BYD Series

INSTRUCTION MANUAL

TCD230050AB

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.



Visit Autonics website (www.autonics.com or QR code) for the latest information. Manuals, CAD files, certifications, software, etc. are available. The dimensions, specifications, certifications, etc. are subject to change without notice for product improvement. Certain models may be discontinued without notice.

Safety Considerations

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

★ 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 or store 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
- 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
- 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

Sensing type	Through-beam	Diffuse reflective	Convergent reflective
Product components	Product, instruction manual		
Adjustment screwdriver	=	×1	×1
Bracket A	×2	×1	×1
M3 bolt / nut	×4	×2	×2

Ordering Information

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

0 - 0 0 0 - 0 - 0 -

Sensing distance

Number: Sensing distance (unit: mm) Number+M: Sensing distance (unit: m)

Sensing type

D: Diffuse reflective D: Convergent reflective

❸ Power supply D: 12 - 24 VDC

Output

6 Emitter/Receiver

o mark: Integrated type 1: Emitter

G Connection No mark: Cable type

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

(Through-beam type) 3 Feature of convergent reflective type

T: Built-in timer (OFF delay mode)

No mark: Front operation indicato U: Upper operation indicator

Sold Separately

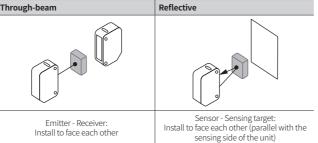
Bracket B

• Slit for through-beam type: BYD3M-ST (sticker)

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
- $\bullet \ \ \text{When installing multiple sensors closely, it may result in malfunction due to mutual}\\$
- \bullet 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.
- The waterproof function may be damaged if the product is subjected to impact from a hard object or bent excessively or repeatedly.

Thursday has a	Deflective
 Use this product after the test. Check whethe positions of the detectable object. 	r the indicator works appropriately for th



Timer Setting

- $\bullet\,$ In case of the built-in timer model, you can set the OFF Delay timer.
- (adjustable time: 0.1 to 2 sec)
- Use the offered adjustment screwdriver. Do NOT turn with excessive force to prevent product



Operation Timing Chart and Indicators

Standard type

- Standard type		
Operation mode	Light ON	Dark ON
Received light	Received Interrupted	Received Interrupted
Operation indicator (red)	ON OFF	ON OFF
Transistor output	ON OFF	ON OFF

In case of the through-beam type, to prevent malfunction, output of units keeps the state of OFF

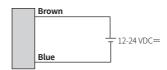
■ Built-in timer type

= bank in timer type				
Operation mode	Light ON			
Received light	Received		Ja.	
	Interrupted -			
Operation	ON	Lt. LT.	,t	,T,
indicator (red)	OFF -			
Transistor output	ON			
	OFF -			

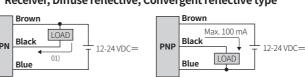
- $\begin{array}{l} \bullet \text{ T: Setting time by the adjuster (setting time: 0.1 to 2 sec)} \\ \bullet \text{ t:} \leq 3 \text{ ms (When the adjuster is set to Min (0.1 sec))} \end{array}$
- . If the interrupted time (Ta) after receiving the light is shorter than the setting time (T), the transistor output maintains the ON state

Connections

■ Emitter



■ Receiver, Diffuse reflective, Convergent reflective type

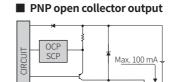


01) Through-beam type: max, 100 mA, diffuse reflective or convergent reflective type: max, 50 mA

Circuit

OCP SCP

■ NPN open collector output



01) Through-beam type: max. 100mA, diffuse reflective or convergent reflective type: max. 50 mA

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

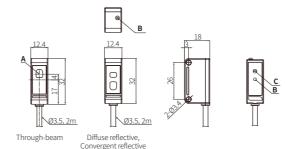
- $\bullet \ \mathsf{Set} \ \mathsf{the} \ \mathsf{adjuster} \ \mathsf{for} \ \mathsf{stable} \ \mathsf{Light} \ \mathsf{ON} \ \mathsf{area}, \\ \mathsf{minimizing} \ \mathsf{the} \ \mathsf{effect} \ \mathsf{of} \ \mathsf{the} \ \mathsf{installation} \ \mathsf{environment}.$ Use the offered adjustment screwdriver. Do NOT turn with excessive force to prevent
- product damage. a based on Light ON made

The steps below are based on Light ON mode.				
STEP	Status	Description	Description	
01	Received	MIN MAX	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	MIN B MAX	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 MAX	Set the adjuster at the mid position between (A) and (B) for optimal sensitivity.	

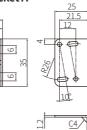
Dimensions

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

Α	Optical axis
В	Upper operation indicator of convergent reflective type (red)
С	Sensitivity adjustment adjuster or timer adjuster of built-in timer model



Bracket A



Specifications

•					
Model	BYD3M-TDT-□-□	BYD100-DDT-□	BYD□-DDT-□-□		
Sensing type	Through-beam	Diffuse reflective	Convergent reflective		
Sensing distance	3 m	100 mm ⁰¹⁾	10 to 30 mm ±10% 01) 10 to 50 mr ±10% 01)		
Sensing target	Opaque materials	Opaque materials, translucent materials	Opaque materials, translucent materials		
Min. sensing target	≥ Ø 6 mm	-	-		
Hysteresis	-	≤ 25 % of sensing distance	≤ 10 % of sensing distance		
Response time	≤ 1 ms	Operation: ≤ 3 ms Return: ≤ 100 ms	Operation: \leq 3 ms Return: \leq 100 ms ⁽¹²⁾		
ight source	Infrared	Infrared	Infrared		
Sensitivity adjustment	-	YES (Adjuster)	-		
Timer function	-	-	OFF delay mode : 0.1 to 2 sec (Adjuster)		
Operation mode	Dark ON mode	Light ON mode	Light ON mode		
ndicator	Front	Front	Front / Upper operation indicator model		
	Operation indicator (red)				
Certification	C€ Ek c⊕os sassa [H[C€ Ek c⊕us ustra [H[C € FR c⊕ as usus [H[
Jnit weight (packaged)	≈ 80 g (≈ 105 g)	≈ 38 g (≈ 75 g)	≈ 38 g (≈ 75 g)		
Non-glossy white paper 50	× 50 mm				

02) When the timer adjuster is set to min (0.1 sec)

Power supply	12-24 VDC== ±10 % (ripple P-P: ≤ 10 %)	
Current consumption	It depends on the sensing type	
Through-beam	Emitter: ≤ 30 mA, receiver: ≤ 30 mA	
Reflective	≤ 35 mA	
Control output	Through-beam type : NPN open collector output / PNP open collector output model Diffuse reflective, convergent reflective type : NPN open collector output	
Load voltage	≤ 26.4 VDC==	
Load current	Through-beam type : \le 100 mA Diffuse reflective, convergent reflective type : \le 50 mA	
Residual voltage	NPN: ≤ 1 VDC=-, PNP: ≤ 2.5 VDC=-	
Protection circuit	Reverse power protection circuit, output short overcurrent protection circuit	
Insulation resistance	≥ 20 MΩ (500 VDC megger)	
Noise immunity	$\pm 240\text{VDC}$ the square wave noise (pulse width: 1 μ s) by the noise simulator	
Dielectric strength	Between the charging part and the case: 1,000 VAC ~ 50/60 Hz for 1 min	
Vibration	$1.5\mathrm{mm}$ double amplitude at frequency of 10 to 55 Hz in each X, Y, Z directio 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 01)	-20 to 65 °C, storage: -25 to 70 °C (no freezing or condensation)	
Ambient humidity	35 to 85 %RH, storage: 35 to 85 %RH (no freezing or condensation)	
Protection rating	Through-beam, convergent reflective type (front operation indicator mode: IP64 (IEC standard), Others: IP50 (IEC standard)	
Connection	Cable type	
Cable specification	Ø 3.5 mm, 3-wire (Emitter: 2-wire), 2 m	
Wire specification	AWG26 (0.52 mm, 20-core), insulator outer diameter: Ø 1 mm	
Material	Case: PC, sensing part: PC, bracket: SPCC, bolt: SCM, nut: SCM, sleeve: Brass Ni-plate	

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