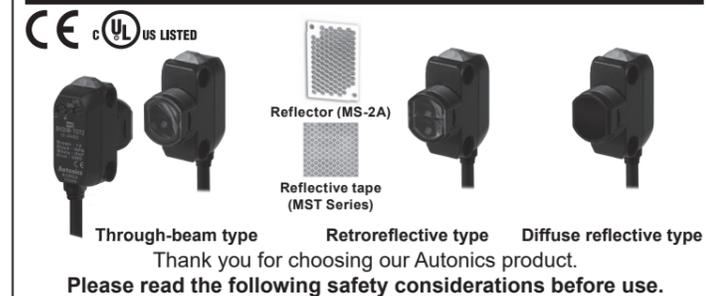


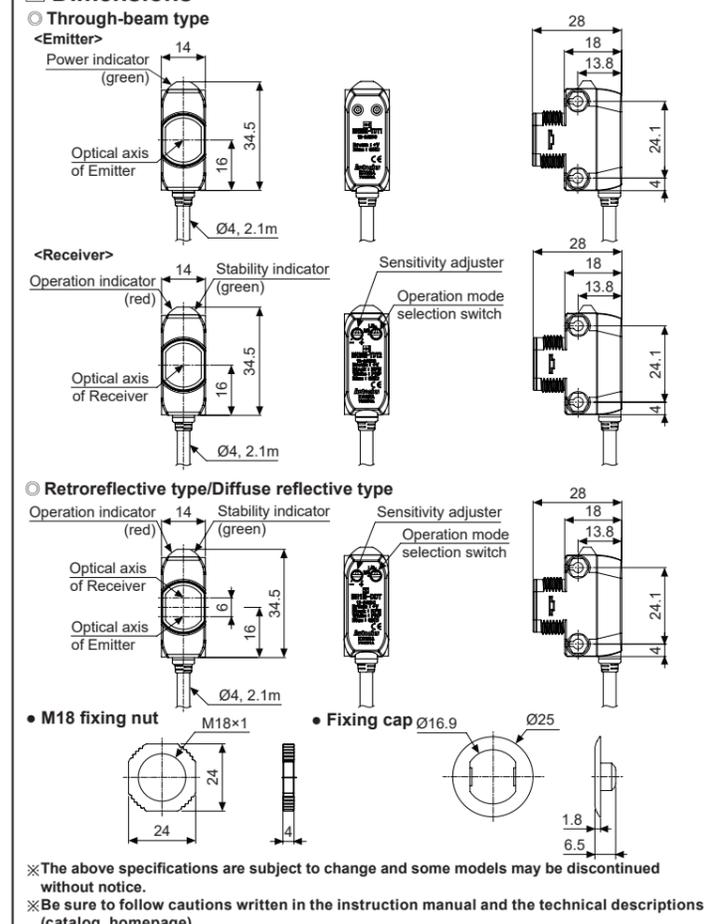
RusAutomation
Autonics
Threaded/Side Mounting Photoelectric Sensor
BH SERIES
INSTRUCTION MANUAL



■ Safety Considerations

- ⚠ Please observe all safety considerations for safe and proper product operation to avoid hazards.
- ⚠ symbol represents caution due to special circumstances in which hazards may occur.
- Warning** Failure to follow these instructions may result in serious injury or death.
- Caution** Failure to follow these instructions may result in personal injury or product damage.
- Warning**
- 1. **Fail-safe device must be installed when using the unit with machinery that may cause serious injury or substantial economic loss.** (e.g. nuclear power control, medical equipment, ships, vehicles, railways, aircraft, combustion apparatus, safety equipment, crime/disaster prevention devices, etc.)
 Failure to follow this instruction may result in fire, personal injury, or economic loss.
- 2. **Do not disassemble or modify the unit.**
 Failure to follow this instruction may result in fire.
- 3. **Do not connect, repair, or inspect the unit while connected to a power source.**
 Failure to follow this instruction may result in fire.
- 4. **Check 'Connections' before wiring.**
 Failure to follow this instruction may result in fire.
- Caution**
- 1. **Use the unit within the rated specifications.**
 Failure to follow this instruction may result in fire or product damage.
- 2. **Use dry cloth to clean the unit, and do not use water or organic solvent.**
 Failure to follow this instruction may result in fire.
- 3. **Do not use the unit in the place where flammable/explosive/corrosive gas, humidity, direct sunlight, radiant heat, vibration, impact, or salinity may be present.**
 Failure to follow this instruction may result in fire or explosion.

■ Dimensions



■ Model

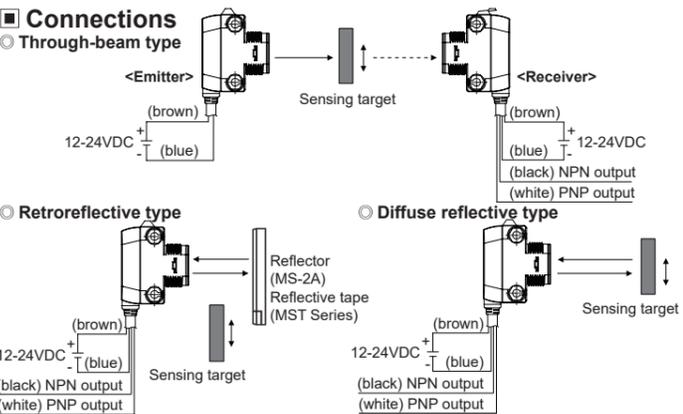
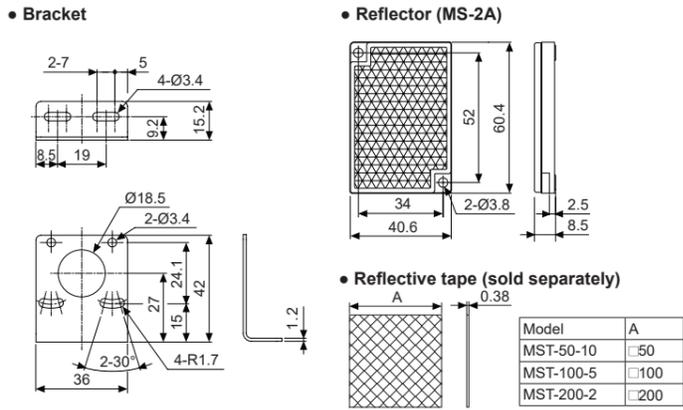
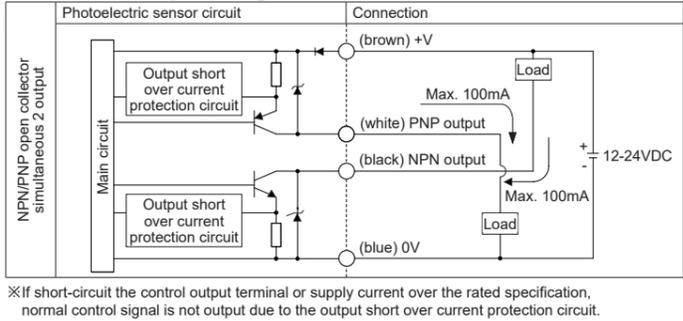
| Model | Sensing distance | Sensing type | Power supply | Output |
|-----------|------------------|--|--------------|-----------------------------|
| BH20M-TDT | 20m | Through-beam type | 12-24VDC | Transistor output (NPN/PNP) |
| BH4M-PDT | 4m | Retroreflective type (built-in polarized filter) | | |
| BH1M-DDT | 1m | Diffuse reflective type | | |
| BH300-DDT | 300mm | Diffuse reflective type | | |

■ Specifications

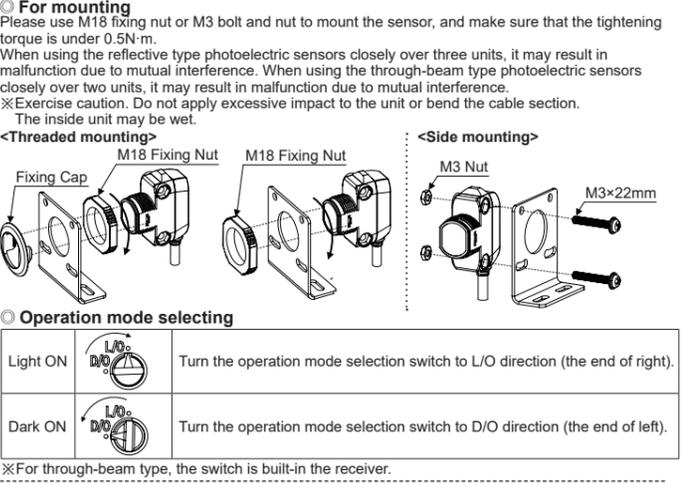
| Model | BH20M-TDT | BH4M-PDT | BH1M-DDT | BH300-DDT |
|------------------------|---|---|------------------------------|---------------------|
| Sensing type | Through-beam | Retroreflective (built-in polarized filter) | Diffuse reflective | |
| Sensing distance | 20m | 4m ^{※1} | 1m ^{※2} | 300mm ^{※3} |
| Sensing target | Opaque material over Ø20mm | Opaque material over Ø75mm | — | — |
| Hysteresis | — | — | Max. 20% at sensing distance | — |
| Response time | Max. 1ms | — | — | — |
| Power supply | 12-24VDC±10% (ripple P-P: max. 10%) | | | |
| Current consumption | Emitter/Receiver : max. 20mA | Max. 30mA | Max. 35mA | Max. 30mA |
| Light source | Red LED (660nm) | Red LED (660nm) | Infrared LED (850nm) | Red LED (660nm) |
| Sensitivity adjustment | Sensitivity adjuster | | | |
| Operation mode | Light ON / Dark ON selectable by switch | | | |
| Control output | NPN / PNP open collector simultaneous 2 output · Load voltage: max. 26.4VDC— · Load current: max. 100mA · Residual voltage - NPN: max. 1VDC—, PNP: max. 2.5VDC | | | |
| Protection circuit | Interference prevention function (except through-beam type), Power reverse polarity protection circuit, Output short over current protection circuit | | | |
| Indicator | Operation indicator: red LED Stability indicator: green LED (emitter of through-beam type's power indicator: green) | | | |
| Connection | Cable type | | | |
| Insulation resistance | Over 20MΩ (at 500VDC megger) | | | |
| 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 X, Y, Z direction for 3 times | | | |
| Environment | Ambient illu.: Sunlight: max. 11,000lx, Incandescent lamp: max. 3,000lx (receiver illumination) Ambient temp.: -25 to 55°C, storage: -40 to 70°C Ambient humi.: 35 to 85%RH, storage: 35 to 85%RH | | | |
| Protection structure | IP67 (IEC standard) | | | |
| Material | Case: polycarbonates, LED indicator: polycarbonates, sensing part: polymethyl methacrylate acrylic | | | |
| Cable | Ø4mm, 4-wire, 2.1m (emitter of through-beam type: Ø4mm, 2-wire, 2.1m) (AWG24, core diameter: 0.08mm, number of cores: 40, insulator out diameter: Ø1.03mm) | | | |
| Accessories | Common | Adjustment screwdriver, fixing bracket, M18 fixing nut: 2, fixing cap: 2, M3 bolt: 4, M3 nut: 4 | | |
| | Individual | Reflector (MS-2A) | — | |
| Approval | CE, RoHS | | | |
| Weight ^{※4} | Approx. 190g (approx. 120g) | Approx. 140g (approx. 60g) | Approx. 130g (approx. 60g) | |

※1: The sensing distance is specified with using the MS-2A reflector. The distance between the sensor and the reflector should be set over 0.1m. When using reflective tapes, the reflectivity will vary by the size of the tape. Please refer to the catalog or web site.
 ※2: Non-glossy white paper 300×300mm. ※3: Non-glossy white paper 100×100mm.
 ※4: 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.

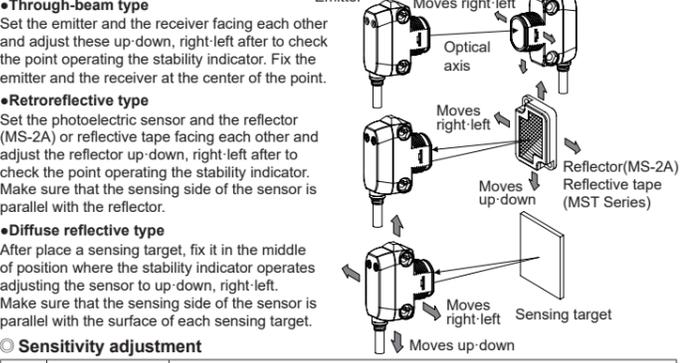
■ Control Output Diagram



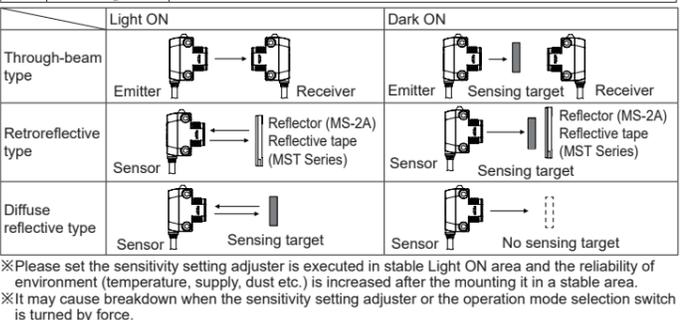
■ Installation and Sensitivity Adjustment



○ **Optical axis adjustment**



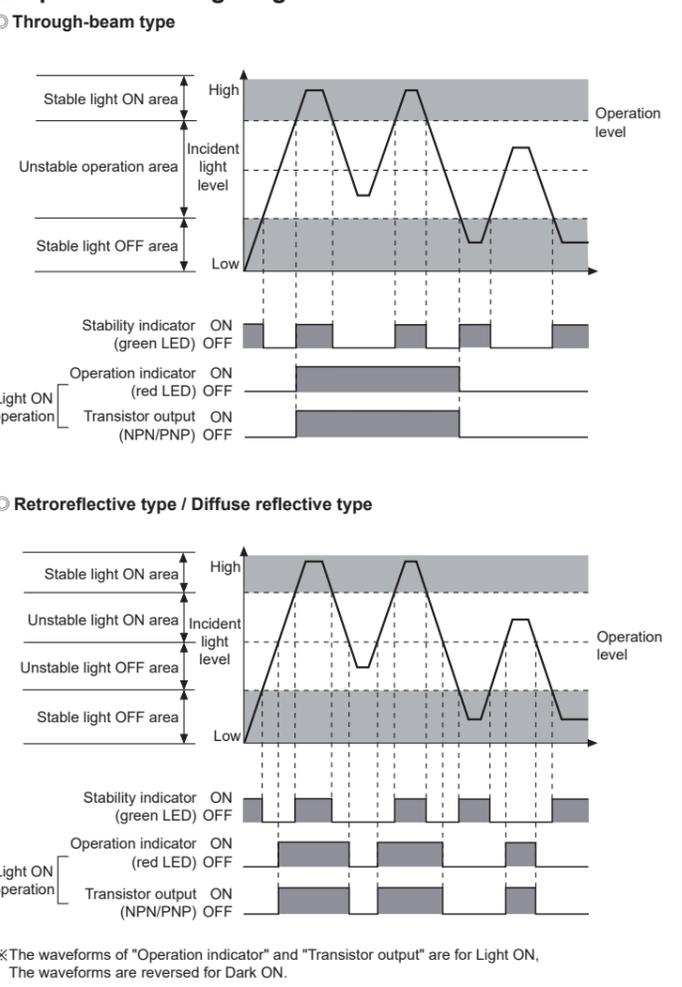
| Order | Sensitivity setting | Descriptions |
|-------|---------------------|---|
| 1 | (A) | From Light ON status, turn the sensitivity setting adjuster slowly to the right from min. sensitivity (-) and check the position where operation indicator turns on (A). |
| 2 | (A), (B), (C) | From Dark ON status, turn the sensitivity setting adjuster further right and check the position where the operation indicator turns on (B). Turn the adjuster left and check the position where the operation indicator turns off (C). ⚠ If the operation indicator does not turn on at max. sensitivity (+), the maximum sensitivity setting is set at position (C). |
| 3 | (A), (B), (C) | Set the adjuster at the center position between (A) and (C) for optimal sensitivity. Also, check if the stability indicator turns off with or without the sensing target. If it does not turn off, please review the operation mode again, as sensitivity may be unstable. |



■ Operation Mode

| Operation mode | Light ON | Dark ON |
|-------------------------------|-------------------------------------|-------------------------------------|
| Receiver operation | Received light Interrupted light | Received light Interrupted light |
| Operation indicator (red LED) | ON | OFF |
| Transistor output (NPN/PNP) | ON | OFF |

■ Operation Timing Diagram



■ Cautions during Use

- Follow instructions in 'Cautions during Use'. Otherwise, it may cause unexpected accidents.
- When connecting a DC relay or other inductive load to the output, remove surge by using diodes or varistors.
- Use the product, 0.5 sec after supplying power. When using separate power supply for the sensor and load, supply power to sensor first.
- 12-24VDC power supply should be insulated and limited voltage/current or Class 2, SELV power supply device.
- Wire as short as possible and keep away from high voltage lines or power lines, to prevent inductive noise.
- When using switching mode power supply to supply the power, ground F.G. terminal and connect a condenser between 0V and F.G. terminal to remove noise.
- When using sensor with the equipment which generates noise (switching regulator, inverter, servo motor, etc.), ground F.G. terminal of the equipment.
- This unit may be used in the following environments.
 - ①Indoors (UL Type 1 Enclosure)
 - ②Altitude max. 2,000m
 - ③Pollution degree 3
 - ④Installation category II

■ Major Products

- Photoelectric Sensors
- Fiber Optic Sensors
- Door Sensors
- Area Sensors
- Proximity Sensors
- Pressure Sensors
- Rotary Encoders
- Connectors/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/Cutting System
- Temperature Controllers
- Temperature/Humidity Transducers
- SSRs/Power Controllers
- Counters
- Timers
- Panel Meters
- Tachometers/Pulse(Rate)Meters
- Display Units
- Sensor Controllers

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