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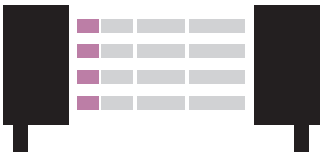
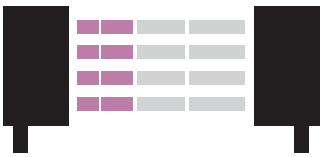
II

Area Sensors

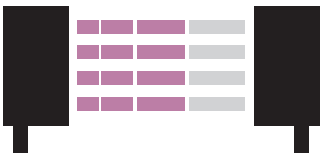
Nominal sensing distance Sn



Under 1 m



From 1 to 2 m



From 2 to 4 m

Over 4 m

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Area Sensor
Basic theory

Introduction
Optoelectronic scanners are not covered by the provisions of EN 60947-5-2 and the following details only refer to common parameters. The technical terms of the paragraph headings reflect those used in the wording of this legislation, whilst those in italics are synonyms. The specifications listed relate to the nominal performance envisaged by said legislation and apply to products whose technical specifications do not include a specific figure.

Operating principle
Type-T Optoelectronic scanners are made up of two elements; an emitter and a receiver. The emitter has an optical unit that consists of an array of photoemitters which emit a series of narrow luminous pulses to the receiver in a consecutive well-defined manner. Luminous radiation is generated by a solid- state source made up of high-performance long-lasting semiconductor elements. This radiation can be from outside the visible band. The receiver has an optical unit which is made up of an array of photoreceivers which correspond geometrically to those of the emitter. The luminous radiation reaching the photoreceivers is converted to an electric signal, amplified and processed in order to drive receiver output elements. As there is synchronous reading of the luminous pulse, a synchronous signal must be transmitted between emitter/receiver. Detection occurs when the path of the beam is interrupted by the presence of an opaque object.

Parallel-ray scanning
Every pulse emitted by a single element of the emitter array must be synchronously read by the corresponding element of the receiver array so that the single pair can be considered in light state. Every single emitter/receiver pair only controls its own axis of conjunction. Scanning determines an area crossed by parallel rays. Using parallel rays enables precise information to be obtained regarding size and position of target object.

Cross-ray scanning
Every pulse emitted by a single element of the emitter array must be synchronously read by the corresponding element of the receiver array, and by a variable number of other receivers positioned on either side of the central one, so that the single pair can be considered in light state (i.e. path of beam completely clear). Every single emitter/ receiver pair controls a range of axes which originate from the emitter and reach an array of receivers. Scanning determines an area crossed by cross rays in a complex manner. The number of lateral receivers involved in reading the single emitter varies according to the range of the particular model. Every emitter must illuminate various receivers and can only do so if the optical-beam angle is sufficient for a certain distance. The number of receivers enabled can also vary during scanning. In extreme cases the two emitters on the edge of the array may only illuminate the internal lateral receivers because the external ones do not exist. Another case in particular is when single emitters must always illuminate all the receivers. This operating mode is simple to manage but requires large beam angles. Operating with cross rays does not enable precise information to be immediately obtained regarding size and position of target object, but merely reveals its presence.

Synchronising scanning
It is the function which allows a single element of the receiver array to be enabled to read only at the moment in which the luminous pulse is sent by the corresponding emitter element. The synchronisation serves to determine a strict relationship between corresponding emitter and receiver so as to reduce the effects of interference from other signals. With type T parallel-ray scanning sensors used for determining size and position of objects, the synchronisation must be realised by connecting a cable between emitter and receiver. With sensors that are only used for detecting the presence of an object, the synchronisation can be sent optically. Usually an emitter is added to the receiver array sends synchronisation message to an additional receiver in the emitter array. Alternatively, timing techniques can be used for autosynchronisation of the receiver, thus eliminating the need for cabling between emitter and receiver. Devices also exist whose arrays of optical elements alternate between emitters and receivers that pass the optical pulses on to each other. This type of solution is another which does not require cable synchronisation and cannot be used for pinpointing position and size of objects.

State of area
To define the state of the area or the single elements, reference must be made to the light/dark condition of the receivers. The dark condition is determined by the presence of an opaque object that blocks the path of the rays. The light condition is on the other hand determined by the fact that the path between emitter and receiver is clear.

General description
The area sensors are composed of two elements: an emitter and a receiver element. The optical part is composed of an array of synchronized photoelements in order to avoid mutual interference. The main characteristics are:

- istance between emitter and receiver (D): it indicates the operating distance between the emitter and the receiver;
- optical beams space (BS): it indicates the spacing that exists between the optical axes of the single elements;
- optical diameter (BD): it indicates the diameter of the output optical lens of the single element;
- optical elements number (BN): it indicates the number of elements that composes the array;
- blind zone (X): it indicates the zones near the emitter and the receiver where the resolution is less than the maximum one. This zone is properly related to the distance (D) between the emitter and the receiver: $X = 0,06 \times D$
- area height (AH): it indicates the height of the area selected by the optical beams: $A_H = [B_S \times (B_N - 1)] + B_D$
- resolution (R): it indicates the minimum dimensions of the target that it is possible to detect: $R = B_S + B_N$
  Utilising cross-ray functions the resolution of the minimum detectable target increases (with blind zones exclusion);
- analogical voltage output (VOUT) V it is an available value on the analogical voltage output properly related to the number of occupied / free optics:
  NO configuration: $V_{OUT} = (10 / B_N) \times$ (number of occupied optics)
  NC configuration : $V_{OUT} = (10 / B_N) \times$ (number of free optics)
- analogical current-type output (IOUT) V it is an available value on the analogical current-type output properly related to the number of occupied / free optics:
  NO configuration: $I_{OUT} = (16 / B_N) \times$ (number of occupied optics) + 4
  NC configuration: $I_{OUT} = (16 / B_N) \times$ (number of free optics) + 4

Blanking function
If enabled some rays are turned off. This means that one or more areas are inactive; this can be useful in specific applications.

notes

CR0 series
Retroreflective Polarized Area sensors

features

- **Area height controlled 69 mm**
- **Maximun operative distance up to 4.5 m**
- **Minimum object detection diam. 6mm**
- **Two teach-in types: fine and standard**
- **Optical pitch 10mm**
- **Protection degree IP67**
- **Blanking function**

web contents

- **Application notes**
- **Photos**
- **Catalogue / Manuals**

code description

CR 0 / 0 I - 1 V

series	CR	Retroreflective Polarized Area Sensor with aluminum compact housing
models	0	Model area aetection : high 69 mm ; pitch 10 mm
output	0	Outputs select (NO/NC); IO Link mode
	B	Complementary output (NO +NC)
logic output	I	IO Link output
	B	NPN + PNP output
	N	NPN outputs
	P	PNP outputs
	T	Push-Pull output
housing material	1	Metallic housing
connections	V	Output cable length 25 cm with M12 pigtail

available models

pitch (mm)	detection height (mm)	working range (m)	response time (ms)	plug	poles	logic	output	models
10	69	0.2...4,5	1.2	M12	4	IO Link	IO Link	CR0/0I-1V
					5	PNP+NPN	NC/NO	CR0/0B-1V
					4	Push Pull		CR0/0T-1V
						PNP	NO+NC	CR0/BP-1V
						NPN		CR0/BN-1V

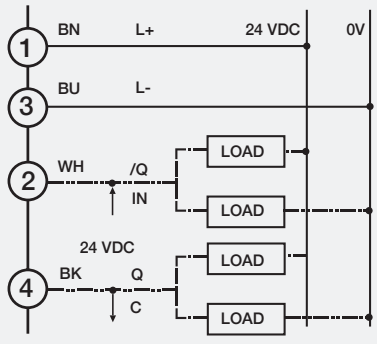
technical specifications

	CR0
	
nominal sensing distance (Sn)	0.2…4.5 m (RL106G - ExG 2)
emission	red (617nm)
operating voltage	16...30 Vdc
no load supply current	≤ 10%
no load supply current	100mA
load current	100mA
leakage current	≤ 100 µA (Vdc max)
output voltage drop	3 V max (100mA)
adjustment	Teach-in: fine < 3 sec; > 6 sec
output type	PNP; NPN ; Push-pull ; (NO+NC) compl. output (NO+NC)
switching frequency	600 Hz
time delay before available	300 ms
minimum object detection	3...6mm @2m RL106G(1) 3...10mm@4,5m RL106G (1)
power supply protections	polarity reversal, transient
output protection	short circuit (autoreset)
interference external light	5000 lux (fluorescent lamp); 50000 lux (sunlight)
operative temperature range	-10°C….+55°C (without freeze)
temperature drift	10% Sr
LED indicators	green: power supply red: dark/light status
protection degree	IP67 (EN60529)
housing material	aluminium
optical material	PMMA

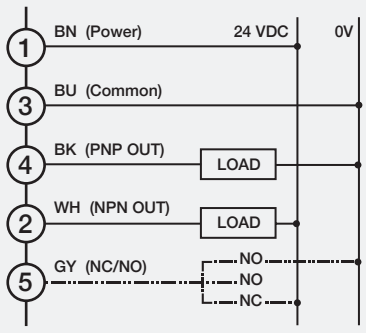
(1) 106G reflector 20 x 80mm (concealment)

electric diagrams of the connections

CR0/0I-1V



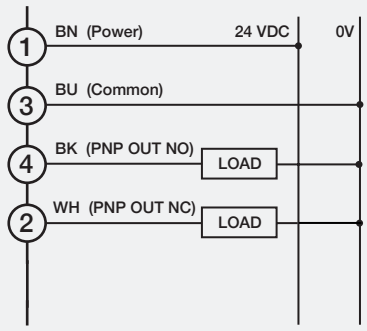
CR0/0B-1V



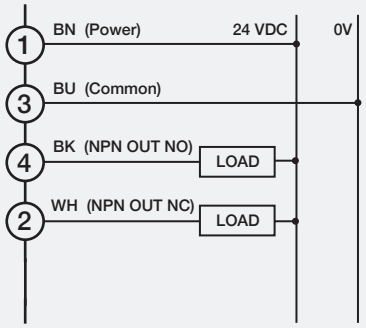
BU	blue
GY	gray
WH	white
BK	black
BN	brown

electric diagrams of the connections

CR0/BP-1V

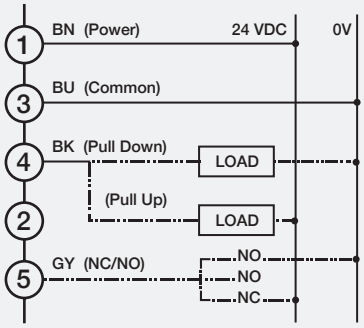


CR0/BN-1V



BU	blue
GY	gray
WH	white
BK	black
BN	brown

CR0/0T



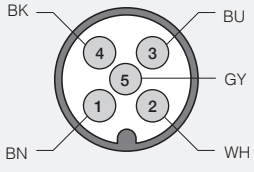
response diagrams

Distance from sensor to reflector

Reflector	Min (m)	Max (m)
RL 106G	0,2	5,5
RL 135	0,3	3,5
RL100D (150 x 40mm)	0,3	2,5

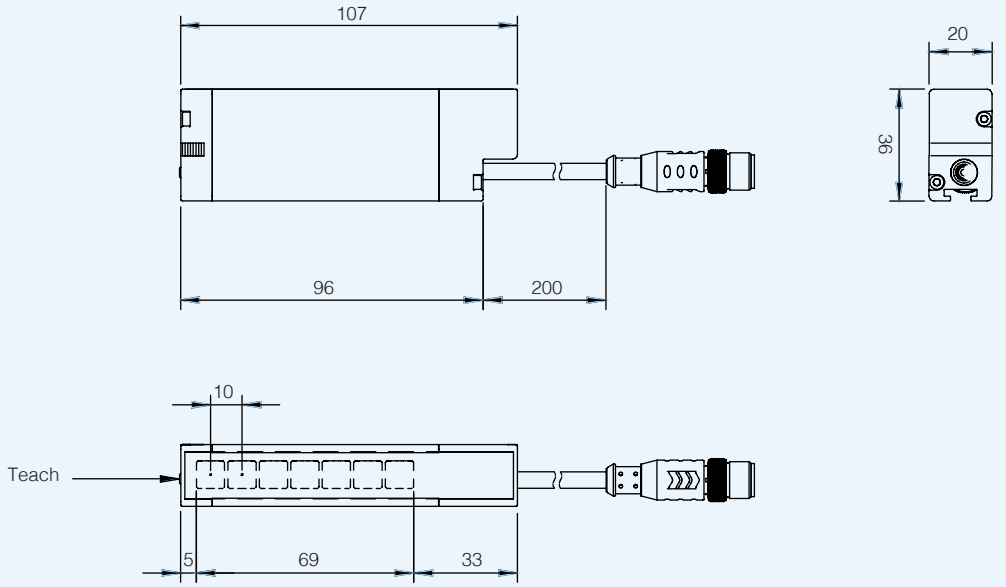
plugs

CR0 - Plug M12



dimensions (mm)

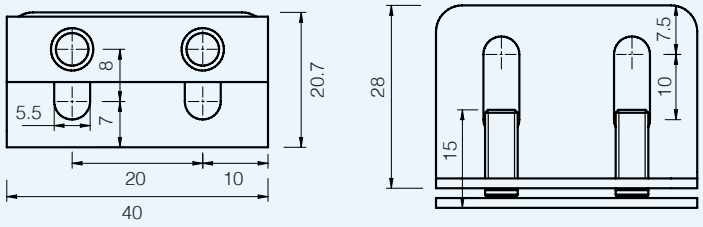
CR0/**-**



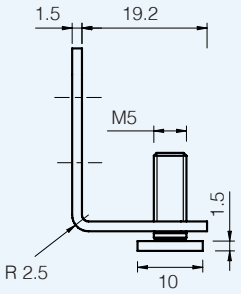
dimensions (mm)

accessories included with all models

accessories fixing kit ST151

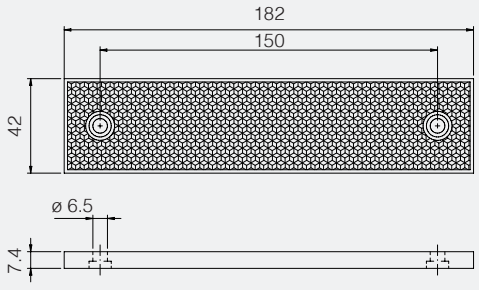


T insert, two M5 nuts and split washers included



L bracket

RL 106G

product	dimensions (mm)
	

BX04 e BX10 series

Medium resolution area sensors

features

- **IP67 protection degree (IP69K special model)**
- **Complete protection against electrical damages**
- **Detection of objects with irregular shape**
- **ATEX models, cat. 2 and cat. 3, available on request**
- **LED indicators**
- **Crossed beams detection**

web contents

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- **Photos**
- **Catalogue / Manuals**

code description

BX 04 S / 0 0 - H B

series	BX	Compact area sensor
optics	04	4 optics, 90 mm area height, 30 mm optic step
	10	10 optics, 90 mm area height, 10 mm optic step
emitter / receiver	S	Emitter with sensitivity adjustment
	R	Receiver
	SR	Kit emitter + receiver
emitter / receiver	0	Emitter
	X	Emitter with check
	A	Receiver NO (Dark ON)
	C	Receiver NO (Light ON)
emitter / receiver	0	Emitter
	D	Receiver NPN + PNP
cable exit	H	M12 plug cable exit
	A	Cable exit
distance	B	Sensing distance 0.3 ... 2 m (standard version)
version		Standard version
	6X	Models with 4 m sensing distance
	6A	Models with 6 m sensing distance
	79	Models with aluminium enclosure and air cooling inlet
	DA	Models with glass optic window
	70	Models with reduced sensing distance 100...350 mm
	SY	Models with impulse synchronisation
	9K	Models with IP69K protection
	AN	ATEX models 3 GD
	AT	ATEX models 2 GD

available models

area (mm)	n° of beams	distance (m)	resolution (mm)	model	output	NPN + PNP NO	NPN + PNP NC
90	4	0.3...2	Ø 35 (1) Ø 25 (2) Ø 15 (3)	emitter	M12	BX04S/00-HB	
					cable	BX04S/00-AB	
				emitt. + check	M12	BX04S/X0-HB	
					cable	BX04S/X0-AB	
				receiver	M12	BX04R/AD-HB	-
					cable	BX04R/AD-AB	-
	10		Ø 15 (1) Ø 7.5 (2) Ø 5 (3)	emitter	M12	BX10S/00-HB	
					cable	BX10S/00-AB	
				emitt. + check	M12	BX10S/X0-HB	
					cable	BX10S/X0-AB	
				receiver	M12	BX10R/AD-HB	BX10R/CD-HB
					cable	BX10R/AD-AB	BX10R/CD-AB
		0.3...4		emitter	M12	BX10S/00-HB6X	
				receiver		BX10R/AD-HB6X	-
		0.3...6		emitter		BX10S/00-HB6A	
				receiver		BX10R/AD-HB6A	-

	KIT					
area (mm)	n° of beams	distance (m)	resolution (mm)	model	output	NPN + PNP NO
90	4	0.3...2	Ø 35 (1) Ø 25 (2) Ø 15 (3)	emitter + receiver	M12	BX04SR/0A-HB
					cable	BX04SR/0A-AB
					M12	BX04SR/XA-HB
					cable	BX04SR/XA-AB
	10		Ø 15 (1) Ø 7.5 (2) Ø 5 (3)		M12	BX10SR/0A-HB
					cable	BX10SR/0A-AB
					M12	BX10SR/XA-HB
					cable	BX10SR/XA-AB
		0.3...4			M12	BX10SR/0A-HB6X
		0.3...6				BX10SR/0A-HB6A

(1) Guaranteed resolution everywhere in the detection area
(2) Guaranteed resolution in the central part of the detection area with exclusion of the dark zones
(3) As note (2), but with sensivity adjustment
(4) NC output models available on request
Dark zones are parts of the detection area close to the emitter and receiver, their amplitude X is proportional to the distance D between the emitter and the receiver.
BX04 => X = 0,17D
BX10 => X = 0,06D

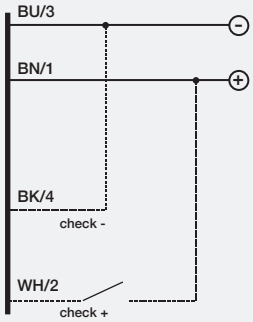
technical specification

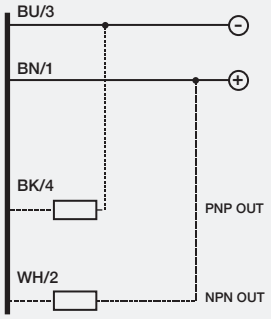
	BX04	BX10
nominal sensing distance	 0.3...2 m (standard model) 0.3...1,5 m (model DA) 0.3...4 m (model 6X) 0.3...6 m (model 6A)	
controlled height	90 mm	
n° of beams	4	10
beams space	30 mm	10 mm
minimum detectable object	Ø 35 mm (1) Ø 25 mm (2) Ø 15 mm (3)	Ø 15 mm (1) Ø 7.5 mm (2) Ø 5 mm (3)
emission	infrared	
hysteresis	≤ 10%	
supply voltage	10 ... 26 V cc/dc	
ripple	≤ 10%	
no-load supply current	50 mA (emitter) 25 mA (receiver)	
load current	≤ 100 mA	
leakage current	≤ 10 µA	
voltage drop	≤ 2 V @ IL = 100 mA	
output type	NPN + PNP NO or NC	
response time (light/dark)	500 µs (800 µs models 6X and 6A)	
response time (dark/light)	5 ms (8 ms models 6X and 6A)	
power on delay	≤ 85 ms	
power supply protections	polarity reversal, transient	
output protections	short circuit (autoreset)	
sensitivity adjustment	trimmer	
operative temperature range	0 ... +50°C (without freeze)	
temperature drift	≤ 10%	
interference to external light	1000 lux (incandescent lamp) 1500 lux (sunlight)	
IP mechanical protection degree	IP67 (IP69K 9K version)	
LED indicators	green (emitter) red, yellow (receiver)	
housing materials	PBT (PC 9K version)	
optic materials	PC	
tightening torque	25 Nm	
weight	230 g connector / 300 g cable	

(1) Guaranteed resolution everywhere in the detection area
(2) Guaranteed resolution in the central part of the detection area
(3) As note (2), but with sensivity adjustment
(4) NC output models available on request
Dark zones are parts of the detection area close to the emitter and receiver, their amplitude X is proportional to the distance D between the emitter and the receiver.
BX04 => X = 0,17D
BX10 => X = 0,06D

electrical diagrams of the connections

BX04 - BX10 emitter	BX04 - BX10 receiver

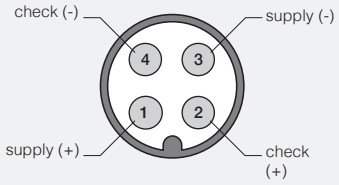


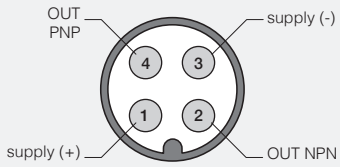


BN	brown
BU	blue
BK	black
WH	white

plug

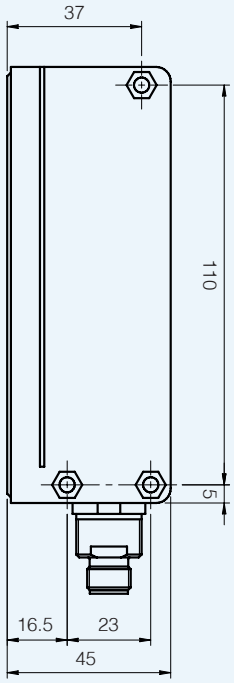
BX04 - BX10 emitter	BX04 - BX10 receiver

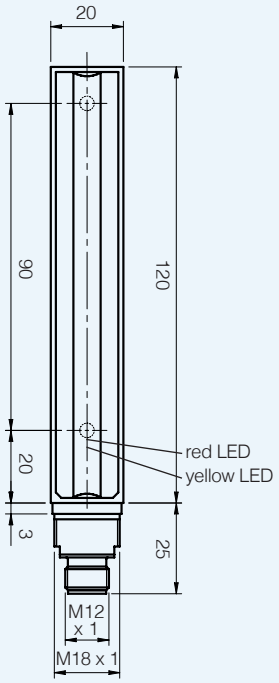


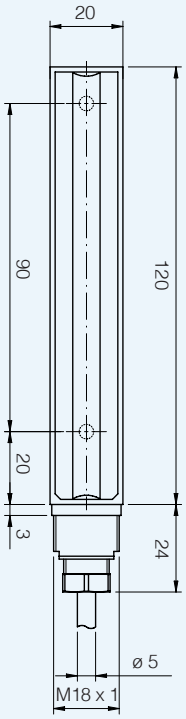


dimensions (mm)

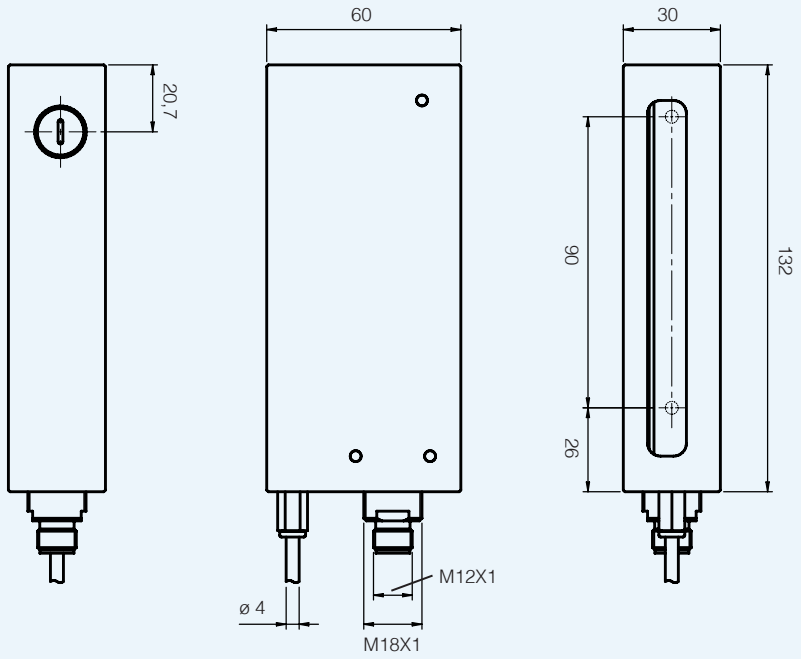
BX04*/-**, BX10*/**-****



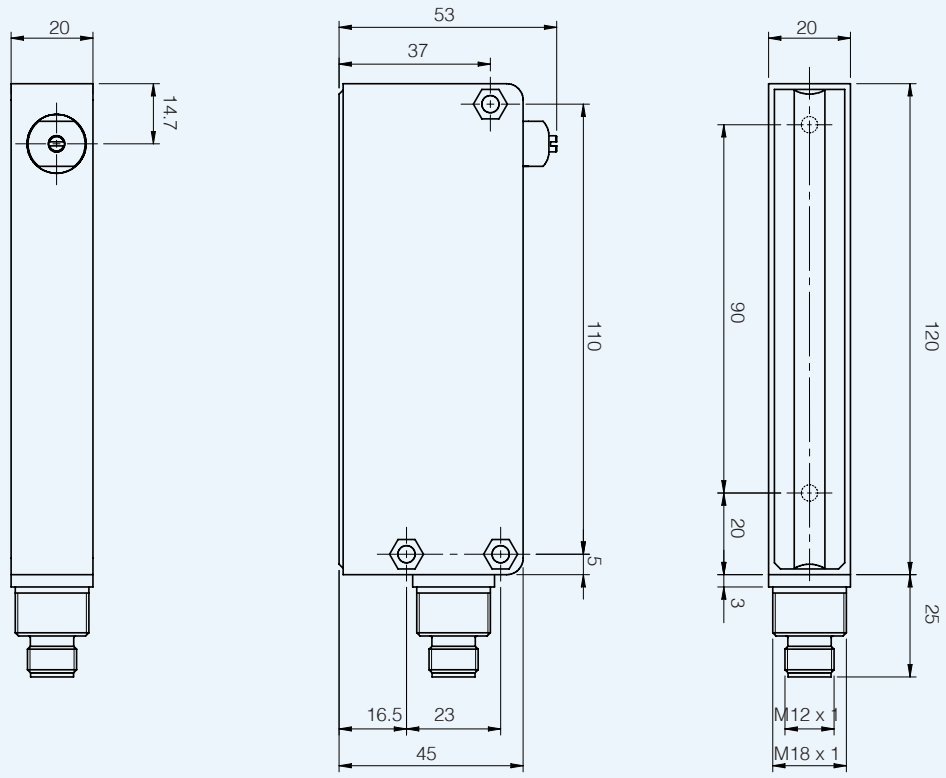




BX10*/**-**79

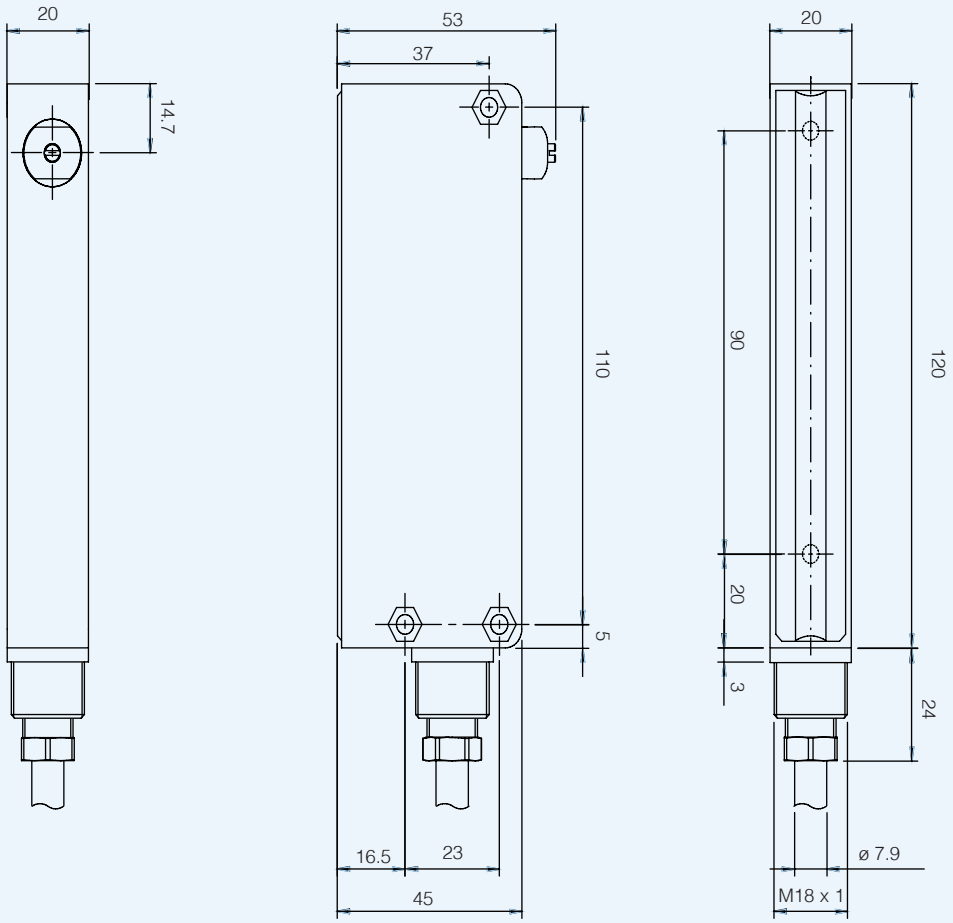


BX04*/**-**9K, BX10*/**-0H9K



dimensions (mm)

BX04*/**-**AT, BX10*/**-**AT



BX80 series

High resolution cubic housing area sensor

features

- **Controlled heightt 70 mm**
- **Operating distance up to 2 m**
- **Microprocessor based circuit**
- **Sensitivity adjustment**
- **Strong cubic housing**
- **Special version with metallic enclosure for high-duty use**
- **Protection degree IP67**
- **Complete protection against electrical damages**

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- **Photos**
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IP69K CE cULus Ex

code description

BX80 A / 1 P - 0 H

series	BX80	High resolution area sensor
function	E	Emitter without sensitivity adjustment
	S	Emitter with sensitivity adjustment
	A	Receiver for object detection with limited crossed beam, logic output, NO/NC selectable
	B	Receiver for object detection with extended crossed beam, logic output, NO/NC selectable
range	1	Range 2 m, resolution ø 5-6 mm, response time 10 ms
	2	Range 1.5 m, resolution ø 5-6 mm, response time 10 ms
	3	Range 1 m, resolution ø 5-6 mm, response time 3 ms
	4	Range 0.6 m, resolution ø 3-6 mm, response time 2 ms
	5	Range 0.25 m, resolution ø 2 mm, response time 2 ms
output	P	PNP output
	N	NPN output
	0	Sender
housing	0	PBT standard body, with PC optic window
	1	PBT standard body, with PC optic window + aluminium enclosure with air cooling system
	2	PBT standard body, with PC glass optic window
cable / connector	A	Cable 2 m
	H	M12 male connector
version		Standard version
	2D	All logic output receivers, 100 ms delay on dark/light commutation of logic output
	6X	All the codes with 1 position 3, increased reading distance to 2.5 m
	3E	BX80S/50-0H3E, BX80B/0*-0H3E special version for envelopes detection with the follow spec.: operating distance = 200-500 mm; response time = 10 ms; minimum envelope dimension = 1x70 mm
	9K	Models with IP69K protection
	AN	ATEX models 3 GD
	AT	ATEX models 2 GD

available models

PBT standard body with PC optic window					receiver	
area (mm)	response time (ms)	distance	distance (mm)	emitter	PNP NO/NC	NPN NO/NC
70	10	0...2 m	Ø 6	BX80S/10-0H	BX80A/1P-0H	BX80A/1N-0H
		0.3...2 m	Ø 5		BX80B/1P-0H	BX80B/1N-0H
		0...1.5 m	Ø 6	BX80S/20-0H	BX80A/2P-0H	BX80A/2N-0H
		0.3...1.5 m	Ø 5		BX80B/2P-0H	BX80B/2N-0H
	3	0...1 m	Ø 6	BX80S/30-0H	BX80A/3P-0H	-
		0.5...1 m	Ø 5		BX80B/3P-0H	-
	2	30...600 mm	Ø 6	BX80S/40-0H	BX80A/4P-0H	-
		550...660 mm	Ø 3		BX80B/4P-0H	-
		90...250 mm	Ø 2	BX80S/50-0H	BX80A/5P-0H	-
	10	200...500 mm	1 X 70	BX80S/50-0H3E	BX80A/5P-0H	-

PBT standard body with PC optic window + aluminium enclosure					receiver
area (mm)	response time (ms)	distance	resolution (mm)	emitter	PNP NO/NC
70	10	0...2 m	Ø 6	BX80S/10-1H	BX80A/1P-1H
		0,3...2 m	Ø 5		BX80B/1P-1H
		0.3...2.5 m		BX80S/10-1H6X	BX80B/1P-1H6X
		0...1.5 m	Ø 6	BX80S/20-1H	BX80A/2P-1H
		0.3...1.5 m	Ø 5		BX80B/2P-1H
	3	0...1 m	Ø 6	BX80S/30-1H	BX80A/3P-1H
		0.5...1 m	Ø 5		BX80B/3P-1H
	2	30...600 mm	Ø 6	BX80S/40-1H	BX80A/4P-1H

PBT standard body, glass optic window					receiver
area (mm)	response time (ms)	distance (m)	resolution (mm)	emitter	PNP NO/NC
70	10	0...2	Ø 6	BX80S/10-2H	BX80A/1P-2H
		0.3...2	Ø 5		BX80B/1P-2H
		0.3...2.5		BX80S/10-2H6X	BX80B/1P-2H6X
		0...1.5	Ø 6	BX80S/20-2H	BX80A/2P-2H
		0.3...1.5	Ø 5		BX80B/2P-2H
	3	0...1	Ø 6	BX80S/30-2H	BX80A/3P-2H

PBT standard body, glass optic window					receiver
area (mm)	response time (ms)	distance	resolution (mm)	emitter	PNP NO/NC
70	3	0...1 m	Ø 6	BX80S/30-2H	BX80A/3P-2H
		0.5...1 m	Ø 5		BX80B/3P-2H
	2	30...600 mm	Ø 6	BX80S/40-2H	BX80A/4P-2H
		90...250 mm	Ø 2	BX80S/50-2H	BX80A/5P-2H
	10	200...500 mm	1 X 70	BX80B/50-2H3E	BX80A/5P-2H

Models with cable exit (2 m): replace H with A in the code (BX80*/**-*H becomes BX80*/**-*A)

technical specification

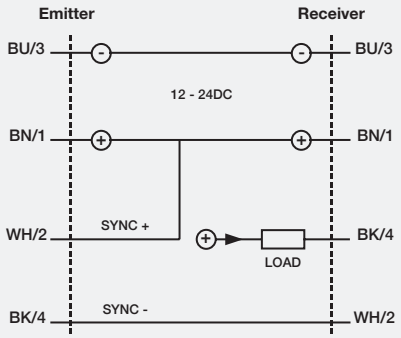
	BX80*/1*-**	BX80*/2*-**	BX80*/3*-**
			
nominal sensing distance	2 m	1,5 m	1 m
response time	max. 10 ms		max. 3 ms
controlled height	70 mm		
n° of beams	12		
beam pitch	6 mm		
minimum detectable object	ø 6 mm (BX80A/*), ø 5 mm (BX80B/*)		
minimum operating distance	0 (BX80A/*), 300 mm (BX80B/1 e BX80B/2), 500 mm (BX80B/3)		
hysteresis	max.15%		
repeatibility	5 %		
tolerance	0/20% of the nominal sensing distance Sn		
operating voltage	12-24 Vcc (standard)		
ripple	10 %		
no-load supply current	50 mA (receiver), 100 mA (emitter)		
load current	100 mA max		
leakage current	10 µA (at max operating voltage)		
voltage drop	1.2 V max. (IL = 100 mA)		
output type	NPN or PNP - NO/NC selectable PNP NO/NC selectable		
connection	M12 4 pin connector cable 2 m,M12 5 pin connector cable 2 m (BX80D/*)		
excess gain	2° (at nominal distance Sn)		
angular displacement	3° (emitter) - 6° (receiver) at Sn distance		
emission	infrared (880 nm)		
power on delay	500 ms		
power supply protections	reversal polarity and voltage transient		
output protections	short circuit (auto reset)		
operating temperature range	-25°...+50°C (without freeze)		
storage temperature	-40°...+80°C		
temperature drift	10% Sr		
external light	1.500 lux max. (incandescent lamp), 4.500 lux max. (sunlight)		
IP mechanical protection	IP67 (IP69K 9K version)		
emitter LED	green (supply), red (alarm sync.), yellow (area state)		
receiver LED	green (supply), red (alignment), yellow (output state)		
housing material	PBT (PC 9K version)		
lens materal	PC		
tightening torque	25 Nm max.		
wight (approximate)	260...300 g connector / 800..820 g cable		

technical specification

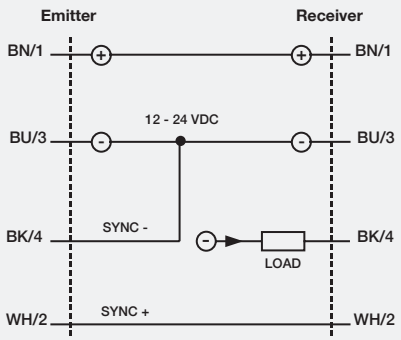
	BX80*/4*-**	BX80*/5*-**
		
nominal sensing distance Sn	0.6 m	0.25 m
response time	max. 2 ms	
controlled height	70 mm	
n° of beams	12	
beam pitch	6 mm	
minimum detectable object	ø 6 mm (BX80A/4), ø 2 mm (BX80B/4), ø 3 mm (BX80D/4)	
minimum operating distance	30 (BX80A/4), 90 mm (BX80B/5), 550 mm (BX80B/4)	
hysteresis	max.15%	
repeatibility	5 %	
tolerance	0/20% of the nominal sensing distance Sn	
operating voltage	12-24 Vcc (standard)	
ripple	10 %	
no-load supply current	50 mA (receiver), 100 mA (emitter)	
load current	100 mA max	
leakage current	10 µA (at max operating voltage)	
voltage drop	1.2 V max. (IL = 100 mA)	
output type	NPN or PNP- NO/NC selectable	
connection	M12 plug 4 pins cable 2 m	
excess gain	2° (at nominal distance Sn)	
angular displacement	3° (emitter) - 6° (receiver) at Sn distance	
emission	infrared (880 nm)	
power on delay	500 ms	
power supply protections	reversal polarity and voltage transient	
output protections	short circuit (auto reset)	
operating temperature range	-25°...+50°C (without freeze)	
storage temperature	-40°...+80°C	
temperature drift	10% Sr	
external light	1,500 lux max. (incandescent lamp), 4,500 lux max. (sunlight)	
IP mechanical protection	IP67 (EN 60529) - IP69K (special models)	
emitter LED	green (supply), red (alarm sync.), yellow (area state)	
receiver LED	green (supply), red (alignment), yellow (output state)	
housing material	PBT (PC 9K version)	
lens materal	PC	
tightening torque	25 Nm max.	
wight (approximate)	260...300 g connector / 800...820 g cable	

electrical diagrams of the connections

NPN output



PNP output

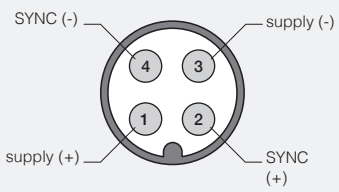


BN	brown
BU	blue
BK	black
WH	white

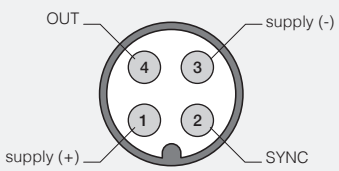
Maximum synchronism cable length : 10 m.

plug

emitter

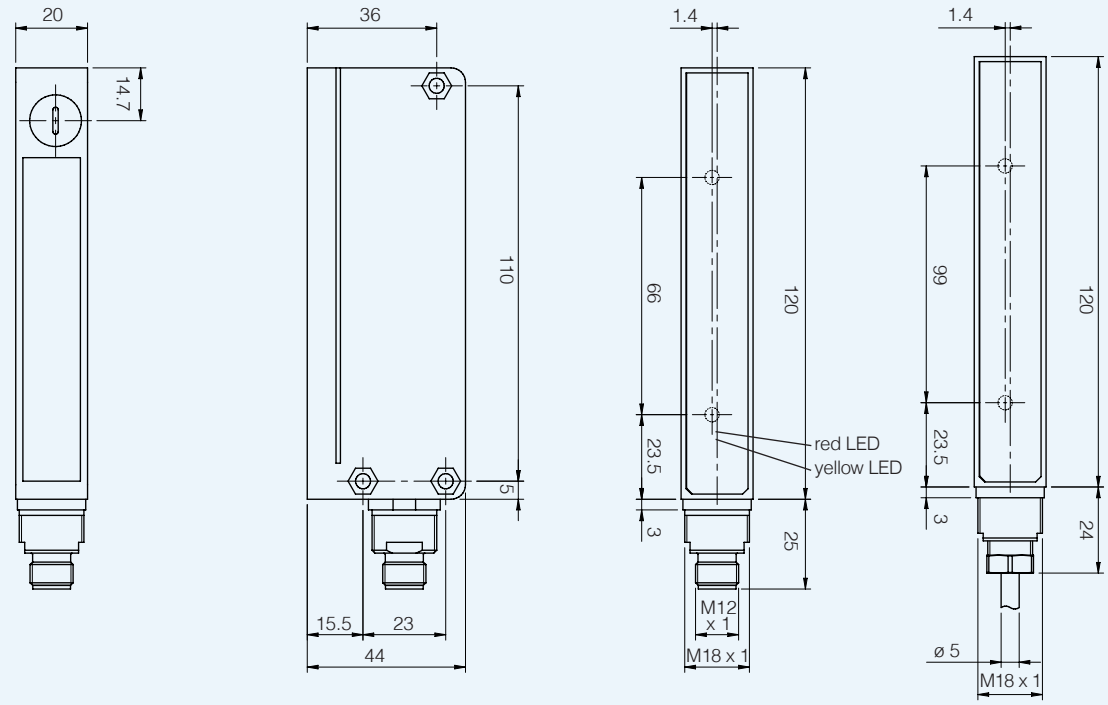


receiver



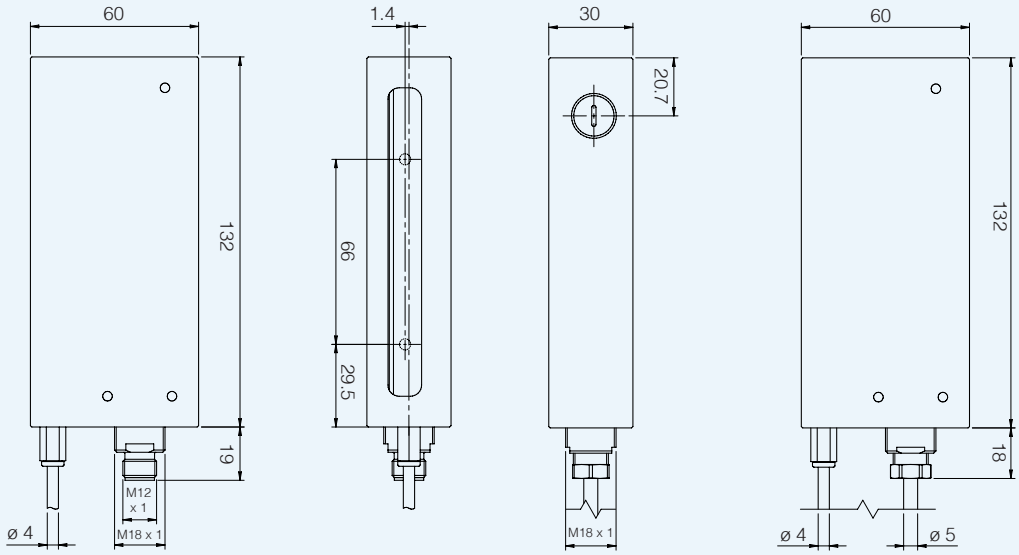
dimensions (mm)

BX80*/**-**

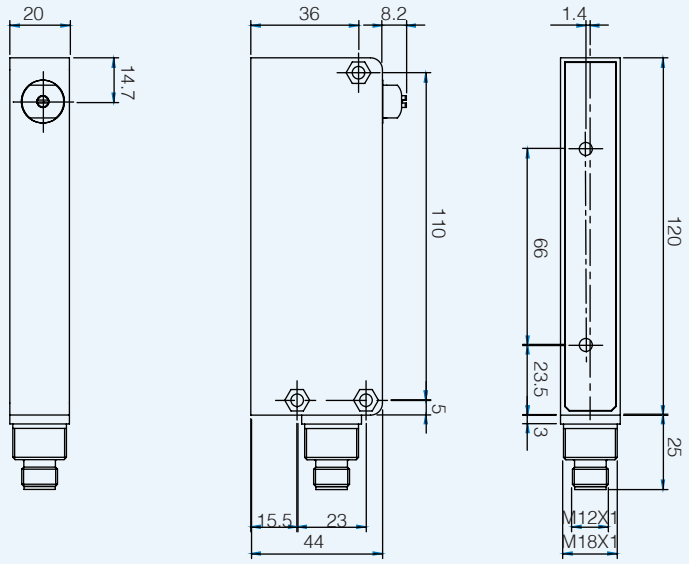


dimensions (mm)

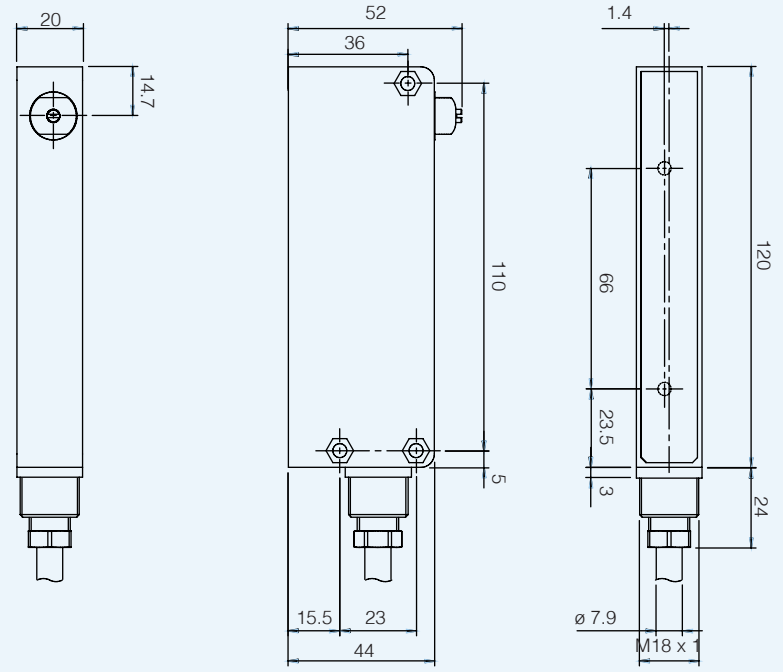
BX80*/**-1H



BX80*/**-0H9K



BX80*/**-AT



diagnostics

LED	state	conditions	check
GREEN receiver Supply	stable on	supply is present and stable	-
	unstable on	supply is present but not stable	supply
	off	no supply or voltage lower than 8Vdc	supply
RED receiver Allignment	full on	no alignment	alignment (1)
	light on	partial alignment or short signal	orientamento (1)
	off	correct alignment and sufficient signal	-
	blinking on	receiver does not function correctly or output short circuit	wiring or failure
YELLOW receiver Supply	on	output in ON state	-
	off	output in OFF state	-
GREEN emitter Supply	stable on	supply is present and stable	-
	unstable on	supply is present but not stable	supply
	off	no supply or voltage lower than 8Vdc	supply
RED emitter Sync. alam	off	synchronism property received	-
	on	syncronism is not received or emitted	wiring or failure
YELLOW emitter Area state	on	engaged area or uncorrect alignment	alignment (1)
	off	free area or correct alignment	-

(1) By free area

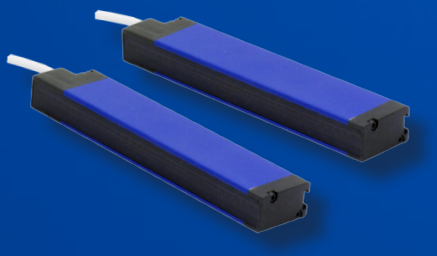
notes

CX0 series

Area sensors with high resolution and compact housing

features

- **Total crossbeam through all the optics**
- **Crossed area 160 and 320mm**
- **Pitch 5mm and 10mm**
- **Operating distance up to 3m (for 5mm pitch) and 6m (for 10mm pitch)**
- **2 digital NPN and PNP outputs (teach-in model available only with PNP logic) NO/NC configurable**
- **Available with Teach in adjustment or with external trimmer**
- **High switching frequency to detection**
- **Intrinsic synchronism by cable (Teach-in models)**



web contents

- **Application notes**
- **Photos**
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code description

CX0 E 1 R P / 05 - 016 V

series	CX0	Area Sensor cubic section
emitter	E	Emitter
emitter type	0	Emitter with I/O standard configuration
	1	Emitter with special I/O configuration: input Teach-in instead of test
receiver	R	Receiver
receiver type	P	Receiver with PNP output
	B	Receiver with two digital outputs (NPN / PNP)
pitch	05	Pitch 5 mm
	10	Pitch 10 mm
height	016	Controlled height 160 mm
	032	Controlled height 320 mm
output	V	Output cable length 220 mm with M12 pigtail
special function		Standard version
	1	Emitter and receiver with CX0 common wire and Teach-in emitter

available models

OUTPUT			INPUT			beams number	pitch (mm)	plot (P/I) [3]	working range (m)	detection height (h)	KIT (E + R) [2]
state	logic	output	blanking	test	adjustment						
NO/NC	NPN + PNP	2	-	●	External Trimmer [1]	32	5	I	0.3...3	160 mm	CX0E0RB/05-016V
						17	10		0.5...6		CX0E0RB/10-016V
						32			1...6	320 mm	CX0E0RB/10-032V
	PNP	1		-	Teach-In		5		0.3...3	160 mm	CX0E1RP/05-016V
						17	10		0.5...6		CX0E1RP/10-016V
						32			1...6	320 mm	CX0E1RP/10-032V

[1] External trimmer ST 140 sold separately [2] Sales code; single code (emitter or receiver) not available [3] Plot: P = parallel beams, I = crossed beams

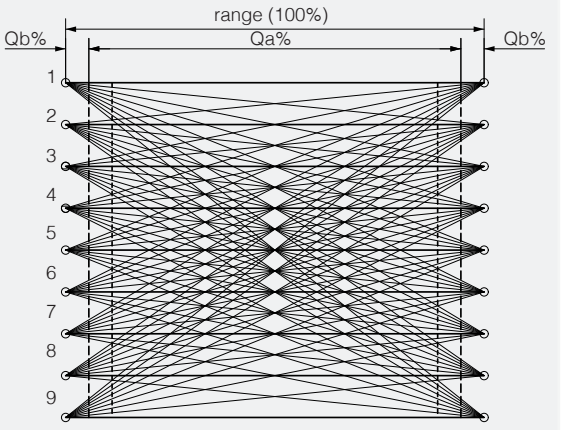
technical specifications

	CX0E*R*/**-***
	
nominal sensing distance	0.3 ... 3 m (beam pitch 5 mm, detection height 160 mm) 0.5 ... 6 m (beam pitch 10 mm, detection height 160 mm) 1 ... 6 m (beam pitch 10 mm, detection height 320 mm)
emission	850 nm (beam pitch 5 mm) 880 nm (beam pitch ≥10 mm)
operating voltage	16.8...30 Vdc
ripple	< 1.2 Vpp
power consumption (receiver)	1...1.5 W
power consumption (emitter)	1...1.5 W
outputs	1 x PNP, 1 x NPN (CX0RB); 1 x PNP (CX0RP)
output current	< 100 mA
output voltage drop	< 1.5 V @ 100 mA
minimum load resistance	280 Ω
leakage current	≤ 10 µA
tolerated capacitive load	< 0.7 µF
power on delay	200 ms
Teach-In	< 15 s
response time	< 6.6 ms Dark On; < 11 ms Light On
operating temperature	-10°C...55°C
storage temperature	-25°C...60°C
artificial light rejection	IEC EN 60947-5-2
ambient light rejection	IEC EN 60947-5-2
IP mechanical protection	IP67
humidity	95% max (no condensation)
vibrations	IEC EN 60947-5-2
shocks	IEC EN 60947-5-2
cable length	< 20 m
connectors / cables	1 x M12, 4 poles, male (CX0E), 1 x M12, 5 poles, male (CX0R)
housing material	painted alluminium RAL5002
optic materials	PMMA

MDO (Minimum Detectable Object)

beams	step (mm)	resolution [1] (mm)	Qa 17 beams	Qa 32 beams
crossed [2]	5	2,5	-	96%
	10	5	93%	

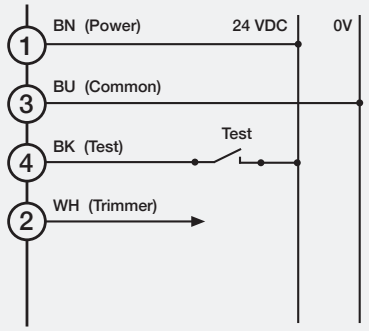
total crossed-beam



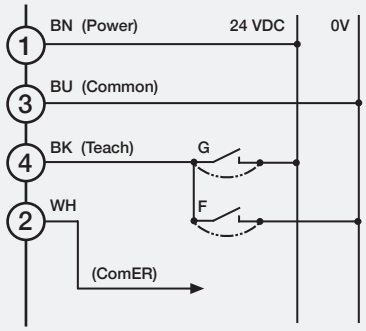
[1] = Resolution detected with ST140 or with Teach Gross
[2] = The optics cross beam allows detection of objects with a very small diameter or very thin (such as a sheet of paper or an envelope). For those targets with small diameter, the detecting resolution is less effective exactly in the centre between Emitter and Receiver (see Resolution) as well as at the ends of detection area (near to the sensors); the mentioned detection is obtained in the central area Qa with a width equal to a certain % of the distance between the 2 sensors.

electric diagrams of the connections

emitter with external trimmer

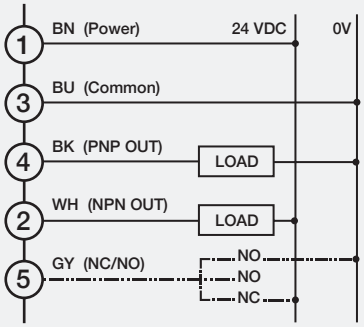


emitter with Teach-In input

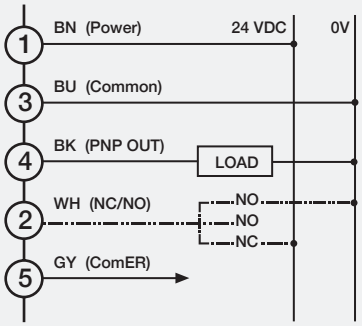


BU	blue
GY	gray
WH	white
BK	black
BN	brown
RD	red
G	gross calibration
F	fine calibration

receiver with PNP and NPN output



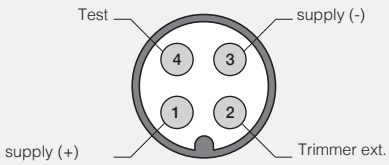
receiver with PNP output and Teach-In function



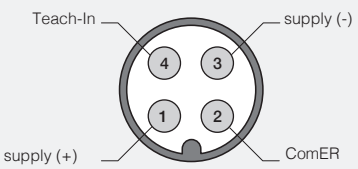
BU	blue
GY	gray
WH	white
BK	black
BN	brown
RD	red

plugs

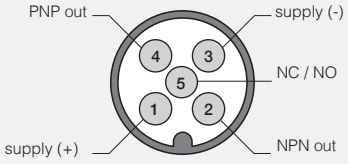
CX0E0/**-**-** emitter with external trimmer



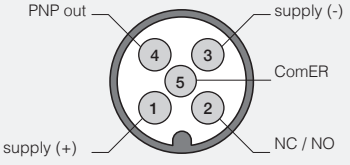
CX0E1/**-**-** emitter with Teach-In input



CX0RB/**-**-** receiver with PNP and NPN output



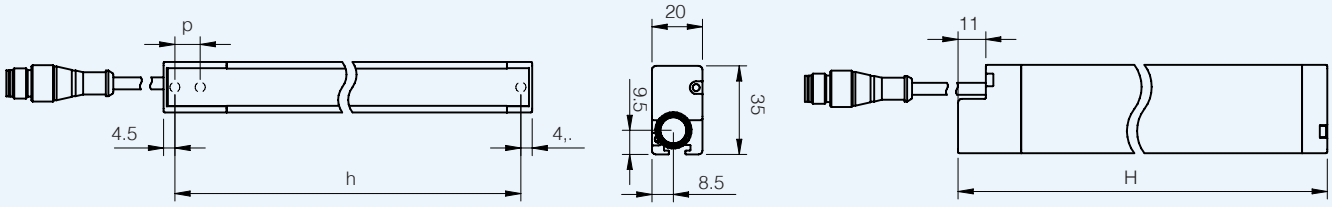
CX0RP/**-**-** receiver with PNP output and Teach-In function



dimensions (mm)

CX0/-****

H (barrier height) = h (controlled height) + 9 mm

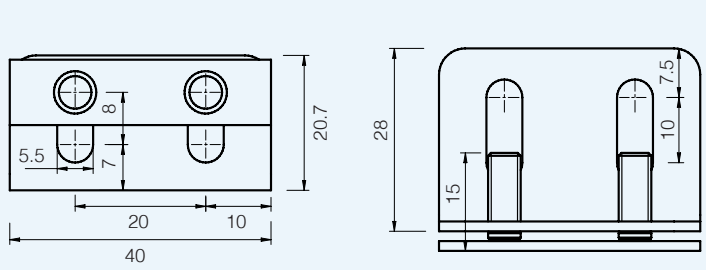


h (mm)	160	320	480	640	800	960
H (mm)	169	329	489	649	809	969

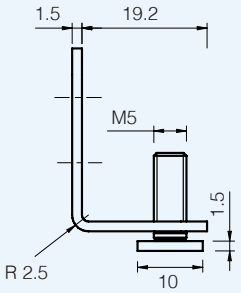
dimensions (mm)

accessories included with all models

accessories fixing kit ST151



T insert, two M5 nuts and split washers included



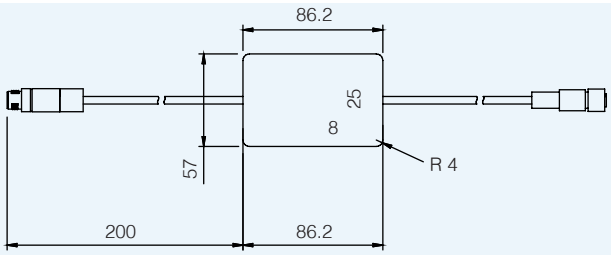
L bracket

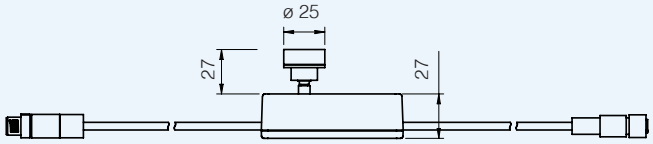
code	description
ST4V S	4 pcs. kit antivibration basement for barriers with 150 mm protected height
ST8V S	8 pcs. kit antivibration basement for barriers with protected height from 1,500 mm to 1,050 mm

accessories

not included

accessory for external adjustment ST 140





*Necessary for the adjustment for CX0E0RB models. Sale separately.

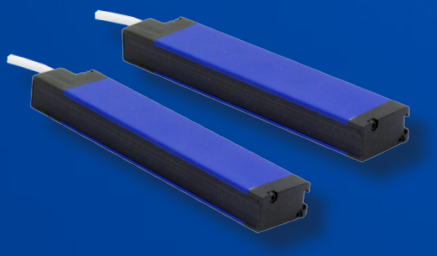
code	description
CD12M/0B-050A1	power connector M12, 4 wires, female, axial, cable 5 m PVC
CD12M/0B-100A1	power connector M12, 4 wires, female, axial, cable 10 m PVC
CD12M/0B-150A1	power connector M12, 4 wires, female, axial, cable 15 m PVC
CD12M/0B-050A5	power connector M12, 4 wires, female, axial, cable 5 m PUR
CD12M/0B-100A5	power connector M12, 4 wires, female, axial, cable 10 m PUR
CD12M/0B-150A5	power connector M12, 4 wires, female, axial, cable 15 m PUR
CD12M/0H-050A5	power connector M12, 5 wires, female, axial, cable 5 m PUR
CD12M/0H-100A5	power connector M12, 5 wires, female, axial, cable 10 m PUR
CD12M/0H-150A5	power connector M12, 5 wires, female, axial, cable 15 m PUR

CX1 series

Area sensors with high resolution
and compact housing with digital output

features

- **Crossed beam (parallel beams for height with more of 33 beams)**
- **Optical synchronization**
- **Pitch 5mm and 10mm**
- **Control height up 480mm (pitch 5mm) and up 960mm (pitch10mm)**
- **Maximum operating distance up to 3m (for 5mm pitch) and 6m (for 10mm pitch)**
- **NPN and PNP digital outputs**
- **For a correct use it is necessary to manually adjustment the emitter (accessory ST140)**



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code description

CX1 E 0 R B / 05 - 016 V

series	CX1	Area Sensor cubic section
emitter	E	Emitter
emitter type	0	Emitter with I/O standard configuration
receiver	R	Receiver
receiver type	B	Receiver with two digital outputs (NPN / PNP)
pitch	05	Pitch 5 mm
	10	Pitch 10 mm
height	016	Controlled height 160 mm
	032	Controlled height 320 mm
	048	Controlled height 480 mm
	064	Controlled height 640 mm
	080	Controlled height 800 mm
	096	Controlled height 960 mm
output	V	Output cable length 220 mm with M12 pigtail

available models

OUTPUT			INPUT			beams number	pitch (mm)	plug (P/I) [3]	working range (m)	detection height (mm)	KIT (E + R)
state	logic	output	blanking	test	adjustment						
NO/NC	NPN + PNP	2	-	●	External Trimmer [1]	33	5	I	0.3...3	160	CX1E0RB/05-016V
						65		P		320	CX1E0RB/05-032V
						97				480	CX1E0RB/05-048V
						17	10	I	0.3...6	160	CX1E0RB/10-016V
						33				320	CX1E0RB/10-032V
						49		P		480	CX1E0RB/10-048V
						65				640	CX1E0RB/10-064V
						81				800	CX1E0RB/10-080V
						97				960	CX1E0RB/10-096V

[1] External trimmer ST 140 sold separately [2] Sales code; single code (emitter or receiver) not available [3] Plot: P = parallel beams, I = crossed beams

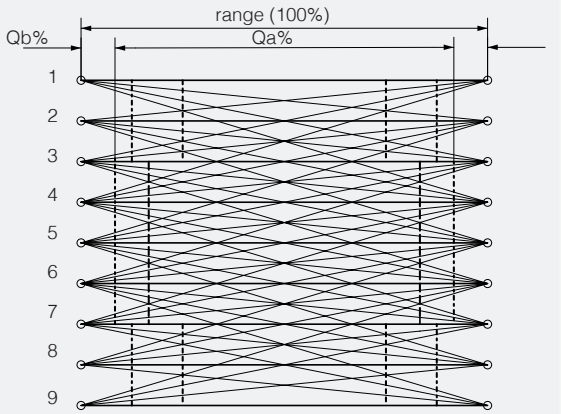
technical specifications

	CX1E*R*/**-***
	
nominal sensing distance	0.3 ... 6 m (beam pitch 10 mm) 0.3... 3 m (beam pitch 5 mm)
emission	850 nm (beam pitch 5mm) 880 nm (beam pitch ≥10mm)
operating voltage	16.8...30 Vdc
ripple	< 1.2 Vpp
power consumption (receiver)	1...1.5 W
power consumption (emitter)	1...1.5 W
output	1 x PNP, 1 x NPN
output current	< 100 mA
output voltage drop	< 1.5 V @ 100 mA
minimum load resistance	280 Ω
leakage current	≤ 10 µA
tolerated capacitive load	< 0.7 µF
power on delay	200 ms
Teach-In	< 15 s
response time	< 17 ms
operating temperature	-10°C...55°C
storage temperature	-25°C...60°C
artificial light rejection	IEC EN 60947-5-2
ambient light rejection	IEC EN 60947-5-2
IP mechanical protection	IP67
humidity	95% max (no condensation)
vibrations	IEC EN 60947-5-2
shocks	IEC EN 60947-5-2
cable length	< 20 m
connectors / cables	1 x M12, 4 poles, male (CX1E), 1 x M12, 5 poles, male (CX1R)
housing material	painted aluminium RAL5002
optic materials	PMMA

MDO (Minimum Detectable Object)

beams	step (mm)	resolution [1] (mm)	qa 17 beams	qa 32 beams
crossed [2]	5	2,5	-	80%
	10	5	80%	

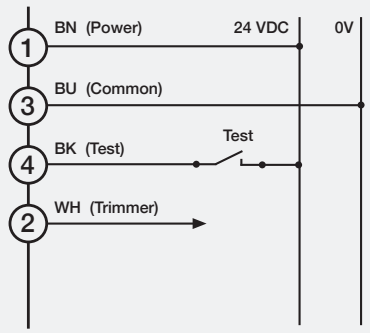
crossed-beam 5+1+5



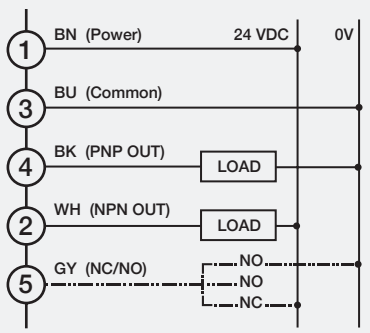
[1] = Resolution detected with ST140
[2] = The optics cross beam allows detection of objects with a very small diameter or very thin (such as a sheet of paper or an envelope). For those targets with small diameter, the detecting resolution is less effective exactly in the centre between Emitter and Receiver (see Resolution) as well as at the ends of detection area (near to the sensors); the mentioned detection is obtained in the central area Qa with a width equal to a certain % of the distance between the 2 sensors.

electric diagrams of the connections

emitter with external trimmer



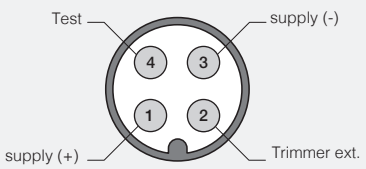
emitter with Teach-In input



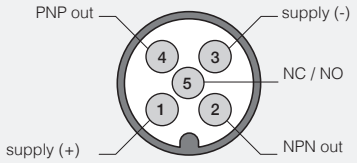
BU	blue
GY	gray
WH	white
BK	black
BN	brown
RD	red

plugs

CX1E0/**-**-** emitter with external trimmer

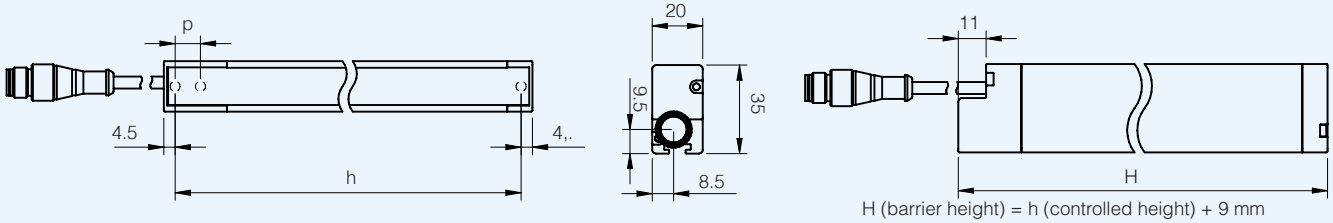


CX1RB/**-**-** emitter with Teach-In input



dimensions (mm)

CX1/**-**

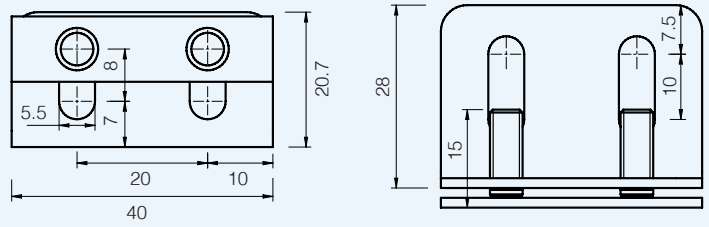


h (mm)	160	320	480	640	800	960
H (mm)	169	329	489	649	809	969

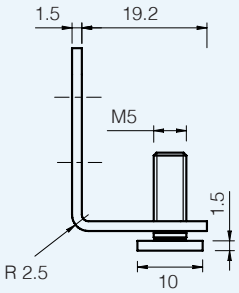
dimensions (mm)

included with all models

accessories fixing kit ST151



T insert, two M5 nuts and split washers included



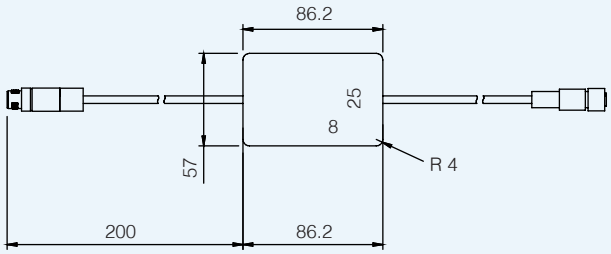
L bracket

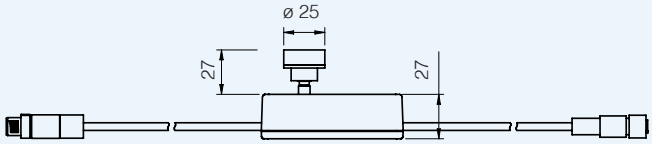
code	description
ST4V S	4 pcs. kit antivibration basement for barriers with 150 mm protected height
ST8V S	8 pcs. kit antivibration basement for barriers with protected height from 1,500 mm to 1,050 mm

accessories

not included

accessory for external adjustment ST 140





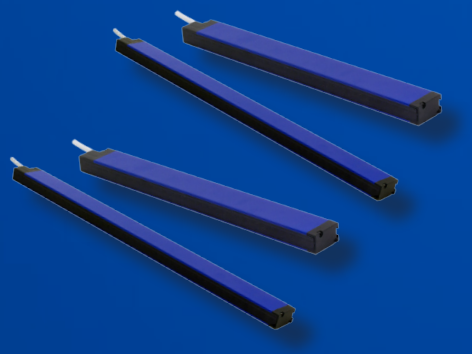
code	description
CD12M/0B-050A1	power connector M12, 4 wires, female, axial, cable 5 m PVC
CD12M/0B-100A1	power connector M12, 4 wires, female, axial, cable 10 m PVC
CD12M/0B-150A1	power connector M12, 4 wires, female, axial, cable 15 m PVC
CD12M/0B-050A5	power connector M12, 4 wires, female, axial, cable 5 m PUR
CD12M/0B-100A5	power connector M12, 4 wires, female, axial, cable 10 m PUR
CD12M/0B-150A5	power connector M12, 4 wires, female, axial, cable 15 m PUR
CD12M/0H-050A5	power connector M12, 5 wires, female, axial, cable 5 m PUR
CD12M/0H-100A5	power connector M12, 5 wires, female, axial, cable 10 m PUR
CD12M/0H-150A5	power connector M12, 5 wires, female, axial, cable 15 m PUR

CX2 series

Area sensors with high resolution and compact housing with digital and analogue output

features

- **Parallel beams and floating crossbeams with variable amplitude**
- **Synchronization by cable. Pitch 5, 10 and 20mm**
- **Control height up 480mm (pitch 5mm) and up 960mm (pitch10mm and 20mm)**
- **Maximum operating distance up to 3m (for 5mm pitch) and 6m (for 10mm and 20 pitch)**
- **Digital outputs NPN and PNP ; analogue current output (4...20mA) and analogue voltage output (0..10V), mix outputs : digital PNP and analogue voltage output (0..10V)**
- **Adjustment by teach-in , 2 levels of adjustment**
- **Blanking function . Available analogue versions TOP BEAM**



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- **Application notes**
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- **Catalogue / Manuals**

code description

CX2 E 0 R B / 05 - 016 V

series	CX2	Area Sensor cubic section
emitter	E	Emitter
emitter type	0	Emitter with I/O standard configuration
receiver	R	Receiver
receiver type	A	Receiver with two analogue outputs (voltage 0...10 V and current 4...20 mA)
	B	Receiver with two digital outputs (NPN and PNP)
	F	Receiver with one digital output PNP and one analogue output (voltage 0...10 V)
pitch	05	Pitch 5 mm
	10	Pitch 10 mm
	20	Pitch 20 mm
height	016	Controlled height 160 mm
	032	Controlled height 320 mm
	048	Controlled height 480 mm
	064	Controlled height 640 mm
	080	Controlled height 800 mm
	096	Controlled height 960 mm
output	V	Output cable length 220 mm with M12 pigtail
special function	TB	Analogue reading last led TOP BEAM (CX2RA)

available models

OUTPUT			INPUT			beams number	pitch (mm)	plot (P/I) [1]	working range (m)	detection height	KIT (E + R)
state	logic	output	blanking	test	adjustment						
NO/NC	NPN + PNP	2	●	●	Teach-In	33	5	I/P	0.3...3	160 mm	CX2E0RB/05-016V
						65		P		320 mm	CX2E0RB/05-032V
						97				480 mm	CX2E0RB/05-048V
						17	10	I/P	0.3...6	160 mm	CX2E0RB/10-016V
						33				320 mm	CX2E0RB/10-032V
						49		P		480 mm	CX2E0RB/10-048V
						65				640 mm	CX2E0RB/10-064V
						81				800 mm	CX2E0RB/10-080V
						97				960 mm	CX2E0RB/10-096V
						9	20			160 mm	CX2E0RB/20-016V
						17				320 mm	CX2E0RB/20-032V
						25				480 mm	CX2E0RB/20-048V
						33				640 mm	CX2E0RB/20-064V
						41				800 mm	CX2E0RB/20-080V
						49				960 mm	CX2E0RB/20-096V
	analog voltage output + analog current output					33	5		0.3...3	160 mm	CX2E0RA/05-016V
						65				320 mm	CX2E0RA/05-032V
						97				480 mm	CX2E0RA/05-048V
						17	10		0.3...6	160 mm	CX2E0RA/10-016V
						33				320 mm	CX2E0RA/10-032V
						49				480 mm	CX2E0RA/10-048V
						65				640 mm	CX2E0RA/10-064V
						81				800 mm	CX2E0RA/10-080V
						97				960 mm	CX2E0RA/10-096V
						9	20			160 mm	CX2E0RA/20-016V
						17				320 mm	CX2E0RA/20-032V
						25				480 mm	CX2E0RA/20-048V
						33				640 mm	CX2E0RA/20-064V
						41				800 mm	CX2E0RA/20-080V
						49				960 mm	CX2E0RA/20-096V
	PNP + analog voltage output					33	5	I/P	0.3...3	160 mm	CX2E0RF/05-016V
						65		P		320 mm	CX2E0RF/05-032V
						97				480 mm	CX2E0RF/05-048V
						17	10	I/P	0.3...6	160 mm	CX2E0RF/10-016V
						33				320 mm	CX2E0RF/10-032V
						49		P		480 mm	CX2E0RF/10-048V
						65				640 mm	CX2E0RF/10-064V
						81				800 mm	CX2E0RF/10-080V
						97				960 mm	CX2E0RF/10-096V
						9	20			160 mm	CX2E0RF/20-016V
						17				320 mm	CX2E0RF/20-032V
						25				480 mm	CX2E0RF/20-048V
						33				640 mm	CX2E0RF/20-064V
						41				800 mm	CX2E0RF/20-080V
						49				960 mm	CX2E0RF/20-096V

[1] Plot: P = parallel beams, I = crossed beams

technical specifications

	CX2E*R*/**-***V
	
nominal sensing distance	0.1 ... 3 m (beam pitch 5 mm) 0.3 ... 6 m (beam pitch 10 mm)
emission	850 nm (beam pitch 5mm) 880 nm (beam pitch ≥10mm)
operating voltage	16.8...30 Vdc
ripple	< 1.2 Vpp
power consumption (receiver)	1...2.5 W
power consumption (emitter)	1...3 W
output	1 x PNP, 1 x NPN (CX2E0RB); 1 x analogue voltage output, 1 x analog current output (CX2E0RA); 1 x PNP, 1 X analogue votlage output (CX2E0RF)
output current	< 100 mA
output voltage drop	< 1.5 V @ 100 mA
minimum load resistance	280 Ω
leakage current	≤ 10 µA
tolerated capacitive load	< 0.7 µF
power on delay	< 3 sec(1)
Teach-In	(0.5 x N beams) sec
response time	((0.2 x (N beams - 1)) + 1) x 2 ms
operating temperature	-10°C...55°C
storage temperature	-25°C...60°C
artificial light rejection	IEC EN 60947-5-2
ambient light rejection	IEC EN 60947-5-2
IP mechanical protection	IP67
humidity	95% max (no condensation)
vibrations	IEC EN 60947-5-2
shocks	IEC EN 60947-5-2
cable length	< 20 m
connectors / cables	1 x M12, 4 poles, male (CX2E), 1 x M12, 8 poles, male (CX2R)
housing material	painted aluminium RAL5002
optic materials	PMMA

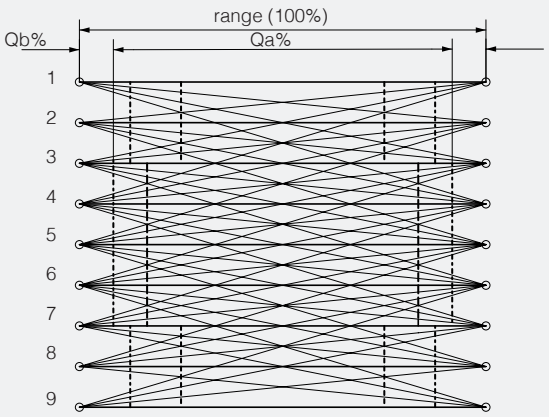
(1) Power on delay with blanking function: (1 x N beams) sec

MDO (Minimum Detectable Object)

beams	step (mm)	resolution [1] (mm)	qa 17 beams	qa 32 beams
crossed [2]	5	2,5	-	93%
	10	5	93%	
parallel	5	5	-	-
	10	10		
	20	20		

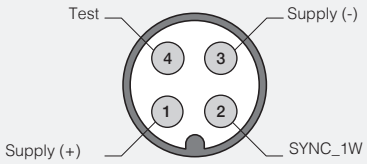
[1] = resolution detected with Teach Gross
[2] = the optics cross beam allows detection of objects with a very small diameter or very thin (such as a sheet of paper or an envelope). For those targets with small diameter, the detecting resolution is less effective exactly in the centre between Emitter and Receiver (see Resolution) as well as at the ends of detection area (near to the sensors); the mentioned detection is obtained in the central area Qa with a width equal to a certain % of the distance between the 2 sensors.

crossed-beam 8+1+8

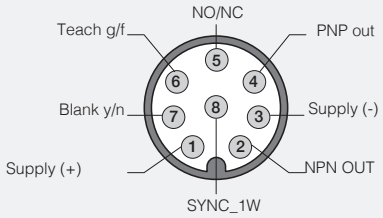


plugs

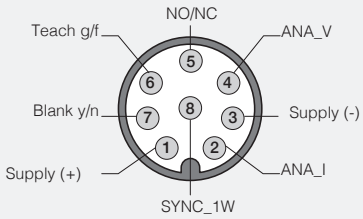
CX2E0/-**-**-** emitter with test input**



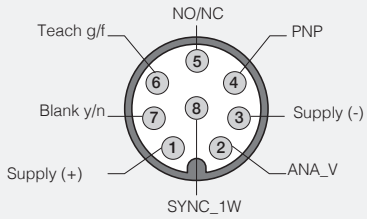
CX2RB/-**-**-** receiver with PNP and NPN output**



CX2RA/-**-**-** receiver with analog output**

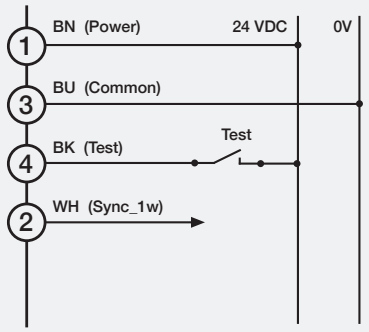


CX2RF/-**-**-** receiver PNP with analog output V**

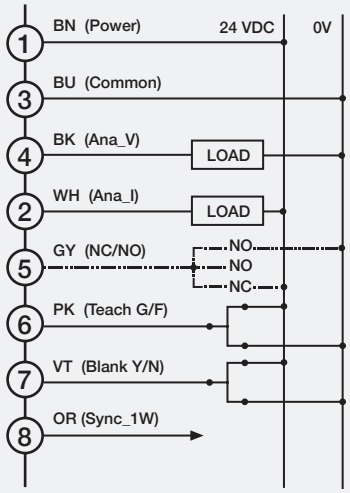


electric diagrams of the connections

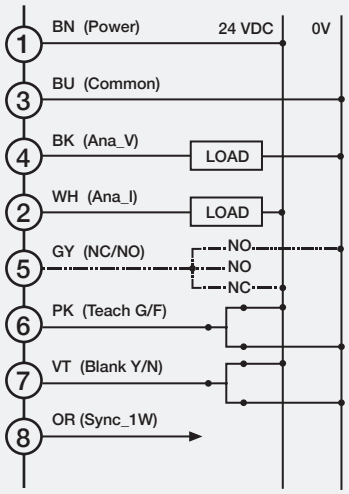
emitter with test input



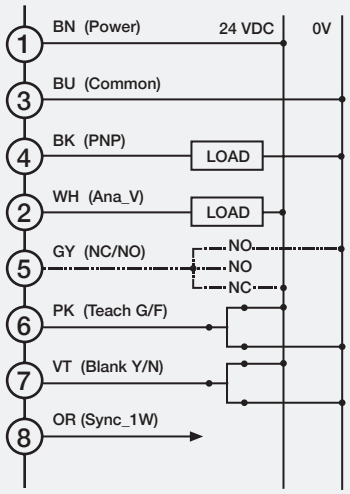
receiver with PNP and NPN output



receiver with analog output



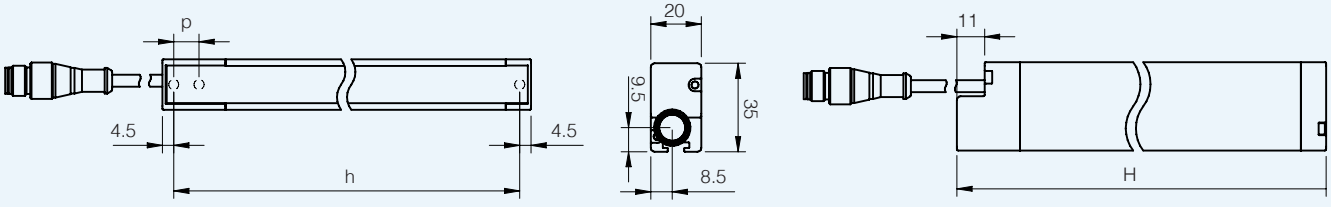
receiver PNP with analog output V



G	coarse calibration	F	fine calibration
BK	black	BU	blue
BN	brown	GY	gray
RD	red	WH	white
PK	pink	VT	violet
OR	orange		

dimensions (mm)

CX2/**-**



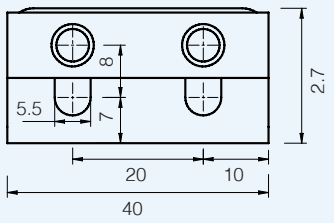
H (barrier height) = h (controlled height) + 9 mm

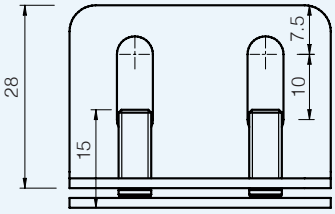
h (mm)	160	320	480	640	800	960
H (mm)	169	329	489	649	809	969

accessories

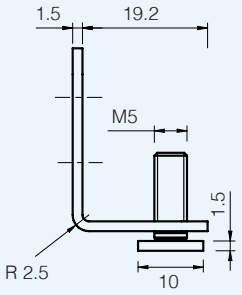
included with all models

accessories fixing kit ST151





T insert, two M5 nuts and split washers included



L bracket

code	description
ST4V S	4 pcs. kit antivibration basement for barriers with 150 mm protected height
ST8V S	8 pcs. kit antivibration basement for barriers with protected height from 1,500 mm to 1,050 mm

accessories

not included

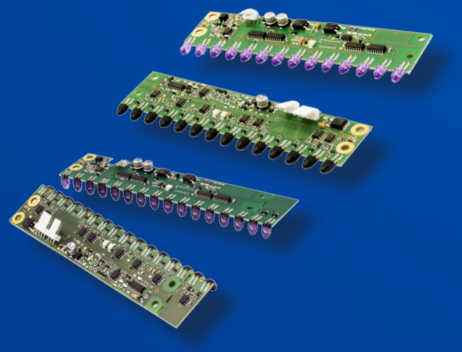
code	description
CD12M/0B-050A1	power connector M12, 4 wires, female, axial, cable 5 m PVC
CD12M/0B-100A1	power connector M12, 4 wires, female, axial, cable 10 m PVC
CD12M/0B-150A1	power connector M12, 4 wires, female, axial, cable 15 m PVC
CD12M/0B-050A5	power connector M12, 4 wires, female, axial, cable 5 m PUR
CD12M/0B-100A5	power connector M12, 4 wires, female, axial, cable 10 m PUR
CD12M/0B-150A5	power connector M12, 4 wires, female, axial, cable 15 m PUR
CD12M/0X-050A5	power connector M12, 8 wires, female, axial, cable 5 m PUR
CD12M/0X-100A5	power connector M12, 8 wires, female, axial, cable 10 m PUR
CD12M/0X-150A5	power connector M12, 8 wires, female, axial, cable 15 m PUR

NX series

Medium resolution area sensors
without housing

features

- **Complete protection against electrical damages**
- **LED indicators**
- **Crossed beams detection**
- **Without housing**
- **16 or 14 optics**
- **Detection of goods in automatic vending machines**
- **Detection of objects with irregular shape**



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code description

NX 16 SR / X A N - A 0 00

series	NX	Area sensor without housing
optics	16	16 optics (150 mm area height)
	14	14 optics (132 mm area height)
emitter / receiver	S	Emitter with sensitivity adjustment
	R	Receiver
	SR	Emitter + receiver kit
emitter / receiver	0	Emitter without check
	X	Emitter with check
	R	Receiver
output	0	Emitter
	A	NO output
	C	NC output
output	0	Emitter
	P	PNP output
	N	NPN output
optics	A	Axial optics
	C	Right angle optics
model	0	Standard model
	T	Moisture resistant model
output	00	Output without delay off
	10	100 ms output delay off
distance	-	Sensing distance 0,5...2 m
	20	Sensing distance 0,25...0,7 m

available models

function	optics	adjust.	check	output	moisture resistant	delay (ms)	distance (m)	model
emitter + receiver	14 axial	•	•	NPN - NO	-	100	0,.5...2	NX14SR/XAN-A010
				PNP - NO		-		NX14SR/XAP-A000
	14 right angle							NX14SR/XAP-C000
						100		NX14SR/XAP-C010
	14 axial			NPN - NC	•			NX14SR/XCN-AT10
	14 right angle				-			NX14SR/XCN-C010
					•			NX14SR/XCN-CT10
				PNP - NC		-		NX14SR/XCP-C000
	16 axial			NPN - NO	-	100		NX16SR/XAN-A010
	16 right angle					-		NX16SR/XAN-C000
								NX16SR/XAN-C010
					•			NX16SR/XAN-CT10
	16 axial			PNP - NO	-			NX16SR/XAP-A010
	16 right angle							NX16SR/XAN-C010
	16 axial			NPN - NC				NX16SR/XCN-A010
					•	100		NX16SR/XCN-AT10
	16 right angle				-			NX16SR/XCN-C010
					•			NX16SR/XCN-CT10
	axial			NPN - NO	-		0.25...0.7	NX16SR/XAN-A01020
	right angle				•			NX16SR/XAN-CT1020
				PNP - NO	-			NX16SR/XAP-C01020
	axial			NPN - NC				NX16SR/XCN-AT1020

technical specification

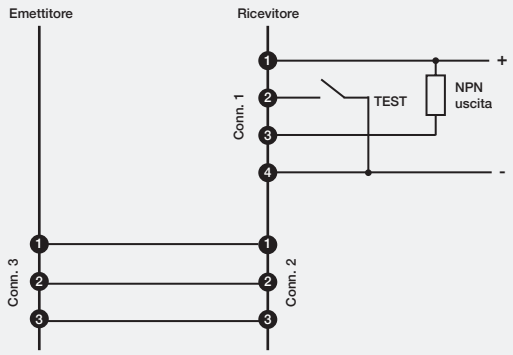
	NX**SR/***-*****20	NX**SR/***-*****
		
type	medium resolution area sensor with 16/14 optics, step 10 mm	
nominal sensing distance	0.25...0.7 m 880 nm (beam pitch ≥10mm)	0.5...2 m 880 nm (beam pitch ≥10mm)
emission	infrared (880 nm), modulated	
controlled height	150 mm (16 optics) ; 132 mm (14 optics)	
minimum sensing distance	0.25 m	0.5 m
minimum detectable object	ø15 (1) / ø 7.5 (2) / ø 5 (3) mm	
hysteresis	< 10%	
supply voltage	10 – 26 Vdc	
ripple	10%	
no-load supply current	150 mA (emitter) – 25 mA (receiver)	
output current	100 mA	
leakage current	< 10 µA (a Vdc max.)	
voltage drop	2 V a 100 mA	
output type	NPN or PNP open collector, NO or NC	
input	check input	
response time (Light/Dark)	500 µsec	
response time (Light/Dark)	7 ms	
power on delay	< 85 ms (switch on delay)	
output delay	100 ms (according to models)	
power supply protections	polarity reversal - transient	
output protection	short circuit (autoreset)	
temperature range	-0 /+ 55 °C (without freeze)	
interference to external light	1000 lux (incandescent lamp) 1500 lux (sunlight)	
IP mechanical protection	not defined	
emitter LED	yellow (supply and emission active)	
receiver LED	red (signal level) – Yellow (output state active)	
housing material	No housing. Mechanical and electrical protections of the PCB have to be submitted to the machine structure	
connections	With PCB connectors / Emitter, Conn. 3 MOLEX 22-05-7038 - Positive, Check, Common / Receiver, Conn. 1 MOLEX 22-05-7038 - Positive, Check, Common / Receiver, Conn. 2 MOLEX 22-05-7048 Positive, Check, Output, Common	
dimensions	157 x 36 x 18 mm (16 optics) - 140 x 36 x 18 mm (14 optics)	
weight (approximate)	104 g	

(1) Guaranteed resolution everywhere in the detection area
(2) Guaranteed resolution in the central part of the detection
(3) As note (2), but with sensivity adjustment

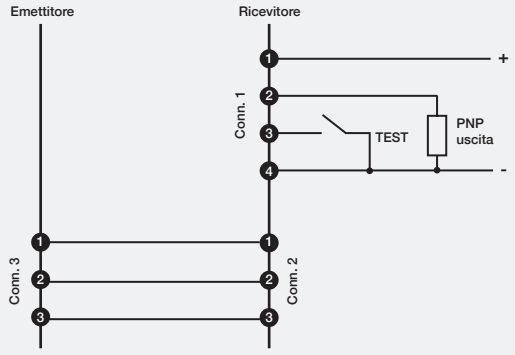
Dark zones are parts of the detection area close to the emitter and receiver, their amplitude X is proportional to the distance D between the emitter and the receiver. X=0.06D.

electrical diagrams of the connections

NPN output



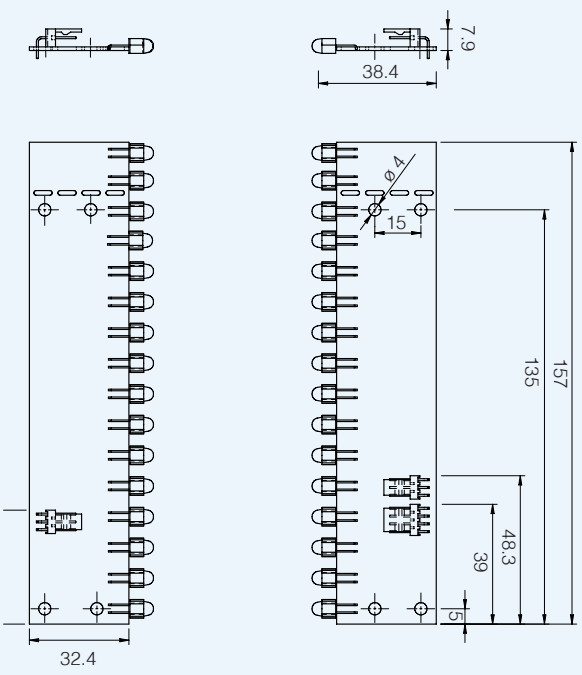
PNP output



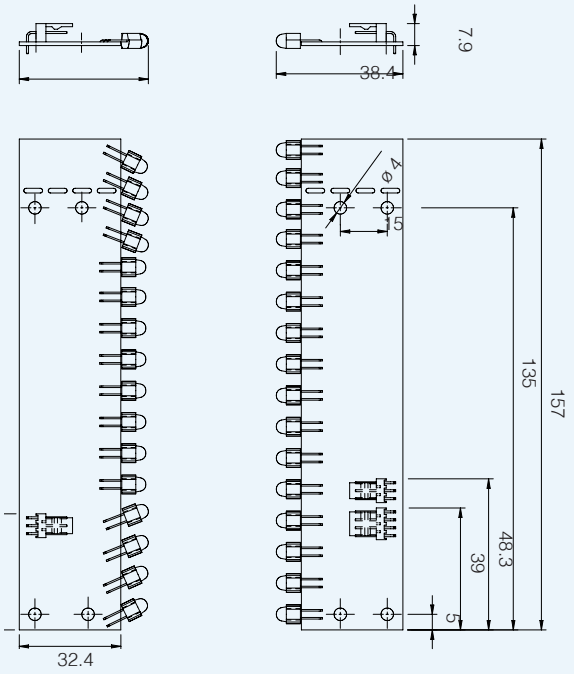
Warnings regarding to electrostatic discharge (ESD)
- disconnect the supply voltage before touching the device
- discharge the electrostatic charges before touching the device
- use metallic screws to install the device

dimensions (mm)

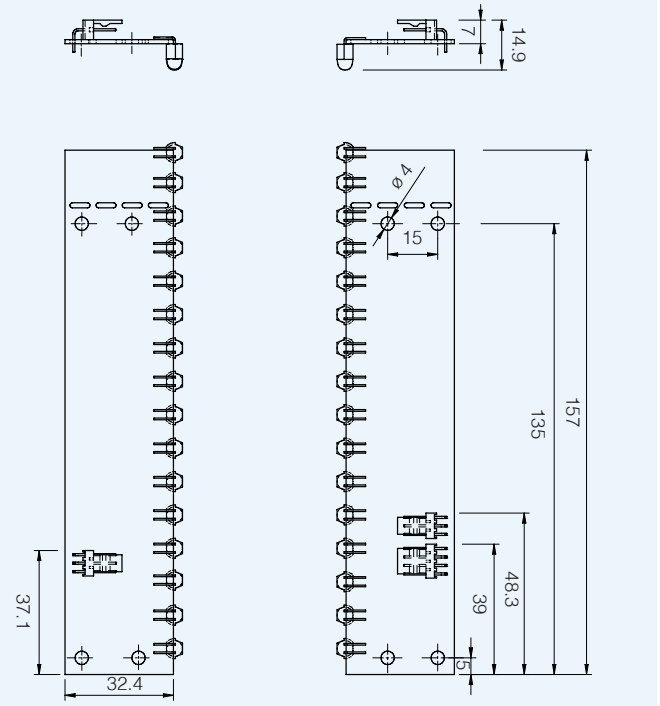
NX16SR/***-A***



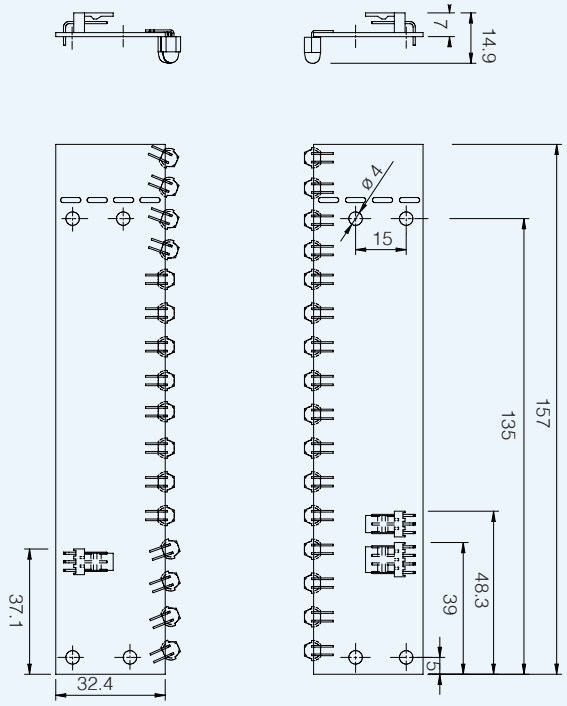
NX16SR/***-A***20



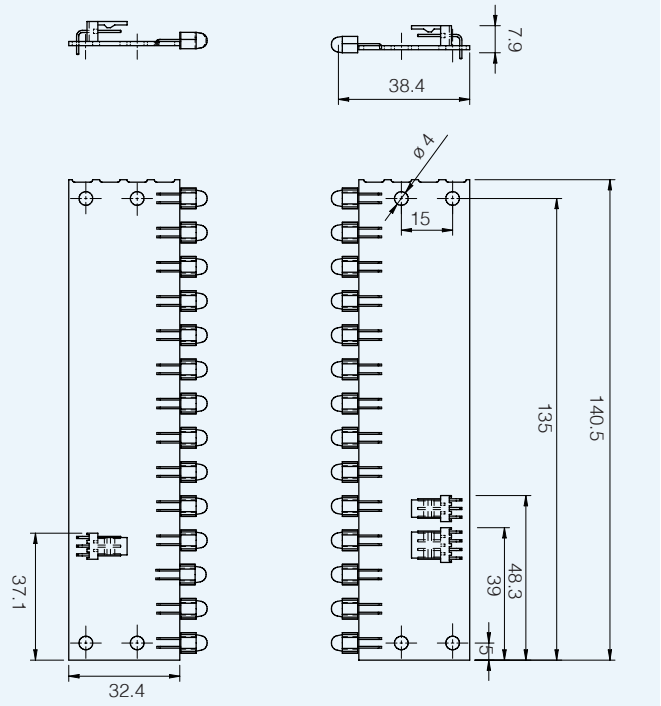
NX16SR/***-C***



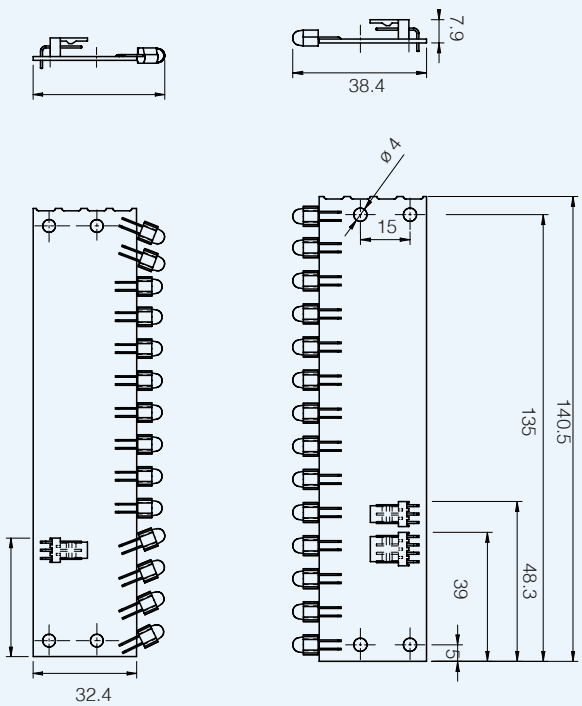
NX16SR/***-C***20



NX14SR/***-A***

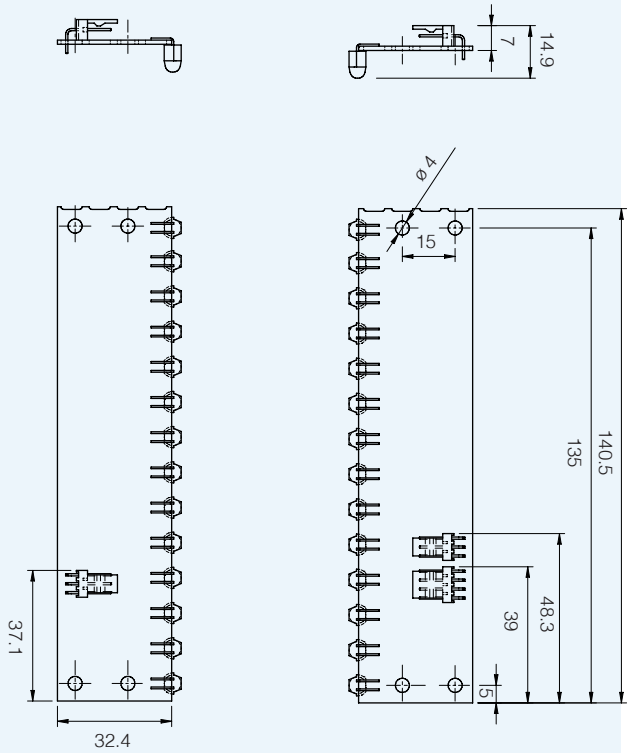


NX14SR/***-A***20



dimensions(mm)

NX14SR/***-C***



NX14SR/***-C***20