# **BJR-F Series** INSTRUCTION MANUAL

TCD210045AA

Autonics

Thank you for choosing our Autonics product.

Read and understand the instruction manual and manual thoroughly before using the product.

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

Keep this instruction manual in a place where you can find easily.

The specifications, dimensions, etc. are subject to change without notice for product improvement. Some models may be discontinued without notice. Follow Autonics website for the latest information.

#### Safety Considerations

Observe all 'Safety Considerations' for safe and proper operation to avoid hazards.

 <u>A</u> 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.
- 10-30 VDC= 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. 2,000m - Pollution degree 3
- Installation category I
- Installation category i

#### **Product Components**

Sensing type	Through-beam	Polarized retroreflective	Diffuse reflective	
Product components	Product, instruction	manual		
Reflector	-	MS-2S	-	
Adjustment screwdriver	$\times 1$	× 1	$\times 1$	
Bracket A or B <sup>01)</sup>	× 2	× 1	×1	
M3 bolt	× 4	× 2	× 2	

01) Cable type and cable connector type: Bracket A, connector type: Bracket B

## **Ordering Information**

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

BJR	0	-	0	D	Т	-	ß	-	4	-	F
• Sensing distance Number: Sensing distance (unit: mm) Number+M: Sensing distance (unit: m)				No C:	o mark Conne	ection Cable t ctor type connect	e	2			
Sensing type			4	Control output							

#### **O Sensing type** T: Through-beam P: Polarized retroreflective

D: Diffuse reflective

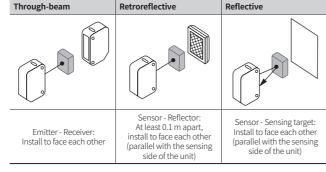
No mark: NPN open collector output P: PNP open collector output

#### Sold Separately

Reflector: MS Series
 Connector cable, connector connection cable
 Retroreflective tape: MST Series

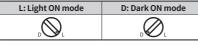
#### **Cautions during Installation**

- 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
- Feature data
  When installing multiple sensors closely, it may result in malfunction due to mutual
- interference.
- 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. • Although some of the cable connector types can have color differences in the connector part
- due to the coating, it does not affect operation and performance. • Use this product after the test. Check whether the indicator works appropriately for the
- positions of the detectable object.



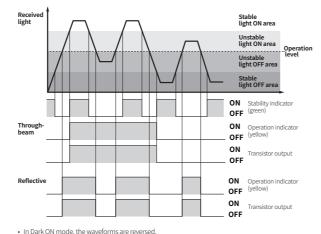
## Setting Operation Mode

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



## **Operation Timing Chart**

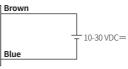
#### Light ON mode



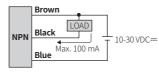
Operation indicator and transistor output differ from the sensing method

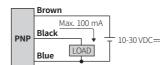
#### Connections

### Cable type: Emitter



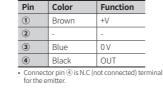
#### ■ Cable type: Receiver, Polarized retroreflective, Diffuse reflective type











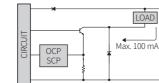
## Cable connector type

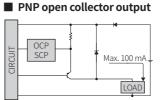


Pin	Color	Function
1	Brown	+V
2	-	-
3	Blue	0 V
4	Black	OUT

## Circuit

## NPN 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.

#### Sensitivity Adjustment

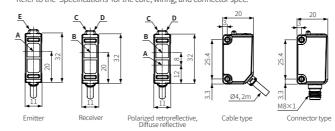
- · Set the adjuster for stable Light ON area, minimizing the effect of the installation
- environment.
- Use the offered adjustment screwdriver. Do NOT turn with excessive force to prevent product damage.

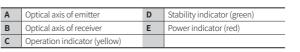
The steps below are based on Light ON mode.						
STEP	Status	Description				
01	Received	+	Turn the adjuster from MIN (—) to MAX (+) sensitivity and check the position (A) where the operation indicator activates under the light ON area.			
02	12 Interrupted		Turn the adjuster from (A) to MAX ( $+$ ) 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 - A B B B B B B B B B B B B B B B B B B		A B	Set the adjuster at the mid position between (A) and (B) for optimal sensitivity.			

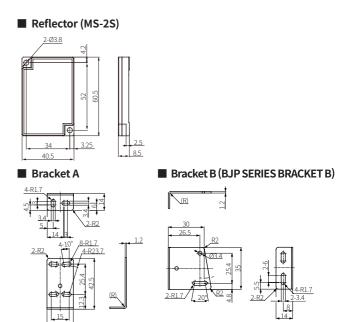
## Dimensions

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

This dimensions shows the cable type and connector type.
 Refer to the 'Specifications' for the core, wiring, and connector specifications' for the core.







#### Specifications

Model	BJR -TDTF		BJR3M-PDTF	BJR DDT	BJR -DDTF		
Sensing type	Through-beam		Polarized retroreflective	Diffuse refle	ctive		
Sensing distance	10 m 15 m		3 m <sup>01)</sup>	100 mm <sup>02)</sup>	1 m <sup>03)</sup>		
Sensing target	Opaque materials		Opaque materials		Opaque materials, translucent materials		
Min. sensing target	≥Ø12mm		≥Ø75mm	-	-		
Hysteresis	-		-	$\leq$ 20 % of s	$\leq$ 20 % of sensing distance		
Response time	$\leq 1  \text{ms}$						
Light source	Infrared	Red	Red	Red	Infrared		
Peak emission wavelength	850 nm	660 nm	660 nm	660 nm	850 nm		
Sensitivity adjustment	YES (Adjuster)		YES (Adjuster)	YES (Adjuster)			
Mutual interference prevention	-		YES	YES	YES		
Operation mode	Light ON mode - Dark ON mode selectable (Adjuster)						
Indicator	Operation indicator (yellow), stability indicator (green), power indicator (red) 04						
Approval	CE		CE	CE	CE		

02) Non-glossy white paper 100  $\times$  100 mm

03) Non-glossy white paper 300  $\times$  300 mm

os) Non-glossy white papers

04) Only for the emitter

Unit weight (packaged)	Through-beam	Polarized retroreflective	Diffuse reflective				
Cable type	≈ 95 g (≈ 145 g)	≈ 50 g (≈ 115 g)	≈ 50 g (≈ 100 g)				
Connector type	$\approx 12 \text{ g} (\approx 65 \text{ g})$ $\approx 6 \text{ g} (\approx 75 \text{ g})$ $\approx 6 \text{ g}$		≈ 6 g (≈ 60 g)				
Cable connector type	$\approx 55 \text{ g} (\approx 105 \text{ g}) \qquad \approx 30 \text{ g} (\approx 95 \text{ g}) \qquad \approx 30 \text{ g} (\approx 80 \text{ g})$						
Power supply	10-30 VDC== ±10 % (ripple	P-P: ≤ 10 %)					
Current consumption	It depends on the sensing type						
Through-beam	Emitter: ≤ 20 mA, receiver:	≤ 20 mA					
Reflective	≤ 30 mA						
Control output	NPN open collector output	/ PNP open collector output N	Nodel				
Load voltage	≤ 30 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	$\geq$ 20 M $\Omega$ (500 VDC== megger)						
Noise immunity	$\pm 240$ VDC= the square wave noise (pulse width: 1 $\mu s)$ by the noise simulator						
Dielectric strength	1,000 VAC~ 50/60 Hz for 1 min						
Vibration	1.5 mm double amplitude at frequency of 10 to 55 Hz (for 1 min) in each X, Y, Z direction for 2 hours						
Shock	500 m/s² (≈ 50 G) in each X, Y, Z direction for 3 times						
Ambient illuminance (receiver)	Sunlight: ≤ 11,000 lx, incandescent lamp: ≤ 3,000 lx						
Ambient temperature	-25 to 60 °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	IP67 (IEC standard), IP67F (JEM standard)						
Connection	Cable type / Connector type / Cable connector type model						
Cable spec.	Ø 4 mm, 3-wire (Emitter: 2-v	vire), cable type: 2 m, cable co	onnector type: 300 mm				
Wire spec.	AWG26 (0.52 mm, 20-core),	insulator outer diameter: Ø 1	mm				
Connector	Connector type: M8 4-pin p	lug type, cable connector type	e: M12 4-pin plug type				
Material	Case: ABS, CAP: PA12, sensi	ng part: PMMA					

