(C) Door/Area Sensor

Door sensor
ADS-A Series

Door side sensor
ADS-SE Series

Picking sensor
BWPK Series

Product Overview

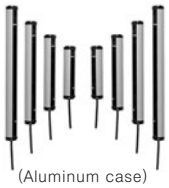
▣Auto Door sensor

Appearances	Sensing type	Mounting height	Model	Power supply	Cover color	Control output	Reference
	Diffuse reflective type	2.0 to 2.7m	**ADS-AF**	24−240VAC/ 24−240VDC	Silver	Relay output	**C-2 to 8**
			ADS-AE	12−24VAC/ 12−24VDC			

▣Door side sensor

Appearances	Sensing type	Sensing distance	Model	Power supply	Response speed	Control output	Reference
	Through−beam type	10m	**ADS-SE**	12−24VAC/ 12−24VDC	Max. 50ms	Relay output	**C-9 to 14**

▣Area sensor

Appearances	Sensing type	Sensing distance	Model	Power supply	Response speed	Control output	Reference
CE  (Aluminum case)	Through−beam type	0.1 to 7m	**BW20-□□**	12−24VDC	Max. 12ms	NPN open collector output	**C-15 to 20**
			BW40-□□				
			BW20-□□P			PNP open collector output	
			BW40-□□P				
CE  (Plastic case)		0.1 to 5m	**BWP20-□□**		Max. 6ms	NPN open collector output	**C-20 to 25**
			BWP20-□□P			PNP open collector output	
Picking sensor CE  (Plastic case)		0.1 to 3m	**BWPK25-05**		Max. 30ms	NPN open collector output	**C-26 to 30**
			BWPK25-05P			PNP open collector output	

Auto door sensor

▣Features

- ●Stop time selection function
  (Selectable stop time 2 / 7 / 15sec.)
- ●4 steps variable function for front sensing area
  (7.5°, 14.5°, 21.5°, 28.5° 4steps variable)
- ●Right/Left sensing area elimination function
- ●Power supply
  (24-240VAC/24-240VDC, 12-24VAC/12-24VDC)
- ●Built-in Microprocessor

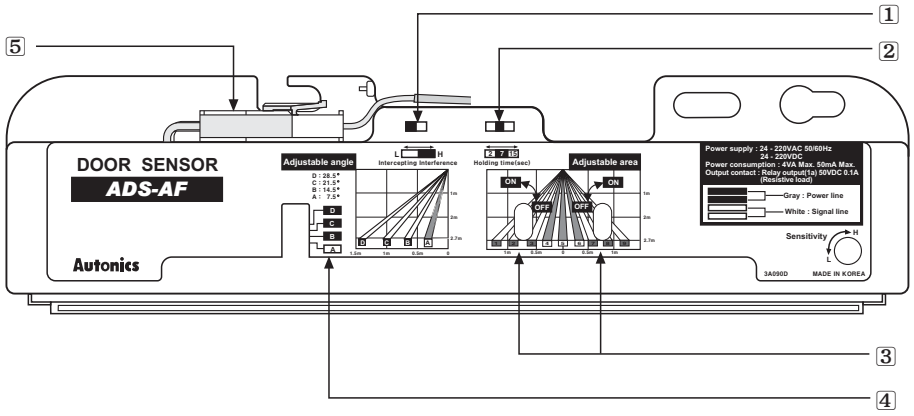
Please read "Caution for your safety" in operation manual before using.

▣Specifications

Model	ADS-AF	ADS-AE
Cover color	Silver	
Power supply	24-240VAC ±10% 50/60Hz, 24-240VDC ±10%(Ripple P-P : Max. 10%)	12-24VAC ±10% 50/60Hz, 12-24VDC ±10%(Ripple P-P : Max. 10%)
Power consumption	Max. 4VA(at 240VAC)	Max. 2VA(at 24VAC)
Control output	**(*1)** Relay contact output [Relay contact capacity : 50VDC 0.1A(Resistive load) Relay contact composition : 1a	
Relay life cycle	Mechanical : Min. 20,000,000 times, Electrical : Min. 50,000 times	
Mounting height	2.0m to 2.7m(Max. sensing distance : 3m)	
Sensing method	Infrared reflection method(Diffuse reflective)	
Output delay time	Delay time approx. 0.5sec.	
Output holding time	Selectable 2sec., 7sec., 15sec. by slide switch	
Interference prevention	H, L(Interfearence prevention switch)	
Front sensing area	7.5° , 14.5° , 21.5° , 28.5° : Using angle adjuster	
Adjustable sensing area	(1, 2, 3 Area), (7, 8, 9 Area) Eliminate each by each : Adjusting with right/Eliminating right/left sensing area lever	
Light source	Infrared LED(850nm)	
Indicator	Power on : Green LED turns on, Sensing : Red LED turns on	
Connection method	Connector wire connection	
Insulation resistance	Min. 20MΩ(at 500VDC megger)	
Noise strength	±2,000V the square wave noise(pulse width:1㎲) by the noise simulator	
Dielectric strength	1,000VAC 50/60Hz for 1 minute	
Vibration	1.5mm amplitude at frequency of 10 to 55Hz in each of X, Y, Z directions for 2 hours	
Shock	100m/s² (Approx. 10G) in X, Y, Z directions for 3 times	
Ambient illumination	Sunlight : Max. 11,000ℓx, Incandescent lamp : Max. 3,000ℓx	
Ambient temperature	-20℃ to 50℃(at non-freezing status), Storage : -20 to 70℃	
Ambient humidity	35 to 85%RH, Storage : 35 to 85%RH	
Accessory	Cable : 2.5m, Mounting screw : 2EA, Mounting template	
Protection	IP50(IEC standard)	
Material	Case : ABS, Cover : Acrylic	
Unit weight	Approx. 320g	

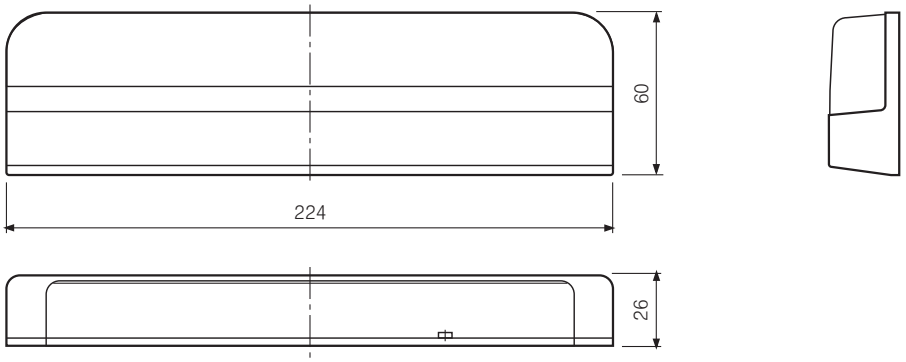
※(*1)Do not use Load which is beyond the rated capacity of contact point of Relay.
It can cause bad insulation, contact fusion, bad contact, relay breakdown, and fire etc.

▣Parts description



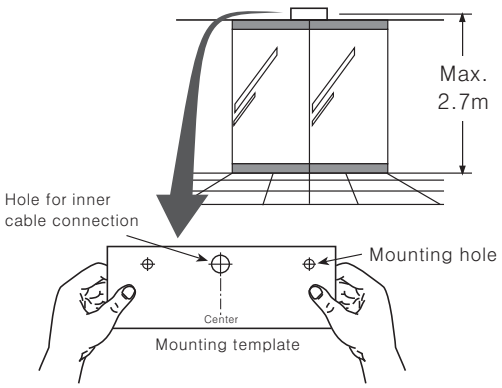
1 Interference prevention switch
2 Holding time setting switch
3 Eliminating right/left sensing area lever
4 Angle adjuster
5 Body connector

▣Dimensions

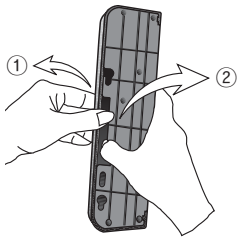
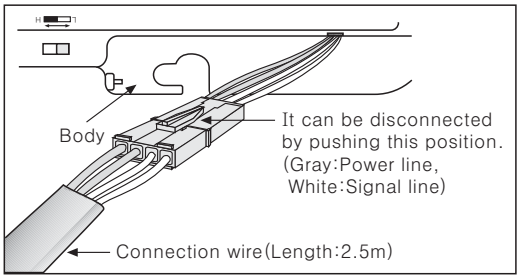


(Unit:mm)

▣Installation

Installation	⚠ Caution
1. Attach mounting template at mounting position (Mounting height : 2.0m to 2.7m) • Drill ϕ3.4mm hole based on mounting template. • In case of wiring the cable on the wall to hide the cable, drill ϕ9mm hole. • Install the unit after removing the mounting template. 	**⚠ Warning** **It may give an electric shock.** • When this unit is used with cable outlet removed from cover, it must be installed indoors. (Electric shock or damage can occur if water flows through cable outlet.) **⚠ Caution** **People can be jammed in the door.** • If unit is installed higher than 2.7m in height, it may not detect short children. • If unit is installed lower than 2.0m in height, it may not work properly.

▣Installation

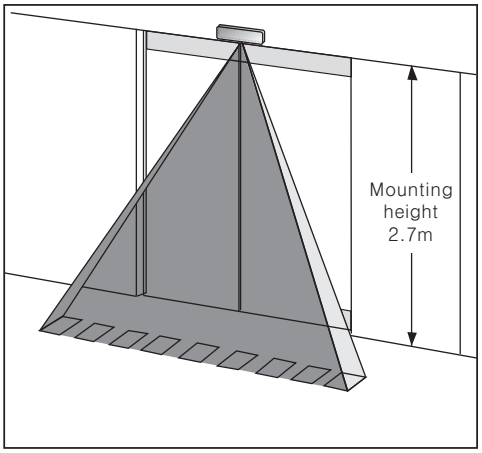
Installation	⚠ Caution
2. Please install this unit with mounting screws after removing protection cover. 	**⚠ Caution Mounting the unit** • Do not put excessive tightening torque on screw bolt when mounting this unit. It may result in mounting hole damage. **<Protection cover detachment>** • Pulling left thumb toward ①, key lock will be released and pull right thumb toward ②, protection cover and body will be detached.
3. The code part of wiring code should be connected to main control part. • Install the connector to be connect to the body.	
4. Connect the extension cable and the main controller. 	**⚠ Caution Connection of the connector** • Plug in the connector of the extension cable and the connector of the unit completely. The unit may not work normally with inferior contact.

▣Adjustment

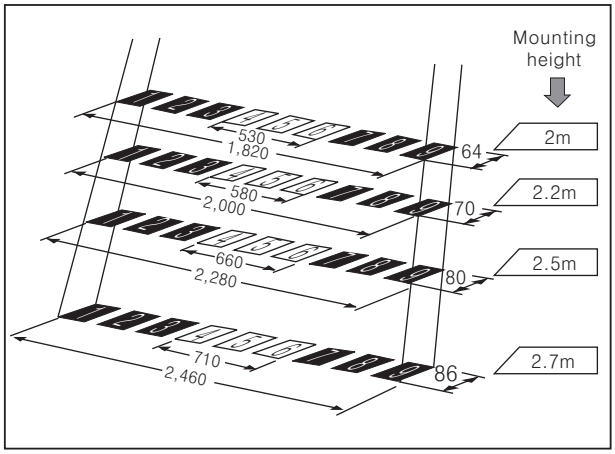
Please turn on the power.

1. Check of the sensing area

This characteristic of the sensing area is shown in below chart and drawing.



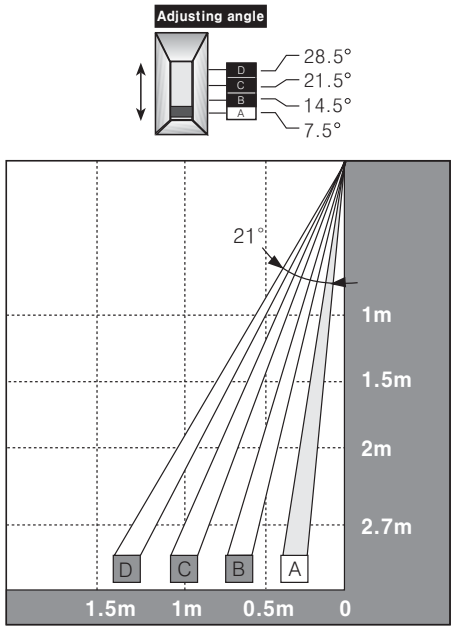
(Unit:mm)



▣Adjustment

2. Adjustable sensing area

Adjustable 7° in each step.
(Sensing area angle step : 7.5° to 28.5°)



⚠ Caution People can be jammed in the door.

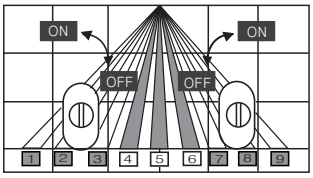
- Be sure to install an auxiliary photo sensor as the safe equipment.
  ADS-SE series is available for additional sensor.(Door side sensor)
- Even if the unit is installed at the closest side from the door, the rail of the door is dangerous.

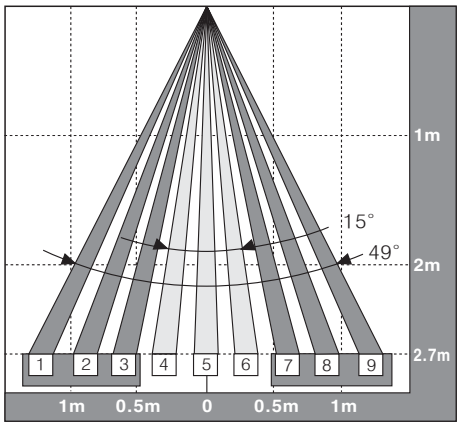
3. Adjustment of Left, Right sensing area width

Sensing area width 1 2 3 can be eliminated by left lever, 7 8 9 by right lever.

- Use the unit as removing non-sensing area by the lever adjusting width at narrow sensing area.

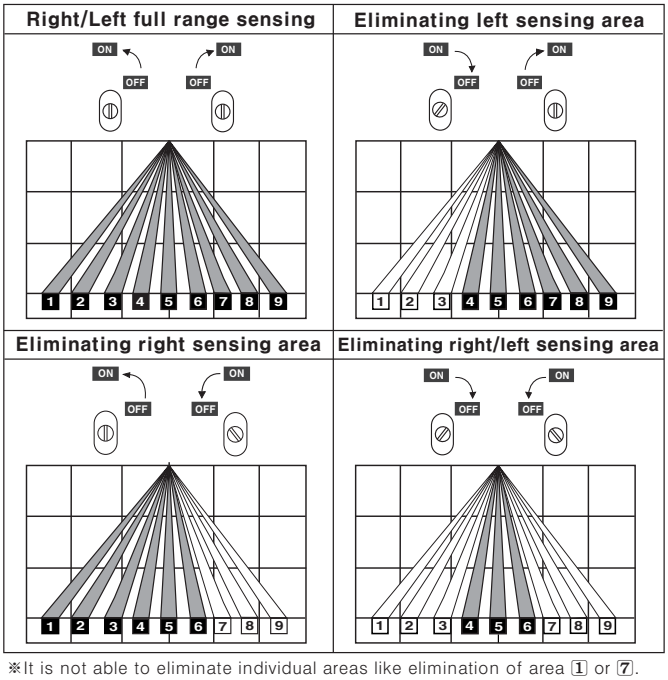
※Turn the adjuster till it stops it toward arrow direction by a (-)driver.





⚠ Caution People can be run against the door.

- When eliminating the right/left sensing range, be sure to install the unit at place where a person approaches at the front of the door.
  In case of eliminating sensing area width:
- If a person approaches at the side of the door, they may not be detected and the door will not open.
- The sensing range for position of eliminating lever is as below.

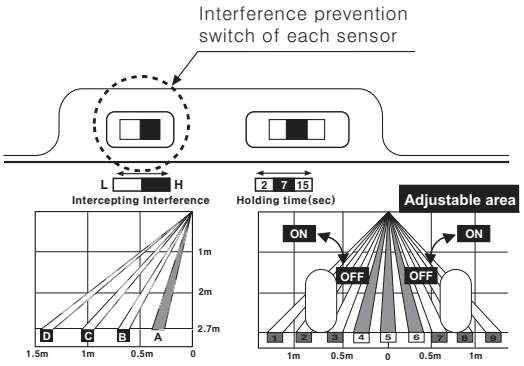


※It is not able to eliminate individual areas like elimination of area 1 or 7.

▣Adjustment

4. How to set the switch for interference prevention

In case of using several door sensors adjacently, please set the interference prevention switches of the sensors differently.

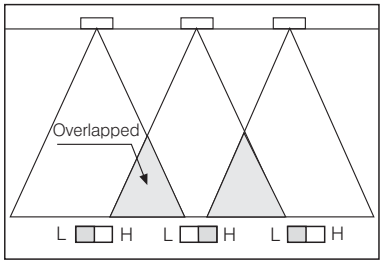


⚠ Caution **Door can be opened and closed**

When several door sensors are installed simultaneously without considering any interference prevention, it may cause malfunction by another door sensor even though no moving object is existed.

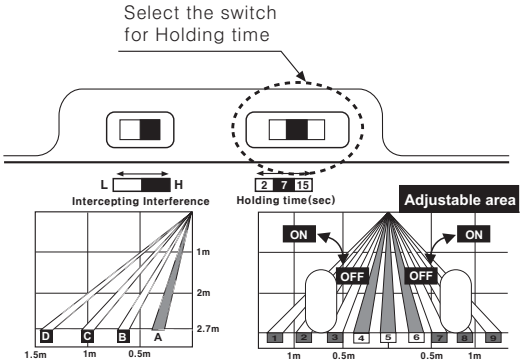
< Interference prevention >

If sensing area of the door sensors is overlapped, set each switch in difference or install the unit on non-overlapped sensing area.



5. Holding time switch setting

It is able to set the holding time by the holding time switch. (Selectable 2sec., 7sec., 15sec.)



⚠ Caution **People can be jammed in the door.**

- Be sure to install a auxiliary sensor as a safe equipment. There is ADS-SE series for a door side sensor.
- The door will close after the time set by the holding time switch has elapsed.

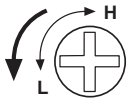
<Holding time>

- When people or objects stay in sensing area after auto tuning(Set 7sec. for holding time), it will detect the stationary people or objects for set time by the holding time switch, and then the sensor's output turns off after set time.

6. Sensitivity Setting

Even though people in the sensing area, if the sensor does not operate, turning the adjuster up to H.
The sensitivity will be increased.

Even though people in the sensing area, if the sensor operated, turning the adjuster up to L.
The sensitivity will be decreased.

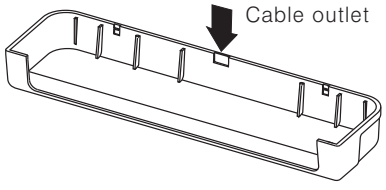


⚠ Caution **Door can be opened and closed**

Please check the normal operation by turning the power ON/OFF after finishing the sensitivity setting.
It may not operate normally because the install setting is changed before and after sensitivity setting.

7. Protection cover

- Mount the cover on the unit.
- In case of using outlet to wire exposed cable, remove the cable outlet as below.



⚠ Warning **It may give an electric shock.**

- Do not take off its cover on operating the unit.
- In case of using the cable outlet, the unit must be installed in inner position of door.
- If water is penetrated into the cable outlet, it may cause human injury or give an electric shock.

▣Adjustment

7. Sensitivity

After turning on the power, please stand by in the condition without moving object in the sensing area.

- If it is not passed for 3 sec. after turning the power, holding detection is impossible

8. Check of sensing operation

Check sensing operation as follow drawing.

Entry activation		Turning on the power	Out of sensing area	Enter the sensing area	Holding sensing	Out of sensing area
Operation indicator	Orange	LED ON	LED OFF	LED OFF	LED OFF	LED OFF
	Green	LED OFF	LED ON	LED OFF	LED ON	LED ON
	Red	LED OFF	LED OFF	LED ON	LED OFF	LED OFF
Output contact		OFF	OFF	ON	Output : ON for holding time□ OFF	Output : OFF after 0.5sec. OFF

9. Maintenance

- If the sensing lens is unclean, the unit may cause malfunction, in this case, please clean it with dry tissue and natural detergent.
- Do not use an organic cleaner such as benzene, etc.

⚠ Caution **It may give an electric shock.**

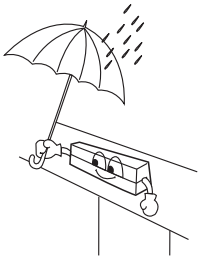
- Do not wash the unit with water.
- Do not repair or disassemble the unit.

▣Troubleshooting

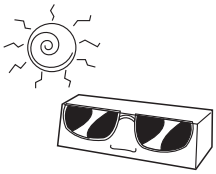
Malfunction	Cause	Troubleshooting
It does not work.	●Power supply ●Cable disconnection, incorrect connection	●Adjust the power cable with the rated voltage. ●Check connector and wiring.
Sometimes it does not work.	●The sensing lens is unclean	●Clean the lens with dry tissue and natural detergent.
The door is opened even if people do not enter in sensing area.	●There are moving objects. ●By occurring sudden change of the sensing area. ●Sensing area is overlapped. ●There is equipment causing strong electric wave, noise. ●A drop of water is placed at the lens.	●Check the status of installation. ●Check surrounding environment for installation. ●Install the unit to avoid overlap for sensing area. ●Set the switch intercepting interference. ●Do not install the equipment producing strong noise near the sensor. ●Remove a drop of water.

▣Installation environment

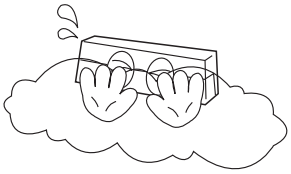
1. This product is not qualified for waterproof.
   Please install without being directly contacted with rain or snow.
   It may cause breakdown and short circuit.



2. Do not install in the place where having reflecting light like sunshine directly reaches.
   It may does not operate normally.

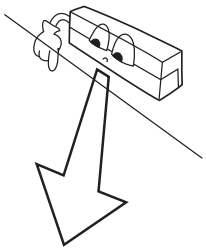


3. Do not install in the place where smoke and vapor occurs. It may don't operate normally.



4. If you place a movable object in the sensing area, it may cause malfunction by sensing the object because of natural phenomenon like wind etc.

5. Sensing hole must face the bottom, or the sensor does not operate normally.



▣Caution for using

⚠ Warning It may give an electric shock.

Do not take off its cover when the unit is operating.
If water is penetrated into the cable outlet, it may cause human injury or give an electric shock.

- When using this unit with cable outlet removed, this unit must be installed indoors. If installing it outdoors, it may give an electric shock or damage by direct contact with water when the water inflows through cable outlet.
- Do not wash the unit with water. Be careful not the water inflow into this unit.
  It may cause damage or give an electric shock.
- Do not repair or disassemble the sensor.
  It may cause damage or give an electric shock.

⚠ Caution Be careful of human injury by the door.

- Do not install this unit at place higher than 2.7m.
  It may not sense small children due to lack of sensitivity.
- Do not install this unit under 2m.
  It may not operate normally.
- Please install photo sensor as the safety equipment.
  It is hard to detect the closest area from a door.
  It may not be able to detect children or old people continuously and they can be jammed in the door.
- Please install photo sensor as the safety equipment.
  This unit holds the door for holding time.
  When the holding time passed, the door will be closed.
  People may be jammed in the door.

⚠ Caution Door may not open.

- When eliminating the right/left sensing area, be sure to make the object from the front of the door.
  When eliminating the right/left sensing area, it is hard to detect the enter from the width direction, it may cause human injury because the door is not opened.

⚠ Caution It may cause malfunction.

- When wiring the photoelectric sensor with high voltage line, power line in the same conduit, it may cause malfunction.
  Therefore please wire separately or use different conduit.
- Do not install this unit at place where there is dust or corrosive gas.
- The wire connection shall be used as short as possible in order to avoid malfunction by surge.
- When it is covered by dirt at lens, please clean the lens with dry cloth, but do not use any organic materials such as alkali, acid, chromic acid.

Door side sensor

▣Features

- ●Long sensing distance : 0 to 10m
- ●High ambient intensity of illumination : Max. 100,000 lux of sunlight
- ●Easy to join sensor head to controller
- ●Easy sensitivity setting(Automatic sensitivity setting by open push method)
- ●Self-diagnosis function
- ●Compact Size(W77×L30×H44mm)

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

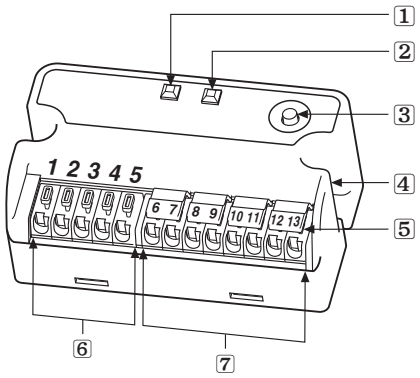
▣Specifications

Model	**ADS-SE**
Sensing type	Through-beam
Max. sensing distance	0 to 10m
Power supply	12-24VAC/DC ±10%(Ripple P-P : Max. 10%)
Power/Current consumption	AC : Max. 2VA / DC : Max. 50mA
Contact output	Contact capacity : 50VDC 0.3A(Resistive load) Contact composition : 1c Relay life cycle : Mechanical-Min. 5,000,000 times, Electrical-Min.100,000 times
Response time	Approx. 50ms(From light OFF)
Output holding time	Approx. 500ms(From light ON)
Available sensor set	2 sets
Indicator	Operation indicator : Red, Green(Refer to C-13 to 14 for the display status in operation)
Light source	Infrared LED(850nm)
Ambient temperature	-20 to 55℃(at non-freezing status)
Storage temperature	-25 to 60℃
Ambient humidity	35 to 85%RH
Storage humidity	35 to 85%RH
Ambient illumination	Sunlight : Max. 100,000ℓx(Receiver illumination)
Protection	IP30(IEC standard)
Sensor wire length	10m
Material	Case : ABS, Lens : Acrylic
Accessory	Sensor : 1 set(ADS-SH), Fixing bolt for controller : 2 pieces
Unit weight	Approx. 300g

※**Do not use Load which is beyond the rated capacity of contact point of Relay.**
It can cause bad insulation, contact fusion, bad contact, fire etc.
※Please purchase 1 set of sensor separately when mounting 2 sets of sensor.
※The mounting bracket of sensor is sold separately.(ADS-SB12, ADS-SB10)
※It is enable to purchase a controller separately.(ADS-SEC)

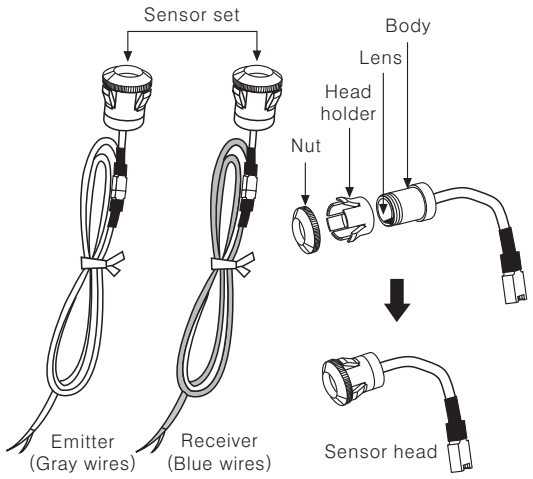
▣Identification

●Controller part



1 Display LED(Red)
2 Display LED(Green)
3 Sensitivity setting button
4 Mounting hole
5 Wiring connection button
6 Terminal for power and output(No. 1 to 5)
7 Terminal for the sensor(No. 6 to 13)

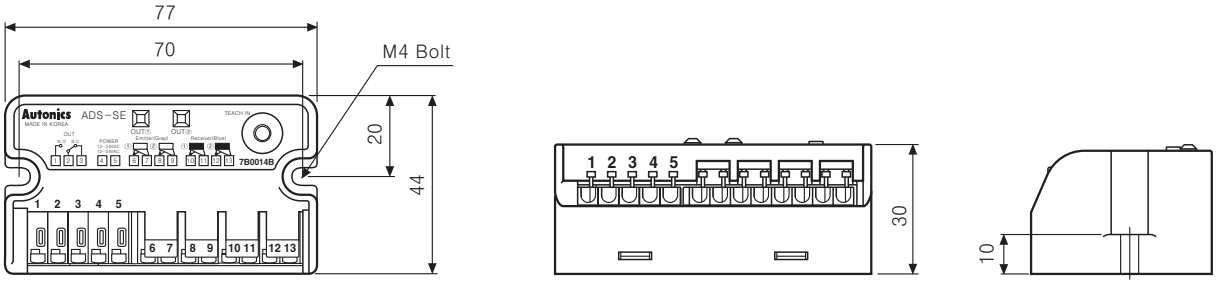
●Sensor part



※It is able to use 2 sets of the sensor with this product.
If it is necessary, purchase a set more for using.

▣Dimensions

●Controller part

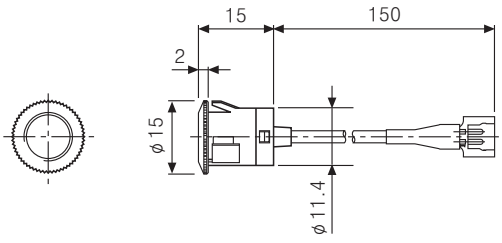


〈ADS-SEC〉

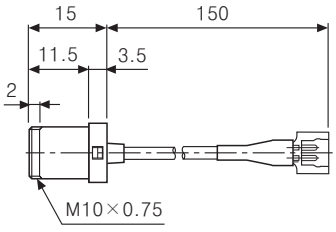
※It is able to purchase a controller(ADS-SEC) separately.

●Sensor part

• One push type

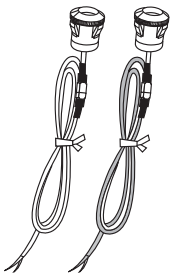


• Screw type



●Option

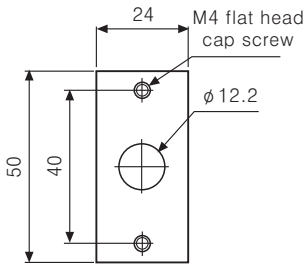
• Sensor set



〈ADS-SH〉

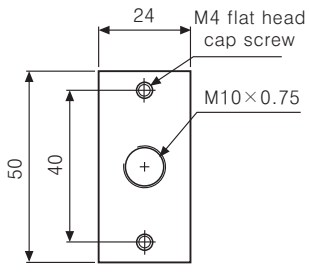
• Bracket

〈For mounting by one push〉



〈ADS-SB12〉

〈For mounting by screw 〉



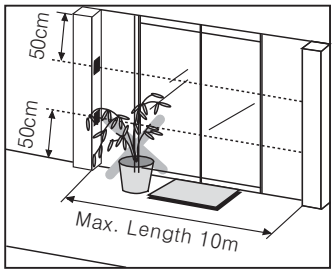
〈ADS-SB10〉

(Unit:mm)

▣Installation

■Caution for sensor installation

1. Sensing distance is 10m.
   Please install it in the rated distance.
2. Please install the sensor with more than 50cm gap from the bottom and ceiling. It may cause malfunction by reflected beams from the surface of the bottom and ceiling.
3. Please don't put obstacles between emitter and receiver.
   It may cause malfunction.
4. This product is for indoor. Please avoid the place where exposed in direct sunlight or is in over rated intensity of illumination.



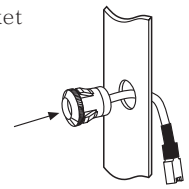
1. Please make a hole on the side post of auto door as follows.

●When not using the mounting bracket
- Mounting hole of sensor head : ϕ12.2mm

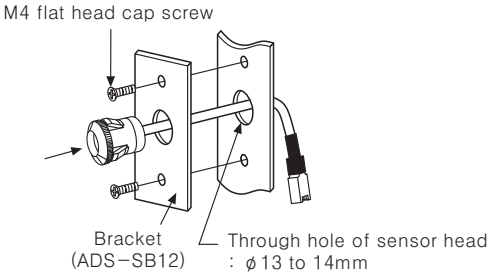
●When using the mounting bracket
- Through hole of sensor head : ϕ13 to ϕ14mm
- Screw hole for fixing the bracket : M4 Tap or ϕ3.5

2. Please mount the sensor head in the mounting hole

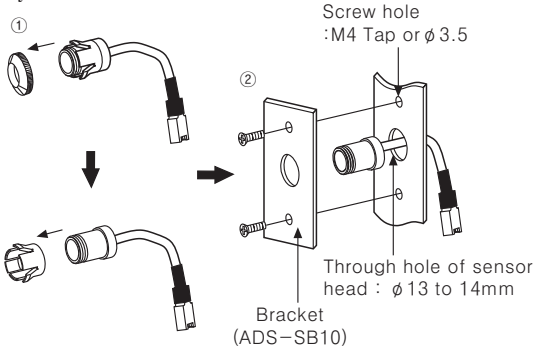
●When not using the mounting bracket
- One push method
  Please insert the sensor head into the mounting hole like the right picture.



●When using the mounting bracket
- One push method
  ①Please install the sensor head at the bracket first.
  ②Please fix the bracket by screws on the place for installing.



- Screw method
  ①Please remove nuts and the head holder from the sensor head.
  ②Please install the sensor head on the bracket.
  ③Please fix the bracket on the side post of the door by screws.



※The mounting bracket is sold separately.
If necessary, please purchase it for using.

⚠ Caution For mounting hole

- Please check the mounting holes for the head of emitter and receiver are in parallel for the optical axes.
- Please grind around the mounting holes drilled smoothly. It may hurt a person by the sharp part and cause malfunction by sensor head inclined.

⚠ Caution When installing in One push method

- Please check the nuts are fixed on the sensor body tightly.
- Please install that there is no gap between the nuts and the side of the door(or bracket).
  It may cause malfunction because sensitivity setting is not available as the optical axes are not matched if sensor body is inclined.

⚠ Caution After installing the sensor head

- Please check the damage such as scratches or pollutant on the lens of the sensor head.
  It may cause malfunction in the condition of shading light or lack of sensitivity by dust.

⚠ Caution For maintenance and mending

- Please keep the sensor head clean.
  It may not operate normally.
  Please clean it by a piece of close with a neutral detergent. But, do not use organic solvent.
  It may cause damage to lens of the head by organic solvent.
- Do not wash the head part of the sensor.
  Sensor by water, it may cause product damage.

▣Installation

■Controller installation

• Please fix controller with the bolts(M4×20, 2pcs).
Please process the fixing hole of controller by M4 included in the package.
Please refer to dimension for installation.

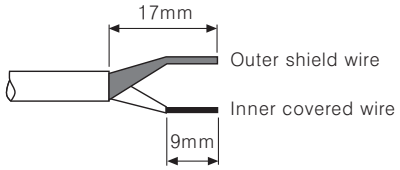
⚠Warning When fixing controller

• Please do not screw the bolts too tightly.
The fixing hole of controller may be broken.

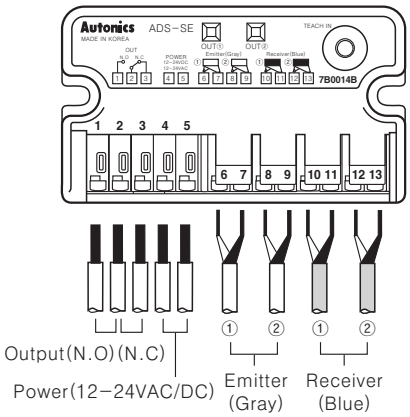
■Wiring connection

1. Please follow as below when adjusting wiring length.

①Please cut off the wiring length as much as user needs.
②Please connect the wire to the terminal after taking off the wire covering. It will be easy to connect if soldering the end of the wires.

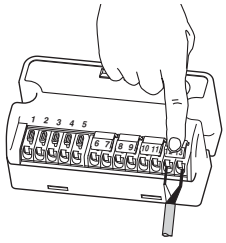


2. Please match wires in the number of terminals and connect them.



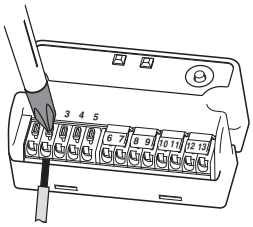
●Connection method for sensor

• Please put outer shield and inner covered wires at once, pressing the insert button, then take off from the button.



●Connection method for power and output wires

• Please put the wires pressing the terminal ends by a driver etc.



• Allowable diameter of power and output wires
−Single wire : φ0.12 to 1.6mm² (AWG26 to 16)
−Stranded wire : φ0.13 to 1.5mm² (AWG26 to 16)

⚠Warning It may give an electric shock.

• Please be sure of connecting wires in power off.

⚠Caution It may cause damage to this product.

• Please follow the left picture when cutting off the wires of sensor head. If the cover of wire is taken off too much, it may cause damage to this product as the end of both wires is shorted.

⚠Caution Do not extend the wire of sensor head.

• Please do not connect extended wire to the wire of sensor head.
It may cause malfunction by noise.

⚠Caution It may cause damage to this product.

• Please do not connect two wires or more to a terminal.

⚠Warning Connection

• It does not operate normally if the wiring is connected conversely.

⚠Warning It may cause damage to this product.

• Please make sure of connecting power wire to the terminal(No. 4, 5).
Otherwise, it may cause damage to this product.

▣Proper usage

■Sensitivity setting

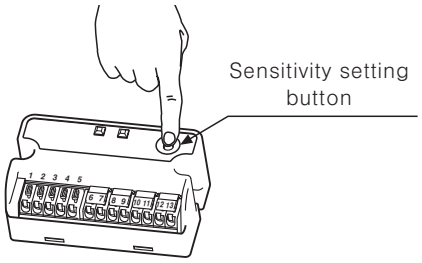
Please set sensitivity after mount this product for a normal operation. It sets the optimum sensitivity automatically at the controller according to installed environment.

Order	LED display	Status
Press sensitivity setting button ↓ After more than 1sec. ↓ Take off from button	Red/Green Flashed by turns ↓ Red/Green All LED OFF ↓ Flashed at once ↓ Displaying operation status	Ready ↓ The beginning of sensitivity setting ↓ The end of sensitivity setting
Please check LED display after setting the sensitivity.		

- When sensitivity setting button is pressed less than 1sec. sensitivity setting is cancelled, then it operates by previous setting.

⚠Caution Before setting the sensitivity

- Please check the wiring again with the connection diagram.
- When set the sensitivity, the transmitted beam must not be shaken and cut off.
- Please do not put obstacles like a pot on the passage of the through beam.
- It may cause malfunction in above cases from lack of sensitivity or abnormal sensitivity setting.



■Sensitivity status and check after setting sensitivity

Connecting sensor	LED display		Status	
	Red	Green	After setting sensitivity	In operation
1set	LED ON ■	LED OFF □	Sensitivity setting success	Light ON
	Flashing ▩	Flashing ▩	Sensitivity setting failure	Emitter disconnected or added
	Flashing ▩	LED OFF □	————	Lack of sensitivity
	LED OFF □	LED OFF □	————	Light OFF
2set	LED ON ■	LED ON ■	1, 2Channel sensitivity setting success	Light ON of channel 1, 2
	LED ON ■	Flashing ▩	1Channel success, 2Channel failure	Sensitivity lock of channel 2
	LED ON ■	LED OFF □	————	Light ON of channel 1, Light OFF of channel 2
	Flashing ▩	LED ON ■	1Channel failure, 2Channel success	Sensitivity lack of channel 1
	LED OFF □	LED ON ■	————	Light OFF of channel 1, Light ON of channel 2
	Flashing ▩	Flashing ▩	1, 2Channel sensitivity setting failure	Lack of channel sensitivity or emitter disconnected
	LED OFF □	LED OFF □	————	Light OFF of channel 1, 2

●After complete sensitivity setting for using one set of sensor, red LED is flashing, green LED is off and only red LED displays the operation status.

※After complete sensitivity setting in using two sets of sensors, red LED indicates the operation status of receiver set by receiver ① and green LED indicates the operation status of receiver set by receiver ②.(Refer to C-12)

※Self-diagnosis function

If lack of sensitivity occurs by optical axes not matched and pollution by dust on the lens of emitter/receiver etc., the LED of normal operation channel will flash due to unstable operation.

●Check process for sensitivity setting failure

①Please check obstacles between the heads of emitter/receiver.

②Please check pollutant on the lens of emitter/receiver.

③Please check wires cut off and the connection with the connection diagram on the controller.

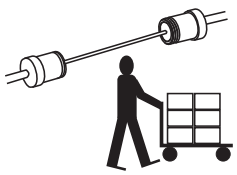
④Please check if the head of emitter/receiver is inclined or not.

⑤Please set sensitivity again after removing above problem.

※When sensitivity setting is failure even though above problem is solved, please contact us.

▣Operation check

Please check the operation flow chart below.

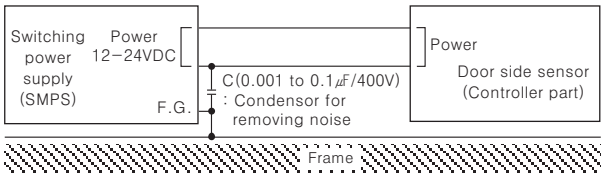
Operation					
LED display		LED OFF	LED ON(Red/Green)	LED OFF	LED ON(Red/Green)
Status		Power OFF	• Normal operation • No human or any material between sensors	Human or material is passing between sensors (When cutting off the transmitted beam)	After human or material is passed
Relay output	N.O	OPEN	OPEN	CLOSE	OPEN
	N.C	CLOSE	CLOSE	OPEN	CLOSE

▣Troubleshooting

Malfunction	Check	Troubleshooting
It is not work.	• Power voltage • Cable disconnection, incorrect connection • Rated sensing distance	• Check the power cable and adjust power voltage. • Please check wiring and terminal. • Use it in rated sensing distance.
Sometimes it is not work.	• Pollution by pollutant on the lens of Emitter/Receiver.	• Remove the pollutant.
It is operated even if people does not enter in sensing area.	• Rated sensing distance • There are obstacles between Emitter and Receiver. • There are equipments generating strong noise or ratio wave(Motor, Generator, High-tension wire).	• Use it in rated sensing distance. • Remove obstacles. • Keep away from the equipment generating strong noise or ratio wave.

▣Caution for using

1. When two sets of sensor are mounted closely, it may cause mutual interference by the emitter of other sensor. Therefore, please install them to avoid the interference by exchanging the head of Emitter and Receiver and by keeping the distance between the heads in more than 50cm.
2. When sensor head is installed on the ceiling or floor closely, it may cause malfunction by receiving the reflected beam. Therefore, please install it by keeping the suitable height(more than approx. 50cm) from the ceiling or floor.
3. When the target is a translucent or small object (Max. ϕ15mm) it may not detect as the light transmits them.
4. When wire sensor in the same pipe laying with the high-tension wire or power line, it may cause malfunction.
   Therefore, please use separated wiring or pipe laying.
5. What sensor is used in much dusty or corroded place, it may cause malfunction.
   Please avoid these places when installing.
6. When making the length of the wiring(power wire or output wire) long, it may cause malfunction by surge etc.
7. When the lens of sensor head is polluted by dust etc., please clean it by dried cloth slightly.
   Do not use organic solvent like thinner.
8. When switching power supply is used as the source of supplying power, please ground F.G. terminal and install a condenser for removing noise between 0V and F.G. terminal as following drawing.



Area sensor

▣Features

- ●Long sensing distance up to 7m
- ●22 types of products
  (Optical axis : 20/40mm, Sensing height : 120 to 940mm)
- ●Increased sensing stability by minimizing the non sensing area
- ●Easy identification of the side, front and long distance with high luminance twin operation indicators
- ●Includes self-diagnosis function, mutual interference provention function, external diagnosis function.
- ●Polished design & slim size(W28.6×T22.6×H□mm)
- ●Protection structure IP65(IEC standard)

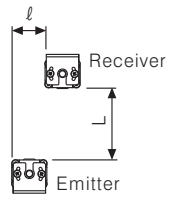
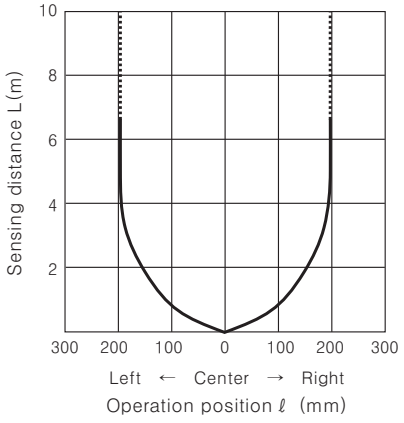
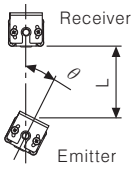
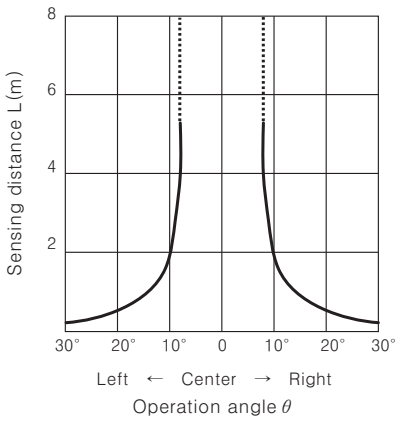
⚠ **Please read "Caution for your safety" in operation manual before using.**

CE

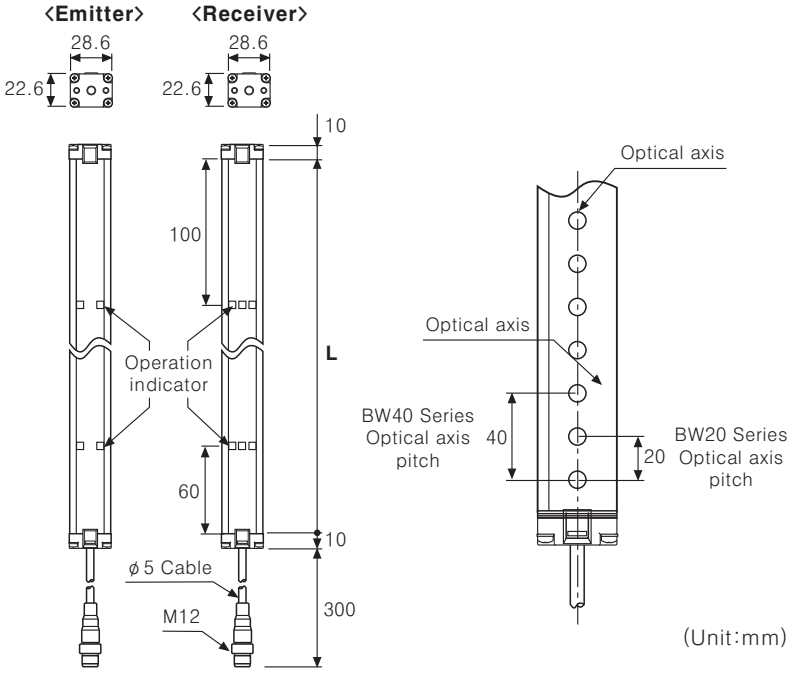
▣Specifications

Model									
	NPN open collector output	**BW20-08 BW20-12 BW20-16**	**BW20-20 BW20-24 BW20-28**	**BW20-32 BW20-36 BW20-40**	**BW20-44 BW20-48**	**BW40-04 BW40-06 BW40-08**	**BW40-10 BW40-12 BW40-14**	**BW40-16 BW40-18 BW40-20**	**BW40-22 BW40-24**
	PNP open collector output	**BW20-08P BW20-12P BW20-16P**	**BW20-20P BW20-24P BW20-28P**	**BW20-32P BW20-36P BW20-40P**	**BW20-44P BW20-48P**	**BW40-04P BW40-06P BW40-08P**	**BW40-10P BW40-12P BW40-14P**	**BW40-16P BW40-18P BW40-20P**	**BW40-22P BW40-24P**
Sensing type		Through-beam							
Sensing distance		0.1 to 7m							
Sensing target		Opaque materials of Min. ϕ30mm				Opaque materials of Min. ϕ50mm			
Optical axis pitch		20mm				40mm			
Number of optical axis		8 to 48pcs				4 to 24pcs			
Sensing width		140 to 940mm				120 to 920mm			
Power supply		12-24VDC ±10%(Ripple P-P : Max. 10%)							
Reverse polarity protection		Built-in							
Current consumption		Emitter : Max. 80mA, Receiver : Max. 80mA							
Control output		NPN or PNP open collector output • Load voltage : Max. 30VDC • Load current : Max. 100mA • Residual voltage ☞ NPN : Max. 1V, PNP : Min. (Power voltage -2.5V)							
Operation mode		Light ON fixed							
Short-circuit protection		Built-in							
Response time		Max. 12ms							
Light source		Infrared LED(850nm)							
Synchronization type		Synchronized by synchronous line							
Self-diagnosis		Ambient light monitoring, Emitter/Receiver light circuit monitoring, Output circuit monitoring							
Interference protection		Interference protection by master/slave function							
Ambient temperature		-10 to 55℃(at non-freezing status)							
Storage temperature		-20 to 60℃							
Ambient humidity		35 to 85%RH							
Storage humidity		35 to 85%RH							
Ambient illumination		Sunlight : 100,000ℓx							
Noise strength		The square wave noise by the noise simulator(Voltage : ±240V, Period : 10ms, Pulse width : 1㎲)							
Dielectric strength		1,000VAC 50/60Hz for 1minute							
Insulation resistance		Min. 20MΩ(at 500VDC megger)							
Vibration		1.5mm amplitude at frequency of 10 to 55Hz in each of X, Y, Z directions for 2 hours							
Shock		500m/s² (50G) in X, Y, Z directions for 3 times							
Protection		IP65(IEC standard)							
Material		Case : Aluminum, Cover : Acrylic							
Accessory		Bracket A : 4EA, Bracket B : 4EA, Bolt : 8EA							
Unit weight		Approx. 1.4kg(For 48 optical axis)							

▣Feature data

Parallel shifting characteristic		Angle characteristic	
Measuring method	Data	Measuring method	Data
			

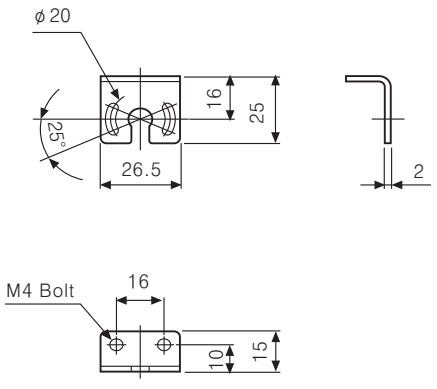
▣Dimensions



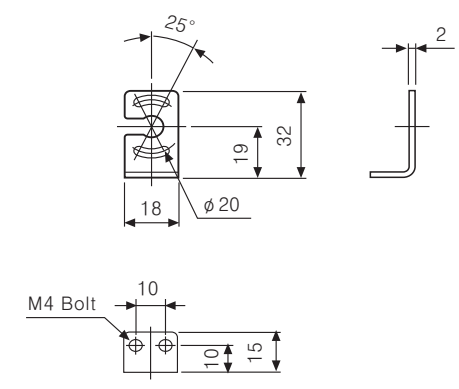
(Unit:mm)

Model	L(mm)	Model	L(mm)
BW20-08(P)	160mm	BW20-32(P)	640mm
BW40-04(P)		BW40-16(P)	
BW20-12(P)	240mm	BW20-36(P)	720mm
BW40-06(P)		BW40-18(P)	
BW20-16(P)	320mm	BW20-40(P)	800mm
BW40-08(P)		BW40-20(P)	
BW20-20(P)	400mm	BW20-44(P)	880mm
BW40-10(P)		BW40-22(P)	
BW20-24(P)	480mm	BW20-48(P)	960mm
BW40-12(P)		BW40-24(P)	
BW20-28(P)	560mm		
BW40-14(P)			

●Bracket A



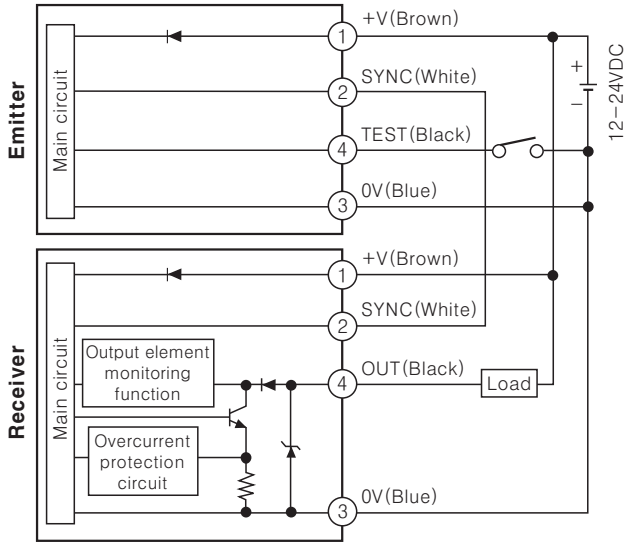
●Bracket B



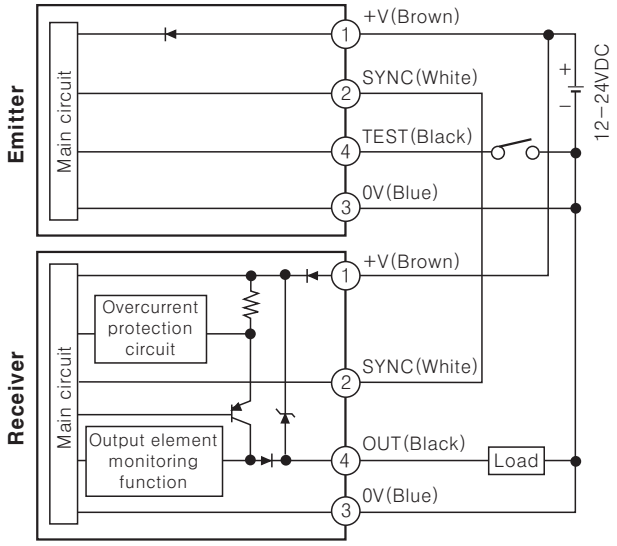
(Unit:mm)

▣Input/Output circuit and connection diagram

●NPN open collector output

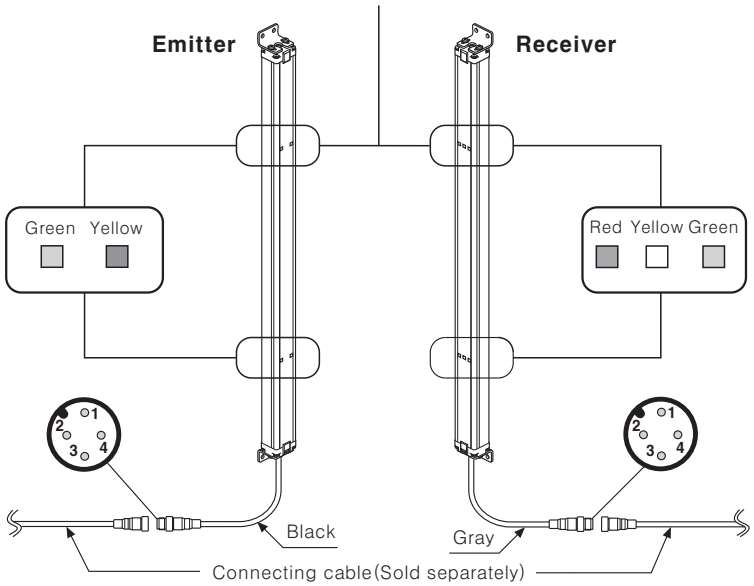


●PNP open collector output



▣Structure

Upper operation indicator is set additionally, in case the number of the optical axes is more than 24pcs in BW20-Series and more than 12pcs in BW40-Series.



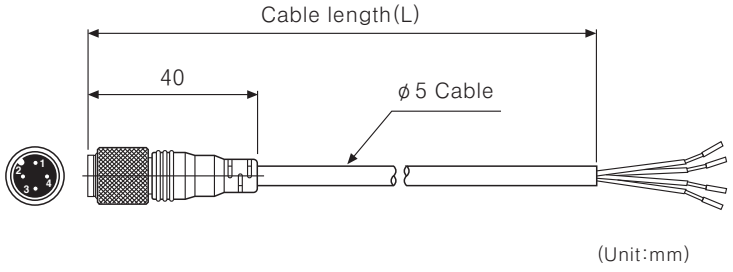
〈Operation indicator〉

LED color	Emitter	Receiver
Green	POWER	ON
Yellow	TEST(M/S)	UNSTABLE
Red	———	OFF

〈Wiring Connection〉

Pin No	Cable color	Emitter	Receiver
1	Brown	12-24VDC	12-24VDC
2	White	SYNC	SYNC
3	Blue	0V	0V
4	Black	TEST(M/S)	OUT

▣Connecting cable(Sold separately)



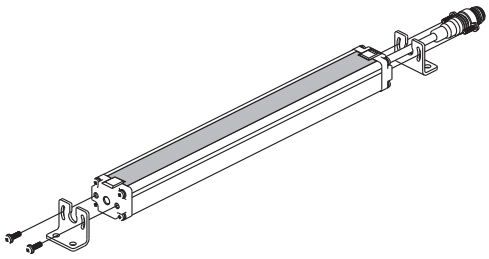
(Unit:mm)

Model	Cable length(L)	Connector color
CID4-3-T CID4-3-R	3m	Emitter(T) : Black Receiver(R) : Gray
CID4-5-T CID4-5-R	5m	
CID4-7-T CID4-7-R	7m	
CID4-10-T CID4-10-R	10m	

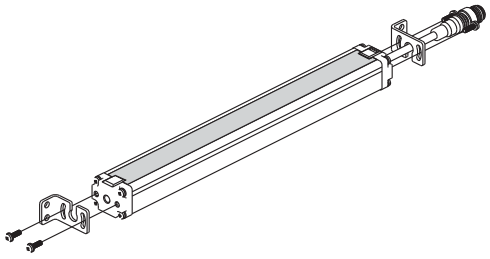
※Connecting cable is sold separately.

▣Bracket mounting

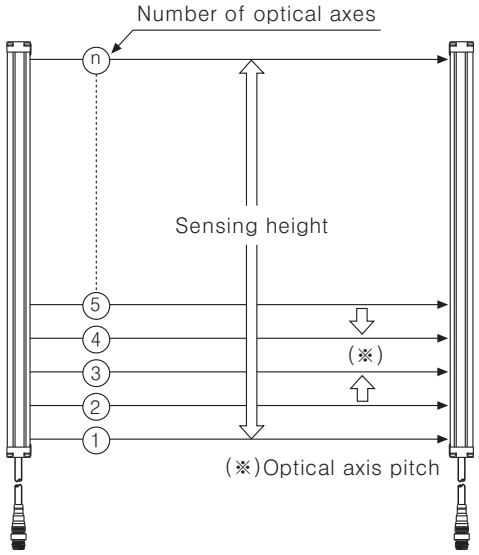
●Connect the bracket A



●Connect the bracket B



▣Optical axis pitch/Number of optical axis/Sensing height

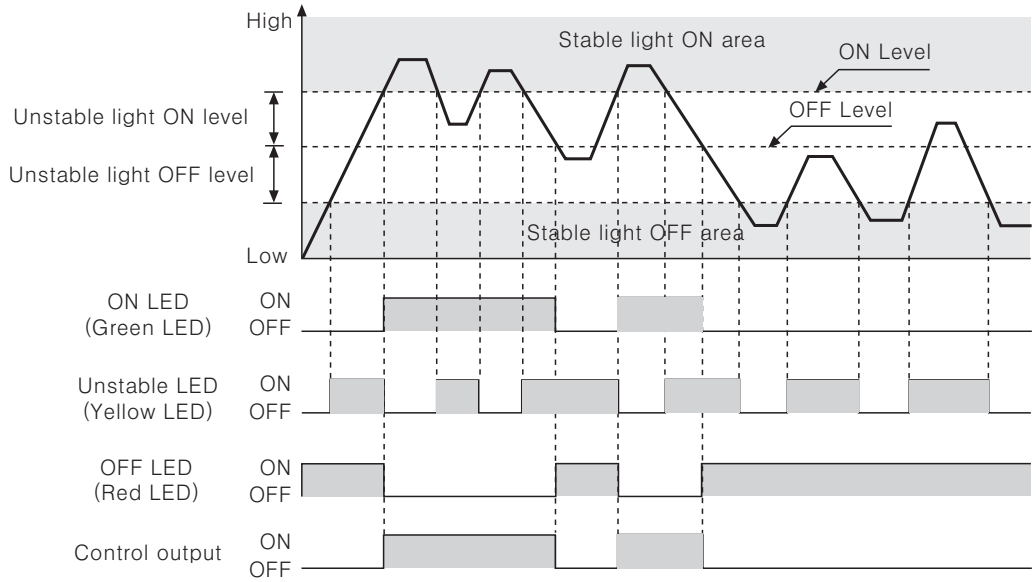


Model	Optical axis pitch
BW20-□□(P)	20mm
BW40-□□(P)	40mm

Model	Number of optical axis	Sensing height	Model	Number of optical axis	Sensing height
BW20-08(P)	8	140mm	BW40-04(P)	4	120mm
BW20-12(P)	12	220mm	BW40-06(P)	6	200mm
BW20-16(P)	16	300mm	BW40-08(P)	8	280mm
BW20-20(P)	20	380mm	BW40-10(P)	10	360mm
BW20-24(P)	24	460mm	BW40-12(P)	12	440mm
BW20-28(P)	28	540mm	BW40-14(P)	14	520mm
BW20-32(P)	32	620mm	BW40-16(P)	16	600mm
BW20-36(P)	36	700mm	BW40-18(P)	18	680mm
BW20-40(P)	40	780mm	BW40-20(P)	20	760mm
BW20-44(P)	44	860mm	BW40-22(P)	22	840mm
BW20-48(P)	48	940mm	BW40-24(P)	24	920mm

▣Operation timing diagram

●Operation mode : Light ON fixed

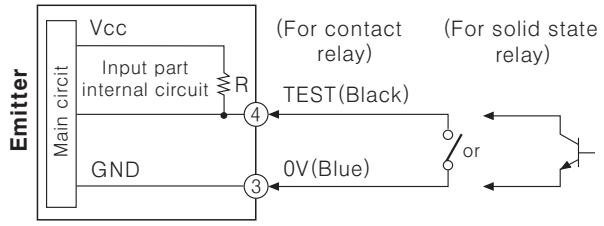


▣Function

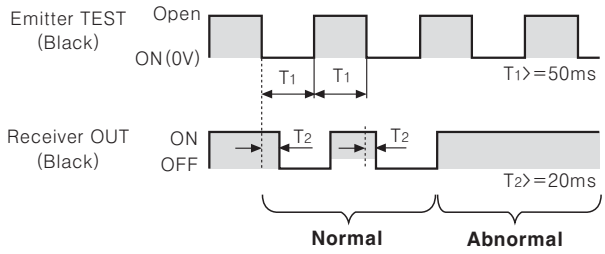
◎Stop transmission function(External diagnosis function)

The transmission will be stopped and yellow LED is flashed if supplying 0V to test input on the emitter. It is for checking malfunction of the sensors during TEST input on the emitter is 0V. (Control output of the receiver is OFF as it becomes light cut off when the transmission is stopped.)

●Connections for TEST input



●Control output pulse by TEST input



◎Self-diagnosis function

Control output will be OFF and operating indicator is ON when malfunction is checked by self-diagnosis regularly in normal operation.

●Diagnosis items

- Emitter : ①Break of light emitting element
  ②Break of light emitting circuit
  ③Malfunction of MASTER/SLAVE line(Operation in MASTER)
- Receiver : ①Break of light receiving circuit
  ②Break of output circuit
  ③Overcurrent at output part
  ④Synchronous line malfunction
  ⑤Extraneous light received

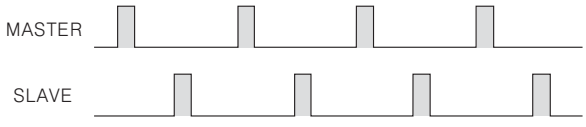
●Refer to C-20, "▣Operation indicator" for the display operation of diagnosis.

◎Interference protection function

2 sensors are used in parallel in order to extend sensing width, the detection will be failure because as light interference.

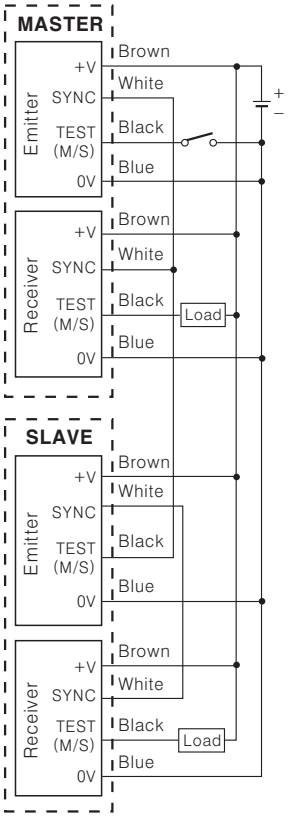
This function is to avoid the light interference as operating a sensor in MASTER and another sensor in SLAVE to protect these kinds of failures.

●Time chart for MASTER/SLAVE transmission pulse

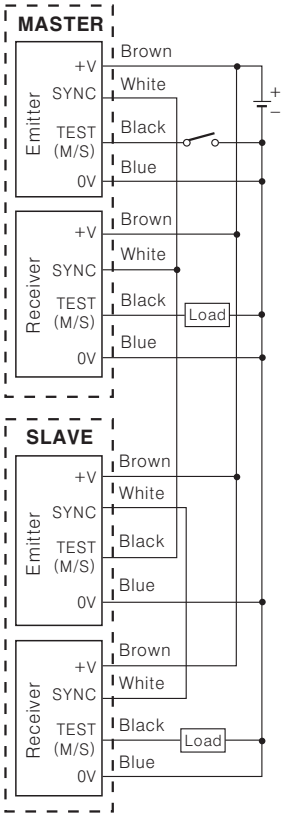


●MASTER/SLAVE connections

<NPN open collector output>



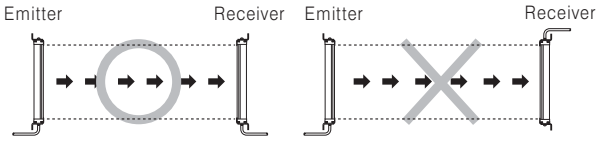
<PNP open collector output>



▣Installation

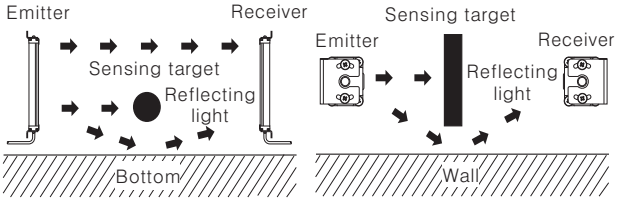
◎For direction of installation

Emitter and receiver should be installed in same up/down direction.



◎For reflection from the surface of wall and flat

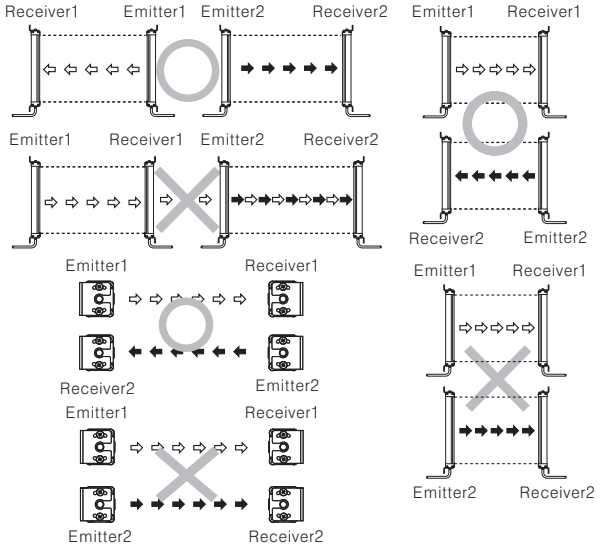
When installing it as below the light reflected from the surface of wall and flat will not be shaded.
Please, check whether it operates normally or not with a sensing target before using.
(Interval distance : Min. 0.5m)



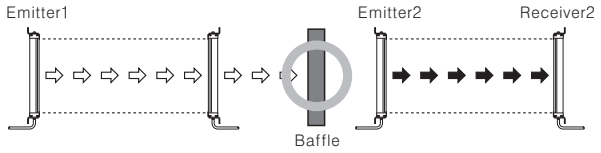
◎For prevention of interference

It may cause interference when installing more than 2 sets of the sensor. In order to avoid the interference of the sensor, please install as following figures and use the interference protection function.

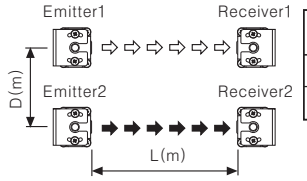
〈Light emitting direction should be opposite between 2 sets〉



〈Baffle should be installed between 2 sets〉



〈It should be installed out of the installation allowable distance〉



Sensing distance(L)	Installation allowable distance(D)
0.1 to 3m	Min. 0.4m
Min. 3m	L×tan8°=L×0.14 min.

※There can be a little different based on installation environment.

▣Operation indicator

Item	Emitter		Receiver			
	Indicator		Indicator			Control output
	Green	Yellow	Green	Yellow	Red	
Power on	☼	●	—	—	—	—
MASTER operation	☼	●	—	—	—	—
SLAVE operation	☼	☼	—	—	—	—
Test input	☼	◑	—	—	—	—
Break of light emitting element	▶	◀	—	—	—	OFF
Break of light emitting circuit	◑	◑	—	—	—	OFF
Stable light ON	—	—	☼	●	●	ON
Unstable light ON	—	—	☼	☼	●	ON
Unstable light OFF	—	—	●	☼	☼	OFF
Stable light OFF	—	—	●	●	☼	OFF
Break of light receiving circuit	—	—	●	▶	◀	OFF
Break of output element	—	—	▶	◀	●	OFF
Synchronous line malfunction	—	—	▶	●	◀	OFF
Overcurrent	—	—	◑	◑	◑	OFF
Extraneous light received	—	—	●	◑	◑	OFF
Breakdown of emitter	—	—	▶	▶	▶	OFF

Display classification list	
☼	Light ON
●	Light OFF
◑	Flashing by 0.5 sec.
◑ ◑ or ◑ ◑ ◑	Flashing simultaneously by 0.5 sec.
▶ ◀	Cross-Flashing by 0.5 sec.
▶ ▶ ▶	Sequence-Flashing by 0.5 sec.

▣Troubleshooting

Malfunction	Cause	Troubleshooting
Non-operation	Power	Supply rated power
	Cable disconnection, incorrect connection	Check the wiring
	Rated connection failure	Use within rated sensing distance
Non-operation in sometimes	Pollution by dirt of sensor cover	Remove dirt by soft brush or cloth
	Connector connection failure	Check the assembled part of the connector
Control output is OFF even though there is not a target object.	Out of rated sensing distance	Use within rated sensing distance
	There is an obstacle to cut off the light emitted between emitter and receiver	Remove the obstacle
	There is a strong electric wave or noise generated by motor, electric generator, high voltage line etc.)	Put away the strong electric wave or noise generator.
LED display for break of light emitting element	Damage on light emitting element	Contact us
LED display for break of light emitting circuit	Damage on light emitting circuit	
LED display for break of light receiving element	Damage on light receiving element	
LED display for break of output element	Damage on output element	
LED display for synchronous line malfunction	Synchronous line incorrect connection or disconnection	Check the wiring
	Damage on synchronous circuit of emitter or receiver	Contact us
LED display for over current	Control output line shorted	Check the wiring
	Over load	Check the rated load capacity
LED display for ambient light receiving	Extraneous light received to receiver	Remove the extraneous light
LED displayed for emitter malfunction	Emitter malfunction	Treat after checking the emitter display LED

Area sensor with plastic case

▣Features

- **●13mm slim body with fresnel lens**
- ●Adoption of plastic(PC/ABS) injection case
- ●Includes Stop transmission function, Mutual interference prevention function, Job indicator Blink function, Light ON/Dark ON switching function
- ●Easy to distinguish of side/front and long distance with high luminance twin operation indicators
- ●Fast response time, max. 7ms
- ●4 types of product(Optical axis pitch : 20mm, Number of optical axis : 8, 12, 16, 20)

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

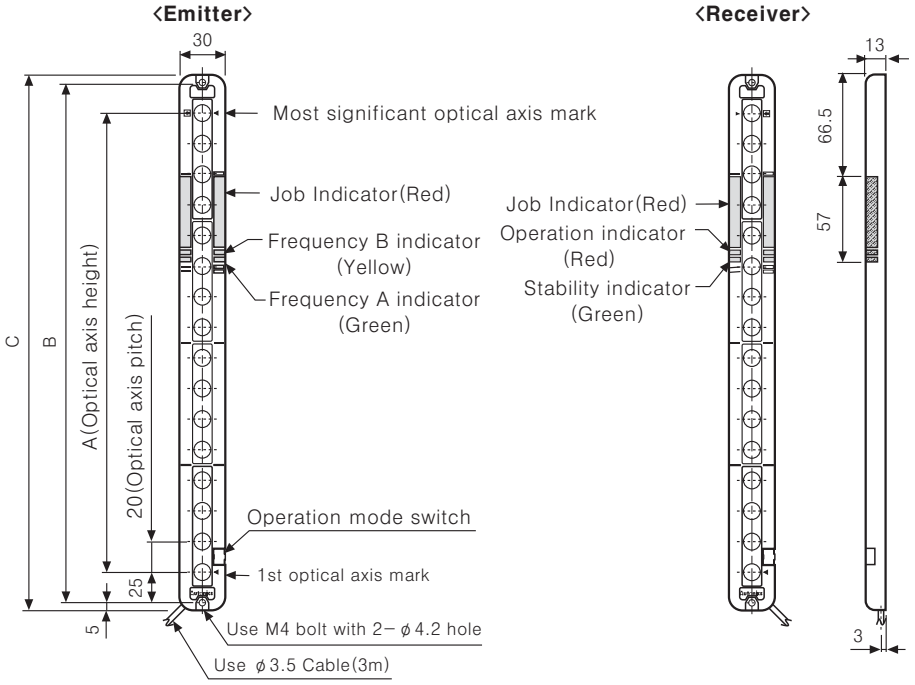
CE

▣Specifications

Model	NPN open collector output	BWP20-08	BWP20-12	BWP20-16	BWP20-20
	PNP open collector output	BWP20-08P	BWP20-12P	BWP20-16P	BWP20-20P
Sensing type		Through-beam			
Sensing distance		0.1 to 5m			
Sensing target		Opaque materials of Min. ϕ30mm			
Optical axis pitch		20mm			
Number of optical axis		8pcs	12pcs	16pcs	20pcs
Sensing width		140mm	220mm	300mm	380mm
Power supply		12-24VDC ±10%(Ripple P-P : Max. 10%)			
Protection circuit		Includes			
Current consumption		Emitter : Max. 80mA, Receiver : Max. 80mA			
Control output		NPN or PNP open collector output • Load voltage : Max. 30VDC • Load current : Max. 150mA • Residual voltage ☞ NPN : Max. 1V, PNP : Min. (Power voltage -2.5V)			
Operation mode		Light ON/Dark ON			
Short-circuit protection		Built-in			
Response time		Max. 6ms(Max. 7ms when selecting frequency B)			
Light source		Infrared LED(850nm)			
Synchronization type		Synchronized by synchronous line			
Interference protection		Anti-interference by transmittance frequency selection			
Ambient temperature		-10 to 55℃(at non-freezing status)			
Storage temperature		-20 to 60℃			
Ambient humidity		35 to 85%RH			
Storage humidity		35 to 85%RH			
Ambient illumination		Sunlight : 100,000ℓx			
Noise strength		The square wave noise by the noise simulator(Voltage : ±240V, Period : 10ms, Pulse width : 1㎲)			
Dielectric strength		1,000VAC 50/60Hz for 1minute			
Insulation resistance		Min. 20MΩ(at 500VDC megger)			
Vibration		1.5mm amplitude at frequency of 10 to 55Hz in each of X, Y, Z directions for 2 hours			
Shock		500m/s² (Approx. 50G) in X, Y, Z directions for 3 times			
Protection		IP40(IEC standard)			
Material		Body : PC+ABS, Lens : Acrylic			
Cable		Emitter : ϕ3.5mm, 4P, 3m / Receiver : ϕ3.5mm, 4P, 3m			
Unit weight		Approx. 280g	Approx. 320g	Approx. 360g	Approx. 430g

▣Dimensions

(Unit:mm)

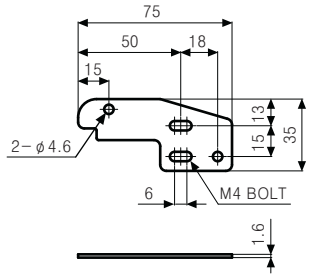


Application model	A	B	C
BWP20-08	140	180	190
BWP20-12	220	260	270
BWP20-16	300	340	350
BWP20-20	380	420	430

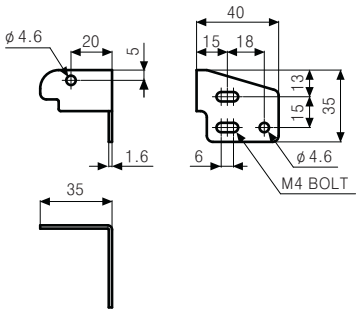
◎Mounting of bracket

(Unit:mm)

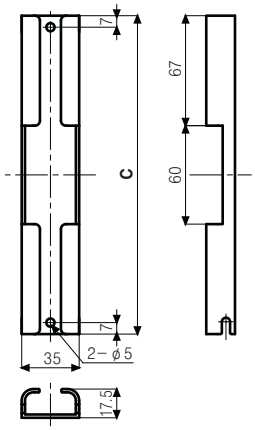
●BK-BWP-ST(Parallel or bracket)
Sold separately

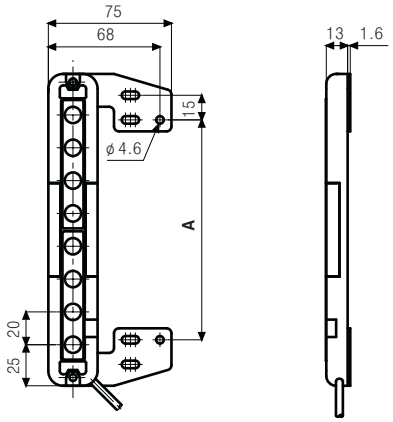


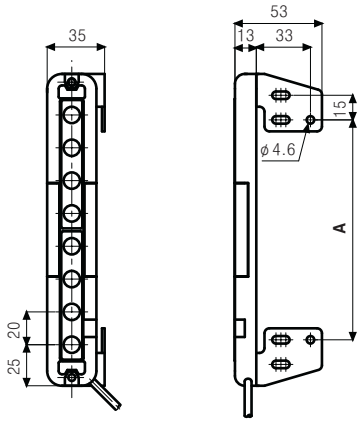
●BK-BWP-L(L-Shaped bracket)
Sold separately

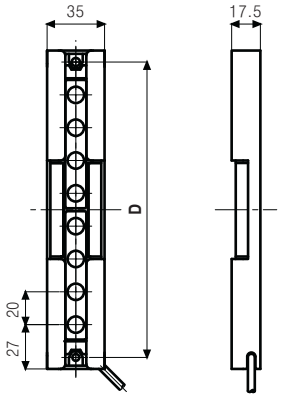


●BK-BWP-P□(Protection bracket)
Sold separately







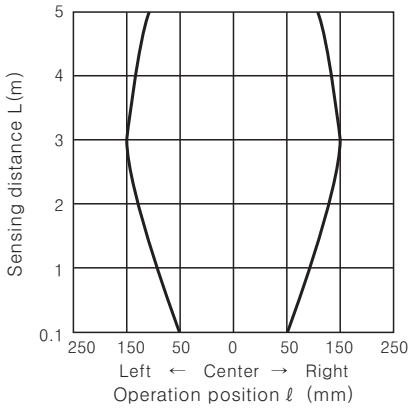
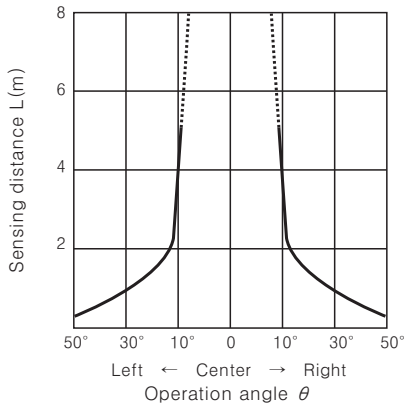


※It is able to mount parallel or L-shaped bracket together.

Model	A[mm]	B[mm]	BK-BWP-P		
			Name of bracket	C[mm]	D[mm]
BWP20-08	134	160	BK-BWP-P08	194	180
BWP20-12	214	240	BK-BWP-P12	274	260
BWP20-16	294	320	BK-BWP-P16	354	340
BWP20-20	374	400	BK-BWP-P20	434	420

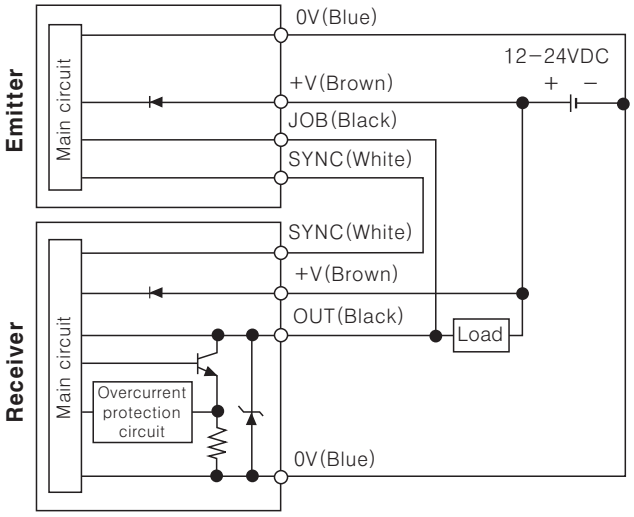
※Bracket is sold separately.

▣Feature data

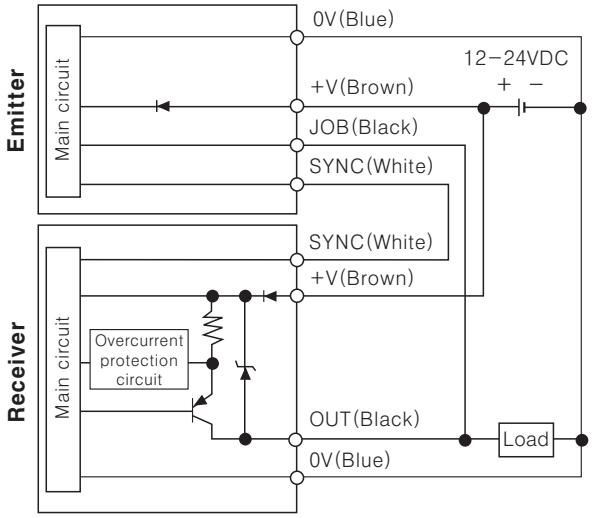
Parallel shifting characteristic	Angle characteristic
Data	Data
	

▣Input/Output circuit and connection diagram

●NPN open collector output



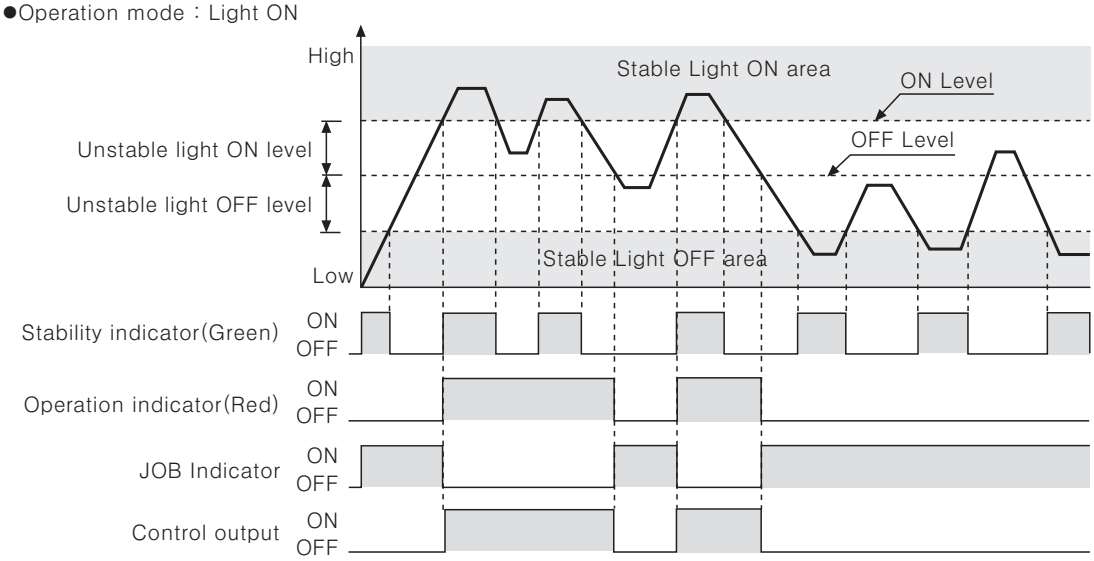
●PNP open collector output



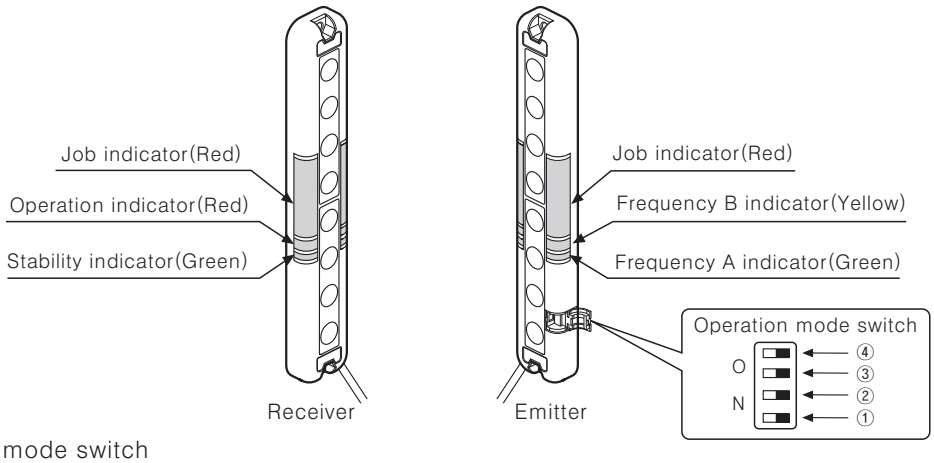
※If the receiver OUT(Black) line and the emitter JOB(Black) line are not connected each other, the JOB indicator of the emitter is not operated and maintain the light status.

▣Operation timing diagram

●Operation mode : Light ON



▣Structure



◎Operation mode switch

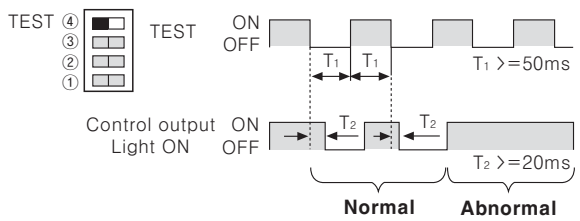
No	Function	Switch OFF	Switch ON
①	Transmission frequency selection	Frequency A	Frequency B
②	Light ON/Dark ON selection	Light ON operation	Dark ON operation
③	Steady/flashing light of Job indicator selection	Job indicator with Steady light	Job indicator with Flashing light
④	Job/TEST selection	Normal mode	TEST mode

▣Functions

◎TEST(Stop transmission function) functions

In TEST mode, emission is stopped and Green & Yellow LED on emitter flashes alternately.
This function is to see whether sensor operates properly when the transmission is stopped. As it is changed to dark status, control output will be OFF in Light-ON mode and ON in Dark-ON mode.

●Control output pulse for TEST input



◎Interference prevention function

In case of using 2 pcs of sensor in serial or parallel in order to extend sensing height, the detection can be failed because of their light interference.
This function is to avoid the light interference as operating a sensor in transmission frequency A and another sensor in transmission frequency B to protect these kinds of failures.

	Operation mode switch	Frequency A, B indicator
Sensor Ⓐ (Transmission frequency A)	④ ③ ② ① FREQ.A	JOB INDI. Frequency B(Yellow) Frequency A(Green)
Sensor Ⓑ (Transmission frequency B)	④ ③ ② FREQ.B ①	JOB INDI. Frequency B(Yellow) Frequency A(Green)

◎Switching Light-ON / Dark-ON

In Light-ON mode, the control output is ON when the target is missing. In Dark-ON mode, the control output is ON when the target is present.

	Operation mode switch	Control output operation
Light -ON	④ ③ ② ① Light-ON	It is ON when it is lighted.
Dark -ON	④ ③ Dark ON ② ①	It is ON when it is shaded.

◎Switching Steady / Flashing light of JOB indicator

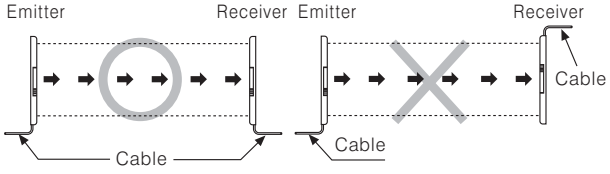
JOB indicator will be lighted and flashed to make out work sensing operation more easily.

Operation mode switch	JOB indicator operation
④ ③ ② ① GLOW	Light on
BLINK ④ ③ ② ①	Flashing

▣Installation

◎For direction of installation

Emitter and receiver should be installed as same up/down position.

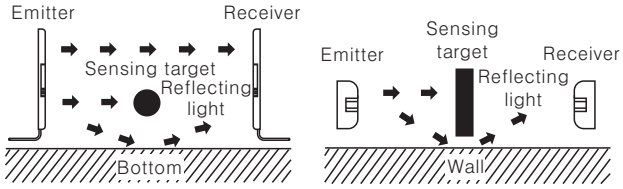


◎Reflective Surface Interference

In the case shown below, the beam can be reflected from the wall or flat surface and exposed to the receiver.

Please pre-test the operation of sensor with a target under this condition.

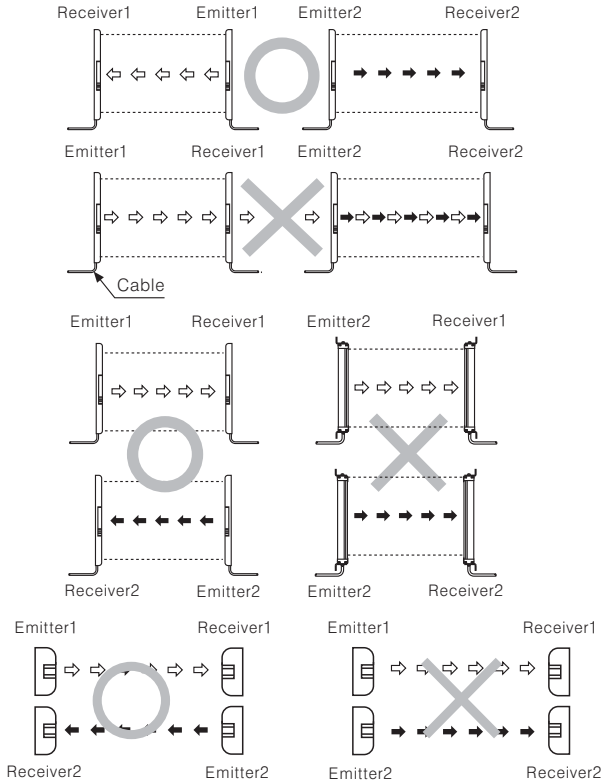
(Interval distance : Min. 0.3m)



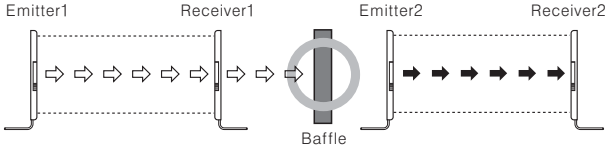
◎**For prevention of interference**

It may cause interference when installing more than 2 sets of the sensor. In order to avoid the interference of the sensor, please install as following figures and use the interference prevention function.

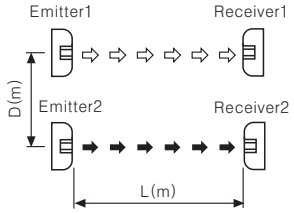
●Transmission direction should be opposited between 2 sets.



●Baffle should be installed between 2 sets.



●Keep sufficient distance between two sets of sensors to avoid mutual interference.



Sensing distance(L)	Installation allowable distance(D)
0.1 to 1m	Min. 0.2m
Min. 1m	Min. 0.3m

※There can be a little difference depending on installing environment.

▣Operation indicator

Item	Emitter			Receiver			
	Indicator			Indicator			Control output
	Green	Yellow	JOB indicator	Green	Red	JOB indicator	
Power on	☼	●	—	—	—	—	—
FREQ. A operation	☼	●	—	—	—	—	—
FREQ. B operation	☼	☼	—	—	—	—	—
TEST	◔	◔	☼	☼	●	☼	OFF
Stable light ON	—	—	●	☼	☼	●	ON
Unstable light ON	—	—	●	●	☼	●	ON
Unstable light OFF	—	—	☼	●	●	☼	OFF
Stable light OFF	—	—	☼	☼	●	☼	OFF
Flashing function ON	—	—	◑	☼	●	◑	OFF
Synchronous line malfunction	—	—	☼	◔	◔	☼	OFF
Overcurrent	—	—	☼	◑	◑	☼	OFF

Display classification list	
☼	Light ON
●	Light OFF
◑	Flashing by 0.3 sec.
◑ ◑	Flashing simultaneously by 0.3 sec.
◔ ◔	Cross-Flashing by 0.3 sec.

※'Control output' above is for Light ON mode. For Dark ON mode, they operate in opposite. (When malfunction of synchronous line or overcurrent occurs, control output is OFF in both modes.)

▣Troubleshooting

Malfunction	Cause	Troubleshooting
Non-operation	Power supply	Supply rated power
	Cable disconnection incorrect connection	Check the wiring
	Rated connection failure	Use within rated sensing distance
Irregular operation	Pollution by dirt on sensor cover	Remove dirt by soft brush or cloth
	Connector connection failure	Check the assembled part of the connector
Control output is OFF even though there is not a target object.	Out of rated sensing distance	Use within rated sensing distance
	There is an obstacle that cut off the light betwee emitter and receiver	Remove the obstacle
	There is a strong electric wave or noise generated by such as motor, electric generator, high voltage line etc.)	Put away the strong electric wave or noise generator.
LED display for synchronous line malfunction	Synchronous line incorrect connection or disconnection	Check the wiring
	Damage on synchronous circuit of emitter or receiver	Contact us
LED display for overcurrent	Control output line shorted	Check the wiring
	Over load	Check the rated load capacity

Picking sensor

▣Features

- ●Plastic injection case
- ●Slim body (W30×H140×T10mm)
- ●Wide range of sensing distance (0.1 to 3m, 0.05 to 1m)
- ●Mutual interference prevention (FREQ A/B)
- ●Light ON/Dark ON switching mode
- ●Picking indicator includes
- ●Protection structure IP40 (IEC standard)

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

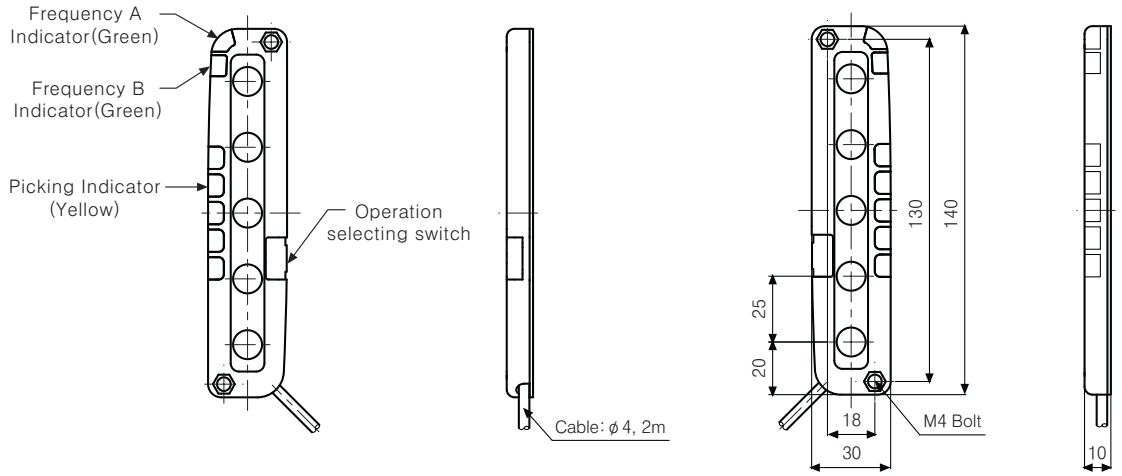
▣Specifications

Model	NPN open collector output	**BWPK25-05**
	PNP open collector output	**BWPK25-05P**
Sensing type		Through-beam
Sensing distance	Long mode	0.1 to 3m
	Short mode	0.05 to 1m
Sensing target		Opaque materials of Min. ϕ35mm
Optical axis pitch		25mm
Number of optical axis		5pcs
Sensing width		100mm
Power supply		12-24VDC ±10% (Ripple P-P : Max. 10%)
Current consumption		Emitter : Max. 60mA, Receiver : Max. 60mA
Control output		NPN or PNP open collector output • Load voltage : Max. 30VDC • Load current : Max. 150mA • Residual voltage ☞ NPN : Max. 1V, PNP : Min. (Power voltage -2.5V)
Operation mode		Switching of Light ON/Dark ON
Response time		Max. 30ms
Light source		Infrared LED (850nm)
Interference protection		Anti-interference by transmittance frequency selection
Protection circuit		Reverse power polarity, Output short-circuit (Overcurrent) protection
External picking input		Non-contact or contact input • NPN open collector output : Lighting (0-2V), Light out (5-30V or open) • PNP open collector output : Lighting (4-30V), Light out (0-3V or open)
Ambient temperature		-10 to 55℃ (at non-freezing status)
Storage temperature		-20 to 60℃ (at non-freezing status)
Ambient humidity		35 to 85%RH
Storage humidity		35 to 85%RH
Ambient illumination		Sunlight : Max. 11,000ℓx, Incandescent lamp : Max. 3,000ℓx
Insulation resistance		Min. 20MΩ (at 500VDC megger)
Noise strength		The square wave noise by the noise simulator (Voltage : ±240V, Period : 10ms, Pulse width : 1㎲)
Dielectric strength		1,000VAC 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/s² (50G) in X, Y, Z directions for 3 times
Protection		IP40 (IEC standard)
Material		• Body : PC/ABS, Lens : Acrylic
Unit weight		Approx. 250g

▣Dimensions

(Unit:mm)

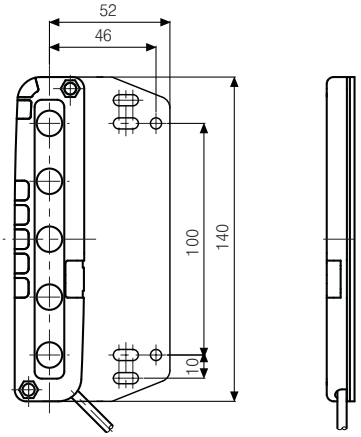
◎Product dimension



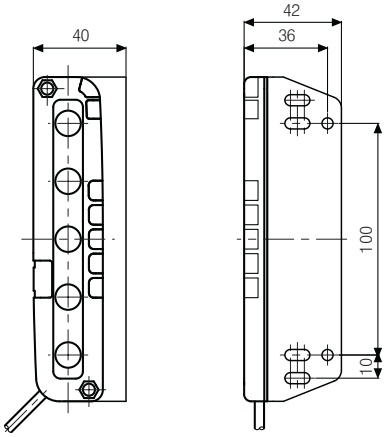
〈Emitter〉 〈Receiver〉

◎Bracket mounting dimension

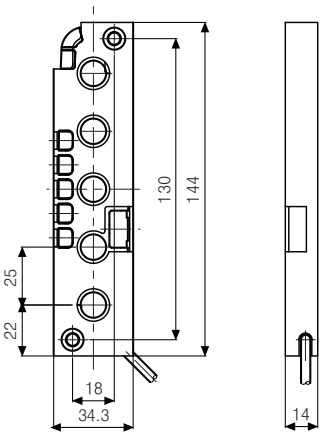
●Connect the bracket A



●Connect the bracket B

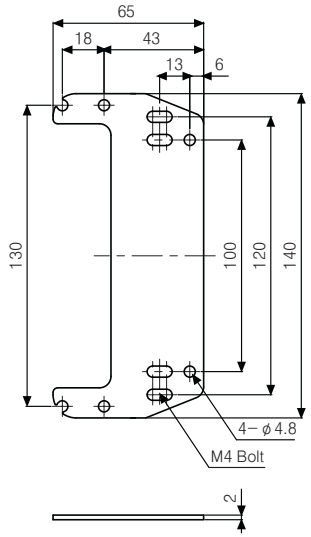


●Connect the protection Bracket

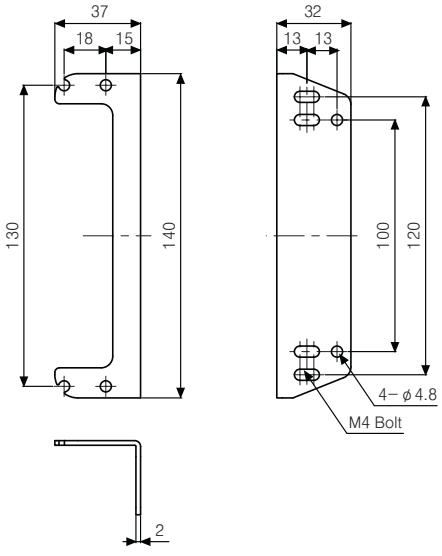


◎Bracket dimension(Sold separately)

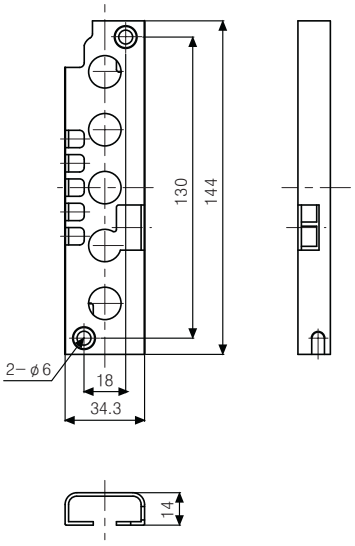
●Bracket A(BK-BWPK-ST)



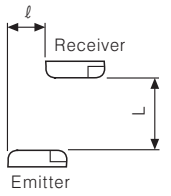
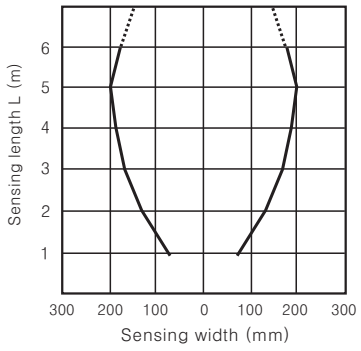
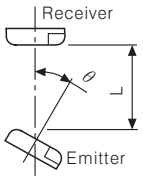
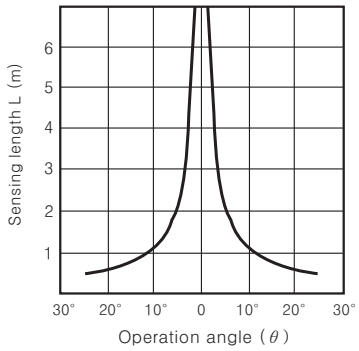
●Bracket B(BK-BWPK-L)



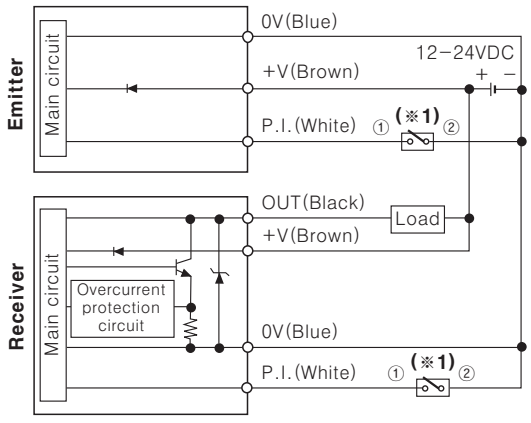
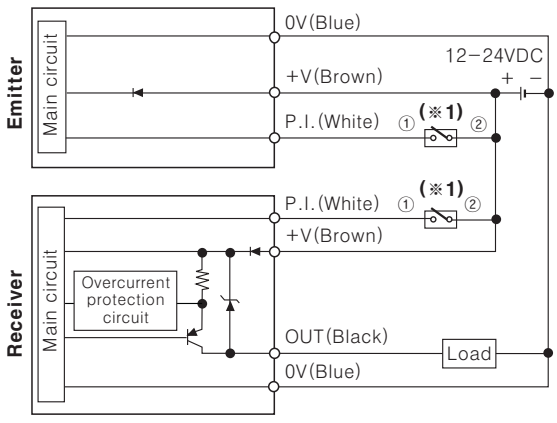
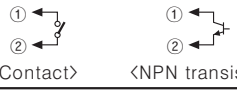
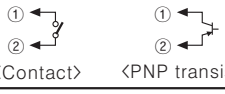
●Protection Bracket(BK-BWPK-P)



▣Feature data

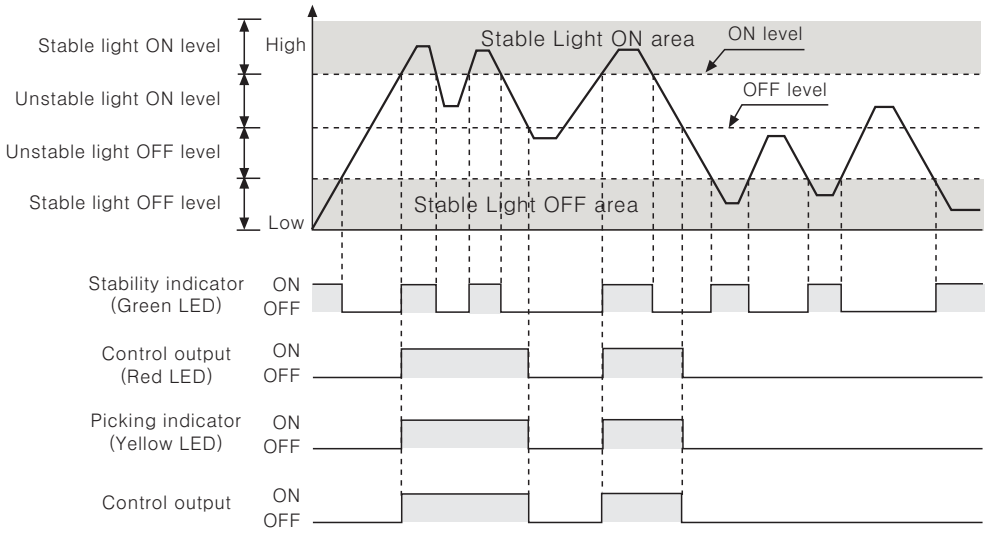
Parallel shifting characteristic		Angle characteristic	
Measuring method	Data	Measuring method	Data
			

▣Input/Output circuit and connection diagram

NPN open collector output	PNP open collector output
	
(※1) Picking input(P.I) : Contact or transistor are ON. Picking indicator us operated.	**(※1)** Picking input(P.I) : Contact or transistor are ON. Picking indicator us operated.
	
〈Contact〉 〈NPN transistor〉	〈Contact〉 〈PNP transistor〉

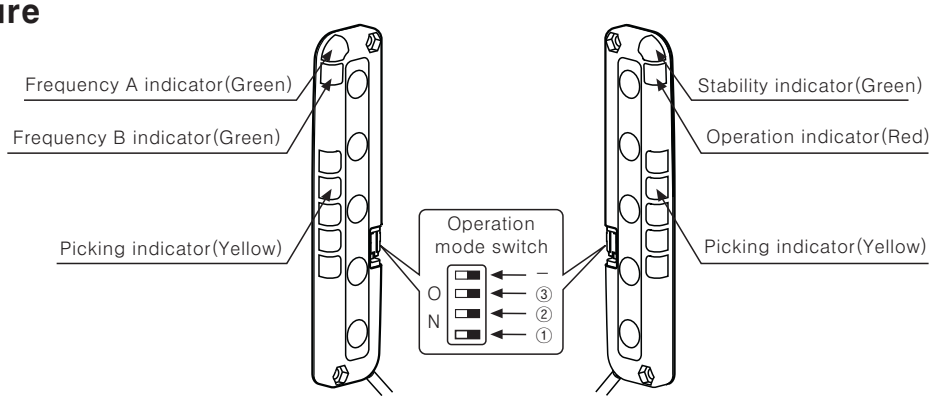
※Picking indicator:When external picking input(P.I) is short-circuited with OUT(Black), it is operated same as ON/OFF status of control output.

▣Operation timing diagram



※1. Picking indicator is operated connecting output to picking input, or it will be OFF regardless of operation mode.
2. The above diagram is for Light ON mode, it is operated reversely in Dark ON.

▣Structure



◎Operation mode switch

No	Function		Switch OFF	Switch ON
①	Transmission frequency selection		Frequency A	Frequency B
②	Steady/Falshing Light of Picking lindicator Selection		Lighting indicator	Flashing indicator
③	Emitter	Sensing distance mode selection	Long mode	Short mode
	Receiver	Operation mpde selection	Light ON mode	Dark ON mode

▣Functions

◎Switching function of Long / Short mode (Selectable sensing distance)

The rated sensing distance is 3m for Long mode, 1m for short mode. It minimizes interference setting as short mode when using more than 3 sets closely together.

	Operation mode switch(Emitter)	Rated sensing distance
Long mode	Long	3m
Short mode	Short	1m

◎Interference protection function

In case of using 2 pcs of sensor in serial or parallel in order to extend sensing width, the detection can be failed because of their light interference.

This function is to avoid the light interference as operating a sensor in transmission frequency A and another sensor in transmission frequency B to protect these kinds of failures.

	Operation mode switch(Emitter +Receiver)	Frequency A, B indicator(Emitter)
Sensor Ⓐ (Transmission frequency A)	FREQ.A	Frequency A(Green) Frequency B(Green)
Sensor Ⓑ (Transmission frequency B)	FREQ.B	Frequency A(Green) Frequency B(Green)

◎Switching Light-ON / Dark-ON

In Light-ON mode, the control output is ON when the target is missing. In Dark-ON mode, the control output is ON when the target is present.

	Operation mode switch(Receiver)	Control output operation
Light ON	Light ON	It is ON when it is lighted.
Dark ON	Dark ON	It is ON when it is shaded.

◎Switching Steady / Flashing Light of Picking indicator

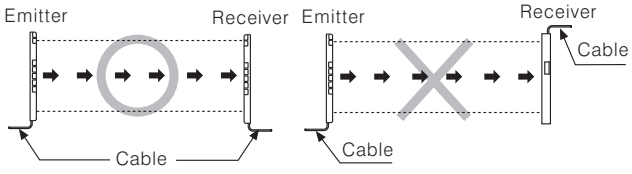
Select the indication method of operating indicator LED to make out work sensing operation more easily.

	Operation mode switch (Emitter+Receiver)	Picking indicator operation
GLOW	GLOW	Lighting indicator
BLINK	BLINK	Flashing indicator

▣Installation

◎For direction of installation

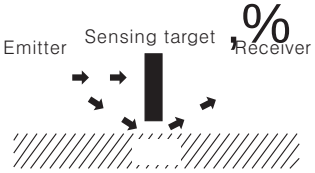
Emitter and receiver should be installed in same up/down position.



◎Reflective Surface Interference

In the case shown below, the beam can be reflected from the wall or flat surface and exposed to the receiver. Please pre-test the operation of sensor with a target under this condition.

(Interval distance : Min. 0.3m)

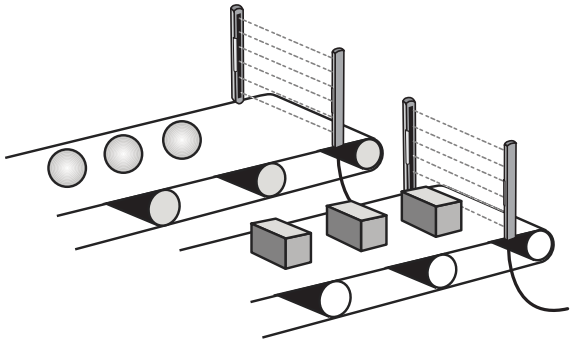
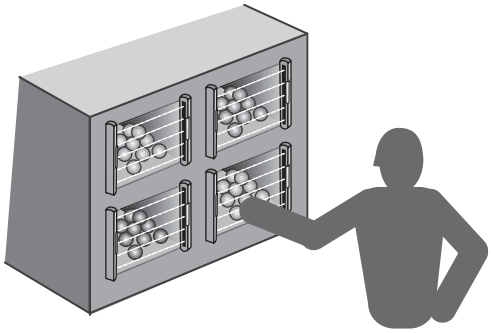


◎**For prevention of interference**

It may cause interference when installing more than 2 sets of the sensor. In order to avoid the interference of the sensor, please install as following figures and use the interference prevention function not to let light of the other emitter in a receiver..

●**Transmission direction should be opposite between 2 sets.**

▣Applications

Sensing arrival of components	Sensing of approaching object or person
	
Sensing of fallen object	**Sensing of lengthened part**