

Flat Area Sensor With Plastic Case

■ Features

- 13mm slim body with fresnel lens
- Adoption of plastic (PC/ABS) injection case
- Various functions; stop transmission, interference prevention, lightening/flashng JOB indicator, Light ON/Dark ON operation by switch
- Easy to recognize at side, front, and long-distance by high brightness LED of Emitter and Receiver
- Fast response time up to 7ms
- 4 models with various optical axes (8 to 20) and sensing height (140 to 380mm)
- Protection structure IP40 (IEC standard)

⚠ Please read "Safety Considerations" in operation manual before using.



■ 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. Ø30mm | | | | |
| Optical axis pitch | | 20mm | | | | |
| Number of optical axis | | 8 12 16 20 | | | | |
| Sensing height | | 140mm 220mm 300mm 380mm | | | | |
| Response time | | Max. 6ms (frequency B selection is max. 7ms) | | | | |
| Power supply | | 12-24VDC±10% (ripple P-P: max. 10%) | | | | |
| Current consumption | | Emitter: max. 80mA, receiver: max. 80mA | | | | |
| Light source | | Infrared LED (850nm modulated) | | | | |
| Operation mode | | Light ON/Dark ON by switch | | | | |
| Control output | | NPN or PNP open collector output • Load voltage: Max. 30VDC± • Load current: Max. 150mA • Residual voltage - NPN: Max. 1VDC±, PNP: Max. 2.5VDC | | | | |
| Protection circuit | | Reverse power polarity, output short over current protection circuit | | | | |
| Insulation resistance | | Over 20MΩ (at 500VDC megger) | | | | |
| Synchronization type | | Synchronized by synchronous line | | | | |
| Interference protection | | Interference protection by transmission frequency selection | | | | |
| Noise immunity | | ±240V the square wave noise (pulse width: 1μs) by the noise simulation | | | | |
| Dielectric strength | | 1,000VAC 50/60Hz for 1 minute | | | | |
| Vibration | | 1.5mm amplitude or 300m/s ² at frequency of 10 to 55Hz (for 1 min) in each X, Y, Z direction for 2 hours | | | | |
| Shock | | 500m/s ² (approx. 50G) in each X, Y, Z direction for 3 times | | | | |
| Environment | Ambient illumination | Ambient light: max. 10,000lx (received light side illumination) | | | | |
| | Ambient temperature | -10 to 55°C, storage: -20 to 60°C | | | | |
| | Ambient humidity | 35 to 85%RH, storage: 35 to 85%RH | | | | |
| Protection structure | | IP40 (IEC standard) | | | | |
| Material | | Case: Polycarbonate/Acrylonitrile butadiene styrene, Sensing part: Polymethyl methacrylate | | | | |
| Cable | | Ø3.5mm, 4-wire, 3m (emitter: Ø3.5mm, 4-wire, 3m) (AWG 24, core diameter: 0.08mm, number of cores: 40, insulator out diameter: Ø1mm) | | | | |
| Approval | | CE | | | | |
| Weight※1 | | Approx. 480g (approx. 280g) | Approx. 520g (approx. 320g) | Approx. 620g (approx. 360g) | Approx. 680g (approx. 430g) | |

※1: The weight includes packaging. The weight in parenthesis is for unit only.

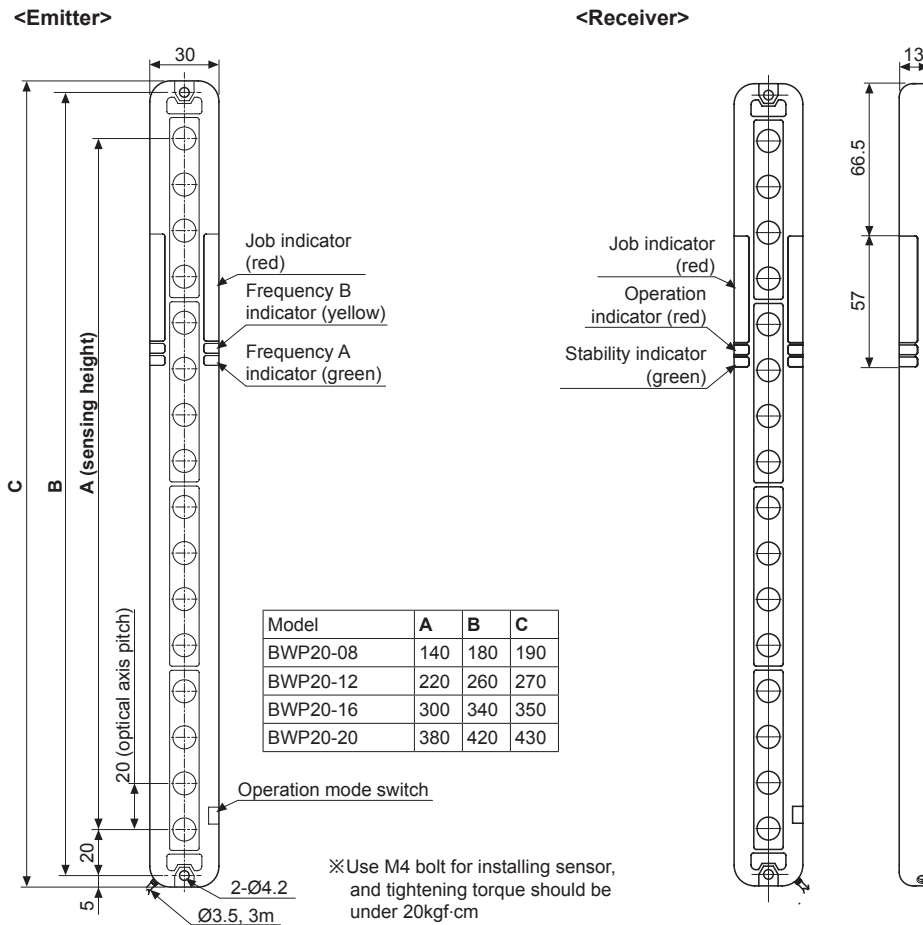
※The temperature or humidity mentioned in Environment indicates a non freezing or condensation environment.

| | |
|-----|--|
| (A) | Photoelectric Sensors |
| (B) | Fiber Optic Sensors |
| (C) | Door/Area Sensors |
| (D) | Proximity Sensors |
| (E) | Pressure Sensors |
| (F) | Rotary Encoders |
| (G) | Connectors/ Connector Cables/ Sensor Distribution Boxes/ Sockets |
| (H) | Temperature Controllers |
| (I) | SSRs / Power Controllers |
| (J) | Counters |
| (K) | Timers |
| (L) | Panel Meters |
| (M) | Tacho / Speed / Pulse Meters |
| (N) | Display Units |
| (O) | Sensor Controllers |
| (P) | Switching Mode Power Supplies |
| (Q) | Stepper Motors & Drivers & Controllers |
| (R) | Graphic/ Logic Panels |
| (S) | Field Network Devices |
| (T) | Software |

BWP Series

■ Dimensions

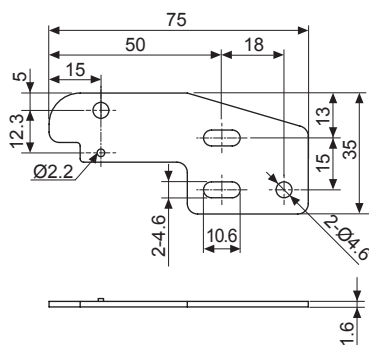
(unit: mm)



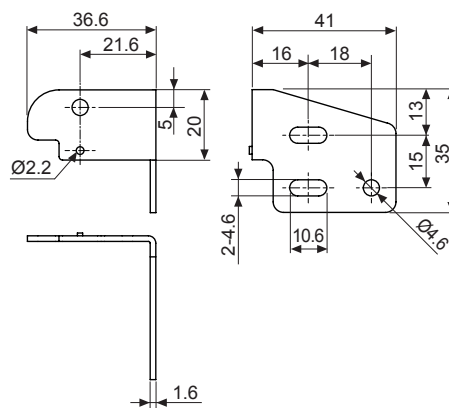
<Bracket>: sold separately

(unit: mm)

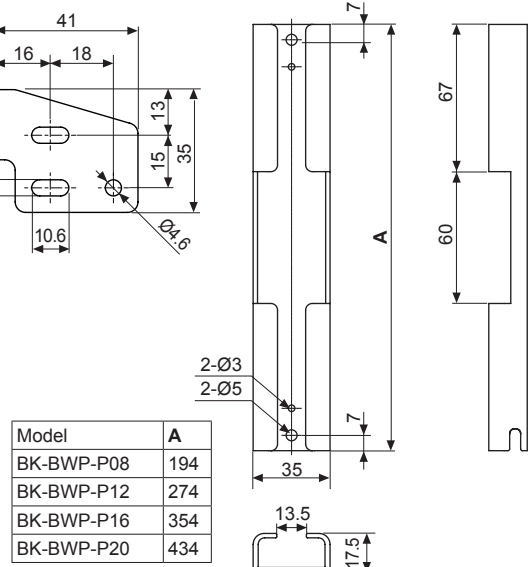
• Flat bracket (BK-BWP-ST)



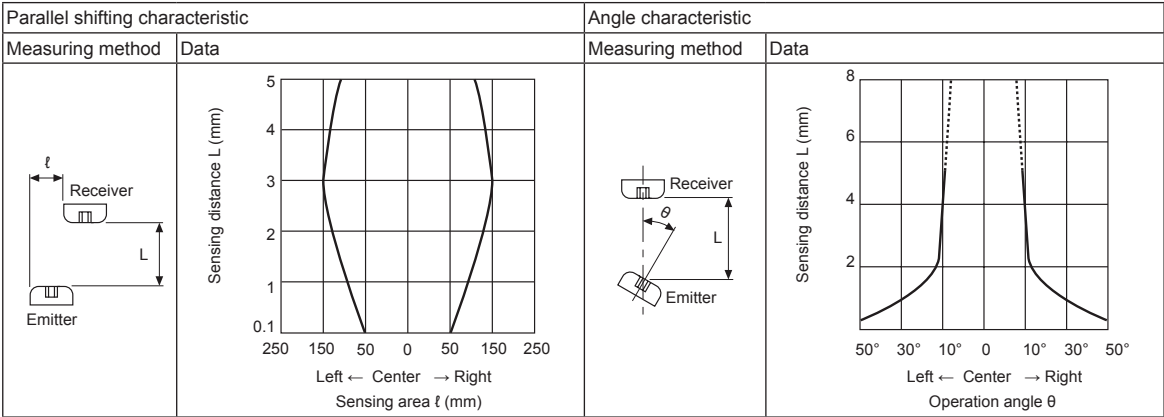
• L-shaped bracket (BK-BWP-L)



• Protection bracket (BK-BWP-P□)

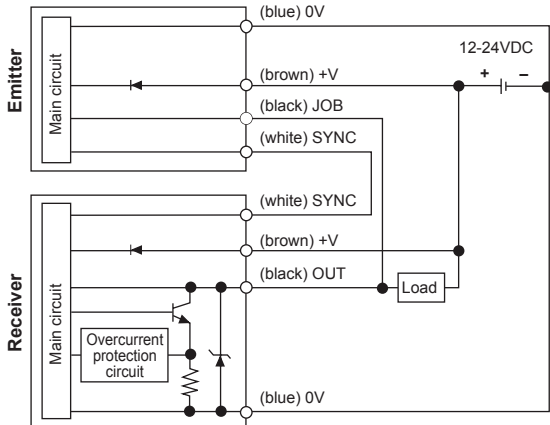


Feature Data

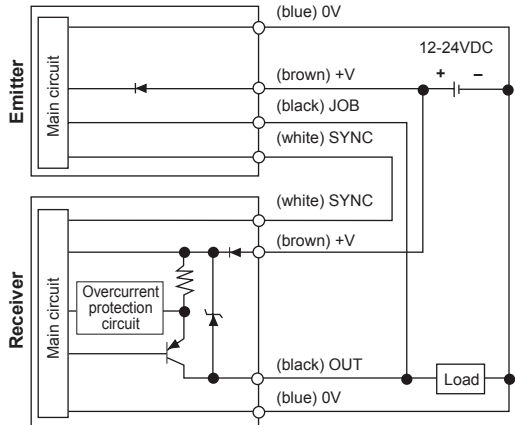


Input/Output Circuit and Connection Diagram

• NPN open collector output

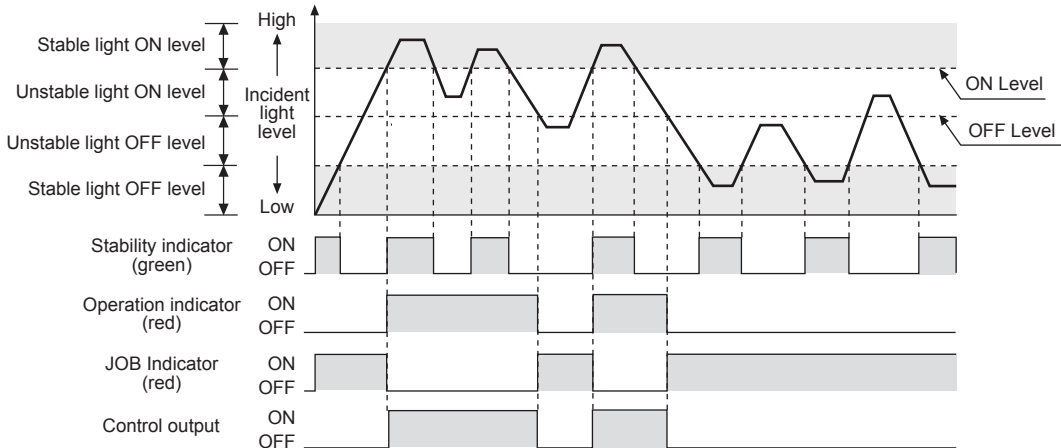


• PNP open collector output



※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

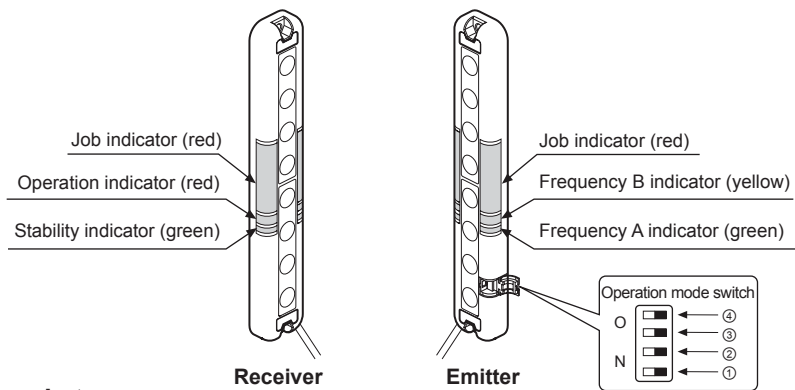


※The waveforms of operation indicator, job indicator, and control output are the state of operation for Light ON, but in case of Dark ON, it is opposite operation against Light ON mode.

- (A) Photoelectric Sensors
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- (E) Pressure Sensors
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BWP Series

■ Structure



◎ Mounting of bracket

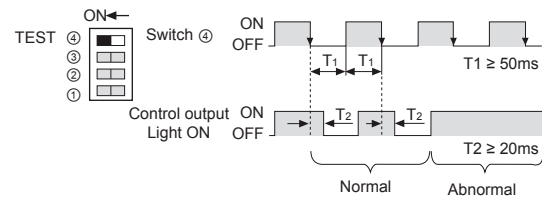
| No | Function | Switch OFF | Switch ON |
|----|--|---------------------------------|-----------------------------------|
| ① | Transmission frequency selection | Frequency A | Frequency B |
| ② | Light ON/Dark ON selection | Light ON operation | Dark ON operation |
| ③ | Steady/flashing light of Job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

■ Functions

◎ TEST (stop transmission)

When selecting TEST mode, emit is stopped and green & yellow LED of emitter flashes. It is available to check whether sensor operates properly with stopping the transmission in TEST mode. It is changed to light OFF status when emit the transmission is stopped, control output is OFF in Light ON mode and ON in Dark ON mode.

● Control output pulse for TEST input



◎ Light-ON / Dark-ON operation mode

The control output is ON when it is light ON in Light ON and the control output is ON when it is light OFF in Dark ON. It is available to select with user's preference.

| | Operation mode switch | Control output operation |
|----------|-----------------------|--------------------------------|
| Light ON | | It is ON when it is light ON. |
| Dark ON | | It is ON when it is light OFF. |

◎ Interference prevention

In case of using 2pcs of sensor in serial or parallel in order to extend sensing width, it may cause sensing error because of light interference.

This function is operating a sensor in transmission frequency A and another sensor in transmission frequency B to avoid these sensing errors by the light interference.

| | Operation mode switch | Frequency A, B indicator |
|-------------------------------------|-----------------------|---|
| Sensor ① (transmission frequency A) | | Frequency B (yellow) Frequency A (green) |
| Sensor ② (transmission frequency B) | | Frequency B (yellow) Frequency A (green) |

◎ Lightening/Flashing JOB indicator

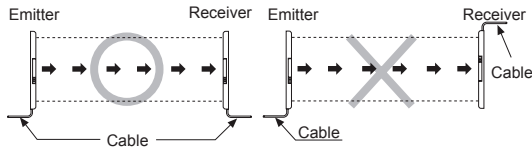
JOB indicator will be lighted and flashed to make out work sensing operation more easily.

| Operation mode switch | JOB indicator operation |
|-----------------------|-------------------------|
| | Lighting indicator |
| | Flashing indicator |

■ Installation

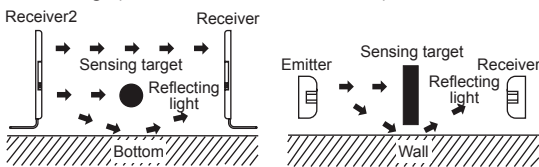
◎ For direction of installation

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



◎ For reflection from the surface of wall and flat

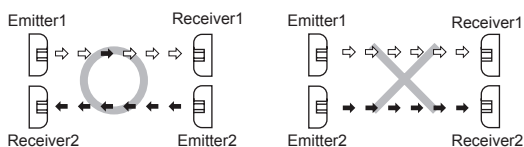
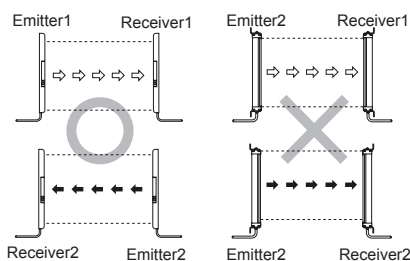
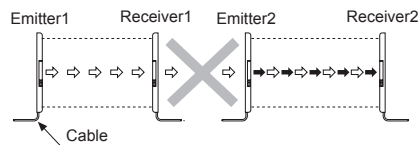
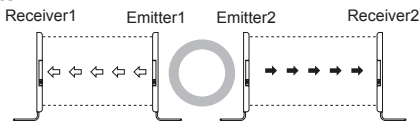
When installing it as below the light reflected from the surface of wall and flat will not be shaded. Please, check whether it operates normally or not with a sensing target before using. (interval distance: min. 0.3m)



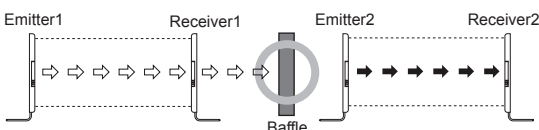
◎ For prevention of interference

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 protection function.

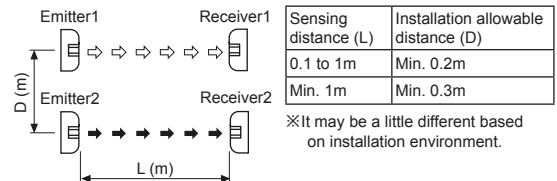
• Transmission direction should be opposite between 2 sets



• Baffle should be installed between 2 sets.



• It should be installed out of the interference distance



※Avoid using the unit in the place where the sensor is exposed directly to the fluorescent light with high speed start or high frequency.

■ Operation Indicator

| Item | Emitter Indicator | | | Receiver 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 |

※The operation of 'Operation indicator (red)', 'Job indicator (red)', 'Control output' is for Light ON, in case of Dark ON, it is opposite operation against Light ON. (In case, malfunction of synchronous line and over current, control output is OFF regardless of the mode.)

■ Troubleshooting

| Malfunction | Cause | Troubleshooting |
|---|---|---|
| Non-operation | Power supply | Supply rated power. |
| | Cable incorrect connection or disconnection | Check the wiring. |
| | Rated connection failure | Use it 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 displays for synchronous line incorrect connection or disconnection | Break of synchronous circuit of emitter or receiver | Check the wiring. |
| | Control output line is shorten | Contact our company. |
| LED displays for over current | Over load | Check the wiring. |
| | | Check the rated load capacity. |

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■ Proper Usage

1. Follow instructions in 'Proper Usage'.
Otherwise, It may cause unexpected accidents.
2. 12-24VDC power supply should be insulated and limited voltage/current or Class 2, SELV power supply device.
3. Use the product, 1 sec after supplying power.
When using separate power supply for the sensor and load, supply power to sensor first.
4. When using switching mode power supply to supply the power, ground F.G. terminal and connect a condenser between 0V and F.G. terminal to remove noise.
5. When connecting a DC relay or other inductive load, remove surge by using diodes or varistors.
6. Wire as short as possible and keep away from high voltage lines or power lines, to prevent surge and inductive noise.
7. This unit may be used in the following environments.
 - ①Indoors (in the environment condition rated in 'Specifications')
 - ②Altitude max. 2,000m
 - ③Pollution degree 2
 - ④Installation category II