

Autonics

Photoelectric Sensor

BY 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.

⚠ Caution

1. **Use the unit within the rated specifications.**
Failure to follow this instruction may result in fire or product damage.
2. **Use dry cloth to clean the unit, and do not use water or organic solvent.**
Failure to follow this instruction may result in fire.
3. **Do not use the unit in the place where flammable/explosive/corrosive gas, humidity, direct sunlight, radiant heat, vibration, impact, or salinity may be present.**
Failure to follow this instruction may result in fire or explosion.

■ Ordering Information

BY	500	T	D	T	
Appearances	1	Emitter			
	2	Receiver			
Output		Transistor output			
Power supply		DC power			
Sensing type		Through-beam			
Sensing distance		Unit: mm			
Detection form		Standard type			
	S	Side detection type			
Photoelectric sensor	BY	Series name			

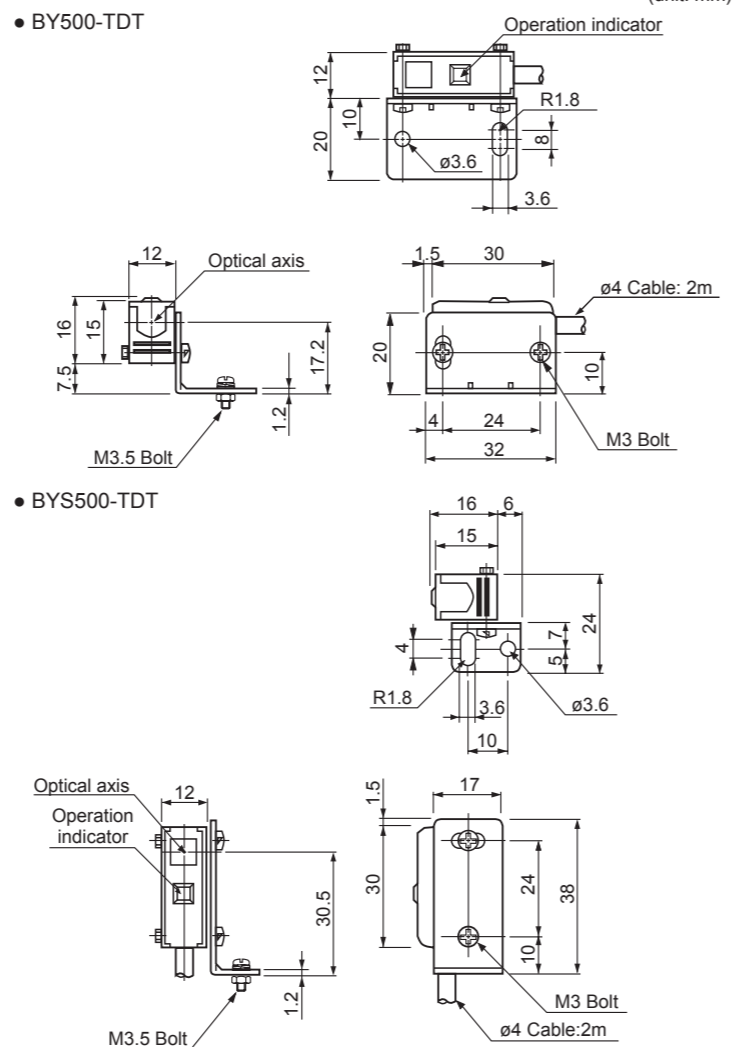
※The above specifications are subject to change and some models may be discontinued without notice.
※Be sure to follow cautions written in the instruction manual and the technical descriptions (catalog, homepage).

■ Specification

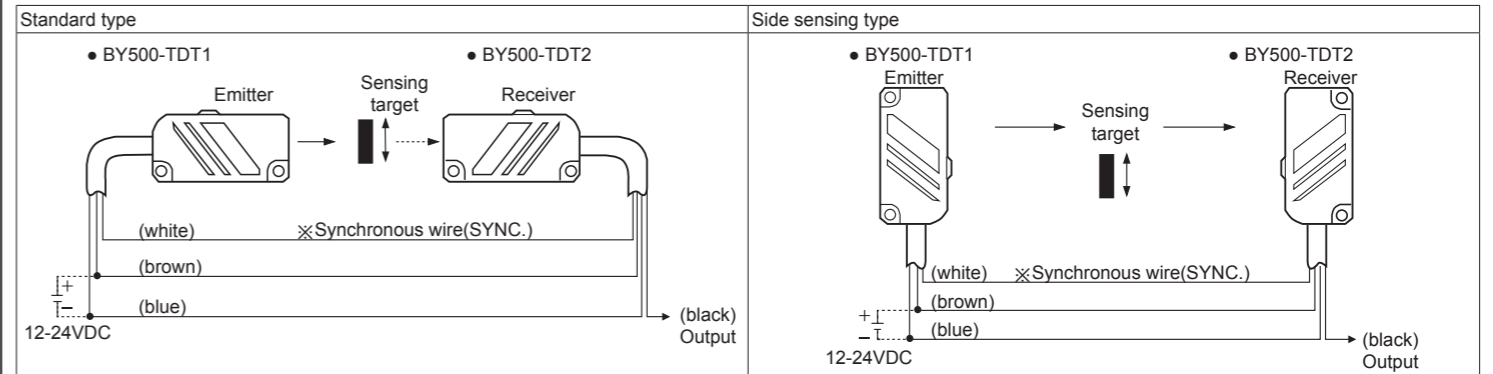
Type	Through-beam	
Model	Standard type BY500-TDT	Side detection type BYS500-TDT
Sensing distance	500mm	
Sensing target	Opaque materials of min. $\phi 5$ mm	
Response time	Max. 1ms	
Power supply	12-24VDC $\pm 10\%$ (ripple P-P: max. 10%)	
Current consumption	Max. 30mA	
Light source	Infrared LED (940nm)	
Operation mode	Dark ON	
Control output	NPN open collector output • Load voltage: 30VDC \pm • Load current: max. 100mA • Residual voltage: max. 1VDC \pm	
Protection circuit	Reverse polarity protection circuit, output short overcurrent protection circuit	
Indication	Operation indicator: red LED	
Connection	Outgoing cable	
Insulation resistance	Over 20M Ω (500VDC)	
Noise strength	± 240 V the square wave noise (pulse width: 1 μ s) by the noise simulator	
Dielectric strength	1000VAC 50/60Hz for 1minute	
Vibration	1.5mm amplitude at frequency of 10 to 55Hz in each of X, Y, Z directions for 2 hours	
Shock	500m/s ² (50G) in X, Y, Z directions for 3 times	
Environment	Ambient illu.	Sunlight: max. 11,000lx, incandescent lamp: max. 3,000lx
	Ambient temp.	-10 to 60°C, storage: -25 to 70°C
	Ambient humi.	35 to 85%RH, storage: 35 to 85%RH
Protection structure	IP50 (IEC standard)	
Material	Case: acrylonitrile butadiene styrene, sensing part: acrylic, bracket: steel plate cold commercial, bolt: Steel chromium molybdenum, nut: steel chromium molybdenum	
Cable	$\phi 4$ mm, 4-wire, 2m (emitter of through-beam type: $\phi 4$ mm, 3-wire, 2m) (AWG22, core diameter: 0.08mm, number of cores: 60, insulator out diameter: $\phi 1.25$ mm)	
Accessories	Fixing bracket, M3 bolt: 4, M3 nuts: 4	
Weight	Approx. 150g	

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

■ Dimension

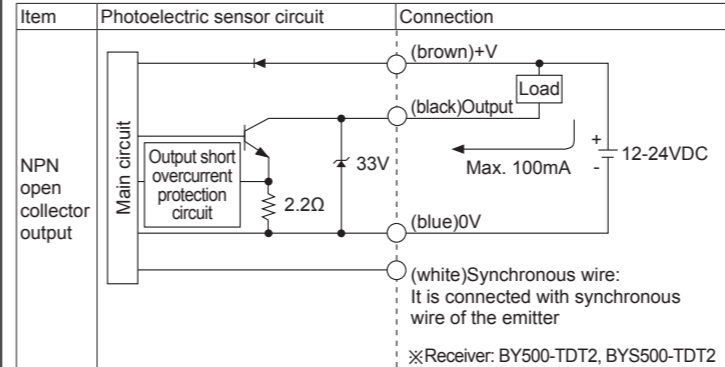


■ Connection



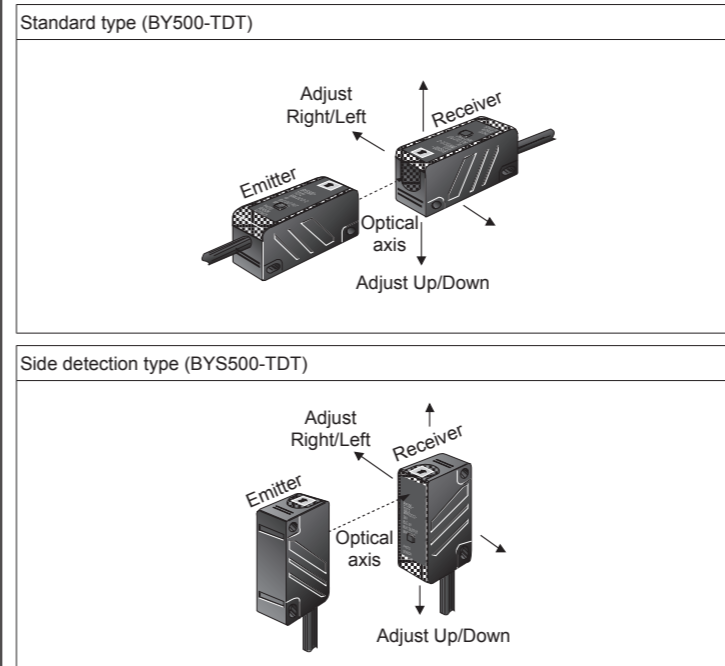
※The power of the emitter and the receiver must be used as same power line.
※Synchronous wire(White) of the receiver must be connected with that of the emitter.
※Non-using wires are insulated.

■ Control Output Circuit Diagram



※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.

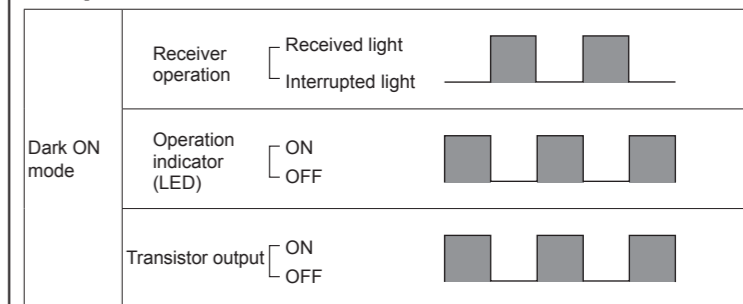
■ Mounting & Adjustment



1. Supply the power to the sensor, after installing the emitter and the receiver in face to face.
2. Set the receiver in center of position where indicator turns on, as adjusting the receiver to the right and the left or up and down.
3. Fix both units tightly after checking that the units sense the target.

※If the sensing target is translucent body or smaller than $\phi 5$ mm, it might not detect the target cause light passed.
※When using 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 0.3Nm.

■ Operation Mode



■ 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. 12-24VDC 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
- Connector/Sockets
- Temperature controllers
- Temperature/Humidity transducers
- SSR/Power controllers
- Counters
- Timers
- Panel meters
- Tachometer/Pulse(Rate) meters
- Display units
- Sensor controllers
- 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/soldering system

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