

Official Product Identity Mapping

BX5M-MFR

Official Autonics exact-model identity: BX5M-MFR

Retroreflective photoelectric sensor with 5 m sensing distance using MS-2

12 to 24 V DC supply and relay output

Terminal-block connection; standard model without timer suffix

Selected BX manual pages define order code, ratings and housing dimensions.

Official model page:

<https://www.autonics.com/id/model/BX5M-MFR>

Ordering Information

This is only for reference, the actual product does not support all combinations. For selecting the specified model, follow the Autonics website.

BX **1** - **2** **3** **4** - **5**

① Sensing distance

Number: Sensing distance (unit: mm)
Number+M: Sensing distance (unit: m)

② Sensing type

T: Through-beam
M: Retroreflective
P: Polarized retroreflective
D: Diffuse reflective

③ Output method

FR: AC/DC power, relay contact output
DT: DC power, solid state (transistor) output

④ Through-beam Emitter/Receiver ⁰¹⁾

No mark: Reflective type
1: Emitter
2: Receiver

⑤ Function

No mark: No function
T: Built-in timer function

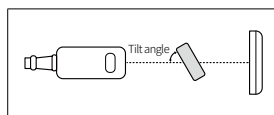
⁰¹⁾ This model name is for through-beam photoelectric sensor management only and is not required when placing an order.

Sold Separately

- Reflector: MS Series
- Retroreflective tape: MST Series

Cautions during Installation

- Be sure to install this product by following the usage environment, location, and specified ratings. Consider the listed conditions below.
 - Installation environment and background (reflected light)
 - Sensing distance and sensing target
 - Direction of target's movement
 - Characteristic curves
- When installing multiple sensors closely, it may result in malfunction due to mutual interference.
- Mount the brackets correctly to prevent the twisting of the sensor's optical axis.
- Retroreflective: If the sensing target has a glossy surface or high reflection, tilt the sensing target with an angle from 30 to 45 degrees and install the sensor.

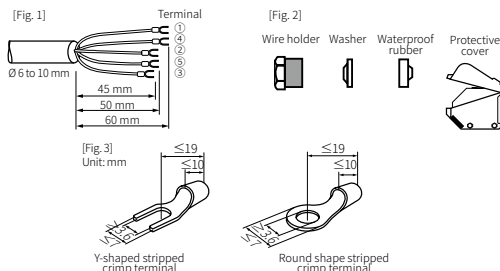


- Use this product after the test. Check whether the indicator works appropriately for the positions of the detectable object.

Through-beam	Retroreflective	Reflective
Emitter - Receiver: Install to face each other	Sensor - Reflector: At least 0.1 m apart, install to face each other (parallel with the sensing side of the unit)	Sensor - Sensing target: Install to face each other (parallel with the sensing side of the unit)

Cautions for Wiring

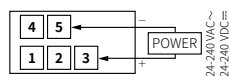
- Use the round wire with the size of $\phi 6$ to 10 mm like [Fig. 1].
- When extending the wire, use a wire of AWG 20 or higher. (extension length: ≤ 100 m)
- Use the wire holder, washer, and waterproof rubber together like [Fig. 2].
- Select the round wire with the size of $\phi 6$ to 10 mm for the waterproof and tighten the cable holder by a torque of 1.0 to 1.5 N m.
- Be sure to mount the protective cover. Failure to follow this instruction may result in electric shock. Tighten the screw of protective cover by a torque of 0.3 to 0.5 N m.
- Use the UL approved stripped crimp terminal that satisfies the size of [Fig. 3].
- Tighten the terminal screw with a torque of 0.8 N m.



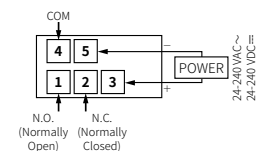
Connections

■ AC/DC power, relay contact output

- Emitter

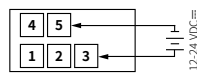


- Receiver, Retroreflective, Polarized retroreflective, Diffuse reflective type

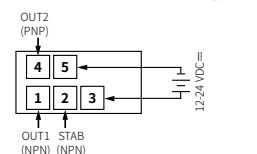


■ DC power, solid state (transistor) output

- Emitter

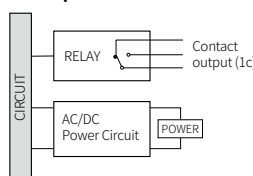


- Receiver, Retroreflective, Polarized retroreflective, Diffuse reflective type

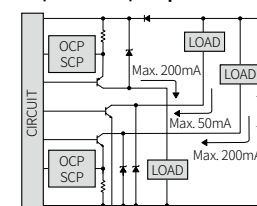


Circuit

■ AC/DC power, relay contact output



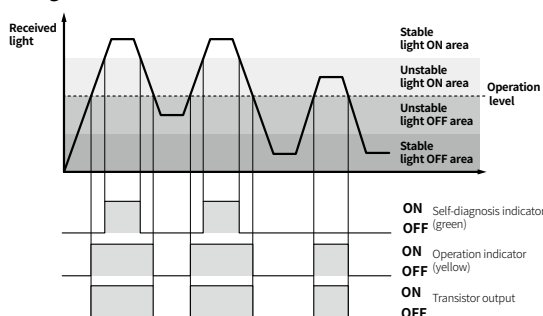
■ DC power, solid state (transistor) output



- OCP (over current protection), SCP (short circuit protection)
- If short-circuit the control output terminal or supply current over the rated specification, normal control signal is not output due to the protection circuit.

Operation Timing Chart and Indicators

■ Light ON mode



- For preventing the malfunction, the control output maintains off state for 0.5 sec after power-on.
- Timer mode: Timer OFF (SW1: ON, SW2: ON)
- In Dark ON mode, the waveforms are reversed.

Sensitivity Adjustment

- Set the adjuster for stable Light ON area, minimizing the effect of the installation environment.
- Use the offered adjustment screwdriver. Do NOT turn with excessive force to prevent product damage.
- The steps below are based on Light ON mode.

STEP	Status	Description
01	Received	Turn the adjuster from MIN to MAX sensitivity and check the position (A) where the operation indicator activates under the light ON area.
02	Interrupted	Turn the adjuster from (A) to MAX and check the position (B) where the operation indicator activates under the light OFF area. If the operation indicator does NOT activate at the MAX (maximum sensitivity): MAX = (B).
03	-	Set the adjuster at the mid position between (A) and (B) for optimal sensitivity.

Specifications

Model	BX15M-T□-□	BX5M-M□-□	BX3M-P□-□	BX700-D□-□
Sensing type	Through-beam	Retroreflective	Polarized retroreflective	Diffuse reflective
Sensing distance	15 m	0.1 to 5 m ⁽⁰¹⁾	0.1 to 3 m ⁽⁰²⁾	700 mm ⁽⁰³⁾
Sensing target	Opaque materials	Opaque materials	Opaque materials	Opaque, translucent materials
Min. sensing target	≥ Ø 15 mm	≥ Ø 60 mm	≥ Ø 60 mm	-
Hysteresis	-	-	-	≤ 20 % of sensing distance
Response time	AC/DC power, relay contact output model: ≤ 20 ms DC power, solid state (transistor) output model: ≤ 1 ms			
Light source	Infrared	Infrared	Red	Infrared
Peak emission wavelength	850 nm	940 nm	660 nm	940 nm
Sensitivity adjustment	YES (Adjuster)	YES (Adjuster)	YES (Adjuster)	YES (Adjuster)
Timer mode ⁽⁰⁴⁾	OFF, ON Delay, OFF Delay, One Shot Delay mode selectable (Switch): 0.1 to 5 sec (Adjuster)			
Operation mode	Light ON mode - Dark ON mode selectable (Switch)			
Indicator	Operation indicator (yellow), self-diagnosis indicator (green), power indicator (yellow) ⁽⁰⁵⁾			
Certifications	CE 标志	CE 标志	CE 标志	CE 标志
Unit weight	Based on the standard model, timer model: weight + 1 g			
AC/DC power	≈ 225 g	≈ 130 g	≈ 148 g	≈ 115 g
DC power	≈ 211 g	≈ 123 g	≈ 141 g	≈ 116 g

(01) Reflector (MS-2)

(02) Reflector (MS-3)

(03) Non-glossy white paper 200 × 200 mm

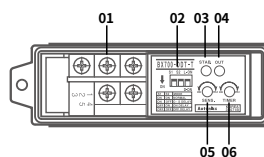
(04) Only for the timer model

(05) Only for the emitter

Output method	AC/DC power, relay contact output	DC power, Transistor solid state output
Power supply	24-240 VAC ~ ± 10 % 50/60 Hz 24-240 VDC ~ ± 10 % (ripple P-P: ≤ 10 %)	12-24 VDC ~ ± 10 % (ripple P-P: ≤ 10 %)
Power / current consumption	≤ 3 VA	It depends on the sensing type
Through-beam		Emitter: ≤ 50 mA, receiver: ≤ 50 mA
Reflective		≤ 50 mA
Control output	Relay contact output	NPN open collector - PNP open collector simultaneous output
Contact capacity	250 VAC ~ 3 A of resistance load, 30 VDC ~ 3 A of resistance load	
Contact composition	1c	-
Relay life cycle	Mechanical: ≥ 50,000,000 Electrical: ≥ 100,000	
Load voltage		≤ 30 VDC ~
Load current		≤ 200 mA
Residual voltage		NPN: ≤ 1 VDC ~, PNP: ≤ 2.5 VDC ~
Self-diagnosis output		NPN open collector output ⁽⁰¹⁾
Protection circuit		Reverse power protection circuit, output short overcurrent protection circuit
Insulation resistance	≥ 20 MΩ (500 VDC ~ megger)	
Insulation type	Double or strong insulation (dielectric voltage between the measured input and the power: 1.5 kV)	-
Noise immunity	± 1,000 VDC ~ the square wave noise (pulse width: 1 μs) by the noise simulator	± 240 VDC ~ the square wave noise (pulse width: 1 μs) by the noise simulator
Dielectric strength	Between the charging part and the case: 1,500 VAC ~ 50/60 Hz for 1 min	
Vibration	1.5 mm double amplitude at frequency of 10 to 55 Hz in each X, Y, Z direction for 2 hours	
Vibration (malfunction)	1.5 mm double amplitude at frequency of 10 to 55 Hz in each X, Y, Z direction for 10 min	
Shock	500 m/s ² (≈ 50 G) in each X, Y, Z direction for 3 times	
Shock (malfunction)	100 m/s ² (≈ 10 G) in each X, Y, Z direction for 3 times	
Ambient illuminance (receiver)	Sunlight: ≤ 11,000 lx, incandescent lamp: ≤ 3,000 lx	
Ambient temperature	-20 to 55 °C, storage: -25 to 70 °C (no freezing or condensation)	
Ambient humidity	35 to 85 %RH, storage: 35 to 85 %RH (no freezing or condensation)	
Protection rating	IP65 (IEC standard)	
Connection	Terminal type	
Material	Case, lens cover: PC, sensing part: Acrylic, bracket: SPCC, bolt: SCM, nut: SCM	

(01) Load voltage: ≤ 30 VDC ~, load current: ≤ 50 mA, residual voltage: ≤ 1 VDC ~ (50 mA), ≤ 0.4 VDC ~ (16 mA)

Unit Descriptions



- 01. Terminal (power, input/output)**
Refer to the 'Connections'.
- 02. Setting switch**
Select L.ON (Light ON) or D.ON (Dark ON) mode.
Built-in timer model: Configure SW1 and SW2 for setting the timer mode.
- 03. Self-diagnosis indicator (green)**
- 04. Operation indicator (yellow)**
- 05. Sensitivity adjuster**
- 06. Timer adjuster**
(built-in timer model)

Timer Setting

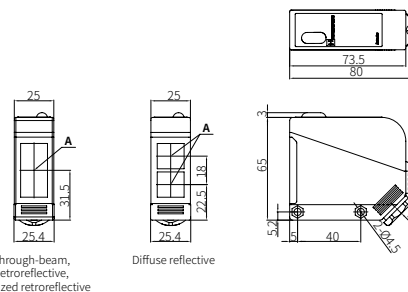
- Built-in timer model: Cong figure the timer switch (SW1 + SW2) for setting the timer mode.
- Use offered adjustment screwdriver for timer adjuster. (setting range: 0.1 to 5 sec)
Do NOT turn with excessive force to prevent product damage.
- During the operation of timer mode, conversion to other timer modes is applied after a former mode is finished.

Timer mode	Switch SW1 SW2	Operation mode	Received Interrupted
Timer OFF	ON ON	Light ON	ON OFF
		Dark ON	ON OFF
One Shot Delay Mode	ON OFF	Light ON	ON OFF
		Dark ON	ON OFF
ON Delay Mode	OFF ON	Light ON	ON OFF
		Dark ON	ON OFF
OFF Delay Mode	OFF OFF	Light ON	ON OFF
		Dark ON	ON OFF

• T: Time set by timer adjuster.

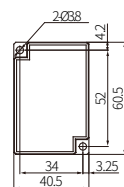
Dimensions

- Unit: mm, For the detailed drawings, follow the Autonics website.

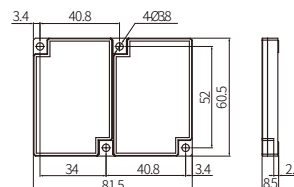


A	Optical axis	B	22 mm hexagonal nut
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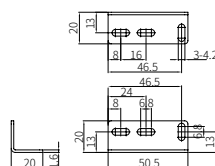
■ Reflector (MS-2)



■ Reflector (MS-3)



■ Bracket





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