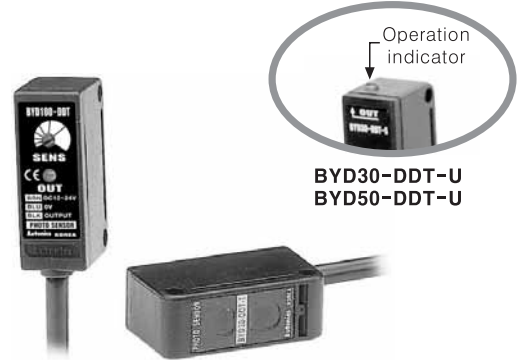


Small and Amplifier Built-in Type

Small diffuse reflective and limited distance reflective type photoelectric sensor

■ Features

- Easy installation by compact size.
- Superior detection not affected by color of target.
(Limited distance reflective type)
- Operation indicator is located on the top.
(BYD30-DDT-U, BYD50-DDT-U)
- Easy to adjust the response time of Timer function.
(OFF Delay time : 0.1 ~ 2sec variable)
- Built-in overcurrent protection circuit / Reverse power polarity protection circuit.



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



■ 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 | Limited distance reflective | | Diffuse reflective | Transmitted beam | |
| Sensing distance | (★3) 10 ~ 30mm | (★3) 10 ~ 50mm | (★3) 100mm | 3m | |
| Sensing target | Transparent, Translucent, Opaque materials | | | Opaque materials of Min. ϕ 6mm | |
| Hysteresis | Max. 10% at rated setting distance | | Max. 20% at rated setting 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 | Fixed | | Adjustable VR | Fixed | |
| 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 Ω (at 500VDC) | | | | |
| Noise strength | \pm 240V 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 ~ 55Hz in each of X, Y, Z directions for 2 hours | | | | |
| Shock | 500m/s ² (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 standard) (Built-in timer type : IP50) | | IP50 (IEC standard) | IP64(IEC standard) | |
| Material | Case : ABS, Lens : Acrylic | | | | |
| Cable | 3P, ϕ 4mm, Length : 2m | | | | |
| Accessory | Adjustment driver, Bracket A, Bolts, Nuts | | | Bracket A \times 2, Bolts/Nuts | |
| Approval | CE | | | | |
| Unit weight | Approx. 70g | | | | |

- * (★1) Operation indicator is on the top.
- * (★2) OFF delay timer is built-in. (Delay time : Max. 0.1 ~ 2sec)
- * (★3) Sensing 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) Switching power supply

(J) Proximity sensor

(K) Photo electric sensor

(L) Pressure sensor

(M) Rotary encoder

(N) Stepping motor & Driver & Controller

(O) Graphic panel

(P) Production stoppage models & replacement

Feature data

Sensing distance(Limited distance reflective /Diffuse reflective type)

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

Parallel Shifting(Transmitted beam)

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

※Above characteristic is from 400mm sensing distance to install transmitted beam type slit(φ 1, φ 1.5, φ 2)

Sensor Angle(Transmitted beam)

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

※Above characteristic is from 400mm sensing distance to install transmitted beam type slit(φ 1, φ 1.5, φ 2)

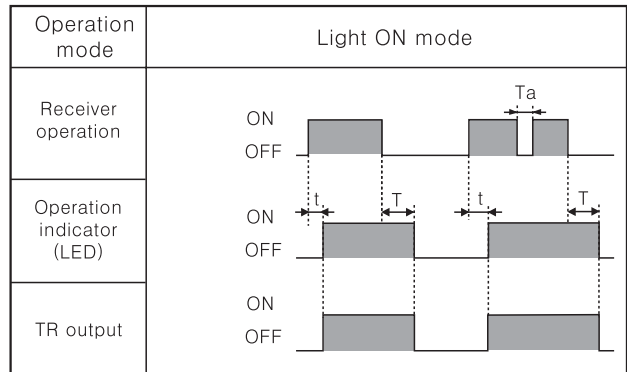
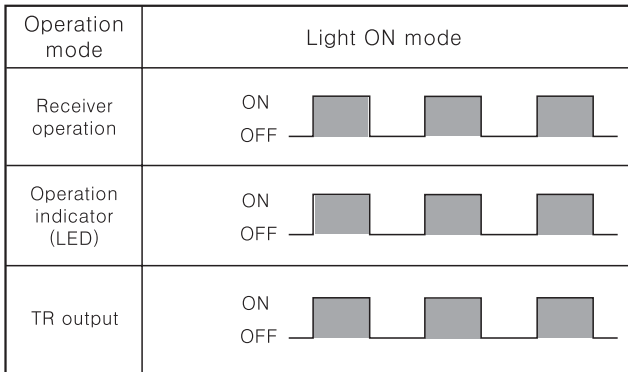
Sensing distance by color(Limited distance reflective)

| BYD30-DDT(-S), BYD30-DDT-T | BYD50-DDT(-S), BYD50-DDT-T | |
|----------------------------|----------------------------|---|
| | | 1) This mode is stable limited distance 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. |

Small and Amplifier Built-in Type

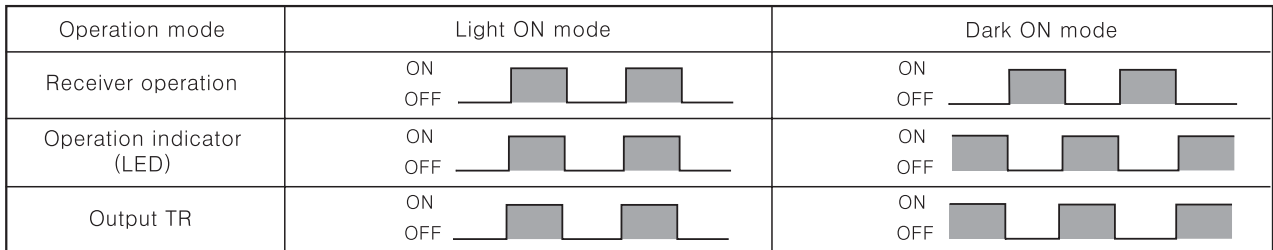
Operation mode and timing diagram

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



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

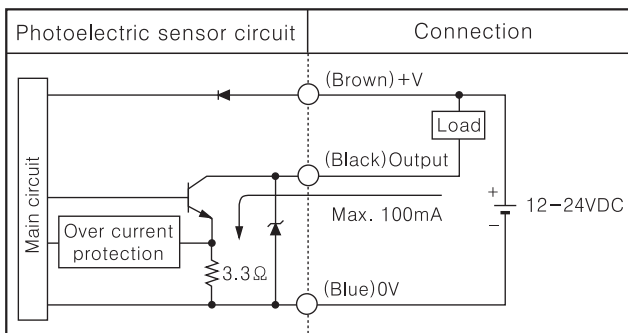
●BYD3M-TDT, BYD3M-TDT-P



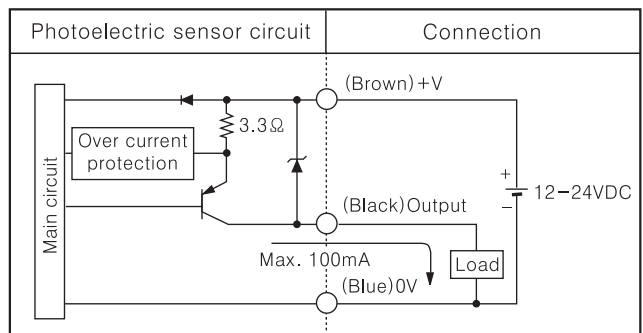
※To prevent incorrect operation, output of units keeps the state of OFF for 0.5sec. after power ON.
 ※If the control output terminal is short-circuited or overcurrent condition is existed, the control output will turn off due to protection circuit.
 ※Light ON mode is optional.

Control output diagram

●BYD3M-TDT2



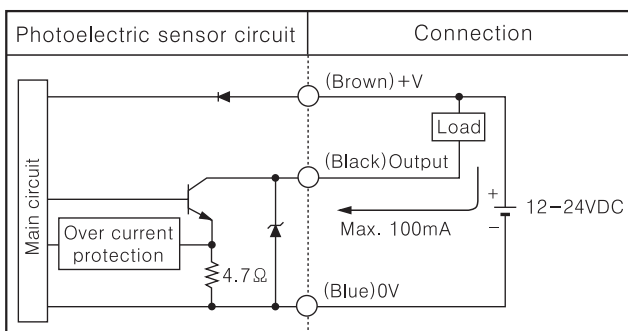
●BYD3M-TDT2-P



●BYD30-DDT(-U), BYD50-DDT(-U)

●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) Switching power supply

(J) Proximity sensor

(K) Photo electric sensor

(L) Pressure sensor

(M) Rotary encoder

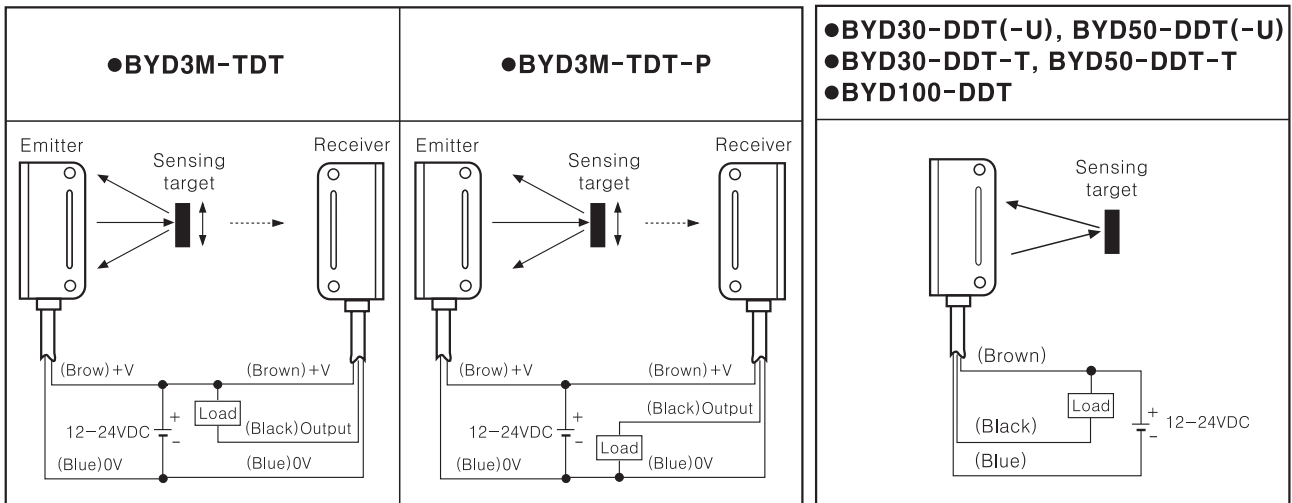
(N) Stepping motor & Driver & Controller

(O) Graphic panel

(P) Production stoppage models & replacement

BYD Series

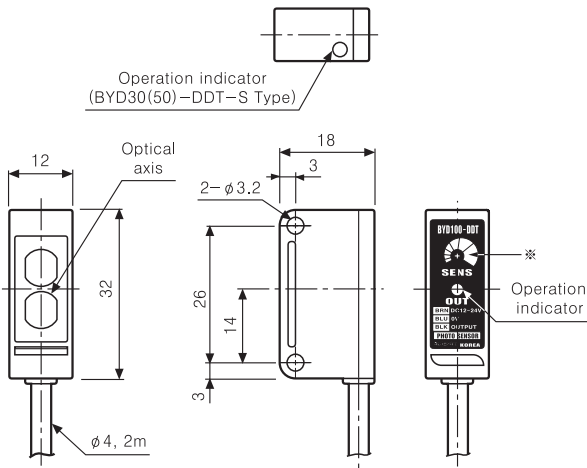
Connections



Dimensions

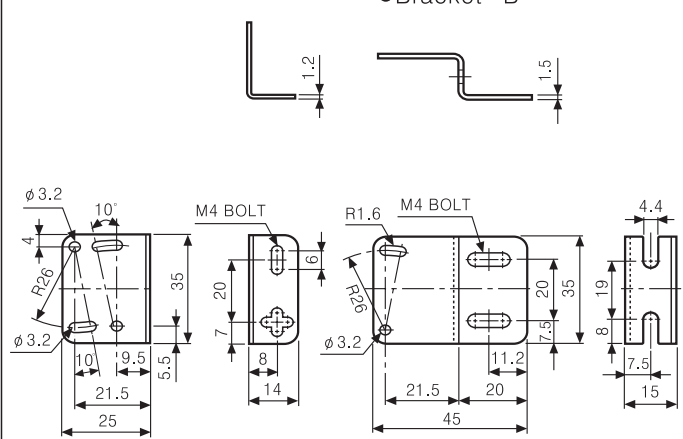
(Unit:mm)

●Product



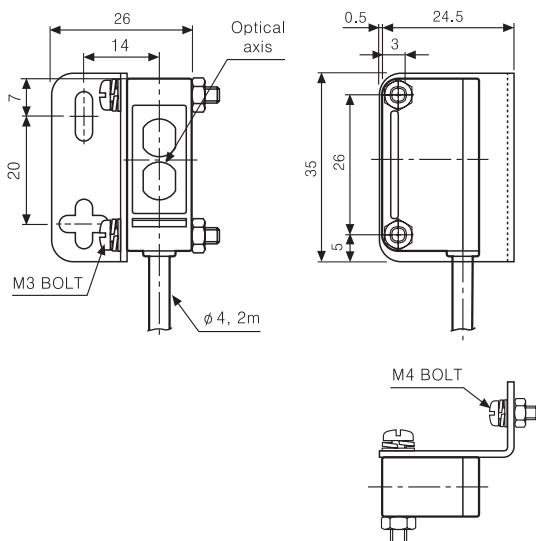
※Timer built-in type : Time VR, Diffuse reflective type : Sensitivity Adjusting VR

●Bracket-A

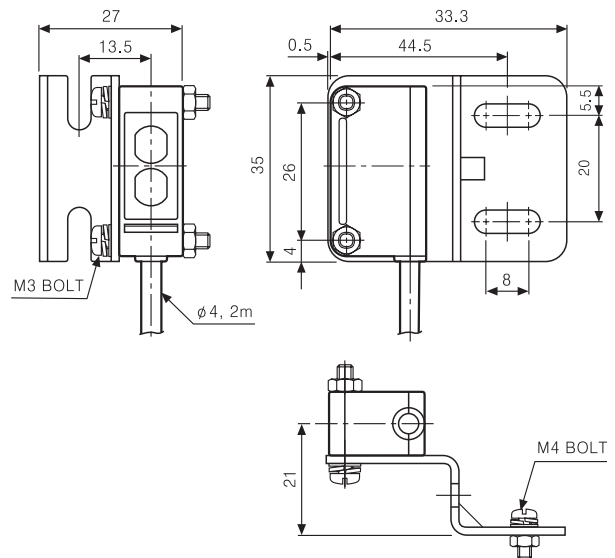


※Bracket-A is Standard, Bracket-B is optional.□

●Connect the bracket-A



●Connect the bracket-B

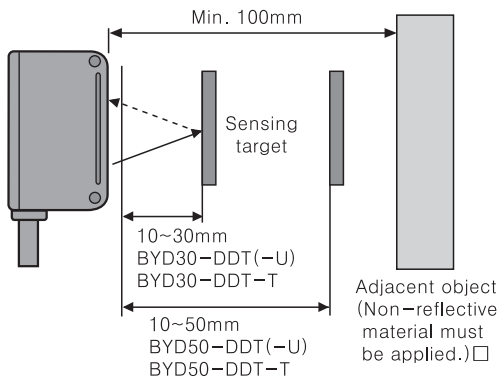


Small and Amplifier Built-in Type

■ Mounting & Adjustment

○ Limited distance reflective type

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

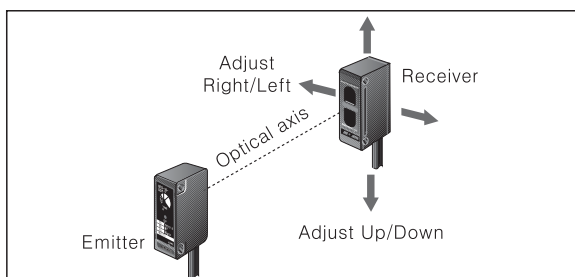


2. Install the target at sensing position and adjust the sensor to the right and the left or up and down to be at the right angle against optical axis and fix it at safe operating position.
Keep the distance
BYD30-DDT, (-T), (-U) : 10 ~ 30mm
BYD50-DDT, (-T), (-U) : 10 ~ 50mm
between photoelectric sensor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

※ 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.

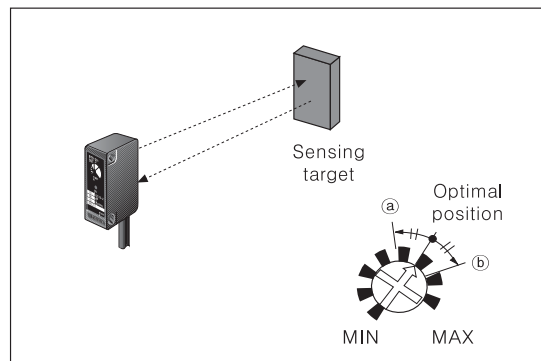
○ Transmitted beam type

1. Supply the power to the photoelectric sensor, after set the emitter and the receiver facing each other.
 2. Set the receiver in the middle of the operation range of indicator adjusting the receiver and the emitter right and left, up and down.
 3. Adjust up and down direction as the same.
 4. After adjustment, check the stability of operation putting the object at the optical axis.
- ※ If the sensing target is translucent body or smaller than $\phi 6\text{mm}$, it can be missed by sensor because light penetrate it.



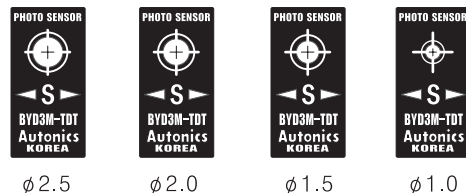
○ Diffuse reflective type

1. The sensitivity should be adjusted depending on a sensing target or mounting side.
 2. Set the target at a position to be detected by the beam, then turn the adjuster until position ① in the operation range of indicator from min. position of the adjuster.
 3. Take the target out of the sensing area, then turn the adjuster until position ② where the indicator turns on. If the indicator does not turn on, Max. position is position ②.
 4. Set the adjuster at the center of two switching position ①, ②.
- ※ 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 (Option)

- Slit (Model name : BYD3M-Slit)



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

| SLIT ϕ | Min. sensing target | Max. sensing 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 ϕ 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) Switching power supply
- (J) Proximity sensor
- (K) Photo electric sensor
- (L) Pressure sensor
- (M) Rotary encoder
- (N) Stepping motor & Driver & Controller
- (O) Graphic panel
- (P) Production stoppage models & replacement