

Autonics

Compact Long Distance Type Photoelectric Sensing with Amplifier

BJX SERIES

INSTRUCTION MANUAL

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.

BJX

30

M

T

D

T

1

C

P

Control output

No mark

NPN open collector output

P

PNP open collector output

Connection

No mark

Cable type

C

Connector type

Appearance

1

Emitter

2

Receiver

Output type

T

Transistor output

D

DC power

Sensing type

T

Through-beam type

P

Retroreflective type (built-in polarizing filter)

D

Diffuse Reflective type

Sensing distance unit

No mark

mm

M

m

Sensing distance

Number

Sensing distance

Item

BJX

Compact Long Distance Type Photoelectric Sensing with Amplifier

Type

Photoelectric sensor circuit

Connection

NPN open collector output

Main circuit

Output short over current protection circuit

(brown) +V

(black) Output

Load

(blue) 0V

10-30VDC

Max. 100mA

Control output

No mark

NPN open collector output

P

PNP open collector output

PNP open collector output

Main circuit

Output short over current protection circuit

(brown) +V

(black) Output

Load

(blue) 0V

10-30VDC

Max. 100mA

Control output

No mark

Cable type

C

Connector type

⚠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.

⚠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	NPN open collector output PNP open collector output	BJX30M-TDT BJX30M-TDT-C BJX30M-TDT-P BJX30M-TDT-C-P	BJX15M-TDT BJX15M-TDT-C BJX15M-TDT-P BJX15M-TDT-C-P	BJX10M-TDT BJX10M-TDT-C BJX10M-TDT-P BJX10M-TDT-C-P	BJX3M-PDT BJX3M-PDT-C BJX3M-PDT-P BJX3M-PDT-C-P	BJX1M-DDT BJX1M-DDT-C BJX1M-DDT-P BJX1M-DDT-C-P	BJX300-DDT BJX300-DDT-C BJX300-DDT-P BJX300-DDT-C-P	BJX100-DDT BJX100-DDT-C BJX100-DDT-P BJX100-DDT-C-P
Sensing type	Through-beam type				Retroreflective type (built-in polarizing filter)	Diffuse reflective type		
Sensing distance	30m	15m	10m	3m ^{※1}	1m ^{※2}	300mm ^{※3}	100mm ^{※3}	
Sensing target	Opaque material over Ø15mm				Opaque material over Ø75mm	Opaque, translucent materials		
Hysteresis	—							
Response time	Max. 1ms							
Power supply	10-30VDC=±10% (ripple P-P: max. 10%)							
Power consumption	Emitter / Receiver: max. 20mA				Max. 30mA			
Light source	Red LED (660nm)		Infrared LED (850nm)		Red LED (660nm)		Infrared LED (850nm)	
Sensitivity adjustment	—							
Operation mode	Light ON / Dark ON selectable by switch							
Control output	NPN or PNP open collector output • Load voltage: max. 30VDC= • Load current: max. 100mA • Residual voltage -NPN: max. 1VDC=, PNP: max. 2VDC							
Protection circuit	Power reverse polarity protection circuit, output short over current protection circuit							
Indicator	Operation indicator: yellow LED, stability indicator: green LED (emitter's power indicator: red LED)							
Insulation resistance	Over 20MΩ (500VDC megger)							
Noise immunity	±240V the square wave noise (pulse width: 1μs) by the noise simulator							
Dielectric strength	1,000VAC 50/60Hz for 1 minute							
Vibration	1.5mm amplitude at frequency of 10 to 55Hz (for 1 min) in each X, Y, Z direction for 2 hours							
Shock	500m/s ² (approx. 50G) in each X, Y, Z direction for 3 times							
Environ-ment	Ambient illu.: Sunlight: max. 11,000lx, Incandescent lamp: max. 3,000lx (receiver illumination) Ambient temp.: -25 to 60°C, storage: -40 to 70°C Ambient humi.: 35 to 85%RH, storage: 35 to 85%RH							
Protection structure	IP65 (IEC standard)							
Material	Case: polycarbonate, LED CAP: polycarbonate, sensing part: polymethyl methacrylate acrylic, Ø4mm, 3-wire, 2m (emitter of through-beam type: Ø4mm, 2-wire, 2m)							
Cable ^{※5}	AWG26, core diameter: 0.52mm, number of cores: 20, insulator out diameter: Ø1mm							
Accesso-ry	Common	Mounting bracket ^{※6} , M3 bolt: 4, adjustment screwdriver			Reflector (MS-2A)	—		
Approval								
Weight ^{※7}	Cable type	Approx. 145g (approx. 95g)		Approx. 115g (approx. 50g)		Approx. 100g (approx. 50g)		
	Connector type	Approx. 65g (approx. 12g)		Approx. 75g (approx. 6g)		Approx. 60g (approx. 6g)		

※1: The sensing distance is specified with using the MS-2A reflector.
The distance between the sensor and the reflector should be set over 0.1m.
When using reflective tapes, the reflectivity will vary by size of the tape. Please refer to the catalog or web site.
※2: Non-glossy white paper 300×300mm.
※3: Non-glossy white paper 100×100mm.
※4: UL approved surrounding air temperature 40°C
※5: M8 connector cable is sold separately (AWG22, core diameter: 0.60mm, number of cores: 60, insulator out diameter: Ø1.25mm)
※6: Cable type includes bracket A and connector type includes bracket B.
※7: The weight includes packaging. The weight in parenthesis is for unit only.
※The temperature or humidity mentioned in Environment indicates a non freezing or condensation.

Dimensions

(unit: mm)

○ Cable type

Operation indicator (yellow)

Stability indicator (green)

Optical axis of receiver

Optical axis of emitter

11

12

8

32

20

32

20

32

11

[Retroreflective/Diffuse type]

○ Bracket A

4-R1.7

4.5

3.4

5

14

3

1.4

25.4

3.3

Ø4, 2m

20

[Through-beam type (emitter)] [Through-beam type (receiver)]

○ Connector type

Operation indicator (yellow)

Stability indicator (green)

Optical axis of receiver

Optical axis of emitter

11

12

8

32

20

32

20

32

11

[Retroreflective/Diffuse type]

○ Bracket B

26.5

30

26.5

35

25.4

3

2.6

4-R1.7

2-R1.7

20°

14

8

2.3-4

2-R2

1.2

(R)

[Through-beam type (emitter)] [Through-beam type (receiver)]

Reflector (MS-2A)

52

60.4

34

40.6

2-Ø3.8

2.5

8.5

[Through-beam type (emitter)] [Through-beam type (receiver)]

Reflective tape (sold separately)

A

0.38

Model

A

MST-50-10

50

MST-100-5

100

MST-200-2

200

Installation and Adjustment

○ For mounting

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

M3×8mm

※Install the sensor horizontally with the bracket.

○ Operation mode switching

Light ON		Turn the switch all the way to the right (towards L) to select Light ON operation.
Dark ON		Turn the switch all the way to the left (towards D) to select Dark ON operation.

○ Optical axis adjustment

Through-beam type

1. Place the emitter and the receiver facing each other and supply the power.
2. After adjusting the position of the emitter and the receiver and checking their stable indicating range, mount them in the middle of the range.
3. After mounting this unit, check the operation of the sensor and lighting of the stability indicator in both status. (none or sensing target status)
※If the sensing target is translucent body or smaller than Ø15mm, it may not sense the target because light is passed.

Retroreflective type

1. Place the sensor and the reflector (or reflective tape) facing each other and supply the power.
2. After adjusting the position of the sensor and reflector (or reflective tape) and checking their stable indicating range, mount them in the middle of the range. (none or sensing target status)
3. After mounting this unit, check the operation of the sensor and in both status. (none or sensing target status)
※Please use reflective tape (MST Series) for where a reflector can not be installed.

Diffuse reflective type

1. Place the emitter and the receiver facing each other and supply the power.
2. After adjusting the position of the emitter and the receiver and checking their stable indicating range, mount them in the middle of the range.
3. After mounting this unit, check the operation of the sensor and lighting of the stability indicator in both status. (none or sensing target status)

○ Sensitivity setting

Order	Sensitivity setting	Descriptions
1		From Light ON status, turn the sensitivity setting adjuster slowly to the right from MIN sensitivity and check the position where operation indicator turns on (A).
2		From Dark ON status, turn the sensitivity setting adjuster further right and check the position where the operation indicator turns on (B). Turn the adjuster left and check the position where the operation indicator turns off (C). ※If the operation indicator does not turn on at MAX sensitivity, the maximum sensitivity setting is set at position (C).
3		Set the adjuster at the center position between (A) and (C) for optimal sensitivity. Also, check if the stability indicator turns off with or without the sensing target. If it does not turn off, please review the operation mode again, as sensitivity may be unstable.

Light ON

Dark ON

Through-beam type

Retroreflective type

Diffuse reflective type

Emitter

Receiver

Sensing target

Reflector (MS-2A) Reflective tape (MST Series)

Sensing target

No sensing target

※Please set the sensitivity setting adjuster is executed in stable Light ON area and the reliability of environment (temperature, supply, dust etc.) is increased after the mounting it in a stable area.
※When adjusting sensitivity or switching operation modes, please use the Autonics adjustment screwdriver (accessory included).
Using a screwdriver with a bigger diameter than the adjuster buttons may cause errors when making adjustments.
※It may cause breakdown when the sensitivity setting adjuster or the operation mode selection switch is turned by force.

Operation Mode

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

Connections

○ Cable type

Through-beam type

Retroreflective type

Diffuse reflective type

○ Connector type

Connections for connector part

Connector pin No.	Cable colors	Functions	Etc.
①	Brown	Power Source (+V)	Connector cable (sold separately)
②	White	N-C	• CID408-□
③	Blue	Power Source (0V)	• CLD408-□
④	Black	Output	

※Connector pin ② is N-C (Not Connected) terminal.

Operating Timing Diagram

Through-beam type

Retroreflective/Diffuse reflective type

Stable light ON area

Unstable operation area

Stable light OFF area

Stability indicator (green LED)

Operation indicator (yellow LED)

Transistor output

Light ON operation

High

Incident light level

Operation level

Low

ON

OFF

ON

OFF

ON

OFF

※The waveforms of 'Operation indicator' and 'Transistor output' are for Light ON operation.
The waveforms are reversed for Dark ON operation.

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. 10-30VDC 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, CO₂, Nd: YAG)

■ Laser Welding/Cutting System

■ Temperature Controllers

■ Temperature/Humidity Transducers

■ SSRs/Power Controllers

■ Counters

■ Timers

■ Panel Meters

■ Tachometer/Pulse (Rate) Meters

■ Display Units

■ Sensor Controllers

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