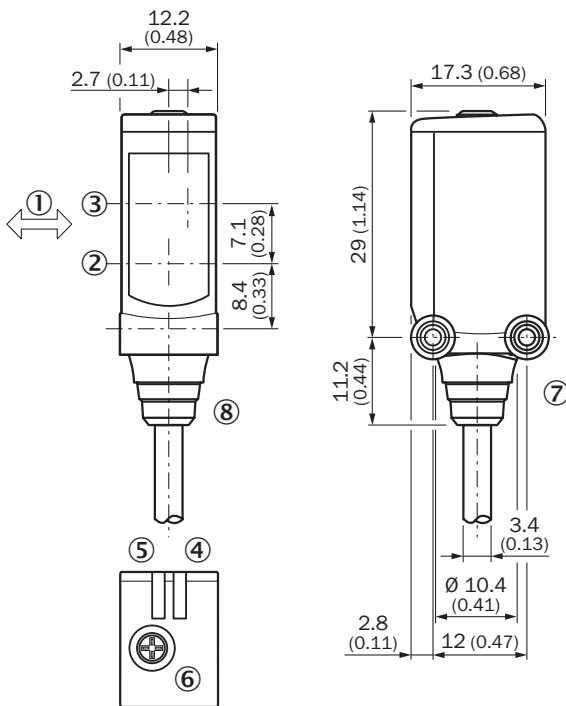
Sensing range max.	Output type	Switching mode	Adjustment	Connection	Connection diagram	Model name	Part no.
0 m ... 60 m	PNP	Light/dark-switching ¹⁾	Single teach-in button	Connector M8, 4-pin	Cd-232	WSE4SL-3P2237	1058249
	NPN			Cable, 4-wire, 2 m, PVC	Cd-231	WSE4SL-3N1137	1058250

¹⁾ Q = light-switching.

Dimensional drawings

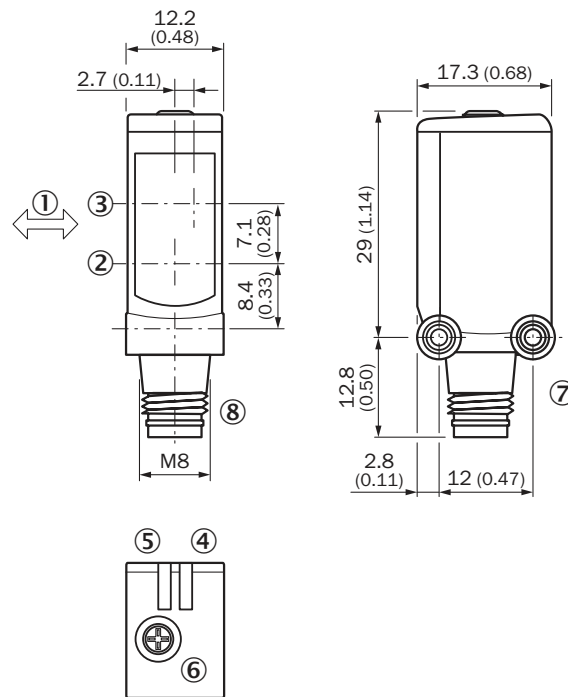
Dimensions in mm (inch)

WTB4SL-3, cable



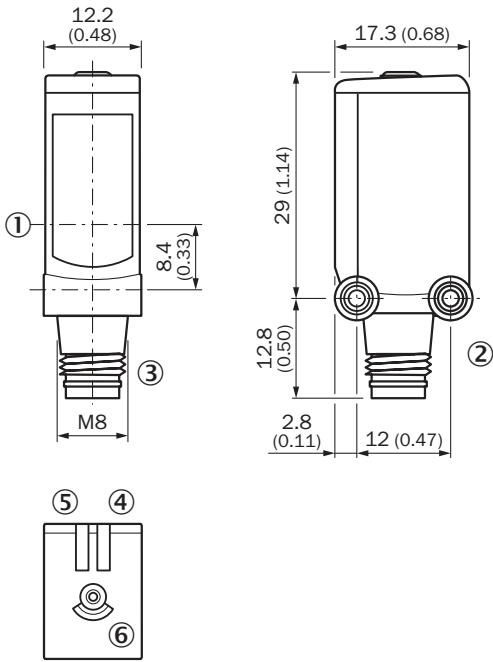
- ① Standard direction of the material being detected
- ② Center of optical axis, sender
- ③ Center of optical axis, receiver
- ④ Status indicator LED green: power on
- ⑤ Status indicator LED, yellow: Status of received light beam
- ⑥ Potentiometer
- ⑦ Threaded mounting hole M3
- ⑧ Connection

WTB4SL-3, plug



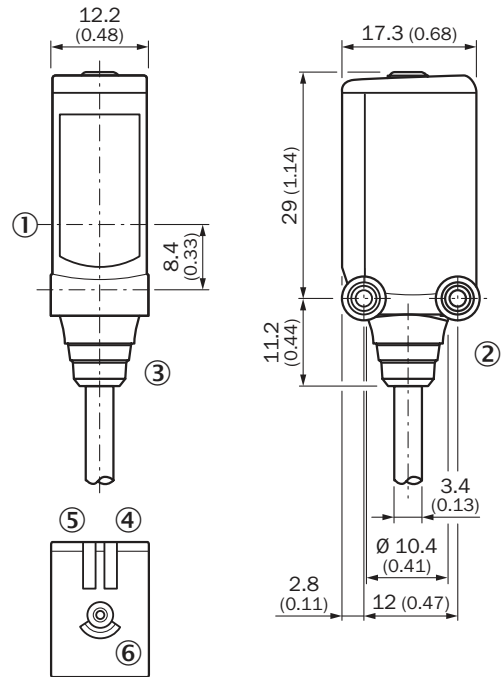
- ① Standard direction of the material being detected
- ② Center of optical axis, sender
- ③ Center of optical axis, receiver
- ④ Status indicator LED green: power on
- ⑤ Status indicator LED, yellow: Status of received light beam
- ⑥ Potentiometer
- ⑦ Threaded mounting hole M3
- ⑧ Connection

WL4SL-3, WL4SLG-3, WSE4SL-3, plug



- 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
- ⑥ Single teach-in button

WL4SL-3, WL4SLG-3, WSE4SL-3, cable



- 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
- ⑥ Single teach-in button

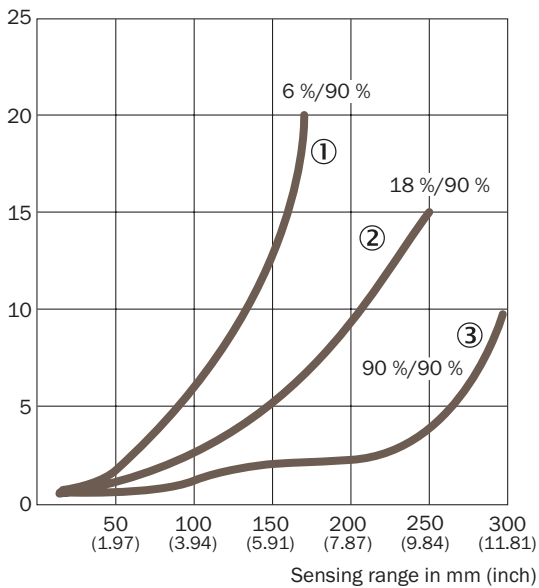
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Characteristic curves

Black-white shift

WTB4SL-3, laser class 1

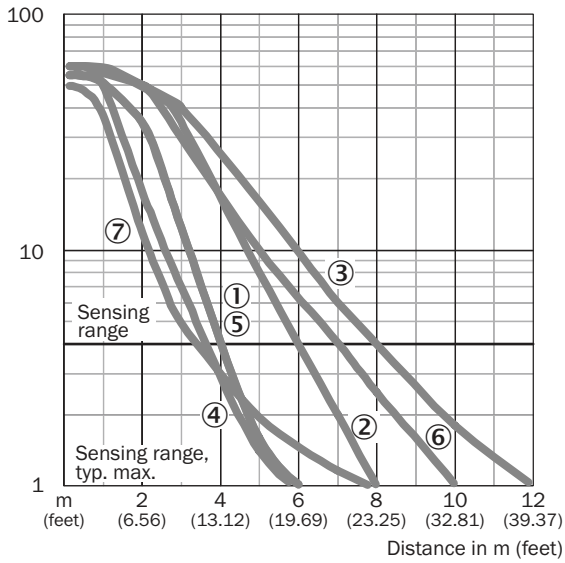
% of sensing range



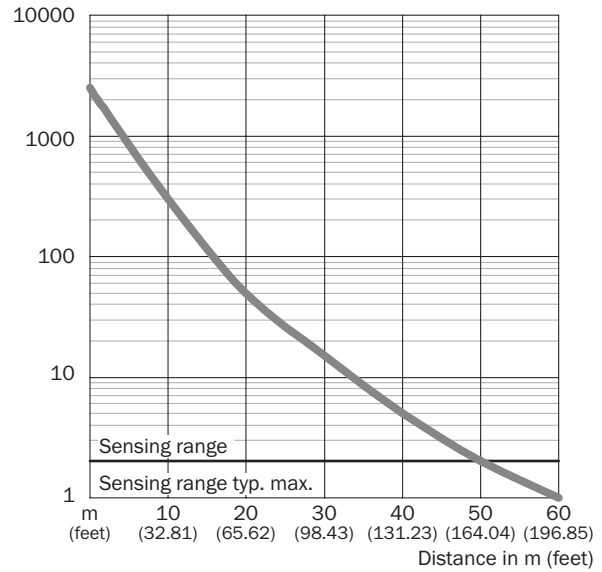
- ① Sensing range on black, 6 % remission
- ② Sensing range on gray, 18 % remission
- ③ Sensing range on white, 90 % remission

Operating reserve

WL4SL-3



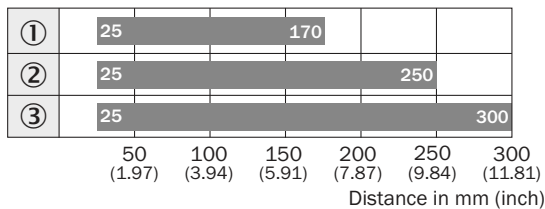
WSE4SL-3



- ① PL20A
- ② PL40A
- ③ PL80A
- ④ PL10F
- ⑤ PL20F
- ⑥ P250F
- ⑦ REF-AC1000

Bar diagrams

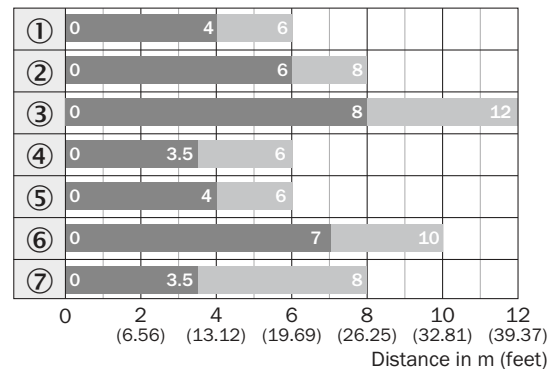
WTB4SL-3, laser class 1



■ Sensing range typ. max.

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

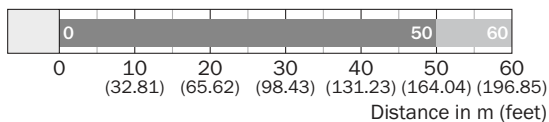
WL4SL-3



■ Sensing range ■ Sensing range typ. max.

- ① PL20A
- ② PL40A
- ③ PL80A
- ④ PL10F
- ⑤ PL20F
- ⑥ P250F
- ⑦ REF-AC1000

WSE4SL-3

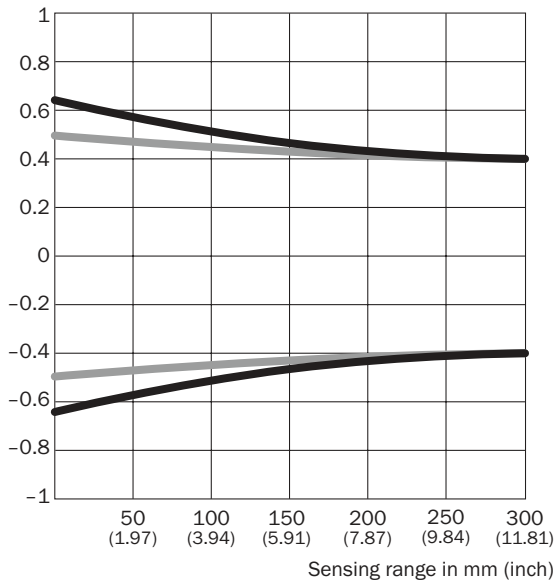


■ Sensing range ■ Sensing range typ. max.

Light spot diameter

WTB4SL-3, laser class 1

Radius in mm (inch)



Dimensions in mm (inch)

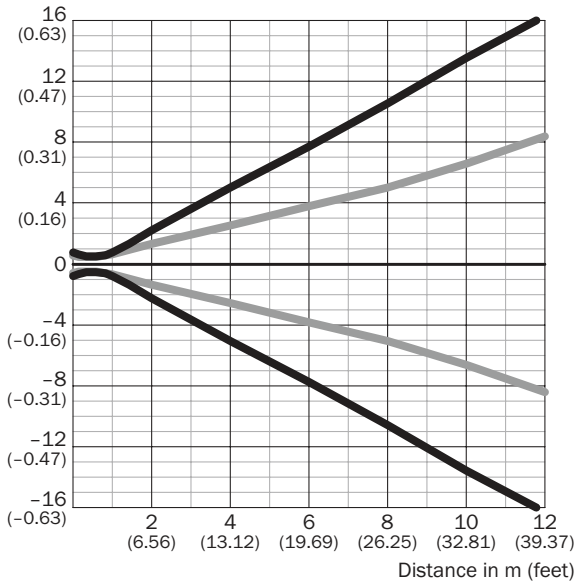
Sensing range	Vertical	Horizontal
50 mm (1.97)	1.2 (0.05)	1.0 (0.04)
100 mm (3.94)	1.1 (0.04)	1.0 (0.04)
200 mm (7.87)	0.9 (0.04)	0.9 (0.04)
300 mm (11.81)	0.8 (0.03)	0.8 (0.03)

— Vertical
— Horizontal

F

WL4SL-3, Overview

Radius in mm (inch)

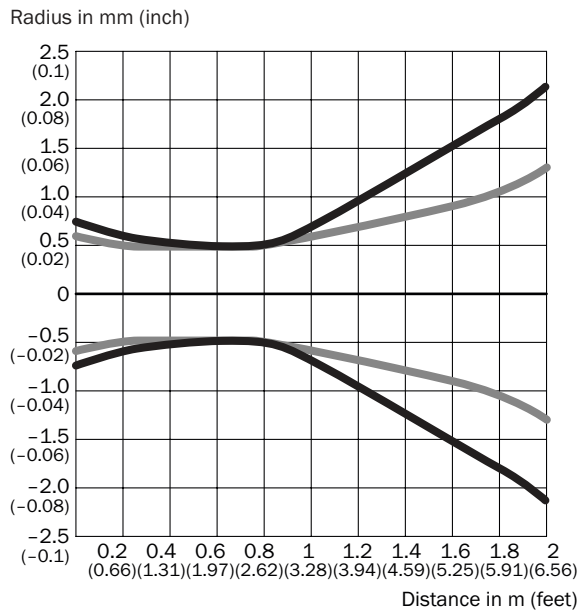


Dimensions in mm (inch)

Sensing range	Vertical	Horizontal
0.5 m (1.64 feet)	< 1.0 (0.04)	< 1.0 (0.04)
1 m (3.28 feet)	1.5 (0.06)	1.2 (0.05)
6 m (19.69 feet)	15.2 (0.60)	7.6 (0.30)
12 m (39.37 feet)	32.4 (1.28)	16.4 (0.65)

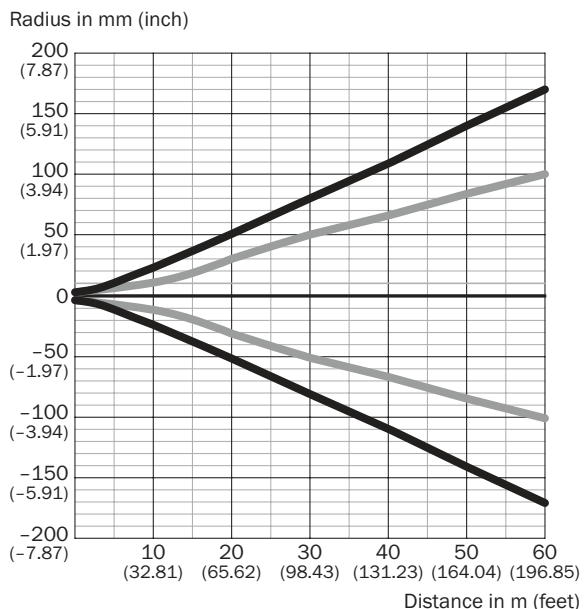
— Vertical
— Horizontal

WL4SL-3, detailed view, close up



- Vertical
- Horizontal

WSE4SL-3, overview

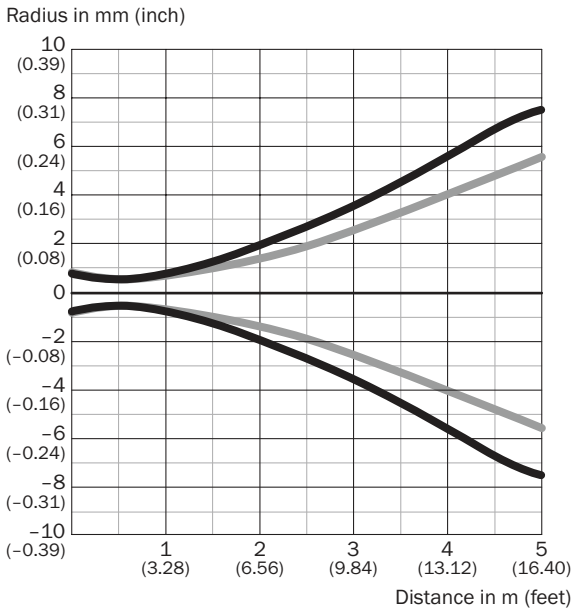


Dimensions in mm (inch)

Sensing range	Vertical	Horizontal
0.5 m (1.64 feet)	< 1.0 (0.04)	< 1.0 (0.04)
1 m (3.28 feet)	1.5 (0.06)	1.2 (0.05)
5 m (16.40 feet)	15 (0.59)	11 (0.43)
10 m (32.81 feet)	45 (1.77)	28 (1.10)
60 m (196.85 feet)	336 (13.23)	200 (7.87)

- Vertical
- Horizontal

WSE4SL-3, detailed view, close up

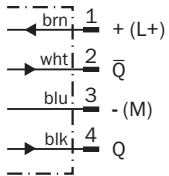


— Vertical
— Horizontal

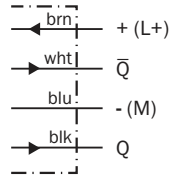
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Connection diagram

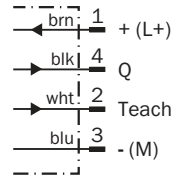
Cd-083



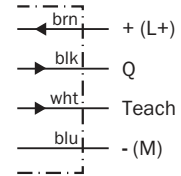
Cd-094



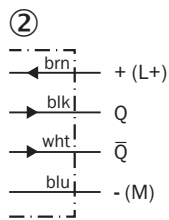
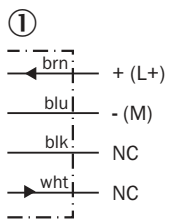
Cd-195



Cd-212

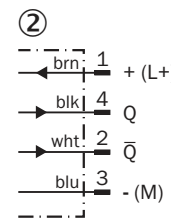
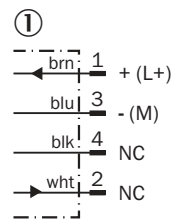


Cd-231



① Sender
② Receiver

Cd-232





① Sender
② Receiver

Recommended accessories



Plug connectors and cables

Connecting cable (female connector-open)

- Cable material: PVC
- Connector material: PVC

Figure	Connection type head A	Connection type head B	Connecting cable	Enclosure rating	Model name	Part no.
	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 (ready to assemble)


Figure	Connection type head A	Connection type head B	Connector material	Enclosure rating	Model name	Part no.
	Female connector, M8, 4-pin, straight	Screw-type terminals	PBT	IP 67	DOS-0804-G	6009974
	Female connector, M8, 4-pin, angled	Pin penetration	PBT	IP 67	DOS-0804-W	6009975

Universal bar clamp systems

Figure	Material	Description	Model name	Part no.
	Zinc plated steel (sheet), Diecast zinc (clamp)	Plate N02 for universal clamp bracket	BEF-KHS-N02	2051608
		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, 80 mm x 80 mm	PL80A	1003865

Fine triple reflectors

Figure	Material	Description	Model name	Part no.
	PMMA/ABS	Fine triple, screw connection, suitable for laser sensors, 47 mm x 47 mm	P250F	5308843
		Fine triple, self-adhesive, suitable for laser sensors, Ø 23 mm	P25F-1	5319385
		Reflector with microprismatic reflex tape REF-AC1000, suitable for laser sensors, see alignment note, 23 mm x 23 mm	P41F	5315128
		Fine triple, screw connection, suitable for laser sensors, 18 mm x 18 mm	PL10F	5311210
		Fine triple, screw connection, suitable for laser sensors, 38 mm x 16 mm	PL20F	5308844
		Fine triple, screw connection, suitable for laser sensors, 56 mm x 28 mm	PL30F	5326523
		Fine triple, screw connection, suitable for laser sensors, 76 mm x 45 mm	PL81-1F	5325060

F

Reflective tape

Figure	Description	Model name	Part no.
	Suitable for laser sensors, self-adhesive, cut, see alignment note, 56.3 mm x 56.3 mm	REF-AC1000-56	4063030

→ For additional accessories, please see page L-861

