Autonics Photoelectric Sensor with Amplifier BYD SERIES

CE indicator BYD30(50)-DDT-U

Thank you for choosing our Autonics product. ${\color{red} \textbf{Please}} \ \underline{\textbf{read the following safety considerations before use}.}$

Safety Considerations

× Please observe all safety considerations for safe and proper product operation to avoid hazards st $m{\Lambda}$ symbol represents caution due to special circumstances in which hazards may occur.

▲ 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 personal injury, economic loss or fire.

 2. 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.

 3. Do not disassemble or modify the unit.

 Failure to follow this instruction may result in fire.

 4. Do not connect, repair, or inspect the unit while connected to a power source.

 Failure to follow this instruction may result in fire.

 5. Check 'Connections' before wiring.

 Failure to follow this instruction may result in fire.

▲ Caution

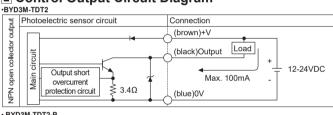
- Use the unit within the rated specifications.
 Failure to follow this instruction may result in fire or product damage.
 Use a dry cloth to clean the unit, and do not use water or organic solvent.
 Failure to follow this instruction may result in fire.

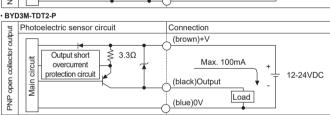
Ordering Information BYD 3 M - T D T Indicator No mark Front operation indicator Upper operation indicator NPN open collector output Control output PNP open collector output Built-in timer type Integrated type Emitter/Receiver Output type Transistor output Power supply DC power Sensing type Through-beam type Sensing distance unit No mark mm Number | Sensing distance BYD Photoelectric sensor series

X:...: This information is intended for product management of through-beam type. (no need to refer when selecting model)

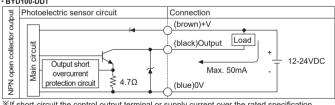
**Randomly combining model components can make a model which is not existing.

Control Output Circuit Diagram



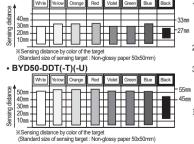


BYD30-DDT(-U), BYD50-DDT(-U) BYD30-DDT-T, BYD50-DDT-T · BYD100-DDT



XIf 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

Sensing Distance by Color of the Target (Convergent reflective type)



- photoelectric sensor, is not influenced by color or material of the sensing target wthin the sensing distance.
- 2. This sensor is able to sense a target stably because of small effect from background.
- 3.This chart for "Sens ng distance by color of target" is when the central axis of photoelectric sensor are matched in a parallel state of a sensing target and the lens surface of the photoelectric sensor. Standard size of sensing target: Non-glossy paper 50x50mm

**Be sure to follow cautions written in the instruction manual and the technical descriptions (catalog, homepage)

Specifications

Type	Convergent reflective		Diffuse reflective	Through beam			
Model	BYD30-DDT	BYD50-DDT		NPN output type	PNP output type		
	BYD30-DDT-U ^{*1} BYD30-DDT-T ^{*2}	BYD50-DDT-U ^{×1} BYD50-DDT-T ^{×2}	BYD100-DDT	BYD3M-TDT	BYD3M-TDT-P		
Sensing distance	10 to 30mm ^{*3}	10 to 50mm ^{*3}	100mm ^{**3}	3m			
Sensing target	Translucent, opaque materials			Opaque materials of min. Ø6mm			
Hysteresis	Max. 10% at sensing distance		Max. 25% at sensing distance	_			
Responsetme	Operation: max. 3ms Return: max. 100ms (when the time adjuster is minimum)		Operation: max. 3ms Return: max. 100ms	Max. 1ms			
Power supply	12-24VDC= ±10% (ripple P-P: max. 10%)						
Current consumpt on	Max. 35mA			Max. 30mA			
Light source	Infrared LED						
Sensitivity adjustment	Fixed Sensitivity Adjuster Fixed						
Operation mode	Light ON fixed			Dark ON (light ON: option)			
Control output	NPN open collector output •Load voltage: max. 30VDC== •Load current: max. 50mA •Residual voltage: max. 1VDC==				NPN or PNP open collector output •Load voltage: max. 30VDC: •Load current: max. 100mA •Residual voltage - NPN: max.1VDC: , PNP: max. 2.5VDC		
Protect on circuit	Reverse polarity protection circuit, output short overcurrent protection circuit						
Timer function	Built-in (OFF delay) delay time: max. 0.1 to 2 sec (timer adjuster)						
Indication	Operation indicator: red LED						
Insulation resistance	Over 20MΩ (at 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						
Vbration		to 55Hz in each of X, Y, Z direction for	2 hours				
Shock	500m/s²(50G) in X, Y, Z directions for 3 times						
Ambient illuminat on Ambient temperature Ambient hum dity	Sunlight: max. 11,0001x, incandescent lamp: max. 3,0001x (receiver illumination)						
Ambient temperature	-20 to 65°C, storage: -25 to 70°C						
Ambient hum dity	35 to 85%RH, storage: 35 to 85%RH						
Protection structure	Standard type: P64 (EC standards) / X1, X2: P50 (IEC standards) IP50 (IEC standards) P64 (EC standards) P64 (EC standards)						
Material	Case: ABS, sensing part: acryl						
Cable	Ø3 5mm, 3-wire, length: 2m (emitter of through-beam type: Ø3 5mm, 2-wire, length: 2m) (AWG24, core diameter: 0.08mm, number of cores: 40, insulator diameter: 1mm)						
Accessory	Adjustment screwdriver, fixing bracket A, M3 bolt: 2, M3 nut: 2 Mounting bracket A, M3 bolt: 4, M3 nut: 4						
Approval	€						

Weight³ Approx. 75g (approx. 38g) ※1: Operation indicator is on top.

×3: Non-glossy white paper 50×50mm

※2: OFF delay timer is built-in

(unit: mm)

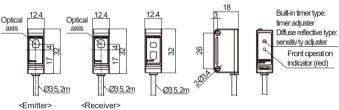
*The temperature or humidity mentioned in Environment indicates a non freezing or condensation environment.

Dimension



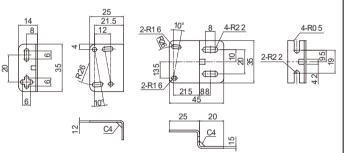
Through beam type



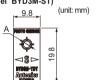


Bracket A

• Bracket B (sold separately)



Accessory (sold separately) · Slit (Model BYD3M-ST)



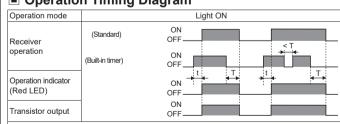
 Min. Sensing target and max. sensing distance by Ø of slit when attach the slits at both a receiver and an emitter. ng

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HeN †			Slit Ø	Min. size of sensing target	Max. sensin distance
Ł		9	Ø1.0	Opaque materials of Min.Ø0.8	500mm
. V	6		Ø1.5	Opaque materials of Min.Ø1.5	700mm
	-		Ø2.0	Opaque materials of Min.Ø2.0	1,200mm
	1		Ø2.5	Opaque materials of Min.Ø2.5	2,300mm

※This slit is for BYD3M-TDT(-P) only.

※Total 8 pieces (2 pieces of each different Ø) are packed and sold separately. X This slit is sticker for attachment, please remove the dirt on lens of photoelectric sensor before using it.

Operation Timing Diagram



. T: Setting time by timer adjuster (time setting range: 0.1 to 2 sec)

t: Max. 3ms (when the timer adjuster is minimum) . To prevent from incorrect operation, output of units keeps the state of OFF for 0.5 sec

The waveform of transistor output and operation indicator are the state of operation for Light ON, but in case of Dark ON, it is opposite operation against Light ON mode. (Above figure is Dark ON for BYD3M series.)

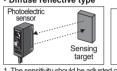
Mounting & Adjustment

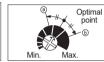
Through beam type

- Supply the power after set the emitter and the receiver facing each other.
 Set them in the middle after checking the operation range of the indicator
- by adjusting or rotating the receiver and the emitter right and left slightly.
- Adjust up and down direction in the same way as above.
 After adjustment, fix them after checking the stable operation by putting the sensing target at the optical axis.
- sense because the light of the sensor is penetrated.

Right/Left Receiv Adjust Up/Down

Diffuse reflective type





Approx. 105g (approx. 80g)

- 3. Remove the sensing target and check the point (⑤) where the operation indicator until turns on by adjusting the sensitivity adjuster. (If the operation indicator does not turn on, max. sensitivity point is ⑥.)

 4. The optimal point is the center of the point ⑥ and ⑥.
- *The sensing distance indicated on the specification chart is that of
- non-glossy white paper 50x50mm. Be sure that it can be different by size, surface and gloss of the sensing

· Convergent reflective type

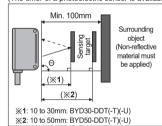
Convergent reflective type

1. Supply the power after mounting the photoelectric sensor to the sensing place.

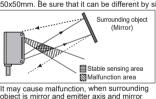
2. Put the target at sensing position and adjust the sensor right and left or up and down to be at the right angle against optical axis and fix it at the stable operating position Keep the distance min. 10 to 30mm for BYD30-DDT(-T)(-U) between photoelectric sensor and sensing target.

3. In case of built-in timer type, set the response time of the photoelectric sensor to the optimal status by adjusting the timer adjuster.

(The timer of a photoelectric sensor is available status.)



*The sensing distance indicated on the specification chart is that of non-glossy white paper 50x50mm. Be sure that it can be different by size, surface and gloss of the sensing target



object

mutual interference. *When installing the product, tighten the screw with a tightening torque of 0 5Nm.

Cautions during Use

1. Follow instructions in 'Cautions during Use', Otherwise, it may cause unexpected accidents. When connecting a DC relay or other inductive load to the output, remove surge by using diodes or varistors.

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 Note that the supply device.

 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.

This unit may be used in the following environments.
 Olndoors (in the environment condition rated in 'Specifications')

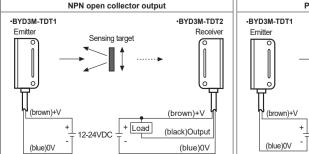
@Altitude max 2 000m

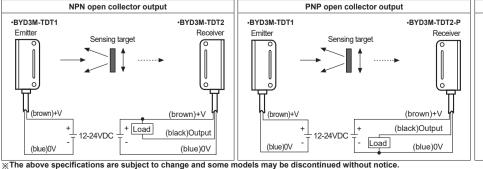
③Pollution degree 3

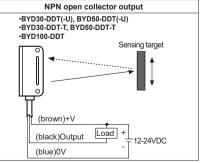
(4) Installation category II

Connections

• BYD30-DDT(-T)(-U)







Major Products

■ Photoelectric Sensors ■ Temperature Controllers
■ Fiber Optic Sensors ■ Temperature/Humidity Transducers

■ Door Sensors ■ SSRs/Power Controllers

■ Door Side Sensors ■ Counters ■ Area Sensors Timers

■ Pressure Sensors ■ Tachometers/Pulse (Rate) Meters

Rotary Encoders ■ Display Units ■ Connectors/Sockets ■ Sensor Controllers

■ Switching Mode Power Supplies ■ Control Switches/Lamps/Buzzers

I/O Terminal Blocks & Cables ■ Stepper Motors/Drivers/Motion Controlle

■ Graphic/Logic Panels

■ Laser Marking System (Fiber, CO₂, Nd: YAG)

■ Laser Welding/Cutting System

DRW171452AC