

Photoelectric Sensors for PCB Detection



BJP Series PRODUCT MANUAL

For your safety, read and follow the considerations written in the instruction manual, other manuals and Autonics website.

The specifications, dimensions, etc. are subject to change without notice for product improvement. Some models may be discontinued without notice.

Features

- 30mm×3mm of rectangular light beam (at 30mm distance) provides accurate detection of PCBs regardless of holes, incomplete fabrication, protrusions, or intrusions on the boards.
- Background suppression (BGS) sensing method allows stable detection regardless of the color, texture or surface of the background object.
- Sensing distance : 10 to 100 mm (adjustable distance: 20 to 100 mm)
- Switch for selecting Light ON/Dark ON mode
- Reverse power protection circuit, output short overcurrent protection circuit
- IP65 protection rating (IEC standard)

Safety Considerations

- Observe all 'Safety Considerations' for safe and proper operation to avoid hazards.
- ⚠ symbol indicates caution due to special circumstances in which hazards may occur.

⚠ Warning Failure to follow instructions may result in serious injury or death.

- 01. 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 personal injury, economic loss or fire.
- 02. Do not use the unit in the place where flammable/explosive/corrosive gas, high humidity, direct sunlight, radiant heat, vibration, impact or salinity may be present.**
Failure to follow this instruction may result in explosion or fire.
- 03. Do not disassemble or modify the unit.**
Failure to follow this instruction may result in fire.
- 04. Do not connect, repair, or inspect the unit while connected to a power source.**
Failure to follow this instruction may result in fire.
- 05. Check 'Connections' before wiring.**
Failure to follow this instruction may result in fire.

⚠ Caution Failure to follow instructions may result in injury or product damage.

- 01. Use the unit within the rated specifications.**
Failure to follow this instruction may result in fire or product damage.
- 02. Use a dry cloth to clean the unit, and do not use water or organic solvent.**
Failure to follow this instruction may result in fire.

Cautions during Use

- Follow instructions in 'Cautions during Use'. Otherwise, It may cause unexpected accidents.
- When connecting an inductive load such as DC relay or solenoid valve to the output, remove surge by using diodes or varistors.
- Use the product after 0.5 sec of the power input.
When using a separate power supply for the sensor and load, supply power to the sensor first.
- The power supply should be insulated and limited voltage/current or Class 2, SELV power supply device.
- Wire as short as possible and keep it away from high voltage lines or power lines to prevent surge and inductive noise.
- When using switching mode power supply (SMPS), ground F.G. terminal and connect a condenser between 0V and F.G. terminal to remove noise.
- When using a sensor with a noise-generating equipment (e.g., switching regulator, inverter, and servo motor), ground F.G. terminal of the equipment.
- This unit may be used in the following environments.
 - Indoors (in the environment condition rated in 'Specifications')
 - Altitude max. 2,000 m
 - Pollution degree 3
 - Installation category II

Product Components

- Product
- Bracket A
- M3 bolt × 2, M3 nut × 2
- Instruction manual
- Adjustment screwdriver

Ordering Information

This is only for reference, the actual product does not support all combinations. For selecting the specified model, follow the Autonics website.

BJP ① - ② ③ ④ - ⑤

① Sensing distance

100: 100 mm

② Sensing type

B: BGS reflective

③ Power supply

D: 12 - 24 VDC=

④ Output

T: Solid state (transistor)

⑤ Control output

No mark: NPN open collector output

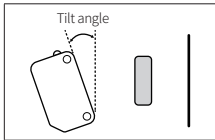
P: PNP open collector output

Sold Separately

- Bracket B: BJP SERIES BRACKET B

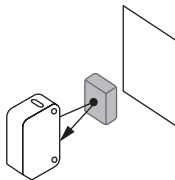
Cautions during Installation

- Be sure to install this product by following the usage environment, location, and specified ratings. Consider the listed conditions below.
 - Installation environment and background (reflected light)
 - Sensing distance and sensing target
 - Direction of target's movement
 - Characteristic curves
- When installing multiple sensors closely, it may result in malfunction due to mutual interference.
- BGS reflective :If the sensing target has a glossy surface or high reflection, tilt the sensor with an angle from 5 to 10 degrees and install it. Get rid of the effect of background object on the sensing performance.
- Narrow beam reflective: Mount the sensor tilted at an angle ranged from 0 to 15 degrees for stable copper wire detection.



- For installation, tighten the screw with a torque of 0.5 N m. Mount the brackets correctly to prevent the twisting of the sensor's optical axis.
- Do not impact with a hard object or bend the cable excessively. That could decrease the product's water resistance.
- Use this product after the test. Check whether the indicator works appropriately for the positions of the detectable object.

Reflective



Sensor - Sensing target:

Install to face each other (parallel with the sensing side of the unit)

BGS reflective : Recommend horizontal / back and force movements of sensing target

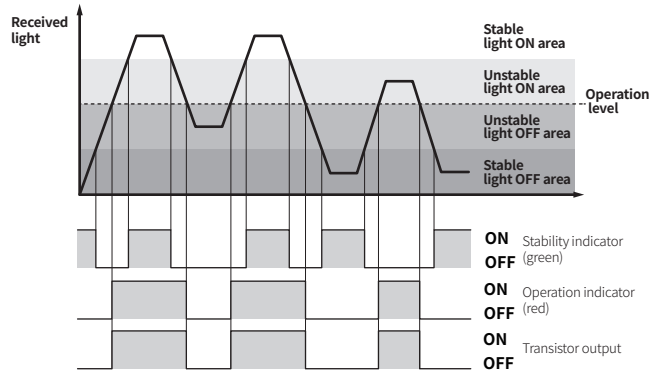
Setting Operation Mode

- Be sure to set the mode before power-on.
- Use the offered adjustment screwdriver. Do NOT turn with excessive force to prevent product damage.

L: Light ON mode	D: Dark ON mode

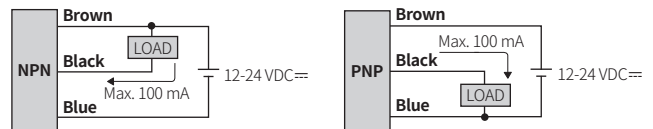
Operation Timing Chart and Indicators

Light ON mode



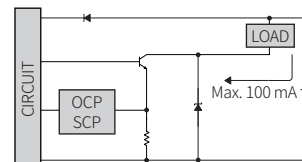
- In Dark ON mode, the waveforms are reversed.

Connections

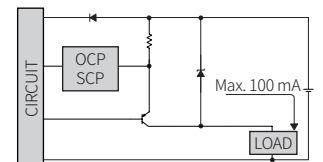


Circuit

NPN open collector output



PNP open collector output



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

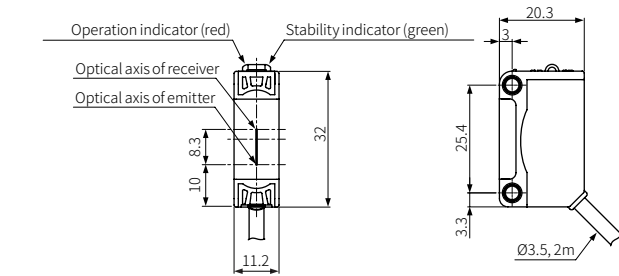
Sensing Distance Setting

- Set the adjuster for stable Light ON area, minimizing the effect of the installation environment.
- Use the offered adjustment screwdriver. Do NOT turn with excessive force to prevent product damage.
- The steps below are based on Light ON mode.

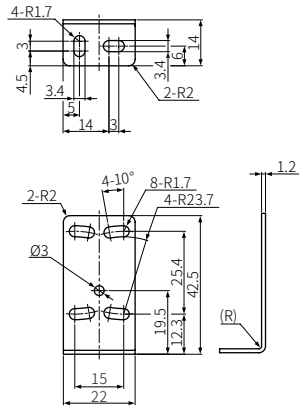
STEP	Status	Description
01	Received	Turn the adjuster from MIN to MAX sensitivity and check the position (A) where the operation indicator activates under the light ON area.
02	Interrupted	Turn the adjuster from (A) to MAX and check the position (B) where the operation indicator activates under the light OFF area. If the operation indicator does NOT activate at the MAX (maximum sensitivity): MAX = (B).
03	-	Set the adjuster at the mid position between (A) and (B) for optimal sensitivity.

Dimensions

- Unit: mm, For the detailed drawings, follow the Autonics website.



■ Bracket A



Specifications

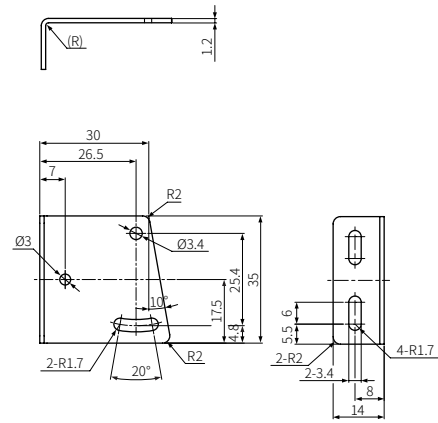
Model	BJP100-BDT-□
Sensing type	BGS reflective
Sensing distance	10 to 100 mm ⁰¹⁾ (at sensing distance: 100 mm)
Sensing target	Opaque materials
Sensing distance setting	20 to 100 mm ⁰¹⁾
Hysteresis	≤ 10% of setting distance ⁰¹⁾
Response time	≤ 1.5 ms
Light source	Red
Peak emission wavelength	660 nm
Beam spot size	W3 × L30 mm (at sensing distance: 30 mm)
Operation mode	Light ON mode - Dark ON mode selectable (Adjuster)
Indicator	Operation indicator (red), stability indicator (green)
Approval	CE
Unit weight (packaged)	≈ 50 g (≈ 105 g)

01) Non-glossy white paper 100 × 100 mm

Power supply	12-24 VDC≐ ±10% (ripple P-P: ≤ 10%)
Current consumption	≤ 30 mA
Control output	NPN open collector output / PNP open collector output model
Load voltage	≤ 26.4 VDC≐
Load current	≤ 100 mA
Residual voltage	NPN: ≤ 1 VDC≐, PNP: ≤ 2 VDC≐
Protection circuit	Reverse power protection circuit, output short overcurrent protection circuit
Insulation resistance	≥ 20 MΩ (500 VDC≐ megger)
Noise immunity	±240 VDC≐ the square wave noise (pulse width: 1 μs) by the noise simulator
Dielectric strength	Between the charging part and the case: 1,000 VAC~ 50/60 Hz for 1 min
Vibration	1.5 mm double amplitude at frequency of 10 to 55 Hz in each X, Y, Z direction for 2 hours
Shock	500 m/s ² (≈ 50 G) in each X, Y, Z direction for 3 times
Ambient illuminance (receiver)	Sunlight: ≤ 10,000 lx, incandescent lamp: ≤ 3,000 lx
Ambient temperature	-25 to 55 °C, storage: -40 to 70 °C (no freezing or condensation)
Ambient humidity	35 to 85 %RH, storage: 35 to 85 %RH (no freezing or condensation)
Protection rating	IP65 (IEC standard)
Connection	Cable type
Cable spec.	∅ 3.5 mm, 3-wire, 2 m
Wire spec.	AWG24 (0.08 mm, 40-core), insulator outer diameter: ∅ 1 mm
Material	Case: PC+ABS, CAP: PC, sensing part: PMMA

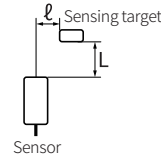
Sold Separately: Bracket B (BJP SERIES BRACKET B)

- Unit: mm, For the detailed drawings, follow the Autonics website.

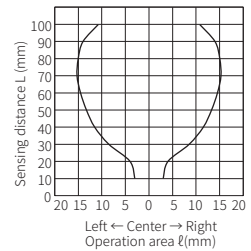


Characteristic Curves

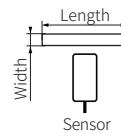
■ Sensing area



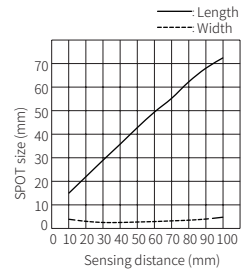
• BJP100-BDT



■ Beam spot size



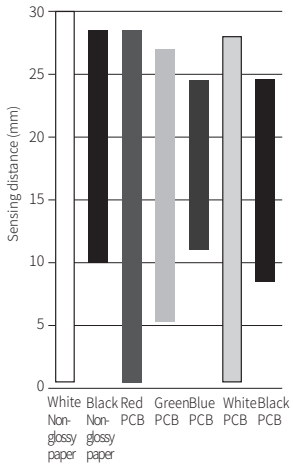
• BJP100-BDT



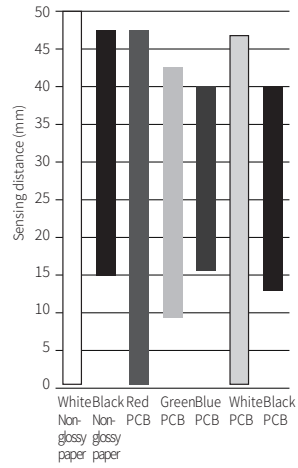
■ Sensing distance by target

- Non-glossy white paper, tested sensing distances are 30 mm, 50 mm, and 100 mm
- Glossy surface of PCB
- BJP100-BDT

• Sensing distance 30 mm



• Sensing distance 50 mm



• Sensing distance 100 mm

