

SERIE BX

Installation manual



Micro Detectors

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MINIATURE DC AREA SENSOR WITH 4 OR 10 OPTICAL ELEMENTS IN A RECTANGULAR HOUSING

- Emitter with power adjustment and check input on request.
- Controlled area height up to 90 mm
- Sensing range up to 2m
- Complete protection against electrical damages.
- Extremely strong housing.
- IP 67 protection degree

Specific applications

Materials handling: detection of differently sized or irregularly shaped objects

Wood industry: way in of wood tables with irregular profiles

Wood industry: detection of a long board (even in the presence of vibrations) coming out from a rolling machine

Metal processing: control of sheets coming out from rolling machines (even in the presence of vibrations)

Control of output material presence

Detection of object presence on the conveyor belt

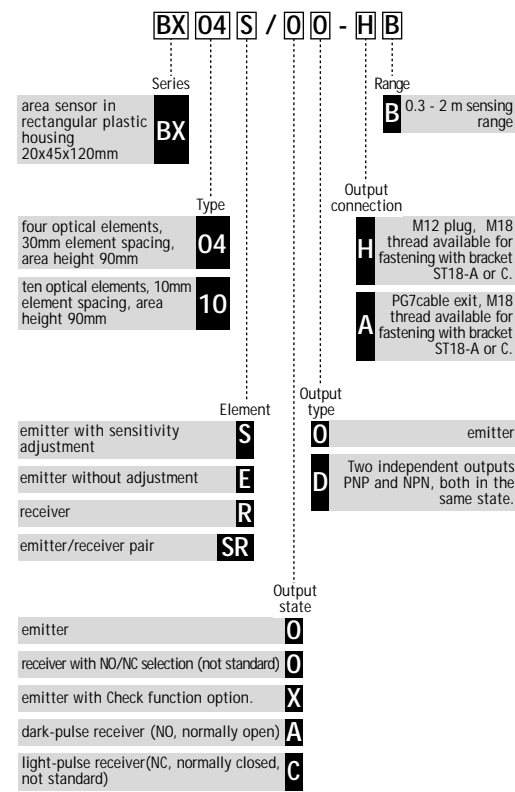
Counting of objects being unloaded

New generation of multiple beam photoelectric area sensors for detecting the presence or passage of objects; no wiring synchronism between emitter and receiver is required. The new housing, rectangular and extremely compact, is manufactured through the injection moulding technique. The use of fibreglass-strengthened plastic together with walls of substantial thickness, make the housing extremely strong and suitable for use in industrial environments. The protection degree is IP67. These sensors' operation is based on the total beam crossing principle: the emitter photodiodes are switched on one at a time in sequence and the light given out by each emitter must be seen simultaneously by all of the receiver photodiodes. The height of the area checked is 90 mm, irrespective of the number of beams (whether 4 or 10). The light from the emitter is modulated to minimize sensitivity of the system to ambient light. The product features a nominal sensing range of 2000mm and a minimum range of 300mm (blind zone); all models have a 90mm high optical lens, the 10-beam version has a 10mm optical element spacing, which is 30mm for the 4-beam version. The Light-dark response time is maximum 1ms, the minimum duration of the dark pulse is 5ms, extendable to 80ms in the special models with delay off. The

emitter has only one green LED indicating emission which, in the version with the check function, switches off when the check mode is active. The receiver has two LEDs, one yellow and one red. The brightness of the red LED is inversely proportional to the level of the signal; the LED switches off when the signal is sufficient and it does not indicate excess gain. The yellow LED lit indicates that the output is ON. The receiver features two available outputs, PNP and NPN. The dark-pulse/light-pulse selection function is available. Emitter with or without check function are available. The emitter power can be adjusted by means of the trimmer.

The main applications are implemented placing emitter and receiver at opposite sides of a conveyor belt and orientating them perpendicularly to the motion direction. Depending on the different requirements and on the objects to be detected, the controlled area can lie entirely above the belt conveying surface, or it can be half above and half below the said surface. In this last case, the BX pair is positioned at an interruption in the belt, at the end or at the separation point between two adjacent belts. The sensor thickness of only 20mm is particularly suitable for applications of the latter type.

• CODE DESCRIPTION



• SUPPLIED MATERIAL

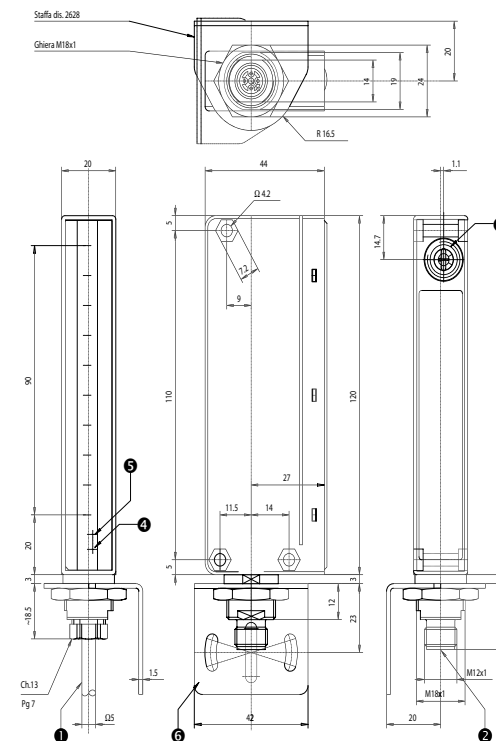
Installation Manual
Sensor / Sensors depending by code
N. 1. bracket ST18-C for each element
N. 1. M18 metal fastening ring nut for each element.
Trimmer adjustment accessori ST82

• SPECIFICATIONS

MODEL	BX04/**-**	BX10/**-**
Type	Medium Resolution Area Sensor	
Nom. Sensing Distance (Sn)	2m	
Emission	Infrared (880nm) modulated	
Controlled Area Height	90mm	
Operative Distance	2m	
Minimum Detectable Object	φ35 ⁽¹⁾ / φ25 ⁽²⁾ / φ15 ⁽³⁾ mm	φ15 ⁽¹⁾ / φ7.5 ⁽²⁾ / φ5 ⁽³⁾ mm
Differential Travel	<10%	
Operating Voltage	10 - 26 Vdc	
Ripple	10%	
No-load Supply Current	50 mA (emitter) - 25 mA (receiver)	
Load Current	100 mA	
Leakage Current	< 10 μA (at VDC max.)	
Voltage Drop	2 V at 100 mA	
Output Type	NPN + PNP - NO Standard ⁽⁴⁾	
Response Time (Light/Dark)	500 μs	
Response Time (Dark/Light)	5 ms	
Time Delay Before Availability	100 ms	
Supply Electrical Protections	Polarity Reversal, Transient	
Output Electrical Protections	Short Circuit (autoreset)	
Temperature Range	-5 / + 55 °C (without freeze)	
Interference to External Light	1000 lux (incandescent lamp) - 1500 lux (sunlight)	
Protection Degree	IP67 (EN60529)	
LED Indicator (emitter)	Green (power and emission)	
LED Indicator (receiver)	Red (alarm) - Yellow (output state)	
Housing Material	Valox	
Lenses Material	PC	
Tightening Torque	25 Nm	
Weight (approx.)	260...300 (plug) - 800g (cable)	

⁽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 sensitivity adjustment
⁽⁴⁾ NC output models available on request
Dark zones are parts of the detection area close to the emitter and the receiver, their amplitude X is proportional to the distance D between the emitter and the receiver.

• MECHANICAL DRAWINGS



- 1 Axial cable exit
- 2 M12 metal plug cable exit
- 3 Sensitivity adjustment
- 4 Yellow LED
- 5 Red LED
- 6 Mounting bracket ST18-C

• INSTALLATION AND ADJUSTMENT PROCEDURES

Connections

- 1) Make sure that the operating voltage is correctly stabilized with a maximum ripple lower than that given in the catalogue.
- 2) In the event that the noise induced by the power lines is greater than that foreseen by the EMC regulation (interference immunity), detach the sensor cables from the power and high voltage lines and insert the cable in an earthed metal cable trough. Furthermore, it is advisable to connect the sensor directly to the supply source and not downstream other devices.
- 3) To extend the supply and output cables use a cable featuring wires with a minimum cross-section of 1mm². The extension limit in length is 100m (with respect to a minimum voltage and load current of 100mA).
- 4) The sensor state will be active only 100ms after voltage has been supplied. During this time, the outputs will be OFF.

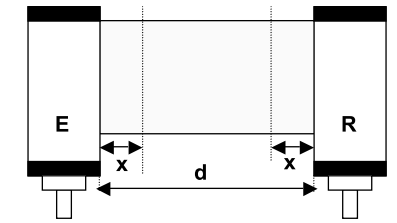
Mounting

- 1) The use of the brackets ST18-C is advised for a perfect mounting and alignment.
- 2) Do not allow dust, water and condensation to deposit on the element optics.
- 3) Avoid exposing the optics to chemical reactive products
- 4) Do not allow strong light or sunlight to fall directly onto the receiver optical element.
- 5) For cleaning, use a wet cloth and then dry all parts.

Alignment / Adjustment

- 1) Check that the distance between the emitter and the receiver falls within the specification range of the model used. Arrange the brackets so that the displacement between the axes of the two parts (emitter and receiver) lies within ±1.5°.
 - 2) Position the optical lenses facing one other, aligning them as much as possible with the axis joining the two parts.
 - 3) Check the wiring and supply power to the system. The green LED on the emitter switches on (check also that, in the emitters, the sensitivity adjustment trimmer is rotated in a clockwise direction to the final position).
 - 4) Rotate the emitter checking the receiver's red LED and searching the minimum brightness position or switching-off; secure it provisionally in this position.
 - 5) Rotate the receiver checking its red LED and searching the minimum brightness position or switching-off; secure it provisionally in this position.
 - 6) Repeat points 4 and 5 until the red LED on the receiver switches off.
 - 7) If it is not possible to switch off the receiver's red LED, check the relative height, parallelism and distance between the two elements, and try to improve the conditions referring to the minimum brightness of the LED. Points 8 to 10 are used to obtain the highest possible signal margin, which is useful in the case of demanding working conditions.
 - 8) Rotate the trimmer on the emitter in an anticlockwise direction, until the receiver's red LED switches on with a medium-low brightness.
 - 9) Orientate the emitter and the receiver as described in points 4 and 5, so as to find the minimum brightness area or switching-off.
 - 10) Repeat points 8 and 9 so as to improve the beam aiming, then bring the trimmer back to its (threshold) position.
 - 11) To detect small object, rotate the trimmer in a clockwise direction a few degrees beyond the point at which the red LED switches off.
 - 12) Check the detection of the required diameters and secure the system.
- N.B. The trimmer adjustment is indispensable for obtaining a maximum resolution, above all in the event that emitter and receiver are positioned at a distance lower than the nominal one, or in the detection of semitransparent objects. Very small diameters cannot be detected regularly in proximity of the optical elements, but are detected in the central zone, this being the maximum resolution area. The dark zone within which such diameters cannot be detected, can be

obtained from the figure below and from the previously described formulas.

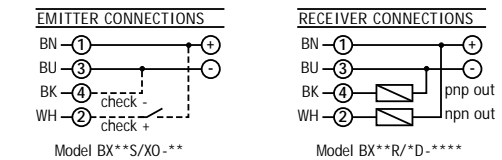


The dimension of the blind zone is found using the following formula:

$$x = 0,06 * d \text{ 10-optics sensor}$$

$$x = 0,17 * d \text{ 4-optics sensor}$$

• WIRING DIAGRAMS



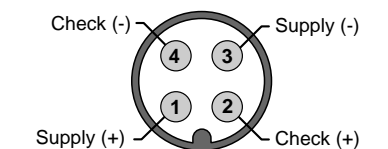
WIRING COLORS

- 1/Bn : Brown
- 2/Wh : White
- 3/Blu : Blue
- 4/Blk : Black

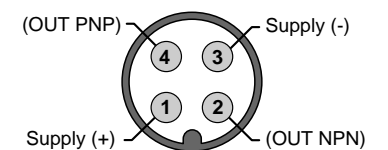
• DIAGNOSTIC

LED	STATUS	CONDITION
GREEN emitter SUPPLY	ON	Supply
YELLOW receiver OUTPUT	ON OFF	ON state output OFF state output
RED receiver ALIGNMENT	BRIGHT ON LESS BRIGHT ON OFF	No alignment Partial alignment or low received signal Good alignment and enough received signal

• CONNECTORS



• EMITTER



• RECEIVER

WARNING

These products are NOT safety sensors and are NOT suitable for use in personal safety application