

Autonics

PHOTOELECTRIC SENSOR
BMS SERIES
M A N U A L



Thank you very much for selecting Autonics products.
For your safety, please read the following before using.

Caution for your safety

- ※Please keep these instructions and review them before using this unit.
- ※Please observe the cautions that follow;
- Warning** Serious injury may result if instructions are not followed.
- Caution** Product may be damaged, or injury may result if instructions are not followed.
- ※The following is an explanation of the symbols used in the operation manual.
- Caution:** Injury or danger may occur under special conditions.

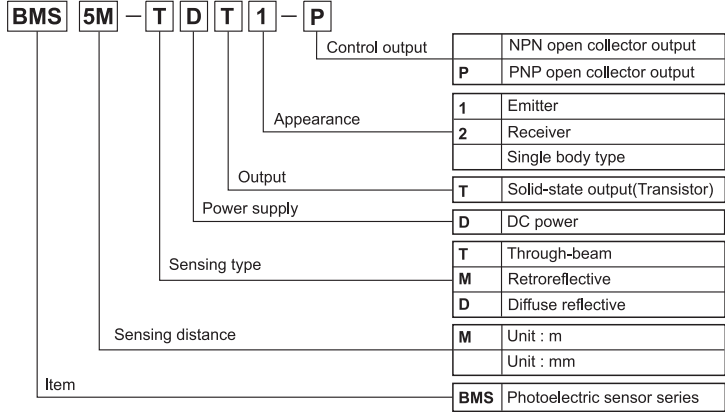
Warning

- In case of using this unit with machinery (Ex: nuclear power control, medical equipment, ship, vehicle, train, airplane, combustion apparatus, safety device, crime/disaster prevention equipment, etc) which may cause damages to human life or property, it is required to install fail-safe device.**
It may cause a fire, human injury or damage to property.
- Do not disassemble or modify this unit. Please contact us if it is required.**
It may cause electric shock or a fire.

Caution

- This unit shall not be used outdoors.**
It might shorten the life cycle of the product or give an electric shock. Use this product inside only. Do not use the product outdoors or location subject to temperatures or humidity outside.(Ex: rain, dirty, frost, sunlight, condensation, etc.)
- Do not use this unit in place where there is flammable or explosive gas.**
It may cause a fire or explosion.
- Please observe the rated voltage and do not supply AC power.**
It may cause damage to this unit.
- Please check the polarity of power and wrong wiring.**
It may cause damage to this unit.
- Do not use this unit in place where there is vibration or impact.**
It may cause damage to this unit.
- In cleaning the unit, do not use water or an oil-based detergent.**
It may cause electric shock or fire.

Ordering information



Operation mode

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

- The Transistor output will be maintained OFF for 0.5 sec. after supplied power in order to prevent malfunction of this photoelectric sensor.
- If the control output terminal is short-circuited or flow beyond rating current, the control signal will not be output normally due protection circuit.

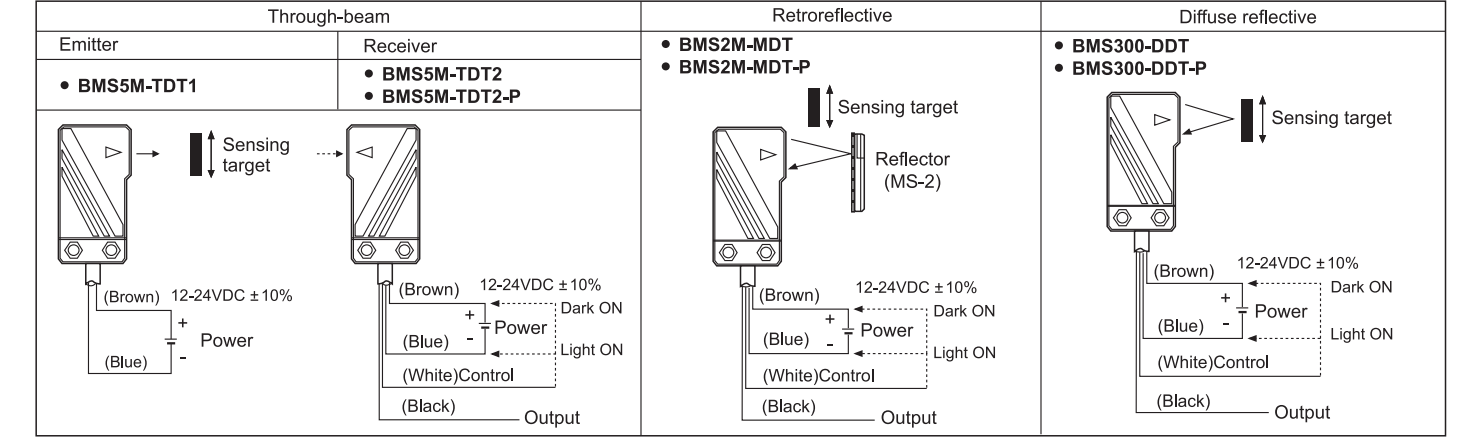
※ The above specifications are subject to change and some models may be discontinued without notice.

Specifications

Type	Through-beam	Retroreflective※1	Diffuse reflective
Model	NPN open collector output PNP open collector output	BMS5M-TDT BMS5M-TDT-P	BMS2M-MDT BMS2M-MDT-P
Detecting distance	5m	0.1 to 2m	300mm(100×100mm non-glossy white paper)
Detecting target	Opaque materials of Min. ø10mm	Opaque materials of Min. ø60mm	Translucent, Opaque materials
Hysteresis			Max. 20% at Sensing distance
Response time	Max. 1ms		
Power supply	12-24VDC ±10%(Ripple P-P: Max. 10%)		
Current consumption	Max. 50mA	Max. 45mA	
Light source	Infrared LED(940nm)		
Sensitivity adjustment		Adjustable VR	
Operation mode	Selectable Light ON, Dark ON by control wire		
Control output	NPN or PNP open collector output • Load voltage: Max. 30VDC • Load current: Max. 200mA • Residual voltage - NPN: Max. 1V, PNP : Max. 2.5V		
Protecting circuit	Reverse polarity protection, Short-circuit protection		
Indication	• Operation indicator: Red LED • Power indicator: Red LED(BMS5M-TDT1)		
Insulation resistance	Min. 20MΩ (500VDC megger)		
Noise strength	±240V the square wave noise(pulse width: 1μs) by the noise simulator		
Dielectric strength	1000VAC 50/60Hz for 1minute		
Vibration	1.5mm amplitude at frequency of 10 to 55Hz in each of X, Y, Z directions for 2 hours		
Shock	500m/s² (50G) in 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°C, Storage : -25 to 70°C Ambient humidity: 35 to 85%RH, Storage: 35 to 85%RH		
Material	Case: ABS, Sensing part: Acryl(Through-beam: PC)		
Cable	ø5mm, 4-wire, length: 2m(Emitter of through-beam type: ø5mm, 2-wire, length: 2m) (AWG22, Core diameter: 0.08mm, Number of cores: 60, Insulator diameter: ø 1.25mm)		
Accessories	Individual Common	Reflector(MS-2), VR adjustment driver	VR adjustment driver
Approval	CE		
Unit weight	Approx. 180g	Approx. 110g	Approx. 100g

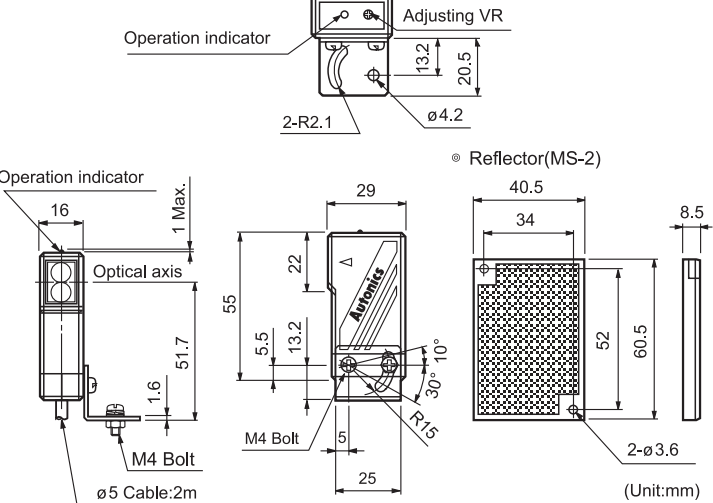
※1: The sensing range and the sensing object of the retroreflective sensor are specified with using the MS-2 reflector. The sensing ranges of the retroreflective sensor in the above table are indentified as the possible setting ranges of the MS-2 reflector. The sensor can detect an object under 0.1m apart.
※The temperature or humidity mentioned in Environment indicates a non freezing or condensation environment.

Connections

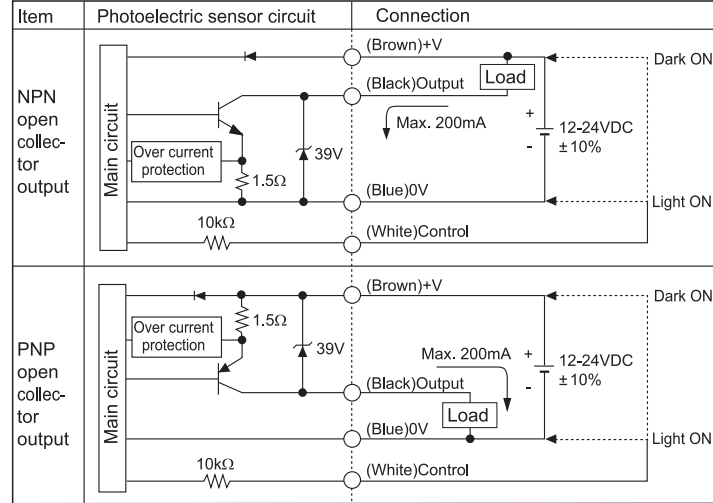


※Dark ON is on when control(White) line is opened.

Dimension



Control output circuit diagram



Mounting and sensitivity adjustment

Please supply the power to the sensor, after setting the emitter and the receiver in face to face, and then adjust an optical axis and the sensitivity as follow;

Optical axis adjustment

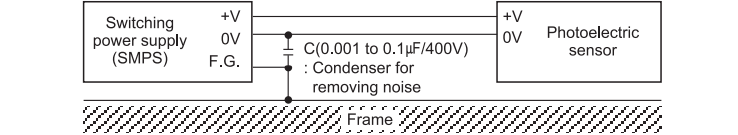
- Through-beam type
Set the photoelectric sensor in the middle of receiver indicator turns on, as adjusting the receiver or emitter right and left, up and down.
- Retroreflective type
Mount the photoelectric sensor and mirror face to face then fix them in the middle of operation indicator turns on, as adjusting the mirror right and left, up and down
- Diffuse reflective type
Mount the photoelectric sensor and the target then fix it in the middle of operation indicator turns on, as adjusting the photoelectric sensor right and left, up and down.

Sensitivity adjustment

- Retroreflective type
Fix the adjuster at max. position and then check if the sensor operates normally or not, as passing the target within detecting range of the sensor.
If the sensor does not work normally by noise or external shine, turn the adjuster slowly at position where the sensor works normally.
※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 photoelectric sensor or the surface of target should be installed at an angle of 30° to 45° against optical axis.
- Diffuse reflective type
Set the target at a position to be detected by the beam, then turn the adjuster till point ② which the indicator turns on from min. Take the target out of the sensor, then turn the adjuster till point ③ which the indicator turns on, if it does not turns on, max. sensitivity position will be point ②. Set the adjuster in middle of two switching point ②, ③.
※Please be aware not to make the unstable operation of sensor by background and mounting side.

Caution for using

- Intercept a strong source of light as like sunlight, spotlight within inclination angle range of photoelectric sensor.
- The photoelectric sensor may cause malfunction under the fluorescent lamp light, so be sure to use cut-off light with panel.
- When more than 2 sets of Through-beam type sensor are used closely, it might cause interference each other. Be sure to put enough space between them in order to avoid malfunction.
- When more than 2 sets of diffuse reflection types are installed adjacently, it can be occurred malfunction by light beam from the other target. So it must be installed at an enough interval.
- If photoelectric sensor is installed at flat part, it might cause malfunction by reflection light from flat part. Be sure to put space between photoelectric sensor and ground.
- When wire the photoelectric sensor with high voltage line, power line in the same conduit, it may cause malfunction or mechanical trouble.
Therefore please wire seperately or use different conduit.
- Avoid installing the unit as following place.
Corrosive gas, oil or dust, strong flux, noise, sunlight, strong alkali, acid.
- In case of connect DC relay as inductive load to output, please remove surges by using diode or varistor.
- The photoelectric sensor cable shall be used as short as possible, because it may cause malfunction by noise through the cable.
- When it is stained by dirt at lens, please clean the lens with dry cloth, but don't use an organic materials such as alkali, acid, chromic acid.
- When use switching power supply as the source of supplying power, F.G. terminal shall be good earth ground and condenser for removing noise shall be installed between 0V and F.G. terminal.



- Installation environment
①It shall be used indoor
②Altitude Max. 2,000m
③Pollution Degree 3
④Installation Category II

※It may cause malfunction if above instructions are not followed.

Major products

- Photoelectric sensors
- Fiber optic sensors
- Door sensors
- Door side sensors
- Area sensors
- Proximity sensors
- Pressure sensors
- Rotary encoders
- Connector/Sockets
- Switching mode power supplies
- Control switches/Lamps/Buzzers
- I/O Terminal Blocks & Cables
- Stepper motors/drivers/motion controllers
- Graphic/Logic panels
- Field network devices
- Laser marking system(Fiber, CO₂, Nd:YAG)
- Laser welding/soldering system
- Temperature controllers
- Temperature/Humidity transducers
- SSR/Power controllers
- Counters
- Timers
- Panel meters
- Tachometer/Pulse(Rate)meters
- Display units
- Sensor controllers

Autonics Corporation
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Satisfiable Partner For Factory Automation

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