

Autonics PHOTOELECTRIC SENSOR BR SERIES

MANUAL



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

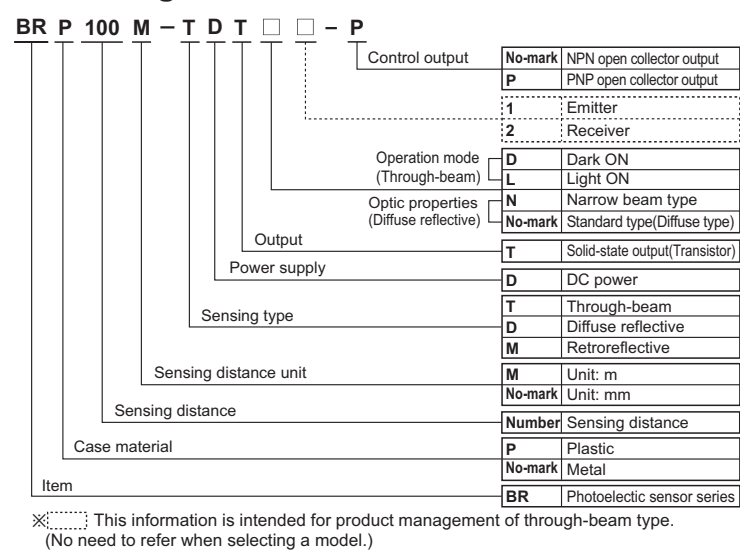
Caution for your safety

- ※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.

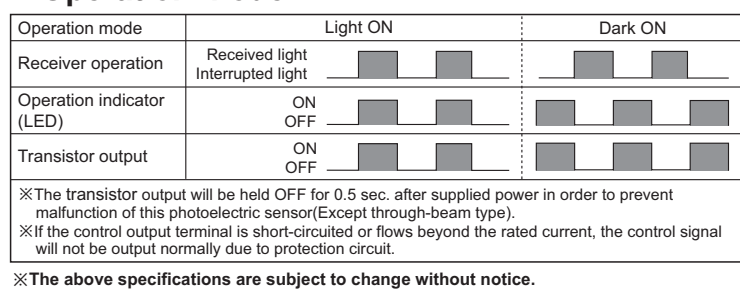
Warning

- 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
- 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 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 shorten the life cycle or damage to the product.
- Please check the polarity of power and wrong wiring.**
It may result in damage to this unit.
- Do not use this unit in place where there is vibration or impact.**
It may result in product damage.
- In cleaning the unit, do not use water or an oil-based detergent.**
It might cause an electric shock or fire that will result in damage to the product.

Ordering information



Operation mode

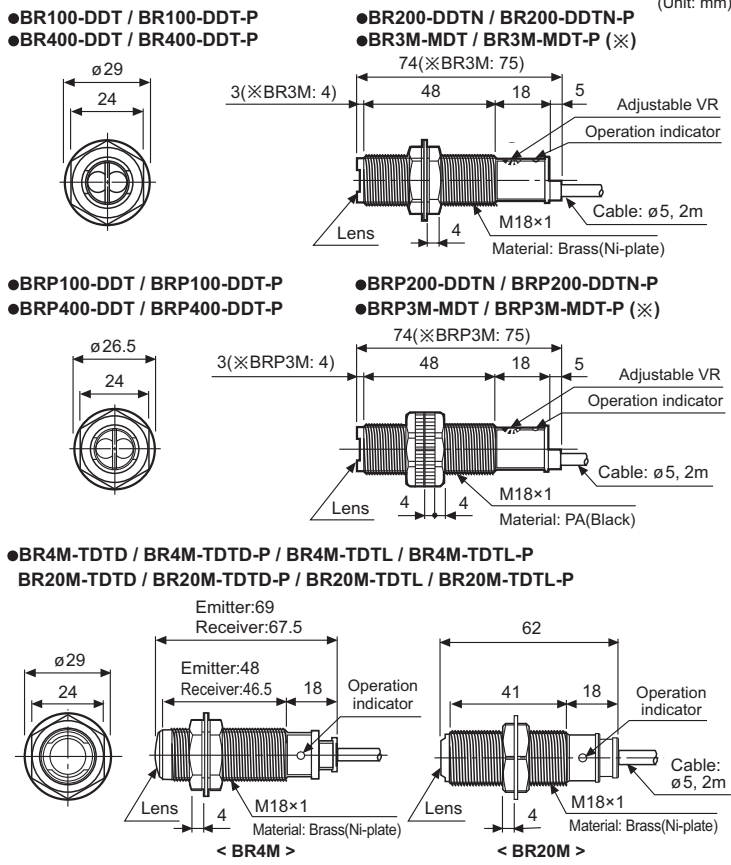


Specifications

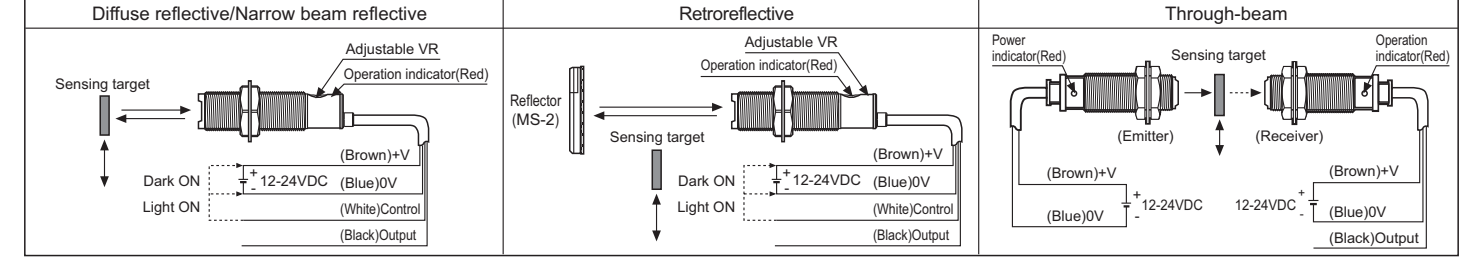
| Sensing type | Diffuse reflective | Narrow beam reflective | Retroreflective | Through-beam |
|------------------------|--|--|---|---|
| Model | BRP100-DDT, BRP100-DDT-P, BRP400-DDT, BRP400-DDT-P, BRP200-DDTN, BRP200-DDTN-P, BRP3M-MDT, BRP3M-MDT-P | BR200-DDTN, BR200-DDTN-P, BR3M-MDT, BR3M-MDT-P | BR4M-TD, BR4M-TD-P, BR20M-TD, BR20M-TD-P, BR20M-TDL, BR20M-TDL-P | BR4M-TD, BR4M-TD-P, BR20M-TD, BR20M-TD-P, BR20M-TDL, BR20M-TDL-P |
| Sensing distance | 100mm×1, 400mm×2 | 200mm×2 | 0.1 to 3m×3 | 4m, 20m |
| Sensing target | Translucent, Opaque materials | Opaque materials of min. ø60mm | Opaque materials of min. ø15mm | |
| Hysteresis | Max. 20% at rated setting distance | | | |
| Response time | Max. 1ms | | | |
| Power supply | 12-24VDC ±10%(Ripple P-P: Max. 10%) | | | |
| Current consumption | Max. 45mA | | | |
| Light source | Infrared LED(940nm) | Infrared LED(850nm) | Red LED(660nm) | Infrared LED(850nm) |
| Sensitivity adjustment | Adjustable(VR) | | | Fixed |
| Operation mode | Selectable Light ON or Dark ON by control cable(White) | | | Dark ON, Light ON |
| Control output | •NPN open collector output ≒ Load voltage: Max. 30VDC, Load current: Max. 200mA, Residual voltage: Max. 1V •PNP open collector output ≒ Output voltage: Min. power voltage-2.5V, Load current: Max. 200mA | | | |
| Protection circuit | Reverse polarity protection circuit, Output short-circuit protection circuit | | | |
| Indicator | Operation indicator: Red LED, Power indicator: Red LED(only for emitter of through-beam type) | | | |
| Connection | Outgoing cable | | | |
| Insulation resistance | Min. 20MΩ (at 500VDC megger) | | | |
| Noise resistance | ±240V the square wave noise(pulse width: 1μs) by the noise simulator | | | |
| Dielectric strength | 1000VAC 50/60Hz for 1 minute | | | |
| Vibration | 1.5mm amplitude at frequency of 10 to 55Hz(for 1 min.) in each of X, Y, Z directions for 2 hours | | | |
| Shock | 500ms ² (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 75°C Ambient humidity: 35 to 85%RH, Storage: 35 to 85%RH | | | |
| Protection | IP66(IEC standard) | | | |
| Material | •Case ≒ BRP: PA(Black) BR: Brass, Ni-plate •Sensing part ≒ PC | | •Case ≒ BRP3M: PA(Black) / BR3M: Brass, Ni-plate •Sensing part ≒ Acrylic | •Case ≒ Brass, Ni-plate •Sensing part ≒ BR4M: Glass, BR20M: PC |
| Cable | ø5mm, 4P, Length: 2m(Emitter of through-beam type: ø5mm, 2P, Length: 2m / Receiver: ø5mm, 3P, Length: 2m) (AWG 22, Core wire diameter: ø0.08, Number of core wire: 60, Insulator out diameter: ø1.2) | | | |
| Accessory | Separate: VR adjustment driver | VR adjustment driver, Reflector(MS-2) | — | |
| Common | BR: Fixing Nuts, Washer / BRP: Fixing Nuts | | | |
| Unit weight | Approx. 100g | Approx. 120g | Approx. 100g | Approx. 300g |
| Approval | CE | | | |

※The temperature or humidity mentioned in Environment indicates a non freezing or condensation environment.
※1: Non-glossy white paper 50×50mm ※2: Non-glossy white paper 100×100mm.
※3: Sensing distance and sensing target for Retroreflective type is rated based on reflector(MS-2). Sensing distance indicates possible reflector setting range. Sensing under 0.1m is also available.

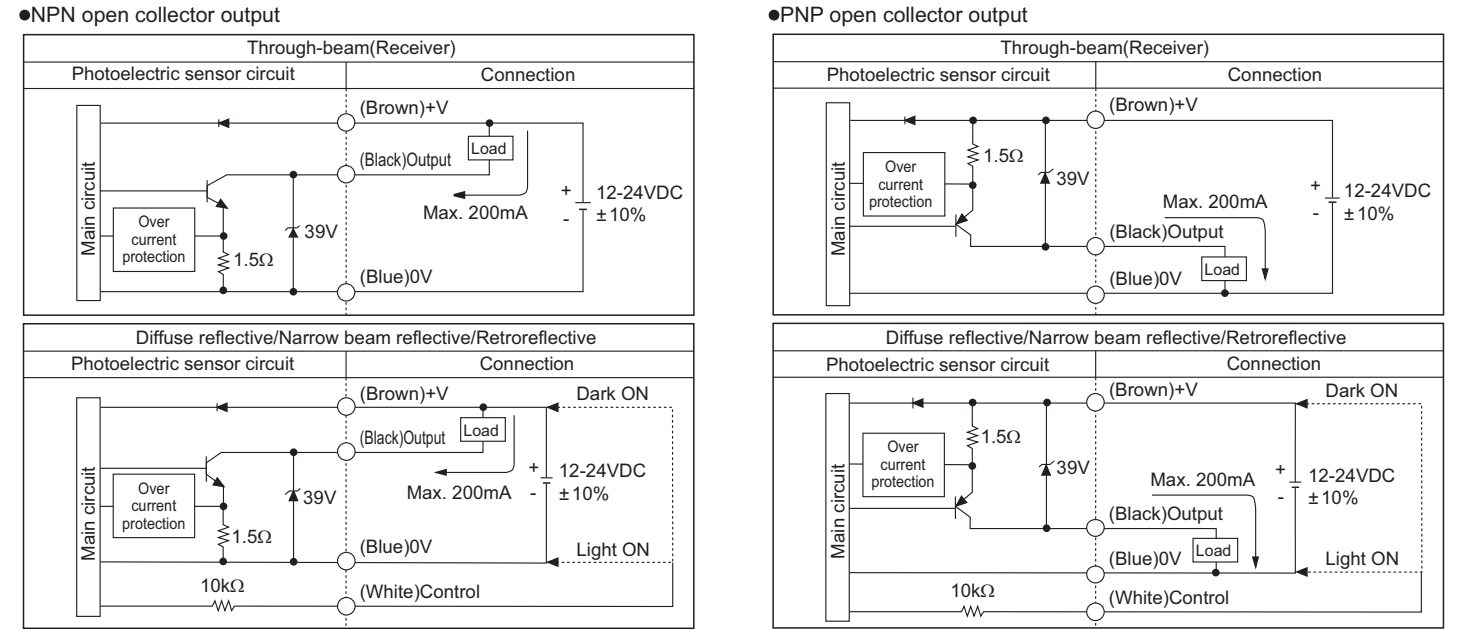
Dimensions



Connections



Control output circuit diagram



※Before using this unit, select Light ON/Dark ON with control cable.(Light ON: Connect control cable with 0V/Dark ON: Connect control cable with +V)
※Control cable is only for Diffuse reflective/Narrow beam reflective/Retroreflective type.

Installation 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;

- Diffuse reflective/Narrow beam reflective**
 - Even though the sensor is still available at the max. sensitivity position, it is recommended to adjust sensor sensitivity with considering existence of reflective material in background.
 - Set the target at a position to be detected by the beam, then turn the adjuster until point ⊙ which the indicator turns on from Min. position of the adjuster.
 - Take the target out of the photoelectric sensor, then turn the adjuster until point ⊙ which the indicator turns ON. [If the indicator does not turn on, max. position is point ⊙.]
 - Set the adjuster at the center of two switching point ⊙, ⊙.

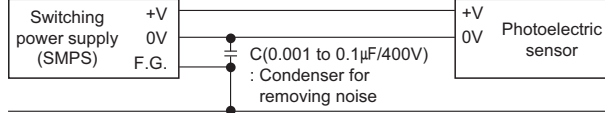
※The sensing distance indicated in the specification chart is for non-glossy white paper 100×100mm or 50×50mm. It is subject to change depending on the size of sensing target, surface status and gloss, etc.
- Retroreflective**
 - Set the sensor and reflector(MS-2) in opposite each other and supply the power.
 - Check stable indicator operation range with moving both sensor and reflector up/down and right/left and adjust the position in the middle.
 - After finishing position adjustment, check whether the sensor is operated normally with placing a sensing target on optical axis.

※In case of using multiple sensors in parallel, keep each sensor's distance min. 30cm.
※In case sensing target has higher reflectivity than non-glassy white paper, the sensor may cause malfunction due to direct reflected light from the target. Keep certain distance between a sensor and sensing target, or install the sensor with making sensing target's surface inclining 30° to 45° to photo sensor's optical axis.

※Sensitivity adjustment: Please see the diffuse reflective /narrow beam reflective type.
- Through-beam**
 - Set the receiver and emitter in opposite each other and supply the power.
 - Check stable indicator operation range with moving both receiver and emitter up/down and right/left and adjust the position in the middle.
 - After finishing position adjustment, check whether the sensor is operated normally with placing a sensing target on optical axis.

※If the sensing target is translucent body or smaller than ø15, it might not detect the target cause light passed.

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 reflective/narrow beam reflective type are installed adjacently, it can occur 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 wiring the photoelectric sensor with high voltage line, power line in the same conduit, it may cause malfunction or mechanical trouble. Therefore please wire separately 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 connecting 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 do not use an organic materials such as alkali, acid, chromic acid.
 - When using switching power supply as the source of supplying power, F.G. terminal shall be grounded and condenser for removing noise shall be installed between 0V and F.G. terminal.
- 
- Installation environment
 - Ⓛ It shall be used indoor
 - Ⓜ Altitude max. 2,000m
 - Ⓨ Pollution degree 2
 - Ⓩ Installation categoryII
- ※It may cause malfunction if above instructions are not followed.

Major products

- Proximity sensors
- Area sensors
- Door/Door side sensors
- Counters
- Rotary encoders
- Power controllers
- Panel meters
- Temperature controllers
- Switching power supplies
- Temperature/Humidity transducers
- Tachometer/Pulse(Rate) meters
- Stepping motors/drivers/motion controllers
- Laser marking system(CO₂, Nd:YAG)
- Laser welding/soldering system
- Photoelectric sensors
- Fiber optic sensors
- Pressure sensors
- Timers
- Display units
- Sensor controllers
- Graphic/Logic panels
- Field network devices

Autonics Corporation
http://www.autonics.com

Satisfiable Partner For Factory Automation

HEAD QUARTERS : 41-5, Yongdang-dong, Yangsan-si, Gyeongsang, 626-847, Korea
OVERSEAS SALES : Bldg. 402, 3rd Fl., Bucheon Techno Park, 193, Yakdang-dong, Wonmi-gu, Bucheon-si, Gyeonggi-do, 420-734, Korea
TEL: 82-32-610-2730 / FAX: 82-32-329-0728
E-mail : sales@autonics.com

The proposal of a product improvement and development : product@autonics.com