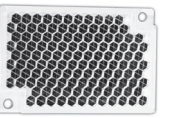
Small and light, common type

▣ 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.



(MS-2)

(MS-5)

(MST-□)

※MS-5, MST-□ is sold separately.

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

CE

▣ Specifications

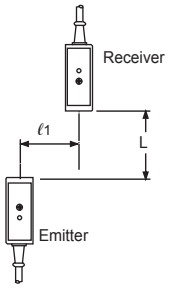
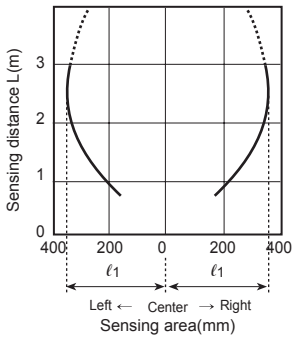
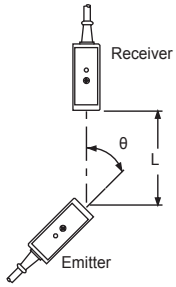
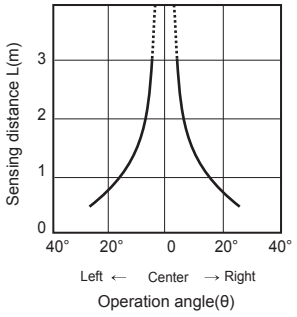
Model		BM3M-TDT	BM1M-MDT	BM200-DDT
Sensing type		Through-beam	Retroreflective	Diffuse reflective
Sensing distance		3m	0.1 to 1m※1	200mm※2
Sensing target		Opaque materials of Min. Ø8mm	Opaque materials of Min. Ø60mm	Translucent, Opaque materials
Hysteresis		—		Max. 10% at rated setting distance
Response 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 of X, Y, Z directions for 2 hours		
Shock		500m/s²(approx. 50G) in each of X, Y, Z directions for 3 times		
Environment	Ambient illumination	Sunlight: Max. 11,000lx Incandescent lamp: Max. 3,000lx(Receiver illumination)		
	Ambient temperature	-10 to 60℃, storage: -25 to 70℃		
	Ambient humidity	35 to 85%RH, storage: 35 to 85%RH		
Material		Case: ABS, Sensing part: PC	Case: ABS, Sensing part: Acrylic(Retroreflective: PC)	
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 same when MS-5 is used. It is detectable under 0.1m.
When using reflective tapes, the reflection efficiency will vary by the size of the tape. Please refer to the "▣Reflection efficiency 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.

▣ Feature data

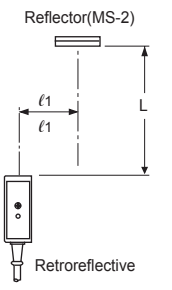
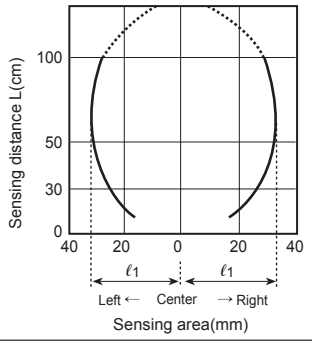
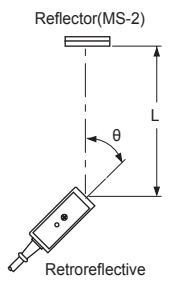
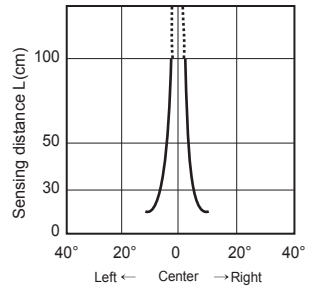
◎ Through-beam type

● BM3M-TDT

Parallel shifting characteristic		Angle characteristic	
Measuring method	Data	Measuring method	Data
			

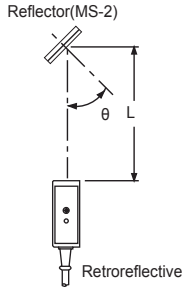
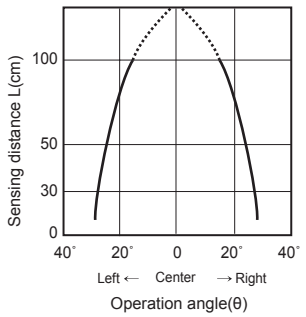
◎ Retroreflective type

● BM1M-MDT

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

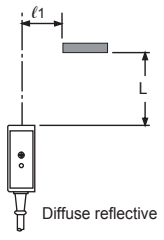
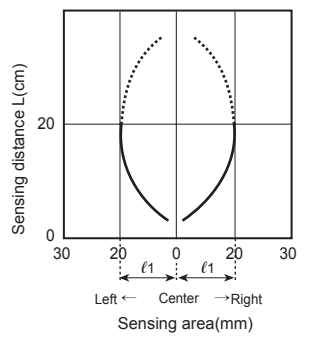
◎ Retroreflective type

● BM1M-MDT

Reflector angle characteristic	
Measuring method	Data
	

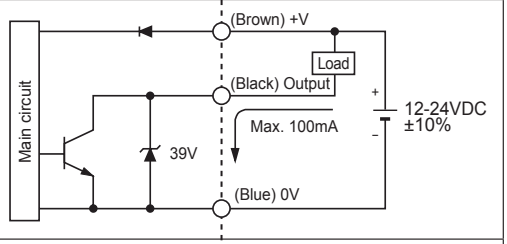
◎ Diffuse reflective type

● BM200-DDT

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

▣ Control output diagram

Photoelectric sensor circuit	Connection



Through-beam: **BM3M-TDT2** Diffuse reflective: **BM200-DDT**
Retroreflective: **BM1M-MDT**

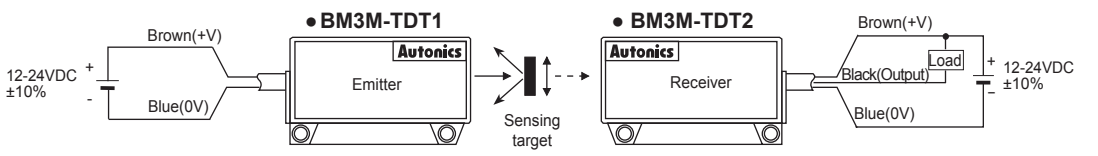
▣ Operation mode

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

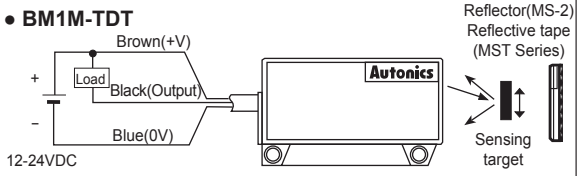
Operation mode	Dark ON
Receiver operation	Received light Interrupted light
Operation indicator (red LED)	ON OFF
Transistor output	ON OFF

▣ Connections

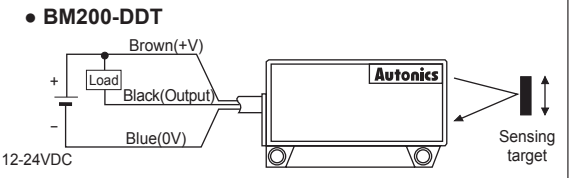
Through-beam(Dark ON)



Retroreflective(Dark ON)

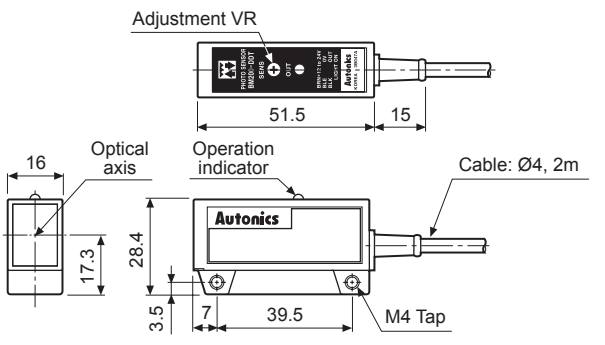


Diffuse reflective(Light ON)

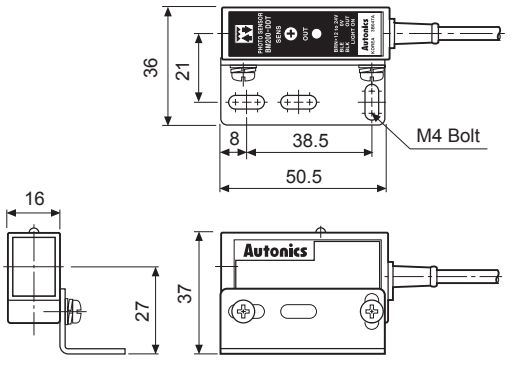


▣ Dimensions

(unit: mm)

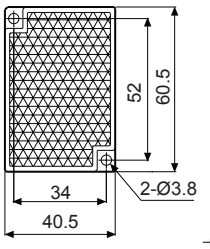


● **Connect the bracket**

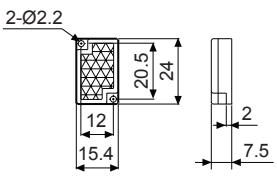


● **Reflector**

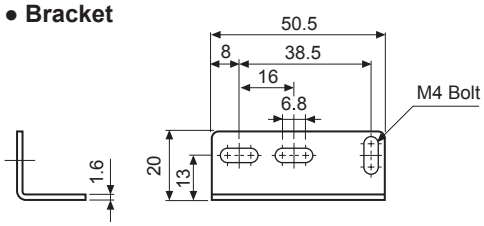
· **MS-2**



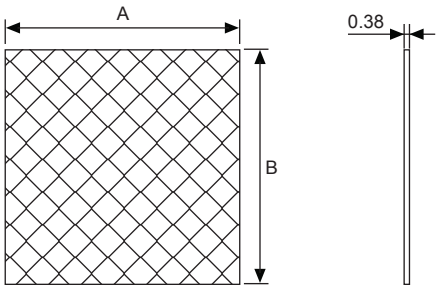
· **MS-5(sold separately)**



● **Bracket**



● **Reflective tape(sold separately)**



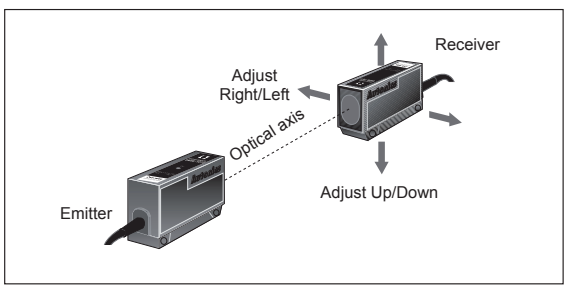
	A	B
MST-50-10	50	50
MST-100-5	100	100
MST-200-2	200	200

▣ Mounting and sensitivity adjustment

◎ Through-beam type

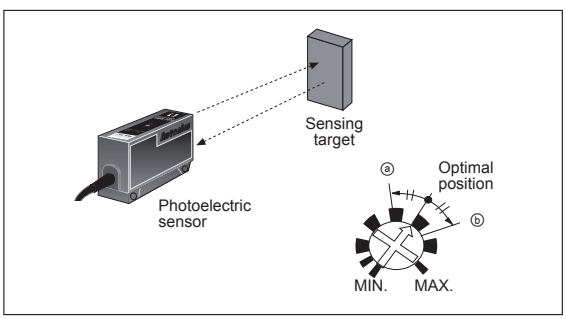
1. Supply the power to the photoelectric sensor, after setting the emitter and the receiver facing each other.
2. Set the receiver in center of position in the middle of the operation range of indicator adjusting the receiver or the emitter right and left, up and down.
3. After adjustment, check the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

※If the sensing target is translucent body or smaller than Ø8mm, it can be missed by sensor cause 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 ⓐ 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 ⓑ where the operation indicator turns ON. If the indicator dose not turn ON, max. position is ⓑ.
4. Set the adjustment VR at the center of two switching position ⓐ, ⓑ.

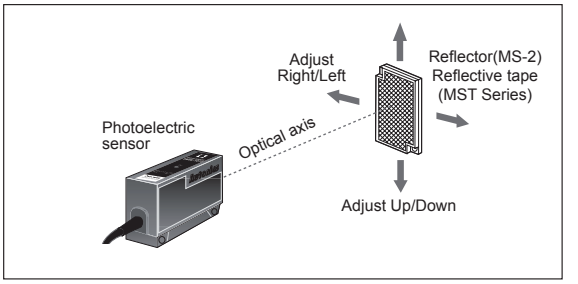


※The sensing distance indicated on specification chart is for 200×200mm of non-glossy white paper. Be sure that it can be different by size, surface and gloss of target.

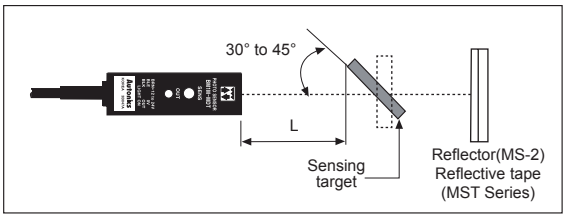
◎ Retroreflective type

1. Supply the power to the photoelectric sensor, after setting the photoelectric sensor and the reflector(MS-2) or reflective tape in face to face.
2. Set the photoelectric sensor in the position which indicator turns on, as 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 between 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.


<MS-5>

▣ Reflective efficiency by reflective tape model

MST-50-10 (50×50mm)	180%
MST-100-5 (100×100mm)	300%
MST-200-2 (200×200mm)	460%

※Reflective efficiency 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 reflection efficiency before using reflective tapes.

※For using reflective tape, installation distance should be min. 20mm.