

Autonics PHOTOELECTRIC SENSOR BR-C 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.
- ⚠: Injury or danger may occur under special conditions.

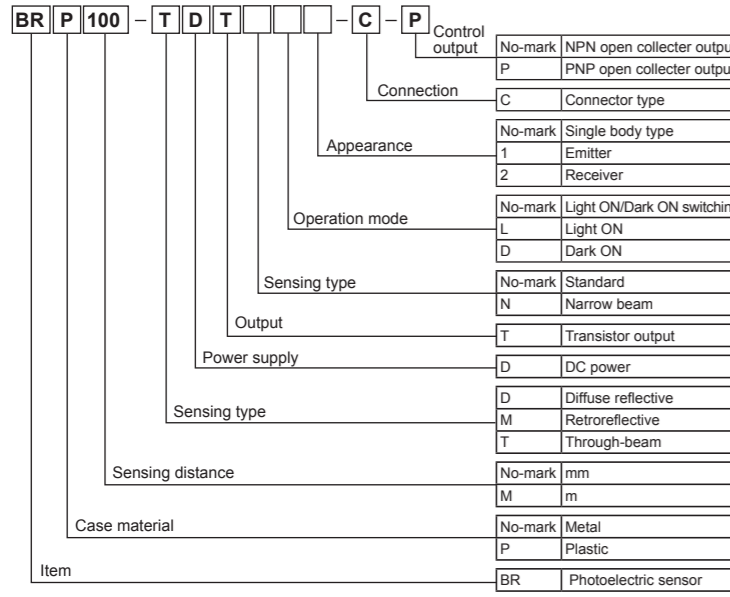
Warning

- 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.

Caution

- This unit shall not be used outdoors.
- Do not use this unit in place where there is flammable or explosive gas.
- Please observe the rated voltage and do not supply AC power.
- Please check the polarity of power and wrong wiring.
- Do not use this unit in place where there is vibration or impact.
- In cleaning the unit, do not use water or an oil-based detergent.

Ordering information



Operation mode

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

Note)1. The transistor output is held OFF for 0.5 sec. after supplied power in order to prevent malfunction of this photoelectric sensor (except through-beam type).
2. If the control output terminal is short-circuited or flow beyond rated current, the control signal is not output normally due to protection circuit.

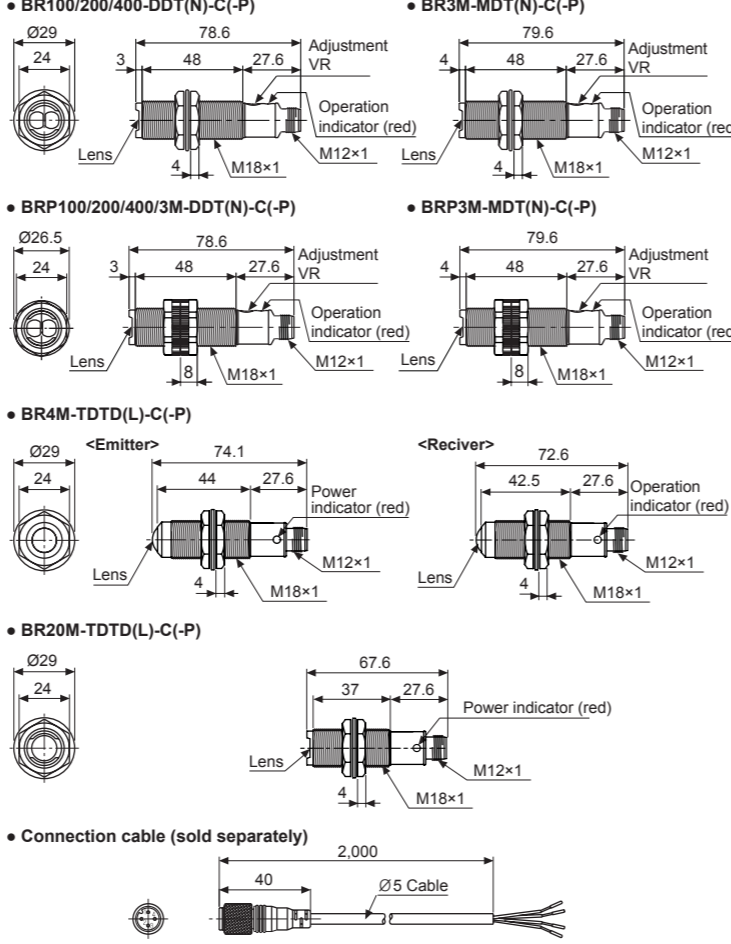
⊗ The above specifications are subject to change without notice.

Specifications

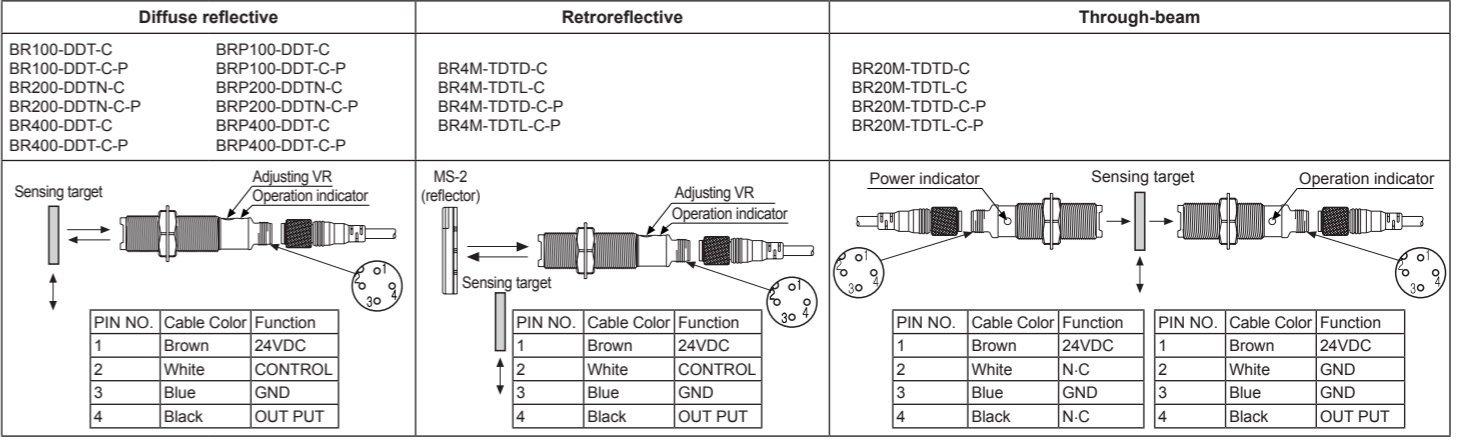
Model	BRP100- -DDT-C	BR100- -DDT-C	BRP400- -DDT-C	BR400- -DDT-C	BRP200- -DDTN-C	BR200- -DDTN-C	BRP3M- -MDT-C	BR3M- -MDT-C	BR4M- -TDTD-C	BR20M- -TDTD-C	BR4M- -TDTL-C	BR20M- -TDTL-C
Sensing type	Standard diffuse				Narrow beam		Retroreflective		Through-beam			
Sensing distance	100mm*1		400mm*2		200mm*2		0.1 to 3m*3		4m		20m	
Sensing target	Opaque, Translucent materials				Opaque materials of min.Ø15		Opaque materials of min.Ø15					
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(Built-in VR)								Fixed			
Operation mode	Selectable Light ON or Dark ON by control wire(White)								Dark ON		Light ON	
Control output	NPN or PNP open collector output Load voltage: Max.30V · Load current: Max.200mA Residual voltage: NPN: Max.1V, PNP: Max. 2.5V											
Protection circuit	Short-circuit protection, Reverse polarity protection											
Indicator	Operation indicator:Red LED, Power indicator:Red LED(only for emitter of through-beam type)											
Insulation resistance	Min. 20MΩ(at 500VDC mega)											
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 in each of X, Y, Z direction 2 hours											
Shock	500m/s ² (approx. 50G) in X, Y, Z directions for 3 times											
Environment	Sunlight: Max.11,000lx, Incandescent lamp: 3,000lx (Receiver illumination)											
Ambient temp.	-10 to 60°C(non-freezing condition), Storage:-25 to 75°C											
Ambient humi.	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: BRP: PA(Black), BR: Brass, Ni-plate Sensing part: Acrylic				Case: Brass, Ni-plate Sensing part: BR4M: Glass, BR20M: PC			
Accessory	Individual: VR Adjustment Driver				Common: BR: Fixing Nuts, Washer / BRP: Fixing Nuts				VR Adjustment Driver, Reflector(MS-2)			
Approval	CE											
Weight**4	BR: Approx. 70g (Approx. 30g) / BRP: Approx. 90g (Approx. 50g) / Approx. 150g (Approx. 110g)											

⊗1: Non-glossy white paper 50×50mm
⊗2: Non-glossy white paper 100×100mm
⊗3: The sensing distance is specified with using the reflector(MS-2). Sensing distance is setting range of the reflector. The sensor can detect under 0.1m.
⊗4: The weight is with packaging and the weight in parentheses is only unit weight.
⊗ Connector tightening torque is 0.39 to 0.49N·m.
⊗ Environment resistance is rated at no freezing or condensation.

Dimensions

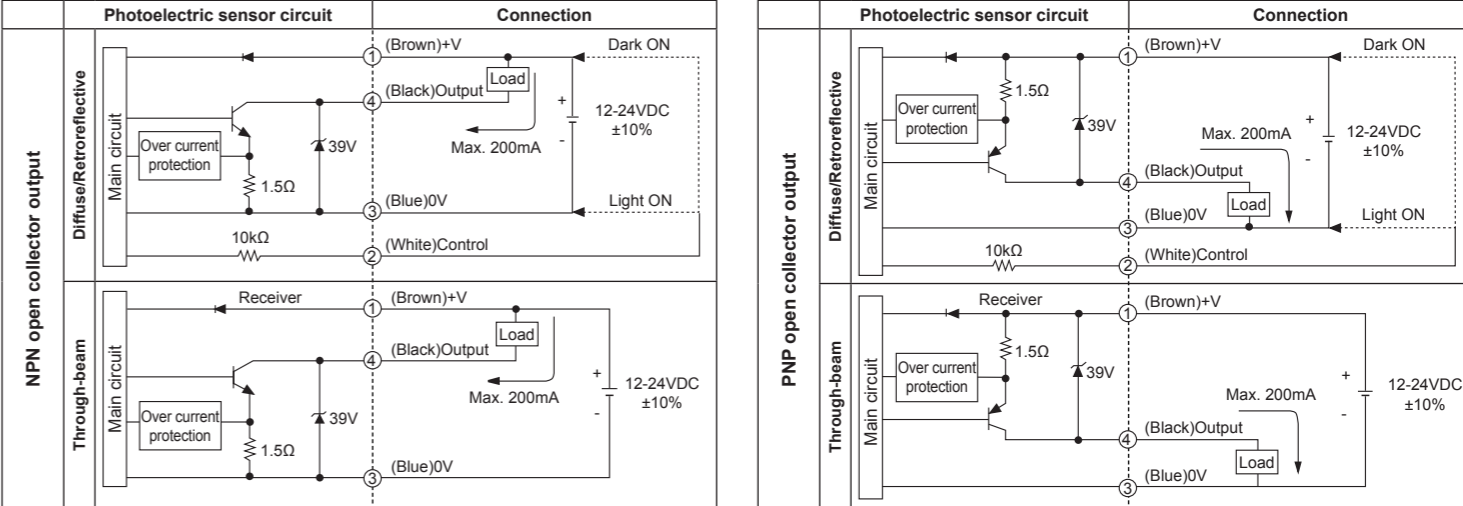


Connections



⊗ Connection cable is sold separately.

Control output circuit diagram



Mounting & Adjustment

Install the sensor to the desired place and check the connections. Supply the power to the sensor and adjust the optical axis and the sensitivity as follow ;

- ⊙ Diffuse reflective/Narrow beam reflective type
 - The sensitivity should be adjusted depending on a sensing target or mounting place.
 - 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.
 - Take the target out of the sensing area, then turn the adjustment VR until position ⊙ where the the operation indicator turns ON. If the indicator dose not turn ON, max. position is ⊙.
 - Set the adjustment VR at the center of two switching position ⊙, ⊙.
- ⊗ The sensing distance indicated on specification chart is for 100×100mm or 50×50mm of non-glossy white paper. Be sure that it can be different by size, surface and gloss of target.
- ⊙ Retroreflective
 - Supply the power to the photoelectric sensor, after setting the photoelectric sensor and the reflector(MS-2)in face to face.
 - Set the photoelectric sensor in the position which indicator turns on, as adjusting the reflector or the sensor right and left, up and down.
 - 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.
- ⊗ Sensitivity adjustment: Refer to the diffuse reflective type's.
- ⊙ Through-Beam
 - Supply the power to the photoelectric sensor, after setting the emitter and the receiver facing each other.
 - 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.
 - After adjustment, check the stability of operation putting the object at the optical axis.
- ⊗ If the sensing target is translucent body or smaller than Ø15mm, it can be missed by sensor cause light penetrate it.

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 type 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 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 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 do not 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.

⊗ 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

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