REFLEX ARRAY

THE PHOTOELECTRIC SENSOR WITH THE 2D LIGHT ARRAY: MULTIFACETED AND ECONOMICAL
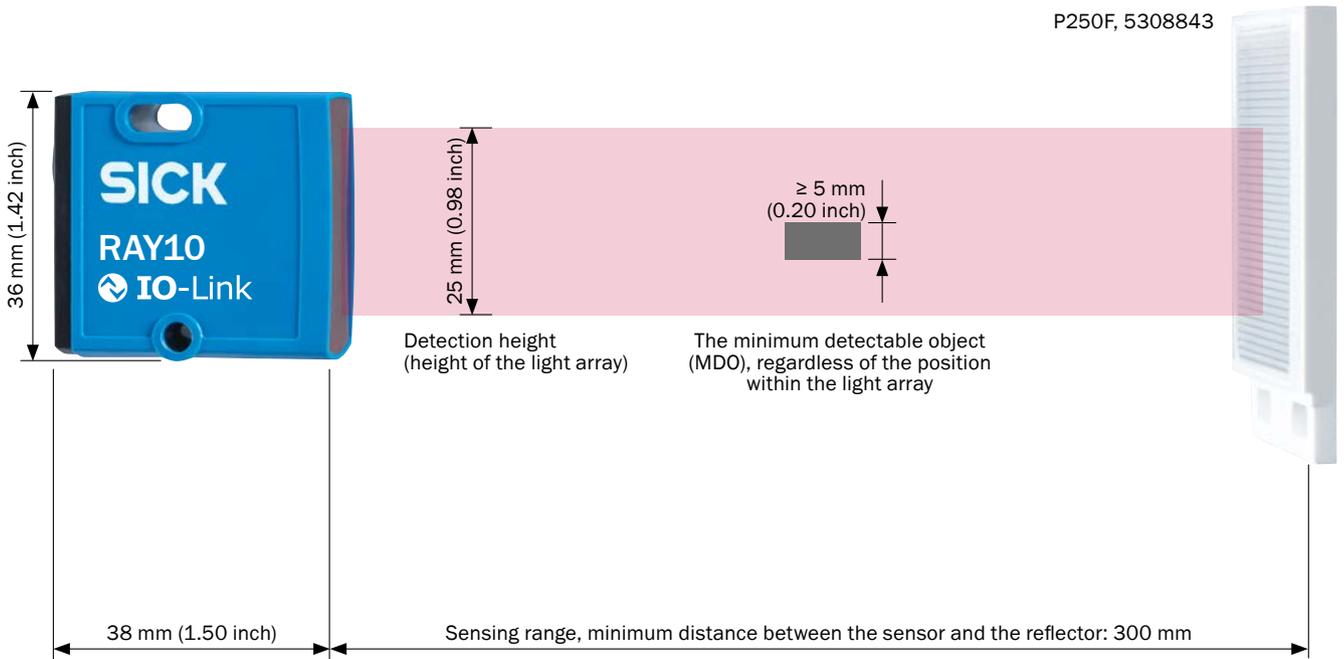
MultiTask photoelectric sensors

SICK
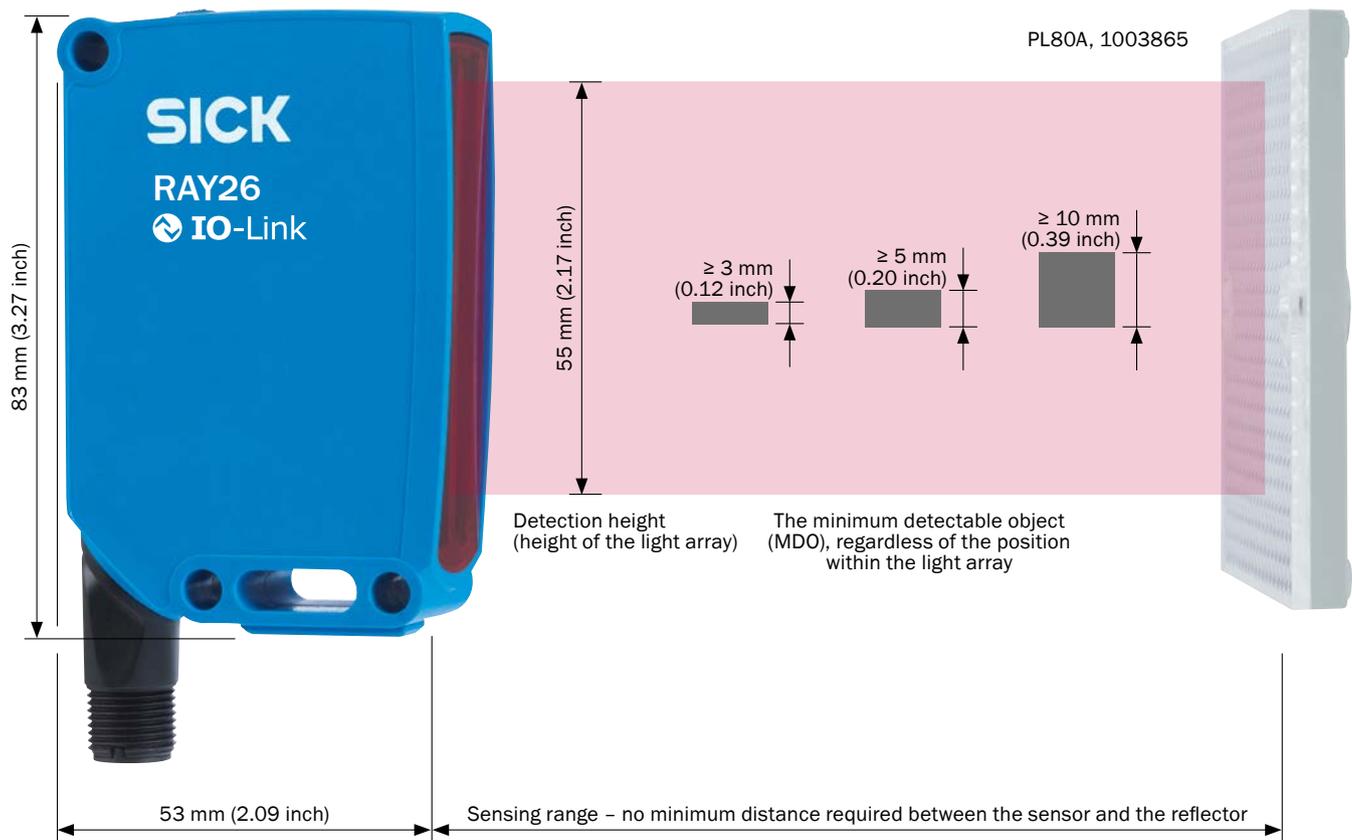Sensor Intelligence.

RELIABLE DETECTION, THANKS TO A 2D LIGHT ARRAY

OPTICAL EXPERT

P250F, 5308843

36 mm (1.42 inch)

25 mm (0.98 inch)

Detection height
(height of the light array)

≥ 5 mm
(0.20 inch)

The minimum detectable object
(MDO), regardless of the position
within the light array

38 mm (1.50 inch)

Sensing range, minimum distance between the sensor and the reflector: 300 mm

Type overview

Figure	MDO	Sensing range	Connection	Smart sensor	Switching output
RAY10 IO-Link	5 mm (0.20 inch)	1.5 m (59 inch)/P250F	• Cable, 4-wire • Cable with M8 male connector, 4-pin • Cable with M12 male connector, 4-pin	• Yes, IO-Link • No	Push-pull (PNP/NPN)
RAY26 IO-Link	3 mm (0.12 inch)	2 m (78.74 inch)/PL80A	• 12 male connector, 4-pin • Cable with M12 male connector, 4-pin • Cable, 4-pin	• Yes, IO-Link	Push-pull (PNP/NPN)
	5 mm (0.20 inch)	3 m (118 inch)/PL80A			
	10 mm (0.39 inch)	4.5 m (177 inch)/PL80A			

PL80A, 1003865

83 mm (3.27 inch)

55 mm (2.17 inch)

≥ 3 mm (0.12 inch)

≥ 5 mm (0.20 inch)

≥ 10 mm (0.39 inch)

Detection height (height of the light array)

The minimum detectable object (MDO), regardless of the position within the light array

53 mm (2.09 inch)

Sensing range – no minimum distance required between the sensor and the reflector

RAY10 and RAY26: Your benefits

- Reduces the overall costs for detection by up to 50% compared to other solutions
- PinPoint LED enables great visibility of the light array and easy and fast optical alignment of the photoelectric sensor
- Continuous threshold adaptation (AutoAdapt) reduces downtimes
- Smart sensors, including IO-Link as part of the Reflex Array, accelerate machine sequences, make them more efficient and transparent, and offer predictive maintenance. This makes these products pioneers for Industry 4.0 applications.

CLEVER COMMISSIONING WITH IO-LINK

BLUE PILOT

Easy and fast alignment thanks to PinPoint LED

Thanks to PinPoint LED, the light array of the Reflex Array MultiTask photoelectric sensor is highly visible. After aligning the photoelectric sensor, all that is required is to teach in the sensor, and then it is ready for detection.


RAY10

RAY26

Predictive maintenance

During operation, blue LEDs indicate the degree of contamination of the sensor and reflector. IO-Link enables corresponding data transfer to the PLC. This ensures that maintenance or cleaning of the device is scheduled in a timely manner. This prevents unwanted downtimes.

BluePilot: The shorter the distance of the blue LEDs from each other, the higher the degree of contamination is (e.g., RAY10)

Conveyor belt blanking (only for RAY26P-xxxxx3)

Conveyor belt blanking enables gradual deactivation of the detection zone (A) right above the conveyor belt. This suppresses the interference of the conveyor belt that causes the sensor to switch during system operation. Conveyor belt blanking is configured via IO-Link.

Conveyor belt

A
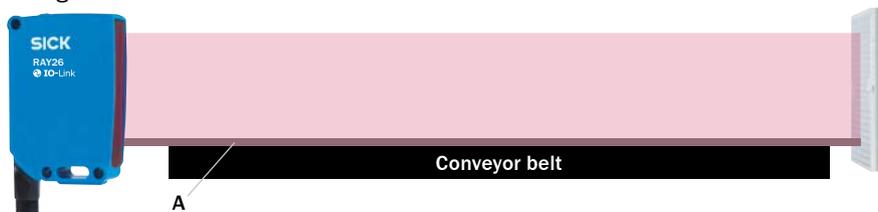
RELIABLE DETECTION OF …

… unevenly formed and shiny objects
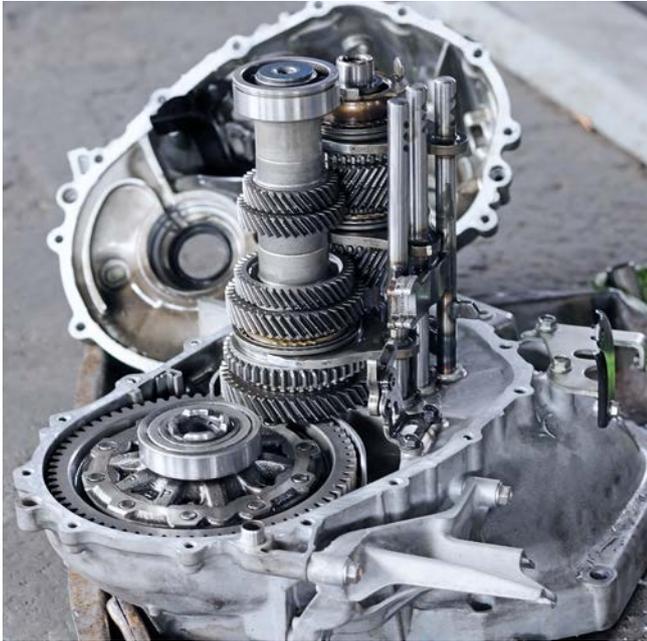
… objects that have different heights

… flat objects, such as polybags
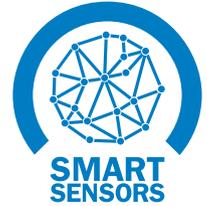

… perforated objects
… transparent objects, such as glass bottles

SMART SENSORS FOR EFFICIENT MACHINE COMMUNICATION

Networked production and control processes in complex machine environments determine the industrial future and make Industry 4.0 possible in the first place. Smart Sensors already support dynamic, real-time-optimized, and self-organized industry processes. They record real operational statuses, turn these into digital data, and share them automatically with the process controller.
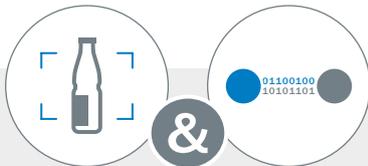
Enhanced Sensing and Efficient Communication
The best sensor performance, flexibility, and transparency

The highest possible level of stability during object detection and recording of measured values is the basis for every Smart Sensor. Benefit from our experience spanning over 70 years in the development and application of groundbreaking sensor technology. With superordinate control systems, our Smart Sensors communicate via IO-Link: This stable communication channel which is used across the globe for sensors and actuators at field level offers many practical advantages in day-to-day industrial operation.

Find out more: www.sick.com/smart-sensors

Diagnostics
Highest availability levels thanks to predictive maintenance

With the diagnostics functions, you always know the condition of your process and every single sensor. They comprise automated sensor self-monitoring or process parameter monitoring for preventative device and system maintenance. Smart Sensors will even send a notification independently if safe operation is at risk. Thanks to predictive maintenance, flexible, needs-based maintenance schedules can be created, helping reduce service costs. If problems should arise, however, the cause can be easily determined thanks to comprehensive visualization options, avoiding system downtimes.

Find out more: www.sick.com/smart-sensors

Smart Tasks
From raw signals to customized information

In these times of "big data", it is important not to lose sight of the big picture. For that reason, Smart Tasks processes the diverse Smart Sensor signals for detection and measurement, linking them to signals from an external sensor if necessary. Only the process information that is actually necessary is generated. Coordinated with the corresponding task in the system. This saves time during data evaluation in the control, accelerates machine processes, and makes high-performance, cost-intensive additional hardware unnecessary.
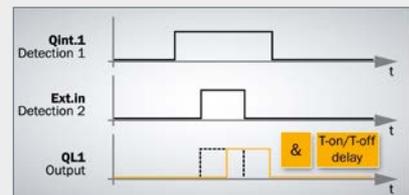
Find out more: www.sick.com/smart-sensors

SMART TASKS

Basic logic:

- Logic functions can be freely configured with a trigger sensor
- Delays for switching signals can be freely configured
- Signal inversion


Time measurement and debouncing:

- Time measurement between the detection edges
- Switching signals are output when freely configured timing values are reached, e.g., if objects that are too short or too long have been detected
- Delays for switching signals can be freely configured
- Signal inversion
- Available on request

Counter and debouncing:

- Counting and evaluation of detection signals
- Switching signals are output when freely configured counter values are reached
- Switching signal generated every x counter pulses
- Manual and automated counter reset
- Delays for switching signals can be freely configured
- Signal inversion
- Available on request
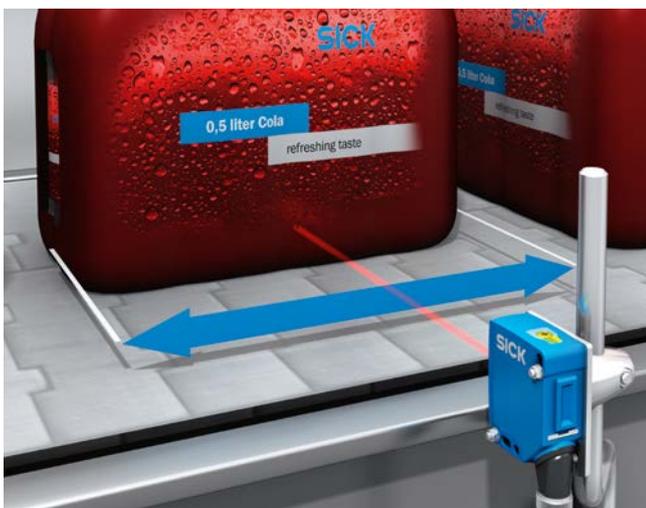
THE PHOTOELECTRIC SENSOR WITH THE LIGHT ARRAY: VERSATILE AND COST-EFFECTIVE
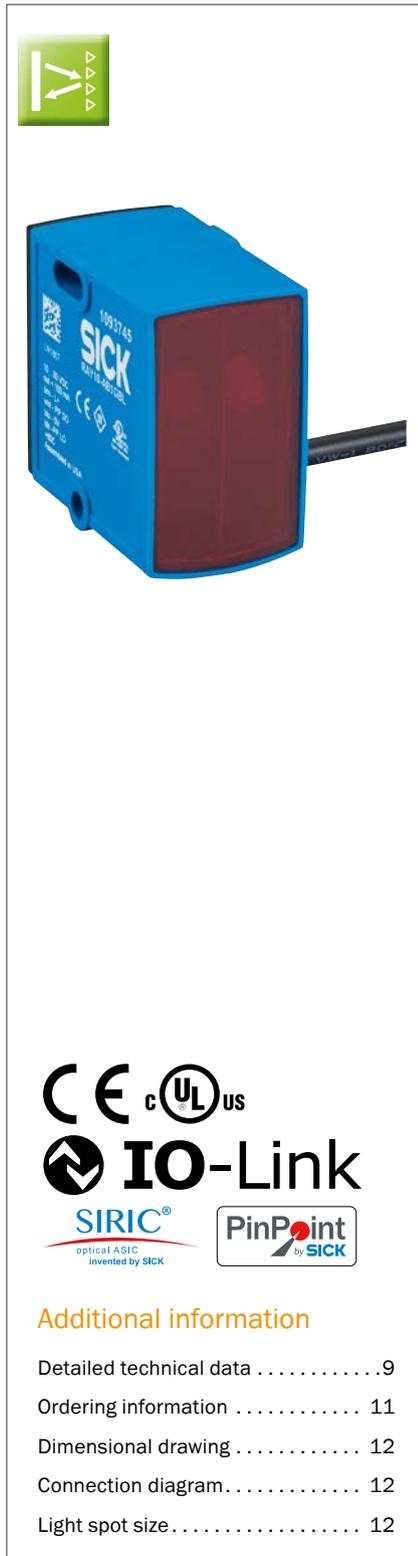
Product description

The Reflex Array in combination with a reflector detects the leading edge of small, flat, transparent, or uneven objects within its light band, regardless of position. Perforated objects are reliably detected without multiple signals. This considerably reduces allover costs and speeds up commissioning. The Reflex Array therefore offers major cost benefits over conventional solutions, which use several individual photoelectric sensors or a small light grid. The RAY10 is the ideal choice for applications such as the detection of polybags. As an extra advantage, this exceptional performance is packed into an extremely compact housing which can be mounted directly on the conveyor and aligned in no time.

At a glance

- Small housing for easy integration into a conveyor
- Detects objects ≥5 mm within a 25 mm light array
- Sensing range for detection up to max. 1.5 m depending

- Predictive maintenance is given with an optical feedback on the devices and via IO-Link depending on type
- Smart Sensor: Enhanced Sensing, IO-Link, Diagnose, Smart Tasks depending on type

Your benefits

- Reduces the allover costs of detection required by up to 50% compared to other solutions
- Detects objects ≥5 mm within a 25 mm light array of 25 mm regardless of position
- Increases productivity due to reliable detection independent of the objects, characterized by shiny, irregular, high-contrast, different colors

- Increases productivity due to reliable detection without any interruption of objects with perforated structure or inhomogeneity
- Enables simple an quick commissioning thanks PinPoint LED and optical alignment aid
- Predictive maintenance due to Auto-Adapt, optical feedback and alarm output

Additional information

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.

Detailed technical data

Features

Sensor principle	Photoelectric retro-reflective sensor
Detection principle	Dual lens
Dimensions (W x H x D)	21.5 mm x 36 mm x 37.7 mm
Housing design (light emission)	Rectangular
Minimum object size	5 mm, position-independent detection within the light array
Detection height	25 mm
Sensing range max. [1]	0 m ... 1.5 m
Distance of the sensor to reflector [1]	0.3 m ... 1.5 m
Type of light	Visible red light
Light source [2]	PinPoint LED
Light spot size (distance)	37 mm x 12 mm (1 m)
Wave length	635 nm
Adjustment	Potentiometer IO-Link (depending on type)
Pin 2 configuration	External Input (test), Teach-in, switching signal
AutoAdapt	✔
Special applications	Detecting transparent objects, Detecting perforated objects, Detecting uneven, shiny objects, Detecting objects with position tolerances

[1] Reflector P250F.
[2] Average service life: 100,000 h at T_U = +25 °C.

Mechanics/electronics

Supply voltage [1]	10 V DC ... 30 V DC
Ripple	≤ 5 V_{pp}
Power consumption [2]	30 mA
Switching output	PUSH/PULL, PNP, NPN
	Switching output or IO-Link mode
Output function	Factory setting: Pin 2 (MF): NPN normally closed (light switching), PNP normally open (dark switching), Pin 4 (QL1/C): NPN normally open (dark switching), PNP normally closed (light switching), IO-Link
Switching mode	Light/dark switching
Switching mode selector	Via IO-Link
Signal voltage PNP HIGH/LOW	Approx. V_S – 2.5 V / 0 V
Signal voltage NPN HIGH/LOW	Approx. VS / < 2.5 V
Output current $I_{max.}$	≤ 100 mA
Response time [3]	≤ 0.5 ms
Switching frequency [4]	± 1,000 Hz
Connection type	Cable, 2 m [5] Cable with male connector, M12, 300 mm [5] Cable with male connector, M12, 1 m [5] Cable with male connector, M8, 300 mm [5] Cable with male connector, M8, 1 m [5] (depending on type)
Circuit protection	A [6], B [7], C [8], D [9]
Protection class	III
Weight	130 g
Housing material	Plastic, ABS

Optics material	Plastic, PMMA
Enclosure rating	IP67
Ambient operating temperature [10]	–40 °C ... +60 °C
Ambient storage temperature	–40 °C ... +70 °C

[1] Limit values.

[2] Without load.

[3] Signal transit time with resistive load in switching mode. Different values possible in COM2 mode.

[4] With light/dark ratio 1:1 in switching mode. Different values possible in IO-Link mode.

[5] Do not bend below 0 °C.

[6] A = V_s connections reverse-polarity protected.

[7] B = inputs and output reverse-polarity protected.

[8] C = interference suppression.

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

[10] Avoid condensation on the front screen of the sensor and on the reflector.

Smart Task

Smart Task name	Base logics
Logic function	Direct AND OR Window Hysteresis
Timer function	Deactivated On delay Off delay ON and OFF delay Impulse (one shot)
Inverter	Yes
Switching frequency	SIO Direct: 500 Hz [1] SIO Logic: 500 Hz [2] IOL: 217 Hz [3]
Response time	SIO Direct: 1 ms [1] SIO Logic: 1 ms [2] IOL: 2,3 ms [3]
Repeat accuracy	SIO Direct: 1 ms [1] SIO Logic: 1 ms [2] IOL: 2,3 ms [3]
Switching signal Q_{L1}	Switching output
Switching signal Q_{L2}	Switching output

[1] SIO Direct: sensor operation in standard I/O mode without IO-Link communication and without using internal sensor logic or time parameters (set to "direct"/"deactivated").

[2] SIO Logic: Sensor operation in standard I/O mode without IO-Link communication. Sensor-internal logic or timing parameters plus Automation Functions used.

[3] IOL: Sensor operation with full IO-Link communication and usage of logic, timing and Automation Function parameters.

Communication interface

|	
Communication interface	IO-Link V1.1
Mode	COM2 (38,4 kBaud)
Cycle time	2.3 ms
Process data length	16 Bit
Process data structure	Bit 0 = switching signal Q_{L1} Bit 1 = switching signal Q_{L2} Bit 2 ... 15 = empty
VendorID	26

Ordering information

- **Detection height:** 25 mm
- **Detection principle:** Dual lens
- **Switching output:** PUSH/PULL, PNP, NPN
- **Switching mode:** Light/dark switching
- **Minimum object size:** ≥ 5 mm

| Sensing range max. [1]	Adjustment	Communication interface	Connection	DeviceID	Connection diagram	Type	Part no.
0 m ... 1.5 m	Potentiometer	-	Cable with M12 male connector, 4-pin 300 mm PVC	–	cd-083	RAY10-AB4CBL	1091724
			Cable with M12 male connector, 4-pin 1 m PVC	–	cd-083	RAY10-AB4EBL	1093749
			Cable with flying leads, 4-wire 2 m PVC	–	cd-094	RAY10-AB1GBL	1093745
			Cable with male connector M8, 4-pin, snap 300 mm PVC	–	cd-083	RAY10-AB5CBL	1093747
			Cable with male connector M8, 4-pin, snap 1 m PVC	–	cd-083	RAY10-AB5EBL	1093746
	Potentiometer IO-Link	IO-Link	Cable with M12 male connector, 4-pin 300 mm PVC	8389085, 0x8001DD	cd-390	RAY10-AB4CBLA00	1096100
			Cable with M12 male connector, 4-pin 1 m PVC	8389085, 0x8001DD	cd-390	RAY10-AB4EBLA00	1096103
			Cable, 4-wire 2 m PVC	8389085, 0x8001DD	cd-389	RAY10-AB1GBLA00	1095884
			Cable with male connector M8, 4-pin, snap 300 mm PVC	8389085, 0x8001DD	cd-390	RAY10-AB5CBLA00	1096102
			Cable with male connector M8, 4-pin, snap 1 m PVC	8389085, 0x8001DD	cd-390	RAY10-AB5EBLA00	1096101

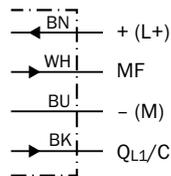[1] Reflector P250F.

Dimensional drawing (Dimensions in mm (inch))
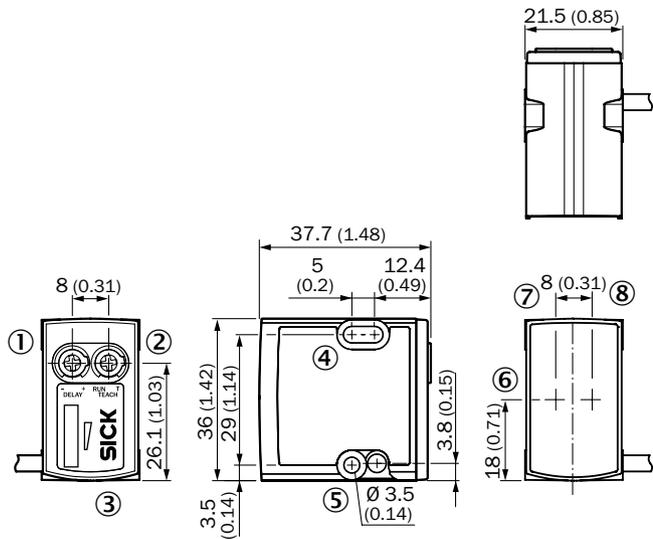
① Potentiometer / LED indicator green
② Potentiometer / LED indicator orange
③ BluePilot blue: signal strength light bar during teach process / AutoAdapt indicator during run
④ Mounting hole M3 (Ø 3.1 mm)
⑤ Mounting hole M3 (Ø 3.1 mm)
⑥ Optical axis
⑦ Optical axis
⑧ Optical axis

Connection diagram

Cd-094
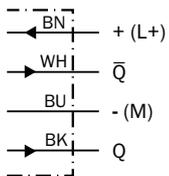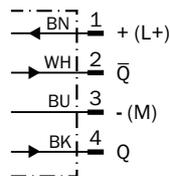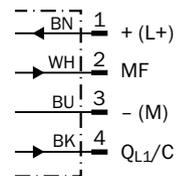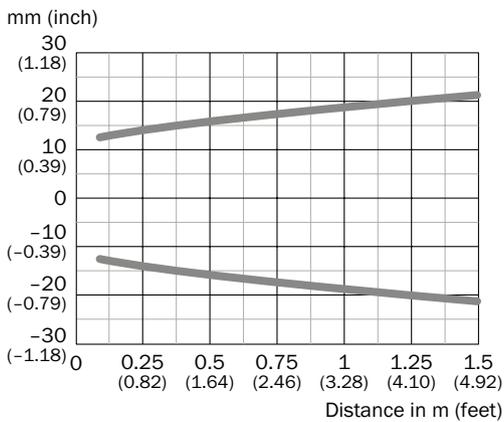

Cd-389

Cd-083

Cd-390

Light spot size

THE PHOTOELECTRIC SENSOR WITH THE LIGHT ARRAY: MULTIFACETED AND ECONOMICAL

Product description

The Reflex Array in combination with a reflector detects the leading edge of small, flat, transparent, or uneven objects within its light band, regardless of position. Perforated objects are reliably detected without multiple signals. This considerably reduces allover costs and speeds up commissioning. The Reflex Array therefore offers major cost benefits over conventional solutions, which use several individual photoelectric sensors or a small light grid.

At a glance

- RAY26 offers three different variants to detect objects ≥ 3 mm, ≥ 5 mm or ≥ 10 mm always within a 55 mm light array
- Sensing range for detection from 0 m to max. 4.5 m depending on the type
- Predictive maintenance is given with an optical feedback on the devices and via IO-Link
- RAY26 has additionally a stepwise suppression for vertical fluctuation of the conveyor belt depending on the type
- Smart Sensor: Enhanced Sensing, IO-Link, Diagnose, Smart Tasks

Your benefits

- Reduces the allover costs of detection required by up to 50% compared to other solutions
- Detects objects ≥ 3 mm, ≥ 5 mm or ≥ 10 mm within a light array of 55 mm, regardless of position
- Increases productivity due to reliable detection independent of the objects, characterized by shiny, irregular, high-contrast, different colors
- Increases productivity due to reliable detection without any interruption of objects with perforated structure or inhomogeneity
- Enables simple an quick commissioning thanks PinPoint LED
- Predictive maintenance due to Auto-Adapt, optical feedback and alarm output

Additional information

➜ www.sick.com/RAY26

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.

Detailed technical data

Features

Sensor principle	Photoelectric retro-reflective sensor
Detection principle	Autocollimation
Dimensions (W x H x D)	24.6 mm x 82.5 mm x 53.3 mm
Housing design (light emission)	Rectangular
Minimum object size	3 mm, position-independent detection within the light array 5 mm, position-independent detection within the light array 10 mm, position-independent detection within the light array (depending on type)
Detection height	55 mm
Sensing range max.	0 m ... 2 m [1] [2] 0 m ... 3 m [1] [3] 0 m ... 4.5 m [1] [4] (depending on type)
Distance of the sensor to reflector	≥ 0 m
Type of light	Visible red light
Light source [5]	PinPoint LED
Light spot size (distance)	55 mm x 9 mm (1 m)
Wave length	635 nm
Adjustment	BluePilot: Teach-in IO-Link
Pin 2 configuration	External Input (test), Teach-in, switching signal
AutoAdapt	✔
Special applications	Detecting objects with position tolerances, Detecting perforated objects, Detecting uneven, shiny objects, Detecting transparent objects

[1] Reflector PL80A.
[2] At minimum object size 3 mm.
[3] At minimum object size 5 mm.
[4] At minimum object size 10 mm.
[5] Average service life: 100,000 h at T_U = +25 °C.

Mechanics/electronics

Supply voltage [1]	10 V DC ... 30 V DC
Ripple	≤ 5 V_{pp}
Power consumption	25 mA [2] 40 mA [3]
Switching output	PUSH/PULL, PNP, NPN
	Switching output or IO-Link mode
Output function	Factory setting: Pin 2 (MF): NPN normally closed (light switching), PNP normally open (dark switching), Pin 4 (QL1/C): NPN normally open (dark switching), PNP normally closed (light switching), IO-Link
Switching mode	Light/dark switching
Switching mode selector	Via IO-Link
Signal voltage PNP HIGH/LOW	Approx. V_S – 2.5 V / 0 V
Signal voltage NPN HIGH/LOW	Approx. VS / < 2.5 V
Output current I$_{max.}$	≤ 100 mA
Response time [4]	≤ 3 ms
Switching frequency [5]	170 Hz

Connection type	Cable with male connector, M12, 270 mm [6] Cable, 2 m [6] Male connector, M12 (depending on type)
Circuit protection	A [7], B [8], C [9], D [10]
Protection class	III
Weight	
Cable with M12 male connector, 4-pin	100 g
Cable, 4-wire	130 g
Male connector M12, 4-pin	80 g
Housing material	Plastic, VISTAL®
Optics material	Plastic, PMMA
Enclosure rating	IP66, IP67
Ambient operating temperature [11] [12]	–40 °C ... +60 °C
Ambient storage temperature	–40 °C ... +75 °C

[1] Limit values.

[2] 16 V DC ... 30 V DC, without load.

[3] 10 V DC ... 16 V DC, without load.

[4] Signal transit time with resistive load in switching mode. Different values possible in COM2 mode.

[5] With light/dark ratio 1:1 in switching mode. Different values possible in IO-Link mode.

[6] Do not bend below 0 °C.

[7] A = V_S connections reverse-polarity protected.

[8] B = inputs and output reverse-polarity protected.

[9] C = interference suppression.

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

[11] Avoid condensation on the front screen of the sensor and on the reflector.

[12] allowed temperature change after Teach +/- 20 K.

Smart Task

Smart Task name	Base logics
Logic function	Direct AND OR Window Hysteresis
Timer function	Deactivated On delay Off delay ON and OFF delay Impulse (one shot)
Inverter	Yes
Switching frequency	SIO Direct: 170 Hz [1] SIO Logic: 170 Hz [2] IOL: 170 Hz [3]
Response time	SIO Direct: 3 ms [1] SIO Logic: 3 ms [2] IOL: 3 ms [3]
Repeat accuracy	SIO Direct: 1,5 ms [1] SIO Logic: 1,5 ms [2] IOL: 1,5 ms [3]
Switching signal Q_{L1}	Switching output
Switching signal Q_{L2}	Switching output

[1] SIO Direct: sensor operation in standard I/O mode without IO-Link communication and without using internal sensor logic or time parameters (set to "direct"/"deactivated").

[2] SIO Logic: Sensor operation in standard I/O mode without IO-Link communication. Sensor-internal logic or timing parameters plus Automation Functions used.

[3] IOL: Sensor operation with full IO-Link communication and usage of logic, timing and Automation Function parameters.

Communication interface

Communication interface	IO-Link V1.1
Mode	COM2 (38,4 kBaud)
Cycle time	2.3 ms
Process data length	16 Bit
Process data structure	Bit 0 = switching signal Q_{L1} Bit 1 = switching signal Q_{L2} Bit 2 ... 15 = empty
VendorID	26

Ordering information

- **Detection height:** 55 mm
- **Detection principle:** autocollimation
- **Switching output:** PUSH/PULL, PNP, NPN
- **Switching mode:** Light/dark switching
- **Adjustment:** BluePilot: Teach-in, IO-Link
- **Communication interface:** IO-Link

Sensing range max. [1]	Minimum object size	Connection	DeviceID	Connection diagram	Type	Part no.
0 m ... 2 m [2] 0 m ... 3 m [3] 0 m ... 4.5 m [4]	≥ 3 mm [5] ≥ 5 mm [5] ≥ 10 mm [5]	Cable with M12 male connector, 4-pin 270 mm PVC	8389143, 0x800217	cd-390	RAY26P-34162330A00	1221943
		Cable, 4-wire 2 m PVC	8389143, 0x800217	cd-389	RAY26P-1H162330A00	1221945
		Male connector M12, 4-pin	8389143, 0x800217	cd-390	RAY26P-24162330A00	1221060
0 m ... 3 m [3]	≥ 5 mm	Cable with M12 male connector, 4-pin 270 mm PVC	8389144, 0x800218	cd-390	RAY26P-34162530A00	1221947
		Cable, 4-wire 2 m PVC	8389144, 0x800218	cd-389	RAY26P-1H162530A00	1221948
		Male connector M12, 4-pin	8389144, 0x800218	cd-390	RAY26P-24162530A00	1221946
0 m ... 4.5 m [4]	≥ 10 mm	Cable with M12 male connector, 4-pin 270 mm PVC	8389145, 0x800219	cd-390	RAY26P-34162930A00	1221950
		Cable, 4-wire 2 m PVC	8389145, 0x800219	cd-389	RAY26P-1H162930A00	1221951
		Male connector M12, 4-pin	8389145, 0x800219	cd-390	RAY26P-24162930A00	1221949

[1] Reflector PL80A.
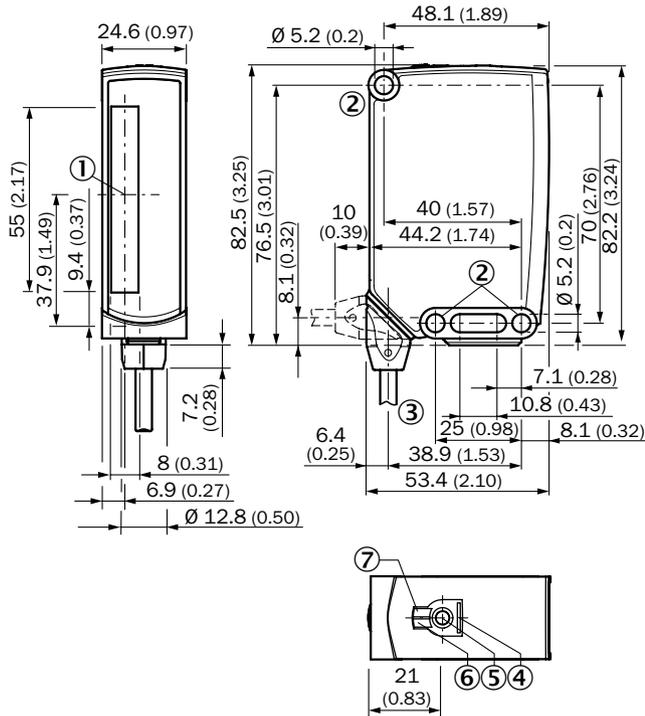
[2] At minimum object size 3 mm.

[3] At minimum object size 5 mm.
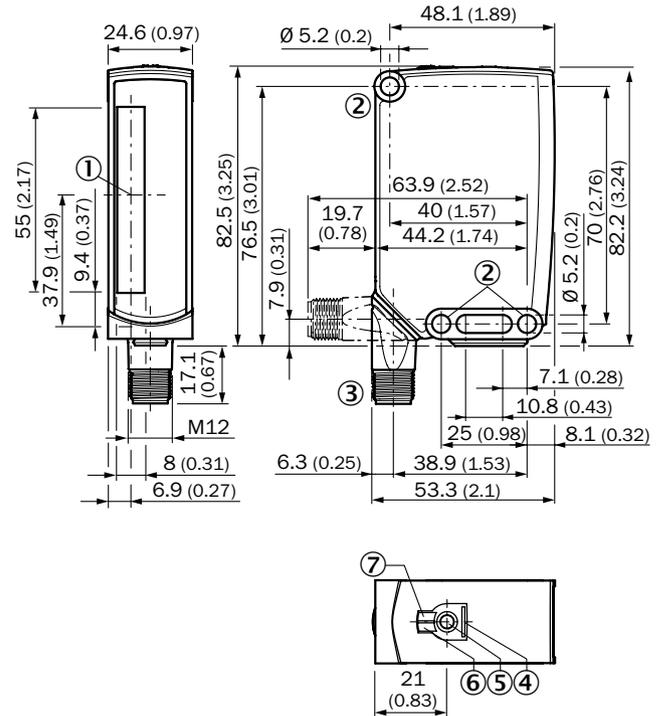
[4] At minimum object size 10 mm.

[5] Adjustable via IO-Link incl. adjustable conveyor belt blanking.

Dimensional drawing (Dimensions in mm (inch))

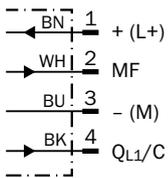### RAY26, cable (with male connector)

RAY26, male connector

① Center of optical axis
② Mounting hole, Ø 5.2 mm
③ Connection
④ BluePilot blue: AutoAdapt indicator during run mode
⑤ Teach-in button
⑥ LED indicator yellow: Status of received light beam
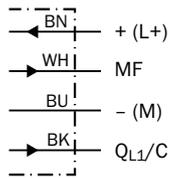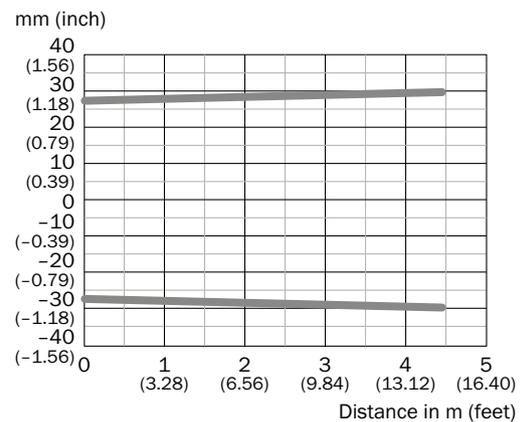⑦ LED indicator green: Supply voltage active

① Center of optical axis
② Mounting hole, Ø 5.2 mm
③ Connection
④ BluePilot blue: AutoAdapt indicator during run mode
⑤ Teach-in button
⑥ LED indicator yellow: Status of received light beam
⑦ LED indicator green: Supply voltage active

Connection diagram

Cd-390

BN	1	+ (L+)
WH	2	MF
BU	3	– (M)
BK	4	Q_{L1}/C

Cd-389

BN	+ (L+)
WH	MF
BU	– (M)
BK	Q_{L1}/C

Light spot size

mm (inch)

Distance in m (feet)

Accessories

Mounting systems

Universal bar clamp systems

Figure	Material	Description	Type	Part no.	RAY10	P250F	RAY26	PL80A
	Zinc plated steel (sheet), Zinc die cast (clamping bracket)	Plate N08 for universal clamp bracket	BEF-KHS-N08	2051607	●	●	–	–
	Stainless steel 1.4571 (sheet), Stainless steel 1.4408 (clamp)	Plate N08N for universal clamp bracket	BEF-KHS-N08N	2051616	●	●	–	–
	Zinc plated steel (sheet), Zinc die cast (clamping bracket)	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	–	–	●	●
	Zinc plated steel (sheet), Zinc die cast (clamping bracket)	Plate N12 for universal clamp. For mounting PL30A, P250 reflectors, W27 and WTR2 sensors.	BEF-KHS-N12	2071950	–	–	●	●
	Steel, zinc coated	Mounting bar, straight, 200 mm, steel	BEF-MS12G-A	4056054	●	●	●	●
		Mounting bar with thread, straight, 100 mm, steel	BEF-MS12G-AG	2062405	●	●	●	●
		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	●	●	●	●
	Zinc diecast	Universal bar clamp for mounting bars with 12 mm diameter	BEF-KHS-KH3	5322626	●	●	●	●
	Aluminum	Bar clamp for bar diameter of 12 mm (fixing the mounting rod)	BEF-RMC-D12	5321878	●	●	●	●

Mounting systems

Device protection (mechanical)

Protective housings and protective pipes

- **Description:** Protective housing for universal clamp

Figure	Material	Type	Part no.	RAY10	RAY26
	Zinc plated steel (protective housing), Zinc die cast (clamping bracket)	BEF-SG-W27S01	2086727	–	●

Mounting brackets and plates

Mounting brackets

Figure	Material	Description	Type	Part no.	RAY10	RAY26
		Mounting bracket with articulated arm for W11-2, W27, Dx50	BEF-WN-MULTI	2064469	–	●
	Steel, zinc coated	Mounting bracket	BEF-WN-W23	2019085	–	●
		Mounting bracket with hinged arm	BEF-WN-W27	2009122	–	●

Other mounting accessories

Mounting tools

Figure	Brief description	Type	Part no.	RAY10	RAY26
	1 piece, M8 mounting key set for SW9 with calibrated torque 0.4 Nm	TOOL-TW04M08AF09	5337207	●	–
	1 piece, M12 mounting key set for SW13 with calibrated torque 0.6 Nm	TOOL-TW06M12AF13	5337208	●	–

Connection systems

Modules and gateways

Cloning module

Figure	Brief description	Type	Part no.	RAY10	RAY26
	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.	RAY10	RAY26
	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.	RAY10	RAY26
	EtherCAT IO-Link Master, IO-Link V1.1, Port Class A, power supply via 7/8'' cable 24 V / 8 A, fieldbus connection via M12 cable	IOLG2EC-03208R01 (IO-Link Master)	6053254	–	●
	EtherNet/IP IO-Link Master, IO-Link V1.1, Port Class A, 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, Port Class A, 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 M12, 4-pin, PUR, halogen-free, Sensor/actuator cable

- **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.	RAY10	RAY26
	Female connector, M12, 4-pin, straight, A-coded, unshielded	Flying leads	2 m, 4-wire, PUR, halogen-free	YF2A14-020UB3X-LEAX	2095607	●	●
			5 m, 4-wire, PUR, halogen-free	YF2A14-050UB3X-LEAX	2095608	●	●
			10 m, 4-wire, PUR, halogen-free	YF2A14-100UB3X-LEAX	2095609	●	●
			15 m, 4-wire, PUR, halogen-free	YF2A14-150UB3X-LEAX	2095610	●	●
			25 m, 4-wire, PUR, halogen-free	YF2A14-250UB3X-LEAX	2095615	●	●
	Female connector, M12, 4-pin, angled, A-coded, unshielded	Flying leads	2 m, 4-wire, PUR, halogen-free	YG2A14-020UB3X-LEAX	2095766	●	●
			5 m, 4-wire, PUR, halogen-free	YG2A14-050UB3X-LEAX	2095767	●	●
			10 m, 4-wire, PUR, halogen-free	YG2A14-100UB3X-LEAX	2095768	●	●
	Female connector, M12, 4-pin, angled with LED, A-coded, unshielded	Flying leads	2 m, 4-wire, PUR, halogen-free	YI2A14-020UB3X-LEAX	2095836	●	●
			5 m, 4-wire, PUR, halogen-free	YI2A14-050UB3X-LEAX	2095837	●	●
			10 m, 4-wire, PUR, halogen-free	YI2A14-100UB3X-LEAX	2095838	●	●

Connecting cables M12, 4-pin, PVC, Sensor/actuator cable

- **Cable material:** PVC
- **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.	RAY10	RAY26
	Female connector, M12, 4-pin, straight, A-coded, unshielded	Flying leads	2 m, 4-wire, PVC	YF2A14-020VB3X-LEAX	2096234	●	●
			5 m, 4-wire, PVC	YF2A14-050VB3X-LEAX	2096235	●	●
			10 m, 4-wire, PVC	YF2A14-100VB3X-LEAX	2096236	●	●
			15 m, 4-wire, PVC	YF2A14-150VB3X-LEAX	2096237	●	●
			20 m, 4-wire, PVC	YF2A14-200VB3X-LEAX	2096238	●	●
	Female connector, M12, 4-pin, angled, A-coded, unshielded	Flying leads	2 m, 4-wire, PVC	YG2A14-020VB3X-LEAX	2095895	●	●
			5 m, 4-wire, PVC	YG2A14-050VB3X-LEAX	2095897	●	●
			10 m, 4-wire, PVC	YG2A14-100VB3X-LEAX	2095898	●	●
			15 m, 4-wire, PVC	YG2A14-150VB3X-LEAX	2096213	●	●
			20 m, 4-wire, PVC	YG2A14-200VB3X-LEAX	2096214	●	●

Figure	Connection type head A	Connection type head B	Connecting cable	Type	Part no.	RAY10	RAY26
	Female connector, M12, 4-pin, angled with LED, A-coded, unshielded	Flying leads	10 m, 4-wire, PVC	YI2A14-100VB3X-LEAX	2096231	●	●

Connecting cables M8, 4-pin, PUR, halogen-free, Sensor/actuator cable

- **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.	RAY10	RAY26
	Female connector, M8, 4-pin, straight, A-coded, unshielded	Flying leads	2 m, 4-wire, PUR, halogen-free	YF8U14-020UA3X-LEAX	2094791	●	–
			5 m, 4-wire, PUR, halogen-free	YF8U14-050UA3X-LEAX	2094792	●	–
			10 m, 4-wire, PUR, halogen-free	YF8U14-100UA3X-LEAX	2094793	●	–
			15 m, 4-wire, PUR, halogen-free	YF8U14-150UA3X-LEAX	2095580	●	–
			20 m, 4-wire, PUR, halogen-free	YF8U14-200UA3X-LEAX	2095582	●	–
	Female connector, M8, 4-pin, angled, A-coded, unshielded	Flying leads	2 m, 4-wire, PUR, halogen-free	YG8U14-020UA3X-LEAX	2095589	●	–
			5 m, 4-wire, PUR, halogen-free	YG8U14-050UA3X-LEAX	2095590	●	–
			10 m, 4-wire, PUR, halogen-free	YG8U14-100UA3X-LEAX	2095591	●	–
	Female connector, M8, 4-pin, angled with LED, A-coded, unshielded	Flying leads	2 m, 4-wire, PUR, halogen-free	YI8U14-020UA3X-LEAX	2095596	●	–
			5 m, 4-wire, PUR, halogen-free	YI8U14-050UA3X-LEAX	2095597	●	–
			10 m, 4-wire, PUR, halogen-free	YI8U14-100UA3X-LEAX	2095598	●	–

Connecting cables M8, 4-pin, PVC, Sensor/actuator cable

- **Cable material:** PVC
- **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.	RAY10	RAY26
	Female connector, M8, 4-pin, straight, A-coded, unshielded	Flying leads	1.5 m, 4-wire, PVC	YF8U14-015VA3X-LEAX	2095894	●	–
			2 m, 4-wire, PVC	YF8U14-020VA3X-LEAX	2095888	●	–
			2.5 m, 4-wire, PVC	YF8U14-025VA3X-LEAX	2095876	●	–
			3 m, 4-wire, PVC	YF8U14-030VA3X-LEAX	2095896	●	–
			5 m, 4-wire, PVC	YF8U14-050VA3X-LEAX	2095889	●	–
			10 m, 4-wire, PVC	YF8U14-100VA3X-LEAX	2095890	●	–
			15 m, 4-wire, PVC	YF8U14-150VA3X-LEAX	2095899	●	–
			20 m, 4-wire, PVC	YF8U14-200VA3X-LEAX	2095891	●	–
			30 m, 4-wire, PVC	YF8U14-300VA3X-LEAX	2095900	●	–
	Female connector, M8, 4-pin, angled, A-coded, unshielded	Flying leads	2 m, 4-wire, PVC	YG8U14-020VA3X-LEAX	2095962	●	–
			5 m, 4-wire, PVC	YG8U14-050VA3X-LEAX	2095963	●	–
			10 m, 4-wire, PVC	YG8U14-100VA3X-LEAX	2095964	●	–
			30 m, 4-wire, PVC	YG8U14-300VA3X-LEAX	2095968	●	–

Field-attachable connectors M12, 4-pin

Figure	Connection type head A	Connection type head B	Connector material	Locking nut material	Type	Part no.	RAY10	RAY26
	Female connector, M12, 4-pin, straight, unshielded	screw-type terminals	PA	CuZn	DOS-1204-G	6007302	●	●
		cutting technology	–	CuZn, nickel-plated brass	DOS-1204-GQU6	6042088	●	●
Illustration may differ	Female connector, M12, 4-pin, angled, unshielded	screw-type terminals	PBT	CuZn	DOS-1204-W	6007303	●	●
	Male connector, M12, 4-pin, straight, unshielded	screw-type terminals	PA	CuZn	STE-1204-G	6009932	●	●
	Male connector, M12, 4-pin, straight	cutting technology	–	CuZn, nickel-plated brass	STE-1204-GQU6	6042089	●	●
	Male connector, M12, 4-pin, angled, unshielded	screw-type terminals	PBT	CuZn	STE-1204-W	6022084	●	●

Field-attachable connectors M8, 4-pin

- **Locking nut material:** CuZn

Figure	Connection type head A	Connection type head B	Connector material	Type	Part no.	RAY10	RAY26
	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	●	–
	Male connector, M8, 4-pin, straight, unshielded	screw-type terminals	PBT/PA	STE-0804-G	6037323	●	–

Reflectors and optics

Reflectors

Angular

Figure	Material	Description	Dimensions	Type	Part no.	RAY10	RAY26
	PMMA/ABS	Rectangular, screw connection	80 mm x 80 mm	PL80A	1003865	–	●

Fine triple reflectors

Figure	Material	Description	Dimensions	Type	Part no.	RAY10	RAY26
	PMMA/ABS	Fine triple reflector, screw connection, suitable for laser sensors	47 mm x 47 mm	P250F	5308843	●	–

Dimensional drawings Mounting systems

BEF-KHS-N08, BEF-KHS-N08N
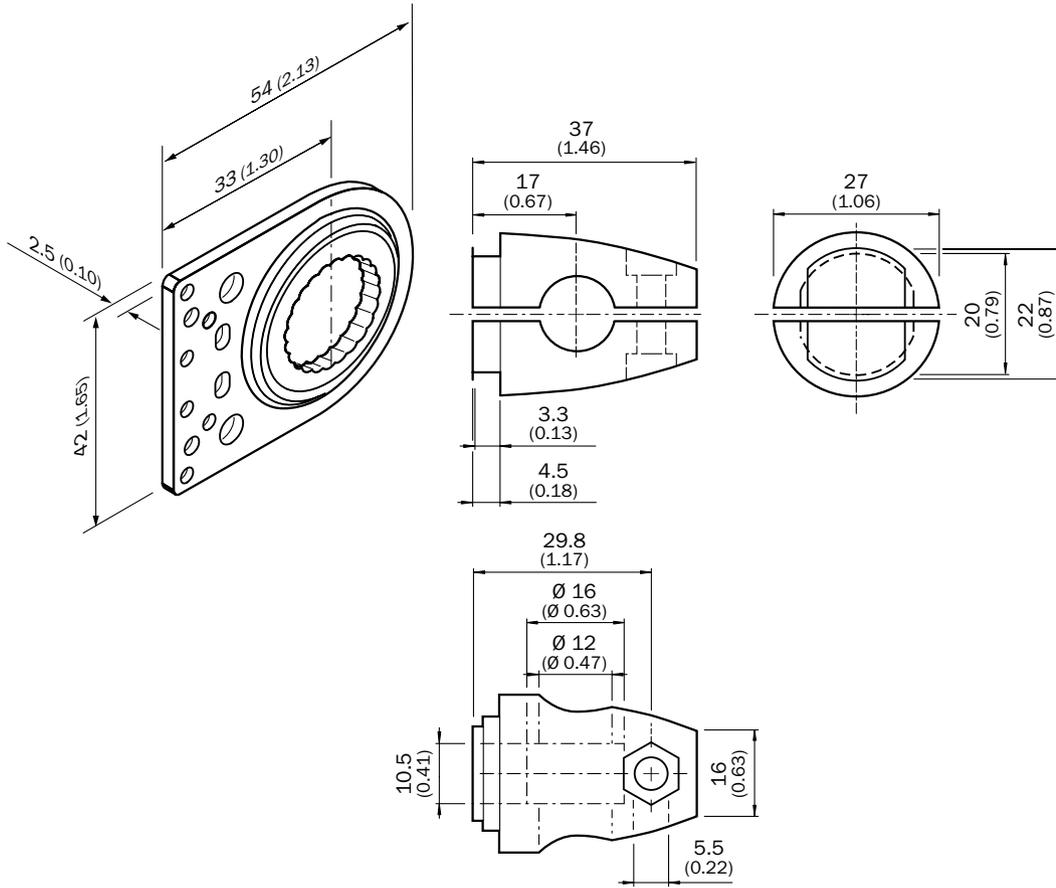
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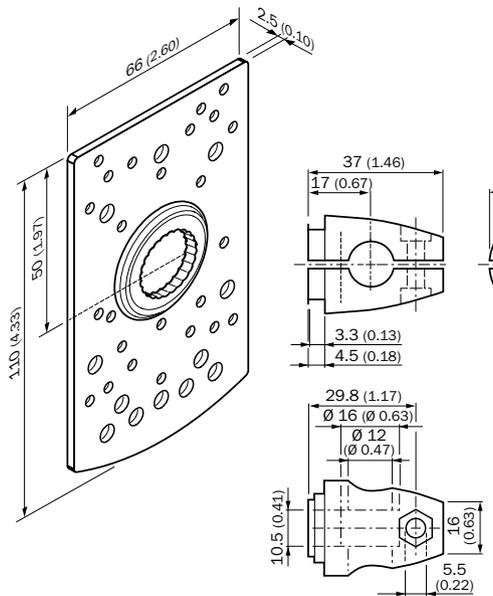
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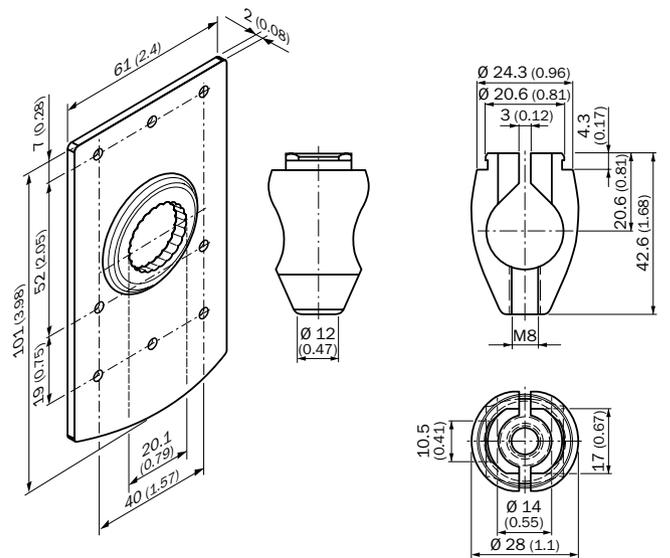
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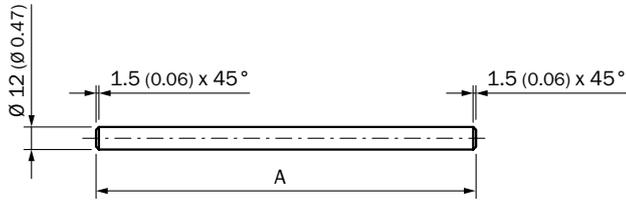
① BEF-MS12G-(N)A: A = 200 mm
② BEF-MS12G-(N)B: A = 300 mm

BEF-MS12G-AG

BEF-MS12L-A, BEF-MS12L-B
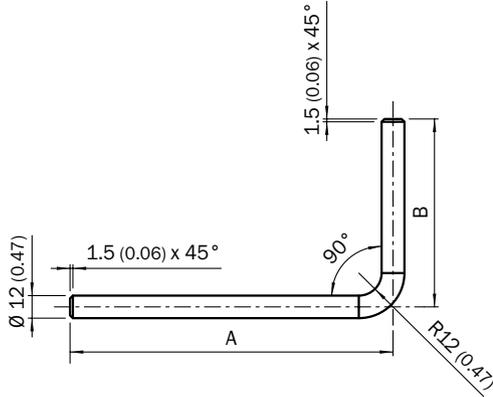
① BEF-MS12L-(N)A: A = 150 mm, B = 150 mm
② BEF-MS12L-(N)B: A = 250 mm, B = 250 mm
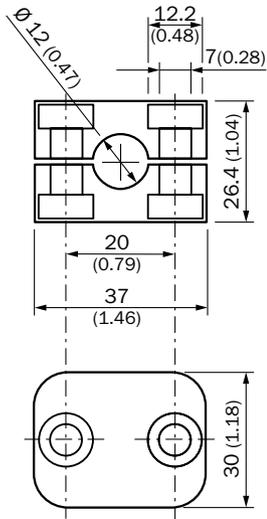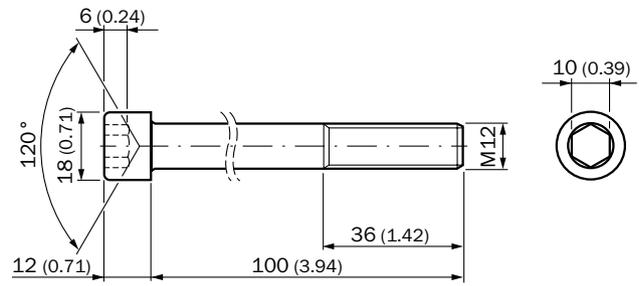
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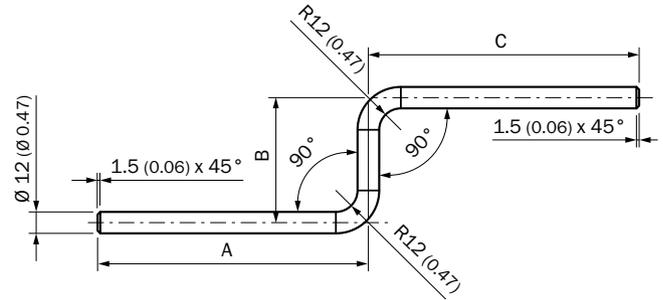
① BEF-MS12Z-(N)A: A = 150 mm, B = 70 mm, C = 150 mm
② BEF-MS12Z-(N)B: A = 150 mm, B = 70 mm, C = 250 mm

BEF-RMC-D12

BEF-KHS-KH3
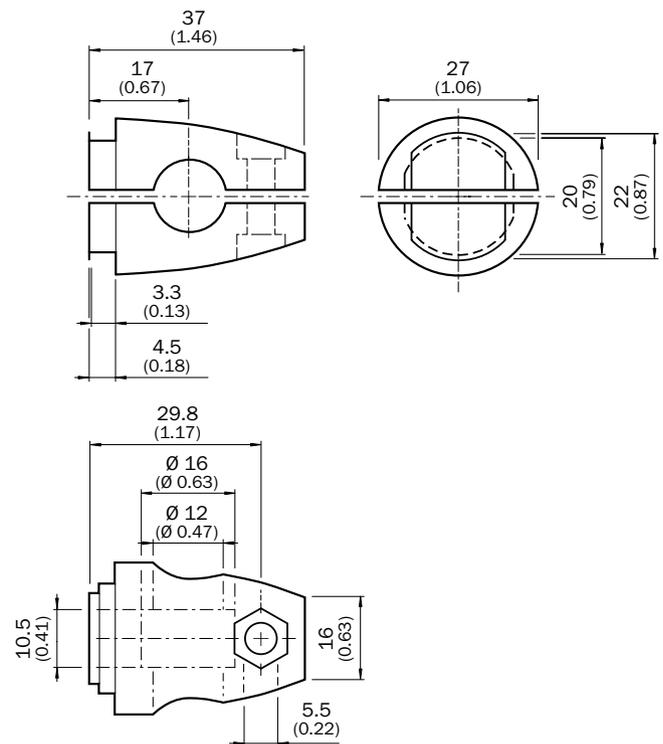
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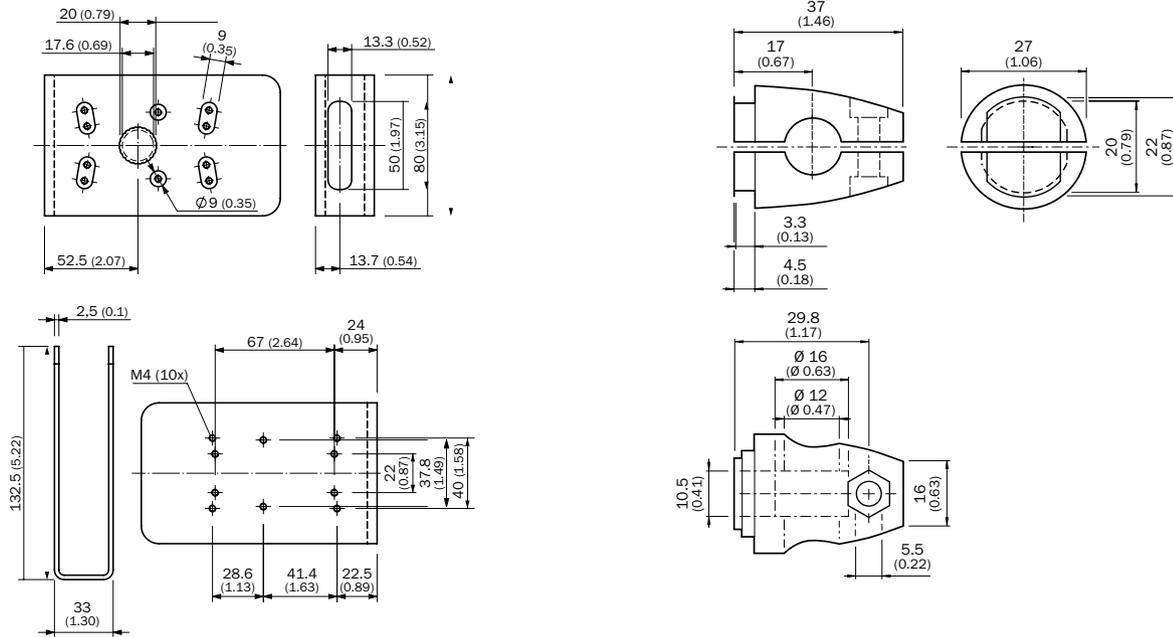
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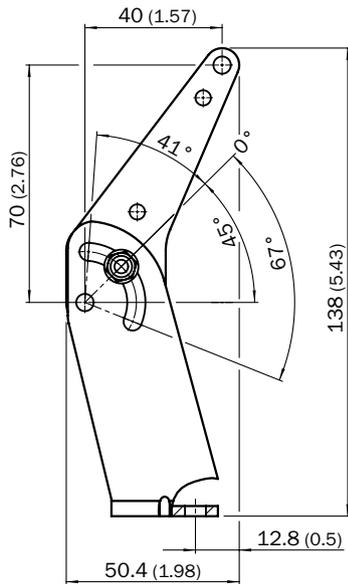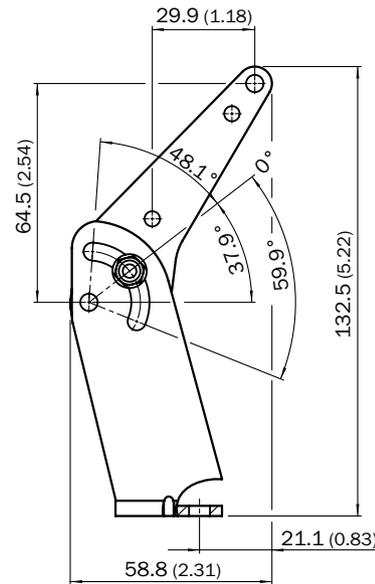
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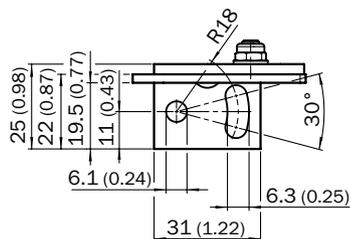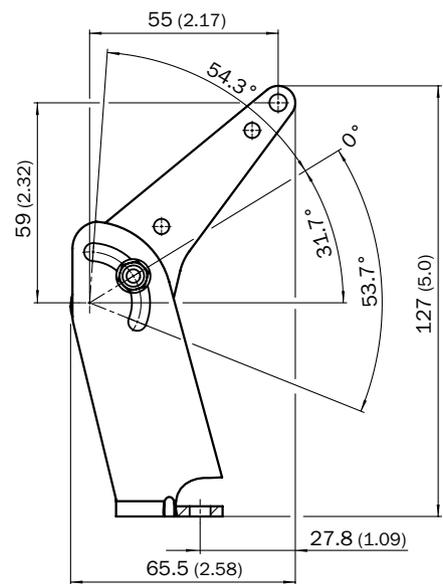
① Setting for sensors W27, W23, W26
② Setting for sensors W12, W11, W16
③ Adjustment for sensors D50

BEF-WN-W23
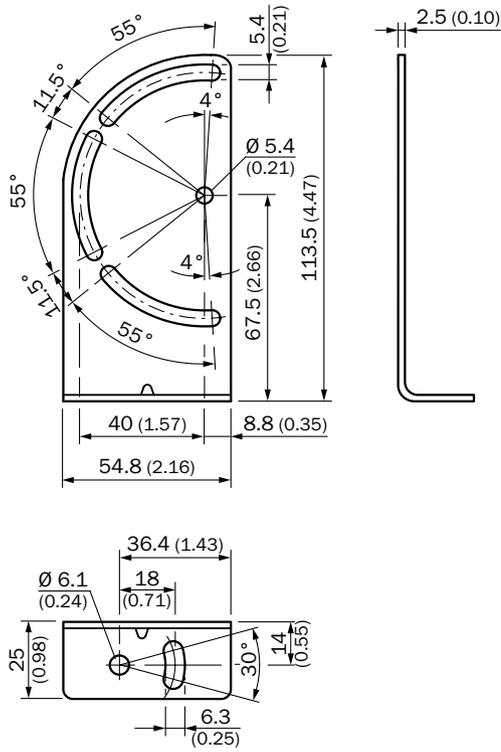
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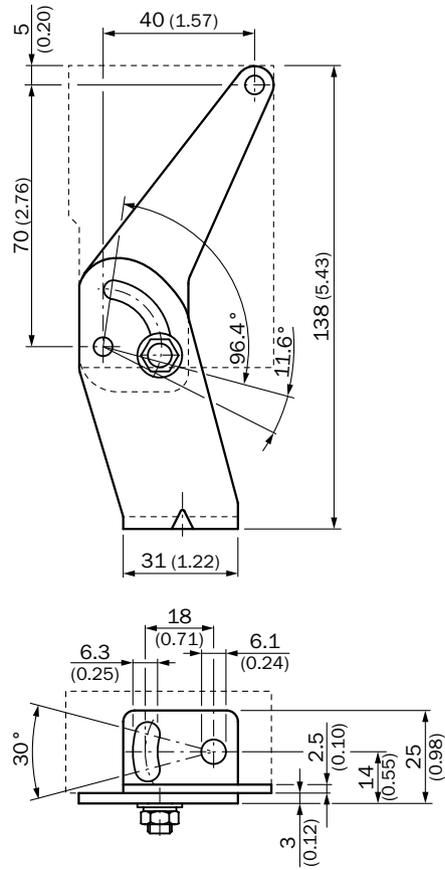
Dimensional drawings Connection systems

IOLA2US-01101 (SiLink2 Master)

DC 24 V

PWR LED

Mini USB B

M 12

M 12-A

CH1 (C/Q)
CH2 (DI/DO)
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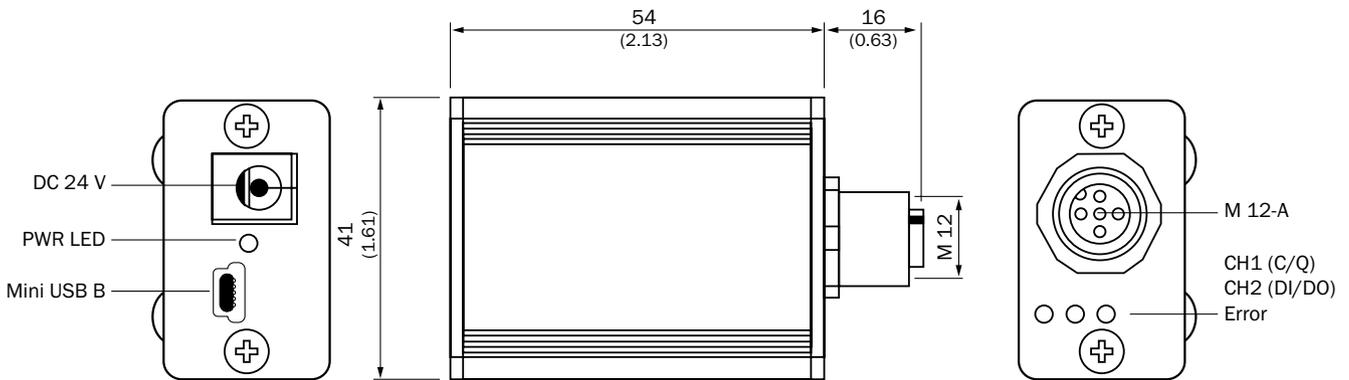
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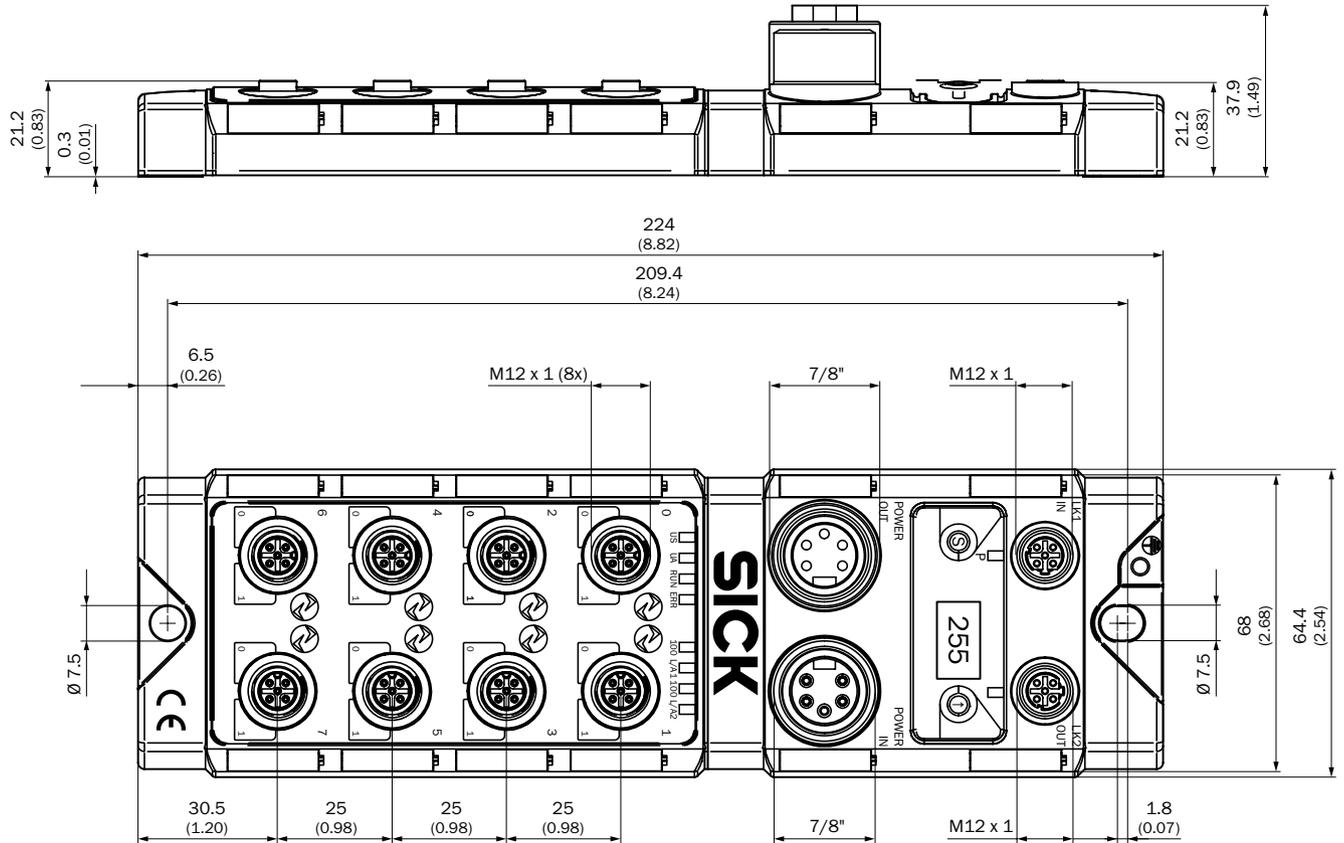
IOLP2ZZ-M3201 (SICK Memory Stick)
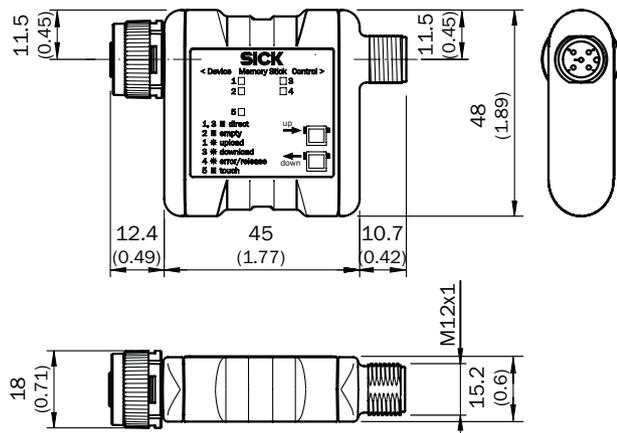
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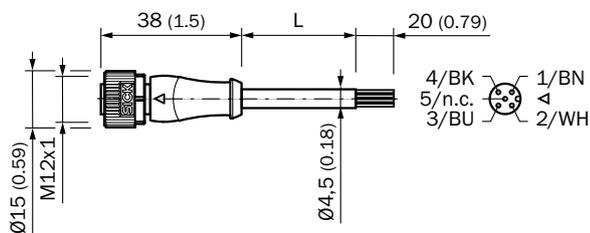
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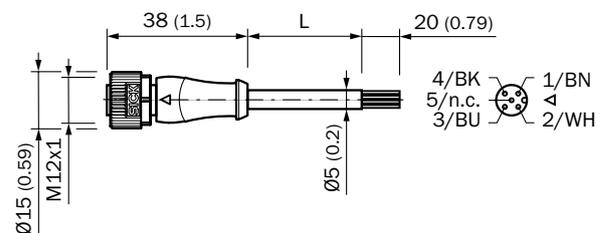
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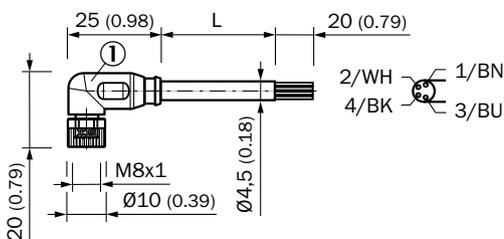YF8U14-050VA3XLEAX, YF8U14-100VA3XLEAX,
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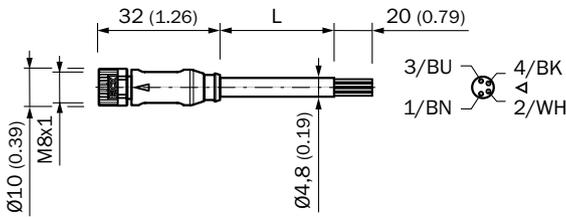
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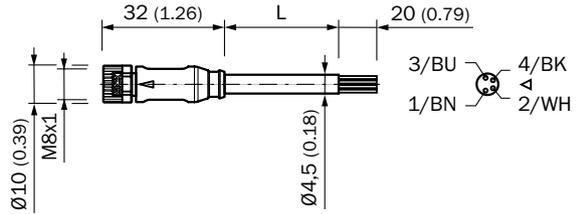
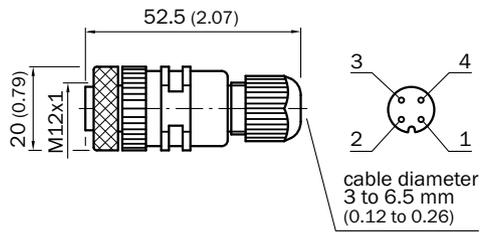YG2A14-020UB3XLEAX, YG2A14-050UB3XLEAX
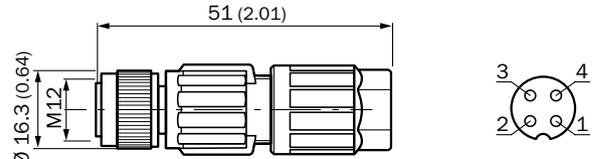YG2A14-100UB3XLEAX
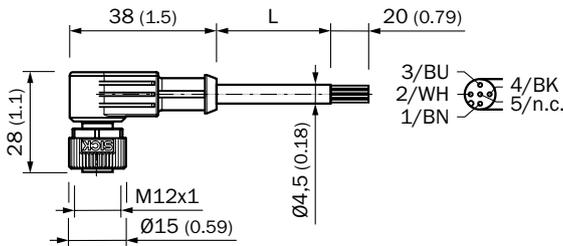
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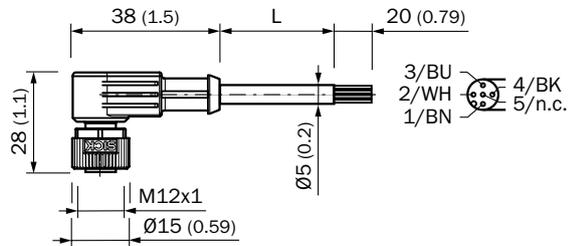
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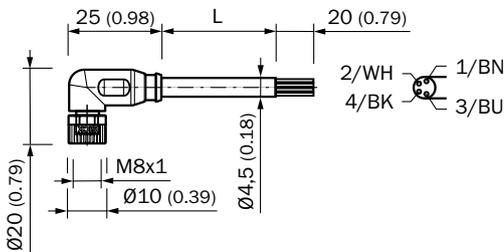
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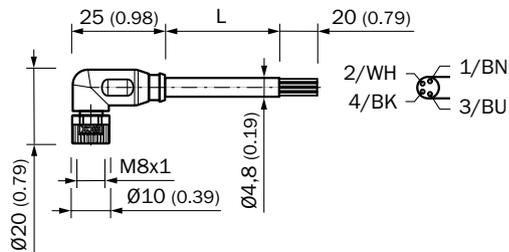
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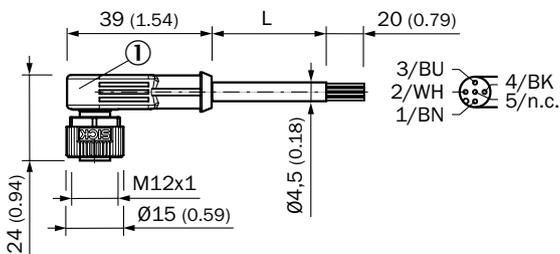
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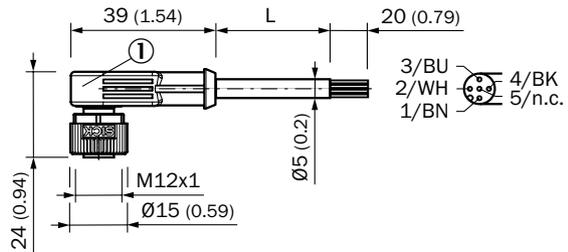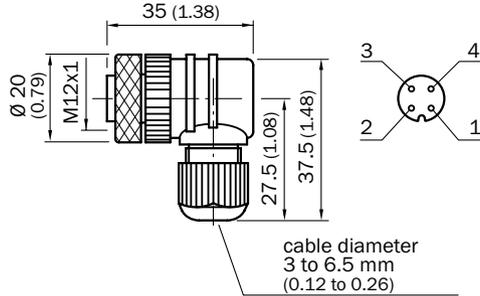
YI8U14-020UA3XLEAX, YI8U14-050UA3XLEAX
YI8U14-100UA3XLEAX

DOS-1204-G

cable diameter
3 to 6.5 mm
(0.12 to 0.26)

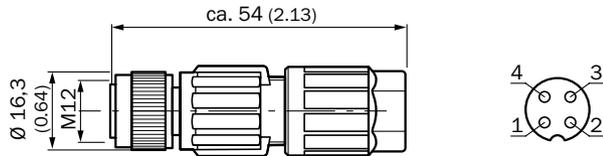### DOS-1204-GQU6

DOS-1204-W

cable diameter
3 to 6.5 mm
(0.12 to 0.26)

STE-1204-G

STE-1204-GQU6

STE-1204-W

cable diameter
3 to 6.5 mm
(0.12 to 0.26)

DOS-0804-G

cable diameter
3.5 to 5 mm
(0.14 to 0.20 inch)
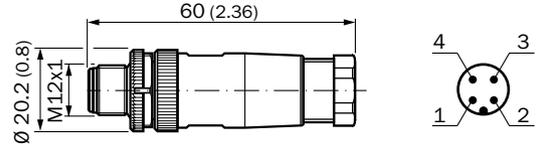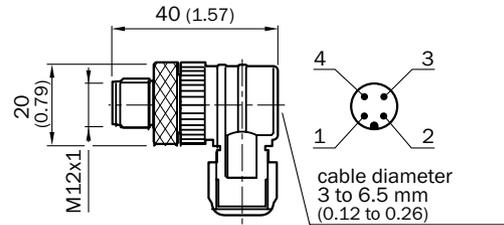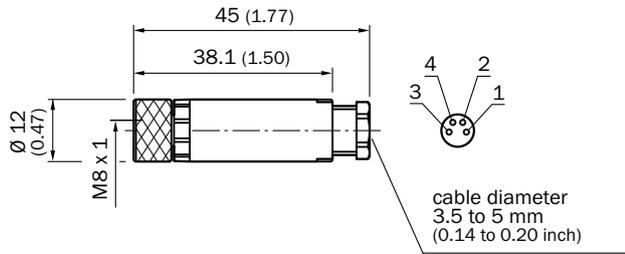
DOS-0804-W

Dimensions in mm (inch)
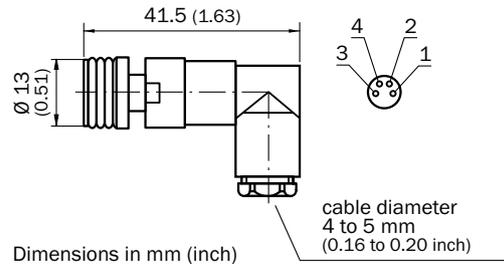
cable diameter
4 to 5 mm
(0.16 to 0.20 inch)

Dimensional drawings Reflectors and optics

P250F
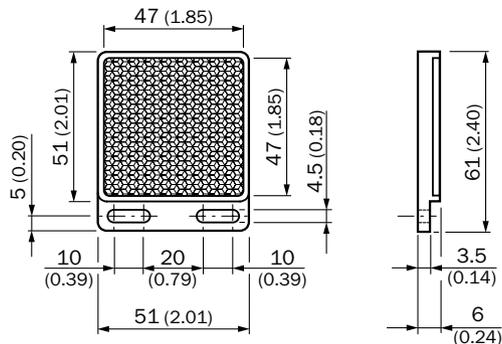
PL80A
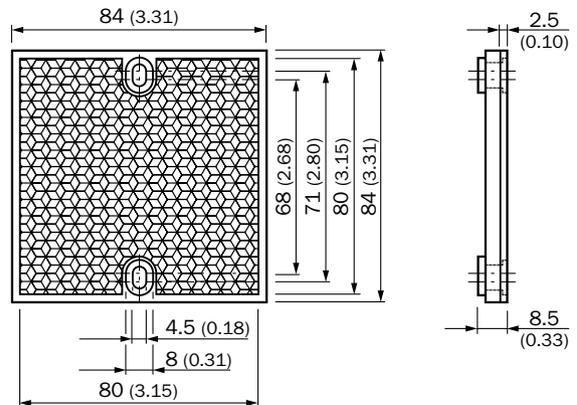
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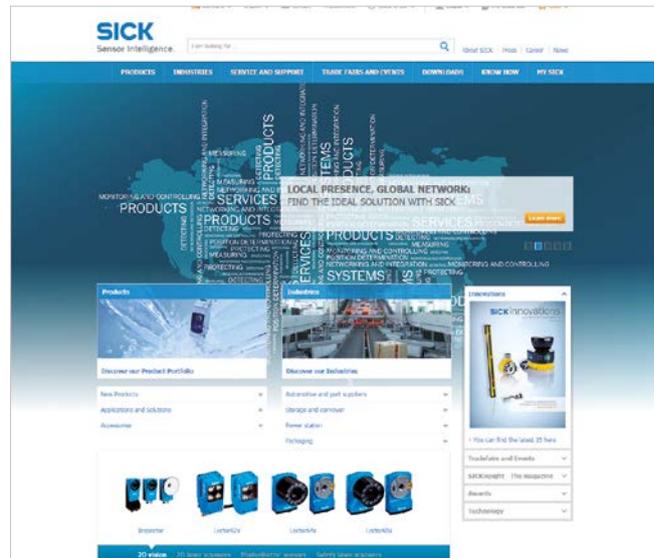
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Easy, safe and economical

Training and education
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