



W9L-3 Small Photoelectric Sensors

Laser precision in a rugged VISTAL™ housing

W9L-3 Small Photoelectric Sensors: Laser Precision in a rugged VISTAL™ Housing

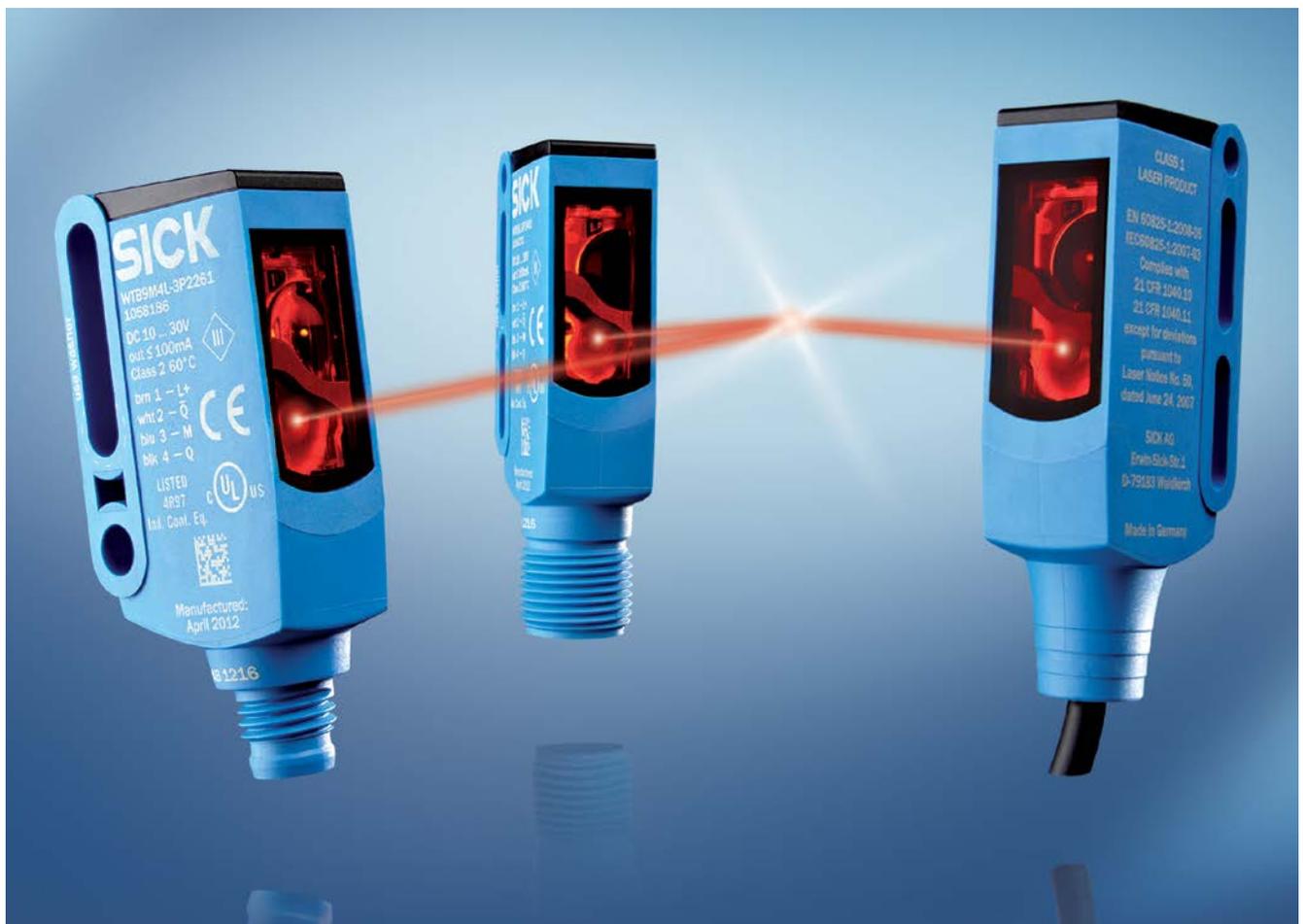
Reliably capturing the smallest objects and the finest details – the ideal application for the W9L-3 small photoelectric sensors. The latest generation of SICK laser technology has a uniquely rugged VISTAL™ housing to ensure reliable detection under the most difficult conditions.

For Demanding Applications: Precise Laser Light Spot

If a standard photoelectric sensor with a red or infrared emitter LED does not provide adequate precision, or if it is not possible to guarantee detection with sufficient reliability, the W9L-3 small photoelectric sensor is the solution. Its laser technology permits the precise detection of small objects and the finest details, as well as the recognition of objects through small openings.

For Maximum Reliability: Tough Technology in a Rugged Housing

The fiberglass-reinforced plastic VISTAL™ housing achieves values many times better than standard plastic housings in terms of the modulus of elasticity, the Brinell hardness number, and chemical resistance. This allows it to withstand the highest level of mechanical stress. Along with its extremely high immunity against ambient light and background reflections, this makes the W9L-3 the most reliable laser photoelectric sensor in its class.



Proven Range of Models – for Best Solutions in a Variety of Applications

Industries: All the Time and Everywhere

The W9L-3 small photoelectric sensor's laser technology provides high precision and ruggedness that make it suitable for a wide variety of industrial applications, including the packing industry, handling and warehousing systems, the automobile industry, machine tool engineering, and the electronics and food industries.

Applications: Always Providing Precise Details

This laser photoelectric sensor is the right choice whenever it comes to detecting the smallest workpieces, fine details, or slight deviations in products or production equipment. Its precise laser beam also permits a very narrow pass-by view of machine parts, as well as inspections for protrusions, the edge alignment of overlapping products, or edge quality.

Models: Always a Solution

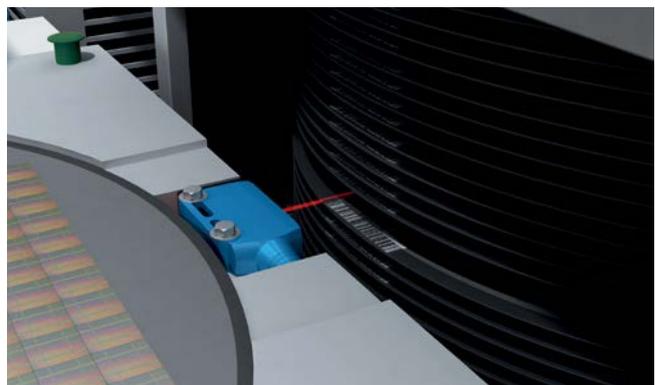
In the world of automation, many different objects must be detected under a variety of ambient conditions. The W9L-3 small photoelectric sensor with laser technology provides a greater range of solutions than ever before. Whether working with objects within a short distance of difficult backgrounds, transparent objects, glossy or reflective objects, and close or distant objects, the W9L-3 laser product family always provides a solution, with proximity sensor, retro-reflective sensor, and through-beam sensor models. All models are ideally suited for object detection in harsh industrial settings, in wet areas, and near electromagnetic interference.

For more information, go to www.sick.com/en/W9L-3



W9L-3 Small Photoelectric Sensor: An Overview of the “Best-in-Class”

- Latest laser technology
- The longest sensing ranges in this class
- Tough VISTAL™ housing
- Optimized ASIC technology
- Leading variety of technical models
- WTB9L-3 photoelectric proximity sensor: Best-in-class background suppression with second emitter LED
- WL9L-3 photoelectric retro-reflective sensor: autocollimation optics eliminate blind zone
- WL9LG-3 photoelectric retro-reflective sensor: “Best-in-class” for detecting transparent objects
- Variable mounting with M3 or M4 mounting screws and elongated holes
- Unique variety of connectors



W9L-3 Small Photoelectric Sensors: “Best-in-Class” Down to the Details



Latest laser Technology

- Precise laser light spot
- High sensing ranges
- Best-in-class background suppression with second emitter LED
- Autocollimation optics

Benefit: Reliable detection of small objects and fine details



Tough VISTAL™ housing

- Maximum mechanical stability
- Fiberglass-reinforced plastic
- Inside-out construction and high-performance adhesives for maximum tightness
- Immune to cleaning agents

Benefit: Reliable detection of small objects and fine details



Optimized ASIC Technology

- Opto-electronic intelligence from SICK
- High immunity to background ambient light and reflections
- Extremely high electromagnetic compatibility

Benefit: Prevents faulty switching and machine downtime



Transparent Objects

- Detection of low light attenuation
- Continuous switching threshold adjustment (CTA)

Benefit: Reliable detection of transparent objects

Benefit: Less cleaning required, higher productivity



The Latest Generation of Laser Technology: High-Tech Inside, Rugged Outside



Multiple Mounting Options

- Housing models for M3 and M4 mounting screws
- Elongated holes on housing

Benefit: Easy alignment by moving the sensor on the screw



A Variety of Connection Options

- Housing with M8 or M12 plug
- Housing with cable
- Housing with cable and M12 plug

Benefit: Selection to match the company's connection scheme

Product model W9L-3	Laser class	Sensing range	Mounting holes
Photoelectric proximity sensor WTB9L-3	1	300 mm / 170 mm ¹⁾	M3, M4
Photoelectric proximity sensor WTB9L-3	2	400 mm / 230 mm ¹⁾	M3, M4
Photoelectric retro-reflective sensor WL9L-3	1	12 m / 8 m ²⁾	M3, M4
Photoelectric retro-reflective sensor WL9LG-3 (for transparent objects)	1	4,5 m / 2 m ³⁾	M3
Through-beam photo-electric sensor WSE9L-3	1	60 m / 50 m ⁴⁾	M3

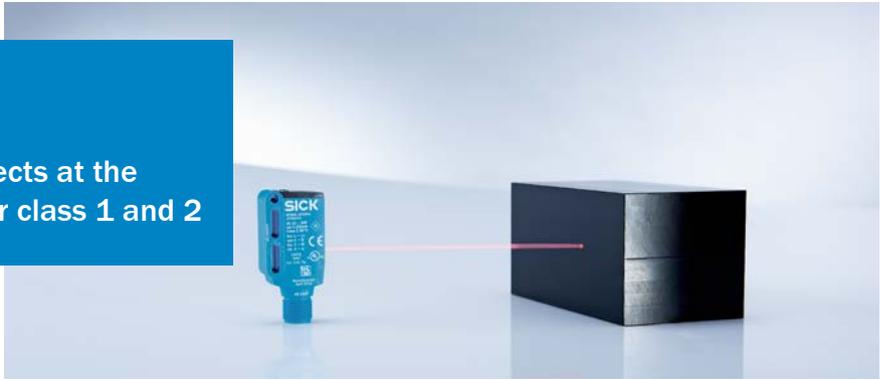
¹⁾ On white / on black

³⁾ On REF-AC1000 reflective tape max./recommended

²⁾ On PL80A reflector max./recommended

⁴⁾ Max./recommended

Precise detection of small objects at the longest sensing ranges in laser class 1 and 2



Product description

The WTB9L-3 photoelectric proximity sensor with new laser technology is the ideal solution for precise and reliable detection of even the smallest objects or object features. The stable VISTAL™ housing and impressive suppression of

optical interference ensures the sensor's reliability during installation and operation. Less machine downtime is therefore guaranteed. The longest sensing ranges and best-in-class background suppression ensure great performance.

At a glance

- Tough VISTAL™ housing
- Precise laser light spot
- Laser classes 1 and 2 available
- Optimized SICK ASIC technology with second transmission LED
- Connections: M8 and M12 plugs, cable as well as cable with plug
- M3 hole pattern and M4 hole pattern

Your benefits

- Precise detection of small objects and object features
- Detection of objects even through small openings
- Less machine downtime due to stable VISTAL™ housing as well as impressive suppression of optical interference
- The longest sensing ranges in its class
- Best-in-class background suppression
- Wide range of connection options
- Multiple mounting options
- Highly visible light spot simplifies alignment



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→ www.mysick.com/en/WTB9L-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

	Laser class 1	Laser class 2
Sensor principle	Photoelectric proximity sensor	
Detection principle	Background suppression	
Dimensions (W x H x D)	12.2 mm x 50 mm x 23.6 mm 12.2 mm x 52.2 mm x 23.6 mm 12.2 mm x 49.8 mm x 23.6 mm (depending on type)	
Housing design (light emission)	Rectangular	
Mounting hole	M3 or M4 (depending on type)	
Sensing range max. ¹⁾	25 mm ... 300 mm	25 mm ... 400 mm
Sensing range ¹⁾	25 mm ... 300 mm	25 mm ... 400 mm
Type of light	Visible red light	
Light source ²⁾	Laser	
Laser class	1 (IEC 60825-1 / CDRH 21 CFR 1040.10 & 1040.11)	2 (IEC 60825-1 / CDRH 21 CFR 1040.10 & 1040.11)
Wave length	650 nm	
Light spot size (distance)	Ø 1 mm (170 mm)	Ø 0.9 mm (230 mm)
Sensitivity adjustment	Potentiometer, 5-turn	

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

²⁾ Average service life 50,000 h at T_a = +25 °C.

Mechanics/electronics

	Laser class 1	Laser class 2
Supply voltage ¹⁾	10 V DC ... 30 V DC	
Residual ripple ²⁾	< 5 V _{pp}	
Power consumption ³⁾	≤ 30 mA	
Switching output	PNP, light/dark-switching, complementary ⁴⁾ NPN, light/dark-switching, complementary ⁴⁾ (depending on type)	PNP, light/dark-switching, complementary ⁴⁾ NPN, light/dark-switching, complementary ⁴⁾ (depending on type)
Output current I_{max.}	≤ 100 mA	
Response time ⁵⁾	≤ 0,5 ms	≤ 1,0 ms
Switching frequency ⁶⁾	1.000 Hz	500 Hz
Connection type	Cable with plug, 120 mm, PVC, 0.14 mm ² ⁷⁾ Cable, 2 m, PVC, 0.14 mm ² ⁷⁾ Connector (depending on type)	
Circuit protection	A ⁸⁾ B ⁹⁾ C ¹⁰⁾	
Protection class	⚡	
Weight	Cable with plug, M12, 4-pin 80 g Connector, M12, 4-pin 13 g Connector, M8, 4-pin 13 g Cable, 4-wire 80 g	
Housing material	VISTAL™ Plastic	
Optics material	PMMA	

	Laser class 1	Laser class 2
Enclosure rating	IP 66 IP 67 IP 69K	
Ambient operating temperature	-10 °C ... +50 °C	
Ambient operating temperature extended ^{11) 12)}	-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 .

³⁾ Without load.

⁴⁾ Q = light-switching.

⁵⁾ Signal transit time with resistive load.

⁶⁾ With light/dark ratio 1:1.

⁷⁾ Do not bend below 0 °C.

⁸⁾ A = V_S connections reverse-polarity protected.

⁹⁾ B = inputs and output reverse-polarity protected.

¹⁰⁾ C = interference suppression.

¹¹⁾ 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.

¹²⁾ 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

Laser class 1

Sensing range max. ⁴⁾	Mounting hole	Output function	Switching mode	Connection	Model name	Part no.
25 mm ... 300 mm	M3	PNP	Light/dark-switching	Cable with plug, M12, 4-pin, 120 mm, PVC	WTB9L-3P3461	1058916
				Connector, M12, 4-pin	WTB9L-3P2461	1058231
				Connector, M8, 4-pin	WTB9L-3P2261	1058230
		Cable, 4-wire, 2 m, PVC		WTB9L-3P1161	1058232	
		Cable with plug, M12, 4-pin, 120 mm, PVC		WTB9L-3N3461	1062525	
		Connector, M12, 4-pin		WTB9L-3N2461	1062524	
	M4	PNP	Light/dark-switching	Connector, M12, 4-pin	WTB9M4L-3P2461	1058187
				Connector, M8, 4-pin	WTB9M4L-3P2261	1058186
				Cable, 4-wire, 2 m, PVC	WTB9M4L-3P1161	1058188

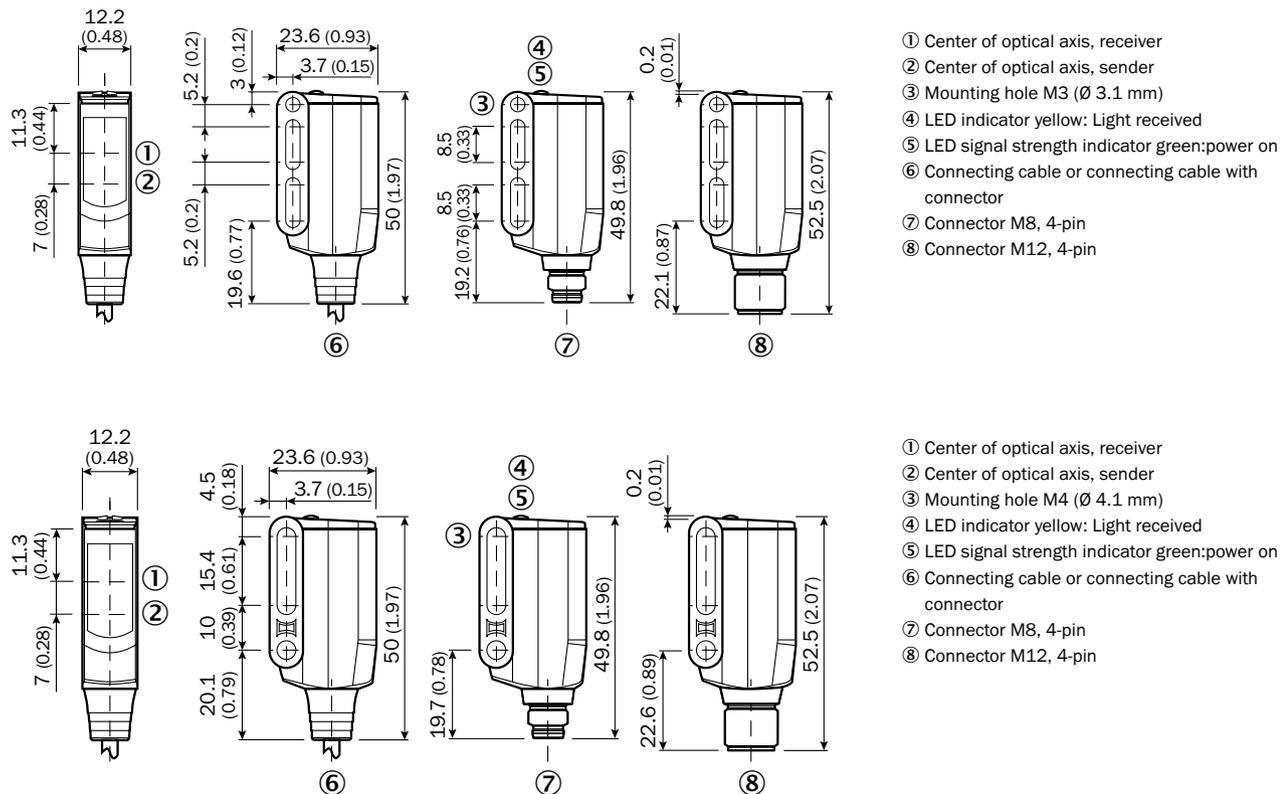
⁴⁾ Object with 90 % reflectance (referred to standard white DIN 5033)

Laser class 2

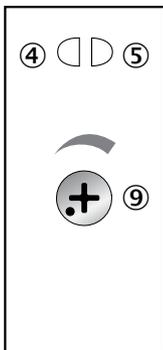
Sensing range max. ¹⁾	Mounting hole	Output function	Switching mode	Connection	Model name	Part no.
25 mm ... 400 mm	M3	PNP	Light/dark-switching	Cable with plug, M12, 4-pin, 120 mm, PVC	WTB9L-3P3491	1058153
				Connector, M12, 4-pin	WTB9L-3P2491	1058151
				Connector, M8, 4-pin	WTB9L-3P2291	1058150
	M3	NPN	Light/dark-switching	Cable with plug, M12, 4-pin, 120 mm, PVC	WTB9L-3N3491	1058152
				Connector, M12, 4-pin	WTB9L-3N2491	1058149
				Connector, M8, 4-pin	WTB9L-3N2291	1058146
M4	PNP	Light/dark-switching	Connector, M12, 4-pin	WTB9M4L-3P2491	1058225	
			Connector, M8, 4-pin	WTB9M4L-3P2291	1058224	
			Cable, 4-wire, 2 m, PVC	WTB9M4L-3P1191	1058226	

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

Dimensional drawing



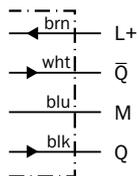
Adjustments



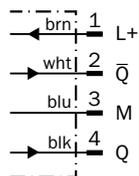
- ④ LED indicator yellow: Light received
- ⑤ LED signal strength indicator green: power on
- ⑨ Sensing distance adjustment

Connection diagram

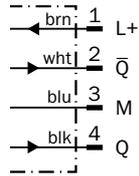
WTB9xxL-3x1xxx
Cable



WTB9xxL-3x2xxx
Connector

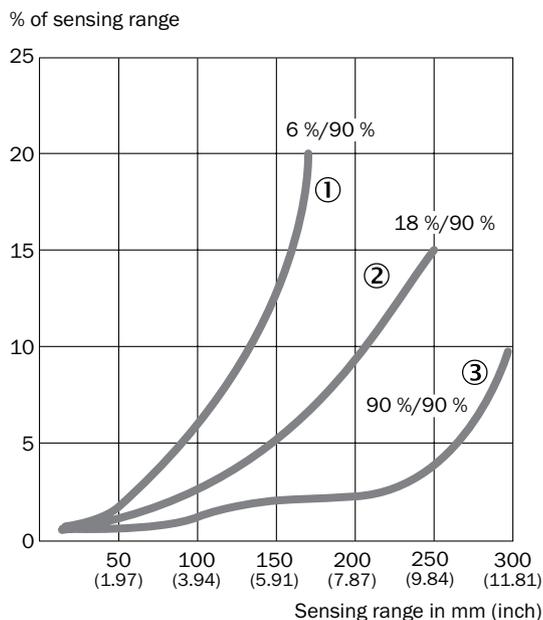


WTB9xxL-3x3xxx
Cable with plug



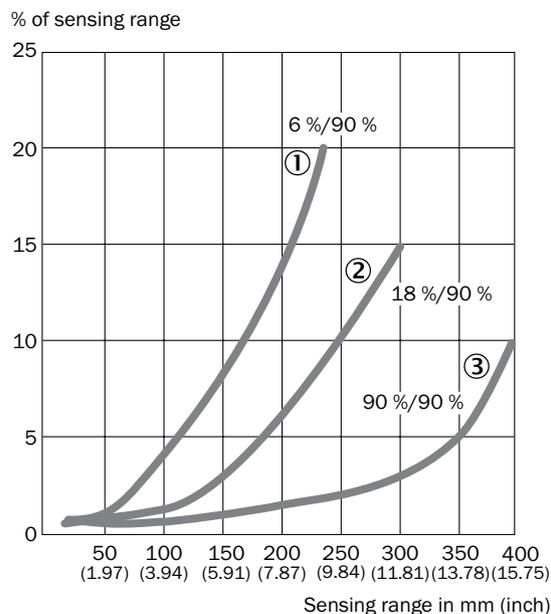
Black/white shift

Laser class 1



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

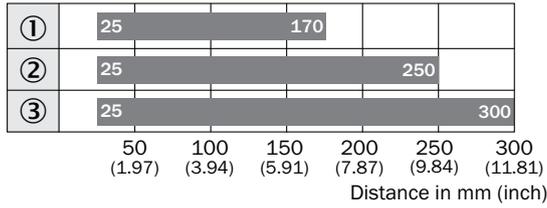
Laser class 2



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

Sensing range

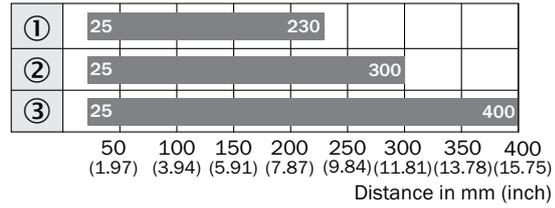
Laser class 1



■ 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

Laser class 2



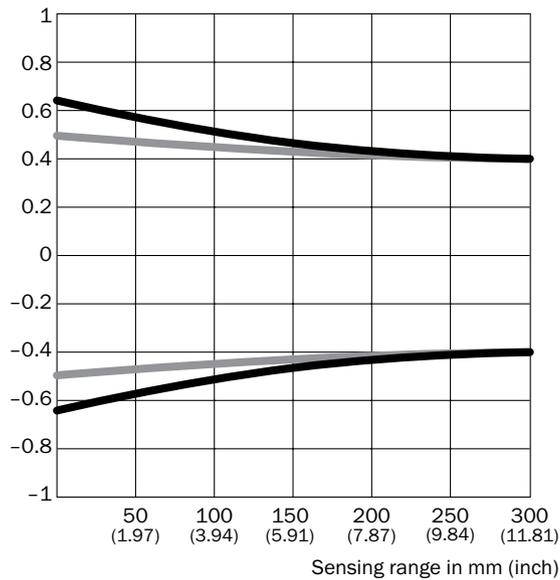
■ Sensing range typ. max.

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

Light spot size

Laser class 1

Radius in mm (inch)



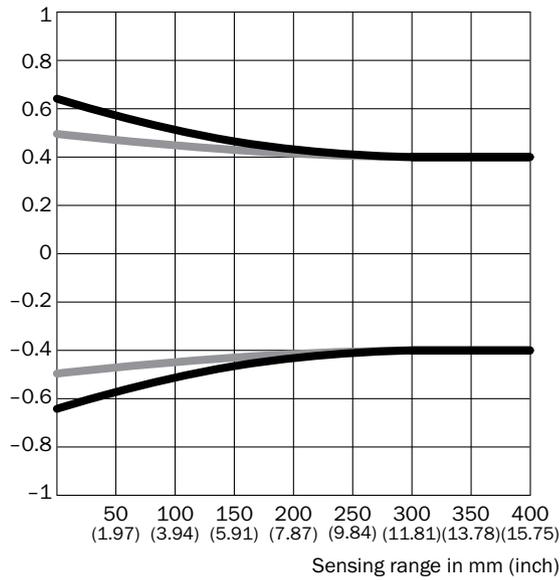
Dimensions in mm (inch)

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

Laser class 2

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)
400 mm (15.75)	0.8 (0.03)	0.8 (0.03)

Vertical
 Horizontal

Precise detection of small objects – even close-up



Product description

The WL9L-3 photoelectric retro-reflective sensor offers a long sensing range with maximum precision. Thanks to its small laser light spot and autocollimation optics even the smallest objects or object features can be reliably detected,

even at close-up range. Polarizing filters enable shiny objects to be detected. The rugged VISTAL™ housing protects the latest laser technology and guarantees less machine downtime.

At a glance

- Tough VISTAL™ housing
- Precise laser light spot
- Laser class 1
- Autocollimation optics and polarizing filter
- Teach-in
- Optimized SICK ASIC technology
- Connections: M8 and M12 plugs, cable as well as cable with plug
- M3 hole pattern and M4 hole pattern

Your benefits

- Precise detection of small objects and object features
- Detection of objects even through small openings
- Less machine downtime thanks to the stable VISTAL™ housing
- The longest sensing ranges in its class
- No blind spots, also detects shiny objects
- Wide range of connection options
- Multiple mounting options
- Highly visible light spot simplifies alignment



Additional information

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Sensing range 18

Light spot size 18

→ www.mysick.com/en/WL9L-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

	Laser class 1
Sensor principle	Photoelectric retro-reflective sensor
Detection principle	Autocollimation
Dimensions (W x H x D)	12.2 mm x 50 mm x 23.6 mm 12.2 mm x 52.2 mm x 23.6 mm 12.2 mm x 49.8 mm x 23.6 mm (depending on type)
Housing design (light emission)	Rectangular
Mounting hole	M3 or M4 (depending on type)
Sensing range max. ¹⁾	0 m ... 12 m
Sensing range ¹⁾	0 m ... 8 m
Type of light	Visible red light
Light source ²⁾	Laser
Laser class	1 (IEC 60825-1 / CDRH 21 CFR 1040.10 & 1040.11)
Wave length	650 nm
Light spot size (distance)	Ø 1 mm (500 mm)
Sensitivity adjustment	Single teach-in button

¹⁾ PL80A.

²⁾ Average service life 50,000 h at T_a = +25 °C.

Mechanics/electronics

	Laser class 1
Supply voltage ¹⁾	10 V DC ... 30 V DC
Residual ripple ²⁾	< 5 V _{pp}
Power consumption ³⁾	≤ 30 mA
Switching output	PNP, light/dark-switching, complementary ⁴⁾ NPN, light/dark-switching, complementary ⁴⁾ PNP, 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 with plug, 120 mm, PVC, 0.14 mm ² ⁸⁾ Cable, 2 m, PVC, 0.14 mm ² ⁸⁾ Connector (depending on type)
Circuit protection	A ⁹⁾ B ¹⁰⁾ C ¹¹⁾
Protection class	◇
Weight	Cable with plug, M12, 4-pin 80 g Connector, M12, 4-pin 13 g Connector, M8, 4-pin 13 g Cable, 4-wire 80 g
Polarisation filter	✓
Housing material	VISTAL™ Plastic

Optics material	PMMA
Enclosure rating	IP 66 IP 67 IP 69K
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 .

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

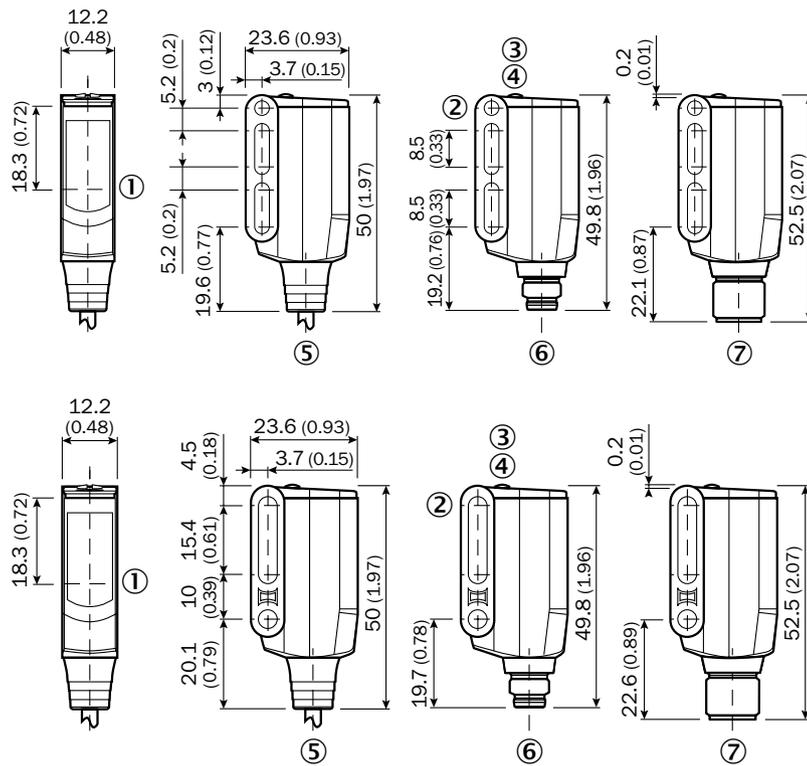
Laser class 1

Sensing range max. ¹⁾	Mounting hole	Output function	Switching mode	Connection	Model name	Part no.
0 m ... 12 m	M3	PNP	Light/dark-switching	Cable with plug, M12, 4-pin, 120 mm, PVC	WL9L-3P3432	1058176
				Connector M12, 4-pin	WL9L-3P2432	1058175
			Dark-switching	Connector M12, 4-pin	WL9L-3P2432S02	1058178
				Connector M12, 4-pin	WL9L-3P2432S01	1058177
			Light/dark-switching	Connector M8, 4-pin	WL9L-3P2232	1058174
				Cable, 4-wire, 2 m, PVC	WL9L-3P1132	1058233
	M4	PNP	Light/dark-switching	Connector M12, 4-pin	WL9L-3N2432	1058173
				Connector M8, 4-pin	WL9L-3N2232	1058172
				Connector M12, 4-pin	WL9M4L-3P2432	1058228
				Connector M8, 4-pin	WL9M4L-3P2232	1058227
				Cable, 4-wire, 2 m, PVC	WL9M4L-3P1132	1058229

¹⁾ PL80A.

Dimensional drawing

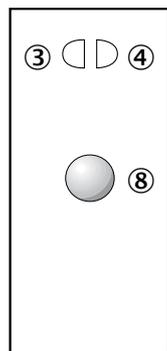
dimensions in mm



- ① Centre of optical axis, sender and receiver
- ② Mounting hole M3 (Ø 3.1 mm)
- ③ LED indicator yellow: Light received
- ④ LED signal strength indicator green: power on
- ⑤ Connecting cable or connecting cable with connector
- ⑥ Connector M8, 4-pin
- ⑦ Connector M12, 4-pin

- ① Centre of optical axis, sender and receiver
- ② Mounting hole M4 (Ø 4.1 mm)
- ③ LED indicator yellow: Light received
- ④ LED signal strength indicator green: power on
- ⑤ Connecting cable or connecting cable with connector
- ⑥ Connector M8, 4-pin
- ⑦ Connector M12, 4-pin

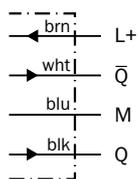
Adjustments



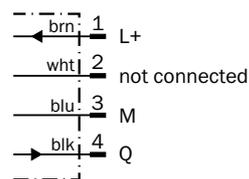
- ③ LED indicator yellow: Light received
- ④ LED signal strength indicator green: power on
- ⑧ Teach-in button

Connection diagram

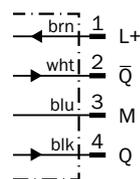
WL9xxL-3x1xxx Cable



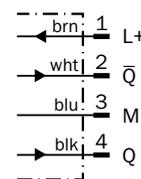
WL9L-3P2432S02 Connector



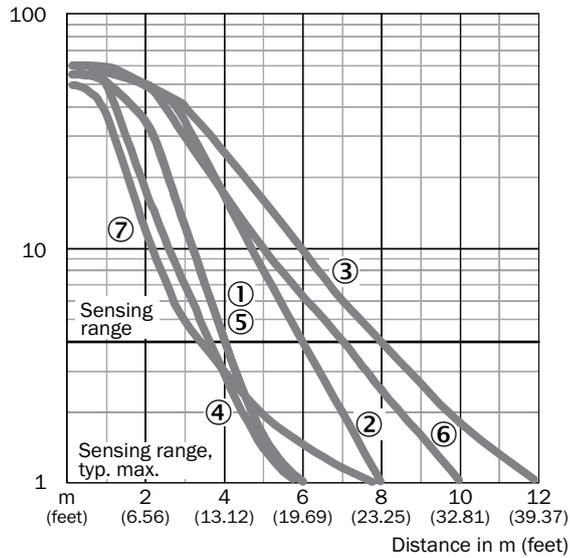
WL9xxL-3x2xxx Connector



WL9xxL-3x3xxx Cable with plug

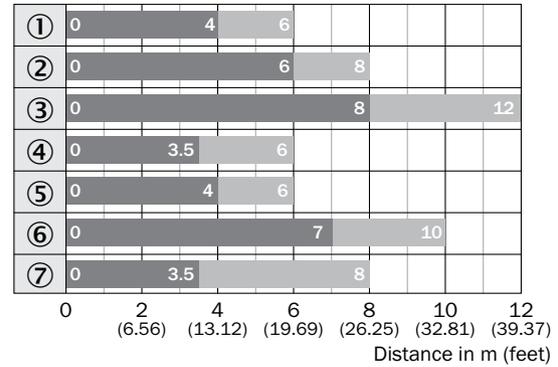


Operating reserve



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

Sensing range

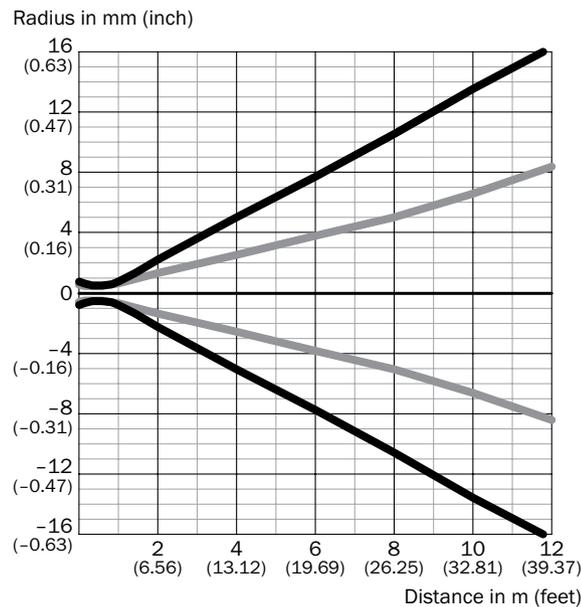


Reflector type

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

Light spot size

Overview



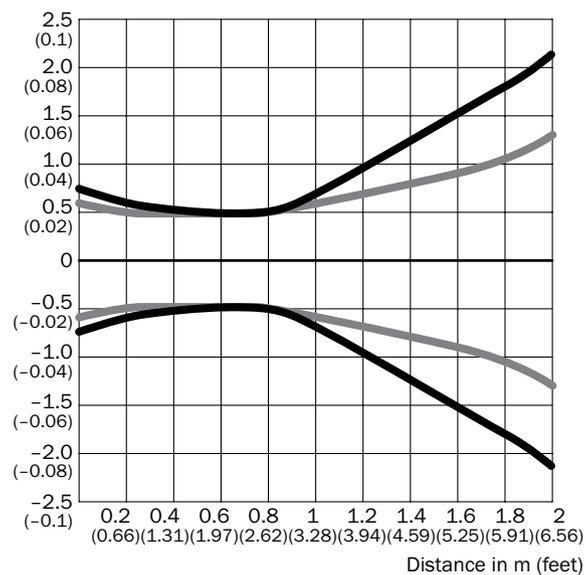
- Vertical
- Horizontal

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)

Close up

Radius in mm (inch)



- Vertical
- Horizontal

Precise detection of transparent objects



Product description

The WL9LG-3 photoelectric retro-reflective sensor with continuous switching threshold adjustment makes it the ideal choice for detecting transparent materials such as glass or clear films. Thanks to its small laser light spot and

autocollimation optics even the smallest objects or object features can be reliably detected, even at close-up range. The rugged VISTAL™ housing protects the latest laser technology and guarantees less machine downtime.

At a glance

- Tough VISTAL™ housing
- Precise laser light spot, laser class 1
- Continuous switching threshold adjustment (CTA)
- Autocollimation optics and polarizing filter
- Teach-in
- Optimized SICK ASIC technology
- Connections: M8 and M12 plugs, cable as well as cable with plug
- M3 hole pattern

Your benefits

- Precise detection of small objects and object features
- Detection of objects even through small openings
- Best in class for detecting transparent objects
- Less machine downtime thanks to the stable VISTAL™ housing
- No blind spots, also detects shiny objects
- Wide range of connection options
- Multiple mounting options
- Highly visible light spot simplifies alignment



Additional information

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→ www.mysick.com/en/WL9LG-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

	Laser class 1
Sensor principle	Photoelectric retro-reflective sensor
Detection principle	Autocollimation
Dimensions (W x H x D)	12.2 mm x 52.2 mm x 23.6 mm 12.2 mm x 49.8 mm x 23.6 mm 12.2 mm x 50 mm x 23.6 mm (depending on type)
Housing design (light emission)	Rectangular
Mounting hole	M3
Sensing range max. ^{1) 2)}	0 m ... 4.5 m
Sensing range ^{1) 2)}	0 m ... 2 m
Type of light	Visible red light
Light source ³⁾	Laser
Laser class	1 (IEC 60825-1 / CDRH 21 CFR 1040.10 & 1040.11)
Wave length	650 nm
Light spot size (distance)	Ø 1 mm (500 mm)
Sensitivity adjustment	Single teach-in button

¹⁾ REF-AC1000.

²⁾ We recommend using reflective tape REF-AC1000 or reflectors based on this reflective tape, like P41F, PLV14-A, PLH25-M12 or PLH25-D12, to ensure reliable operation. Reflectors with larger-scaled triple structures should only be used after application clarification

³⁾ Average service life 50,000 h at $T_a = +25 \text{ °C}$.

Mechanics/electronics

	Laser class 1
Supply voltage ¹⁾	10 V DC ... 30 V DC
Residual ripple ²⁾	< 5 V _{pp}
Power consumption ³⁾	≤ 30 mA
Switching output ⁴⁾	PNP, light/dark-switching, complementary
Output current I _{max.}	≤ 100 mA
Response time ⁵⁾	≤ 0.5 ms
Switching frequency ⁶⁾	1,000 Hz
Connection type	Cable, 2 m, PVC, 0.14 mm ² ⁷⁾ Connector (depending on type)
Circuit protection	A ⁸⁾ B ⁹⁾ C ¹⁰⁾
Protection class	⊠
Weight	Connector, M12, 4-pin 13 g Connector, M8, 4-pin 13 g Cable, 4-wire 80 g
Polarisation filter	✓
Housing material	VISTAL™ Plastic
Optics material	PMMA

Enclosure rating	IP 66 IP 67 IP 69K
Ambient operating temperature	-10 °C ... +50 °C
Ambient operating temperature extended ^{11) 12)}	-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 .
- ³⁾ Without load.
- ⁴⁾ Q = light-switching.
- ⁵⁾ Signal transit time with resistive load.
- ⁶⁾ With light/dark ratio 1:1.
- ⁷⁾ Do not bend below 0 °C.
- ⁸⁾ A = V_S connections reverse-polarity protected.
- ⁹⁾ B = inputs and output reverse-polarity protected.
- ¹⁰⁾ C = interference suppression.
- ¹¹⁾ 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.
- ¹²⁾ 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

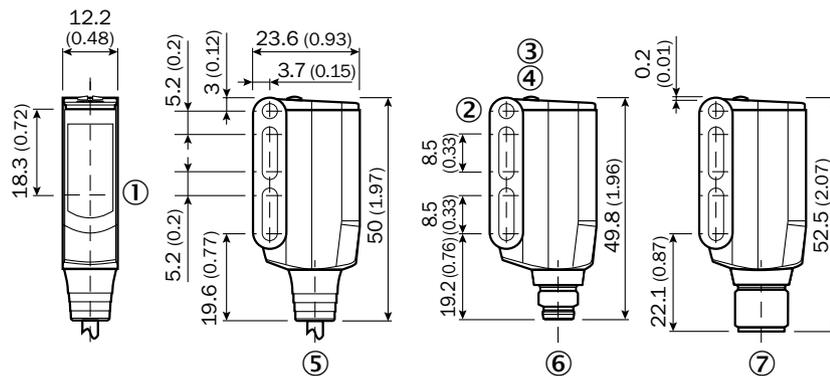
Laser class 1

Sensing range max. ¹⁾	Mounting hole	Output function	Switching mode	Connection	Model name	Part no.
0 m ... 4.5 m	M3	PNP	Light/dark-switching	Connector, M12, 4-pin	WL9LG-3P2432	1058235
				Connector, M8, 4-pin	WL9LG-3P2232	1058234
				Cable, 4-wire, 2 m, PVC	WL9LG-3P1132	1058236

¹⁾ REF-AC1000.

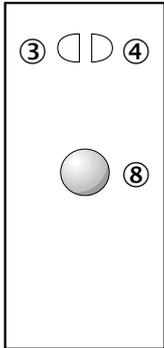
Dimensional drawing

dimensions in mm



- ① Centre of optical axis, sender and receiver
- ② Mounting hole M3 (Ø 3.1 mm)
- ③ LED indicator yellow: Light received
- ④ LED signal strength indicator green: power on
- ⑤ Connecting cable or connecting cable with connector
- ⑥ Connector M8, 4-pin
- ⑦ Connector M12, 4-pin

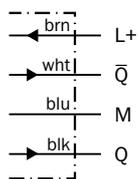
Adjustments



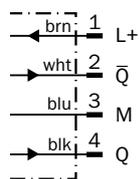
- ③ LED indicator yellow: Light received
- ④ LED signal strength indicator green: power on
- ⑧ Teach-in button

Connection diagram

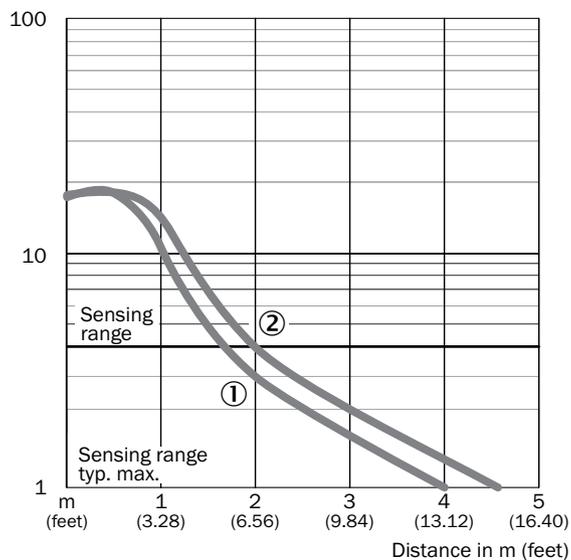
WL9LG-3P1132 Cable



WL9LG-3P2x32 Connector

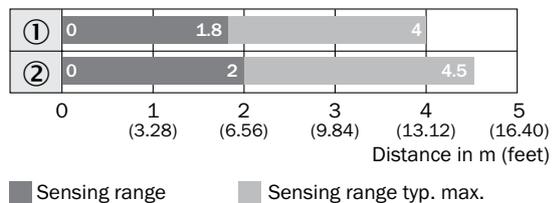


Operating reserve



- ① PLV14-A/PLH25-M12/PLH25-D12
- ② P41F/REF-AC1000

Sensing range



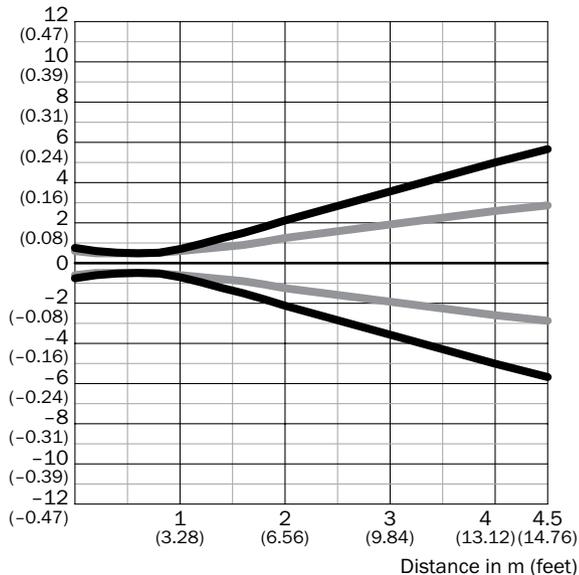
Reflector type

- ① PLV14-A / PLH25-M12 / PLH25-D12
- ② P41F / REF-AC1000

Light spot size

Overview

Radius in mm (inch)



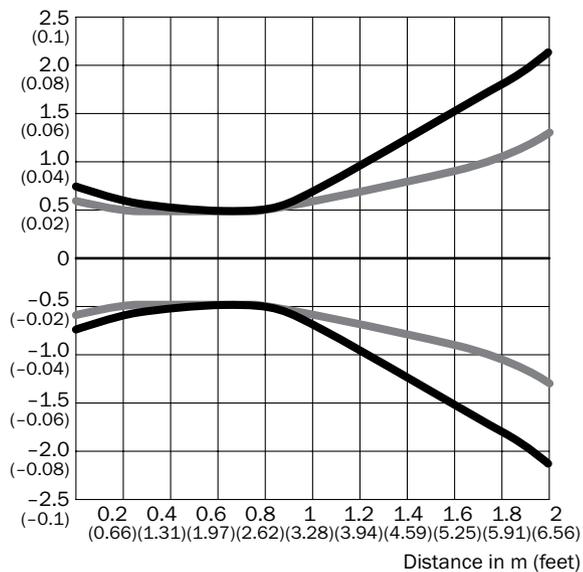
Dimensions in mm (inch)

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)
2 m (6.56 feet)	4.3 (0.17)	2.6 (0.10)
4.5 m (14.76 feet)	11.3 (0.44)	5.6 (0.22)

Vertical
 Horizontal

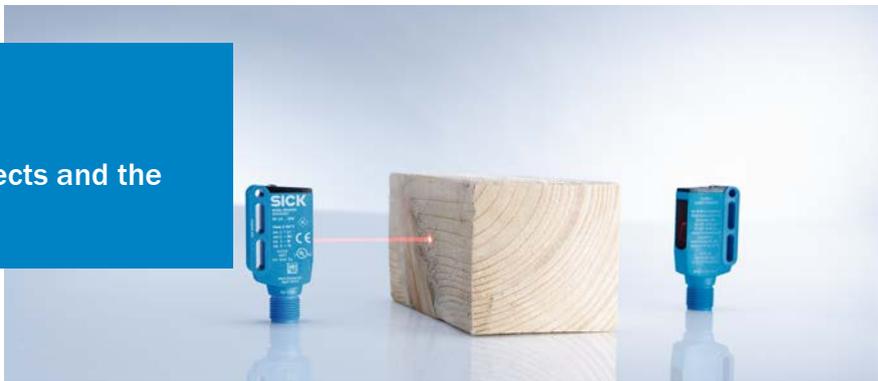
Close up

Radius in mm (inch)



Vertical
 Horizontal

Precise detection of small objects and the longest sensing ranges



Product description

The WSE9L-3 through-beam photoelectric sensor with the latest laser technology includes a very precise light spot that can reliably detect even the smallest objects or object features. In addition, high energy means that sensing ranges

of up to 60 m can be achieved. The stable VISTAL™ housing ensures the photoelectric sensor's reliability during installation and operation. Less machine downtime is therefore guaranteed. Highly visible light spot simplifies alignment.

At a glance

- Tough VISTAL™ housing
- Precise laser light spot
- Laser class 1
- Teach-in
- Optimized SICK ASIC technology
- Connections: M8 and M12 plugs, cable as well as cable with plug
- M3 hole pattern

Your benefits

- Precise detection of small objects and object features
- Detection of objects even through small openings
- Less machine downtime thanks to the stable VISTAL™ housing
- The longest sensing ranges in its class
- Wide range of connection options
- Multiple mounting options
- Highly visible light spot simplifies alignment



Additional information

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Adjustments 29

Connection diagram 29

Operating reserve 29

Sensing range 29

Light spot size 30

→ www.mysick.com/en/WSE9L-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

	Laser class 1
Sensor principle	Through-beam photoelectric sensor
Dimensions (W x H x D)	12.2 mm x 52.2 mm x 23.6 mm 12.2 mm x 49.8 mm x 23.6 mm 12.2 mm x 50 mm x 23.6 mm (depending on type)
Housing design (light emission)	Rectangular
Mounting hole	M3
Sensing range max.	0 m ... 60 m
Sensing range	0 m ... 50 m
Type of light	Visible red light
Light source ¹⁾	Laser
Laser class	1 (IEC 60825-1 / CDRH 21 CFR 1040.10 & 1040.11)
Wave length	650 nm
Light spot size (distance)	Ø 1 mm (500 mm)
Sensitivity adjustment	Single teach-in button

¹⁾ Average service life 50,000 h at T_a = +25 °C.

Mechanics/electronics

	Laser class 1
Supply voltage ¹⁾	10 V DC ... 30 V DC
Residual ripple ²⁾	< 5 V _{pp}
Power consumption ³⁾	≤ 30 mA
Switching output	PNP, light/dark-switching, complementary ⁴⁾ NPN, light/dark-switching, complementary ⁴⁾ (depending on type)
Output current I _{max.}	≤ 100 mA
Response time ⁵⁾	≤ 0.5 ms
Switching frequency ⁶⁾	1,000 Hz
Connection type	Cable, 2 m, PVC, 0.14 mm ² ⁷⁾ Connector (depending on type)
Circuit protection	A ⁸⁾ B ⁹⁾ C ¹⁰⁾
Protection class	⊕
Weight	
Connector, M12, 4-pin	13 g
Connector, M8, 4-pin	13 g
Cable, 4-wire	80 g
Polarisation filter	✓
Housing material	VISTAL™ Plastic
Optics material	PMMA
Enclosure rating	IP 66 IP 67 IP 69K

Ambient operating temperature	-10 °C ... +50 °C
Ambient operating temperature extended ^{11) 12)}	-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 .
- ³⁾ Without load.
- ⁴⁾ Q = light-switching.
- ⁵⁾ Signal transit time with resistive load.
- ⁶⁾ With light/dark ratio 1:1.
- ⁷⁾ Do not bend below 0 °C.
- ⁸⁾ A = V_S connections reverse-polarity protected.
- ⁹⁾ B = inputs and output reverse-polarity protected.
- ¹⁰⁾ C = interference suppression.
- ¹¹⁾ 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.
- ¹²⁾ 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.

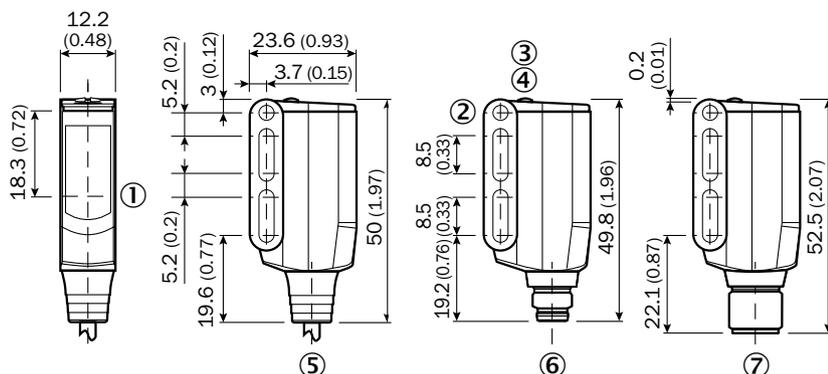
Ordering information

Laser class 1

Sensing range max.	Mounting hole	Output function	Switching mode	Connection	Model name	Part no.
0 m ... 60 m	M3	PNP	Light/dark-switching	Connector, M12, 4-pin	WSE9L-3P2437	1058181
				Connector, M8, 4-pin	WSE9L-3P2237	1058182
				Cable, 4-wire, 2 m, PVC	WSE9L-3P1137	1058915
		NPN	Light/dark-switching	Connector, M12, 4-pin	WSE9L-3N2437	1058180
				Connector, M8, 4-pin	WSE9L-3N2237	1058179

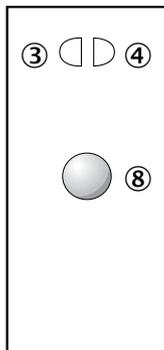
Dimensional drawing

dimensions in mm



- ① Centre of optical axis, sender and receiver
- ② Mounting hole M3 (Ø 3.1 mm)
- ③ LED indicator yellow: Light received
- ④ LED signal strength indicator green: power on
- ⑤ Connecting cable or connecting cable with connector
- ⑥ Connector M8, 4-pin
- ⑦ Connector M12, 4-pin

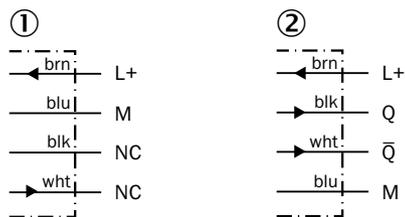
Adjustments



- ③ LED indicator yellow: Light received
- ④ LED signal strength indicator green: power on
- ⑧ Teach-in button

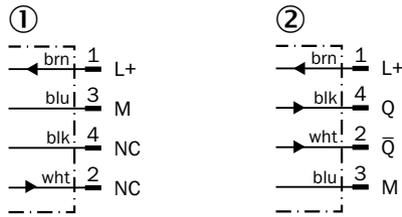
Connection diagram

WSE9L-3P1137 Cable



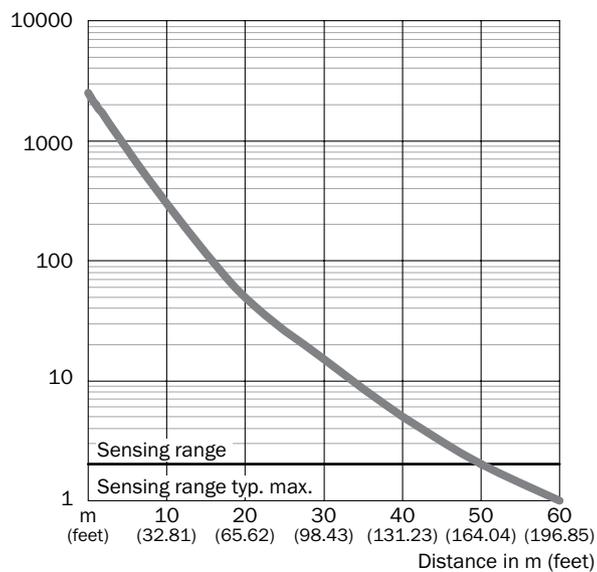
- ① Sender
- ② Receiver

WSE9L-3x2x37 Connector

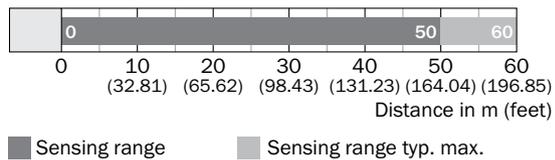


- ① Sender
- ② Receiver

Operating reserve

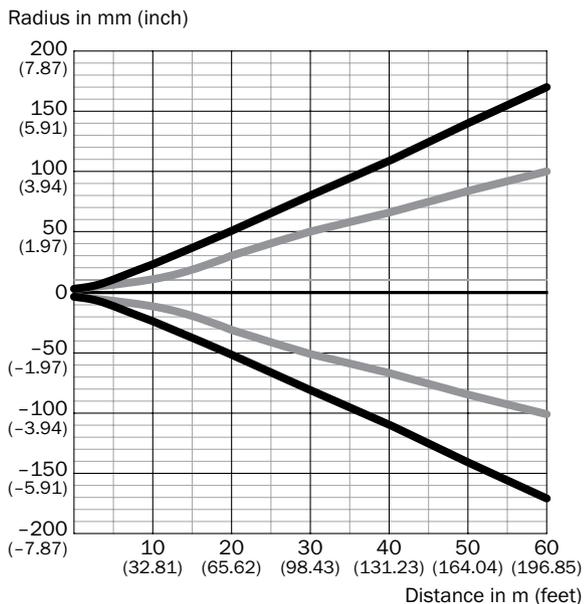


Sensing range



Light spot size

Overview

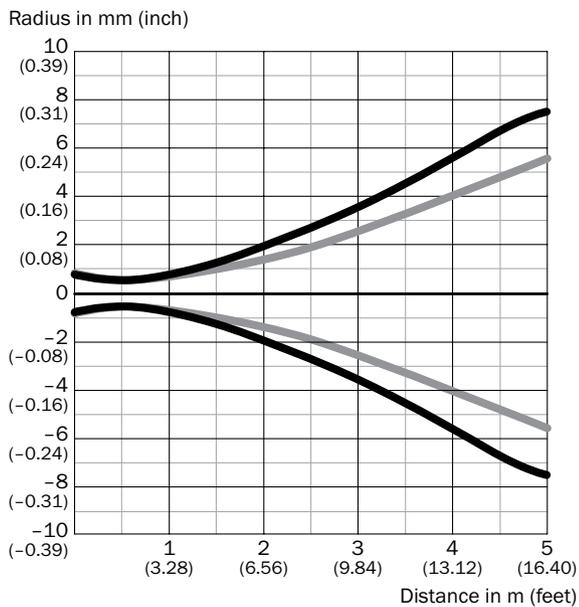


Dimensions in mm (inch)

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

Close up



— Vertical
— Horizontal

Accessories W9L-3

Mounting brackets/plates

Figure	Accessory type	Material	Model name	Part no.	WTB9L-3	WTB9M4L-3	WL9L-3	WL9M4L-3	WL9LG-3	WSE9L-3
	Mounting plates	PMMA, Brass (Br)	BEF-GPM3-W9	4066039	●	-	●	-	●	●
	Mounting brackets	Steel, zinc coated	BEF-WN-W9-2	2022855	●	●	●	●	●	●

Terminal and alignment brackets

- **Accessory type:** Universal terminal systems

Figure	Material	Model name	Part no.	WTB9L-3	WTB9M4L-3	WL9L-3	WL9M4L-3	WL9LG-3	WSE9L-3
	Zinc diecast	BEF-KHS-KH3	5322626	●	●	●	●	●	●
	Zinc plated steel (sheet), Diecast zinc (clamp)	BEF-KHS-N02	2051608	●	●	●	●	●	●
		BEF-KHS-N08	2051607	●	●	●	●	●	●
	Steel, zinc coated	BEF-MS12G-A	4056054	●	●	●	●	●	●
		BEF-MS12G-B	4056055	●	●	●	●	●	●
		BEF-MS12L-A	4056052	●	●	●	●	●	●
		BEF-MS12L-B	4056053	●	●	●	●	●	●
		BEF-MS12Z-A	4056056	●	●	●	●	●	●
		BEF-MS12Z-B	4056057	●	●	●	●	●	●
	Aluminum	BEF-RMC-D12	5321878	●	●	●	●	●	●

Reflectors

Figure	Accessory type	Dimensions (L x W)	Material	Model name	Part no.	WTB9L-3	WTB9M4L-3	WL9L-3	WL9M4L-3	WL9LG-3	WSE9L-3
	Fine triple reflectors	47 mm x 47 mm	PMMA/ABS	P250F	5308843	-	-	●	●	-	-
		∅ 23 mm	PMMA/ABS	P25F-1	5319385	-	-	●	●	-	-
		23 mm x 23 mm	PMMA/ABS	P41F	5315128	-	-	●	●	●	-
		18 mm x 18 mm	PMMA/ABS	PL10F	5311210	-	-	●	●	-	-
		16 mm x 38 mm	PMMA/ABS	PL20F	5308844	-	-	●	●	-	-
		28 mm x 56 mm	PMMA/ABS	PL30F	5326523	-	-	●	●	-	-
		45 mm x 76 mm	PMMA/ABS	PL81-1F	5325060	-	-	●	●	-	-
	Angular	80 mm x 80 mm	PMMA/ABS	PL80A	1003865	-	-	●	●	-	-

Figure	Accessory type	Dimensions (L x W)	Material	Model name	Part no.	WTB9L-3	WTB9M4L-3	WL9L-3	WL9M4L-3	WL9LG-3	WSE9L-3
	Special reflectors	25 mm x 25 mm	Stainless steel V4A (1.4404, 316L)	PLH25-D12	2063404	-	-	●	●	●	-
				PLH25-M12	2063403	-	-	●	●	●	-
		14 mm x 14 mm	Stainless steel V4A (1.4404, 316L)	PLV14-A	2063405	-	-	●	●	●	-
	Reflective tape	225 mm x 225 mm	-	REF-AC1000	5319429	-	-	●	●	●	-
		56.3 mm x 56.3 mm	-	REF-AC1000-56	4063030	-	-	●	●	●	-

Plug connectors and cables

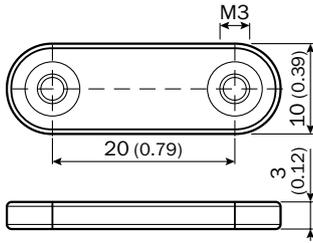
- Connector type: Female connector
- Enclosure rating: IP 67

Figure	Connection type	Flying leads	Sheath material	Cable length	Model name	Part no.	WTB9L-3	WTB9M4L-3	WL9L-3	WL9M4L-3	WL9LG-3	WSE9L-3
	Connector M8, 4-pin	Straight	PVC	2 m	DOL-0804-G02M	6009870	●	●	●	●	●	●
				5 m	DOL-0804-G05M	6009872	●	●	●	●	●	●
	Angled	PVC	PVC	2 m	DOL-0804-W02M	6009871	●	●	●	●	●	●
				5 m	DOL-0804-W05M	6009873	●	●	●	●	●	●
	Connector M12, 4-pin	Straight	PVC	2 m	DOL-1204-G02M	6009382	●	●	●	●	●	●
				5 m	DOL-1204-G05M	6009866	●	●	●	●	●	●
	Angled	PVC	PVC	2 m	DOL-1204-W02M	6009383	●	●	●	●	●	●
				5 m	DOL-1204-W05M	6009867	●	●	●	●	●	●
	Connector M8, 4-pin	Straight	-	-	DOS-0804-G	6009974	●	●	●	●	●	●
			Angled	-	-	DOS-0804-W	6009975	●	●	●	●	●
	Connector M12, 4-pin	Straight	PBT	-	DOS-1204-G	6007302	●	●	●	●	●	●
			Angled	PBT	-	DOS-1204-W	6007303	●	●	●	●	●

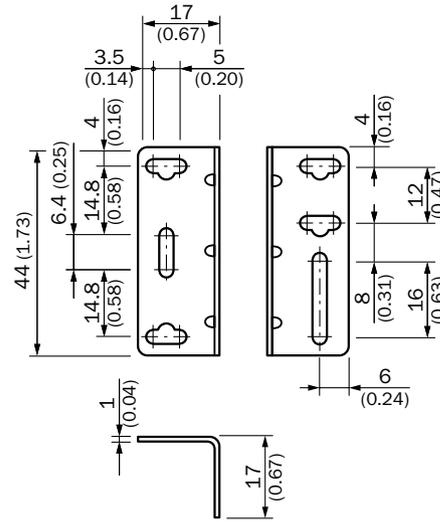
Dimensional drawings Mounting brackets/plates

dimensions in mm

BEF-GPM3-W9



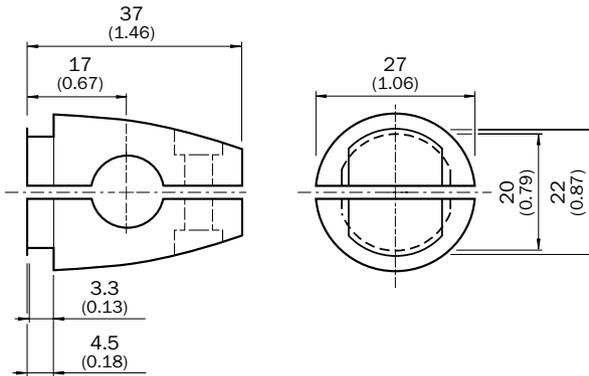
BEF-WN-W9-2



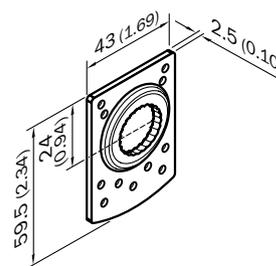
Dimensional drawings Terminal and alignment brackets

dimensions in mm

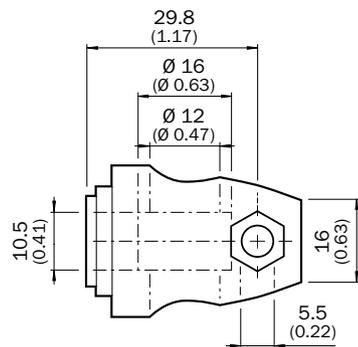
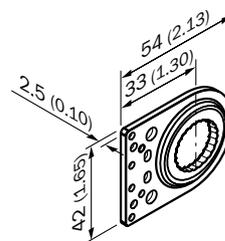
BEF-KHS-KH3



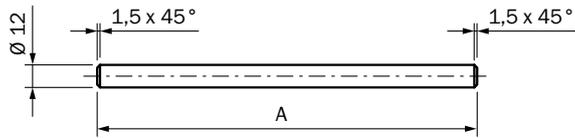
BEF-KHS-N02



BEF-KHS-N08

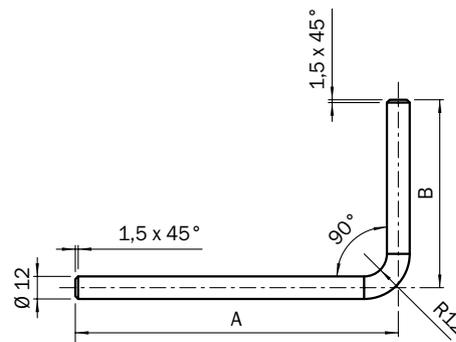


BEF-MS12G-A
BEF-MS12G-B



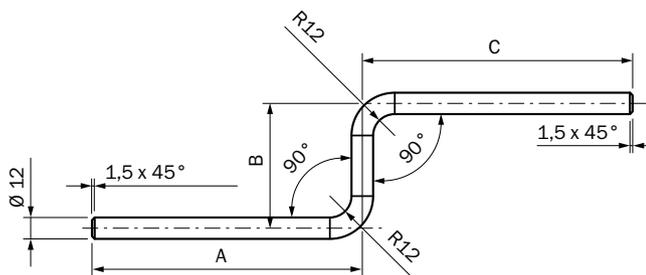
A = 200 mm (BEF-MS12G-A)
A = 300 mm (BEF-MS12G-B)

BEF-MS12L-A
BEF-MS12L-B



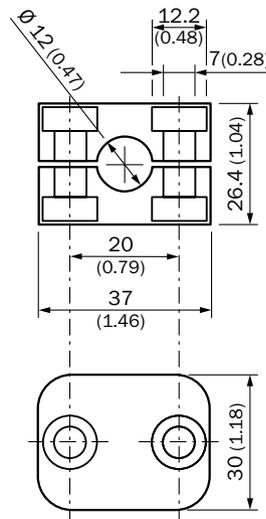
A = 150 mm, B = 150 mm (BEF-MS12L-A)
A = 250 mm, B = 250 mm (BEF-MS12L-B)

BEF-MS12Z-A
BEF-MS12Z-B



A = 150 mm, B = 70 mm, C = 150 mm (BEF-MS12Z-A)
A = 150 mm, B = 70 mm, C = 250 mm (BEF-MS12Z-B)

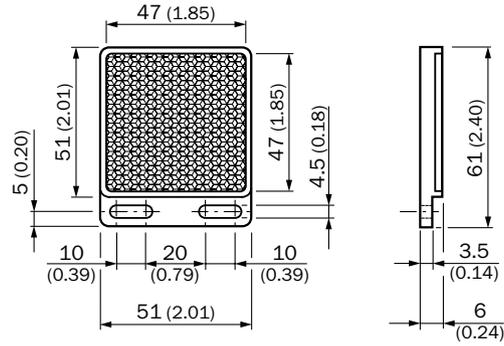
BEF-RMC-D12



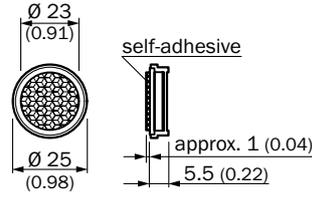
Dimensional drawings Reflectors

dimensions in mm

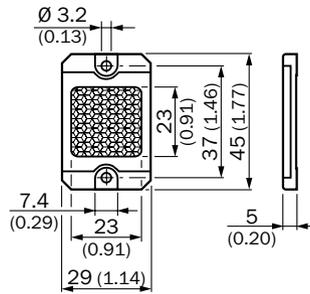
P250F



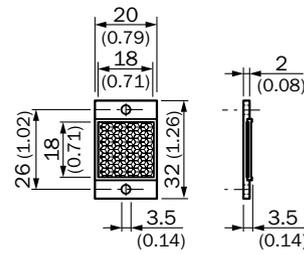
P25F-1



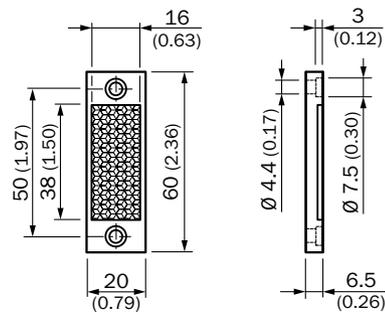
P41F



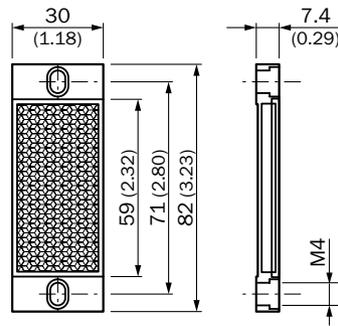
PL10F



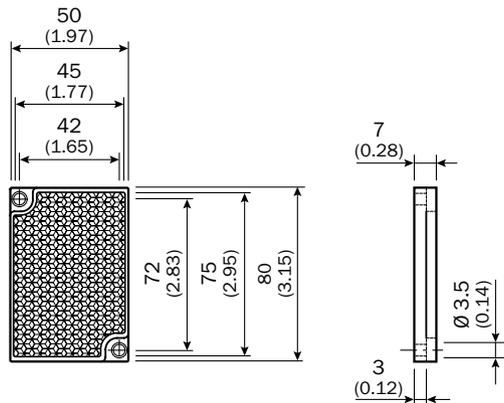
PL20F



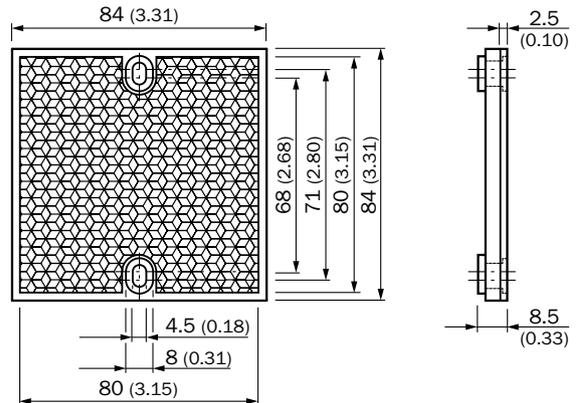
PL30F



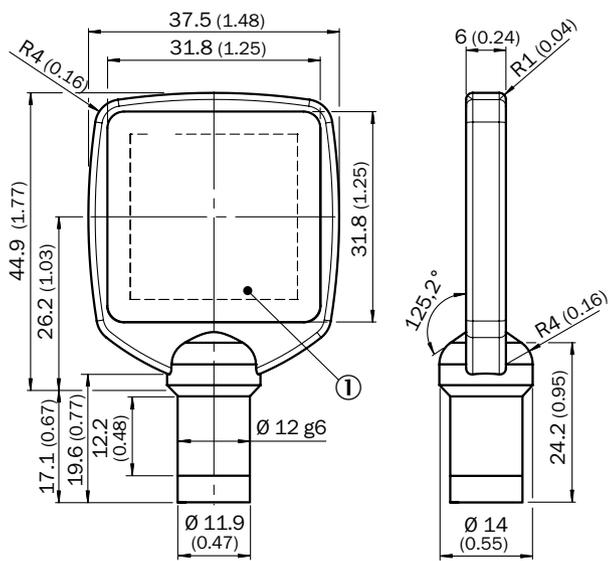
PL81-1F



PL80A

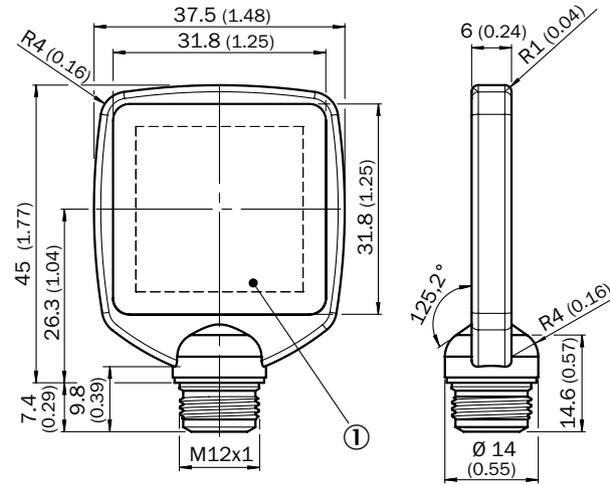


PLH25-D12



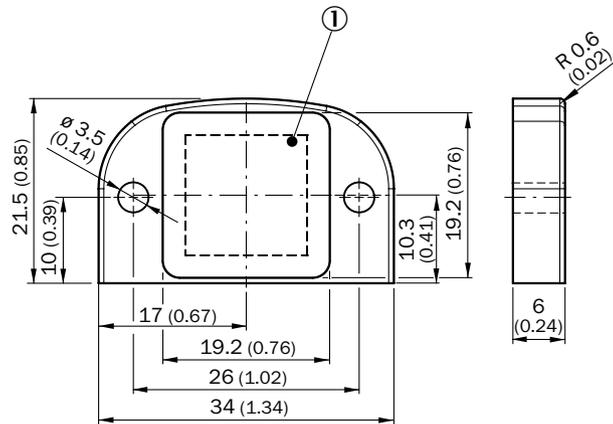
① Reflective area

PLH25-M12



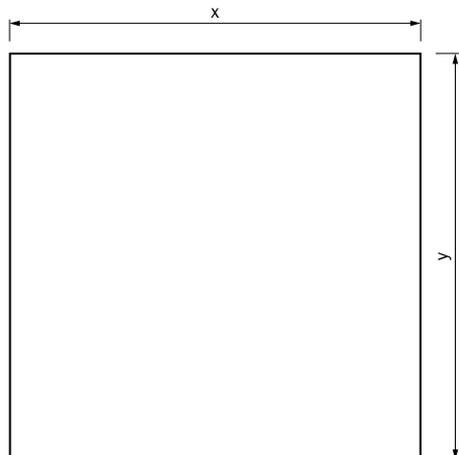
① Reflective area

PLV14-A



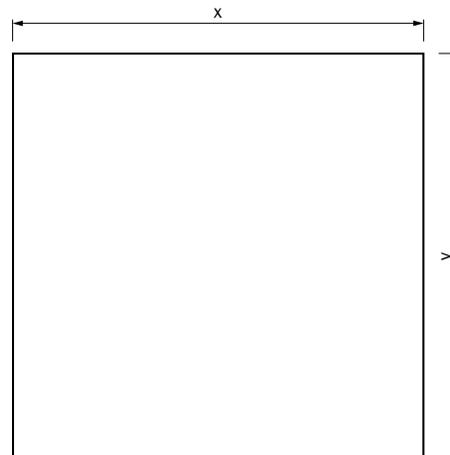
① Reflective area

REF-AC1000



① X = 225 mm
② Y = 225 mm

REF-AC1000-56

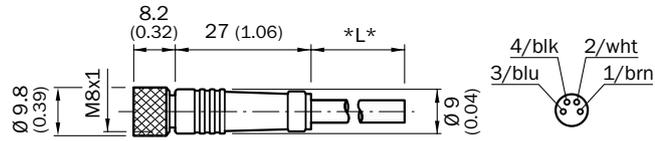


① X = 56,3 mm
② Y = 56,3 mm

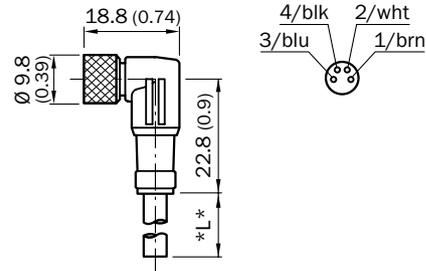
Dimensional drawings Plug connectors and cables

dimensions in mm

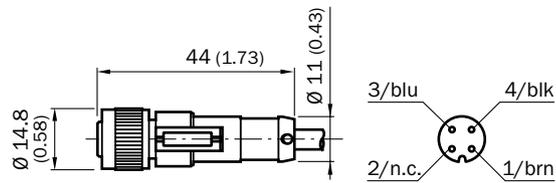
DOL-0804-G02M
DOL-0804-G05M



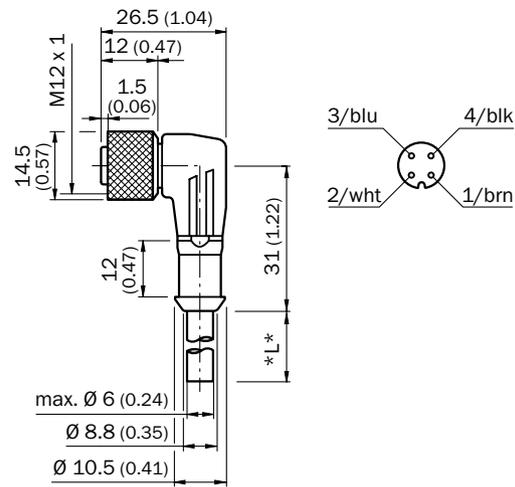
DOL-0804-W02M
DOL-0804-W05M



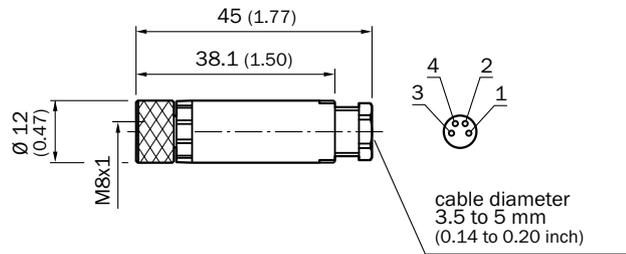
DOL-1204-G02M
DOL-1204-G05M



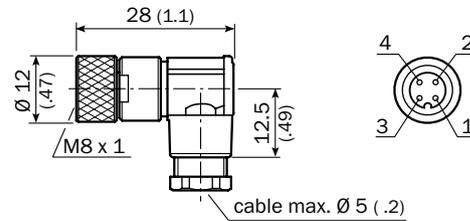
DOL-1204-W02M
DOL-1204-W05M



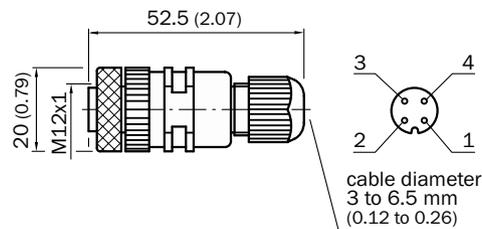
DOS-0804-G



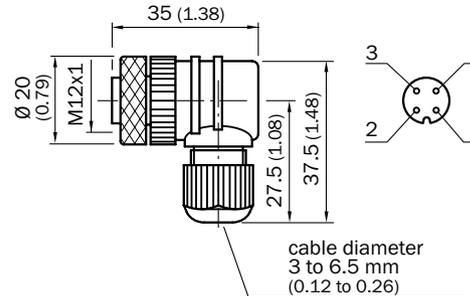
DOS-0804-W



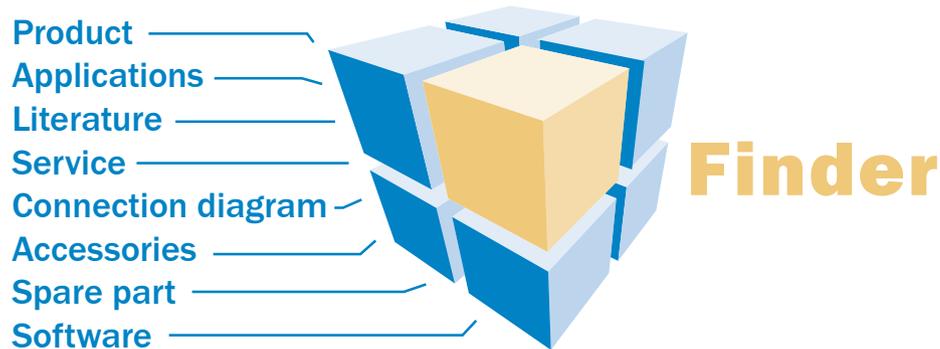
DOS-1204-G



DOS-1204-W



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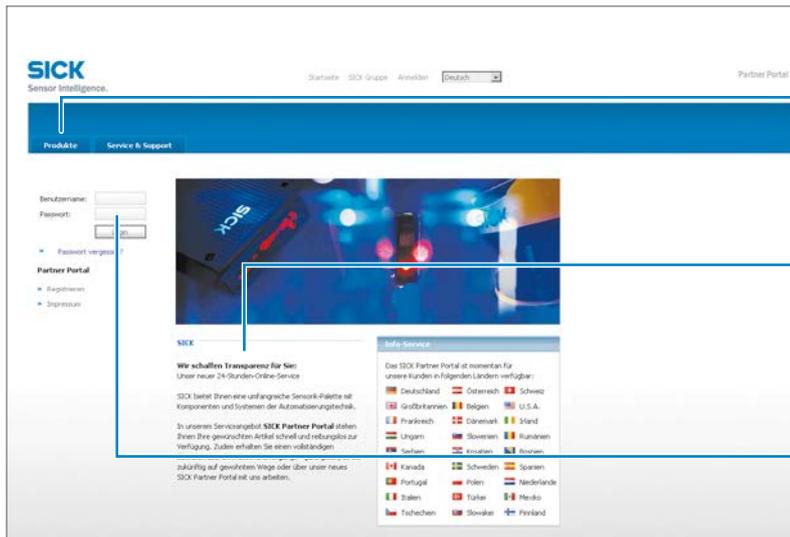
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