

# PHOTOELECTRIC SENSOR BY SERIES

## M A N U A L



Thank you very much for selecting Autonics products.  
For your safety, please read the following before using.

### Caution for your safety

- ※Please keep these instructions and review them before using this unit.
- ※Please observe the cautions that follow;
- Warning** Serious injury may result if instructions are not followed.
- Caution** Product may be damaged, or injury may result if instructions are not followed.
- ※The following is an explanation of the symbols used in the operation manual.
- ▲: Injury or danger may occur under special conditions.

### Warning

- In case of using this unit with machineries(Nuclear power control, medical equipment, vehicle, train, airplane, combustion apparatus, entertainment or safety device etc), it requires installing fail-safe device, or contact us for information on type required.**  
It may result in serious damage, fire or human injury.
- Do not disassemble and modify this unit, when it requires. If needs, please contact us.**  
It may give an electric shock and cause a fire.

### Caution

- This unit shall not be used outdoors.**  
It might shorten the life cycle of the product or give an electric shock.
- Do not use this unit in place where there is flammable or explosive gas.**  
It may cause a fire or explosion.
- Please observe voltage rating and do not supply AC power.**  
It may result in damage to this unit.
- Please check the polarity of power and wrong wiring.**  
It may result in damage to this unit.
- Do not use this unit in place where there is vibration or impact.**  
It may result in damage to this unit.
- In cleaning the unit, do not use water or an oil-based detergent**  
It might cause an electric shock or fire that will result in damage to this product.

### Ordering information

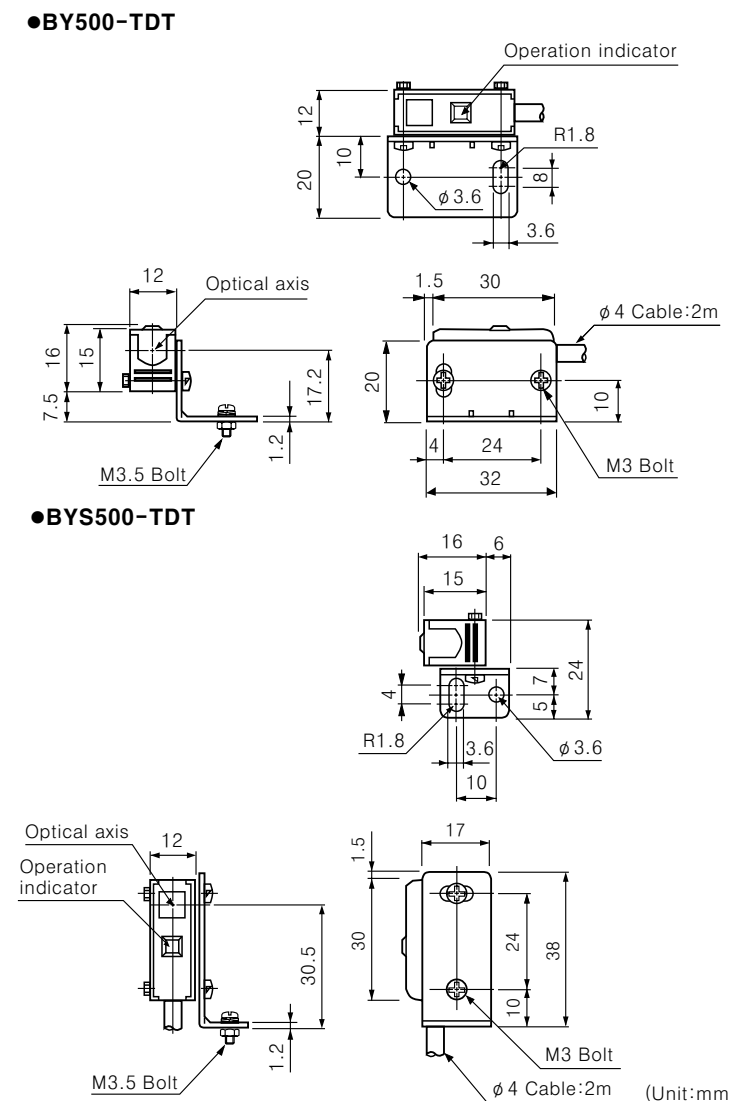
BY □ 500 - T D T □	Appearances	1   Emitter 2   Receiver
	Output	Solid-state output(TR)
	Power supply	DC power
	Detecting type	Through-beam
	Detecting distance	Unit:mm
	Detection form	S   Standard type S   Side detection type
	Photoelectric sensor	BY   Series name

※The above specifications are changeable without notice anytime.

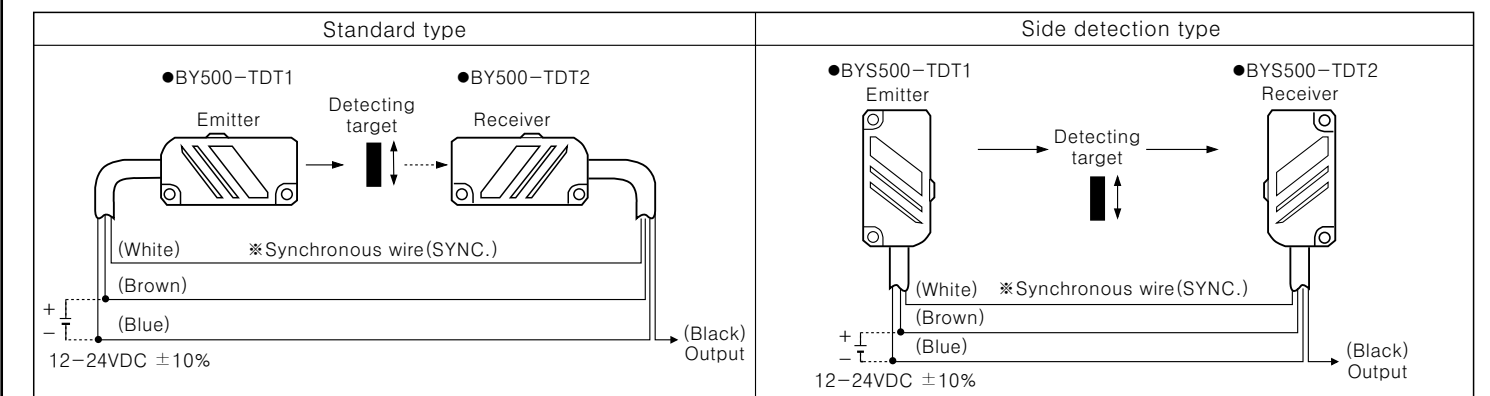
### Specification

Type	Through-beam	
	Standard type BY500-TDT	Side detection type BYS500-TDT
Detecting distance	500mm	
Detecting target	Opaque materials of Min. $\phi$ 5mm	
Response time	Max. 1ms	
Power supply	12-24VDC $\pm$ 10% (Ripple P-P:Max. 10%)	
Current consumption	Max. 30mA	
Light source	Infrared LED(modulated)	
Operation mode	Dark ON	
Control output	NPN open collector output Load voltage : 30VDC, Load current : Max. 100mA, Residual voltage : Max. 1V	
Protection circuit	Reverse polarity protection, short-circuit protection	
Indication	Operation indicator : Red LED	
Connection	Outgoing cable	
Insulation resistance	Min. 20M $\Omega$ (500VDC)	
Noise strength	$\pm$ 240V the square wave noise(pulse width:1 $\mu$ 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 <sup>2</sup> (50G) in X, Y, Z directions for 3 times	
Ambient illumination	Sunlight:Max. 11,000 lx Incandescent lamp:Max. 3,000 lx	
Ambient temperature	Operating : -10 to 60°C (non-freezing condition) Storage: -25 to 70°C	
Ambient humidity	35 to 85%RH, Storage:35 to 85%RH	
Protection	IP50	
Material	Case:ABS, Lens:Acryl	
Cable	• Emitter:3P, $\phi$ 4mm • Receiver:4P, $\phi$ 4mm length:2m	
Accessories	Mounting bracket, Bolts/nuts	
Weight	Approx. 150g	

### Dimension

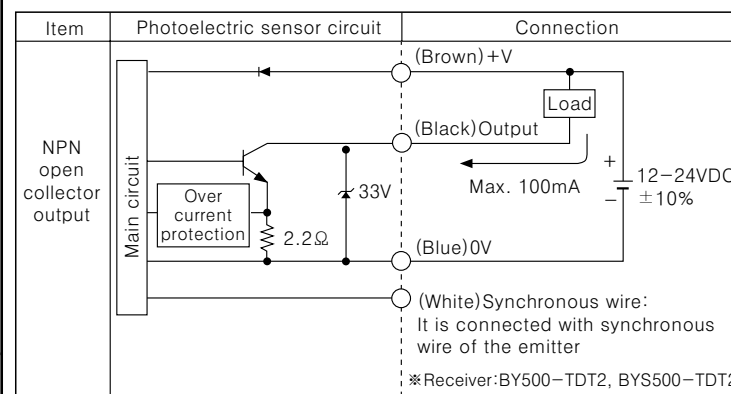


### Connection

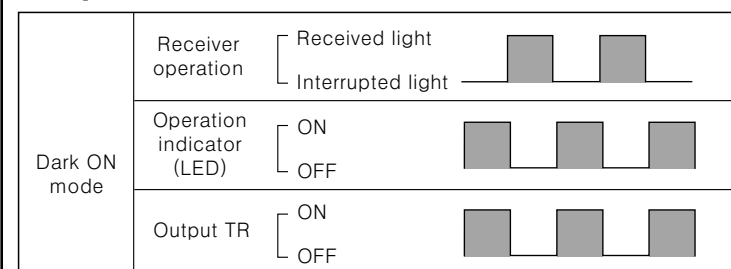


- ※The power of the emitter and the receiver must be used as same power line.
- ※Synchronous wire(White) of the receiver must be connected with that of the emitter.
- ※Non-using wires are insulated.

### Control output circuit diagram

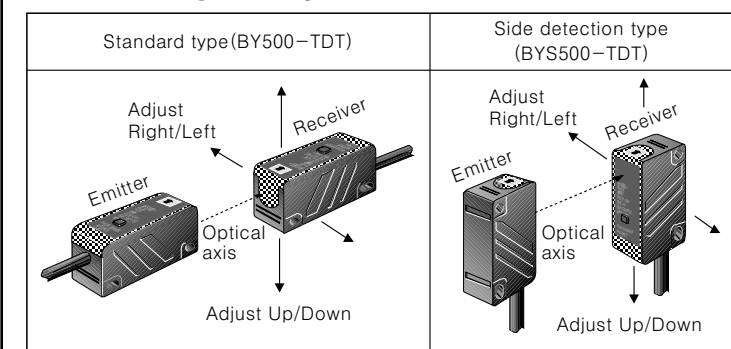


### Operation mode



Note)If the control output terminal is short-circuited or flow beyond rating current, the control signal will not be output normally due protection circuit.

### Mounting & Adjustment

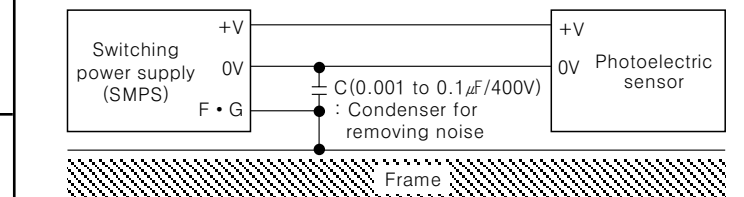


- Supply the power to the sensor, after installing the emitter and the receiver in face to face.
- Set the receiver in center of position where indicator turns on, as adjusting the receiver to the right and the left or up and down.
- Fix both units tightly after checking that the units detect the target.

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

### Caution for using

- Intercept a strong source of light as like sunlight, spotlight within inclination angle range of photoelectric sensor.
- The photoelectric sensor may cause malfunction under the fluorescent lamp light, so be sure to use cut-off light with panel.
- When more than 2 sets of sensors are used closely, it might cause interference each other. Be sure to put enough space between them in order to avoid malfunction.
- If photoelectric sensor is installed at flat part, it might cause malfunction by reflection light from flat part. Be sure to put space between photoelectric sensor and ground.
- When wire the photoelectric sensor with high voltage line, power line in the same conduit, it may cause malfunction or mechanical trouble. Therefore please wire separately or use different conduit.
- Avoid installing the unit as following place.  
Corrosive gas, oil or dust, strong flux, noise, sunlight, strong alkali, acid.
- In case of connect DC relay as inductive load to output, please remove surges by using diode or varistor.
- The photoelectric sensor cable shall be used as short as possible, because it may cause malfunction by noise through the cable.
- When it is stained by dirt at lens, please clean the lens with dry cloth, but don't use an organic materials such as alkali, acid, chromic acid.
- When use switching power supply as the source of supplying power, F.G terminal shall be good earth ground and condenser for removing noise shall be installed between 0V and F.G terminal.



※It may cause malfunction if above instructions are not followed.

### Main products

- COUNTER
- TIMER
- TEMPERATURE CONTROLLER
- PANEL METER
- TACHOMETER
- LINE SPEED METER
- DISPLAY UNIT
- PROXIMITY SWITCH
- PHOTOELECTRIC SENSOR
- FIBER OPTIC SENSOR
- PRESSURE SENSOR
- ROTARY ENCODER
- SENSOR CONTROLLER
- POWER CONTROLLER
- STEPPING MOTOR & DRIVER & CONTROLLER

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