


BM Series

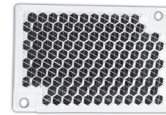
Small and Light, Common Type

■ Features

- Easy to mount at a narrow space with small size and light weight.
- Convenient to adjust the sensitivity by external sensitivity adjustment control. (diffuse reflective type only)
- Easy to mount by screw type in mounting hole.
- Built-in reverse polarity protection circuit.



 Please read "Safety Considerations" in operation manual before using.



(MS-2)



(MS-5)



(MST-□)

※MS-5, MST-□ is sold separately.

■ Specifications

Model	BM3M-TDT	BM1M-MDT	BM200-DDT
Sensing type	Through-beam	Retroreflective	Diffuse reflective
Sensing distance	3m	1m ^{※1}	200mm ^{※2}
Sensing target	Opaque materials of Min. Ø8mm	Opaque materials of Min. Ø60mm	Transparent, translucent, opaque materials
Hysteresis	—		Max. 10% at rated setting distance
Response time	Max. 3ms		
Power supply	12-24VDC [≒] ±10% (ripple P-P: max. 10%)		
Current consumption	Max. 45mA	Max. 40mA	
Light source	Infrared LED (940nm)		
Sensitivity adjustment	Fixed		Sensitivity adjuster
Operation mode	Dark ON		Light ON (Dark ON: option)
Control output	NPN open collector output ●Load voltage: max. 30VDC [≒] ●Load current: max. 100mA ●Residual voltage: max. 1VDC [≒]		
Protection circuit	Reverse polarity protection circuit		
Indication	Operation indicator: red LED		
Connection	Cable type		
Insulation resistance	Over 20MΩ (at 500VDC megger)		
Noise immunity	±240V the square wave noise (pulse width: 1μs) by the noise simulator		
Dielectric strength	1,000VAC 50/60Hz for 1 minute		
Vibration	1.5mm amplitude at frequency of 10 to 55Hz (for 1 min) in each X, Y, Z direction for 2 hours		
Shock	500m/s ² (approx. 50G) in each X, Y, Z direction for 3 times		
Environment	Ambient illumination	Sunlight: max. 11,000lx incandescent lamp: max. 3,000lx (receiver illumination)	
	Ambient temperature	-10 to 60°C, storage: -25 to 70°C	
	Ambient humidity	35 to 85%RH, storage: 35 to 85%RH	
Material	Case: acrylonitrile butadiene styrene, sensing part: polycarbonate, bracket: steel plate cold commercial, bolt: steel chromium molybdenum, nut: steel chromium molybdenum		Case: acrylonitrile butadiene styrene, sensing part: acrylic, bracket: steel plate cold commercial, bolt: steel chromium molybdenum, nut: steel chromium molybdenum
	Cable		
Accessories	Individual	—	Reflector (MS-2) Adjuster driver
	Common	Fixing bracket, 4M bolt: 4, 4M nut: 4	Fixing bracket, 4M bolt: 2, 4M nut: 2
Approval			
Weight ^{※3}	Approx. 240g (approx. 170g)	Approx. 188g (approx. 105g)	Approx. 156g (approx. 88g)

※1: The sensing distance is specified with using the MS-2 reflector, and it is the same when using MS-5 (sold separately). The distance between the sensor and the reflector should be set over 0.1m. When using reflective tapes, the reflectivity will vary by size of the tape. Please refer to the "Reflectivity by Reflective Tape Model" table before using the tapes.

※2: Non-glossy white paper 200×200mm.

※3: The weight includes packaging. The weight in parenthesis is for unit only.

※The temperature or humidity mentioned in Environment indicates a non freezing or condensation.

Amplifier Built-in Type For General Purpose

■ Feature Data

◎ Through-beam type

● BM3M-TDT

Parallel shifting characteristic		Angle characteristic	
Measuring method	Data	Measuring method	Data

◎ Retroreflective type

● BM1M-MDT

Parallel shifting characteristic		Sensor angle characteristic	
Measuring method	Data	Measuring method	Data

◎ Retroreflective type

● BM1M-MDT

Reflector angle characteristic	
Measuring method	Data

◎ Diffuse reflective type

● BM200-DDT

Sensing area characteristic	
Measuring method	Data
<p>Standard sensing target: Non-glossy white paper 200×200mm</p>	

(A) Photoelectric Sensors

(B) Fiber Optic Sensors

(C) Door/Area Sensors

(D) Proximity Sensors

(E) Pressure Sensors

(F) Rotary Encoders

(G) Connectors/ Connector Cables/ Sensor Distribution Boxes/ Sockets

(H) Temperature Controllers

(I) SSRs / Power Controllers

(J) Counters

(K) Timers

(L) Panel Meters

(M) Tacho / Speed / Pulse Meters

(N) Display Units

(O) Sensor Controllers

(P) Switching Mode Power Supplies

(Q) Stepper Motors & Drivers & Controllers

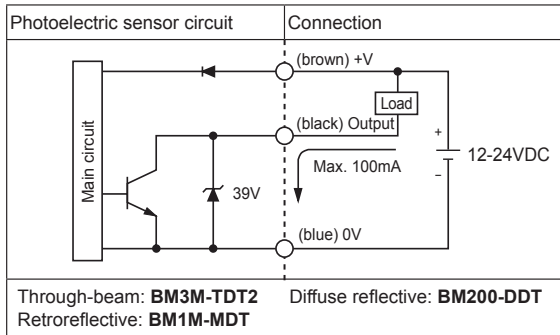
(R) Graphic/ Logic Panels

(S) Field Network Devices

(T) Software

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Control Output Circuit Diagram

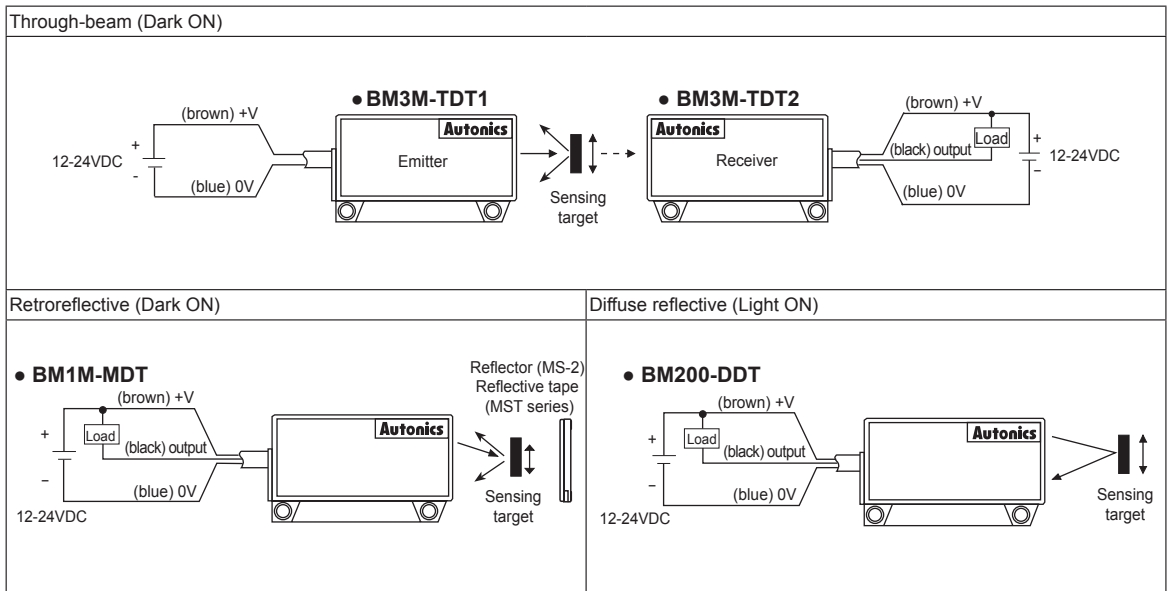


※ The product is not equipped with the output short over current protection circuit. If short-circuit the control output terminal or supply current over the rated specification, it may result in product damage.

Operation Mode

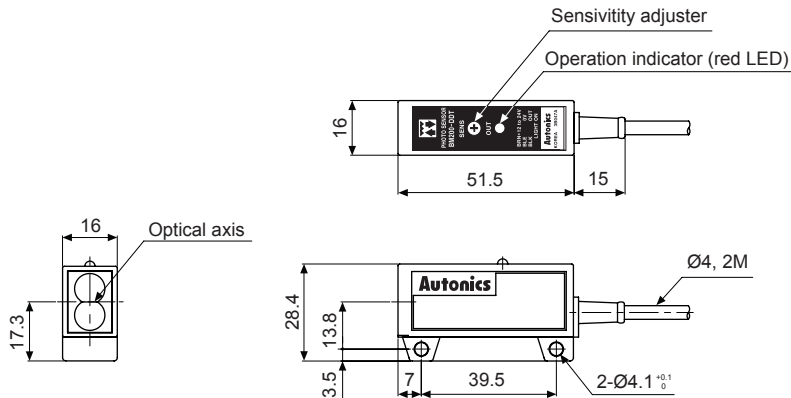
Operation mode	Light ON
Receiver operation	Received light Interrupted light
Operation indicator (red LED)	ON OFF
Transistor output	ON OFF
Operation mode	Dark ON
Receiver operation	Received light Interrupted light
Operation indicator (red LED)	ON OFF
Transistor output	ON OFF

Connections



Dimensions

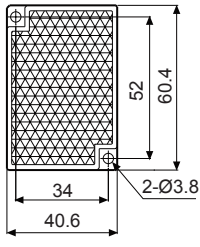
(unit: mm)



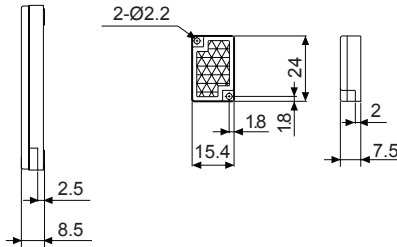
Amplifier Built-in Type For General Purpose

• Reflector

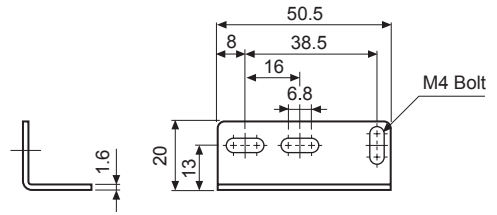
• MS-2



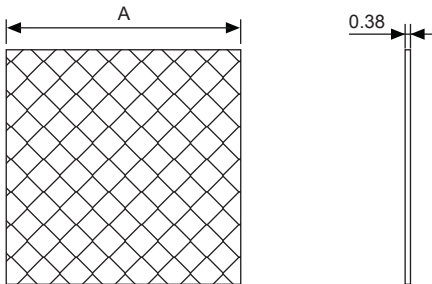
• MS-5 (sold separately)



• Bracket



• Reflective tape (sold separately)



(unit: mm)

Model	A
MST-50-10	□50
MST-100-5	□100
MST-200-2	□200

■ Installation and Adjustment

◎ For installation

When using photoelectric sensors closely over two units, it may result in malfunction due to mutual interference.

When installing the product, tighten the screw with a tightening torque of 0.8 N·m.

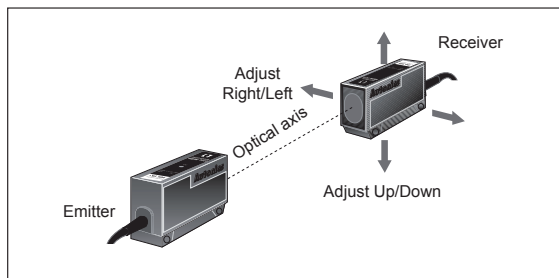
Do not impact on the unit with the hard object or bend the cable with excessive power. Otherwise, It may result in damage to the waterproof function.

◎ For optical axis adjustment

• Through-beam type

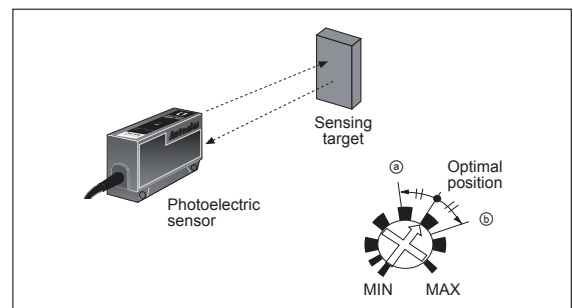
1. Supply the power to the photoelectric sensor, after setting the emitter and the receiver facing each other.
2. Set the receiver in center of position in the middle of the operation range of indicator by adjusting the receiver or the emitter right and left, up and down.
3. After the adjustment, check the stability of operation by putting the object at the optical axis.

※If the sensing target is translucent body or smaller than Ø8mm, it can be missed by sensor because light penetrate it.



• Diffuse reflective type

1. The sensitivity should be adjusted depending on a sensing target or mounting place.
2. Set the target at a position to be detected by the beam, then turn the sensitivity adjuster until position ㊦ where the operation indicator turns ON from MIN position of the sensitivity adjuster.
3. Take the target out of the sensing area, then turn the sensitivity adjuster until position ㊧ where the operation indicator turns ON. If the indicator dose not turn ON, MAX position is ㊦.
4. Set the sensitivity adjuster at the center of two switching position ㊦, ㊧.



※The sensing distance indicated on specification chart is for 200×200mm of non-glossy white paper. Be sure that it can be different by size, surface and gloss of target.

(A) Photoelectric Sensors

(B) Fiber Optic Sensors

(C) Door/Area Sensors

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(E) Pressure Sensors

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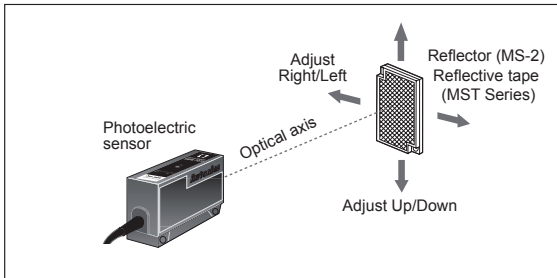
(S) Field Network Devices

(T) Software

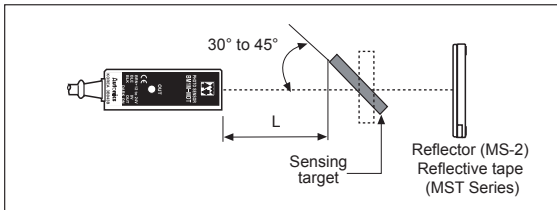
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• Retroreflective type

1. Supply the power to the photoelectric sensor, after setting the photoelectric sensor and the reflector (MS-2) or reflective tape face to face.
 2. Set the photoelectric sensor in the position which indicator turns on, by adjusting the reflector, reflective tape or the sensor right and left, up and down.
 3. Fix both units tightly after checking that the unit detects the target.
- ※If using more than 2 photoelectric sensors in parallel, the space among them should be more than 30cm.



※If reflectance of target is higher than non-glossy white paper, it might cause malfunction by reflection from the target when the target is near to photoelectric sensor. Therefore put enough space between the target and the photoelectric sensor or the surface of the target should be installed at angle of 30° to 45° against optical axis.



- ※If the mounting place is too narrow, please use MS-5 instead of MS-2.
- ※Please use reflective tape (MST series) for where a reflector is not installed.



■ Reflectivity by Reflective Tape Model

MST-50-10 (50×50mm)	70%
MST-100-5 (100×100mm)	110%
MST-200-2 (200×200mm)	170%

- ※This reflectivity is based on the reflector (MS-2).
- ※Reflectivity may vary depending on usage environment and installation conditions.
The sensing distance and minimum sensing target size increase as the size of the tape increases.
Please check the reflectivity before using reflective tapes.
- ※For using reflective tape, installation distance should be min. 20mm.