PRODUCTINFORMATION

PowerProx

THE NEW HOME OF THE SENSING RANGE

MultiTask photoelectric sensors

SICK
Sensor Intelligence.

PowerProx:
THE NEW STANDARD FOR RELIABLE DETECTION WITH AN EXTENDED SENSING RANGE

The new standard for reliable detection with an extended sensing range can't be measured with a conventional yard stick. After all, with sensing ranges from 5 cm to 4 m, no object goes undetected by the PowerProx MultiTask photoelectric sensors. In this sensor, SICK has packed all the advantages of time-of-flight technology into the world's smallest housing. And we increased the detection speed: thanks to PowerProx, now even objects being conveyed at high speed, small and flat objects, and jet black and shiny objects can be reliably detected over a longer distance. The photoelectric sensors also provide stable detection results over a large detection angle and are immune to ambient light. In addition, many variants are available with analog output, thereby delivering precise measured values for different positioning tasks. The ideal solution: the product family PowerProx combines sensing range, speed, precision, reliability and a small housing size under one roof.

PowerProx: you can see the film at www.sick.com/PowerProx

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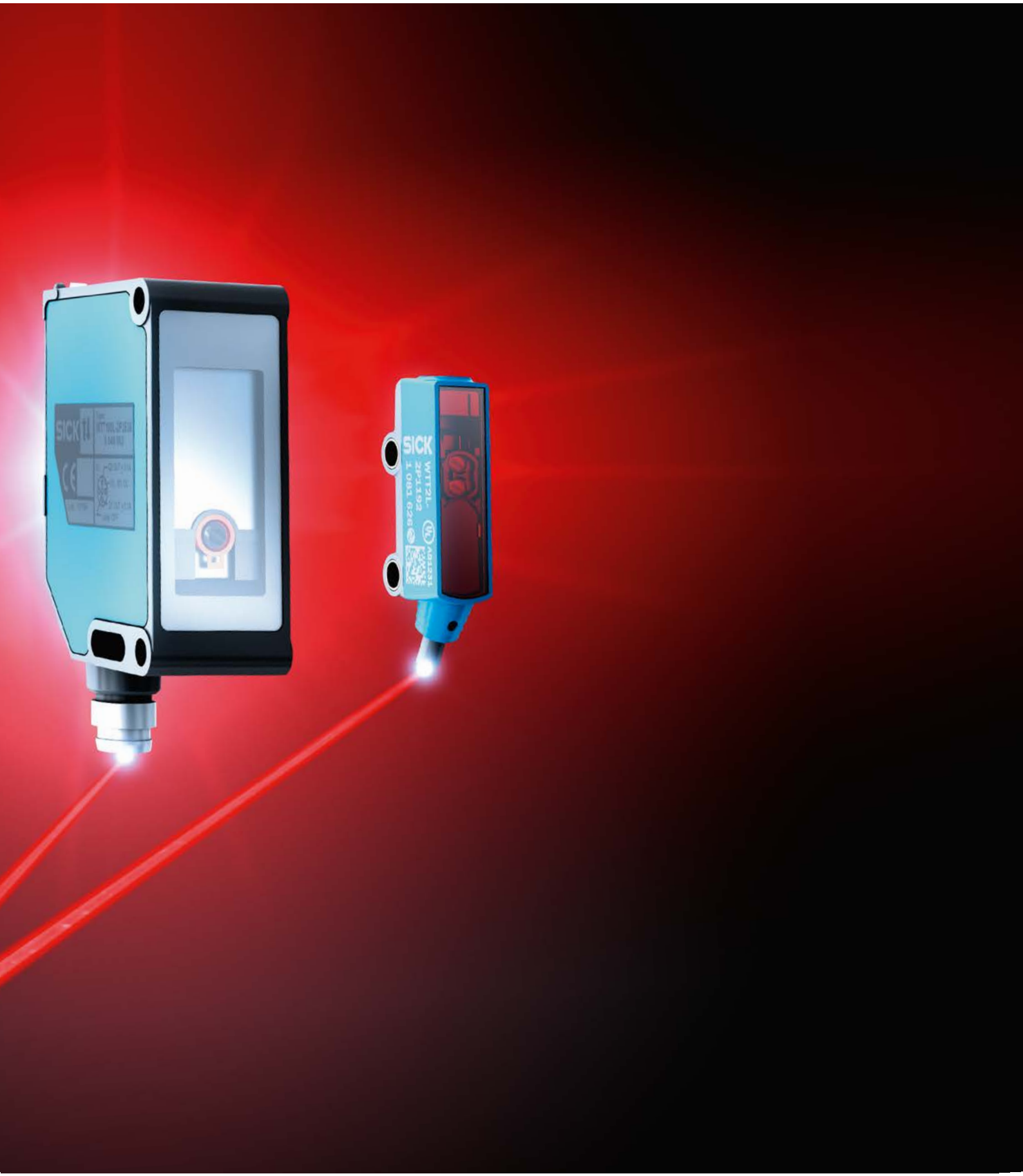
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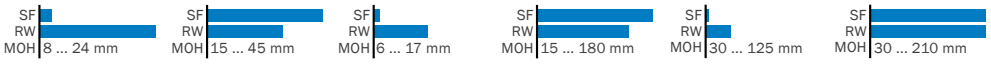
PowerProx:
EVERYTHING UNDER ONE ROOF

The PowerProx MultiTask photoelectric sensors set standards, including when it comes to choice and commissioning – not only do they offer the best solution, they always provide the right solution.

Sub product family	NEW PowerProx Distance Shiny	NEW PowerProx Speed Shiny	NEW PowerProx Precision Shiny			
						
Sub product family	**PowerProx Distance**	**PowerProx Speed**	**PowerProx Precision**	**PowerProx Small**	NEW **PowerProx Micro**	**WTT280L**
						
						
Switching output	✔	✔	✔	✔	✔	✔
IO-Link	✔	✔	✔	–	–	–
NEW Analog output	✔	✔	✔	✔	–	–
Empty bay and clearance detection	■			■	■	■
Rapid counting and precise edge detection		■		■		■
Quality control by detecting the smallest of objects and object ropertiesproperties			■			
Checking the pick-up point and collision awareness			■		■	
Protection for doors and gates	■				■	
Monitoring level, slack, stack height, or roll thickness	■	■	■	■	■	■

SF: Switching frequency
RW: Sensing range
MOH: Minimum distance from object to background



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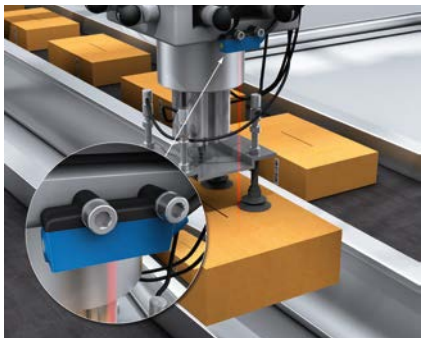
THE NEW STANDARD: CUSTOMIZED FOR YOUR APPLICATION

Depending on the application, there are also specific requirements placed on the sensors. PowerProx offers tailor-made solutions for all requirements:

The smallest design and largest sensing range: presence monitoring of objects in grippers

Grippers are always in motion when picking up objects, therefore sensors attached to the grippers must be as small and light as possible. The PowerProx Micro has the currently smallest size in the world with a sensing range of 800 mm: the ideal solution for use in grippers. The sensor can be set easily via the single teach-in button.

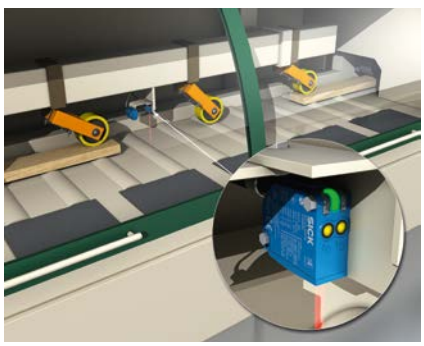


Extended sensing range: Occupied bay and clearance detection

Thanks to its extended sensing range of up to 3.8 m and two separate, adjustable switching points and analog output, the PowerProx Distance is the ideal solution for occupied bay and clearance detection, for palletization, and collision protection. Up to eight switching points can be defined with IO-Link, which means that the occupation status of up to eight bays can be checked. The PowerProx Distance is immune to background reflections, e.g., from steel shelf beams. Even mutual interference between two sensors is eliminated. The PowerProx Small and Micro are suitable for use in the tightest of spaces – and operate reliably for sensing ranges up to 2.5 m and 0.8 m.

High speed: Rapid counting and precise edge detection

When it comes to processes, such as counting at high speed in the packaging industry or precise edge detection in the wood industry, the PowerProx Speed is the right choice: The short response time, the high switching frequency, and the high-precision laser beam enable precise edge detection on wooden boards, for example. What's more, the PowerProx Speed also offers smart sensor functions, such as a time stamp. The PowerProx Speed also reliably detects even very shiny objects at a large detection angle. If the background is not in close proximity to the object, then the PowerProx Small is ideal and, as it is even smaller, it offers more flexibility in terms of machine design.



Maximum precision: Quality control by detecting the smallest of objects and object properties.

Top results when detecting and measuring the smallest of objects thanks to small hysteresis, small minimum distance between object and background as well as high repeatability: the PowerProx Precision really comes into its own during quality control, in the automotive and part supplier industries, for example. The photoelectric sensor reliably detects even the smallest objects, gaps, and recesses from far away. It handles changing materials and very shiny surfaces with ease, even in front of shiny or reflective backgrounds.

Maximum precision: Checking the pick-up point and collision awareness

PowerProx Precision reliably detects small and flat objects as well, no matter what the surface finish: A crucial requirement for use in industrial handling and assembly. With up to two adjustable switching points or up to eight adjustable switching points in the IO-Link version as well as analog output, several robot pick-up points, for example, can be reliably checked. PowerProx Precision provides precise detection at sensing ranges from 5 cm to 1.8 m and can be installed wherever desired.

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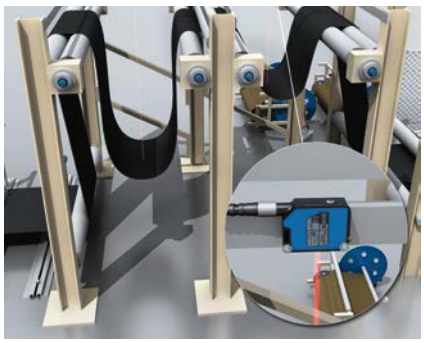
Extended sensing range: Protection for doors and gates

When you need to protect doors and gates, an extended sensing range is a must. Photoelectric retro-reflective sensors and through-beam photoelectric sensors always require a reflector or a receiver system. while PowerProx operates according to the scanning principle, with reflectors and receivers not being required. Power-Prox With its extended sensing range of up to 3.8 m and high ambient light immunity, PowerProx Distance is ideal for protecting large doors and gates. For smaller distances to be measured, for example access monitoring at subway stations, the space-saving PowerProx Micro offers new possibilities when designing access zones.

Two switching points: Monitoring level, slack, stack height, or roll thickness

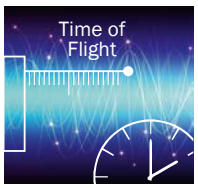
Many variants of the PowerProx product family are also available with two adjustable switching points. this means that control tasks, such as slack control in the printing industry, the tire industry, or during sheet steel processing, can be carried out efficiently and easily. Depending on additional requirements relating to speed, precision, sensing range, or size, different PowerProx photoelectric sensor variants are the ideal choice. The versions with IO-Link and up to eight switching points or the versions with analog output are well-suited if a finer application resolution is required.



INSTALLED AS STANDARD: THE INNOVATIVE POWER OF SICK

It simply can't get any more powerful than this: not only does the PowerProx pack time-of-flight technology into the world's smallest housing for the first time, its improved optics and electronics, high level of ruggedness, and full smart sensor functions also offer a range of advantages, including:

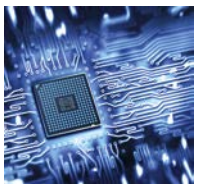
Outstanding detection properties over large sensing ranges, high switching frequencies and small minimum distance between object and background



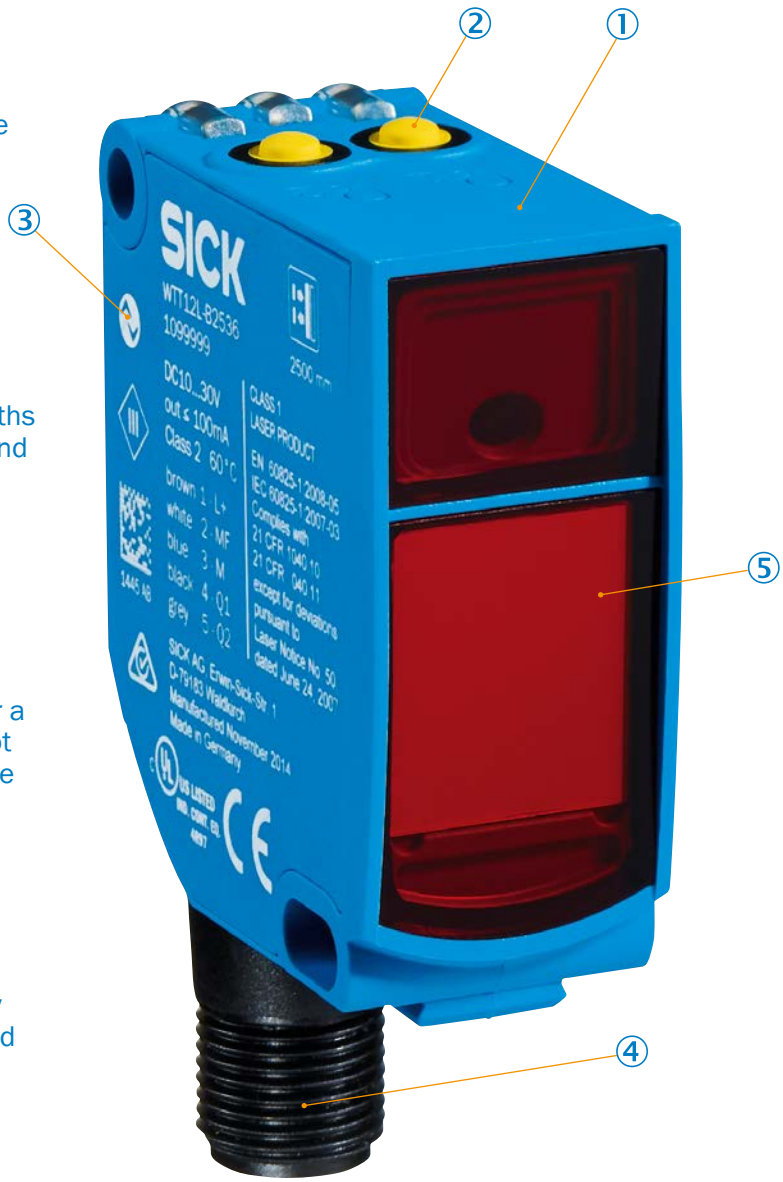
Time-of-flight technology in the smallest housing

Improved optics and beam paths deliver greater performance and precision

The latest laser technology for a precise, highly visible light spot (red light version) No risk to the eyes thanks to laser class 1



Greater precision due to highly accurate receiver elements and rapid signal processing



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① High level of robustness and maximum flexibility in the machine design

- VISTAL® housing (“Distance”, “Speed”, “Precision”, and corresponding “Shiny” variants)
- Smallest housing with this performance level (“Micro” variant)

② Easy commissioning, easy replacement

- No complicated sensor programming required
- A setting element and an LED is assigned to each switching threshold
- Highly visible light spot or alignment accessory simplifies alignment

③ Intelligent additional functions, which provide extra options

- The distance value can be read out in mm via IO-Link, and up to eight switching points can be defined (“Distance”, “Speed”, “Precision” and corresponding “Shiny” variants)
- Configuration of various sensor functions via the display (“Small” variant)

④ Analog output

- Variants with analog output available
- Output of the measured distance value via current and voltage output

⑤ “Shiny” variants available

- For detection tasks in which large amounts of emitted light from shiny objects are reflected back to the sensor

RELIABLE DETECTION WITH UNRIVALED RANGE

Product description

PowerProx Distance provides reliable detection up to a sensing range of 3.8 m. This enables PowerProx Distance to measure large areas, e.g., multi-deep bays in storage and conveyor systems. The small PowerProx Distance housing combines time-of-flight technology, laser class 1 (i.e., no danger to eyes), outstanding optics, and fast signal processing. The MultiTask photoelectric sensor is adjusted via potentiometer or teach-in button. There are versions available with either one or two separately adjustable switching thresholds with analog output or IO-Link, depending on the application. IO-Link can be used to define up to eight switching points and to make use of the smart sensor functions. The VISTAL™ housing ensures the device is sufficiently rugged.

At a glance

- Time-of-flight technology, laser class 1
- Sensing range for object detection: 5 cm to 3.8 m
- Switching frequency: 100 Hz
- Minimum distance between the object and background: 8 ... 24 mm
- VISTAL™ housing
- 1 or 2 switching points which can be adjusted separately
- Analog output
- IO-Link available as an option (distance value, 8 switching points, smart sensor functions)

Your benefits

- Measures large areas up to a sensing range of 3.8 m, e.g., multi-deep bays in storage and conveyor systems
- Reliable object detection, e.g., even with shiny or jet-black surfaces and background reflections
- Highly visible light spot simplifies alignment of the photoelectric proximity sensor
- Precise, simple adjustment with potentiometer or teach-in button
- Eye-safe thanks to laser class 1
- High levels of availability and durability. Rugged even when subjected to high mechanical loads thanks to VISTAL™ housing.
- Small housing offers great flexibility in terms of machine design
- IO-Link extends functionality

Additional information

→ www.sick.com/PowerProx

For more information, simply 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.

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Detailed technical data

Features

Sensor principle	Photoelectric proximity sensor
Detection principle	Background suppression
Dimensions (W x H x D)	20 mm x 49.6 mm x 44.2 mm
Housing design (light emission)	Rectangular
Sensing range max. [1]	50 mm ... 3,800 mm
Sensing range [2]	100 mm ... 3,800 mm
Distance value-measuring range [1]	50 mm ... 3,800 mm 100 mm ... 3,800 mm (depending on type)
Distance value-resolution	1 mm
Distance value-repeatability [3] [4] [5]	1,1 mm ... 3,0 mm
Distance value-accuracy	Typ. ± 15 mm
Type of light	Visible red light
Light source [6]	Laser
Light spot size (distance)	Ø 18 mm (3,800 mm)
Wave length	658 nm
Laser class	1 (IEC 60825-1 / CDRH 21 CFR 1040.10 & 1040.11)
Adjustment	Potentiometer, 4 turns (1 x) Potentiometer, 4 turns (2 x) Single teach-in button (1 x) Single teach-in button (2 x) IO-Link (depending on type)

[1] Object with 6 ... 90 % remission (based on standard white to DIN 5033).
[2] Adjustable.
[3] Equivalent to 1 σ.
[4] See characteristic curves repeatability.
[5] 6 % ... 90 % remission.
[6] Average service life: 100,000 h at T_U = +25 °C.

Mechanics/electronics

Supply voltage	10 V DC ... 30 V DC [1] [2] 12 V DC ... 30 V DC [1] [3] (depending on type)
Ripple [4]	≤ 5 V_{pp}
Power consumption [5]	≤ 70 mA
Output type [6] [7] [8]	PUSH/PULL, PNP, NPN
Number of switching outputs	2 (Q1, Q2) [6] 2 (Q, /Q) [7] 1 (Q1) [8] (depending on type)
Switching mode	Light switching [6] [8] Light/dark switching [7] (depending on type)
Output current $I_{max.}$	≤ 100 mA / ≤ 50 mA (depending on type)
Response time [9]	≤ 5 ms
Switching frequency [10]	100 Hz
Analog output	4 mA ... 20 mA (≤ 450 Ω) / 0 V ... 10 V (≥ 50 kΩ) / switchable
Resolution of analog output	12 bit

Output time	≤ 5 ms
Input	MF_{in} = multifunctional input programmable L/D = light/dark switching Sender off (depending on type)
Connection type	Cable with male connector, M12, 0.3 m [11] Male connector, M12 Cable, 2 m [11] (depending on type)
Circuit protection	A [12] B [13] C [14]
Protection class	III
Weight	
Cable with plug M12, 5-pin	80 g
Male connector M12, 5-pin	48 g
Cable, 5-wire	111 g
Housing material	VISTAL®
Optics material	Plastic, PMMA
Enclosure rating	IP67
Ambient operating temperature [15] [16] [17]	–35 °C ... +50 °C
Ambient storage temperature	–40 °C ... +70 °C
Warm-up time [17]	< 15 min
Initialization time	< 300 ms

[1] Limit values. Operated in short-circuit protected network: max. 8 A.
[2] V_s min at IO-Link operation = 18 V.
[3] Vs min when using the voltage output = 13 V.
[4] May not exceed or fall below U_v tolerances.
[5] Without load. At V_S = 24 V.
[6] Q1, Q2 = 2 switching thresholds, light switching.
[7] Q, /Q = 1 switching threshold, light/dark switching (complementary).
[8] Q1 = 1 switching threshold, light switching.
[9] Signal transit time with resistive load.
[10] With light/dark ratio 1:1.
[11] Do not bend below 0 °C.
[12] A = V_S connections reverse-polarity protected.
[13] B = inputs and output reverse-polarity protected.
[14] C = interference suppression.
[15] As of T_a = 45 °C, a max.load current I_{max} = 50 mA is permitted.
[16] For Vs ≤ 24 V. When Tu = 45 °C or above, a maximum load resistance of 300 Ω ... 450 Ω is permitted on QA.
[17] Below T_a = –10 °C a warm-up time is required.

Fieldbus, industrial network

Fieldbus integration	IO-Link V1.1
Mode	COM 2 (38,4 kBaud)
Cycle time	5 ms
Process data length	32 Bit
Process data structure	Bit 0 = switching signal Q_{01} Bit 1 = switching signal Q_{02} Bit 2 ... 8 = BDC 2 ... 8 Bit 9 ... 15 = empty Bit 16 ... 31 = distance value
Additional features	8 switching points for distance to object, of which 2 can be inverted, 1 switching point as switching window or configurable with hysteresis. Multifunctional input: sender off, external teach, inactive

Ordering information

PowerProx Distance, switching output

- **Supply voltage:** 10 V DC ... 30 V DC (Limit values. Operated in short-circuit protected network: max. 8 A.)
- **Output type:** PUSH/PULL, PNP, NPN
- **Sensing range max.:** 50 mm ... 3,800 mm (Object with 6 ... 90 % remission (based on standard white to DIN 5033).)
- **Output current $I_{Max.}$:** ≤ 100 mA

Number of switching outputs	Switching mode	Adjustment	Input	Connection	Connection diagram	Type	Part no.
2 (Q, /Q) [1]	Light/dark switching [1]	Single teach-in button (1 x)	Sender off	Cable with plug M12, 5-pin, 0.3 m, PVC	cd-282	WTT12L-B3562	1072640
				Cable, 5-wire, 2 m, PVC	cd-283	WTT12L-B1562	1072634
				Male connector M12, 5-pin	cd-282	WTT12L-B2562	1072637
		Potentiometer, 4 turns (1 x)	Sender off	Cable with plug M12, 5-pin, 0.3 m, PVC	cd-282	WTT12L-B3561	1072614
				Cable, 5-wire, 2 m, PVC	cd-283	WTT12L-B1561	1072608
				Male connector M12, 5-pin	cd-282	WTT12L-B2561	1072611
2 (Q1, Q2) [2]	Light switching [2]	Single teach-in button (2 x)	L/D = light/dark switching	Cable with plug M12, 5-pin, 0.3 m, PVC	cd-286	WTT12L-B3567	1072657
				Cable, 5-wire, 2 m, PVC	cd-287	WTT12L-B1567	1072651
				Male connector M12, 5-pin	cd-286	WTT12L-B2567	1072654
			Sender off	Cable with plug M12, 5-pin, 0.3 m, PVC	cd-284	WTT12L-B3563	1072648
				Cable, 5-wire, 2 m, PVC	cd-285	WTT12L-B1563	1072643
				Male connector M12, 5-pin	cd-284	WTT12L-B2563	1072645
		Potentiometer, 4 turns (2 x)	L/D = light/dark switching	Cable with plug M12, 5-pin, 0.3 m, PVC	cd-286	WTT12L-B3568	1072631
				Cable, 5-wire, 2 m, PVC	cd-287	WTT12L-B1568	1072625
				Male connector M12, 5-pin	cd-286	WTT12L-B2568	1072628
			Sender off	Cable with plug M12, 5-pin, 0.3 m, PVC	cd-284	WTT12L-B3566	1072622
				Cable, 5-wire, 2 m, PVC	cd-285	WTT12L-B1566	1072617
				Male connector M12, 5-pin	cd-284	WTT12L-B2566	1072619

[1] Q, /Q = 1 switching threshold, light/dark switching (complementary).

[2] Q1, Q2 = 2 switching thresholds, light switching.

PowerProx Distance, analog and switching output

- **Supply voltage:** 12 V DC ... 30 V DC (Limit values. Operated in short-circuit protected network: max. 8 A.) (Vs min when using the voltage output = 13 V.)
- **Output type:** PUSH/PULL, PNP, NPN
- **Sensing range max.:** 50 mm ... 3,800 mm (Object with 6 ... 90 % remission (based on standard white to DIN 5033).)
- **Output current $I_{Max.}$:** ≤ 50 mA
- **Analog output:** 4 mA ... 20 mA (≤ 450 Ω) / 0 V ... 10 V (≥ 50 kΩ) / switchable
- **Distance value-measuring range:** 100 mm ... 3,800 mm (Object with 6 ... 90 % remission (based on standard white to DIN 5033).)

Number of switching outputs [1]	Switching mode [1]	Adjustment	Input	Connection	Connection diagram	Type	Part no.
1 (Q1)	Light switching	Single teach-in button (2 x)	Sender off	Male connector M12, 5-pin	cd-375	WTT12L-A2563	1082474

[1] Q1 = 1 switching threshold, light switching.

PowerProx Distance, IO-Link

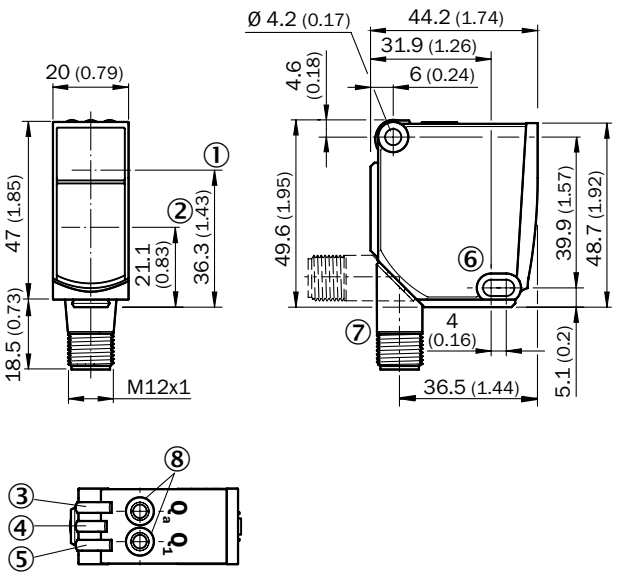
- **Supply voltage:** 10 V DC ... 30 V DC (Limit values. Operated in short-circuit protected network: max. 8 A.) (V_s min at IO-Link operation = 18 V.)
- **Output type:** PUSH/PULL, PNP, NPN
- **Sensing range max.:** 50 mm ... 3,800 mm (Object with 6 ... 90 % remission (based on standard white to DIN 5033).)
- **Output current $I_{Max.}$:** ≤ 100 mA
- **Distance value-measuring range:** 50 mm ... 3,800 mm (Object with 6 ... 90 % remission (based on standard white to DIN 5033).)

Number of switching outputs [1]	Switching mode [1]	Adjustment	Input	Connection	Connection diagram	Type	Part no.
2 (Q1, Q2)	Light switching	Single teach-in button (2 x) IO-Link	MF_{in} = multi-functional input programmable	Male connector M12, 5-pin	cd-290	WTT12LC-B2563	1072532

[1] Q1, Q2 = 2 switching thresholds, light switching.

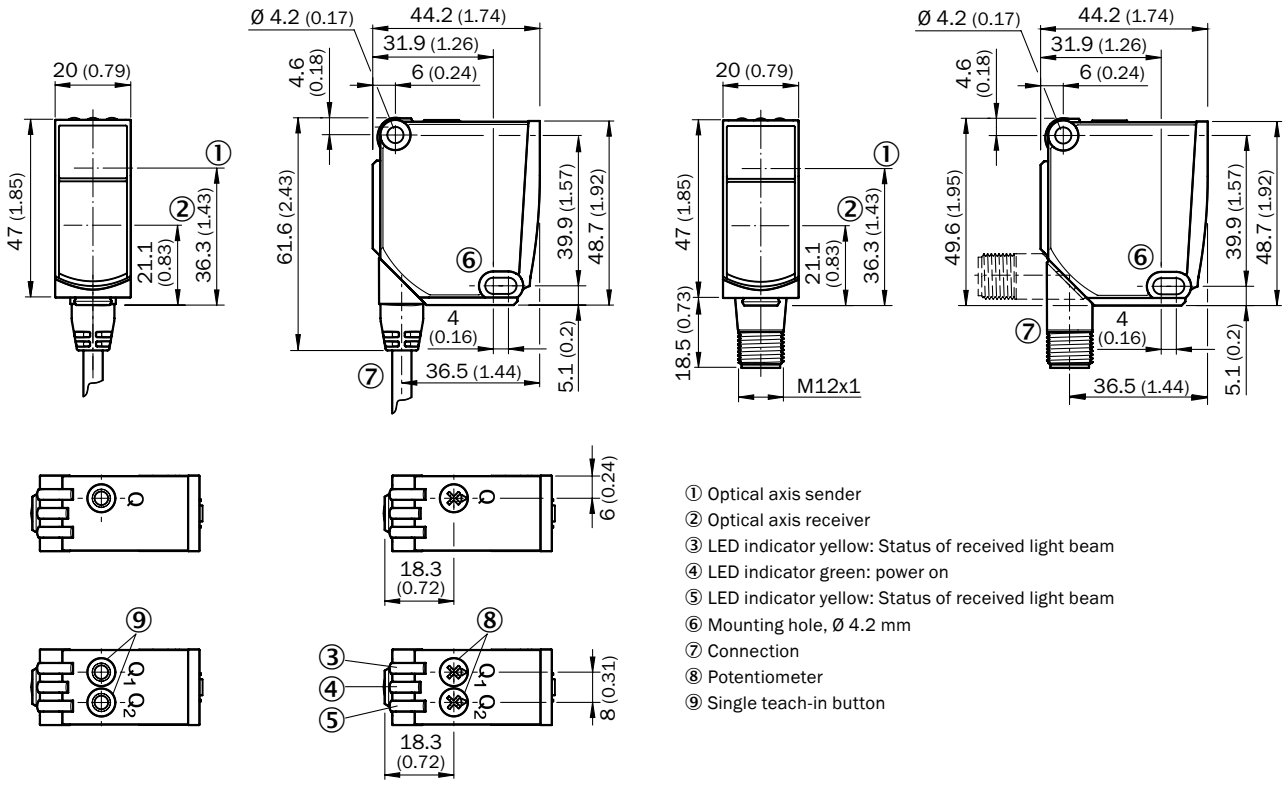
Dimensional drawings (Dimensions in mm (inch))

Analog and switching output



① Optical axis sender
② Optical axis receiver
③ LED indicator yellow: Status of analog output
④ LED indicator green: power on
⑤ Status indicator LED, yellow: Status switching output
⑥ Mounting hole, Ø 4.2 mm
⑦ Connection
⑧ Single teach-in button

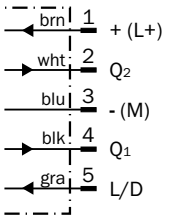
Switching output and IO-Link



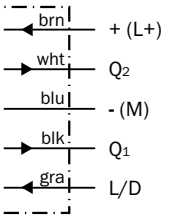
① Optical axis sender
② Optical axis receiver
③ LED indicator yellow: Status of received light beam
④ LED indicator green: power on
⑤ LED indicator yellow: Status of received light beam
⑥ Mounting hole, Ø 4.2 mm
⑦ Connection
⑧ Potentiometer
⑨ Single teach-in button

Connection diagram

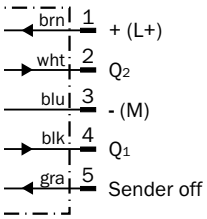
Cd-286



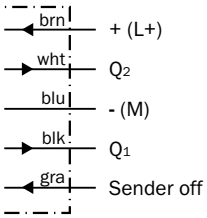
Cd-287



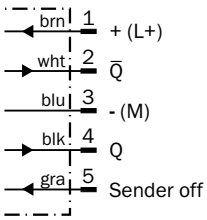
Cd-284



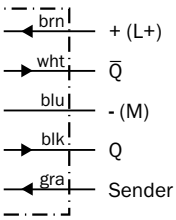
Cd-285



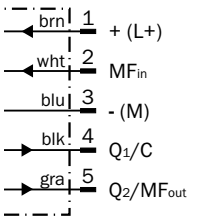
Cd-282



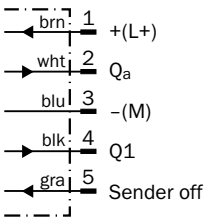
Cd-283



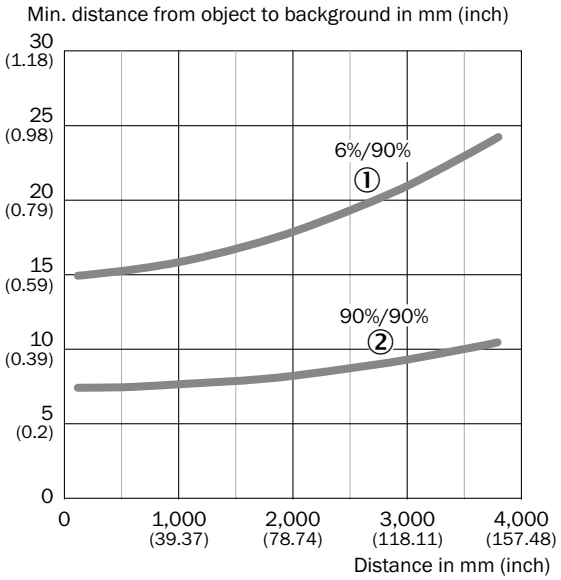
Cd-290



Cd-375

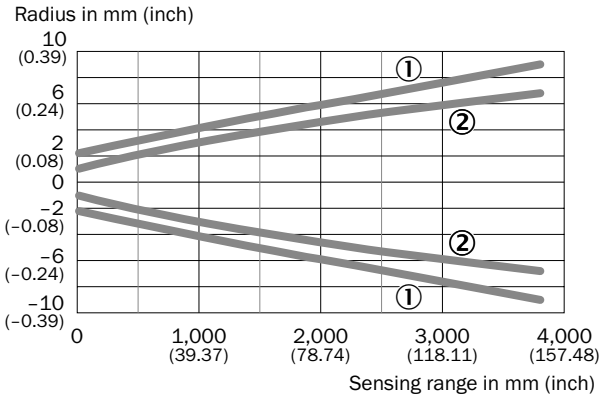


Sensing range



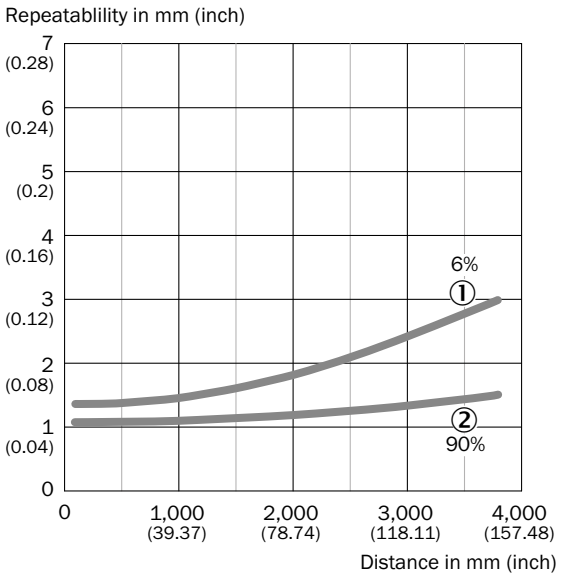
① Sensing range on black, 6% remission
② Sensing range on white, 90% remission

Light spot size



① Light spot horizontal
② Light spot vertical

Reproducibility



① 6 % remission, on black
② 90 % remission, on white

8018415/2017-06-21

RELIABLE DETECTION OF VERY SHINY, DISTANT OBJECTS

Product description

The PowerProx Distance Shiny sensor is a variant of the PowerProx Distance MultiTask photoelectric sensor. PowerProx Distance Shiny was specially developed for the detection of shiny objects which reflect a high proportion of the light emitted by the sensor directly to the sensor receiver. Even under these conditions, PowerProx Distance Shiny provides accurate, reliable measurements. Positive side effects: The sensors even detect object edges arriving from the side more precisely and are less sensitive to dust and steam in the ambient air than the standard PowerProx Distance variant.

At a glance

- Time-of-flight technology, laser class 1
- Sensing range for object detection: 5 cm ... 1.8 m
- Switching frequency: 100 Hz
- Minimum distance between object and background: 9 mm ... 22 mm
- VISTAL® housing
- 1 or 2 switching points which can be adjusted separately
- Analog output
- IO-Link (distance value, 8 switching points, smart sensor functions)

Your benefits

- High measurement accuracy even when the emitted light beam meets very shiny objects (no reflectors) vertically
- More precise detection of object edges arriving from the side
- More precise detection of holes in objects
- Better suppression of dust and steam in ambient air

Additional information

→ www.sick.com/PowerProx

For more information, simply 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.

8018415/2017-06-21
Subject to change without notice

Detailed technical data

Features

Sensor principle	Photoelectric proximity sensor
Detection principle	Background suppression
Dimensions (W x H x D)	20 mm x 49.6 mm x 44.2 mm
Housing design (light emission)	Rectangular
Sensing range max. [1]	50 mm ... 1,800 mm
Sensing range [2]	100 mm ... 1,800 mm
Distance value-measuring range [1]	50 mm ... 1,800 mm 100 mm ... 1,800 mm (depending on type)
Distance value-resolution	1 mm
Distance value-repeatability [3] [4] [5]	1,2 mm ... 3,0 mm
Distance value-accuracy	Typ. ± 20 mm [6], typ. ± 15 mm [7]
Type of light	Visible red light
Light source [8]	Laser
Light spot size (distance)	Ø 12 mm (1,800 mm)
Wave length	658 nm
Laser class	1 (IEC 60825-1 / CDRH 21 CFR 1040.10 & 1040.11)
Adjustment	Potentiometer, 4 turns (2 x) Single teach-in button (2 x) IO-Link (depending on type)

[1] Object with 6 ... 90 % remission (based on standard white to DIN 5033).
[2] Adjustable.
[3] Equivalent to 1 σ.
[4] See characteristic curves repeatability.
[5] 6 % ... 90 % remission.
[6] 50 ... 1000 mm.
[7] 1000 ... 1800 mm.
[8] Average service life: 100,000 h at T_U = +25 °C.

Mechanics/electronics

Supply voltage	12 V DC ... 30 V DC [1] [2] 10 V DC ... 30 V DC [1] [3] (depending on type)
Ripple [4]	≤ 5 V_{pp}
Power consumption [5]	≤ 70 mA
Output type [6] [7]	PUSH/PULL, PNP, NPN
Number of switching outputs	2 (Q1, Q2) [6] 1 (Q1) [7] (depending on type)
Switching mode [6] [7]	Light switching
Output current $I_{max.}$	≤ 100 mA / ≤ 50 mA (depending on type)
Response time [8]	≤ 5 ms
Switching frequency [9]	100 Hz
Analog output	4 mA ... 20 mA (≤ 450 Ω) / 0 V ... 10 V (≥ 50 kΩ) / switchable
Resolution of analog output	12 bit
Output time	≤ 5 ms

Input	MF_{in} = multifunctional input programmable Sender off (depending on type)
Connection type	Male connector, M12
Circuit protection	A [10] B [11] C [12]
Protection class	III
Weight	48 g
Housing material	VISTAL®
Optics material	Plastic, PMMA
Enclosure rating	IP67
Ambient operating temperature [13] [14] [15]	–35 °C ... +50 °C
Ambient storage temperature	–40 °C ... +70 °C
Warm-up time [15]	< 15 min
Initialization time	< 300 ms

[1] Limit values. Operated in short-circuit protected network: max. 8 A.
[2] Vs min when using the voltage output = 13 V.
[3] V_s min at IO-Link operation = 18 V.
[4] May not exceed or fall below U_v tolerances.
[5] Without load. At V_S = 24 V.
[6] Q1, Q2 = 2 switching thresholds, light switching.
[7] Q1 = 1 switching threshold, light switching.
[8] Signal transit time with resistive load.
[9] With light/dark ratio 1:1.
[10] A = V_S connections reverse-polarity protected.
[11] B = inputs and output reverse-polarity protected.
[12] C = interference suppression.
[13] As of T_a = 45 °C, a max.load current I_{max} = 50 mA is permitted.
[14] For Vs ≤ 24 V. When Tu = 45 °C or above, a maximum load resistance of 300 Ω ... 450 Ω is permitted on QA.
[15] Below T_a = –10 °C a warm-up time is required.

Fieldbus, industrial network

Fieldbus integration	IO-Link V1.1
Mode	COM 2 (38,4 kBaud)
Cycle time	5 ms
Process data length	32 Bit
Process data structure	Bit 0 = switching signal Q_{01} Bit 1 = switching signal Q_{02} Bit 2 ... 8 = BDC 2 ... 8 Bit 9 ... 15 = empty Bit 16 ... 31 = distance value
Additional features	8 switching points for distance to object, of which 2 can be inverted, 1 switching point as switching window or configurable with hysteresis. Multifunctional input: sender off, external teach, inactive

Ordering information

PowerProx Distance Shiny, switching output

- **Supply voltage:** 10 V DC ... 30 V DC (Limit values. Operated in short-circuit protected network: max. 8 A.)
- **Output type:** PUSH/PULL, PNP, NPN
- **Sensing range max.:** 50 mm ... 1,800 mm (Object with 6 ... 90 % remission (based on standard white to DIN 5033).)
- **Output current $I_{Max.}$:** ≤ 100 mA

Number of switching outputs [1]	Switching mode [1]	Adjustment	Input	Connection	Connection diagram	Type	Part no.
2 (Q1, Q2)	Light switching	Single teach-in button (2 x)	Sender off	Male connector M12, 5-pin	cd-284	WTT12L-B2553	1082415
		Potentiometer, 4 turns (2 x)	Sender off	Male connector M12, 5-pin	cd-284	WTT12L-B2556	1082418

[1] Q1, Q2 = 2 switching thresholds, light switching.

PowerProx Distance Shiny, analog and switching output

- **Supply voltage:** 12 V DC ... 30 V DC (Limit values. Operated in short-circuit protected network: max. 8 A.) (Vs min when using the voltage output = 13 V.)
- **Output type:** PUSH/PULL, PNP, NPN
- **Sensing range max.:** 50 mm ... 1,800 mm (Object with 6 ... 90 % remission (based on standard white to DIN 5033).)
- **Output current $I_{Max.}$:** ≤ 50 mA
- **Analog output:** 4 mA ... 20 mA (≤ 450 Ω) / 0 V ... 10 V (≥ 50 kΩ) / switchable
- **Distance value-measuring range:** 100 mm ... 1,800 mm (Object with 6 ... 90 % remission (based on standard white to DIN 5033).)

Number of switching outputs [1]	Switching mode [1]	Adjustment	Input	Connection	Connection diagram	Type	Part no.
1 (Q1)	Light switching	Single teach-in button (2 x)	Sender off	Male connector M12, 5-pin	cd-375	WTT12L-A2553	1082475

[1] Q1 = 1 switching threshold, light switching.

PowerProx Distance Shiny, IO-Link

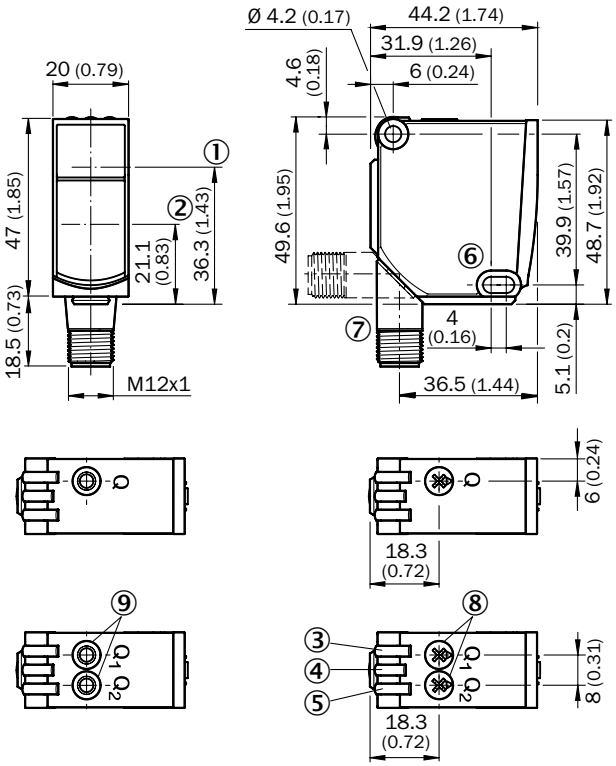
- **Supply voltage:** 10 V DC ... 30 V DC (Limit values. Operated in short-circuit protected network: max. 8 A.) (V_s min at IO-Link operation = 18 V.)
- **Output type:** PUSH/PULL, PNP, NPN
- **Sensing range max.:** 50 mm ... 1,800 mm (Object with 6 ... 90 % remission (based on standard white to DIN 5033).)
- **Output current $I_{Max.}$:** ≤ 100 mA
- **Distance value-measuring range:** 50 mm ... 1,800 mm (Object with 6 ... 90 % remission (based on standard white to DIN 5033).)

Number of switching outputs [1]	Switching mode [1]	Adjustment	Input	Connection	Connection diagram	Type	Part no.
2 (Q1, Q2)	Light switching	Single teach-in button (2 x) IO-Link	MF_{in} = multi-functional input programmable	Male connector M12, 5-pin	cd-290	WTT12LC-B2553	1082412

[1] Q1, Q2 = 2 switching thresholds, light switching.

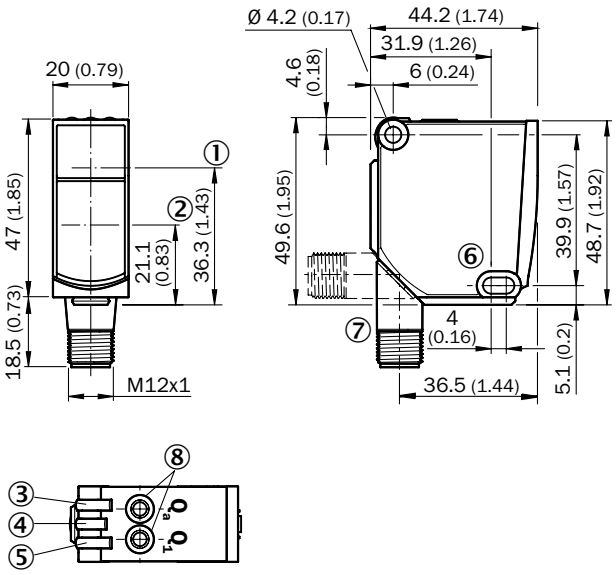
Dimensional drawings (Dimensions in mm (inch))

Switching output and IO-Link



① Optical axis sender
② Optical axis receiver
③ LED indicator yellow: Status of received light beam
④ LED indicator green: power on
⑤ LED indicator yellow: Status of received light beam
⑥ Mounting hole, Ø 4.2 mm
⑦ Connection
⑧ Potentiometer
⑨ Single teach-in button

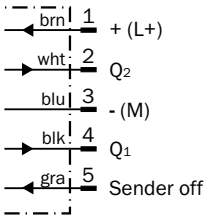
Analog and switching output



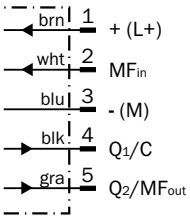
① Optical axis sender
② Optical axis receiver
③ LED indicator yellow: Status of analog output
④ LED indicator green: power on
⑤ Status indicator LED, yellow: Status switching output
⑥ Mounting hole, Ø 4.2 mm
⑦ Connection
⑧ Single teach-in button

Connection diagram

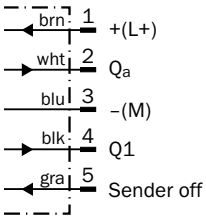
Cd-284



Cd-290

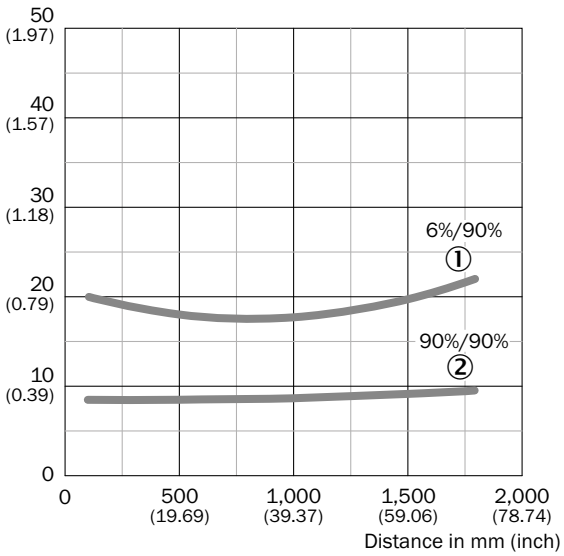


Cd-375



Sensing range

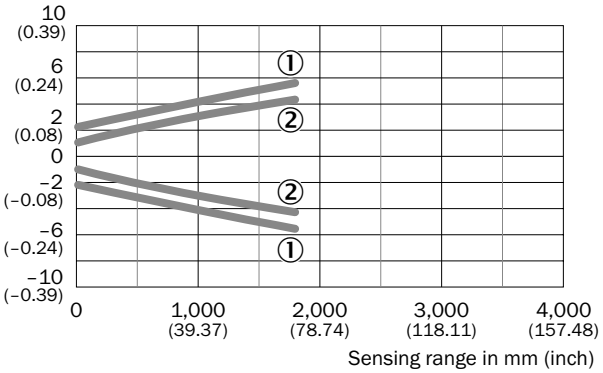
Min. distance from object to background in mm (inch)



① Sensing range on black, 6% remission
② Sensing range on white, 90% remission

Light spot size

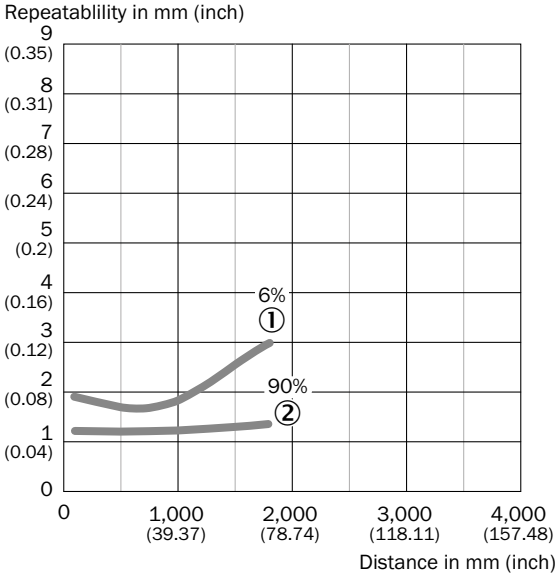
Radius in mm (inch)



① Light spot horizontal
② Light spot vertical

Reproducibility

Repeatablility in mm (inch)



① 6 % remission, on black
② 90 % remission, on white

FOR HIGH SPEED DETECTION

Product description

Quick response times, high switching frequencies: PowerProx Speed offers all of this as well as reliable object detection at sensing ranges up to 2.5 m. It is ideal for use in the packaging industry or in any application that relies on detection at top speed. The small PowerProx Speed housing combines time-of-flight technology, laser class 1 (i.e., no danger to eyes), outstanding optics, and fast signal processing. The MultiTask photoelectric sensor is adjusted via potentiometer or teach-in button. There are versions available with either one or two separately adjustable switching thresholds with analog output or IO-Link, depending on the application. IO-Link can be used to define up to eight switching points and to make use of the smart sensor functions. The VISTAL™ housing ensures the device is sufficiently rugged.

At a glance

- Time-of-flight technology, laser class 1
- Sensing range for object detection: 5 cm to 2.5 m
- Switching frequency: 1,000 Hz
- Minimum distance between the object and background: 15 ... 36 mm
- VISTAL™ housing
- 1 or 2 switching points which can be adjusted separately
- Analog output
- IO-Link available as an option (distance value, 8 switching points, smart sensor functions)

Your benefits

- Rapid counting and detection of object edges at sensing ranges between 5 cm and 2.5 m
- Reliable object detection, e.g., even with shiny or jet-black surfaces and background reflections
- Highly visible light spot simplifies alignment of the photoelectric proximity sensor
- Precise, simple adjustment with potentiometer or teach-in button
- Eye-safe thanks to laser class 1
- High levels of availability and durability. Rugged even when subjected to high mechanical loads thanks to VISTAL™ housing.
- Small housing offers great flexibility in terms of machine design
- IO-Link extends functionality

IO-Link

Additional information

→ www.sick.com/PowerProx

For more information, simply 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.

8018415/2017-06-21
Subject to change without notice

Detailed technical data

Features

Sensor principle	Photoelectric proximity sensor
Detection principle	Background suppression
Dimensions (W x H x D)	20 mm x 49.6 mm x 44.2 mm
Housing design (light emission)	Rectangular
Sensing range max. [1]	50 mm ... 2,500 mm
Sensing range [2]	100 mm ... 2,500 mm
Distance value-measuring range [1]	50 mm ... 2,500 mm 100 mm ... 2,500 mm (depending on type)
Distance value-resolution	1 mm
Distance value-repeatability [3] [4] [5]	2,3 mm ... 6,1 mm
Distance value-accuracy	Typ. ± 15 mm
Type of light	Visible red light
Light source [6]	Laser
Light spot size (distance)	Ø 14 mm (2,500 mm)
Wave length	658 nm
Laser class	1 (IEC 60825-1 / CDRH 21 CFR 1040.10 & 1040.11)
Adjustment	Potentiometer, 4 turns (1 x) Potentiometer, 4 turns (2 x) Single teach-in button (1 x) Single teach-in button (2 x) IO-Link (depending on type)

[1] Object with 6 ... 90 % remission (based on standard white to DIN 5033).
[2] Adjustable.
[3] Equivalent to 1 σ.
[4] See characteristic curves repeatability.
[5] 6 % ... 90 % remission.
[6] Average service life: 100,000 h at T_U = +25 °C.

Mechanics/electronics

Supply voltage	10 V DC ... 30 V DC [1] [2] 12 V DC ... 30 V DC [1] [3] (depending on type)
Ripple [4]	≤ 5 V_{pp}
Power consumption [5]	≤ 70 mA
Output type [6] [7] [8]	PUSH/PULL, PNP, NPN
Number of switching outputs	2 (Q, /Q) [6] 2 (Q1, Q2) [7] 1 (Q1) [8] (depending on type)
Switching mode	Light switching [7] [8] Light/dark switching [6] (depending on type)
Output current $I_{max.}$	≤ 100 mA / ≤ 50 mA (depending on type)
Response time [9]	≤ 0.5 ms
Switching frequency [10]	1,000 Hz
Analog output	4 mA ... 20 mA (≤ 450 Ω) / 0 V ... 10 V (≥ 50 kΩ) / switchable
Resolution of analog output	12 bit

Output time	≤ 3 ms
Input	MF_{in} = multifunctional input programmable L/D = light/dark switching Sender off (depending on type)
Connection type	Cable with male connector, M12, 0.3 m [11] Male connector, M12 Cable, 2 m [11] (depending on type)
Circuit protection	A [12] B [13] C [14]
Protection class	III
Weight	
Cable with plug M12, 5-pin	80 g
Male connector M12, 5-pin	48 g
Cable, 5-wire	111 g
Housing material	VISTAL®
Optics material	Plastic, PMMA
Enclosure rating	IP67
Ambient operating temperature [15] [16] [17]	–35 °C ... +50 °C
Ambient storage temperature	–40 °C ... +70 °C
Warm-up time [17]	< 15 min
Initialization time	< 300 ms

[1] Limit values. Operated in short-circuit protected network: max. 8 A.
[2] V_s min at IO-Link operation = 18 V.
[3] Vs min when using the voltage output = 13 V.
[4] May not exceed or fall below U_v tolerances.
[5] Without load. At V_S = 24 V.
[6] Q, /Q = 1 switching threshold, light/dark switching (complementary).
[7] Q1, Q2 = 2 switching thresholds, light switching.
[8] Q1 = 1 switching threshold, light switching.
[9] Signal transit time with resistive load.
[10] With light/dark ratio 1:1.
[11] Do not bend below 0 °C.
[12] A = V_S connections reverse-polarity protected.
[13] B = inputs and output reverse-polarity protected.
[14] C = interference suppression.
[15] As of T_a = 45 °C, a max.load current I_{max} = 50 mA is permitted.
[16] For Vs ≤ 24 V. When Tu = 45 °C or above, a maximum load resistance of 300 Ω ... 450 Ω is permitted on QA.
[17] Below T_a = –10 °C a warm-up time is required.

Fieldbus, industrial network

Fieldbus integration	IO-Link V1.1
Mode	COM 2 (38,4 kBaud)
Cycle time	5 ms
Process data length	32 Bit
Process data structure	Bit 0 = switching signal Q_{01} Bit 1 = switching signal Q_{02} Bit 2 ... 8 = BDC 2 ... 8 Bit 9 ... 15 = empty Bit 16 ... 31 = distance value
Additional features	8 switching points for distance to object, of which 2 can be inverted, 1 switching point as switching window or configurable with hysteresis. Multifunctional input: sender off, external teach, inactive

Ordering information

PowerProx Speed, switching output

- **Supply voltage:** 10 V DC ... 30 V DC (Limit values. Operated in short-circuit protected network: max. 8 A.)
- **Output type:** PUSH/PULL, PNP, NPN
- **Sensing range max.:** 50 mm ... 2,500 mm (Object with 6 ... 90 % remission (based on standard white to DIN 5033).)
- **Output current $I_{Max.}$:** ≤ 100 mA

Number of switching outputs	Switching mode	Adjustment	Input	Connection	Connection diagram	Type	Part no.
2 (Q, /Q) [1]	Light/dark switching [1]	Single teach-in button (1 x)	Sender off	Cable with plug M12, 5-pin, 0.3 m, PVC	cd-282	WTT12L-B3532	1072638
				Cable, 5-wire, 2 m, PVC	cd-283	WTT12L-B1532	1072632
				Male connector M12, 5-pin	cd-282	WTT12L-B2532	1072635
		Potentiometer, 4 turns (1 x)	Sender off	Cable with plug M12, 5-pin, 0.3 m, PVC	cd-282	WTT12L-B3531	1072612
				Cable, 5-wire, 2 m, PVC	cd-283	WTT12L-B1531	1072606
				Male connector M12, 5-pin	cd-282	WTT12L-B2531	1072609
2 (Q1, Q2) [2]	Light switching [2]	Single teach-in button (2 x)	L/D = light/dark switching	Cable with plug M12, 5-pin, 0.3 m, PVC	cd-286	WTT12L-B3537	1072655
				Cable, 5-wire, 2 m, PVC	cd-287	WTT12L-B1537	1072649
				Male connector M12, 5-pin	cd-286	WTT12L-B2537	1072652
			Sender off	Cable with plug M12, 5-pin, 0.3 m, PVC	cd-284	WTT12L-B3533	1072646
				Cable, 5-wire, 2 m, PVC	cd-285	WTT12L-B1533	1072641
				Male connector M12, 5-pin	cd-284	WTT12L-B2533	1072531
		Potentiometer, 4 turns (2 x)	L/D = light/dark switching	Cable with plug M12, 5-pin, 0.3 m, PVC	cd-286	WTT12L-B3538	1072629
				Cable, 5-wire, 2 m, PVC	cd-287	WTT12L-B1538	1072623
				Male connector M12, 5-pin	cd-286	WTT12L-B2538	1072626
			Sender off	Cable with plug M12, 5-pin, 0.3 m, PVC	cd-284	WTT12L-B3536	1072620
				Cable, 5-wire, 2 m, PVC	cd-285	WTT12L-B1536	1072615
				Male connector M12, 5-pin	cd-284	WTT12L-B2536	1072618

[1] Q, /Q = 1 switching threshold, light/dark switching (complementary).

[2] Q1, Q2 = 2 switching thresholds, light switching.

PowerProx Speed, analog and switching output

- **Supply voltage:** 12 V DC ... 30 V DC (Limit values. Operated in short-circuit protected network: max. 8 A.) (Vs min when using the voltage output = 13 V.)
- **Output type:** PUSH/PULL, PNP, NPN
- **Sensing range max.:** 50 mm ... 2,500 mm (Object with 6 ... 90 % remission (based on standard white to DIN 5033).)
- **Output current $I_{Max.}$:** ≤ 50 mA
- **Analog output:** 4 mA ... 20 mA (≤ 450 Ω) / 0 V ... 10 V (≥ 50 kΩ) / switchable
- **Distance value-measuring range:** 100 mm ... 2,500 mm (Object with 6 ... 90 % remission (based on standard white to DIN 5033).)

Number of switching outputs [1]	Switching mode [1]	Adjustment	Input	Connection	Connection diagram	Type	Part no.
1 (Q1)	Light switching	Single teach-in button (2 x)	Sender off	Male connector M12, 5-pin	cd-375	WTT12L-A2533	1082472

[1] Q1 = 1 switching threshold, light switching.

PowerProx Speed, IO-Link

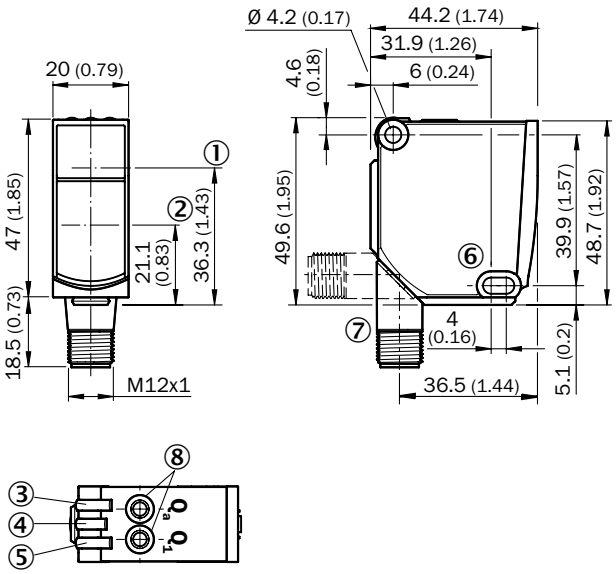
- **Supply voltage:** 10 V DC ... 30 V DC (Limit values. Operated in short-circuit protected network: max. 8 A.) (V_s min at IO-Link operation = 18 V.)
- **Output type:** PUSH/PULL, PNP, NPN
- **Sensing range max.:** 50 mm ... 2,500 mm (Object with 6 ... 90 % remission (based on standard white to DIN 5033).)
- **Output current $I_{Max.}$:** ≤ 100 mA
- **Distance value-measuring range:** 50 mm ... 2,500 mm (Object with 6 ... 90 % remission (based on standard white to DIN 5033).)

Number of switching outputs [1]	Switching mode [1]	Adjustment	Input	Connection	Connection diagram	Type	Part no.
2 (Q1, Q2)	Light switching	Single teach-in button (2 x) IO-Link	MF_{in} = multi-functional input programmable	Male connector M12, 5-pin	cd-290	WTT12LC-B2533	1072658

[1] Q1, Q2 = 2 switching thresholds, light switching.

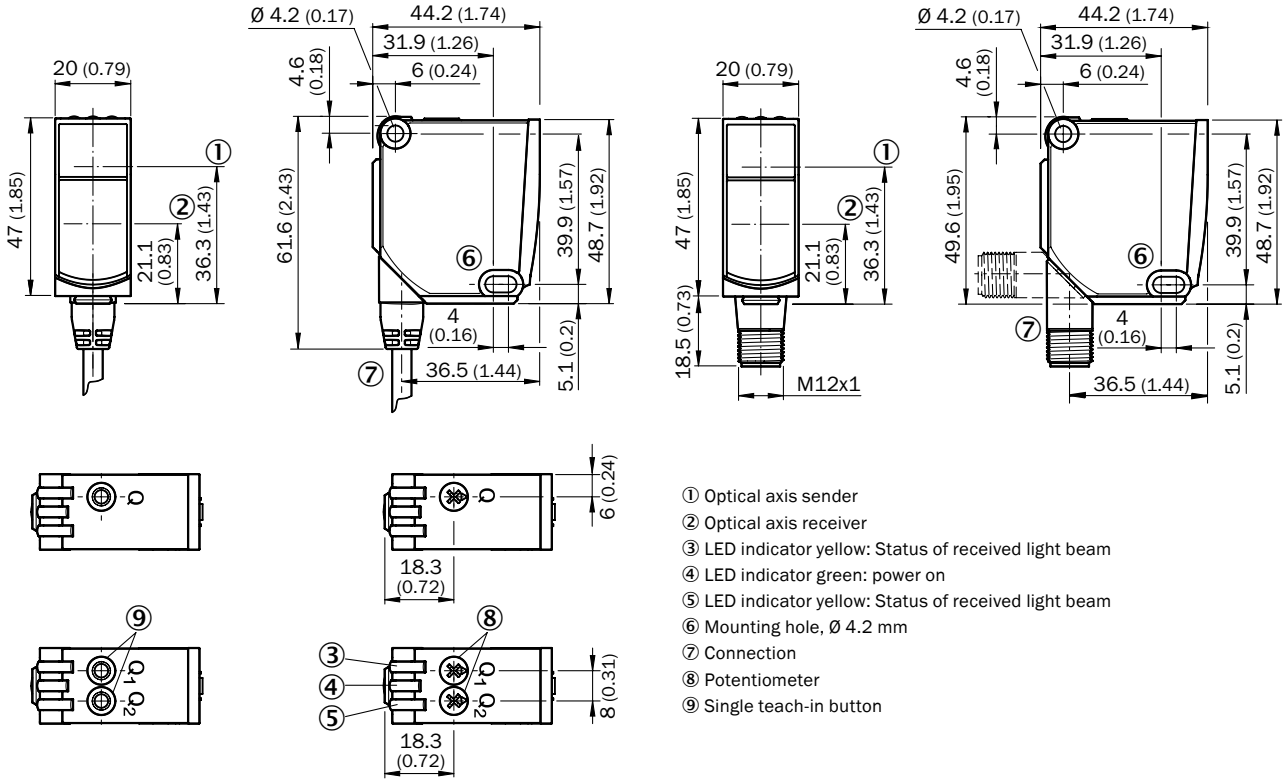
Dimensional drawings (Dimensions in mm (inch))

Analog and switching output



① Optical axis sender
② Optical axis receiver
③ LED indicator yellow: Status of analog output
④ LED indicator green: power on
⑤ Status indicator LED, yellow: Status switching output
⑥ Mounting hole, Ø 4.2 mm
⑦ Connection
⑧ Single teach-in button

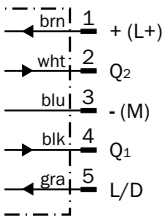
Switching output and IO-Link



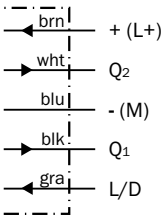
① Optical axis sender
② Optical axis receiver
③ LED indicator yellow: Status of received light beam
④ LED indicator green: power on
⑤ LED indicator yellow: Status of received light beam
⑥ Mounting hole, Ø 4.2 mm
⑦ Connection
⑧ Potentiometer
⑨ Single teach-in button

Connection diagram

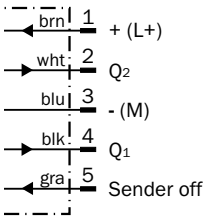
Cd-286



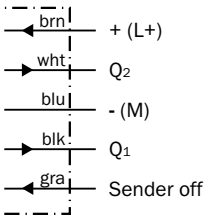
Cd-287



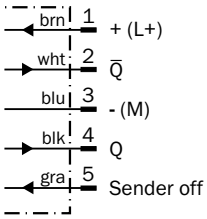
Cd-284



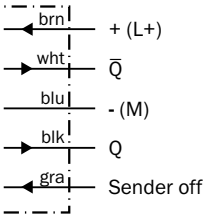
Cd-285



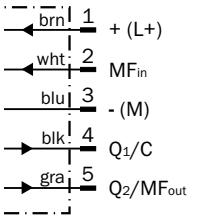
Cd-282



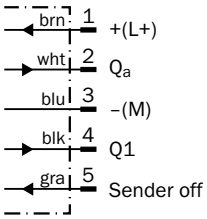
Cd-283



Cd-290

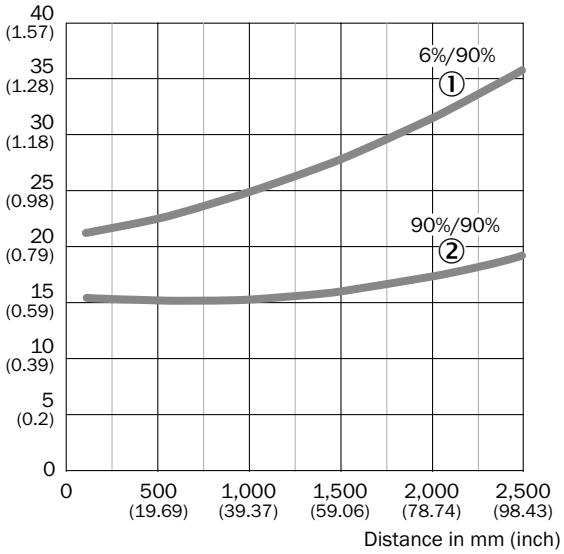


Cd-375



Sensing range

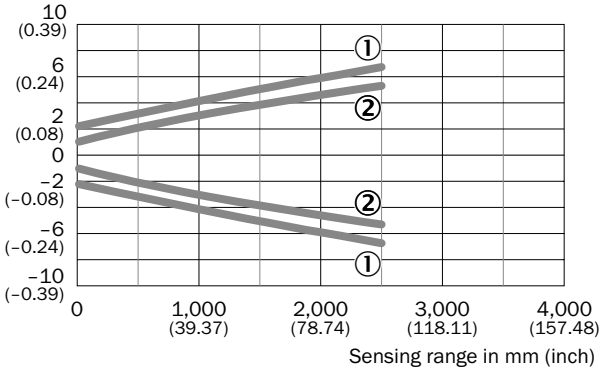
Min. distance from object to background in mm (inch)



① Sensing range on black, 6% remission
② Sensing range on white, 90% remission

Light spot size

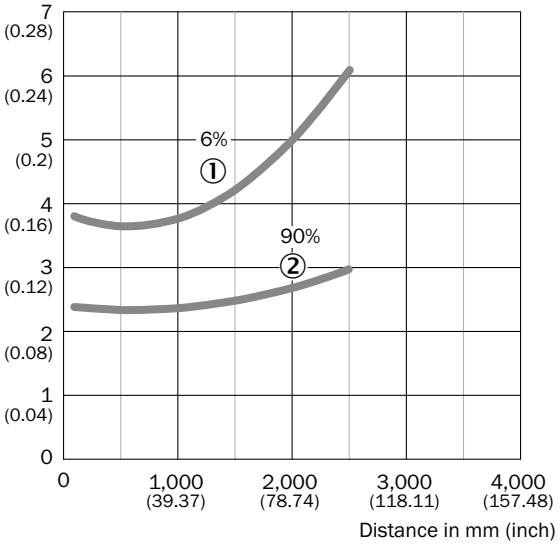
Radius in mm (inch)



① Light spot horizontal
② Light spot vertical

Reproducibility

Repeatablility in mm (inch)



① 6 % remission, on black
② 90 % remission, on white

8018415/2017-06-21

FOR THE DETECTION OF VERY SHINY OBJECTS AT HIGH SPEEDS

Product description

The PowerProx Speed Shiny sensor is a variant of the PowerProx Speed Multi-Task photoelectric sensor. PowerProx Speed Shiny was specially developed for the detection of shiny objects which reflect a high proportion of the light emitted by the sensor directly to the sensor receiver. Even under these conditions, PowerProx Speed Shiny provides accurate, reliable measurements. Positive side effects: Even object edges arriving from the side are detected more precisely and the sensors are less sensitive to dust and steam in the ambient air than the standard PowerProx Speed variant.

At a glance

- Time-of-flight technology, laser class 1
- Sensing range for object detection: 5 cm ... 1.6 m
- Switching frequency: 1000 Hz
- Minimum distance between object and background: 18 mm ... 45 mm
- VISTAL® housing
- 1 or 2 switching points which can be adjusted separately
- Analog output
- IO-Link (distance value, 8 switching points, smart sensor functions)

Your benefits

- High measurement accuracy even when the emitted light beam meets very shiny objects (no reflectors) vertically
- More precise detection of object edges arriving from the side
- More precise detection of holes in objects
- Better suppression of dust and steam in ambient air

Additional information

→ www.sick.com/PowerProx

For more information, simply 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.

8018415/2017-06-21
Subject to change without notice

Detailed technical data

Features

Sensor principle	Photoelectric proximity sensor
Detection principle	Background suppression
Dimensions (W x H x D)	20 mm x 49.6 mm x 44.2 mm
Housing design (light emission)	Rectangular
Sensing range max. [1]	50 mm ... 1,600 mm
Sensing range [2]	100 mm ... 1,600 mm
Distance value-measuring range [1]	50 mm ... 1,600 mm 50 mm ... 1,600 mm (depending on type)
Distance value-resolution	1 mm
Distance value-repeatability [3] [4] [5]	2,7 mm ... 8,0 mm
Distance value-accuracy	Typ. ± 20 mm [6], typ. ± 15 mm [7]
Type of light	Visible red light
Light source [8]	Laser
Light spot size (distance)	Ø 11 mm (1,600 mm)
Wave length	658 nm
Laser class	1 (IEC 60825-1 / CDRH 21 CFR 1040.10 & 1040.11)
Adjustment	Potentiometer, 4 turns (2 x) Single teach-in button (2 x) IO-Link (depending on type)

[1] Object with 6 ... 90 % remission (based on standard white to DIN 5033).
[2] Adjustable.
[3] Equivalent to 1 σ.
[4] See characteristic curves repeatability.
[5] 6 % ... 90 % remission.
[6] 50 ... 1000 mm.
[7] 1000 ... 1600 mm.
[8] Average service life: 100,000 h at T_U = +25 °C.

Mechanics/electronics

Supply voltage	10 V DC ... 30 V DC [1] [2] 12 V DC ... 30 V DC [1] [3] (depending on type)
Ripple [4]	≤ 5 V_{pp}
Power consumption [5]	≤ 70 mA
Output type [6] [7]	PUSH/PULL, PNP, NPN
Number of switching outputs	2 (Q1, Q2) [6] 1 (Q1) [7] (depending on type)
Switching mode [6] [7]	Light switching
Output current $I_{max.}$	≤ 100 mA / ≤ 50 mA (depending on type)
Response time [8]	≤ 0.5 ms
Switching frequency [9]	1,000 Hz
Analog output	4 mA ... 20 mA (≤ 450 Ω) / 0 V ... 10 V (≥ 50 kΩ) / switchable
Resolution of analog output	12 bit
Output time	≤ 3 ms

Input	MF_{in} = multifunctional input programmable Sender off (depending on type)
Connection type	Male connector, M12
Circuit protection	A [10] B [11] C [12]
Protection class	III
Weight	48 g
Housing material	VISTAL®
Optics material	Plastic, PMMA
Enclosure rating	IP67
Ambient operating temperature [13] [14] [15]	–35 °C ... +50 °C
Ambient storage temperature	–40 °C ... +70 °C
Warm-up time [15]	< 15 min
Initialization time	< 300 ms

[1] Limit values. Operated in short-circuit protected network: max. 8 A.
[2] V_s min at IO-Link operation = 18 V.
[3] Vs min when using the voltage output = 13 V.
[4] May not exceed or fall below U_v tolerances.
[5] Without load. At V_S = 24 V.
[6] Q1, Q2 = 2 switching thresholds, light switching.
[7] Q1 = 1 switching threshold, light switching.
[8] Signal transit time with resistive load.
[9] With light/dark ratio 1:1.
[10] A = V_S connections reverse-polarity protected.
[11] B = inputs and output reverse-polarity protected.
[12] C = interference suppression.
[13] As of T_a = 45 °C, a max.load current I_{max} = 50 mA is permitted.
[14] For Vs ≤ 24 V. When Tu = 45 °C or above, a maximum load resistance of 300 Ω ... 450 Ω is permitted on QA.
[15] Below T_a = –10 °C a warm-up time is required.

Fieldbus, industrial network

Fieldbus integration	IO-Link V1.1
Mode	COM 2 (38,4 kBaud)
Cycle time	5 ms
Process data length	32 Bit
Process data structure	Bit 0 = switching signal Q_{01} Bit 1 = switching signal Q_{02} Bit 2 ... 8 = BDC 2 ... 8 Bit 9 ... 15 = empty Bit 16 ... 31 = distance value
Additional features	8 switching points for distance to object, of which 2 can be inverted, 1 switching point as switching window or configurable with hysteresis. Multifunctional input: sender off, external teach, inactive

Ordering information

PowerProx Speed Shiny, sensing range

- **Supply voltage:** 10 V DC ... 30 V DC (Limit values. Operated in short-circuit protected network: max. 8 A.)
- **Output type:** PUSH/PULL, PNP, NPN
- **Sensing range max.:** 50 mm ... 1,600 mm (Object with 6 ... 90 % remission (based on standard white to DIN 5033).)
- **Output current $I_{Max.}$:** ≤ 100 mA

Number of switching outputs [1]	Switching mode [1]	Adjustment	Input	Connection	Connection diagram	Type	Part no.
2 (Q1, Q2)	Light switching	Single teach-in button (2 x)	Sender off	Male connector M12, 5-pin	cd-284	WTT12L-B2513	1082416
		Potentiometer, 4 turns (2 x)	Sender off	Male connector M12, 5-pin	cd-284	WTT12L-B2516	1082420

[1] Q1, Q2 = 2 switching thresholds, light switching.

PowerProx Speed Shiny, analog and switching output

- **Supply voltage:** 12 V DC ... 30 V DC (Limit values. Operated in short-circuit protected network: max. 8 A.) (Vs min when using the voltage output = 13 V.)
- **Output type:** PUSH/PULL, PNP, NPN
- **Sensing range max.:** 50 mm ... 1,600 mm (Object with 6 ... 90 % remission (based on standard white to DIN 5033).)
- **Output current $I_{Max.}$:** ≤ 50 mA
- **Analog output:** 4 mA ... 20 mA (≤ 450 Ω) / 0 V ... 10 V (≥ 50 kΩ) / switchable
- **Distance value-measuring range:** 100 mm ... 1,600 mm (Object with 6 ... 90 % remission (based on standard white to DIN 5033).)

Number of switching outputs [1]	Switching mode [1]	Adjustment	Input	Connection	Connection diagram	Type	Part no.
1 (Q1)	Light switching	Single teach-in button (2 x)	Sender off	Male connector M12, 5-pin	cd-375	WTT12L-A2513	1082476

[1] Q1 = 1 switching threshold, light switching.

PowerProx Speed Shiny, IO-Link

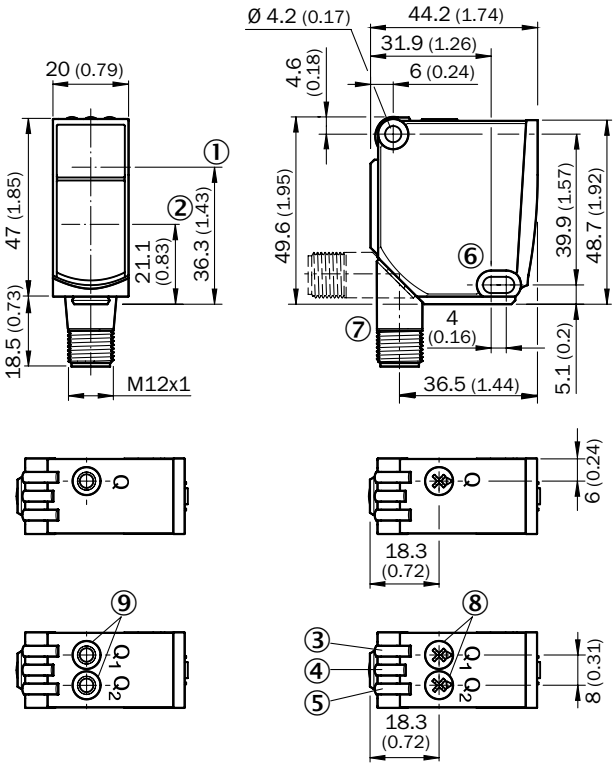
- **Supply voltage:** 10 V DC ... 30 V DC (Limit values. Operated in short-circuit protected network: max. 8 A.) (V_s min at IO-Link operation = 18 V.)
- **Output type:** PUSH/PULL, PNP, NPN
- **Sensing range max.:** 50 mm ... 1,600 mm (Object with 6 ... 90 % remission (based on standard white to DIN 5033).)
- **Output current $I_{Max.}$:** ≤ 100 mA
- **Distance value-measuring range:** 50 mm ... 1,600 mm (Object with 6 ... 90 % remission (based on standard white to DIN 5033).)

Number of switching outputs [1]	Switching mode [1]	Adjustment	Input	Connection	Connection diagram	Type	Part no.
2 (Q1, Q2)	Light switching	Single teach-in button (2 x) IO-Link	MF_{in} = multi-functional input programmable	Male connector M12, 5-pin	cd-290	WTT12LC-B2513	1082413

[1] Q1, Q2 = 2 switching thresholds, light switching.

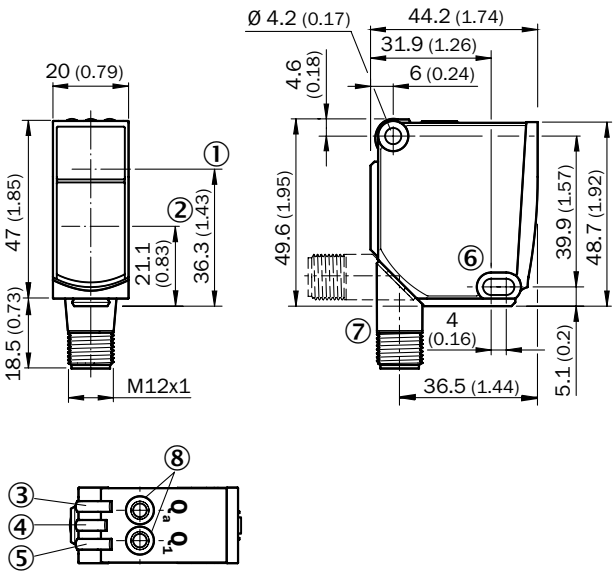
Dimensional drawings (Dimensions in mm (inch))

Switching output and IO-Link



① Optical axis sender
② Optical axis receiver
③ LED indicator yellow: Status of received light beam
④ LED indicator green: power on
⑤ LED indicator yellow: Status of received light beam
⑥ Mounting hole, Ø 4.2 mm
⑦ Connection
⑧ Potentiometer
⑨ Single teach-in button

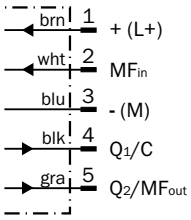
Analog and switching output



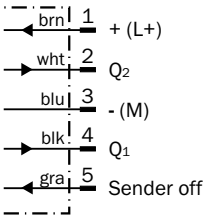
① Optical axis sender
② Optical axis receiver
③ LED indicator yellow: Status of analog output
④ LED indicator green: power on
⑤ Status indicator LED, yellow: Status switching output
⑥ Mounting hole, Ø 4.2 mm
⑦ Connection
⑧ Single teach-in button

Connection diagram

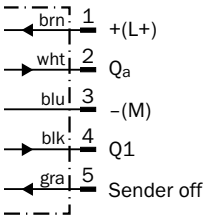
Cd-290



Cd-284

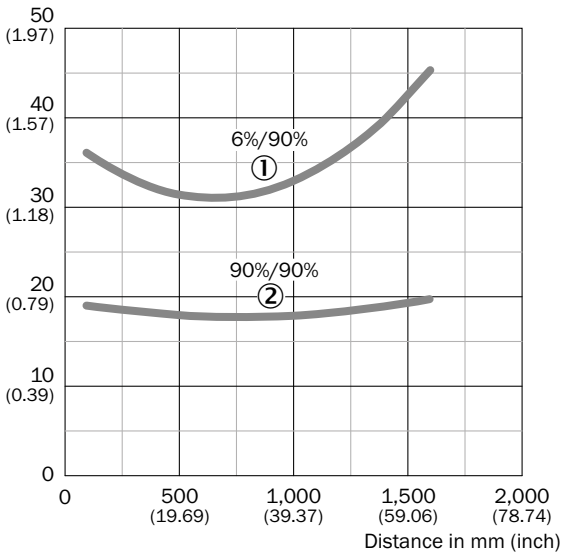


Cd-375



Sensing range

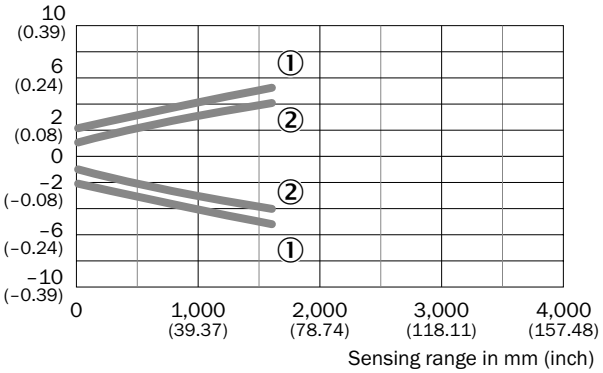
Min. distance from object to background in mm (inch)



① Sensing range on black, 6% remission
② Sensing range on white, 90% remission

Light spot size

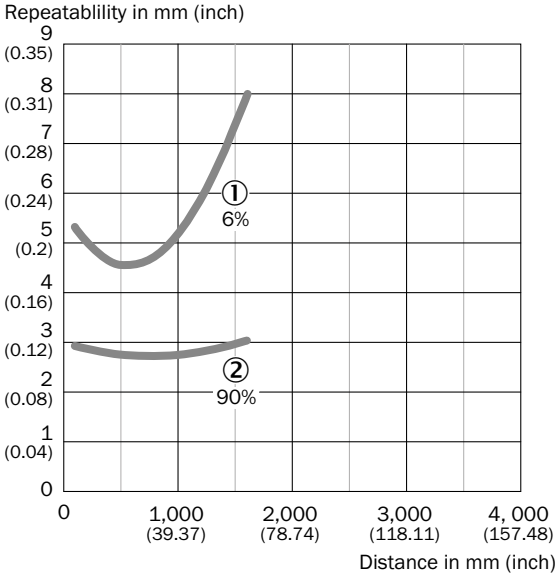
Radius in mm (inch)



① Light spot horizontal
② Light spot vertical

Reproducibility

Repeatablility in mm (inch)



① 6 % remission, on black
② 90 % remission, on white

FOR DETECTING THE SMALLEST OF OBJECTS AND OBJECT FEATURES

Product description

With a sensing range of up to 1.8 m, PowerProx Precision detects even the smallest of objects. Ideal for quality control for the automotive industry and its suppliers, or for checking the pick-up point on a robot. The small PowerProx Precision housing combines time-of-flight technology, laser class 1 (i.e., no danger to eyes), outstanding optics, and fast signal processing. The MultiTask photoelectric sensor is adjusted via potentiometer or teach-in button. There are versions available with either one or two separately adjustable switching thresholds with analog output or IO-Link, depending on the application. IO-Link can be used to define up to eight switching points and to make use of the smart sensor functions. The VISTAL™ housing ensures the device is sufficiently rugged.

At a glance

- Time-of-flight technology, laser class 1
- Sensing range for object detection: 5 cm to 1.8 m
- Switching frequency: 30 Hz
- Minimum distance between the object and background: 6 ... 14 mm
- VISTAL™ housing
- 1 or 2 switching points which can be adjusted separately
- Analog output
- IO-Link available as an option (distance value, 8 switching points, smart sensor functions)

Your benefits

- Precise detection of small and flat objects at sensing ranges between 5 cm and 1.8 m
- Reliable object detection, e.g., even with shiny or jet-black surfaces and background reflections
- Highly visible light spot simplifies alignment of the photoelectric proximity sensor
- Precise, simple adjustment with potentiometer or teach-in button
- Eye-safe thanks to laser class 1
- High levels of availability and durability. Rugged even when subjected to high mechanical loads thanks to VISTAL™ housing.
- Small housing offers great flexibility in terms of machine design
- IO-Link extends functionality

Additional information

→ www.sick.com/PowerProx

For more information, simply 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.

8018415/2017-06-21
Subject to change without notice

Detailed technical data

Features

Sensor principle	Photoelectric proximity sensor
Detection principle	Background suppression
Dimensions (W x H x D)	20 mm x 49.6 mm x 44.2 mm
Housing design (light emission)	Rectangular
Sensing range max. [1]	50 mm ... 1,800 mm
Sensing range [2]	100 mm ... 1,800 mm
Distance value-measuring range [1]	50 mm ... 1,800 mm 100 mm ... 1,800 mm (depending on type)
Distance value-resolution	1 mm
Distance value-repeatability [3] [4] [5]	0,9 mm ... 1,3 mm
Distance value-accuracy	Typ. ± 15 mm
Type of light	Visible red light
Light source [6]	Laser
Light spot size (distance)	Ø 12 mm (1,800 mm)
Wave length	658 nm
Laser class	1 (IEC 60825-1 / CDRH 21 CFR 1040.10 & 1040.11)
Adjustment	Potentiometer, 4 turns (1 x) Potentiometer, 4 turns (2 x) Single teach-in button (1 x) Single teach-in button (2 x) IO-Link (depending on type)

[1] Object with 6 ... 90 % remission (based on standard white to DIN 5033).
[2] Adjustable.
[3] Equivalent to 1 σ.
[4] See characteristic curves repeatability.
[5] 6 % ... 90 % remission.
[6] Average service life: 100,000 h at T_U = +25 °C.

Mechanics/electronics

Supply voltage	10 V DC ... 30 V DC [1] [2] 12 V DC ... 30 V DC [1] [3] (depending on type)
Ripple [4]	≤ 5 V_{pp}
Power consumption [5]	≤ 70 mA
Output type [6] [7] [8]	PUSH/PULL, PNP, NPN
Number of switching outputs	2 (Q, /Q) [6] 2 (Q1, Q2) [7] 1 (Q1) [8] (depending on type)
Switching mode	Light switching [7] [8] Light/dark switching [6] (depending on type)
Output current $I_{max.}$	≤ 100 mA / ≤ 50 mA (depending on type)
Response time [9]	≤ 16.7 ms
Switching frequency [10]	30 Hz
Analog output	4 mA ... 20 mA (≤ 450 Ω) / 0 V ... 10 V (≥ 50 kΩ) / switchable
Resolution of analog output	12 bit

Output time	≤ 16.7 ms
Input	MF_{in} = multifunctional input programmable L/D = light/dark switching Sender off (depending on type)
Connection type	Cable with male connector, M12, 0.3 m [11] Male connector, M12 Cable, 2 m [11] (depending on type)
Circuit protection	A [12] B [13] C [14]
Protection class	III
Weight	
Cable, 5-wire	111 g
Male connector M12, 5-pin	48 g
Cable with plug M12, 5-pin	80 g
Housing material	VISTAL®
Optics material	Plastic, PMMA
Enclosure rating	IP67
Ambient operating temperature [15] [16] [17]	–35 °C ... +50 °C
Ambient storage temperature	–40 °C ... +70 °C
Warm-up time [17]	< 15 min
Initialization time	< 300 ms

[1] Limit values. Operated in short-circuit protected network: max. 8 A.
[2] V_s min at IO-Link operation = 18 V.
[3] Vs min when using the voltage output = 13 V.
[4] May not exceed or fall below U_v tolerances.
[5] Without load. At V_S = 24 V.
[6] Q, /Q = 1 switching threshold, light/dark switching (complementary).
[7] Q1, Q2 = 2 switching thresholds, light switching.
[8] Q1 = 1 switching threshold, light switching.
[9] Signal transit time with resistive load.
[10] With light/dark ratio 1:1.
[11] Do not bend below 0 °C.
[12] A = V_S connections reverse-polarity protected.
[13] B = inputs and output reverse-polarity protected.
[14] C = interference suppression.
[15] As of T_a = 45 °C, a max.load current I_{max} = 50 mA is permitted.
[16] For Vs ≤ 24 V. When Tu = 45 °C or above, a maximum load resistance of 300 Ω ... 450 Ω is permitted on QA.
[17] Below T_a = –10 °C a warm-up time is required.

Fieldbus, industrial network

Fieldbus integration	IO-Link V1.1
Mode	COM 2 (38,4 kBaud)
Cycle time	5 ms
Process data length	32 Bit
Process data structure	Bit 0 = switching signal Q_{01} Bit 1 = switching signal Q_{02} Bit 2 ... 8 = BDC 2 ... 8 Bit 9 ... 15 = empty Bit 16 ... 31 = distance value
Additional features	8 switching points for distance to object, of which 2 can be inverted, 1 switching point as switching window or configurable with hysteresis. Multifunctional input: sender off, external teach, inactive

Ordering information

PowerProx Precision, switching output

- **Supply voltage:** 10 V DC ... 30 V DC (Limit values. Operated in short-circuit protected network: max. 8 A.)
- **Output type:** PUSH/PULL, PNP, NPN
- **Sensing range max.:** 50 mm ... 1,800 mm (Object with 6 ... 90 % remission (based on standard white to DIN 5033).)
- **Output current $I_{Max.}$:** ≤ 100 mA

Number of switching outputs	Switching mode	Adjustment	Input	Connection	Connection diagram	Type	Part no.
2 (Q, /Q) [1]	Light/dark switching [1]	Single teach-in button (1 x)	Sender off	Cable with plug M12, 5-pin, 0.3 m, PVC	cd-282	WTT12L-B3542	1072639
				Cable, 5-wire, 2 m, PVC	cd-283	WTT12L-B1542	1072633
				Male connector M12, 5-pin	cd-282	WTT12L-B2542	1072636
		Potentiometer, 4 turns (1 x)	Sender off	Cable with plug M12, 5-pin, 0.3 m, PVC	cd-282	WTT12L-B3541	1072613
				Cable, 5-wire, 2 m, PVC	cd-283	WTT12L-B1541	1072607
				Male connector M12, 5-pin	cd-282	WTT12L-B2541	1072610
2 (Q1, Q2) [2]	Light switching [2]	Single teach-in button (2 x)	L/D = light/dark switching	Cable with plug M12, 5-pin, 0.3 m, PVC	cd-286	WTT12L-B3547	1072656
				Cable, 5-wire, 2 m, PVC	cd-287	WTT12L-B1547	1072650
				Male connector M12, 5-pin	cd-286	WTT12L-B2547	1072653
			Sender off	Cable with plug M12, 5-pin, 0.3 m, PVC	cd-284	WTT12L-B3543	1072647
				Cable, 5-wire, 2 m, PVC	cd-285	WTT12L-B1543	1072642
				Male connector M12, 5-pin	cd-284	WTT12L-B2543	1072644
		Potentiometer, 4 turns (2 x)	L/D = light/dark switching	Cable with plug M12, 5-pin, 0.3 m, PVC	cd-286	WTT12L-B3548	1072630
				Cable, 5-wire, 2 m, PVC	cd-287	WTT12L-B1548	1072624
				Male connector M12, 5-pin	cd-286	WTT12L-B2548	1072627
			Sender off	Cable with plug M12, 5-pin, 0.3 m, PVC	cd-284	WTT12L-B3546	1072621
				Cable, 5-wire, 2 m, PVC	cd-285	WTT12L-B1546	1072616
				Male connector M12, 5-pin	cd-284	WTT12L-B2546	1072530

[1] Q, /Q = 1 switching threshold, light/dark switching (complementary).

[2] Q1, Q2 = 2 switching thresholds, light switching.

PowerProx Precision, analog and switching output

- **Supply voltage:** 12 V DC ... 30 V DC (Limit values. Operated in short-circuit protected network: max. 8 A.) (Vs min when using the voltage output = 13 V.)
- **Output type:** PUSH/PULL, PNP, NPN
- **Sensing range max.:** 50 mm ... 1,800 mm (Object with 6 ... 90 % remission (based on standard white to DIN 5033).)
- **Output current $I_{Max.}$:** ≤ 50 mA
- **Analog output:** 4 mA ... 20 mA (≤ 450 Ω) / 0 V ... 10 V (≥ 50 kΩ) / switchable
- **Distance value-measuring range:** 100 mm ... 1,800 mm (Object with 6 ... 90 % remission (based on standard white to DIN 5033).)

Number of switching outputs [1]	Switching mode [1]	Adjustment	Input	Connection	Connection diagram	Type	Part no.
1 (Q1)	Light switching	Single teach-in button (2 x)	Sender off	Male connector M12, 5-pin	cd-375	WTT12L-A2543	1082473

[1] Q1 = 1 switching threshold, light switching.

PowerProx Precision, IO-Link

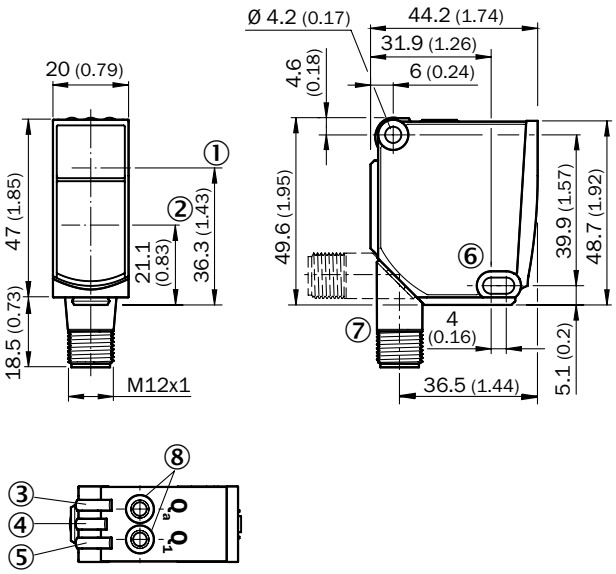
- **Supply voltage:** 10 V DC ... 30 V DC (Limit values. Operated in short-circuit protected network: max. 8 A.) (V_s min at IO-Link operation = 18 V.)
- **Output type:** PUSH/PULL, PNP, NPN
- **Sensing range max.:** 50 mm ... 1,800 mm (Object with 6 ... 90 % remission (based on standard white to DIN 5033).)
- **Output current $I_{Max.}$:** ≤ 100 mA
- **Distance value-measuring range:** 50 mm ... 1,800 mm (Object with 6 ... 90 % remission (based on standard white to DIN 5033).)

Number of switching outputs [1]	Switching mode [1]	Adjustment	Input	Connection	Connection diagram	Type	Part no.
2 (Q1, Q2)	Light switching	Single teach-in button (2 x) IO-Link	MF_{in} = multi-functional input programmable	Male connector M12, 5-pin	cd-290	WTT12LC-B2543	1072659

[1] Q1, Q2 = 2 switching thresholds, light switching.

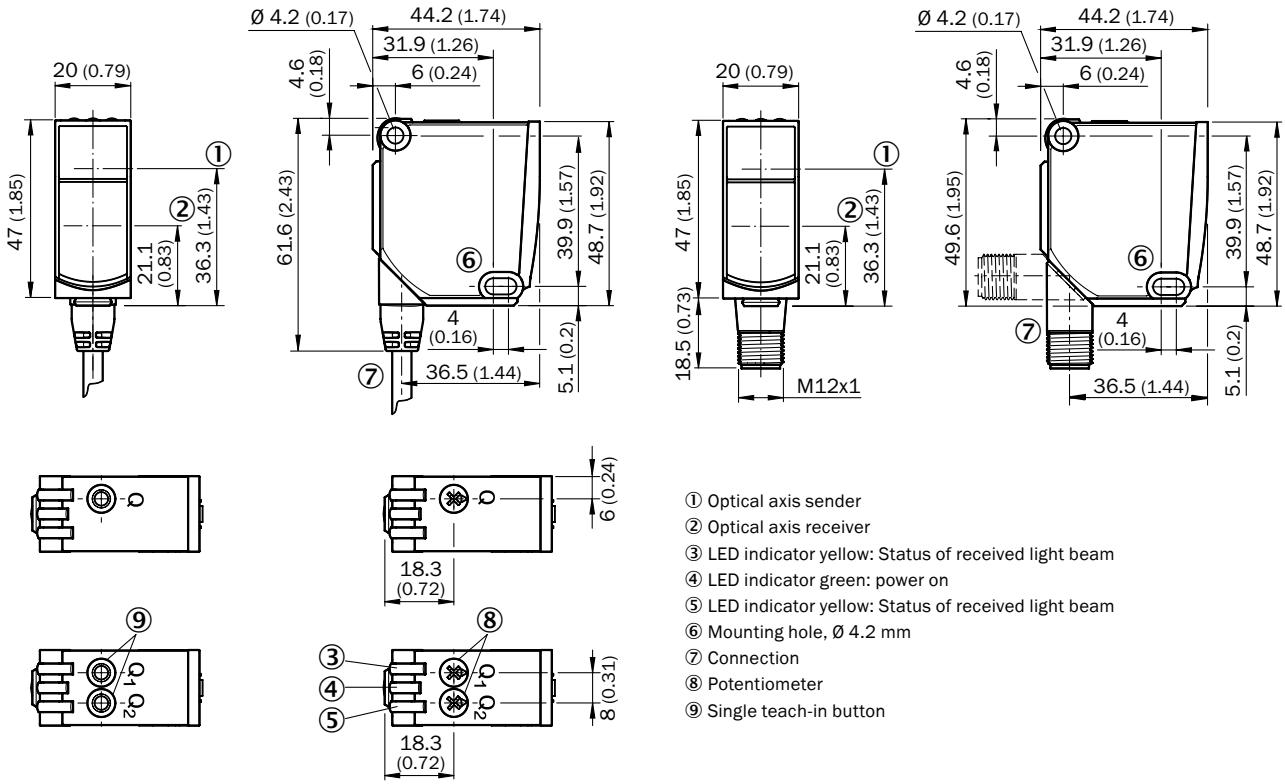
Dimensional drawings (Dimensions in mm (inch))

Analog and switching output



① Optical axis sender
② Optical axis receiver
③ LED indicator yellow: Status of analog output
④ LED indicator green: power on
⑤ Status indicator LED, yellow: Status switching output
⑥ Mounting hole, Ø 4.2 mm
⑦ Connection
⑧ Single teach-in button

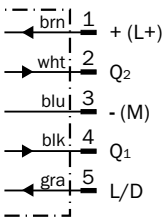
Switching output and IO-Link



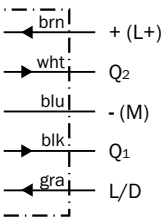
① Optical axis sender
② Optical axis receiver
③ LED indicator yellow: Status of received light beam
④ LED indicator green: power on
⑤ LED indicator yellow: Status of received light beam
⑥ Mounting hole, Ø 4.2 mm
⑦ Connection
⑧ Potentiometer
⑨ Single teach-in button

Connection diagram

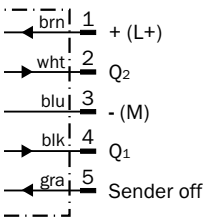
Cd-286



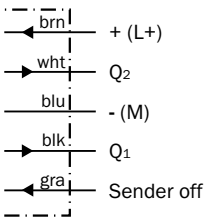
Cd-287



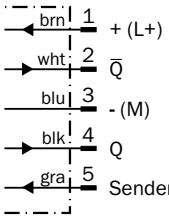
Cd-284



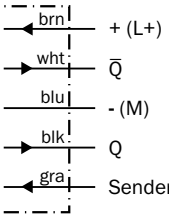
Cd-285



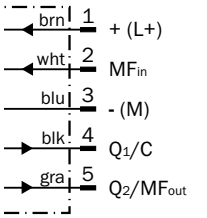
Cd-282



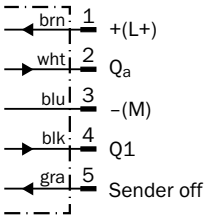
Cd-283



Cd-290

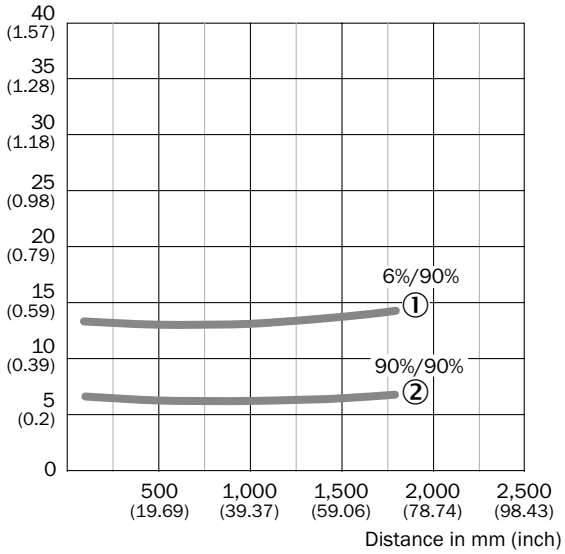


Cd-375



Sensing range

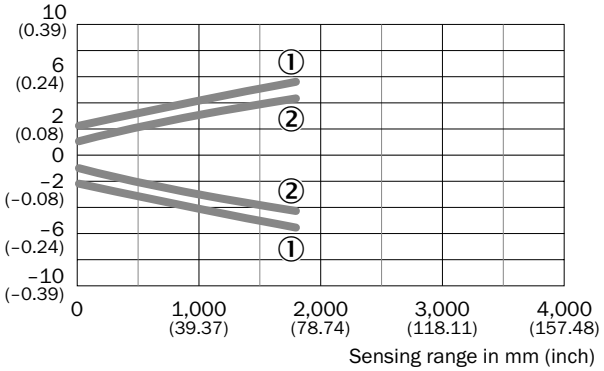
Min. distance from object to background in mm (inch)



① Sensing range on black, 6% remission
② Sensing range on white, 90% remission

Light spot size

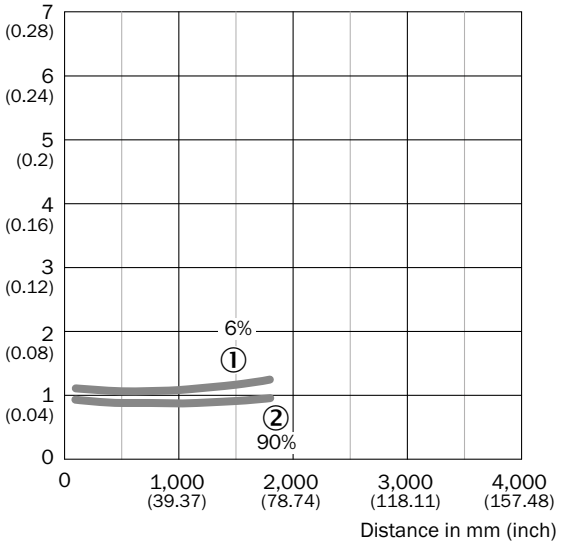
Radius in mm (inch)



① Light spot horizontal
② Light spot vertical

Reproducibility

Repeatablility in mm (inch)



① 6 % remission, on black
② 90 % remission, on white

8018415/2017-06-21
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FOR THE DETECTION OF VERY SMALL, VERY SHINY OBJECTS

Product description

The PowerProx Precision Shiny sensor is a variant of the PowerProx Precision MultiTask photoelectric sensor. PowerProx Precision Shiny was specially developed for the detection of shiny objects which reflect a high proportion of the light emitted by the sensor directly to the sensor receiver. Even under these conditions, PowerProx Precision Shiny provides accurate, reliable measurements. Positive side effects: The sensors even detect object edges arriving from the side more precisely and are less sensitive to dust and steam in the ambient air than the standard PowerProx Precision variant.

At a glance

- Time-of-flight technology, laser class 1
- Sensing range for object detection: 5 cm ... 1.4 m
- Switching frequency: 30 Hz
- Minimum distance between object and background: 7 mm ... 17 mm
- VISTAL® housing
- 1 or 2 switching points which can be adjusted separately
- Analog output
- IO-Link (distance value, 8 switching points, smart sensor functions)

Your benefits

- High measurement accuracy even when the emitted light beam meets very shiny objects (no reflectors) vertically
- More precise detection of object edges arriving from the side
- More precise detection of holes in objects
- Better suppression of dust and steam in ambient air

Additional information

→ www.sick.com/PowerProx

For more information, simply 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.

8018415/2017-06-21
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Detailed technical data

Features

Sensor principle	Photoelectric proximity sensor
Detection principle	Background suppression
Dimensions (W x H x D)	20 mm x 49.6 mm x 44.2 mm
Housing design (light emission)	Rectangular
Sensing range max. [1]	50 mm ... 1,400 mm
Sensing range [2]	100 mm ... 1,400 mm
Distance value-measuring range [1]	50 mm ... 1,400 mm 100 mm ... 1,400 mm (depending on type)
Distance value-resolution	1 mm
Distance value-repeatability [3] [4] [5]	1,1 mm ... 1,5 mm
Distance value-accuracy	Typ. ± 20 mm [6], typ. ± 15 mm [7]
Type of light	Visible red light
Light source [8]	Laser
Light spot size (distance)	Ø 10 mm (1,400 mm)
Wave length	658 nm
Laser class	1 (IEC 60825-1 / CDRH 21 CFR 1040.10 & 1040.11)
Adjustment	Potentiometer, 4 turns (2 x) Single teach-in button (2 x) IO-Link (depending on type)

[1] Object with 6 ... 90 % remission (based on standard white to DIN 5033).
[2] Adjustable.
[3] Equivalent to 1 σ.
[4] See characteristic curves repeatability.
[5] 6 % ... 90 % remission.
[6] 50 ... 1000 mm.
[7] 1000 ... 1400 mm.
[8] Average service life: 100,000 h at T_U = +25 °C.

Mechanics/electronics

Supply voltage	10 V DC ... 30 V DC [1] [2] 12 V DC ... 30 V DC [1] [3] (depending on type)
Ripple [4]	≤ 5 V_{pp}
Power consumption [5]	≤ 70 mA
Output type [6] [7] [8]	PUSH/PULL, PNP, NPN
Number of switching outputs	2 (Q1, Q2) [6] 1 (Q1) [7] 2 (Q / $\overline{Q}$) [8] (depending on type)
Switching mode	Light switching [6] [7] Light/dark switching [8] (depending on type)
Output current $I_{max.}$	≤ 100 mA / ≤ 50 mA (depending on type)
Response time [9]	≤ 16.7 ms
Switching frequency [10]	30 Hz
Analog output	4 mA ... 20 mA (≤ 450 Ω) / 0 V ... 10 V (≥ 50 kΩ) / switchable
Resolution of analog output	12 bit
Output time	≤ 16.7 ms

Input	MF_{in} = multifunctional input programmable Sender off (depending on type)
Connection type	Male connector, M12
Circuit protection	A [11] B [12] C [13]
Protection class	III
Weight	48 g
Housing material	VISTAL®
Optics material	Plastic, PMMA
Enclosure rating	IP67
Ambient operating temperature [14] [15] [16]	–35 °C ... +50 °C –35 °C ... +50 °C (depending on type)
Ambient storage temperature	–40 °C ... +70 °C
Warm-up time [16]	< 15 min
Initialization time	< 300 ms

[1] Limit values. Operated in short-circuit protected network: max. 8 A.
[2] V_s min at IO-Link operation = 18 V.
[3] Vs min when using the voltage output = 13 V.
[4] May not exceed or fall below U_v tolerances.
[5] Without load. At V_S = 24 V.
[6] Q1, Q2 = 2 switching thresholds, light switching.
[7] Q1 = 1 switching threshold, light switching.
[8] Q / $\overline{Q}$ = 1 switching thresholds, light/dark switching/(complementary).
[9] Signal transit time with resistive load.
[10] With light/dark ratio 1:1.
[11] A = V_S connections reverse-polarity protected.
[12] B = inputs and output reverse-polarity protected.
[13] C = interference suppression.
[14] As of T_a = 45 °C, a max.load current I_{max} = 50 mA is permitted.
[15] For Vs ≤ 24 V. When Tu = 45 °C or above, a maximum load resistance of 300 Ω ... 450 Ω is permitted on QA.
[16] Below T_a = –10 °C a warm-up time is required.

Fieldbus, industrial network

Fieldbus integration	IO-Link V1.1
Mode	COM 2 (38,4 kBaud)
Cycle time	5 ms
Process data length	32 Bit
Process data structure	Bit 0 = switching signal Q_{01} Bit 1 = switching signal Q_{02} Bit 2 ... 8 = BDC 2 ... 8 Bit 9 ... 15 = empty Bit 16 ... 31 = distance value
Additional features	8 switching points for distance to object, of which 2 can be inverted, 1 switching point as switching window or configurable with hysteresis. Multifunctional input: sender off, external teach, inactive

Ordering information

PowerProx Precision Shiny, switching output

- **Supply voltage:** 10 V DC ... 30 V DC (Limit values. Operated in short-circuit protected network: max. 8 A.)
- **Output type:** PUSH/PULL, PNP, NPN
- **Sensing range max.:** 50 mm ... 1,400 mm (Object with 6 ... 90 % remission (based on standard white to DIN 5033).)
- **Output current $I_{Max.}$:** ≤ 100 mA

Number of switching outputs	Switching mode	Adjustment	Input	Connection	Connection diagram	Type	Part no.
2 (Q / $\overline{Q}$) [1]	Light/dark switching [1]	Single teach-in button (2 x)	Sender off	Male connector M12, 5-pin	cd-282	WTT12L-B2522	1085283
2 (Q1, Q2) [2]	Light switching [2]	Single teach-in button (2 x)	Sender off	Male connector M12, 5-pin	cd-284	WTT12L-B2523	1082417
		Potentiometer, 4 turns (2 x)	Sender off	Male connector M12, 5-pin	cd-284	WTT12L-B2526	1082419

[1] Q / $\overline{Q}$ = 1 switching thresholds, light/dark switching/(complementary).

[2] Q1, Q2 = 2 switching thresholds, light switching.

PowerProx Precision Shiny, analog and switching output

- **Supply voltage:** 12 V DC ... 30 V DC (Limit values. Operated in short-circuit protected network: max. 8 A.) (Vs min when using the voltage output = 13 V.)
- **Output type:** PUSH/PULL, PNP, NPN
- **Sensing range max.:** 50 mm ... 1,400 mm (Object with 6 ... 90 % remission (based on standard white to DIN 5033).)
- **Output current $I_{Max.}$:** ≤ 50 mA
- **Analog output:** 4 mA ... 20 mA (≤ 450 Ω) / 0 V ... 10 V (≥ 50 kΩ) / switchable
- **Distance value-measuring range:** 100 mm ... 1,400 mm (Object with 6 ... 90 % remission (based on standard white to DIN 5033).)

Number of switching outputs [1]	Switching mode [1]	Adjustment	Input	Connection	Connection diagram	Type	Part no.
1 (Q1)	Light switching	Single teach-in button (2 x)	Sender off	Male connector M12, 5-pin	cd-375	WTT12L-A2523	1082477

[1] Q1 = 1 switching threshold, light switching.

PowerProx Precision Shiny, IO-Link

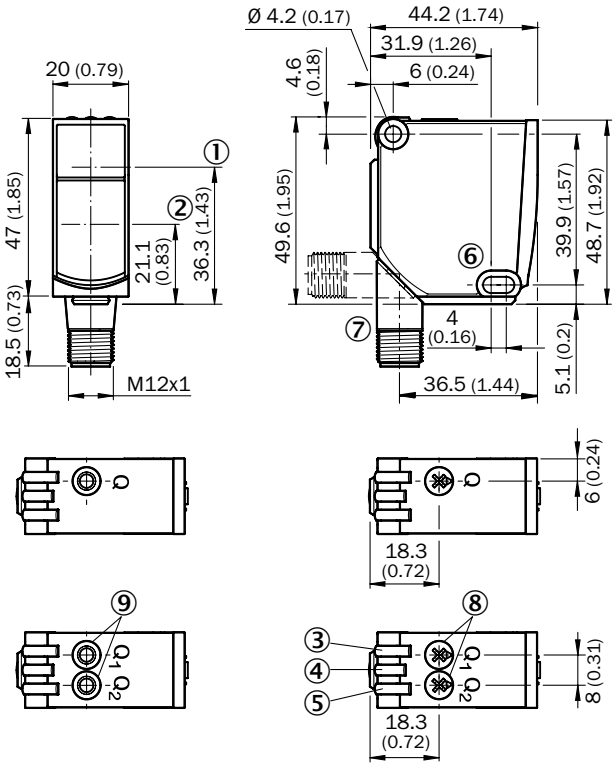
- **Supply voltage:** 10 V DC ... 30 V DC (Limit values. Operated in short-circuit protected network: max. 8 A.) (V_s min at IO-Link operation = 18 V.)
- **Output type:** PUSH/PULL, PNP, NPN
- **Sensing range max.:** 50 mm ... 1,400 mm (Object with 6 ... 90 % remission (based on standard white to DIN 5033).)
- **Output current $I_{Max.}$:** ≤ 100 mA
- **Distance value-measuring range:** 50 mm ... 1,400 mm (Object with 6 ... 90 % remission (based on standard white to DIN 5033).)

Number of switching outputs [1]	Switching mode [1]	Adjustment	Input	Connection	Connection diagram	Type	Part no.
2 (Q1, Q2)	Light switching	Single teach-in button (2 x) IO-Link	MF_{in} = multi-functional input programmable	Male connector M12, 5-pin	cd-290	WTT12LC-B2523	1082414

[1] Q1, Q2 = 2 switching thresholds, light switching.

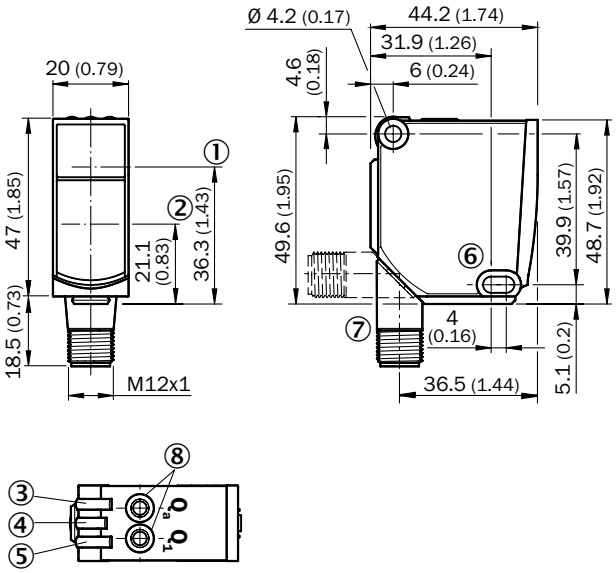
Dimensional drawings (Dimensions in mm (inch))

Switching output and IO-Link



① Optical axis sender
② Optical axis receiver
③ LED indicator yellow: Status of received light beam
④ LED indicator green: power on
⑤ LED indicator yellow: Status of received light beam
⑥ Mounting hole, Ø 4.2 mm
⑦ Connection
⑧ Potentiometer
⑨ Single teach-in button

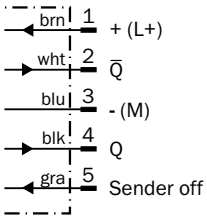
Analog and switching output



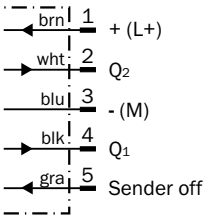
① Optical axis sender
② Optical axis receiver
③ LED indicator yellow: Status of analog output
④ LED indicator green: power on
⑤ Status indicator LED, yellow: Status switching output
⑥ Mounting hole, Ø 4.2 mm
⑦ Connection
⑧ Single teach-in button

Connection diagram

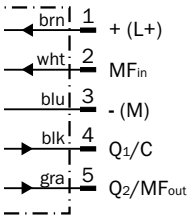
Cd-282



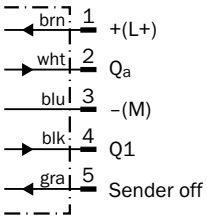
Cd-284



Cd-290

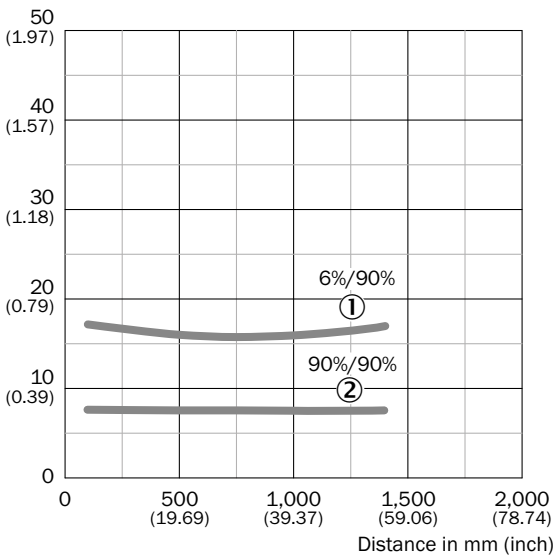


Cd-375



Sensing range

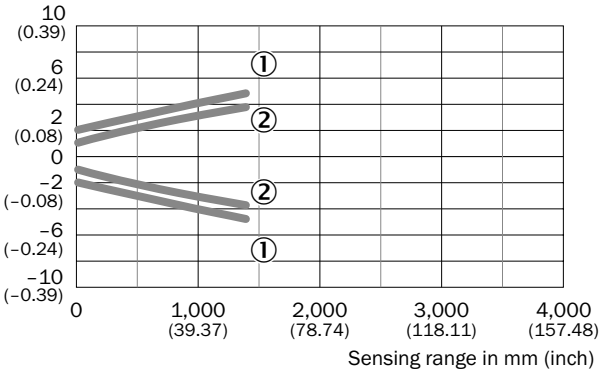
Min. distance from object to background in mm (inch)



① Sensing range on black, 6% remission
② Sensing range on white, 90% remission

Light spot size

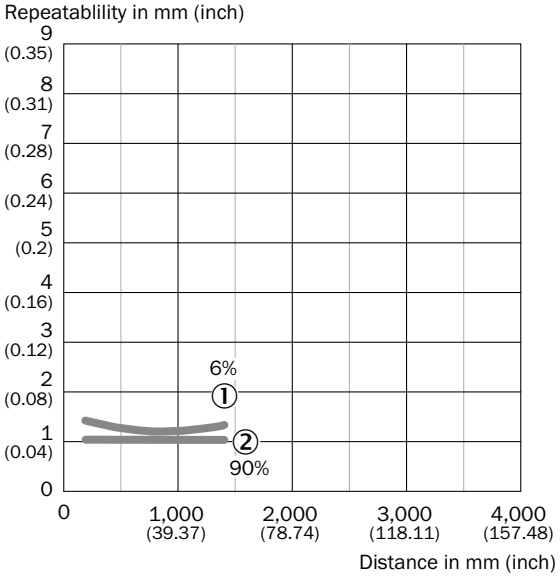
Radius in mm (inch)



① Light spot horizontal
② Light spot vertical

Reproducibility

Repeatablility in mm (inch)



① 6 % remission, on black
② 90 % remission, on white

GREAT SENSING RANGE IN A SMALL PACKAGE

Product description

The PowerProx Small combines time-of-flight technology, sensing ranges up to 3.0 m, and high switching frequencies up to 1,000 Hz in a small housing. The laser technology is classified as laser class 1, ensuring that there is no danger to eyes during operation. The MultiTask photoelectric sensor is adjusted via potentiometer or display with Teach-in buttons. There are versions available with either one or two separately adjustable switching thresholds or with analog output, depending on the application. Thanks to its versatile connection options, the PowerProx Small is extremely flexible and can be used in a wide range of different fields.

At a glance

- Time-of-flight technology, laser class 1
- Sensing range for object detection: 20 cm to 3.0 m
- Switching frequency up to 1,000 Hz
- Minimum distance between the object and background: 15 ... 175 mm
- Adjustment via potentiometer or display with Teach-in buttons
- 1 or 2 switching points which can be adjusted separately
- Analog output
- Wide range of connection options

Your benefits

- The small housing offers great flexibility in terms of machine design
- Flexible: Sensing ranges from 20 cm to 3.0 m
- Reliable object detection, e.g., even with shiny or jet-black surfaces and background reflections
- Highly visible light spot simplifies alignment of the photoelectric proximity sensor
- Precise, simple adjustment with potentiometer or display with Teach-in buttons
- Eye-safe thanks to laser class 1

IO-Link

Additional information

→ www.sick.com/PowerProx

For more information, simply 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.

8018415/2017-06-21
Subject to change without notice

Detailed technical data

Features

Sensor principle	Photoelectric proximity sensor
Detection principle	Background suppression
Dimensions (W x H x D)	17.6 mm x 46.5 mm x 34.1 mm 17.4 mm x 45.6 mm x 34.7 mm (depending on type)
Housing design (light emission)	Rectangular
Sensing range max. [1]	200 mm ... 2,500 mm 200 mm ... 3,000 mm (depending on type)
Sensing range [2]	200 mm ... 2,500 mm 200 mm ... 3,000 mm (depending on type)
Distance value-measuring range [1]	200 mm ... 3,000 mm
Distance value-resolution	2 mm
Distance value-repeatability [3] [4] [5]	5 mm ... 80 mm
Distance value-accuracy	Typ. ± 30 mm [6], typ. ± 50 mm [7]
Type of light	Visible red light
Light source [8]	Laser
Light spot size (distance)	Ø 10 mm (2,500 mm) Ø 12 mm (3,000 mm) (depending on type)
Wave length	658 nm
Laser class	1 (IEC 60825-1 / CDRH 21 CFR 1040.10 & 1040.11)
Adjustment	Potentiometer, 4 turns (1 x) Potentiometer, 4 turns (2 x) Single teach-in button (4 x) Display (depending on type)

[1] Object with 6 ... 90 % remission (based on standard white to DIN 5033).
[2] Adjustable.
[3] Equivalent to 1 σ.
[4] See characteristic curves repeatability.
[5] 6 % ... 90 % remission.
[6] 0.2 m ... 2 m.
[7] 2 m ... 3 m.
[8] Average service life: 100,000 h at T_U = +25 °C.

Mechanics/electronics

Supply voltage [1]	10 V DC ... 30 V DC 12 V DC ... 30 V DC (depending on type)
Ripple [2]	≤ 5 V_{pp}
Power consumption [3]	≤ 75 mA
Output type	PNP [4] [5] NPN [4] [5] PNP/NPN [4] [5] [6] [7] (depending on type)
Number of switching outputs	2 (Q1, Q2) [4] 1 (Q1) [5] 3 (Q1, Q2, Q3) [7] (depending on type)
Switching mode [4] [5] [7]	Light/dark switching

Switching mode selector	Selectable via light/dark selector / selectable via menu (depending on type)
Output current $I_{max.}$	≤ 100 mA
Response time	≤ 0.5 ms [8] ≤ 0.6 ms, ≤ 1 ms, ≤ 3.4 ms, ≤ 13 ms, ≤ 51.4 ms [8] [9] [10] (depending on type)
Switching frequency [11]	
≤ 0.6 ms, ≤ 1 ms, ≤ 3.4 ms, ≤ 13 ms, ≤ 51.4 ms	833 Hz, 500 Hz, 147 Hz, 38 Hz, 10 Hz [9] [10]
≤ 0.5 ms	1,000 Hz
Resolution of analog output	10 bit
Output time [9] [10]	0.6 ms, 1 ms, 3.4 ms, 13 ms, 51.4 ms
Input	MF_{in} = multifunctional input programmable [12] Sender off (depending on type)
Connection type	Cable with male connector, M12, 0.3 m [13] Male connector, M8 Cable, 2 m [13] (depending on type)
Circuit protection	A [14] B [15] C [16]
Protection class	III
Weight	
Cable with plug M12, 5-pin	45 g
Connector M8, 4-pin	25 g
Cable, 5-wire	85 g
Cable, 4-wire	80 g
Housing material	ABS
Optics material	Plastic, PMMA
Enclosure rating	IP67
Items supplied	BEF-W190 mounting bracket
Ambient operating temperature	–10 °C ... +50 °C –30 °C ... +50 °C [17] (depending on type)
Ambient storage temperature	–40 °C ... +70 °C
Warm-up time [18]	< 5 min
Initialization time	< 300 ms

[1] Limit values. Operated in short-circuit protected network: max. 8 A.
[2] May not exceed or fall below U_v tolerances.
[3] Without load. At V_S = 24 V.
[4] Q1, Q2 = 2 switching thresholds, light/dark switching selectable via light/dark selector.
[5] Q1 = 1 switching threshold, light/dark switching selectable via light/dark selector.
[6] PNP/NPN switchable.
[7] Q1, Q2, Q3 = 3 switching thresholds, light/dark switching selectable via light/dark selector.
[8] Signal transit time with resistive load.
[9] Can be set via a mean value filter (AVG1, AVG4, AVG16, AVG64, AVG256).
[10] Depending on distance to object, distance to background and selected switching threshold.
[11] With light/dark ratio 1:1.
[12] External teach-in via cable, laser shutdown.
[13] Do not bend below 0 °C.
[14] A = V_S connections reverse-polarity protected.
[15] B = inputs and output reverse-polarity protected.
[16] C = interference suppression.
[17] Vs ≥ 24 V. Below Ta < –10 °C warm-up time < 10 min.
[18] For best performance consider warm up time ≤ 5 minutes.

Ordering information

PowerProx Small, switching output, adjustment via potentiometer

- **Supply voltage:** 10 V DC ... 30 V DC (Limit values. Operated in short-circuit protected network: max. 8 A.)
- **Sensing range max.:** 200 mm ... 2,500 mm (Object with 6 ... 90 % remission (based on standard white to DIN 5033).)
- **Response time:** ≤ 0.5 ms (Signal transit time with resistive load.)
- **Light spot size (distance):** Ø 10 mm (2,500 mm)
- **Output current $I_{Max.}$:** ≤ 100 mA

Number of switching outputs	Switching mode	Adjustment	Input	Output type	Connection	Connection diagram	Type	Part no.
1 (Q1) [1]	Light/dark switching [1]	Potentiometer, 4 turns (1 x)	Sender off	NPN	Cable with plug M12, 5-pin, 0.3 m, PVC	cd-294	WTT190L-N3531	6055961
				PNP	Cable with plug M12, 5-pin, 0.3 m, PVC	cd-294	WTT190L-P3531	6055955
				NPN	Cable, 4-wire, 2 m, PVC	cd-293	WTT190L-N1131	6055960
				PNP	Cable, 4-wire, 2 m, PVC	cd-293	WTT190L-P1131	6055954
				NPN	Connector M8, 4-pin	cd-292	WTT190L-N2231	6055959
				PNP	Connector M8, 4-pin	cd-292	WTT190L-P2231	6055953
2 (Q1, Q2) [2]	Light/dark switching [2]	Potentiometer, 4 turns (2 x)	–	NPN	Connector M8, 4-pin	cd-296	WTT190L-N2236	6055962
				PNP	Connector M8, 4-pin	cd-296	WTT190L-P2236	6055956
			Sender off	NPN	Cable with plug M12, 5-pin, 0.3 m, PVC	cd-284	WTT190L-N3536	6055964
				PNP	Cable with plug M12, 5-pin, 0.3 m, PVC	cd-284	WTT190L-P3536	6055958
				NPN	Cable, 5-wire, 2 m, PVC	cd-285	WTT190L-N1536	6055963
				PNP	Cable, 5-wire, 2 m, PVC	cd-285	WTT190L-P1536	6055957

[1] Q1 = 1 switching threshold, light/dark switching selectable via light/dark selector.

[2] Q1, Q2 = 2 switching thresholds, light/dark switching selectable via light/dark selector.

PowerProx Small, switching output, adjustment via teach-in

- **Supply voltage:** 10 V DC ... 30 V DC (Limit values. Operated in short-circuit protected network: max. 8 A.)
- **Sensing range max.:** 200 mm ... 3,000 mm (Object with 6 ... 90 % remission (based on standard white to DIN 5033).)
- **Response time:** ≤ 0.6 ms, ≤ 1 ms, ≤ 3.4 ms, ≤ 13 ms, ≤ 51.4 ms [1) 2) 3)]
- **Light spot size (distance):** Ø 12 mm (3,000 mm)
- **Output current $I_{Max.}$:** ≤ 100 mA
- **Output type:** PNP, NPN

Number of switching outputs	Switching mode	Adjustment	Input	Connection	Connection diagram	Type	Part no.
2 (Q1, Q2) [4)]	Light/dark switching [4)]	Single teach-in button (4 x) Display	MF_{in} = multi-functional input programmable	Connector M8, 4-pin	cd-369	WTT190L-K2233	6062141
3 (Q1, Q2, Q3) [5)]	Light/dark switching [5)]	Single teach-in button (4 x) Display		Cable with plug M12, 5-pin, 0.3 m, PVC	cd-371	WTT190L-K3534	6062143
				Cable, 5-wire, 2 m, PVC	cd-370	WTT190L-K1534	6062142

[1)] Signal transit time with resistive load.

[2)] Can be set via a mean value filter (AVG1, AVG4, AVG16, AVG64, AVG256).

[3)] Depending on distance to object, distance to background and selected switching threshold.

[4)] Q1, Q2 = 2 switching thresholds, light/dark switching selectable via light/dark selector.

[5)] Q1, Q2, Q3 = 3 switching thresholds, light/dark switching selectable via light/dark selector.

PowerProx Small, analog and switching output, adjustment via teach-in

- **Supply voltage:** 12 V DC ... 30 V DC (Limit values. Operated in short-circuit protected network: max. 8 A.)
- **Sensing range max.:** 200 mm ... 3,000 mm (Object with 6 ... 90 % remission (based on standard white to DIN 5033).)
- **Response time:** ≤ 0.6 ms, ≤ 1 ms, ≤ 3.4 ms, ≤ 13 ms, ≤ 51.4 ms [1) 2) 3)]
- **Light spot size (distance):** Ø 12 mm (3,000 mm)
- **Output current $I_{Max.}$:** ≤ 100 mA
- **Distance value-measuring range:** 200 mm ... 3,000 mm (Object with 6 ... 90 % remission (based on standard white to DIN 5033).)
- **Output type:** PNP, NPN switchable

Number of switching outputs [4)]	Switching mode [4)]	Adjustment	Input	Connection	Connection diagram	Type	Part no.
1 (Q1)	Light/dark switching	Single teach-in button (4 x) Display	MF_{in} = multi-functional input programmable	Cable with plug M12, 5-pin, 0.3 m, PVC	cd-374	WTT190L-A3532	6062146
				Cable, 5-wire, 2 m, PVC	cd-373	WTT190L-A1532	6062145
				Connector M8, 4-pin	cd-372	WTT190L-A2232	6062144

[1)] Signal transit time with resistive load.

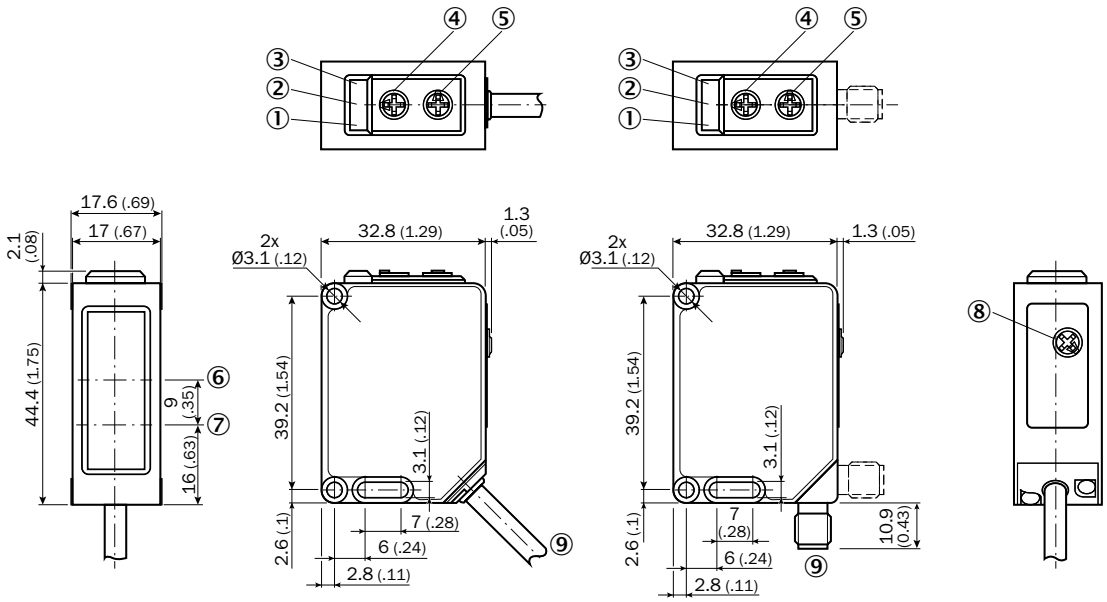
[2)] Can be set via a mean value filter (AVG1, AVG4, AVG16, AVG64, AVG256).

[3)] Depending on distance to object, distance to background and selected switching threshold.

[4)] Q1 = 1 switching threshold, light/dark switching selectable via light/dark selector.

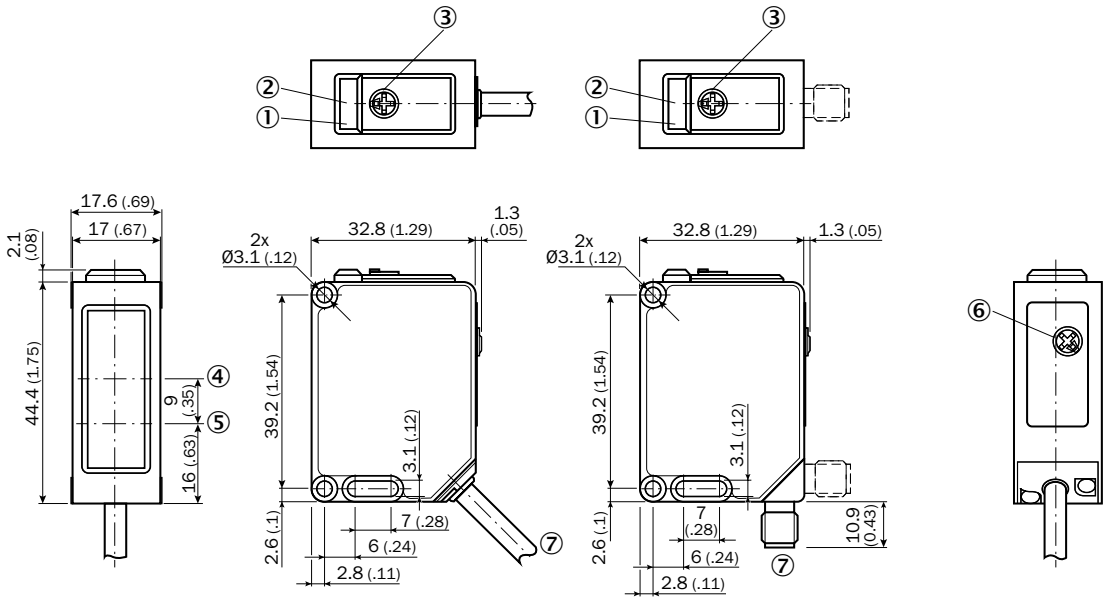
Dimensional drawings (Dimensions in mm (inch))

Switching output, adjustment via potentiometer



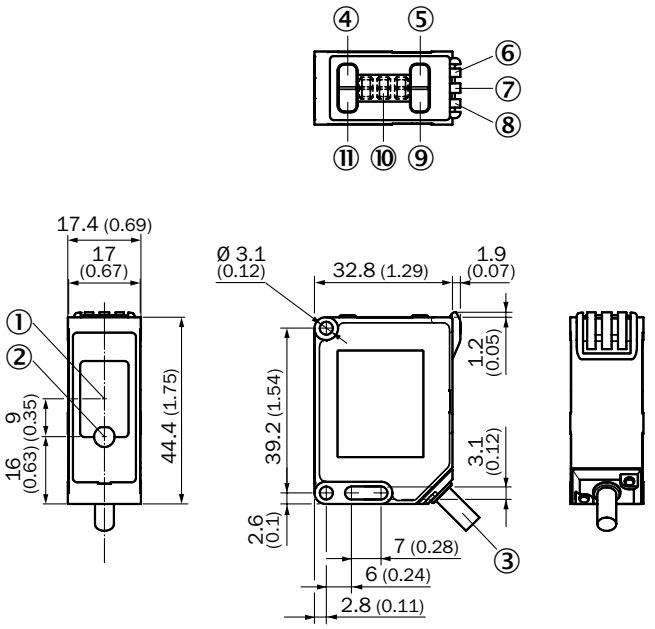
① Status indicator LED, yellow: Status of output Q1
② Status indicator LED, green/red: power on / stability indicator
③ Status indicator LED, yellow: Status of output Q2
④ Potentiometer
⑤ Potentiometer
⑥ Optical axis receiver
⑦ Optical axis sender
⑧ Light/dark selector
⑨ Connection

Switching output, adjustment via potentiometer



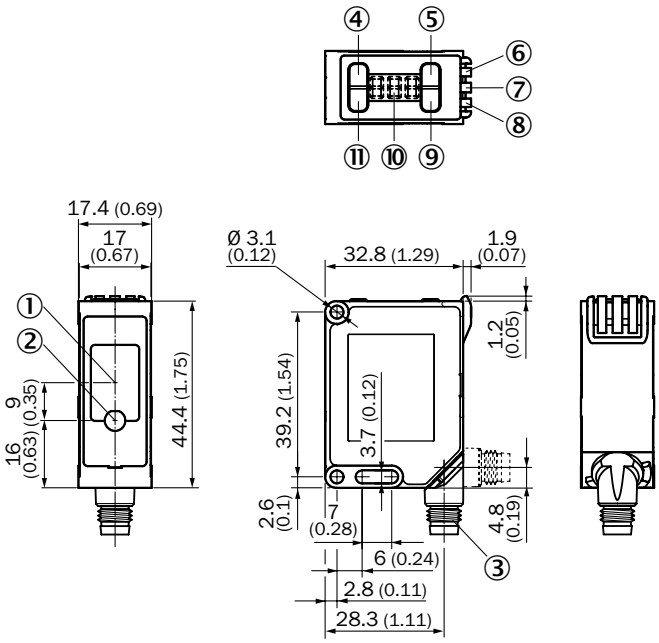
① Status indicator LED, yellow: Status of output Q1
② Status indicator LED, green/red: power on / stability indicator
③ Potentiometer
④ Optical axis receiver
⑤ Optical axis sender
⑥ Light/dark selector
⑦ Connection

Switching output, adjustment via teach-in



① Receiver
② Sender
③ Connection
④ RUN button
⑤ (+/Q2) button
⑥ Status indicator orange: Q2 output indicator
⑦ Status indicator LED, green/red/orange: power on / stability indicator / Q3 output indicator
⑧ Status indicator orange: Q1 output indicator
⑨ (-/Q1) button
⑩ Display
⑪ SET button

Switching output, adjustment via teach-in



① Receiver
② Sender
③ Connection
④ RUN button
⑤ (+) button
⑥ Status indicator orange: output indicator
⑦ Status indicator LED, green/red/off: power on / stability indicator / laser off
⑧ Status indicator orange: output indicator
⑨ (-/Q1) button
⑩ Display
⑪ SET button

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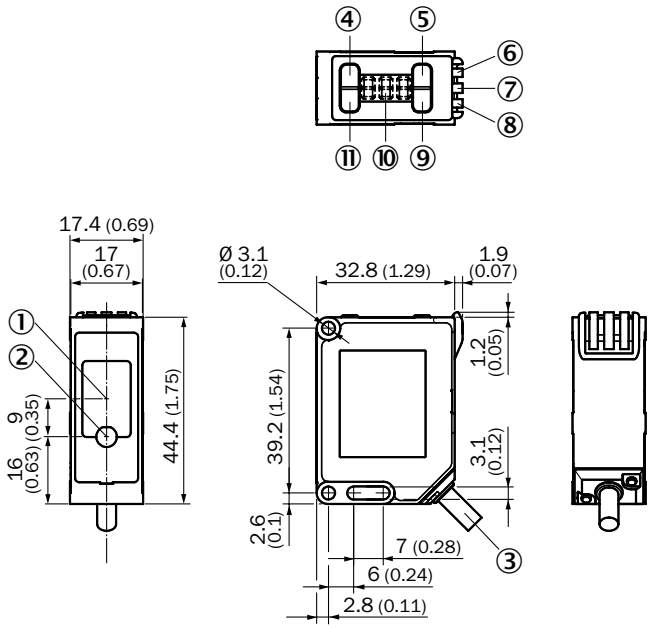
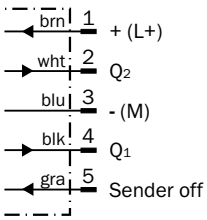
Analog and switching output, adjustment via teach-in



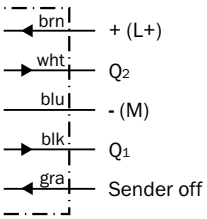
① Receiver
② Sender
③ Connection
④ RUN button
⑤ (+) button
⑥ Status indicator orange: Q1 output indicator
⑦ Status indicator LED, green/red/off: power on / stability indicator / laser off
⑧ Status indicator orange: Q1 output indicator
⑨ (-/Q1) button
⑩ Display
⑪ SET button

Connection diagram

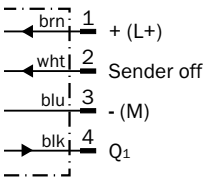
Cd-284



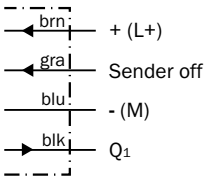
Cd-285



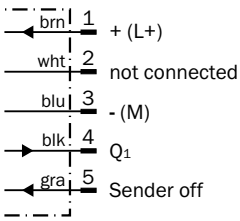
Cd-292



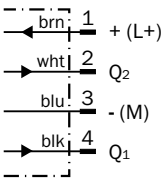
Cd-293



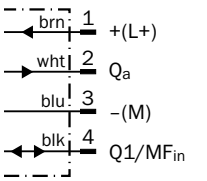
Cd-294



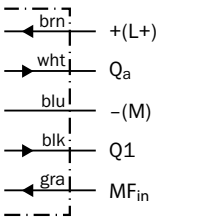
Cd-296



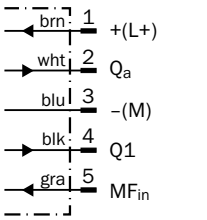
Cd-372



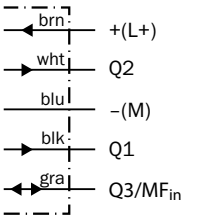
Cd-373



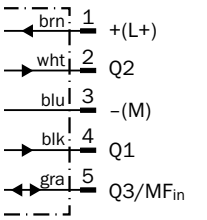
Cd-374



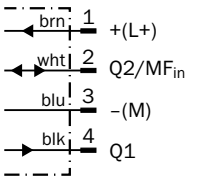
Cd-370



Cd-371

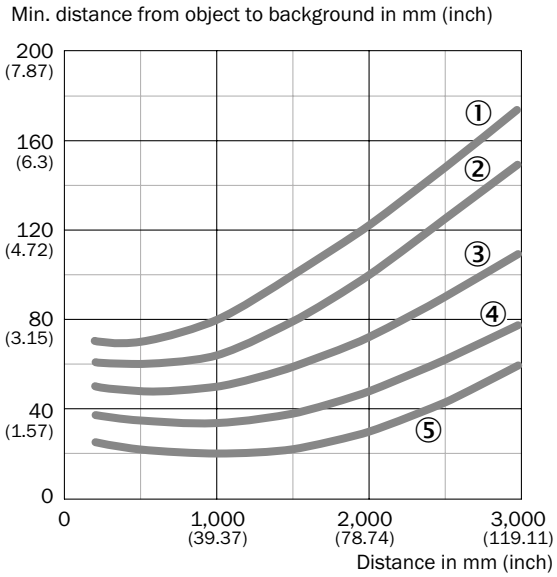


Cd-369



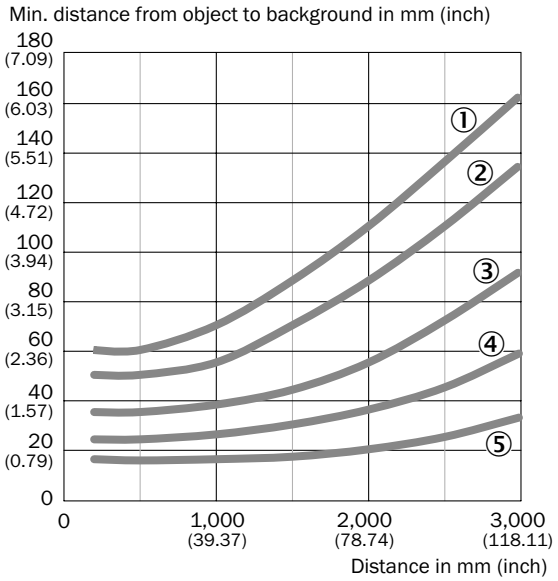
Scanning range

Switching output, adjustment via teach-in
Analog and switching output, adjustment via teach-in



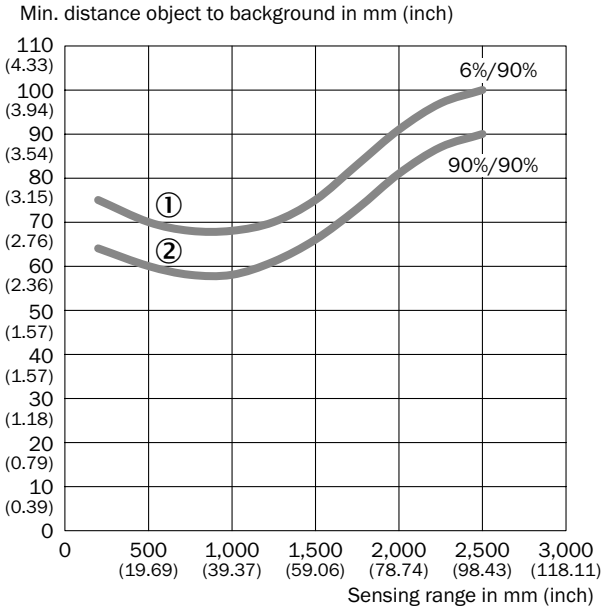
① 6 % / 90 % AVG1
② 6 % / 90 % AVG4
③ 6 % / 90 % AVG16
④ 6 % / 90 % AVG64
⑤ 6 % / 90 % AVG256

Switching output, adjustment via teach-in
Analog and switching output, adjustment via teach-in



① 90 % / 90 % AVG1
② 90 % / 90 % AVG4
③ 90 % / 90 % AVG16
④ 90 % / 90 % AVG64
⑤ 90 % / 90 % AVG256

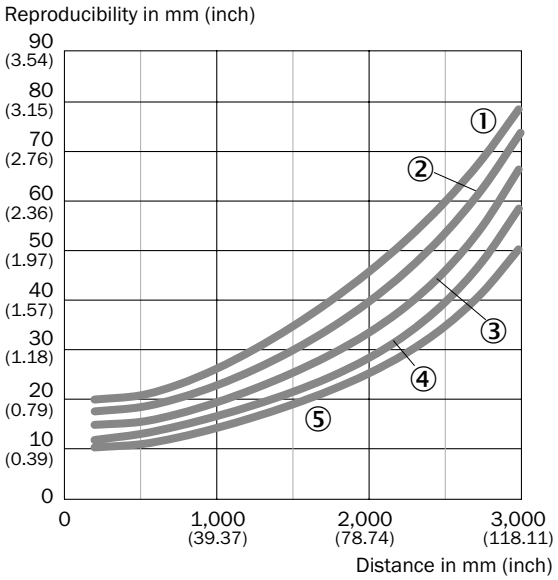
Switching output, adjustment via potentiometer



① Sensing range on black, 6% remission
② Sensing range on white, 90% remission

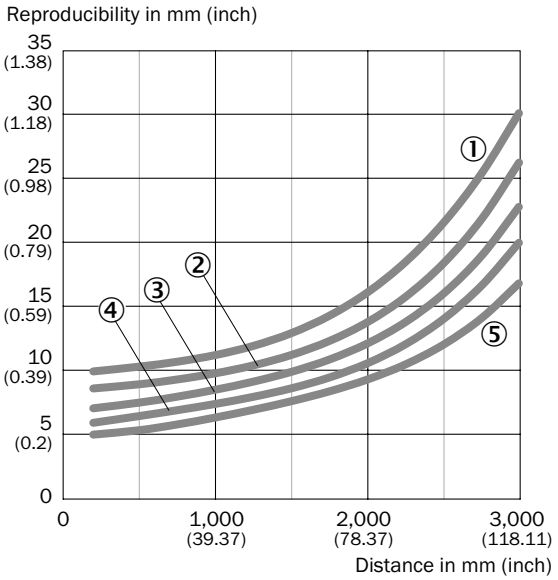
Sensing range

Analog and switching output, adjustment via teach-in



① 6 % AVG1
② 6 % AVG4
③ 6 % AVG16
④ 6 % AVG64
⑤ 6 % AVG256

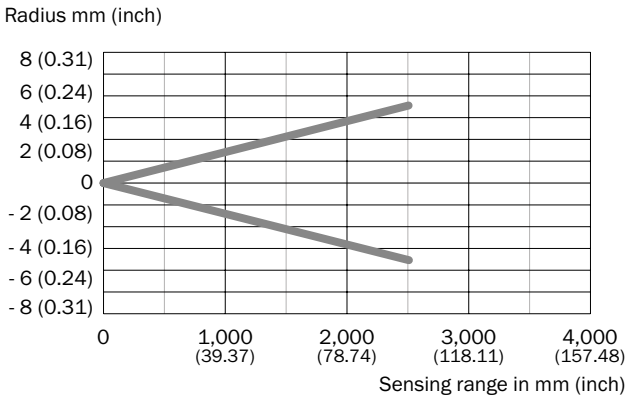
Analog and switching output, adjustment via teach-in



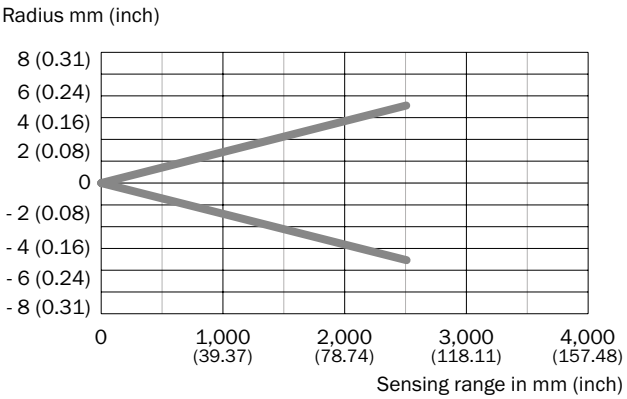
① 90 % AVG1
② 90 % AVG4
③ 90 % AVG16
④ 90 % AVG64
⑤ 90 % AVG256

Light spot size

Switching output, adjustment via potentiometer



Switching output, adjustment via teach-in
Analog and switching output, adjustment via teach-in



NEVER BEFORE HAS BIG PERFORMANCE BEEN SO SMALL

Product description

The PowerProx Micro, with its fingertip-sized housing, is the smallest MultiTask photoelectric sensor with time-of-flight technology worldwide and is well-suited for use in cramped conditions. With its large sensing range of 800 mm, it is impressive in relation to its very small design. Thanks to the single teach-in button, the sensing range can be set quickly, easily and precisely. With its rugged housing and soft cable entry, the sensor is equipped for reliable use in industrial settings.

At a glance

- Miniature design 7.7 x 27.5 x 13.5 mm
- Scanning ranges up to 800 mm
- Time-of-flight technology
- Infrared light
- Laser class 1
- Single teach-in button

Your benefits

- The extremely small design with scanning ranges of up to 800 mm opens new opportunities in machine design
- Easy and precise sensor setting with standard teach-in procedure from SICK
- Laser class 1 and therefore eye-safe
- High availability and long-term use in grippers thanks to soft, durable cable entry and rugged housing

Additional information

→ www.sick.com/PowerProx

For more information, simply 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.

8018415/2017-06-21
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Detailed technical data

Features

Sensor principle	Photoelectric proximity sensor
Detection principle	Background suppression
Dimensions (W x H x D)	7.7 mm x 27.5 mm x 13.5 mm
Housing design (light emission)	Rectangular
Sensing range max. [1]	50 mm ... 800 mm
Sensing range [1]	50 mm ... 800 mm
Type of light	Infrared light
Light source [2]	Laser
Light spot size (distance)	Ø 10 mm (300 mm)
Wave length	940 nm
Laser class	I
Adjustment [3]	Single teach-in button

[1] Object with 6 ... 90 % remission (based on standard white to DIN 5033).
[2] Average service life: 50,000 h at T_U = +25 °C.
[3] Teach-Offset 15 mm.

Mechanics/electronics

Supply voltage [1]	10 V DC ... 30 V DC
Ripple [2]	≤ 5 V_{pp}
Power consumption [3]	≤ 20 mA
Output type	NPN [4] PNP (depending on type)
Switching mode	Light/dark switching
Output current $I_{max.}$	< 50 mA
Response time [5]	Typ. 90 ms
Switching frequency [6]	5 Hz
Connection type [7]	Cable, 2 m Cable with male connector, M8, 200 mm (depending on type)
Circuit protection	A [8] B [9] D [10]
Protection class	III
Housing material	MABS, ABS
Optics material	Plastic, PMMA
Enclosure rating	IP67
Ambient operating temperature	–25 °C ... +50 °C
Ambient storage temperature	–40 °C ... +75 °C

[1] Limit values. Operated in short-circuit protected network: max. 8 A.
[2] May not exceed or fall below U_v tolerances.
[3] Without load.
[4] Off-state current I_R ≤ 0,6 mA.
[5] Jitter +- 20 ms.
[6] With light/dark ratio 1:1.
[7] Do not bend below 0 °C.
[8] A = V_S connections reverse-polarity protected.
[9] B = output reverse-polarity protected.
[10] D = outputs overcurrent and short-circuit protected.

Ordering information

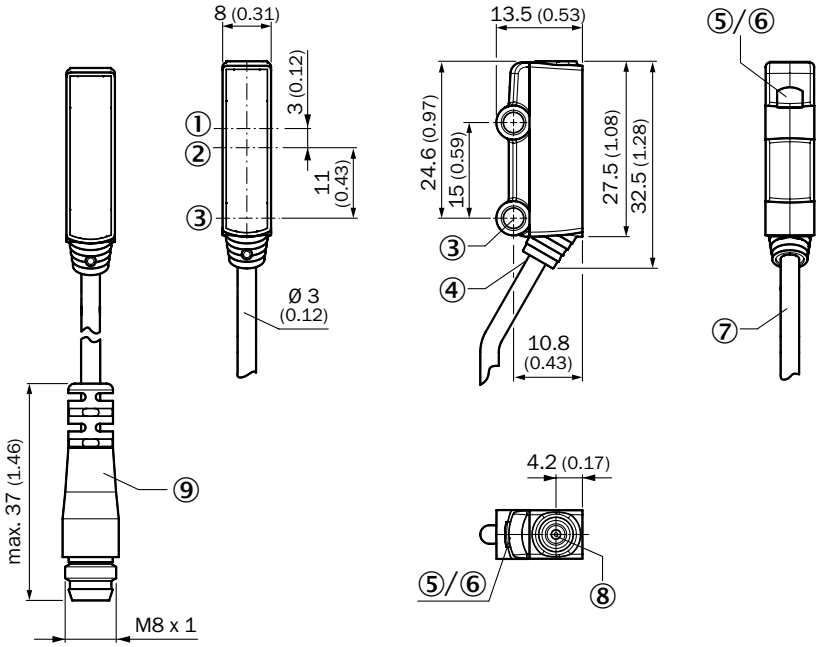
PowerProx Micro, adjustable

- **Sensor principle:** Photoelectric proximity sensor
- **Voltage type:** DC
- **Sensing range max.:** 50 mm ... 800 mm (Object with 6 ... 90 % remission (based on standard white to DIN 5033).)
- **Light spot size (distance):** Ø 10 mm (300 mm)
- **Output current $I_{Max.}$:** < 50 mA

Switching mode	Adjustment [1]	Connection	Connection diagram	Type	Part no.
Light/dark switching	Single teach-in button	Cable with M8 male connector, 4-pin, 200 mm, PVC	cd-083	WTT2SL-2P3292	1085602
		Cable, 4-wire, 2 m, PVC	cd-083	WTT2SL-2N1192	1085601

[1] Teach-Offset 15 mm.

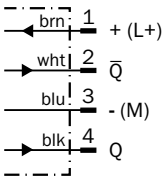
Dimensional drawings (Dimensions in mm (inch))



① Optical axis receiver
② Optical axis sender
③ Mounting hole, Ø 3.2 mm
④ Connection
⑤ LED indicator green: Supply voltage active
⑥ LED indicator yellow: Status of received light beam
⑦ Cable
⑧ Single teach-in button
⑨ Cable with connector M8

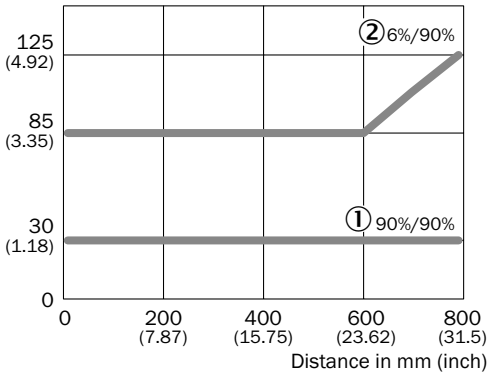
Connection diagram

Cd-083



Sensing range

Min. distance from object to background in mm (inch)



① Sensing range on white, 90% remission
② Sensing range on black, 6% remission

LASER CLASS 1 PHOTOELECTRIC PROXIMITY SENSORS - GREAT PERFORMANCE, SIMPLE OPERATION

Product description

The powerful photoelectric proximity sensor W280L-2 Long Range is characterized by its maximum sensing distance of up to 4 m combined with extremely simple operation. The sensing distance can be further extended to 18 m with the WLT280L-2 Long Range reflector version. The option of 2 independant switching outputs allows feedback of low and high detection points. Setup is easy through an intuitive sensing range adjustment potentiometer and indicator LED for each switching output. A visible red class 1 laser light ensures that the alignment is quick and precise. An integrated protective system in the W280L-2 Long Range prevents adverse effects caused by reflections in the background, for example, resulting from reflective metal surfaces, windows and warning vests. Additionally, the W280L-2 Long Range ignores cross-talk from an adjacent sensor.

At a glance

- WTT280L-2 Long Range: sensing distance up to 4 m
- WLT280L-2 Long Range on reflector: sensing distance up to 18 m
- Complete background suppression: very small black/white shift, insensitive against reflections from the background (e.g. shiny metal, window, safety vest)
- Visible red class 1 laser light
- Version 1: with 1 x switching output and light/dark switch, version 2: with 2 x switching outputs and light/dark switch
- Disable laser by wire
- Reliable detection also in very fast production processes thanks to the switching frequency of 1000 Hz

Your benefits

- Reliable target detection with difficult target colors, angles and color transitions (black/white shift)
- One sensor with two outputs and two status LEDs improves application flexibility and reduces the number of sensors needed
- Quick and easy comissioning with sensing distance adjustment potentiometers and status LED – one for each output
- Quick and easy alignment with a red class 1 laser light
- Rotatable connector and light/dark switch for mounting and installation flexibility

Additional information

→ www.sick.com/PowerProx

For more information, simply 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.

8018415/2017-06-21
Subject to change without notice

Detailed technical data

Features

	WTT280L-2 Long Range	WLT280L-2 Long Range
Sensor principle	Photoelectric proximity sensor	
Detection principle	Background suppression	
Dimensions (W x H x D)	23.5 mm x 76 mm x 55.8 mm	
Housing design (light emission)	Rectangular	
Sensing range max.	200 mm ... 4,000 mm [1] 200 mm ... 3,000 mm [2]	200 mm ... 18,000 mm [3]
Sensing range [4]	200 mm ... 4,000 mm [1] 200 mm ... 3,000 mm [2]	200 mm ... 18,000 mm [3]
Type of light	Visible red light	
Light source [5]	Laser	
Light spot size (distance)	Ø 12 mm (3 m)	Ø 50 mm (18 m)
Laser class	1 (EN 60825-1:2008-5, IEC 60825-1:2007-03)	
Adjustment	Potentiometer (2 x) Potentiometer (1 x) (depending on type)	Potentiometer (2 x)

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

[2] Objects to be sensed with 6 % reflectivity (based on black).

[3] Reflector P250, PL80A.

[4] Einstellbar.

[5] Average service life: 100,000 h at T_U = +25 °C.

Mechanics/electronics

	WTT280L-2 Long Range	WLT280L-2 Long Range
Supply voltage [1]	10 V DC ... 30 V DC	
Ripple [2]	≤ 3 V_{pp}	
Power consumption [3]	≤ 70 mA	
Output type	NPN PNP (depending on type)	
Number of switching outputs	2 (Q1, Q2) [4] 1 (Q1) [5] (depending on type)	2 (Q1, Q2) [4]
Switching mode	Light/dark switching	
Switching mode selector	Selectable via light/dark rotary switch	
Output current $I_{max.}$	≤ 100 mA	
Response time [6]	≤ 0.5 ms	≤ 2 ms
Switching frequency [7]	1,000 Hz	± 250 Hz
Input	Sender off	
Connection type	Male connector, M12 Cable, 2 m [8] (depending on type)	
Circuit protection	A [9] B [10] C [11] D [12]	
Protection class	III	
Weight	120 g	
Housing material	ABS	

	WTT280L-2 Long Range	WLT280L-2 Long Range
Optics material	Plastic, PMMA	
Enclosure rating	IP67	
Items supplied	Mounting bracket BEF-W280	Mounting bracket BEF-W280, Reflector P250
EMC	EN 60947-5-2	
Ambient operating temperature	–10 °C ... +50 °C	
Ambient storage temperature	–40 °C ... +70 °C	

[1] Limit values. Operated in short-circuit protected network: max. 8 A.

[2] May not exceed or fall below U_v tolerances.

[3] Without load.

[4] Q1, Q2 = 2 switching thresholds, light/dark switching selectable via light/dark selector.

[5] Q1 = 1 switching threshold, light/dark switching selectable via light/dark selector.

[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 = output reverse-polarity protected.

[11] C = interference suppression.

[12] D = outputs overcurrent and short-circuit protected.

Ordering information

WTT280L-2 Long Range

- **Sensor principle:** Photoelectric proximity sensor
- **Voltage type:** DC
- **Sensing range max.:** 200 mm ... 4,000 mm (Object with 90 % reflectance (referred to standard white, DIN 5033).), 200 mm ... 3,000 mm (Objects to be sensed with 6 % reflectivity (based on black).)
- **Light spot size (distance):** Ø 12 mm (3 m)
- **Input:** Sender off

Number of switching outputs	Switching mode	Adjustment	Connection	Output type	Connection diagram	Type	Part no.
2 (Q1, Q2) [1]	Light/dark switching	Potentiometer (2 x)	Male connector M12, 5-pin	NPN	cd-211	WTT280L-2N2536	6048064
				PNP	cd-211	WTT280L-2P2536	6048062
			Cable, 5-wire, 2 m, PVC	NPN	cd-208	WTT280L-2N1536	6048068
				PNP	cd-208	WTT280L-2P1536	6048066
1 (Q1) [2]	Light/dark switching	Potentiometer (1 x)	Male connector M12, 5-pin	NPN	cd-210	WTT280L-2N2531	6048063
				PNP	cd-210	WTT280L-2P2531	6048061
			Cable, 5-wire, 2 m, PVC	NPN	cd-209	WTT280L-2N1531	6048067
				PNP	cd-209	WTT280L-2P1531	6048065

[1] Q1, Q2 = 2 switching thresholds, light/dark switching selectable via light/dark selector.

[2] Q1 = 1 switching threshold, light/dark switching selectable via light/dark selector.

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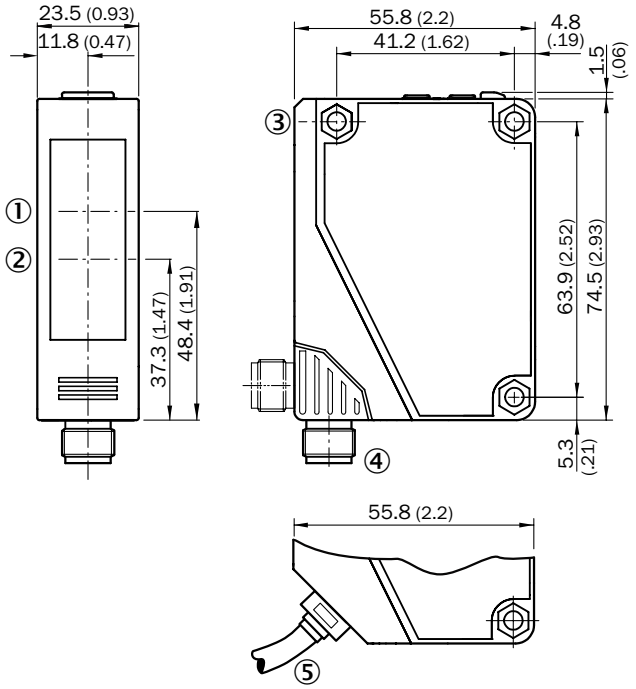
WLT280L-2 Long Range

- **Sensor principle:** Photoelectric proximity sensor
- **Voltage type:** DC
- **Sensing range max.:** 200 mm ... 18,000 mm (Reflector P250, PL80A.)
- **Light spot size (distance):** Ø 50 mm (18 m)
- **Input:** Sender off

Number of switching outputs [1]	Switching mode	Adjustment	Connection	Output type	Connection diagram	Type	Part no.
2 (Q1, Q2)	Light/dark switching	Potentiometer (2 x)	Male connector M12, 5-pin	NPN	cd-211	WLT280L-2N2536	6048070
				PNP	cd-211	WLT280L-2P2536	6048069
			Cable, 5-wire, 2 m, PVC	NPN	cd-208	WLT280L-2N1536	6048072
				PNP	cd-208	WLT280L-2P1536	6048071

[1] Q1, Q2 = 2 switching thresholds, light/dark switching selectable via light/dark selector.

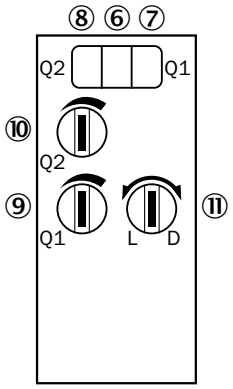
Dimensional drawing (Dimensions in mm (inch))



① Center of optical axis, receiver
② Center of optical axis, sender
③ Mounting hole, Ø 4.3 mm
④ M12 plug connector, 5-pin, can be rotated through 90°
⑤ Cable, 2 m, 5-wire, Ø 3.8 mm

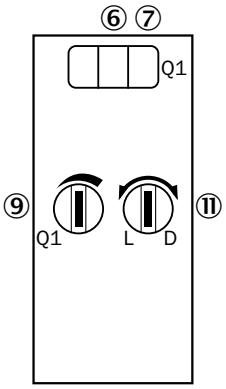
Adjustments

WxT280L-2xxxx6



⑥ LED indicator green: Stability indicator
⑦ Status indicator LED, yellow: Status of received light beam (switching output 1)
⑧ Status indicator LED, yellow: Status of received light beam (switching output 2)
⑨ Sensing range adjustment: potentiometer for switching output 1
⑩ Sensing range adjustment: potentiometer for switching output 2
⑪ Light/dark selector

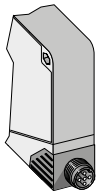
WTT280L-2xxxx1



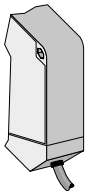
⑥ LED indicator green: Stability indicator
⑦ LED indicator yellow: Status of received light beam
⑨ Sensing range adjustment: potentiometer
⑪ Light/dark selector

Connection type

WTT280L-2x25xx
WLT280L-2x25xx

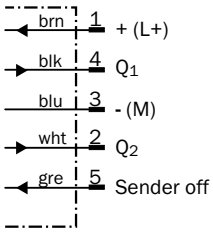


WTT280L-2x15xx
WLT280L-2x15xx

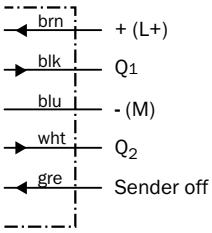


Connection diagram1

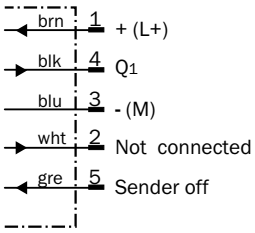
Cd-211



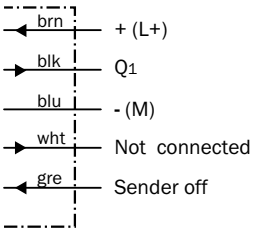
Cd-208



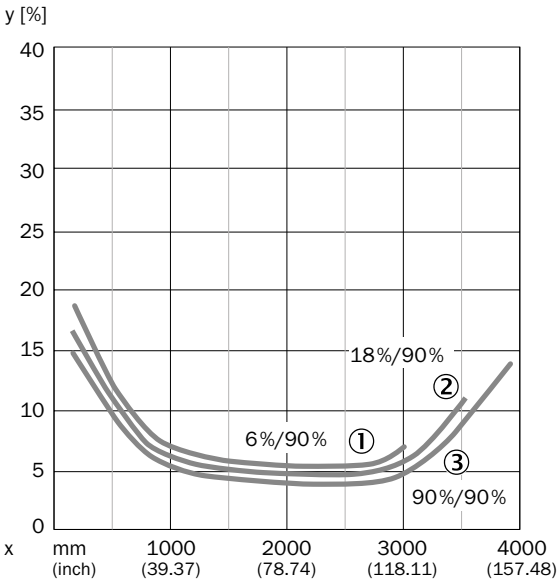
Cd-210



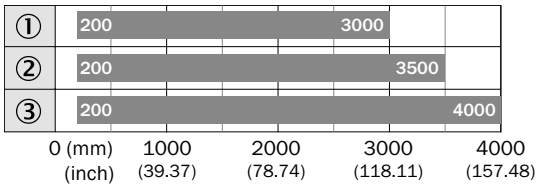
Cd-209



Sensing range



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



Sensing range max.

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

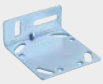
PowerProx

Mounting systems

Universal bar clamp systems

Figure	Material	Description	Type	Part no.	PowerProx Distance (Shiny)	PowerProx Speed (Shiny)	PowerProx Precision (Shiny)	PowerProx Small	PowerProx Micro	WTT280L-2 Long Range	WLT280L-2 Long Range
	Zinc plated steel (sheet), Zinc die cast (clamping bracket)	Plate N02 for universal clamp bracket	BEF-KHS-N02	2051608	●	●	●	●	–	–	–
		Plate N03 for universal clamp bracket, zinc coated	BEF-KHS-N03	2051609	●	●	●	–	–	–	–
		Plate N04 for universal clamp, steel	BEF-KHS-N04	2051610	●	●	●	–	–	●	●
	Stainless steel 1.4571 (sheet), Stainless steel 1.4408 (clamp)	Plate N04N for universal clamp bracket, stainless steel	BEF-KHS-N04N	2051620	●	●	●	●	–	●	●
	Steel, zinc coated	Mounting bar, straight, 200 mm, steel	BEF-MS12G-A	4056054	●	●	●	●	–	●	●
		Mounting bar, straight, 300 mm, steel	BEF-MS12G-B	4056055	●	●	●	●	–	●	●
		Mounting bar, L-shaped, 150 mm x 150 mm, steel	BEF-MS12L-A	4056052	●	●	●	●	–	●	●
		Mounting bar, L-shaped, 250 x 250 mm, steel	BEF-MS12L-B	4056053	●	●	●	●	–	●	●
		Mounting bar, Z-shaped, 150 mm x 70 mm x 150 mm, steel	BEF-MS12Z-A	4056056	●	●	●	●	–	●	●
		Mounting bar, Z-shaped, 150 mm x 70 mm x 250 mm, steel	BEF-MS12Z-B	4056057	●	●	●	●	–	●	●
	Aluminum	Bar clamp for bar diameter of 12 mm (fixing the mounting rod)	BEF-RMC-D12	5321878	●	●	●	●	–	●	●

Mounting brackets and plates

Figure	Material	Type	Part no.	PowerProx Distance (Shiny)	PowerProx Speed (Shiny)	PowerProx Precision (Shiny)	PowerProx Small	PowerProx Micro	WTT280L-2 Long Range	WLT280L-2 Long Range
	Steel, zinc coated	BEF-W190	5311362	–	–	–	●	–	–	–
		BEF-WTT12L	2078538	●	●	●	–	–	–	
	Stainless steel V2A (1.4301)	BEF-W280	5313885	–	–	–	–	–	●	●

Terminal and alignment brackets

Figure	Material	Description	Type	Part no.	PowerProx Distance (Shiny)	PowerProx Speed (Shiny)	PowerProx Precision (Shiny)	PowerProx Small	PowerProx Micro	WTT280L-2 Long Range	WLT280L-2 Long Range
	Aluminum (anodised)	Clamping block for dovetail mounting	BEF-KH-WTT12L	2080772	●	●	●	–	–	–	–

Connection systems

Modules and gateways

Cloning module

Figure	Brief description	Type	Part no.	PowerProx Distance (Shiny)	PowerProx Speed (Shiny)	PowerProx Precision (Shiny)	PowerProx Small	PowerProx Micro	WTT280L-2 Long Range	WLT280L-2 Long Range
	IO-Link version V1.1, Port class 2, PIN 2, 4, 5 galvanically connected, Supply voltage 18 V DC ... 32 V DC (limit values, operation in short-circuit protected network max. 8 A)	IOLP2ZZ-M3201 (SICK Memory Stick)	1064290	●	●	●	–	–	–	–

Connection modules

Figure	Brief description	Type	Part no.	PowerProx Distance (Shiny)	PowerProx Speed (Shiny)	PowerProx Precision (Shiny)	PowerProx Small	PowerProx Micro	WTT280L-2 Long Range	WLT280L-2 Long Range
	IO-Link V1.1 Class A port, USB2.0 port, optional external power supply 24V / 1A	IOLA2US-01101 (SiLink2 Master)	1061790	●	●	●	–	–	–	–

Fieldbus modules

Figure	Brief description	Type	Part no.	PowerProx Distance (Shiny)	PowerProx Speed (Shiny)	PowerProx Precision (Shiny)	PowerProx Small	PowerProx Micro	WTT280L-2 Long Range	WLT280L-2 Long Range
	EtherCAT IO-Link Master, IO-Link V1.1, power supply via 7/8'' cable 24 V / 8 A, fieldbus connection via M12 cable	IOLG2EC-03208R01 (IO-Link Master)	6053254	●	●	●	–	–	–	–

Figure	Brief description	Type	Part no.	PowerProx Distance (Shiny)	PowerProx Speed (Shiny)	PowerProx Precision (Shiny)	PowerProx Small	PowerProx Micro	WTT280L-2 Long Range	WLT280L-2 Long Range
	EtherNet/IP IO-Link Master, IO-Link V1.1, power supply via 7/8'' cable 24 V / 8 A, fieldbus connection via M12-cable	IOLG2EI-03208R01 (IO-Link Master)	6053255	●	●	●	–	–	–	–
	PROFINET IO-Link Master, IO-Link V1.1, Class A port, power supply via 7/8'' cable 24 V / 8 A, fieldbus connection via M12 cable	IOLG2PN-03208R01 (IO-Link Master)	6053253	●	●	●	–	–	–	–

Plug connectors and cables

Connecting cables with female connector M12, 5-pin, PVC, chemical resistant

- **Cable material:** PVC
- **Connector material:** TPU
- **Locking nut material:** CuZn, nickel-plated brass

Figure	Connection type head A	Connection type head B	Connecting cable	Type	Part no.	PowerProx Distance (Shiny)	PowerProx Speed (Shiny)	PowerProx Precision (Shiny)	PowerProx Small	PowerProx Micro	WTT280L-2 Long Range	WLT280L-2 Long Range
	Female connector, M12, 5-pin, straight, unshielded	Cable, Flying leads	2 m, 5-wire	DOL-1205-G02M	6008899	●	●	●	●	–	●	●
			5 m, 5-wire	DOL-1205-G05M	6009868	●	●	●	●	–	●	●
			10 m, 5-wire	DOL-1205-G10M	6010544	●	●	●	●	–	●	●
			15 m, 5-wire	DOL-1205-G15M	6029215	●	●	●	●	–	●	●
	Female connector, M12, 5-pin, angled, unshielded	Cable, Flying leads	2 m, 5-wire	DOL-1205-W02M	6008900	●	●	●	●	–	●	●
			5 m, 5-wire	DOL-1205-W05M	6009869	●	●	●	●	–	●	●

Connecting cables with female connector M8, 4-pin, PVC, chemical resistant

- **Cable material:** PVC
- **Locking nut material:** CuZn, nickel-plated brass

Figure	Connection type head A	Connection type head B	Connecting cable	Connector material	Type	Part no.	PowerProx Distance (Shiny)	PowerProx Speed (Shiny)	PowerProx Precision (Shiny)	PowerProx Small	PowerProx Micro	WTT280L-2 Long Range	WLT280L-2 Long Range
	Female connector, M8, 4-pin, straight, unshielded	Cable, Flying leads	2 m, 4-wire	TPU	DOL-0804-G02M	6009870	–	–	–	●	●	–	–
			5 m, 4-wire	TPU	DOL-0804-G05M	6009872	–	–	–	●	●	–	–
	Female connector, M8, 4-pin, angled, unshielded	Cable, Flying leads	2 m, 4-wire	PVC	DOL-0804-W02M	6009871	–	–	–	●	●	–	–
			5 m, 4-wire	PVC	DOL-0804-W05M	6009873	–	–	–	●	●	–	–

Connection cables with female connector and male connector M12, 5-pin, PUR, halogen-free, Oil / grease resistant, digital I/Os

- **Cable material:** PUR, halogen-free
- **Connector material:** TPU
- **Locking nut material:** zinc die-cast, nickel-plated

Figure	Connection type head A	Connection type head B	Connecting cable	Type	Part no.	PowerProx Distance (Shiny)	PowerProx Speed (Shiny)	PowerProx Precision (Shiny)	PowerProx Small	PowerProx Micro	WTT280L-2 Long Range	WLT280L-2 Long Range
	Female connector, M12, 5-pin, straight, A-coded, unshielded	Male connector, M12, 5-pin, straight, A-coded	2 m, 5-wire	DSL-1205-G02MC	6025931	●	●	●	●	–	●	●
			5 m, 5-wire	DSL-1205-G05MC	6029282	●	●	●	●	–	●	●

Connection cables with female connector and male connector M8, 4-pin, PUR, halogen-free, Oil / grease resistant

- **Cable material:** PUR, halogen-free
- **Connector material:** TPU
- **Locking nut material:** zinc die-cast, nickel-plated

Figure	Connection type head A	Connection type head B	Connecting cable	Type	Part no.	PowerProx Distance (Shiny)	PowerProx Speed (Shiny)	PowerProx Precision (Shiny)	PowerProx Small	PowerProx Micro	WTT280L-2 Long Range	WLT280L-2 Long Range
	Female connector, M8, 4-pin, straight, unshielded	Male connector, M8, 4-pin, straight	2 m, 4-wire	DSL-0804-G02MC	6036335	–	–	–	●	●	–	–
			5 m, 4-wire	DSL-0804-G05MC	6039090	–	–	–	●	●	–	–

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Female connectors (ready to assemble) M12, 5-pin

- **Locking nut material:** CuZn

Figure	Connection type head A	Connection type head B	Connector material	Description	Type	Part no.	PowerProx Distance (Shiny)	PowerProx Speed (Shiny)	PowerProx Precision (Shiny)	PowerProx Small	PowerProx Micro	WTT280L-2 Long Range	WLT280L-2 Long Range
	Female connector, M12, 5-pin, straight, unshielded	Screw-type terminals	PA	Head A: female connector, M12, 5-pin, straight, unshielded, for cable diameter 4 mm ... 6 mm Head B: -	DOS-1205-G	6009719	●	●	●	●	–	●	●
	Female connector, M12, 5-pin, angled, unshielded	-, screw-type terminals	PBT	–	DOS-1205-W	6009720	●	●	●	●	–	●	●

Female connectors (ready to assemble) M8, 4-pin

- **Locking nut material:** CuZn

Figure	Connection type head A	Connection type head B	Connector material	Type	Part no.	PowerProx Distance (Shiny)	PowerProx Speed (Shiny)	PowerProx Precision (Shiny)	PowerProx Small	PowerProx Micro	WTT280L-2 Long Range	WLT280L-2 Long Range
	Female connector, M8, 4-pin, straight, unshielded	-, screw-type terminals	PBT/PA	DOS-0804-G	6009974	–	–	–	●	●	–	–
	Female connector, M8, 4-pin, angled, unshielded	-, solder connection	PA/Zinc diecast	DOS-0804-W	6009975	–	–	–	●	●	–	–

Reflectors and optics

Reflectors

Fine triple reflectors

Figure	Material	Description	Dimensions	Type	Part no.	PowerProx Distance (Shiny)	PowerProx Speed (Shiny)	PowerProx Precision (Shiny)	PowerProx Small	PowerProx Micro	WTT280L-2 Long Range	WLT280L-2 Long Range
	PMMA/ABS	Fine triple reflector, 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 reflector, screw connection, suitable for laser sensors	56 mm x 28 mm	PL30F	5326523	–	–	–	–	–	–	●
			76 mm x 45 mm	PL81-1F	5325060	–	–	–	–	–	–	●
		Reflector with microprismatic reflex tape REF-AC1000, suitable for laser sensors, see alignment note	23 mm x 23 mm	PL9F	5333965	–	–	–	–	–	–	●

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Reflective tape

Figure	Description	Dimensions	Type	Part no.	PowerProx Distance (Shiny)	PowerProx Speed (Shiny)	PowerProx Precision (Shiny)	PowerProx Small	PowerProx Micro	WTT280L-2 Long Range	WLT280L-2 Long Range
	Suitable for laser sensors, self-adhesive, cut, see alignment note	56.3 mm x 56.3 mm	REF-AC1000-56	4063030	–	–	–	–	–	–	●

Reflectors and optics

Optics cloths

Figure	Description	Type	Part no.	PowerProx Distance (Shiny)	PowerProx Speed (Shiny)	PowerProx Precision (Shiny)	PowerProx Small	PowerProx Micro	WTT280L-2 Long Range	WLT280L-2 Long Range
	Cloth for cleaning the front screen	Lens cloth	4003353	●	●	●	●	●	●	●

Further accessories

Cleaning agent

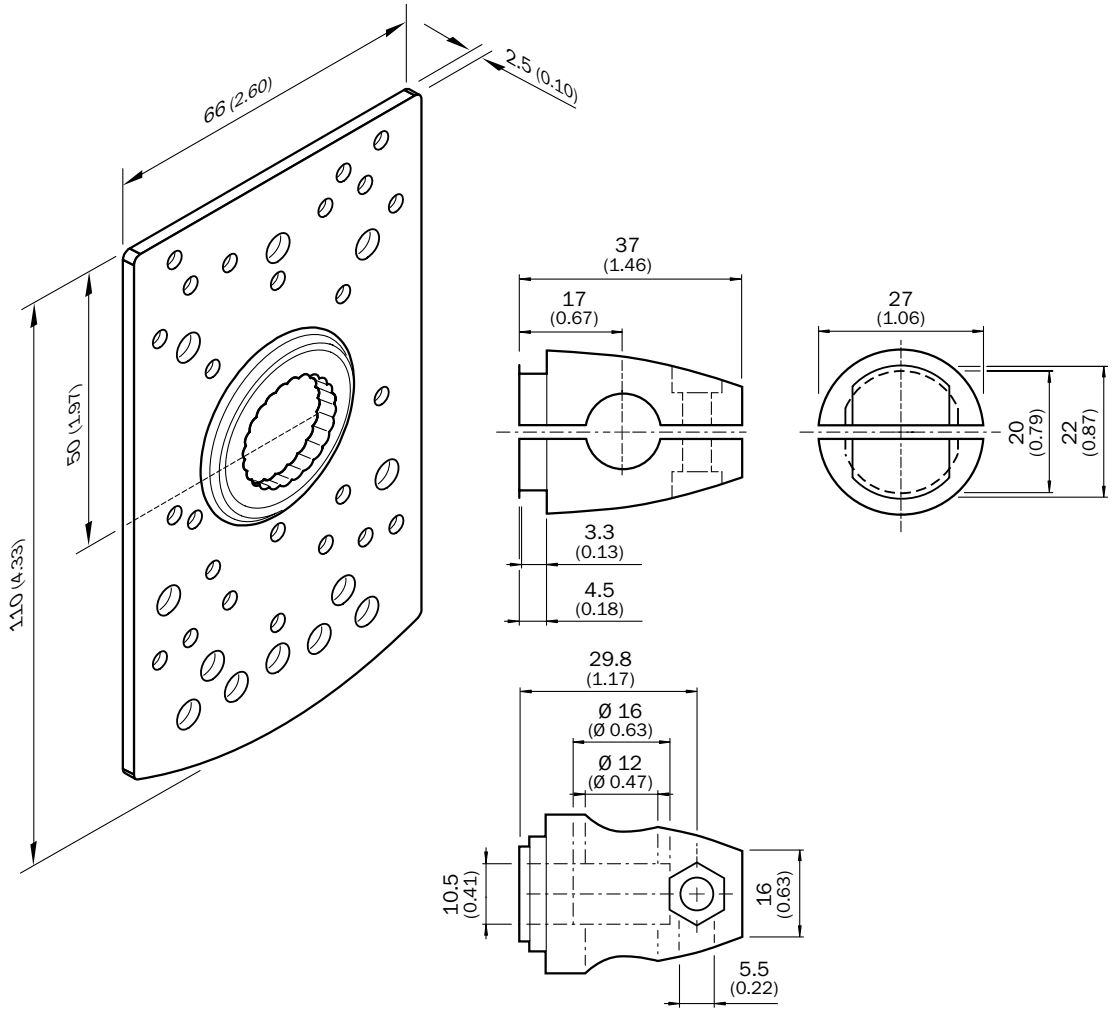
Figure	Description	Type	Part no.	PowerProx Distance (Shiny)	PowerProx Speed (Shiny)	PowerProx Precision (Shiny)	PowerProx Small	PowerProx Micro	WTT280L-2 Long Range	WLT280L-2 Long Range
	Plastic cleaner and care product, anti-static, 0.5 liter	Plastic cleaner	5600006	●	●	●	●	●	●	●

Alignment aids

Figure	Description	Type	Part no.	PowerProx Distance (Shiny)	PowerProx Speed (Shiny)	PowerProx Precision (Shiny)	PowerProx Small	PowerProx Micro	WTT280L-2 Long Range	WLT280L-2 Long Range
	IR radiation is converted into a visible orange glow within the active area	Infrared conversion screen WTT2SL	8020880	–	–	–	–	●	–	–

Dimensional drawings Mounting systems

BEF-KHS-N04
BEF-KHS-N04N



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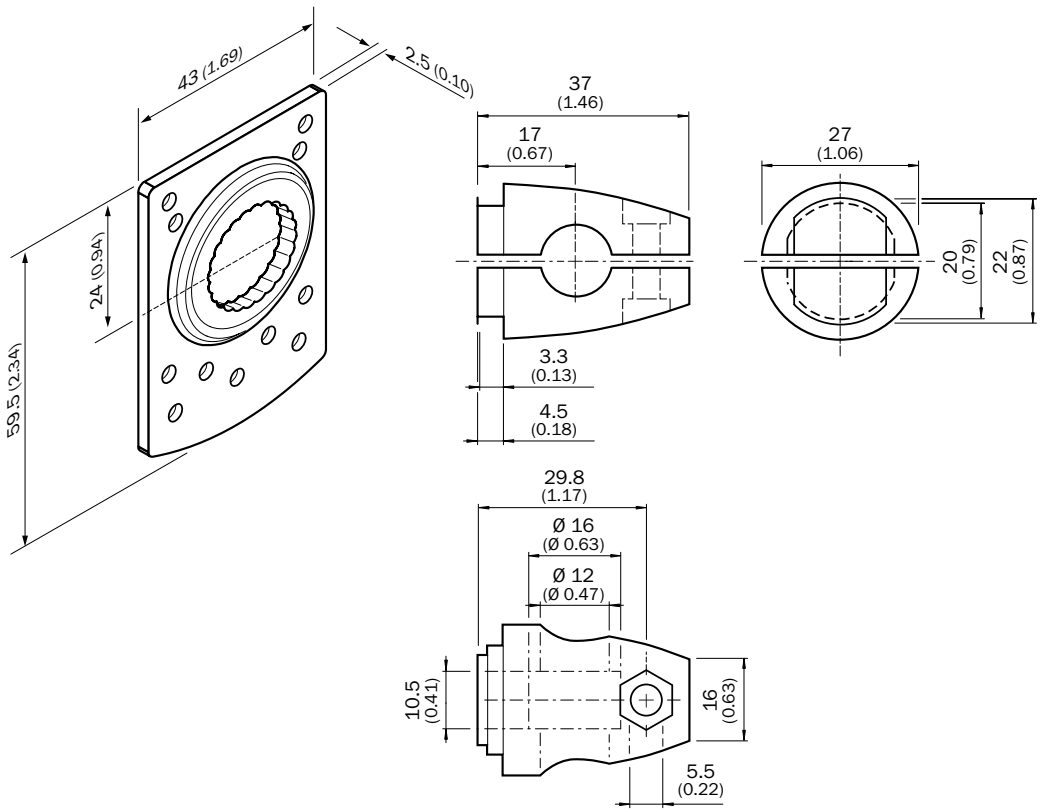
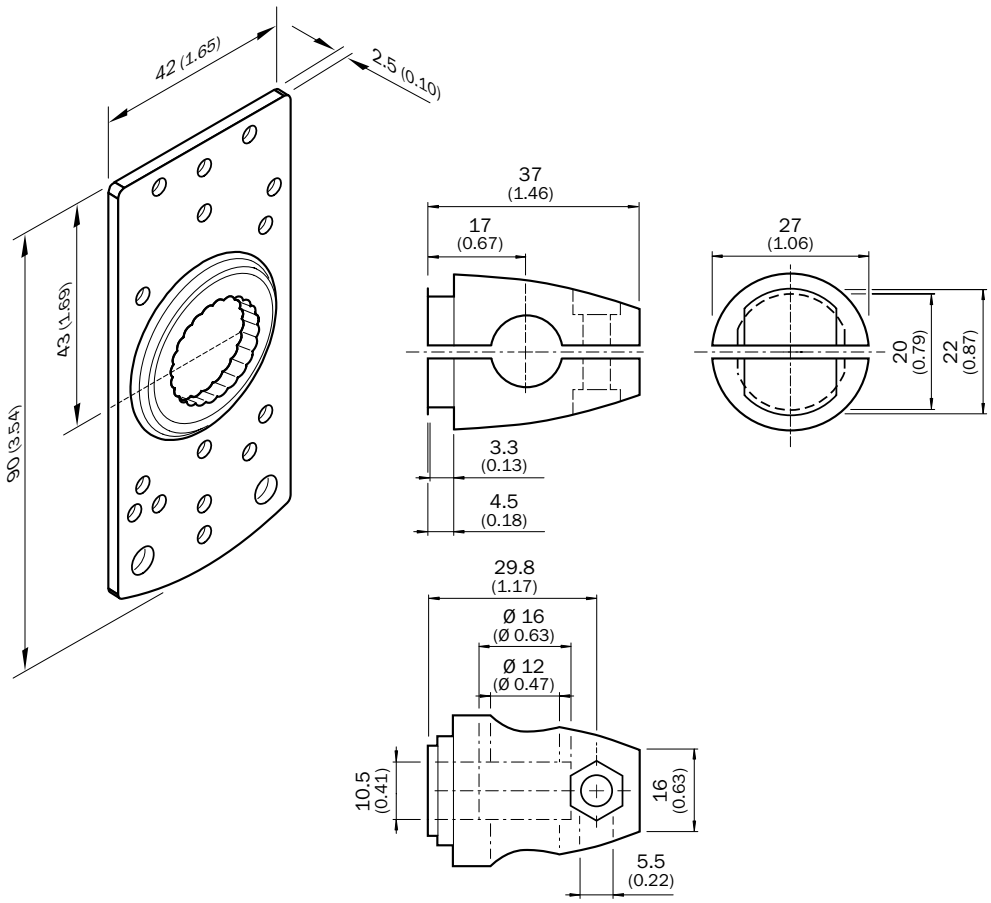
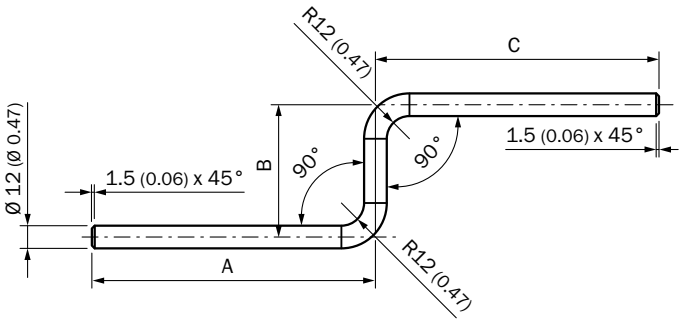
BEF-KHS-N02



BEF-KHS-N03

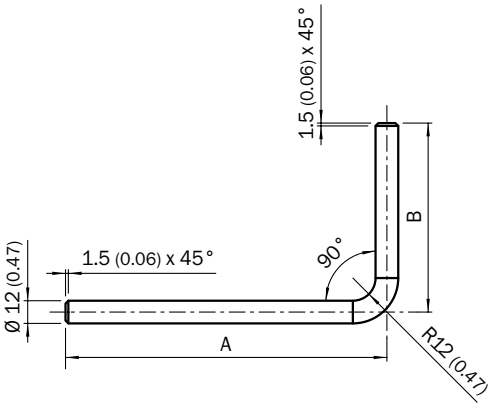


BEF-MS12Z-A
BEF-MS12Z-B



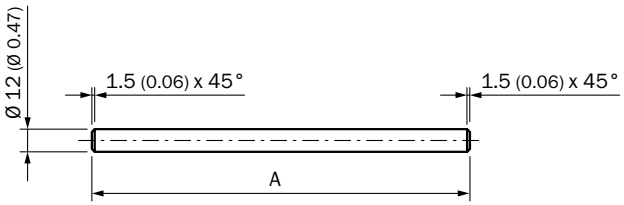
BEF-MS12Z-(N)A: A = 150 mm, B = 70 mm, C = 150 mm
BEF-MS12Z-(N)B: A = 150 mm, B = 70 mm, C = 250 mm

BEF-MS12L-A
BEF-MS12L-B



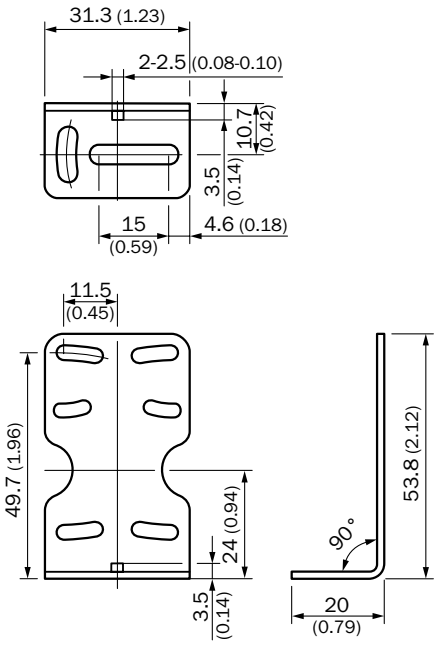
BEF-MS12L-(N)A: A = 200 mm, B = 150 mm
BEF-MS12L-(N)B: A = 250 mm, B = 250 mm

BEF-MS12G-A
BEF-MS12G-B

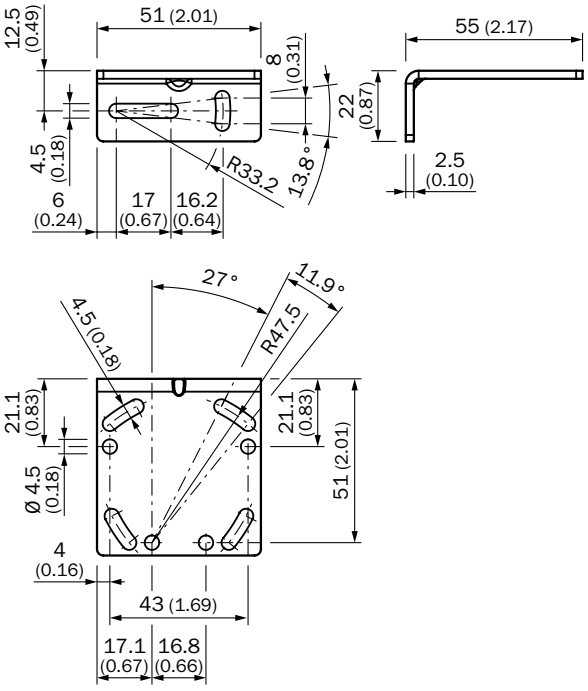


BEF-MS12G-(N)A: A = 200 mm
BEF-MS12G-(N)B: A = 300 mm

BEF-W190



BEF-WTT12L



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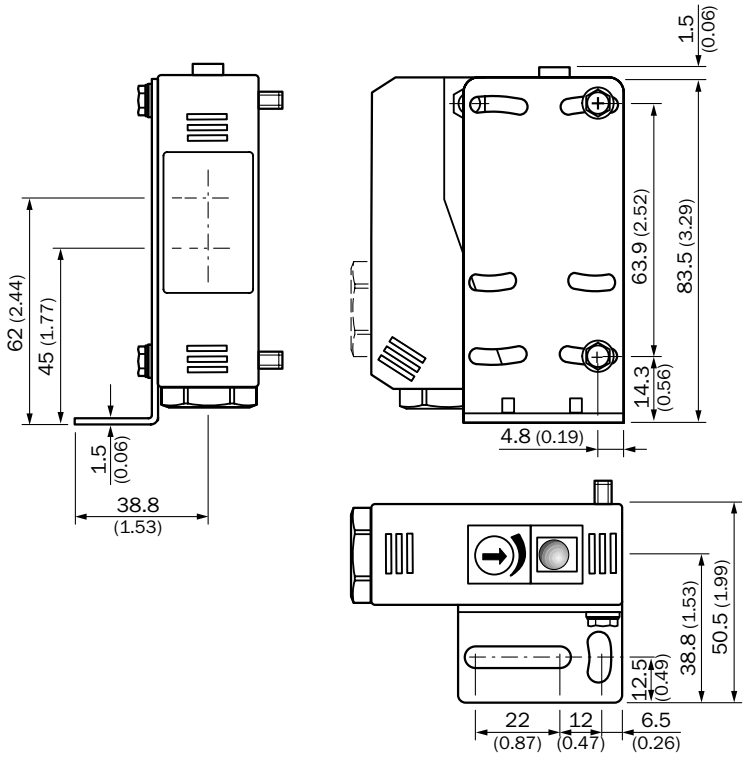
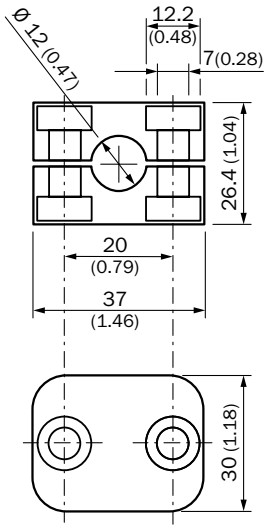
Subject to change without notice

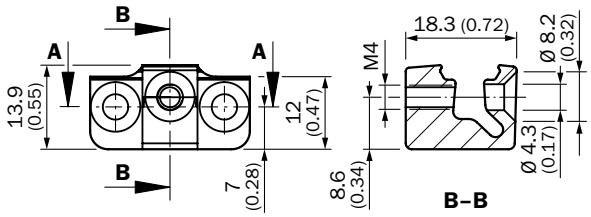
BEF-W280

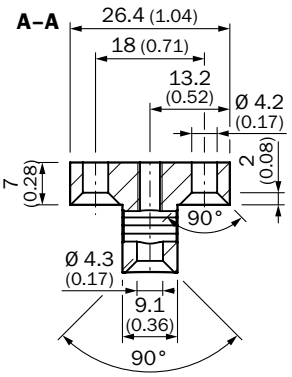


BEF-RMC-D12

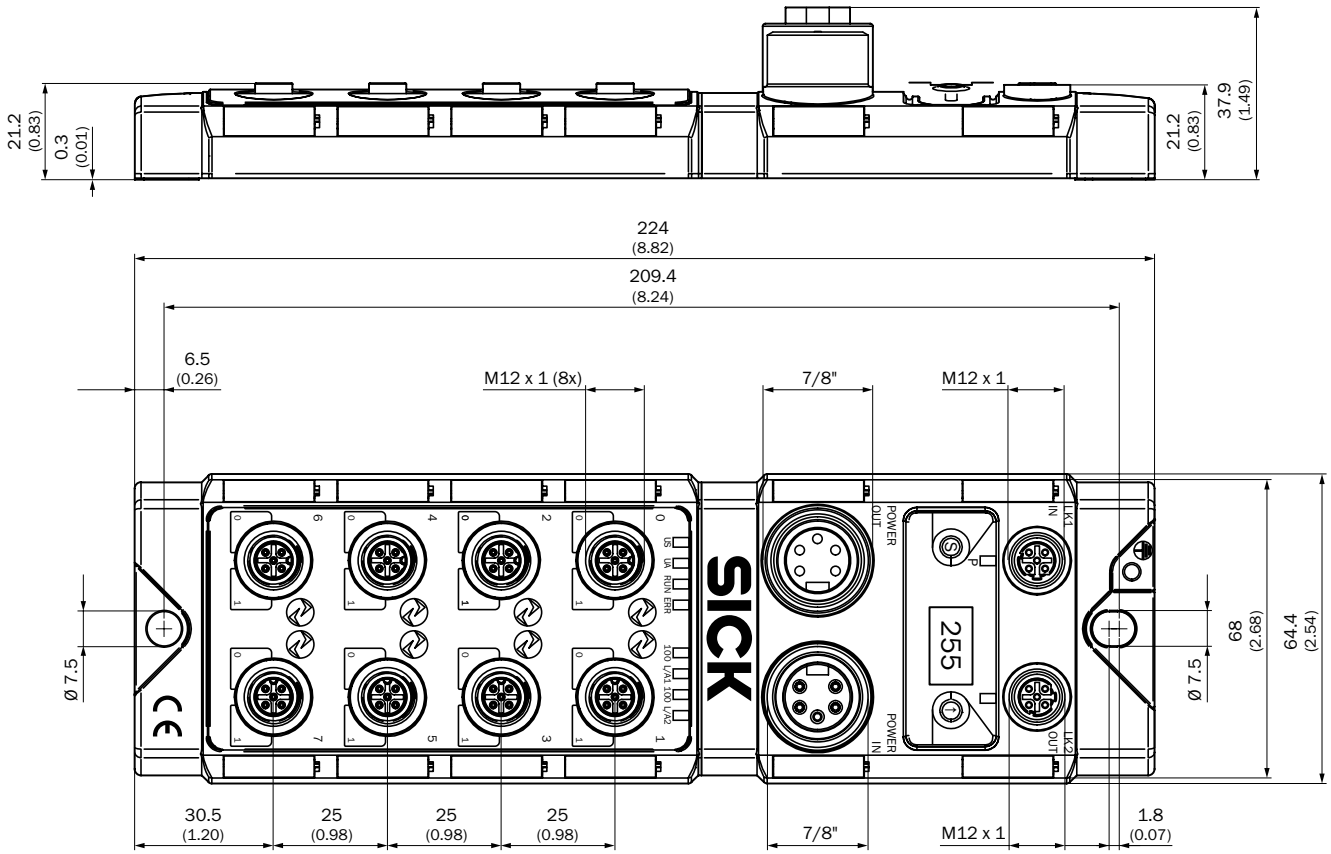


BEF-KH-WTT12L

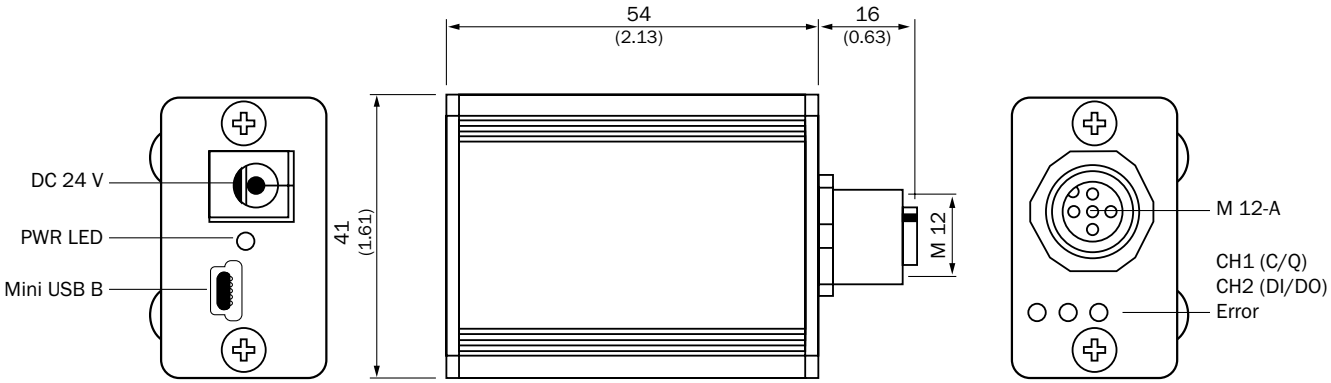




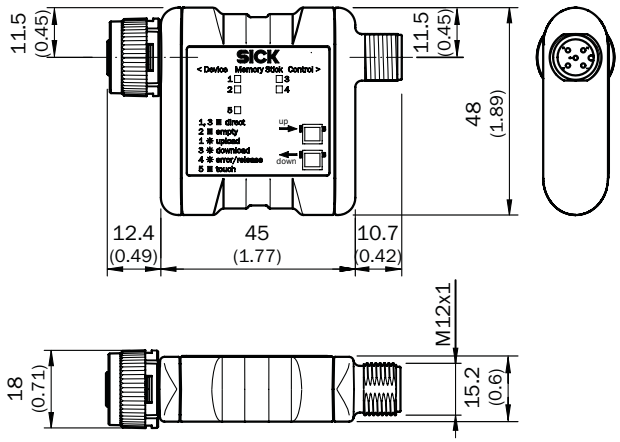
IOLG2EC-03208R01, IOLG2EI-03208R01, IOLG2PN-03208R01 (IO-Link Master)



IOLA2US-01101 (SiLink2 Master)

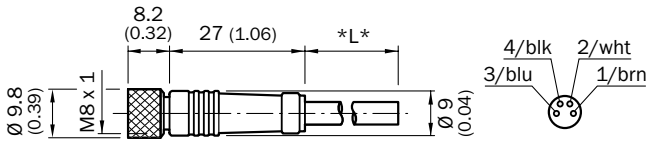


IOLP2ZZ-M3201 (SICK Memory Stick)

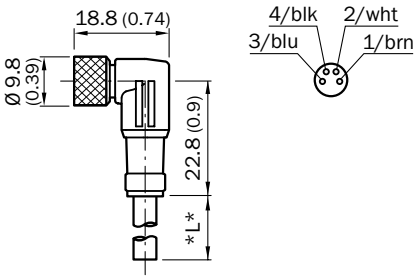


Dimensional drawings Connection systems

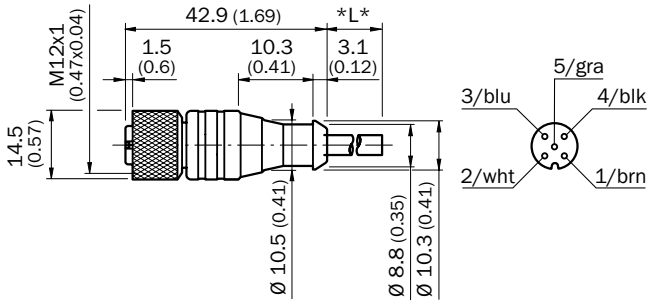
DOL-0804-G02M
DOL-0804-G05M



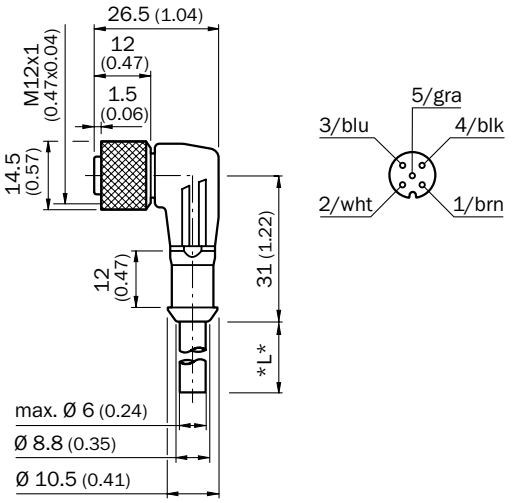
DOL-0804-W02M
DOL-0804-W05M



DOL-1205-G02M
DOL-1205-G05M
DOL-1205-G10M
DOL-1205-G15M



DOL-1205-W02M
DOL-1205-W05M



DSL-0804-G02MC
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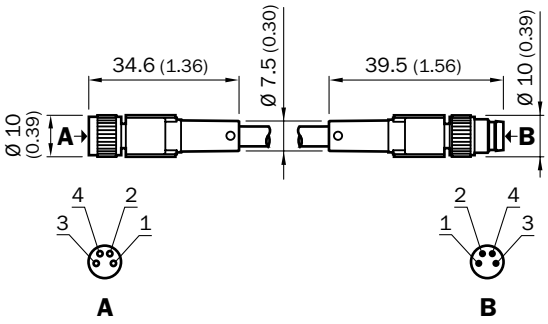
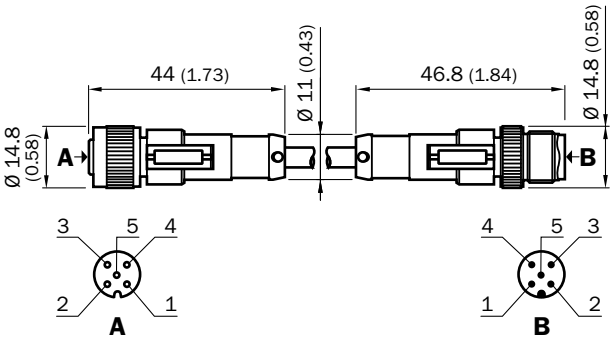
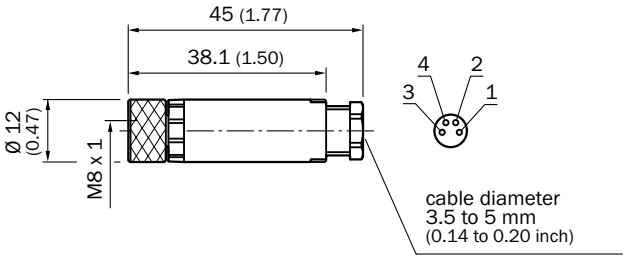


DSL-1205-G02MC
DSL-1205-G05MC

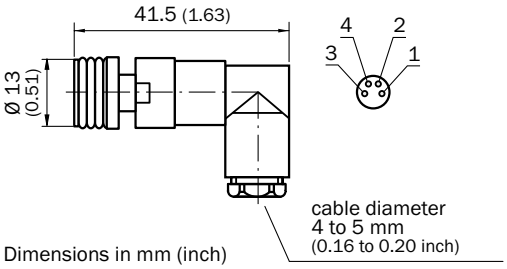


① brn
② wht
③ blu
④ blk
⑤ gra

DOS-0804-G

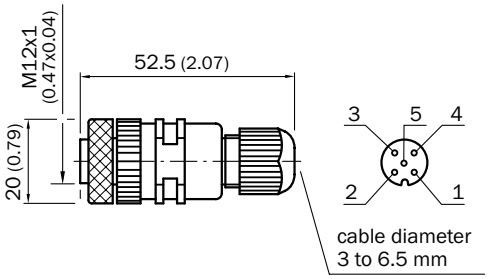


DOS-0804-W

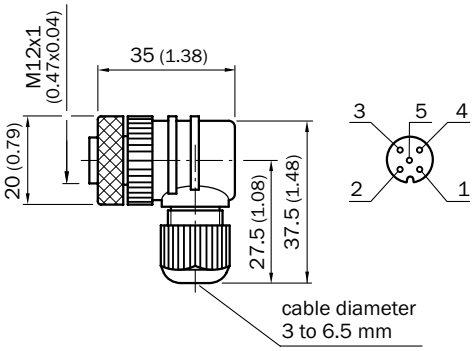


Dimensions in mm (inch)

DOS-1205-G

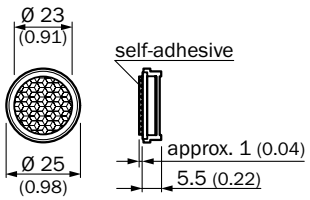


DOS-1205-W

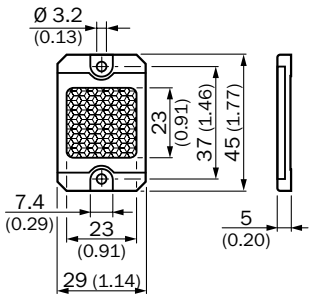


Dimensional drawings Reflectors and optics

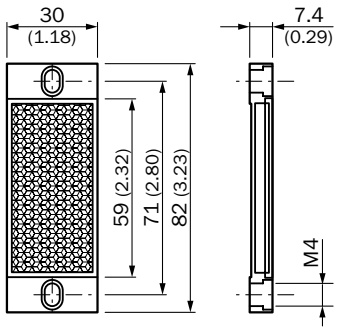
P25F-1



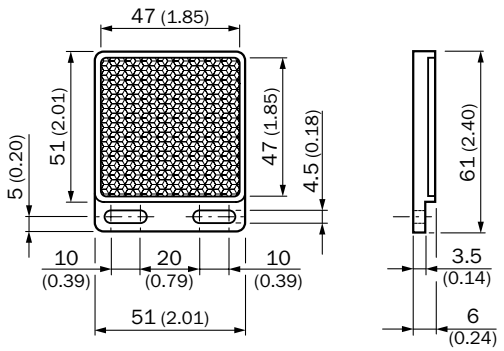
P41F



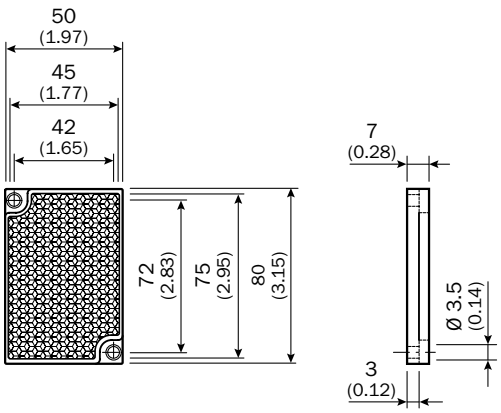
PL30F



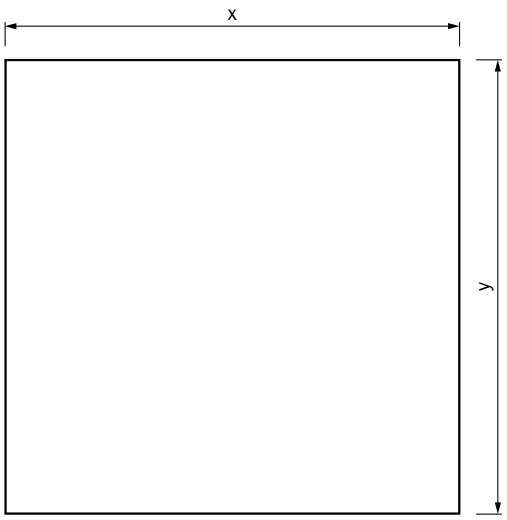
P250F



PL81-1F



REF-AC1000-56



x = 56,3 mm
y = 56,3 mm

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