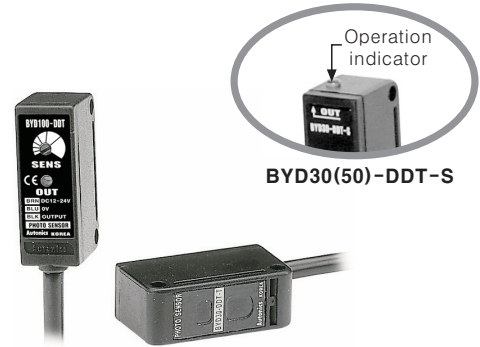


# DC Background Suppression Type

## Small diffuse reflective, limited distance reflective and through beam types

### ■ Features

- Easy installation by compact size.
- Superior detection not affected by color of target.
- Operation indicator located on top.  
(BYD30-DDT-S, BYD50-DDT-S)
- Easy to adjust the response time of Timer function.  
(OFF Delay Time : 0.1 ~ 2sec variable)
- Over current protection circuit / Reverse power polarity protection circuit.



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



### ■ Specifications

Model	BYD30-DDT BYD30-DDT-S(Note1) BYD30-DDT-T(Note2)	BYD50-DDT BYD50-DDT-S(Note1) BYD50-DDT-T(Note2)	BYD100-DDT	BYD3M-TDT	BYD3M-TDT-P
Type	Limited distance reflective		Diffuse reflective	Through-beam	
Detecting distance	(Note3) 10 ~ 30mm	(Note3) 10 ~ 50mm	(Note3) 100mm	3m	
Detecting target	Transparent, Translucent, Opaque materials			Opaque materials of Min. $\phi$ 6mm	
Hysteresis	Max. 10% at detecting distance		Max. 20% at detecting distance	—	
Response time	Operation:Max. 3ms, Return:Max. 100ms (When the timer VR is minimum)		Operation:Max. 3ms, Return:Max. 100ms	Max. 1ms	
Power supply	12-24VDC $\pm$ 10% (Ripple P-P:Max. 10%)				
Current consumption	Max. 35mA			Max. 30mA	
Light source	Infrared LED(modulated)				
Sensitivity adjustment	—		Adjustable VR	—	
Operation mode	Light ON mode fixed			Dark ON(Light ON : Option)	
Control output	NPN open collector output $\Rightarrow$ Load voltage : Max. 30VDC, Load current : Max. 50mA, Residual voltage : Max. 1V			NPN open collector output $\Rightarrow$ Load voltage : Max. 30VDC, Load current : Max. 100mA, Residual voltage : Max. 1V	PNP open collector output $\Rightarrow$ Output voltage : Min. (Power supply-2.5)V, Load current : Max. 100mA
Protection circuit	Reverse polarity protection, Short-circuit protection				
Timer function	OFF delay Timer built-in(VR adjustable) <Delay time : Max. 0.1 ~ 2sec >		—		
Indication	Operation indicator : Red LED				
Connection	Outgoing cable (2m)				
Insulation resistance	Min. 20M $\Omega$ (at 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 ~ 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	-20 ~ +65 $^{\circ}$ C (at non-freezing status), Storage : -25 ~ +70 $^{\circ}$ C				
Ambient humidity	35 ~ 85%RH, Storage : 35 ~ 85%RH				
Protection	IP64 (IEC specification) (Built-in timer type : IP50)	IP50 (IEC specification)	IP64 (IEC specification)		
Material	Case : ABS, Lens : Acryl				
Cable	3P, $\phi$ 4mm, Length : 2m				
Accessory	Adjustment driver, Bracket A, Bolts, Nuts			Bracket A $\times$ 2, Bolts/Nuts	
Approval	<b>CE</b>				
Weight	Approx. 70g				

※ (Note1) "S" : Operation indicator is on top.

※ (Note2) OFF delay timer Built-in(Delay time : Max. 0.1 ~ 2sec)

※ (Note3) Detection distance for Non-glossy white paper(50 $\times$ 50mm).

(A)  
Counter

(B)  
Timer

(C)  
Temp.  
controller

(D)  
Power  
controller

(E)  
Panel  
meter

(F)  
Tacho/  
Speed/  
Pulse  
meter

(G)  
Display  
unit

(H)  
Sensor  
controller

(I)  
Proximity  
sensor

(J)  
Photo  
electric  
sensor

(K)  
Pressure  
sensor

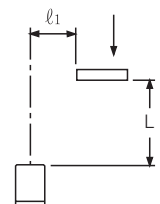
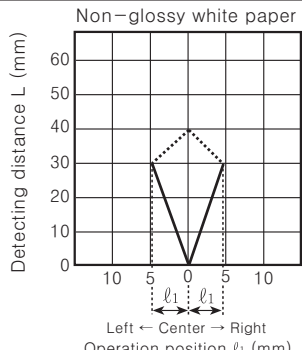
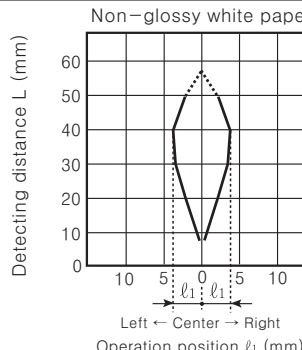
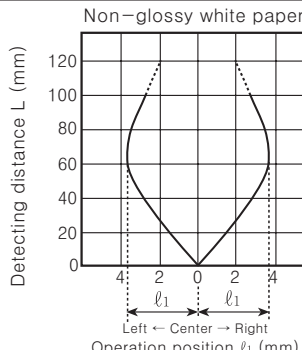
(L)  
Rotary  
encoder

(M)  
5-Phase  
stepping  
motor &  
Driver &  
Controller

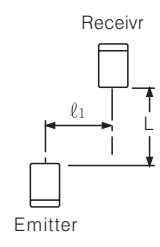
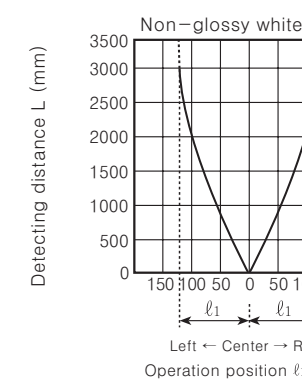
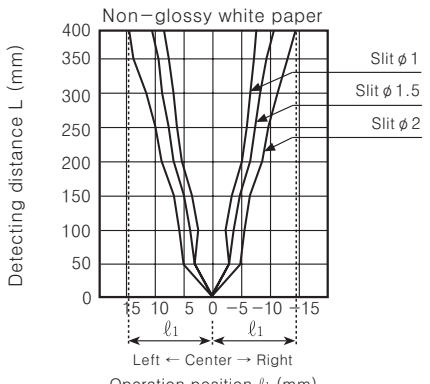
# BYD Series

## Characteristic

### Detection Distance(Limited distance reflective / Diffuse reflective)

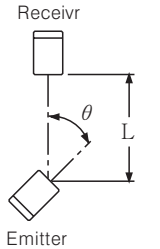
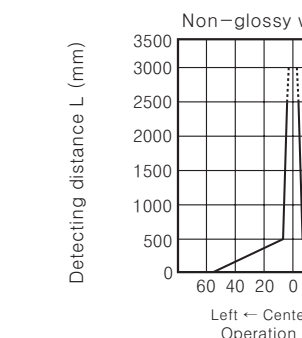
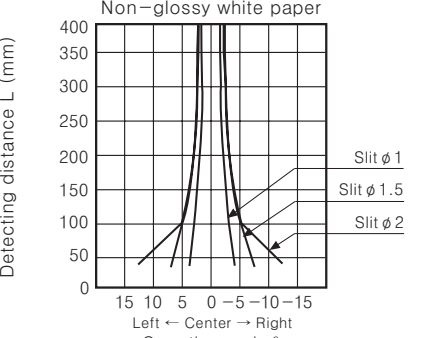
Measuring method	BYD30-DDT / BYD30-DDT-T	BYD50-DDT / BYD50-DDT-T	BYD100-DDT
Standard detecting target : Non-glossy white paper 50×50mm 	Non-glossy white paper 	Non-glossy white paper 	Non-glossy white paper 

### Parallel Shifting(Through-beam)

Measuring method	BYD3M-TDT	BYD3M-TDT(SLIT)
	Non-glossy white paper 	Non-glossy white paper 

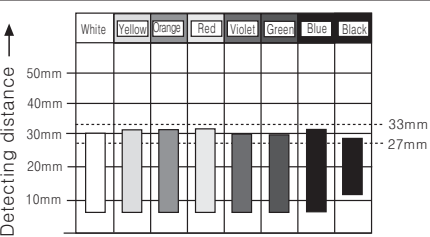
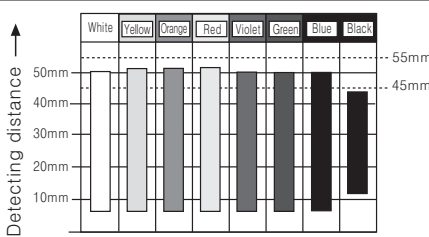
\*Above characteristic is from 400mm detecting distance to install through-beam type slit ( $\phi 1$ ,  $\phi 1.5$ ,  $\phi 2$ )

### Sensor Angle(Through-beam)

Measuring method	BYD3M-TDT	BYD3M-TDT(SLIT)
	Non-glossy white paper 	Non-glossy white paper 

\*Above characteristic is from 400mm detecting distance to install through-beam type slit ( $\phi 1$ ,  $\phi 1.5$ ,  $\phi 2$ )

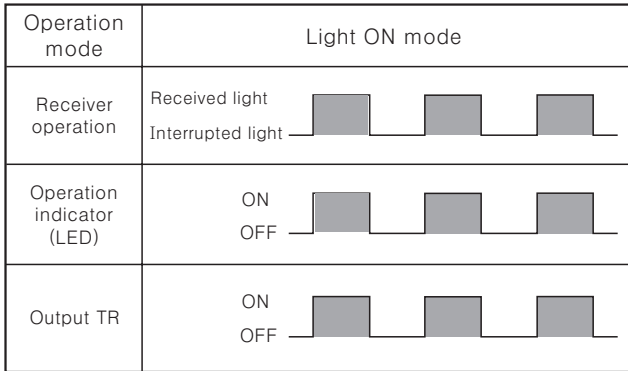
## Detecting distance by color(Limited distance reflective)

BYD30-DDT(-S), BYD30-DDT-T	BYD50-DDT(-S), BYD50-DDT-T	
 <p>*Size of detecting target : Non-glossy paper 50×50mm</p>	 <p>*Size of detecting target : Non-glossy paper 50×50mm</p>	1) This mode is stable detecting photoelectric sensor, therefore it is not affected by color or material within range of detecting distance as specified in chart. 2) It is able to detect target stably because of small effect from background.

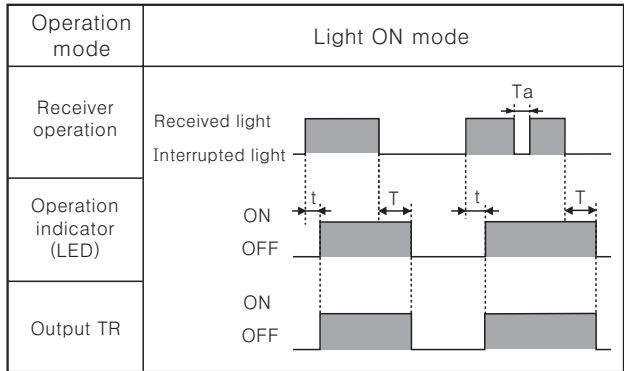
# DC Background Suppression Type

## Operation mode

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

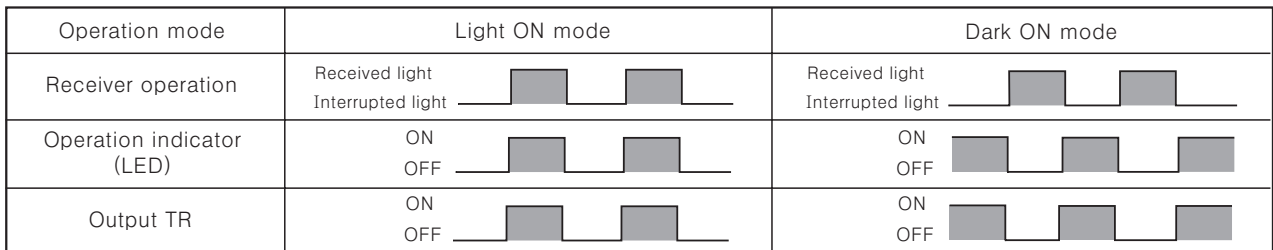


●BYD30-DDT-T, BYD50-DDT-T



※Note1) T : Setting time by timer VR(0.1 ~ 2sec)  
 Note2) t : Max. 3ms(When the Timer VR is minimum)  
 Note3) If (Ta) is shorter than (T), TR output will be ON.

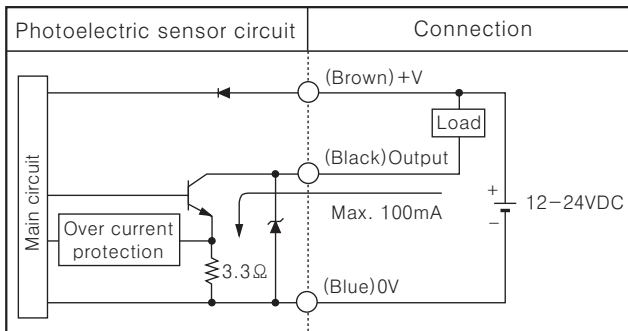
●BYD3M-TDT, BYD3M-TDT-P



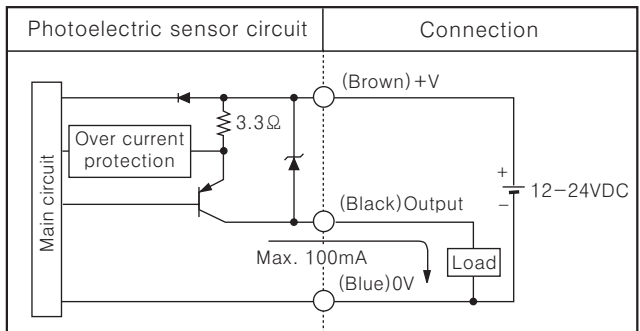
※Note1)To prevent incorrect operation, output of units keeps the state of OFF for 0.5sec. after power ON.  
 Note2)If the control output terminal is short-circuited or If over current condition exists, the control output will turn off due to protection circuit.

## Control output diagram

●BYD3M-TDT2



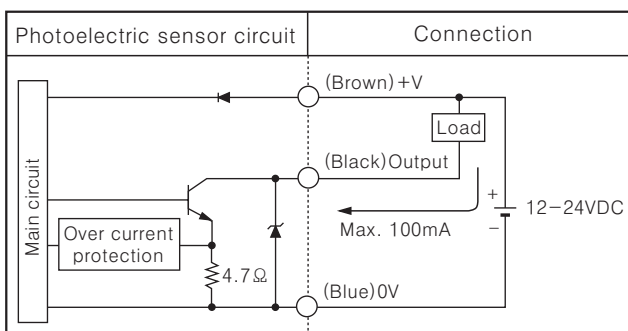
●BYD3M-TDT2-P



●BYD30-DDT(-S), BYD50-DDT(-S)

●BYD30-DDT-T, BYD50-DDT-T

●BYD100-DDT



(A) Counter

(B) Timer

(C) Temp. controller

(D) Power controller

(E) Panel meter

(F) Tacho/Speed/Pulse meter

(G) Display unit

(H) Sensor controller

(I) Proximity sensor

(J) Photo electric sensor

(K) Pressure sensor

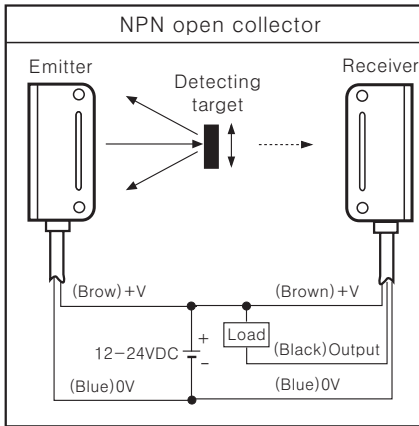
(L) Rotary encoder

(M) 5-Phase stepping motor & Driver & Controller

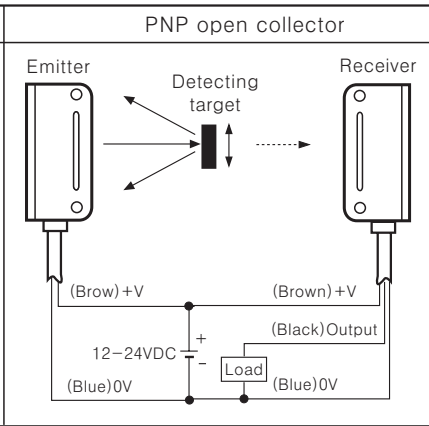
# BYD Series

## Connections

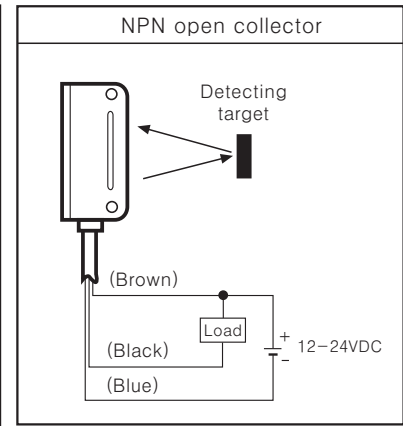
### ●BYD3M-TDT



### ●BYD3M-TDT-P

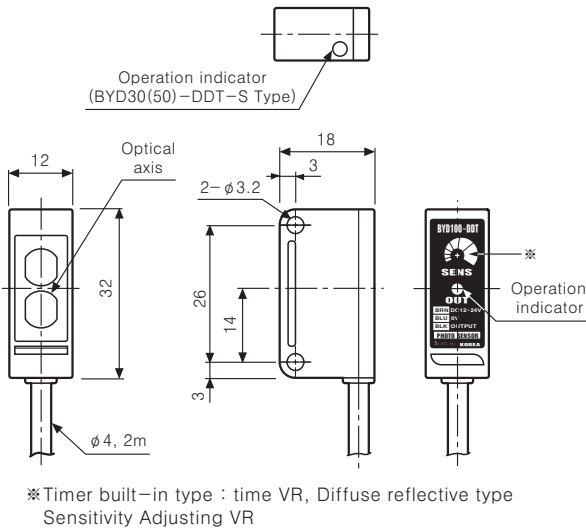


- BYD30-DDT(-S), BYD50-DDT(-S)
- BYD30-DDT-T, BYD50-DDT-T
- BYD100-DDT



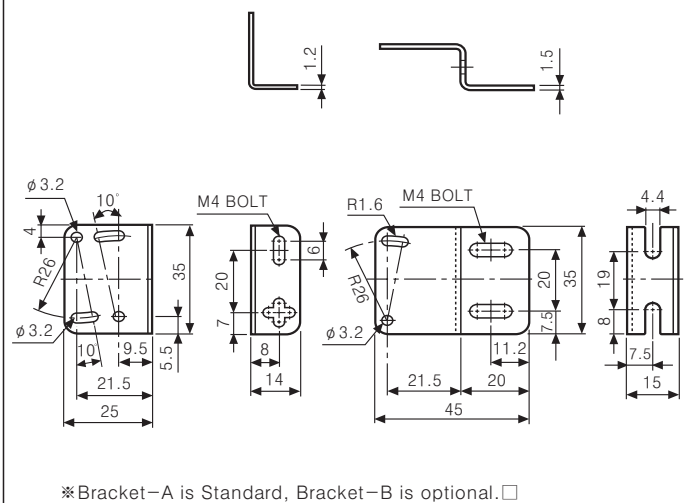
## Dimensions

### ●Product

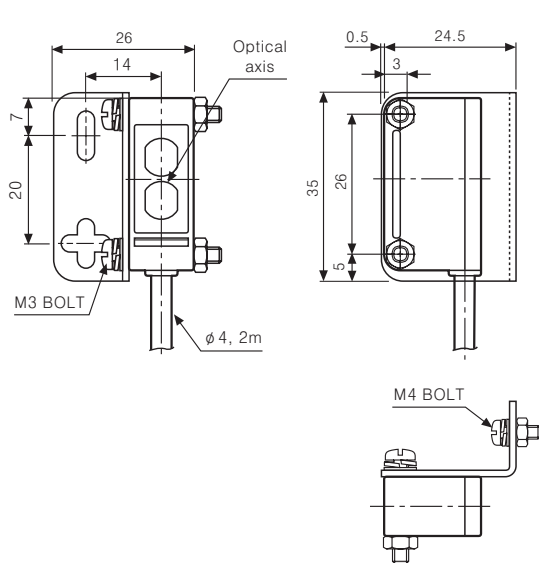


### ●Bracket-A

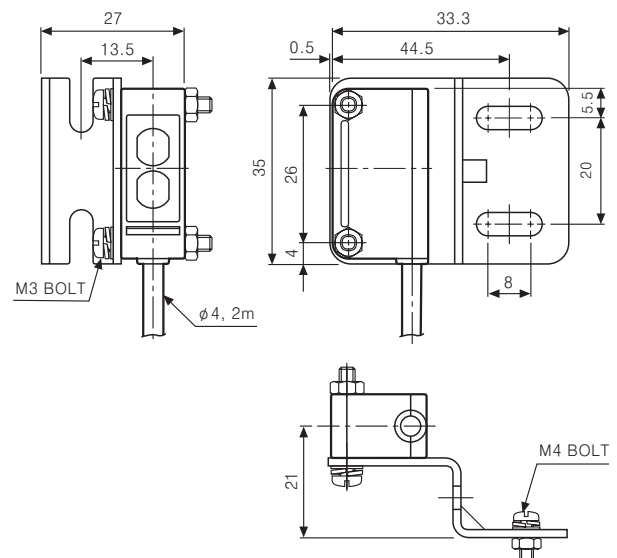
### ●Bracket-B



### ●Mounting a Bracket-A



### ●Mounting a Bracket-B

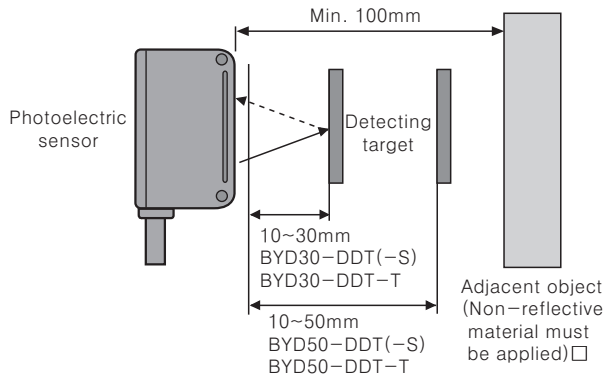


# DC Background Suppression Type

## ■ Mounting & Adjustment

### ○ Limited distance reflective type

1. Supply the power to the sensor after installing the sensor in installation place.



2. Install the target at detecting position and adjust the sensor to the right and the left or up and down to be at the right angle against optical axis and fix it at safe operating position.

Keep the distance

BYD30-DDT, (-T), (-S) : 10 ~ 30mm

BYD50-DDT, (-T), (-S) : 10 ~ 50mm

between photo-electric sensor and target

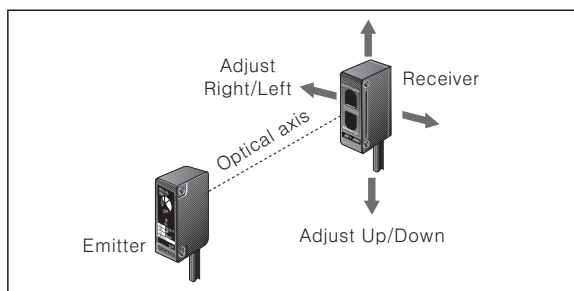
3. It must be adjusted the sensitivity of the volume in accordance with the existence of the reflective material in background. Keep the distance min. 100mm between photoelectric sensor and object in background. It may cause malfunction by reflection light from the other target.

※The detecting distance indicated in the specification chart is that of non-glossy white paper in the target size 50×50mm. The detecting 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 in face to face.
2. Set the receiver in center of position where indicator turns on, as adjusting the receiver and the emitter right and left, up and down.
3. Fix both units tightly after checking that the units detect a target.

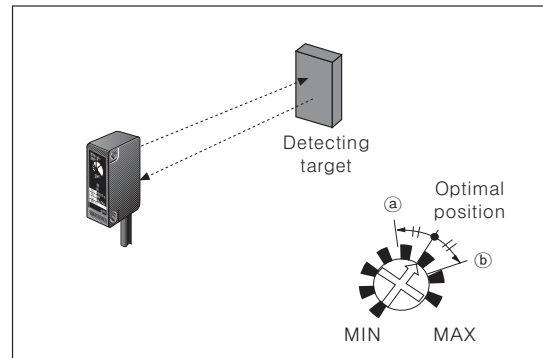
※If the detecting target is translucent body or smaller than  $\phi 6$ mm, it may not detect the target because too much light passes.



### ○ Diffuse reflective type

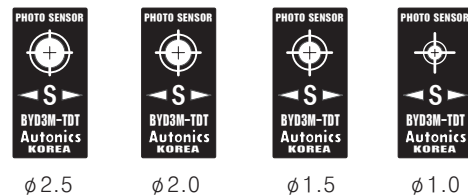
1. Even though the diffuse reflective type is set at Max. sensitive position, the sensitivity of the sensor must be adjusted according to the existence of the reflective material background.
2. Set the target at a position to be detected by the beam, then turn the adjuster until point ① where the indicator turns on from min. position of the adjuster.
3. Take the target out of the sensing area, then turn the adjuster until point ② where the indicator turns on. If the indicator does not turn on, Max. position is point ②.
4. Set the adjuster at the center of two switching point ①, ②.

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



## ■ Accessories (Option)

- Slit (Model name : BYD3M-Slit)



- Min. detecting target and Max. detecting distance by slit's  $\phi$   
- Attach the slit on receiver and emitter together.

SLIT $\phi$	Min. size of target	Max. detecting distance
$\phi 1.0$	Opaque materials of Min. $\phi 0.8$	500mm
$\phi 1.5$	Opaque materials of Min. $\phi 1.5$	700mm
$\phi 2.0$	Opaque materials of Min. $\phi 2.0$	1200mm

※ This slit is for BYD3M-TDT (-P) only.

※ 2 pieces of each different  $\phi$  and total 8 pieces packed.

※ This slit is sticker for attachment, please remove the dirt on lens of photoelectric sensor before using it.

(A) Counter

(B) Timer

(C) Temp. controller

(D) Power controller

(E) Panel meter

(F) Tacho/Speed/Pulse meter

(G) Display unit

(H) Sensor controller

(I) Proximity sensor

(J) Photo electric sensor

(K) Pressure sensor

(L) Rotary encoder

(M) 5-Phase stepping motor & Driver & Controller