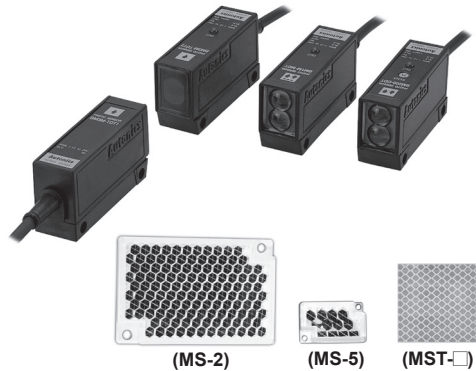


# BM Series

## 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.
- Reverse power polarity protection circuit.



**⚠ Please read "Caution for your safety" in operation manual before using.**



※MS-5, MST-□ is sold separately.

### ■ Specifications

Model	BM3M-TDT	BM1M-MDT	BM200-DDT
Sensing type	Through-beam	Retroreflective	Diffuse reflective
Sensing distance	3m	0.1 to 1m <sup>※1</sup>	200mm <sup>※2</sup>
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		Adjustable VR
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. 1V		
Protection circuit	Reverse polarity protection		
Indication	Operation indicator: red LED		
Insulation resistance	Min. 20MΩ (at 500VDC megger)		
Noise resistance	±240V the square wave noise (pulse width: 1μs) by the noise simulator		
Dielectric strength	1,000VAC 50/60Hz for 1minute		
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 <sup>2</sup> (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: ABS, Sensing part: PC	Case: ABS, Sensing part: Acrylic	
Cable	Ø4mm, 3-wire, Length: 2m (Emitter of through-beam type: Ø4mm, 2-wire, Length: 2m) (AWG22, Core diameter: 0.08mm, Number of cores: 60, Insulator out diameter: Ø1.25mm)		
Accessories	Individual	—	Reflector (MS-2) VR adjustment driver
	Common	Mounting bracket, Bolts/nuts	
Approval	CE		
Unit weight	Approx. 170g	Approx. 105g	Approx. 88g

※1: It is mounting distance between sensor and reflector MS-2 and it is the same when MS-5 is used. It is detectable under 0.1m. When using reflective tapes, the reflectivity will vary by the size of the tape. Please refer to the "Reflectivity By Reflective Tape Model" table before using the tapes.

※2: It is for Non-glossy white paper (200×200mm)

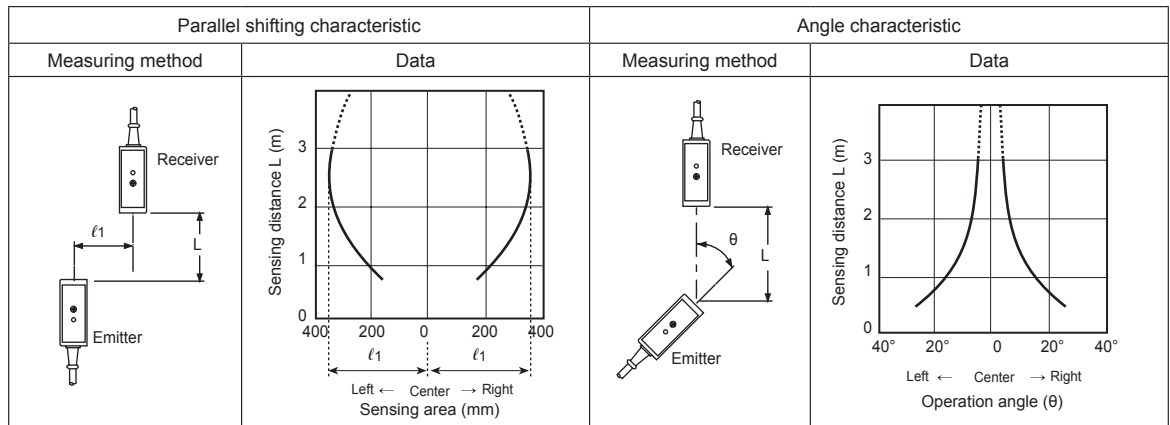
※The temperature or humidity mentioned in Environment indicates a non freezing or condensation environment.

# Amplifier Built-in Type For General Purpose

## ■ Feature Data

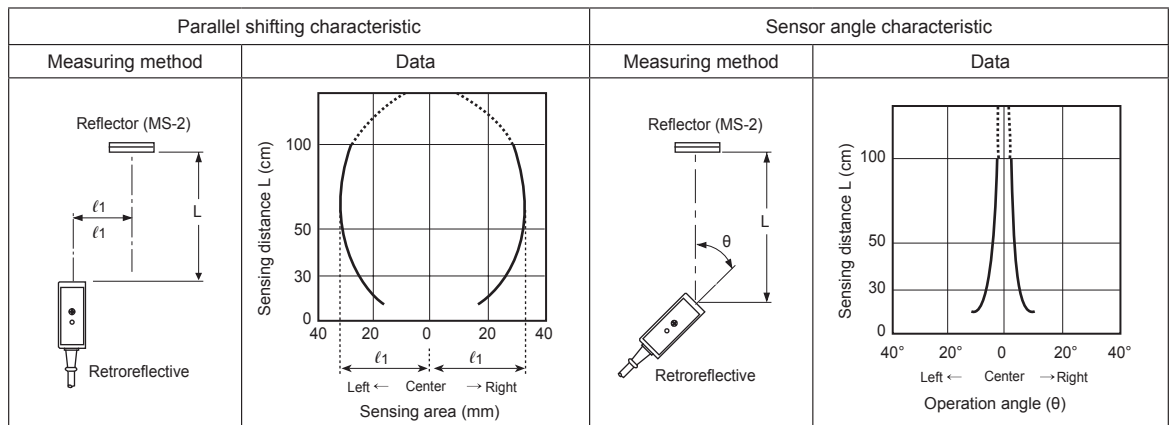
### ◎ Through-beam type

#### ● BM3M-TDT



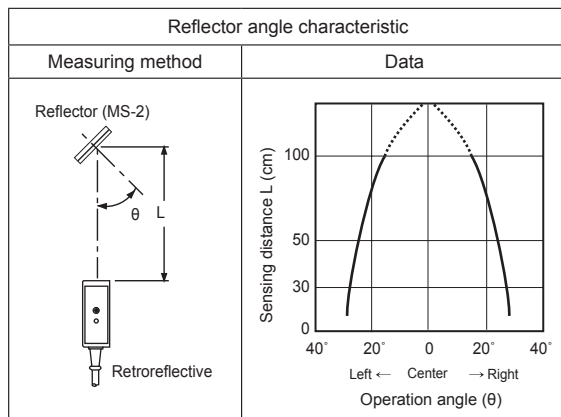
### ◎ Retroreflective type

#### ● BM1M-MDT



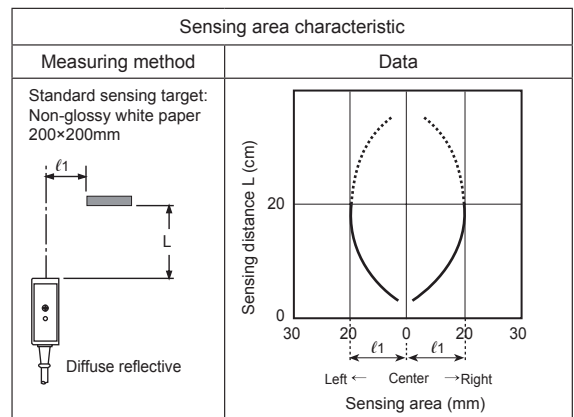
### ◎ Retroreflective type

#### ● BM1M-MDT



### ◎ Diffuse reflective type

#### ● BM200-DDT



(A) Photoelectric Sensors

(B) Fiber Optic Sensors

(C) Door/Area Sensors

(D) Proximity Sensors

(E) Pressure Sensors

(F) Rotary Encoders

(G) Connectors/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

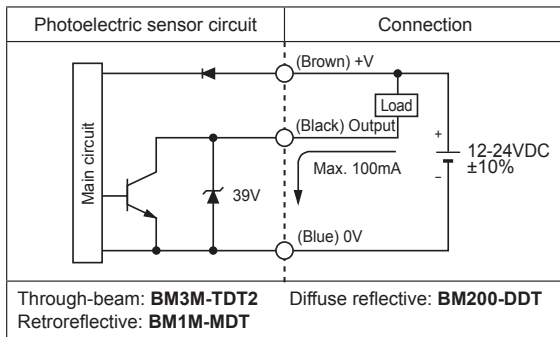
(R) Graphic/Logic Panels

(S) Field Network Devices

(T) Software

# BM Series

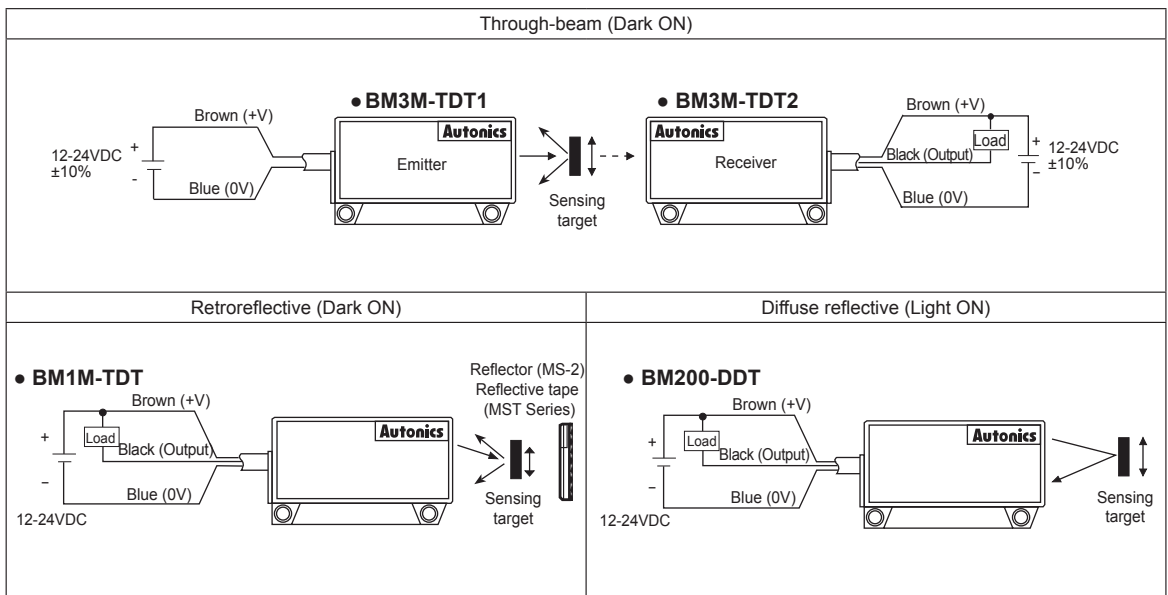
## Control Output Diagram



## Operation Mode

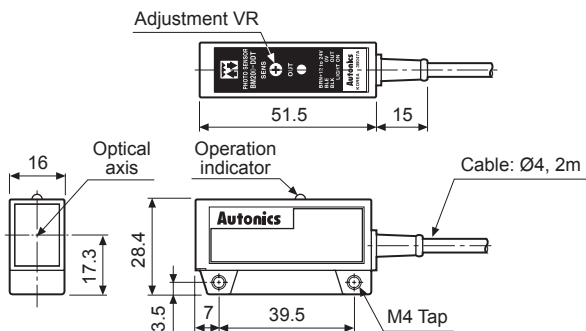
Operation mode	Light ON	
Receiver operation	Received light	
	Interrupted light	
Operation indicator (red LED)	ON	
	OFF	
Transistor output	ON	
	OFF	
Operation mode	Dark ON	
Receiver operation	Received light	
	Interrupted light	
Operation indicator (red LED)	ON	
	OFF	
Transistor output	ON	
	OFF	

## Connections

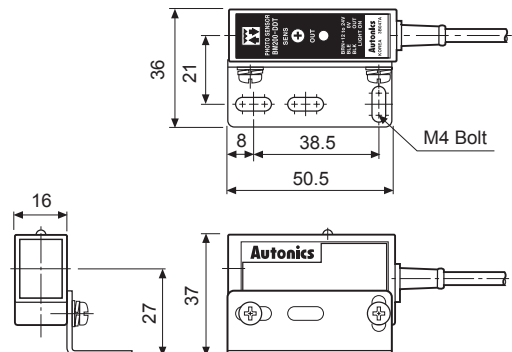


## Dimensions

(unit: mm)



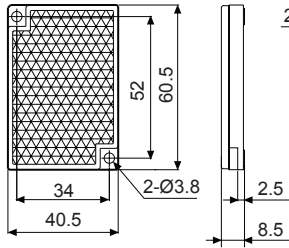
## Connect the bracket



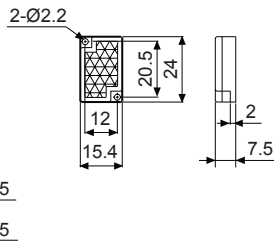
# Amplifier Built-in Type For General Purpose

## ● Reflector

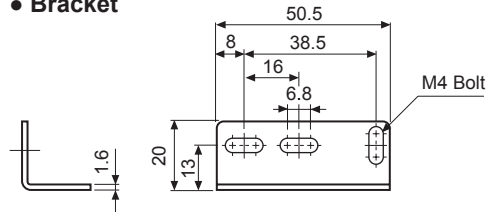
• MS-2



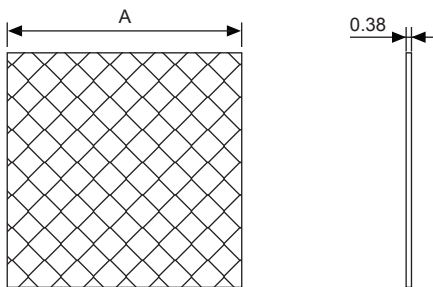
• MS-5 (sold separately)



## ● Bracket



## ● Reflective tape (sold separately)



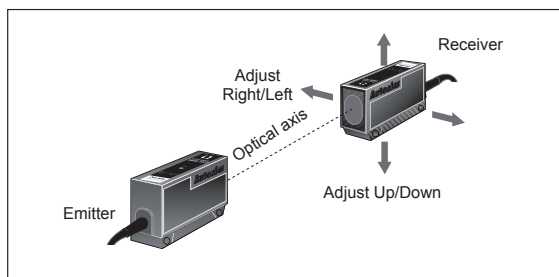
(unit: mm)

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

## ■ Mounting And Sensitivity Adjustment

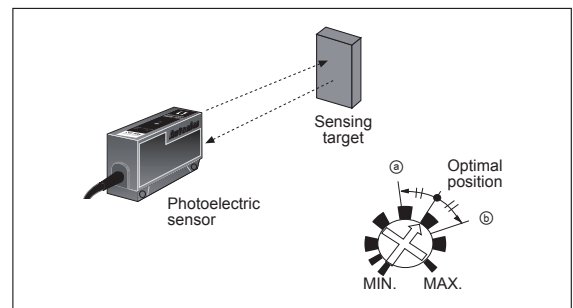
### ◎ Through-beam type

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  $\varnothing 8\text{mm}$ , 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 adjustment VR until position ㊸ where the operation indicator turns ON from min. position of the adjustment VR.
3. Take the target out of the sensing area, then turn the adjustment VR until position ㊹ where the operation indicator turns ON. If the indicator dose not turn ON, max. position is ㊹.
4. Set the adjustment VR at the center of two switching position ㊸, ㊹.



※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

(D) Proximity Sensors

(E) Pressure Sensors

(F) Rotary Encoders

(G) Connectors/ Sockets

(H) Temperature Controllers

(I) SSRs / Power Controllers

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(N) Display Units

(O) Sensor Controllers

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(Q) Stepper Motors & Drivers & Controllers

(R) Graphic/ Logic Panels

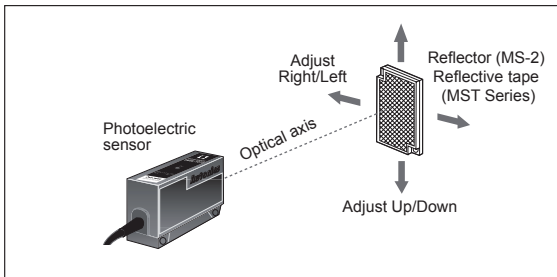
(S) Field Network Devices

(T) Software

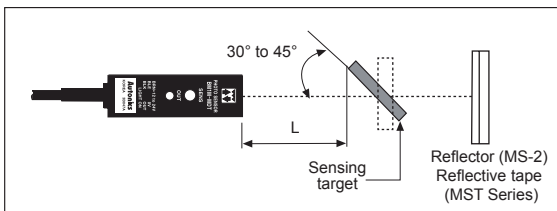
# BM Series

## ◎ 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.