Autonics

Photoelectric Sensor
BJ SERIES
(BGS Reflective Type)

INSTRUICTION MANUAL

CE

Thank you for choosing our Autonics product.
Please read the following safety considerations before use.

■ 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.

■ Ordering Information

BJ 30 - B D T - P

Control Output	**No mark**	NPN open collector output
	P	PNP open collector output
Output	**T**	Transistor output
Power supply	**D**	DC power
Sensing type	**B**	BGS (Background Suppression) reflective
Sensing distance	**Number**	Sensing distance (unit: mm)
Item	**BJ**	Photoelectic sensor series

※**The above specifications are subject to change and some models may be discontinued without notice.**
※**Be sure to follow cautions written in the instruction manual and the technical descriptions (catalog, homepage).**

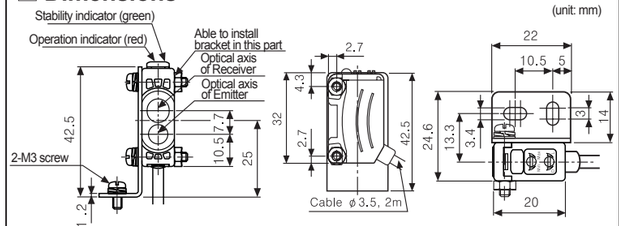
■ Specifications

Model		BJ30-BDT	BJ50-BDT	BJ100-BDT
	NPN open collector output			
	PNP open collector output	BJ30-BDT-P	BJ50-BDT-P	BJ100-BDT-P
Sensing type		Background suppression (BGS)		
Sensing distance※1		10 to 30mm (Non-glossy white paper 50×50mm)	10 to 50mm (Non-glossy white paper 50×50mm)	10 to 100mm (Non-glossy white paper 100×100mm)
Sensing target		Translucent, opaque materials		
Hysteresis		±10% of setting distance		
Black/White difference		±10% of setting distance		
Sensitivity adjustment range		-10 % of max. rated sensing distance (non-glossy white paper)		
Response time		Max. 1.5ms		
Power supply		12-24VDC⎓ ±10% (ripple P-P: max. 10%)		
Power consumption		Max. 30mA		
Light source / Wavelength		Red LED (660nm)		
Sensitivity adjustment		Sensitivity adjuster		
Operation mode		Light ON/Dark ON selectable by switch		
Control output		NPN or PNP Open collector type • Load voltage: max. 26.4VDC⎓ • Load current: max. 100mA • Residual voltage - NPN: max.1VDC⎓, PNP: max. 2VDC		
Protection circuit		Reverse polarity protection circuit, output short over current protection circuit		
Indicator		Operation indicator: red, Stability indicator: green		
Connection		Cable outgoing type		
Insulation resistance		Over 20MΩ (at 500VDC megger)		
Noise immunity		±240V the square wave noise(pulse width: 1μs) by the noise simulator		
Dielectric strength		1000VAC 50/60Hz for 1minute		
Vibration		1.5mm amplitude or 300m/s at frequency of 10 to 55Hz in each X, Y, Z direction for 2 hours		
Shock		500m/s² in each X, Y, Z direction for 3 times		
Environment	Ambient illumination	Sunlight: max. 11,000lx, incandescent lamp: max. 3,000lx (receiver illumination)		
	Ambient temperature	-25 to 55°C, storage: -40 to 70°C		
	Ambient humidity	35 to 85%RH, storage: 35 to 85%RH		
Protection structure		IP65 (IEC standards)		
Material		Case: PC+ABS, LED CAP: PC, lens: PMMA		
Cable		ø3.5mm, 3P, Length: 2m (AWG 24, core wire diameter: 0.08mm, No. of core wire: 40, insulator out diameter: 1mm)		
Accessory		Mounting bracket, M3 bolt: 2, M3 nut: 2, adjustment screwdriver		
Approval		CE		
Unit weight		Approx. 50g		

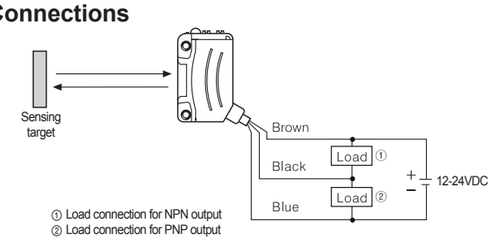
※1: The sensing distance is based on non-glossy white paper and varies from colors or materials.
※The temperature or humidity mentioned in Environment indicates a non freezing or condensation.

■ Dimensions

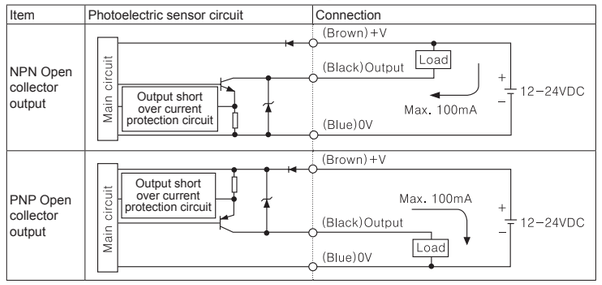
(unit: mm)



■ Connections



■ Control Output Circuit Diagram

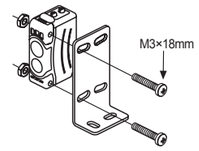


※If short-circuit the control output terminal or supply current over the rated specification, normal control signal is not output due to the output short over current protection circuit.

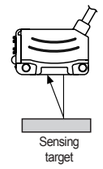
■ Mounting & Adjustment

Mounting

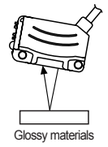
●When installing the product, tighten the screw with a tightening torque of 0.5 N·m.
When using photoelectric sensors closely over three units, it may result in malfunction due to mutual interference.



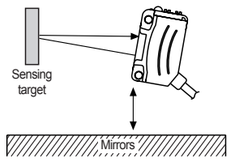
●Place the sensing target in parallel with sensor's detecting part.



●In case sensing targets are glossy materials or mirrors, mount the sensor with the angle of incline 5 to 10° as shown in the figure. Make sure that there is no effect of background on the target.



●Mount the sensor slightly slanted at a certain distance between the sensor and the surface of a mirror. If not, it might cause malfunction by reflection from the mirror to the sensor.

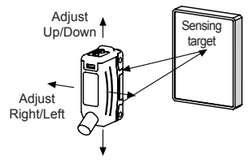


Switch of operation mode

Light ON operation mode	D L	Turn the operation switching adjster to the end of right (L direction), it is set as Light ON mode.
Dark ON operation mode	D L	Turn the operation switching adjuster to the end of left (D direction), it is set as Dark ON mode.

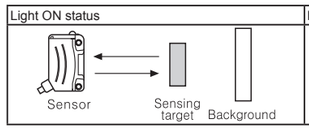
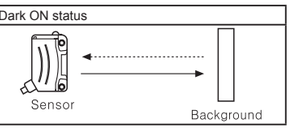
Optical axis adjustment

After placing the sensing target, fix the sensor in the center of position where the indicator is operated by adjusting it up and down or left and right.



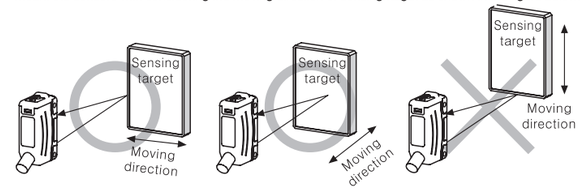
Sensitivity adjustment

Order	Sensitivity adjuster	Description
1	(A) MIN MAX	Turn the sensitivity adjuster to the right from min. sensitivity position and check(A) where the indicator is turned on in "Light ON status".
2	(A) (C) (B) MIN MAX	Turn the sensitivity adjuster more to the right from min. sensitivity position(A), check (B) where the indicator is turned on. And turn the adjuster to the left, check (C) where the indicator is turned on in "Dark ON status". ※If the indicator does not turn on although the adjuster is turned to the max. sensitivity position, the max. sensitivity position is (C).
3	Optimal sensitivity (A) (C) MIN MAX	Set the adjuster at the center of (A) and (C). To set the optimum sensitivity, check the operation and lighting of stable indicator with sensing target or without it. If the indicator is not lighted, please check the sensing method again because sensitivity is unstable.

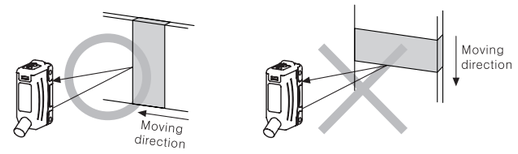
Light ON status	Dark ON status
	

※Please set adjuster as sensitivity adjustment is executed in stable Light ON area and the reliability of environment(temperature, voltage, dust, etc.) is increased after the mounting it in a stable area.
※It may cause breakdown when the sensitivity adjuster or the operation switching adjuster is turned by force.

●Mount the sensors with considering the moving direction of sensing target as shown in the figure below.



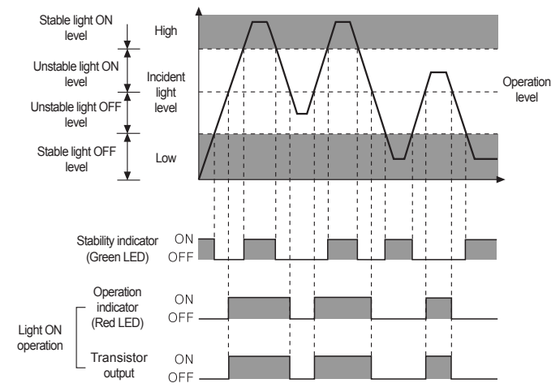
Mount the sensors as shown in the figure below when sensing target's color or materials is radically changing.



■ Operation Mode

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

■ Operation Timing Diagram



※The waveforms of "Operation indicator" and "Transistor output" are for Light ON mode, They are opposite operation for Dark ON mode.

■ Cautions during Use

1. Follow instructions in 'Cautions during Use'. Otherwise, it may cause unexpected accidents.
2. When connecting a DC relay or other inductive load to the output, remove surge by using diodes or varistors.
3. Use the product, 0.5 sec after supplying power.
   When using separate power supply for the sensor and load, supply power to sensor first.
4. 12-24VDC power supply should be insulated and limited voltage/current or Class 2, SELV power supply device.
5. Wire as short as possible and keep away from high voltage lines or power lines, to prevent inductive noise.
6. 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.
7. When using sensor with the equipment which generates noise (switching regulator, inverter, servo motor, etc.), ground F.G. terminal of the equipment.
8. This unit may be used in the following environments.
   ①Indoors (in the environment condition rated in 'Specifications')
   ②Altitude max. 2,000m
   ③Pollution degree 3
   ④Installation category II

■ Major Products

■ Photoelectric Sensors
■ Fiber Optic Sensors
■ Door Sensors
■ Door Side 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, CO_2, 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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