

## Slim Plastic Single-Beam Area Sensors

# BWP Series

## INSTRUCTION MANUAL

TCD210007AB

**Autonics**

Thank you for choosing our Autonics product.

**Read and understand the instruction manual and manual thoroughly before using the product.**

**For your safety, read and follow the below safety considerations before using.**

**For your safety, read and follow the considerations written in the instruction manual, other manuals and Autonics website.**

Keep this instruction manual in a place where you can find easily.

The specifications, dimensions, etc. are subject to change without notice for product improvement. Some models may be discontinued without notice.

Follow Autonics website for the latest information.

### Safety Considerations

- Observe all 'Safety Considerations' for safe and proper operation to avoid hazards.
- ⚠ symbol indicates caution due to special circumstances in which hazards may occur.

**⚠ Warning** Failure to follow instructions may result in serious injury or death.

**01. Fail-safe device must be installed when using the unit with machinery that may cause serious injury or substantial economic loss. (e.g. nuclear power control, medical equipment, ships, vehicles, railways, aircraft, combustion apparatus, safety equipment, crime/disaster prevention devices, etc.)**

Failure to follow this instruction may result in personal injury, economic loss or fire.

**02. Do not use the unit in the place where flammable/explosive/corrosive gas, high humidity, direct sunlight, radiant heat, vibration, impact, or salinity may be present.**

Failure to follow this instruction may result in explosion or fire.

**03. Do not connect, repair, or inspect the unit while connected to a power source.**

Failure to follow this instruction may result in fire.

**04. Check 'Connections' before wiring.**

Failure to follow this instruction may result in fire.

**05. Do not disassemble or modify the unit.**

Failure to follow this instruction may result in fire.

**06. This product is not safety sensor and does not observe any domestic nor international safety standard.**

Do not use this product with the purpose of injury prevention or life protection, as well as in the place where economic loss maybe present.

**⚠ Caution** Failure to follow instructions may result in injury or product damage.

**01. Use the unit within the rated specifications.**

Failure to follow this instruction may result in fire or product damage.

**02. Use a dry cloth to clean the unit, and do not use water or organic solvent.**

Failure to follow this instruction may result in fire.

**03. Do not use a load over the range of rated relay specification.**

Failure to follow this instruction may result in fire, relay broken, contact melt, insulation failure or contact failure.

### Cautions during Use

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

### Cautions during Installation

- Be sure to install this product by following the usage environment, location, and specified ratings. Consider the listed conditions below.
  - Installation environment and background (reflected light)
  - Sensing distance and sensing target
  - Direction of target's movement
  - Feature data
- If the installation environment has reflected light from the wall or floor, a interval distance of at least 0.3 m is required.
- When installing multiple sensors closely, it may result in malfunction due to mutual interference. Install it by referring to the interference protection and the installation method in the manual.
- Do not use in places where the light-receiving sensor is exposed to direct sunlight or where the ambient illumination is higher than the specification.
- Do not impact with a hard object or bend the cable excessively. That could decrease the product's water resistance.
- Use this product after the test. Check whether the indicator works appropriately for the positions of the detectable object.

### Ordering Information

This is only for reference, the actual product does not support all combinations. For selecting the specified model, follow the Autonics website.

**BWP 20 - ① ②**

- ① Number of optical axes**  
Number: Number of optical axes
- ② Control output**  
No-mark: NPN open collector output  
P: PNP open collector output

### Product Components

- Product
- Instruction manual

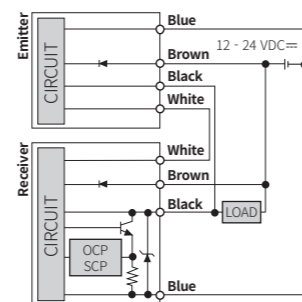
### Sold Separately

- Flat bracket (BK-BWP-ST)
- L-shaped bracket (BK-BWP-L)
- Protection bracket (BK-BWP-P□)

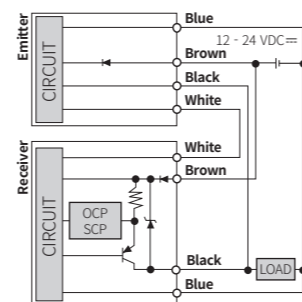
### Connections

Blue	0 V	Brown	+V	Black	JOB (emitter) / OUT (receiver)	White	SYNC
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#### NPN open collector output



#### PNP open collector output



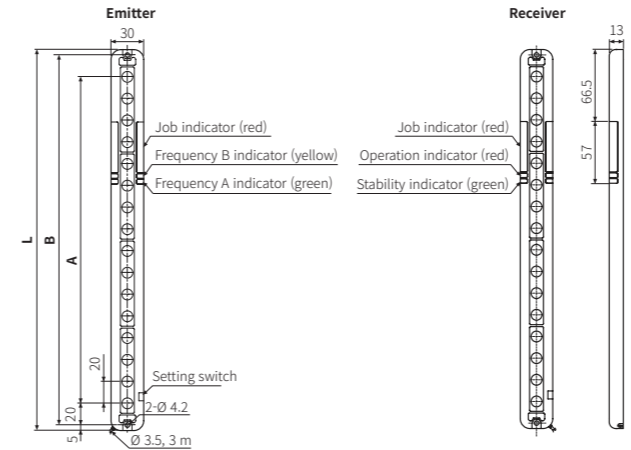
- If the receiver OUT (black) line and the emitter JOB (black) line are not connected each other, the job indicator of the emitter is not operated and maintains the light status.
- OCP (over current protection), SCP (short circuit protection)

### Setting Switch

Switch	No.	Function	Setting	
			ON	OFF
	①	Selection of transmission frequency	Frequency B	Frequency A
	②	Selection of Light ON / Dark ON	Dark ON	Light ON
	③	Selection of ON / flashing for Job indicator	Flashing	ON
	④	Selection of JOB / TEST	TEST mode	NORMAL mode

### Dimensions

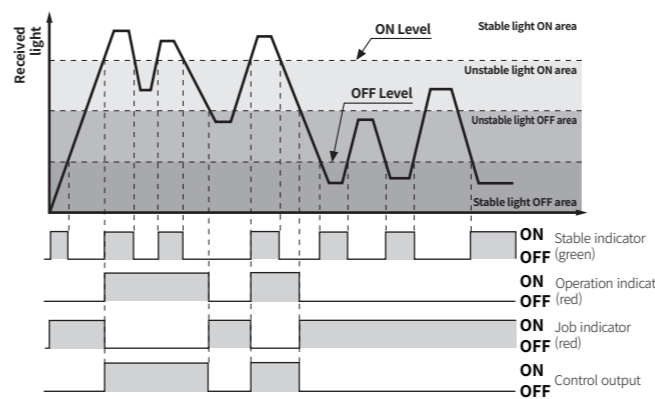
- Unit: mm, For the detailed drawings, follow the Autonics website.
- When installing, use M4 bolts for mounting screws and tighten with a torque of 2 N m or less.



Model	Sensing height (A)	B	Product length (L)
BWP20-08(P)	140	180	190
BWP20-12(P)	220	260	270
BWP20-16(P)	300	340	350
BWP20-20(P)	380	420	430

### Operation Timing Chart

#### Light ON mode



- In Dark ON mode, the waveforms are reversed.

### Operation Indicator

ON	☉	Flashing at 0.3 sec interval	🔊🔊	Cross-flashing at 0.3 sec interval
OFF	☉☉	Flashing simultaneously at 0.3 sec interval		

Item	Emitter			Receiver			Control output
	Indicator	Green	Yellow	Job indicator	Green	Red	
Power ON	☉	●		-	-	-	-
Frequency A operation	☉	●		-	-	-	-
Frequency B operation	☉	☉		-	-	-	-
TEST input	🔊	🔊	☉	☉	●	☉	OFF
Stable light ON	-	-	●	☉	☉	●	ON
Unstable light ON	-	-	●	●	☉	●	ON
Unstable light OFF	-	-	☉	●	☉	☉	OFF
Stable OFF	-	-	☉	☉	●	☉	OFF
Flashing func. ON	-	-	☉	☉	●	☉	OFF
Synchronous line malfunction	-	-	☉	🔊	🔊	☉	OFF
Over current	-	-	☉	☉	☉	☉	OFF

- 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.
- Malfunction of synchronous line and over current, control output is OFF regardless of the mode.

### Specifications

Model	BWP20-08(P)	BWP20-12(P)	BWP20-16(P)	BWP20-20(P)
Sensing method	Through-beam			
Light source	Infrared LED (850 nm modulated light)			
Sensing distance	0.1 to 5.0 m			
Sensing target	Opaque material			
Min. sensing target	≥ Ø 30 mm			
Number of optical axes	8	12	16	20
Sensing height	140 mm	220 mm	300 mm	380 mm
Optical axis pitch	20 mm			
Response time	≤ 6 ms (frequency B: ≤ 7 ms)			
Operation mode	Light ON / Dark ON (switch)			
Functions	Emitter OFF, operation mode change, Job indicator ON / flashing			
Interference protection	Interference protection by transmission frequency selection			
Synchronization type	Timing method by synchronous line			
Indicator	Emitter: frequency A indicator (green), frequency B indicator (yellow) Receiver: operation indicator (red), stable indicator (green) Emitter / receiver: Job indicator (red)			
Approval	CE ENEC		CE ENEC	
Weight (packaged)	≈ 280 g (≈ 480 g)	≈ 320 g (≈ 520 g)	≈ 360 g (≈ 620 g)	≈ 430 g (≈ 680 g)
Power supply	12 - 24 VDC= (ripple P-P: ≤ 10 %)			
Current consumption	Emitter / receiver: ≤ 80 mA			
Control output	NPN / PNP open collector output model			
Load voltage	≤ 30 VDC=			
Load current	≤ 150 mA			
Residual voltage	NPN: ≤ 1 VDC=, PNP: ≤ 2.5 VDC=			
Protection circuit	Reverse power protection circuit, output short overcurrent protection circuit			
Insulation resistance	≥ 20 MΩ (500 VDC= megger)			
Noise immunity	± 240 V the square wave noise (pulse width: 1μs) by the noise simulator			
Dielectric strength	1,000 VAC~ / 50 / 60 Hz for 1minute			
Vibration	1.5 mm double amplitude at frequency of 10 to 55 Hz (for 1 min) in each X, Y, Z direction for 2 hours			
Shock	500 m/s <sup>2</sup> (≈ 50 G) in each X, Y, Z direction for 3 times			
Ambient illumination (receiver)	Ambient light: ≤ 100,000 lx			
Ambient temperature	-10 to 55 °C, storage: -20 to 60 °C (no freezing or condensation)			
Ambient humidity	35 to 85 %RH, storage: 35 to 85 %RH (no freezing or condensation)			
Protection rating	IP40 (IEC standard)			
Cable spec.	Ø 3.5 mm, 4-wire, 3 m			
Wire spec.	AWG 24 (0.08 mm, 40-core), insulator diameter: Ø 1 mm			
Material	Case: PC / ABS, sensing part: PMMA			

### Troubleshooting

Malfunction	Cause	Troubleshooting
Non-operation	Power supply	Supply the rated power.
	Cable incorrect connection, or disconnection	Check the wiring connection.
Non-operation in sometimes	Out of rated sensing distance	Use it within rated sensing distance.
	Pollution by dirt of sensor cover	Remove dirt by soft brush or cloth.
Control output is OFF even though there is not a target object.	Connector connection failure	Check the assembled part of the connector
	Out of the rated sensing distance	Use it within the rated sensing distance.
LED displays for synchronous line	There is an obstacle to cut off the emitted light between emitter and receiver.	Remove the obstacle.
	There is strong electric wave or noise generator such as motor, electric generator, or high voltage line, etc.	Put away the strong electric wave or noise generator.
LED displays for over current	Synchronous line incorrect connection or disconnection	Check the wiring connection.
	Break of synchronous circuit of emitter or receiver	Contact Autonics Corp.
LED displays for over current	Control output line is shorted out.	Check the wiring connection.
	Over load	Check the rated load capacity.