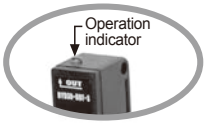
Small diffuse reflective and convergent reflective type

▣ Features

- Easy installation by compact size
- Superior detection not affected by color of target (Convergent reflective type)
- Operation indicator is located on the top (BYD30-DDT-U, BYD50-DDT-U)
- Easy to adjust the response time via Timer function (OFF delay time : 0.1 to 2sec. variable)
- Built-in output short-circuit protection circuit / reverse polarity protection circuit





BYD30(50)-DDT-U

⚠ **Please read "Caution for your safety" in operation manual before using.**

CE

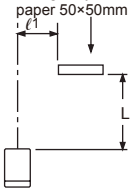
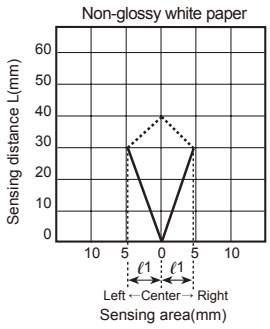
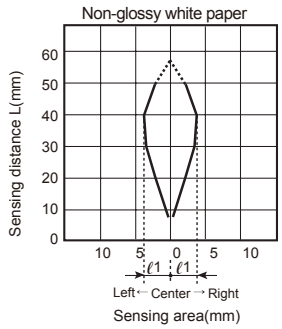
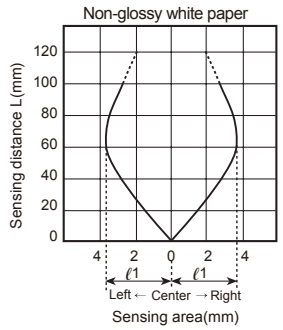
▣ Specifications

Model		BYD30-DDT BYD30-DDT-U※1 BYD30-DDT-T※2	BYD50-DDT BYD50-DDT-U※1 BYD50-DDT-T※2	BYD100-DDT	BYD3M-TDT	BYD3M-TDT-P
Sensing type		Convergent reflective		Diffuse reflective	Through-beam	
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	—	
Response time		Operation: Max. 3ms, Return:Max. 100ms (When the time adjustment VR is minimum)		Operation:Max. 3ms Return:Max. 100ms	Max. 1ms	
Power supply		12-24VDC ±10%(Ripple P-P : Max. 10%)				
Current consumption		Max. 35mA			Max. 30mA	
Light source		Infrared LED				
Sensitivity adjustment		Fixed		Built-in the adjustment VR	Fixed	
Operation mode		Light ON			Dark ON(Light ON : Option)	
Control output		NPN open collector output ●Load voltage : Max. 30VDC,●Load current : Max. 50mA, ●Residual voltage : Max. 1V			NPN or PNP open collector output ●Load voltage :Max. 30VDC, ●Load current : Max. 100mA, ●Residual voltage - NPN: Max.1V, PNP: Max. 2.5V	
Protection circuit		Reverse polarity protection, output short-circuit protection				
Timer function		Built-in(OFF delay) delay Time : Max. 0.1 to 2 sec.(adjustment VR)		—		
Indication		Operation indicator : red LED				
Insulation resistance		Min. 20MΩ(at 500VDC megger)				
Noise resistance		±240V the square wave noise(pulse width : 1μs) by the noise simulator				
Dielectric strength		1,000VAC 50/60Hz for 1minute				
Vibration		1.5mm amplitude or 300m/s² at frequency of 10 to 55Hz(for 1 min.) in each of X, Y, Z directions for 2 hours				
Shock		500m/s²(approx. 50G) in each of X, Y, Z directions for 3 times				
Environment	Ambient illumination	Sunlight: Max. 11,000lx, Incandescent lamp: Max. 3,000lx(Receiver illumination)				
	Ambient temperature	-20 to 65℃, storage : -25 to 70℃				
	Ambient humidity	35 to 85%RH, storage : 35 to 85%RH				
Protection		Standard type: IP64(IEC standards)/ ※1,※2: IP50(IEC standards)		IP50(IEC standard)	IP64(IEC standard)	
Material		Case: ABS, Sensing part: Acrylic				
Cable		ø3.5, 3-wire, Length: 2m(Emitter of through-beam type: ø3.5, 2-wire, Length: 2m) (AWG24, Core diameter: 0.08mm, Number of cores: 40, Insulator out diameter: ø1)				
Accessory		VR adjustment driver, Mounting bracket A, M3 Screws, Nuts			Mounting bracket A, M3 Screws, Nuts	
Approval		CE				
Unit weight		Approx. 70g			Approx. 150g	

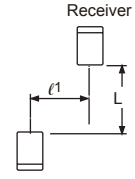
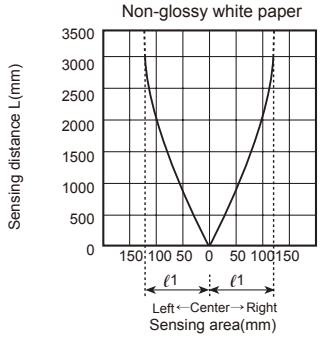
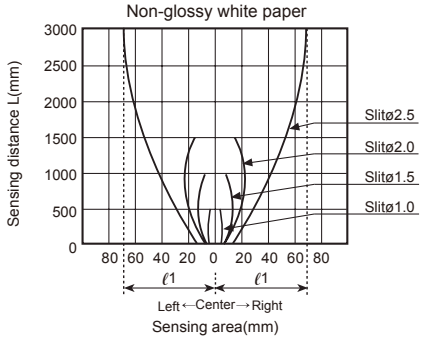
※1: Operation indicator is on the top.
※2: OFF delay timer is built-in. (Delay time : Max. 0.1 to 2sec.)
※3: Sensing distance for Non-glossy white paper(50×50mm)
※The temperature or humidity mentioned in Environment indicates a non freezing or condensation environment.

▣ Feature data

◎ Sensing distance(Convergent/Diffuse reflective type)

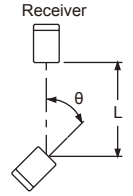
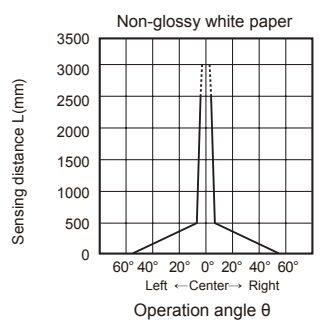
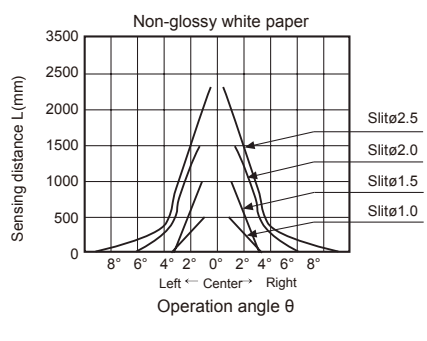
Measuring method	BYD30-DDT(-U) / BYD30-DDT-T	BYD50-DDT(-U) / BYD50-DDT-T	BYD100-DDT
Standardsensing target : Non-glossy white paper 50×50mm 			

◎ Parallel shifting(Through-beam type)

Measuring method	BYD3M-TDT	BYD3M-TDT(SLIT)
		

※Above characteristic is from 400mm sensing distance to install transmitted beam type slit(ø1, ø1.5, ø2, ø2.5).

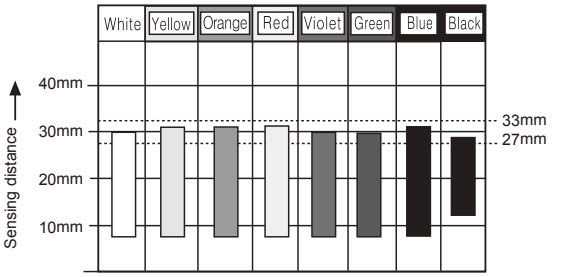
◎ Sensor angle(Through-beam type)

Measuring method	BYD3M-TDT	BYD3M-TDT(SLIT)
		

※Above characteristic is from 400mm sensing distance to install transmitted beam type slit(ø1, ø1.5, ø2, ø2.5).

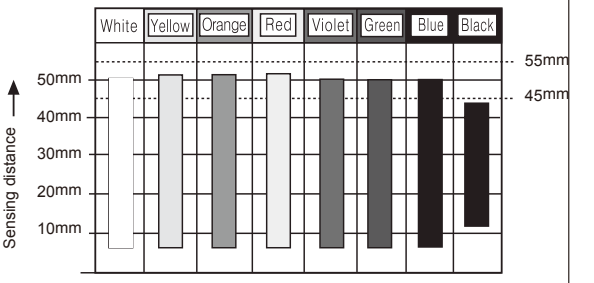
▣ Sensing distance by color(Convergent reflective type)

BYD30-DDT(-U), BYD30-DDT-T



※Size of sensing target :
Non-glossy paper 50×50mm

BYD50-DDT(-U), BYD50-DDT-T



※Size of sensing target :
Non-glossy paper 50×50mm

1)This model is stable convergent detection photoelectric sensor, therefore it is not affected by color or material within range of sensing distance as specified in chart.
2)It is able to detect target stably because of small effect from background.

▣ Operation mode and timing diagram

● BYD30-DDT(-U), BYD50-DDT(-U), BYD100-DDT

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

● BYD30-DDT-T, BYD50-DDT-T

Operation mode	Light ON
Receiver operation	Received light Interrupted light Ta
Operation indicator (red LED)	ON OFF t T t T
Transistor output	ON OFF

※T : Setting time by the timer adjustment VR(0.1 to 2sec.)
※t : Max. 3ms(When the timer adjustment VR is minimum)
※If (Ta) is shorter than (T), TR output will be ON.

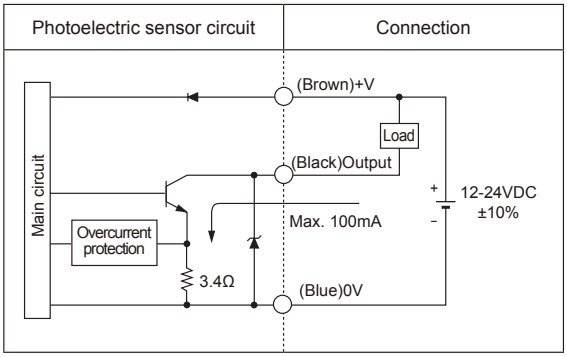
● BYD3M-TDT, BYD3M-TDT-P

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

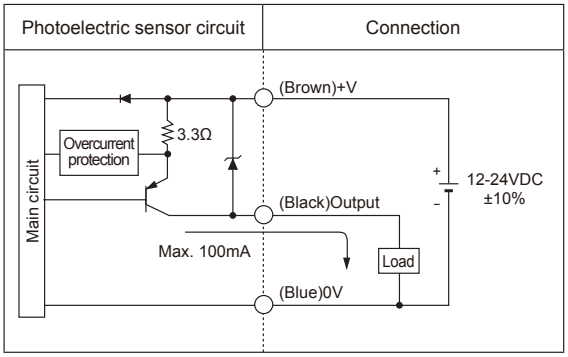
※To prevent incorrect operation, output of units keeps the state of OFF for 0.5sec. after power ON.
※If the control output terminal is short-circuited or overcurrent condition is existed, the control output will turn off due to protection circuit.
※Light ON mode is customizable.

▣ Control output diagram

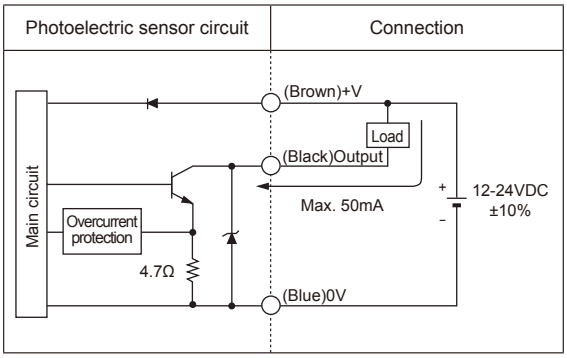
● **BYD3M-TDT2**



● **BYD3M-TDT2-P**

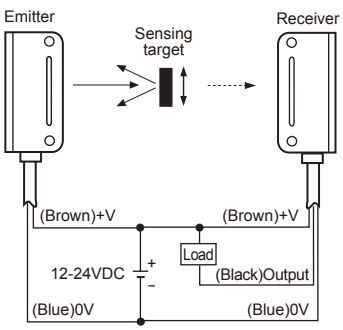


● **BYD30-DDT(-U), BYD50-DDT(-U)**
● **BYD30-DDT-T, BYD50-DDT-T**
● **BYD100-DDT**

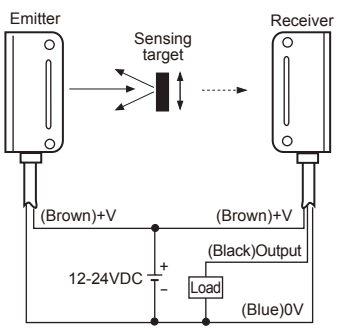


▣ Connections

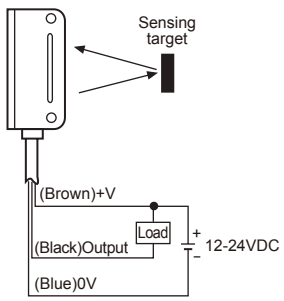
BYD3M-TDT



BYD3M-TDT-P

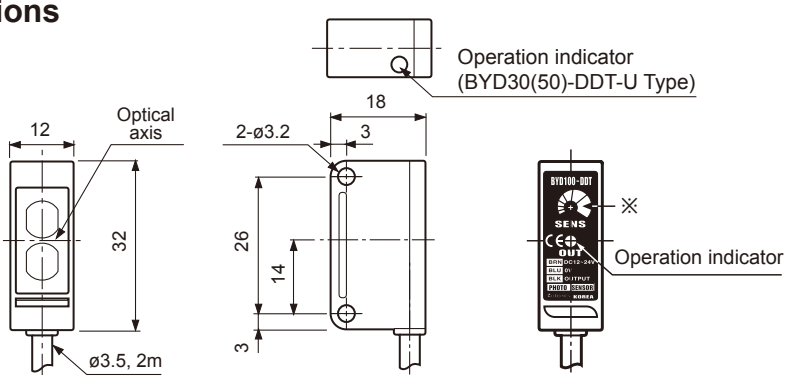


BYD30-DDT(-U), BYD50-DDT(-U), BYD30-DDT-T, BYD50-DDT-T, BYD100-DDT



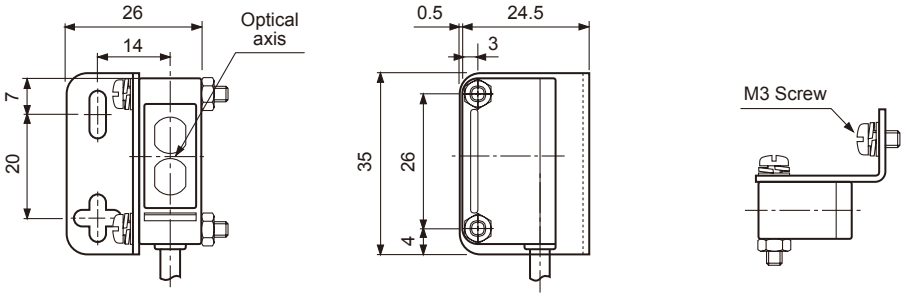
▣ Dimensions

(unit: mm)

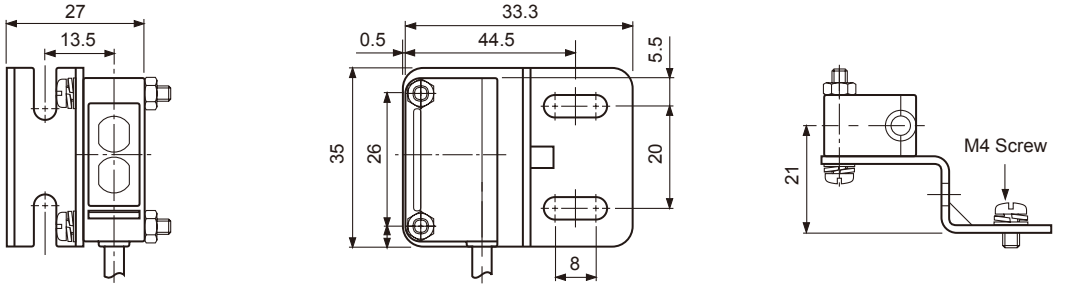


※Built-in timer type: Timer adjustment VR,
Diffuse reflective type: Sensitivity adjustment VR

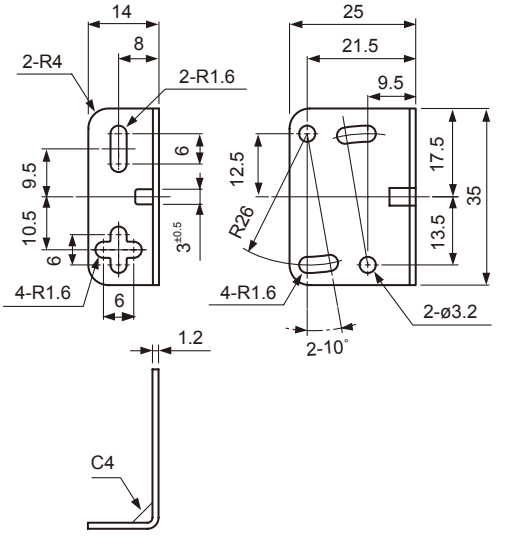
● **Bracket A dimension when mounting**



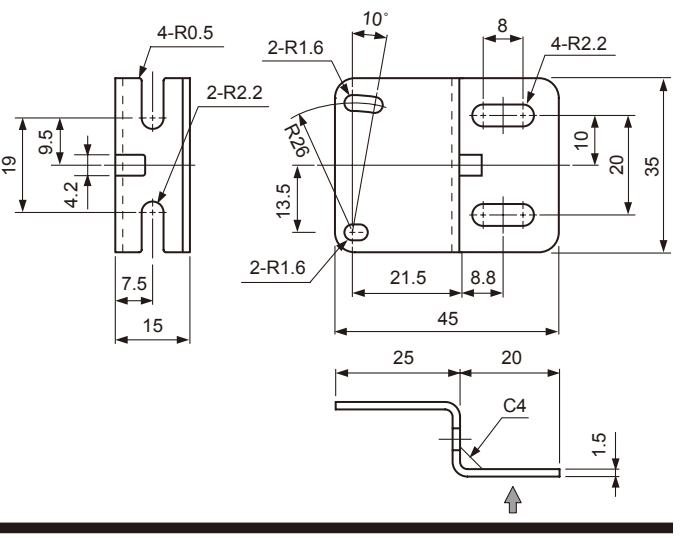
● **Bracket B dimension when mounting**



● **Bracket A**



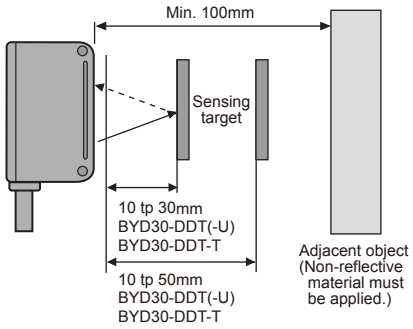
● **Bracket B**



▣ Mounting and sensitivity adjustment

◎ Convergent reflective type

1. Supply the power to the sensor after install the sensor.



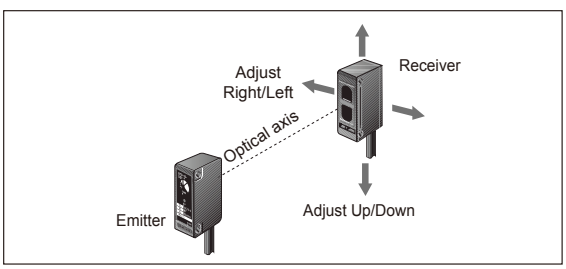
2. Install a target at sensing position and adjust the sensor to right and left or up and down to be at the right angle against the optical axis and fix it at stable operating position.
   Keep the distance BYD30-DDT, (-T), (-U): 10 to 30mm BYD50-DDT, (-T), (-U): 10 to 50mm between the photo-electric sensor and the target.
3. Adjust the response time up to the optimum status in case of timer built-in type. Keep the distance min. 100mm between the photoelectric sensor and the background of the target. It may cause malfunction by reflection light of the background.

※The sensing distance indicated in the specification chart is that of non-glossy white paper in the target size 50×50mm. The sensing distance may be changed by the size of the target, reflectance of the target.

◎ Through-beam type

1. Supply the power to the photoelectric sensor, after setting the emitter and the receiver facing each other.
2. Set the receiver in the middle of the operation range of the operation indicator adjusting the receiver and the emitter right and left, up and down.
3. After adjustment, check the stability of operation putting the object at the optical axis.

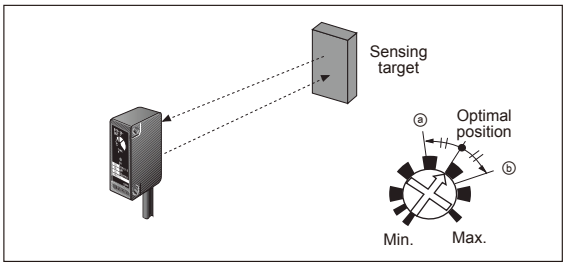
※If the sensing target is translucent body or smaller than ø6mm, it can be missed by sensor because light penetrate it.



◎ Diffuse reflective type

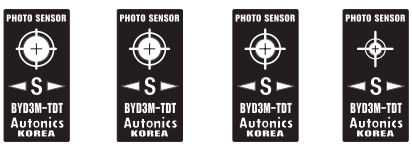
1. The sensitivity should be adjusted depending on a sensing target or mounting place.
2. Set the target at a position to be detected by the beam, then turn the adjustment VR until position ⓐ where the operation indicator turns ON from min. position of the adjustment VR.
3. Take the target out of the sensing area, then turn the adjustment VR until position ⓑ where the the operation indicator turns ON. If the indicator dose not turn ON, max. position is ⓑ.
4. Set the adjustment VR at the center of two switching position ⓐ, ⓑ.

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



▣ Accessory(sold separately)

- **Slit(Model name : BYD3M-Slit)**



ø2.5 ø2.0 ø1.5 ø1.0

- **Min. sensing target and Max. sensing distance by slit ø** - Attach the slit on receiver and emitter together.

SLITø	Min. sensing target	Min. sensing distance
ø1.0	Opaque materials of Min.ø0.8	500mm
ø1.5	Opaque materials of Min.ø1.5	700mm
ø2.0	Opaque materials of Min.ø2.0	1200mm
ø2.5	Opaque materials of Min.ø2.5	2300mm

※This slit is for BYD3M-TDT(-P) only.
※Total 8 pieces, 2 pieces of each ø, are packed.
※This slit is sticker for attachment, please remove the dirt on lens of the photoelectric sensor before using it.