DRW161003AB

Autonics

THIN TYPE AREA SENSOR
BWP SERIES

INSTRUCTION MANUAL

Thank you for choosing Autonics product.
Please read the following safety considerations before use.

■ Safety Considerations

※Please observe all safety considerations for safe and proper product operation to avoid hazards.

※Safety considerations are categorized as follows.
⚠**Warning** Failure to follow these instructions may result in serious injury or death.
⚠**Caution** Failure to follow these instructions may result in personal injury or product damage.

※The symbols used on the product and instruction manual represent the following.
⚠ symbol represents caution due to special circumstances in which hazards may occur.

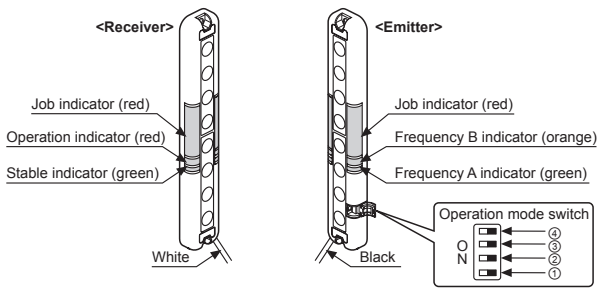
⚠ Warning

1. **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 fire, personal injury, or economic loss.
2. **Do not connect, repair, or inspect the unit while connected to a power source.**
   Failure to follow this instruction may result in fire.
3. **Check 'Connections' before wiring.**
   Failure to follow this instruction may result in fire.
4. **Do not disassemble or modify the unit.**
   Failure to follow this instruction may result in fire.
5. **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

1. **Use the unit within the rated specifications.**
   Failure to follow this instruction may result in fire or product damage.
2. **Use dry cloth to clean the unit, and do not use water or organic solvent.**
   Failure to follow this instruction may result in fire.
3. **Do not use the unit in the place where flammable/explosive/corrosive gas, humidity, direct sunlight, radiant heat, vibration, impact, or salinity may be present.**
   Failure to follow this instruction may result in fire or explosion.
4. **Do not use a load over the range of rated relay specification.**
   Failure to follow this instruction may result in insulation failure, contact melt, contact failure, relay broken, or fire.

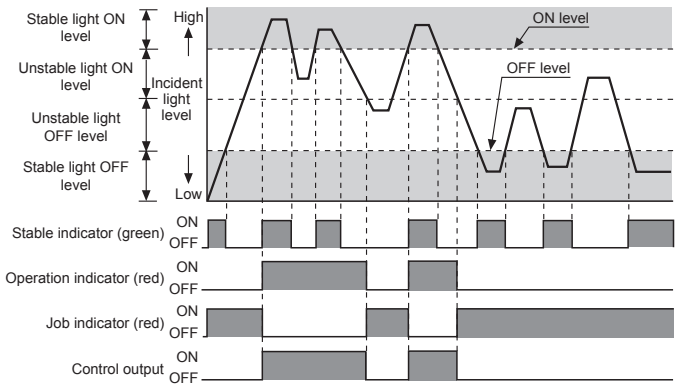
■ Structure



◎ **Operation mode switch**

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

■ Timing Diagram Operation



※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.

■ Indicators Display

Item	Emitter Indicator			Receiver Indicator			Control output
	Green	Orange	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
Over current	—	—	☼	◑	◑	☼	OFF

Display classification list	
☼	Lighting
●	Light out
◑	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.)

※The above specifications are subject to change and some models may be discontinued without notice.
※Be sure to follow cautions written in the instruction manual and the technical descriptions (catalog, homepage).

■ Ordering Information

BWP **20** – **08** **T** **P**

Output	**No-mark**	NPN open collector output
	P	PNP open collector output
Emitter/Receiver	**T**	Emitter
	R	Receiver
Number of optical axis	**08 to 20**	8 to 20
Optical axis pitch	**20**	20mm pitch
Item	**BWP**	Plastic case area sensor

※ ⋯ This information is intended for product management. (no need to refer when selecting a model)

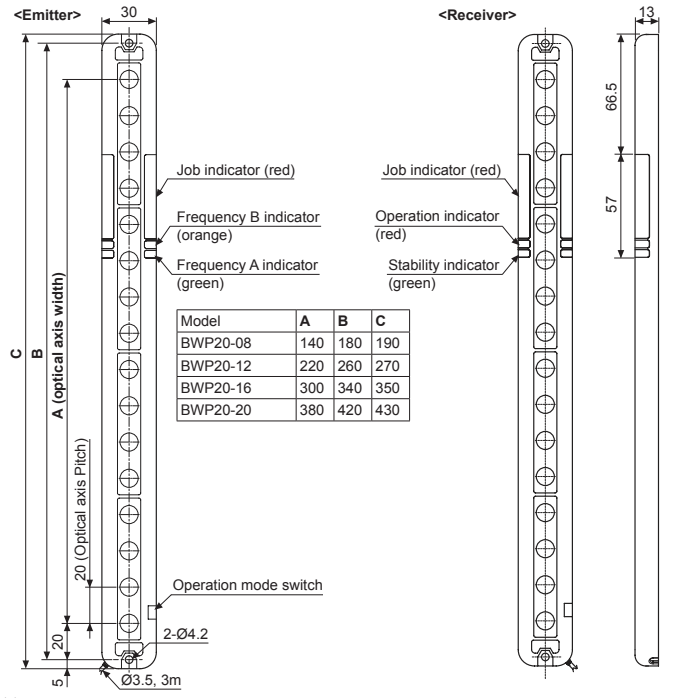
■ Specifications

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 type			
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 width		140mm	220mm	300mm	380mm
Power supply		12-24VDC⎓ ±10% (ripple P-P: max. 10%)			
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. 1VDC⎓, PNP : max. 2.5VDC			
Protection circuit		Reverse polarity protection circuit, output short over current protection circuit			
Operation mode		Switching of Light ON/Dark ON by switch			
Response time		Max. 6ms (frequency B selection is max. 7ms)			
Light source		Infrared LED (850nm modulated)			
Synchronization type		Timing method by synchronous line			
Interference protection		Interference protection by transmission frequency selection			
Environment	Ambient illumination	Ambient light: max. 10,000lx (received light side illumination)			
	Ambient temperature	-10 to 55℃, storage: -20 to 60℃			
	Ambient humidity	35 to 85%RH, storage: 35 to 85%RH			
Noise resistance		±240V the square wave noise (pulse width 1μs) by the noise simulator			
Dielectric strength		1,000VAC 50/60Hz for 1 minute			
Insulation resistance		Over 20MΩ (at 500VDC megger)			
Vibration		1.5mm amplitude at frequency of 10 to 55Hz in each X, Y, Z direction for 2 hours			
Shock		500m/s² (50G) in each X, Y, Z direction for 3 times			
Protection structure		IP40 (IEC standard)			
Material		Case: Polycarbonate/Acrylonitrile-Butadiene-Styrene, Sensing part: Polymethyl methacrylate			
Cable		Ø3.5mm, 4-wire, 3m (AWG24, core diameter: 0.08mm, number of cores: 40, insulator 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.

■ Dimensions

(unit: mm)

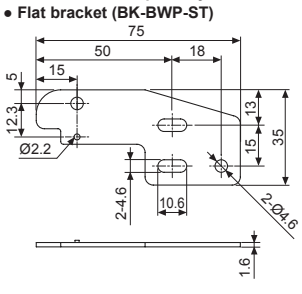


Model	A	B	C
BWP20-08	140	180	190
BWP20-12	220	260	270
BWP20-16	300	340	350
BWP20-20	380	420	430

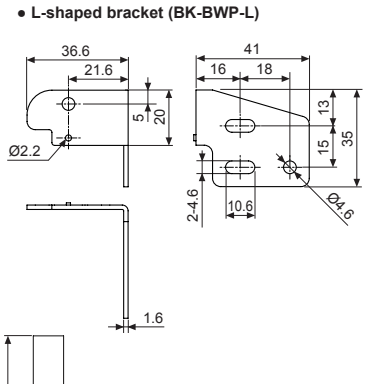
※Please use bolt M4 for mounting of sensor, set the tightening torque under 2N·m.

<Bracket>: sold separately

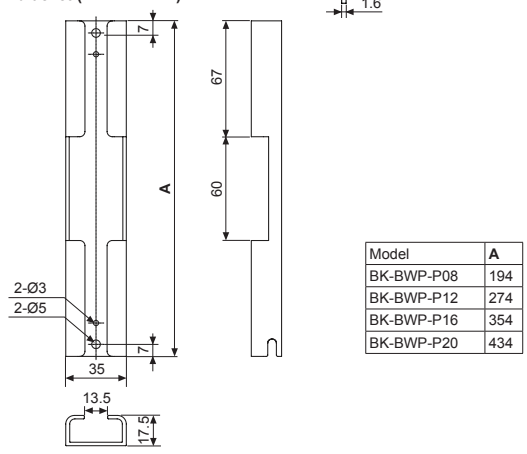
● **Flat bracket (BK-BWP-ST)**



● **L-shaped bracket (BK-BWP-L)**



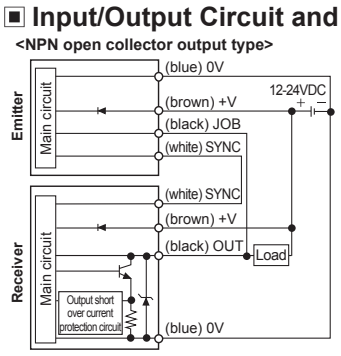
● **Protection bracket (BK-BWP-P□)**



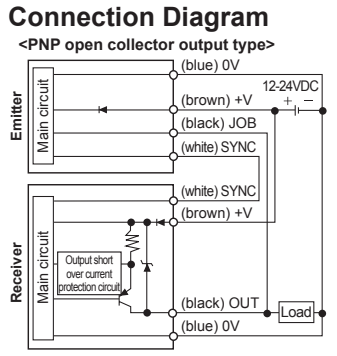
Model	A
BK-BWP-P08	194
BK-BWP-P12	274
BK-BWP-P16	354
BK-BWP-P20	434

■ Input/Output Circuit and Connection Diagram

<NPN open collector output type>



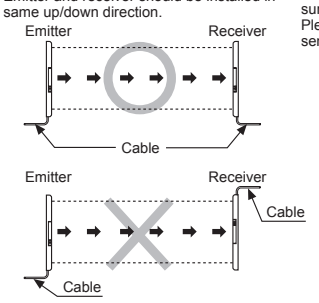
<PNP open collector output type>



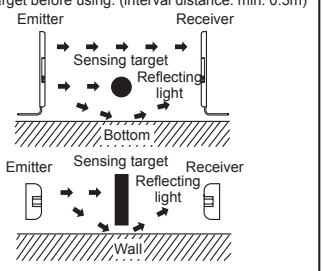
※If the receiver OUT (black) line and the emitter JOB (black) line are not connected each other, the job indicator of the emitter is not operated and maintains the light status.

■ Installations

◎ **For direction of installation**
Emitter and receiver should be installed in same up/down direction.

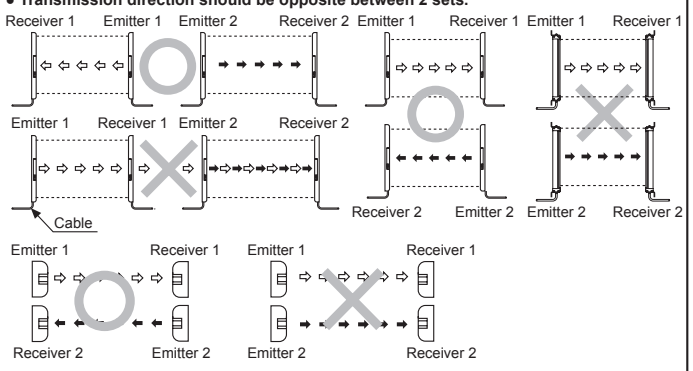


◎ **For reflection from the surface of wall and flat**
When installing it as below, the light reflected from the surface of wall and flat is not shaded.
Please check whether it operates normally or not with a sensing target before using. (interval distance: min. 0.3m)

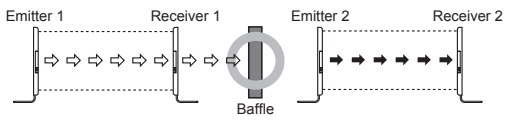


◎ **For protection of interference**
It may cause interference when installing more than 2 sets of the sensor. In order to avoid the interference of the sensor, please install as following figures and use the interference protection function.

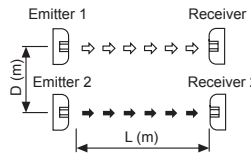
● **Transmission direction should be opposite between 2 sets.**



● **Baffle should be installed between 2 sets.**



● **It should be installed out of the interference distance.**



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

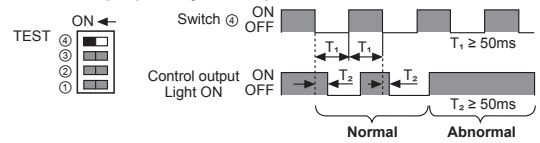
※It may be a little different based on installation environment.

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

■ Functions

◎ **TEST (stop transmission function)**
When selecting TEST mode, emit is stopped and green&orange 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 by TEST input**



◎ **Interference protection**
In case of using 2 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 SW	Frequency A, B indicator
Sensor Ⓐ (transmission frequency A)	Frequency A	Frequency A (green)
Sensor Ⓑ (transmission frequency B)	Frequency B	Frequency B (orange)

◎ **Light ON/Dark ON 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 SW	Control output operation
Light ON	Light ON	It is ON when it is light ON.
Dark ON	Dark ON	It is ON when it is light OFF.

◎ **Switching of Lighting/Flashing of Job indicator**
Job indicator is lighting or flashing to make out work sensing operation more easily.

	Operation mode SW	Job indicator operation
Lighting	Lighting	Lighting indicator
Flashing	Flashing	Flashing indicator

■ 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.
	Cable connection failure	Check the assembled part of the cable.
Control output is OFF even though there is not a target object.	Out of rated sensing distance	Use it 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 generator such as motor, electric generator, high voltage line etc.	Put away the strong electric wave or noise generator.
LED displays for synchronous line malfunction	Synchronous line incorrect connection or disconnection	Check the wiring.
	Break of synchronous circuit of emitter or receiver	Contact our company.
LED displays for over current	Control output line is shorten	Check the wiring.
	Over load	Check the rated load capacity.

■ Cautions during Use

1. Follow instructions in 'Cautions during Use'. 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

■ Major Products

■ Photoelectric Sensors
■ Fiber Optic Sensors
■ Door Sensors
■ Door Side Sensors
■ Area Sensors
■ Proximity Sensors
■ Pressure Sensors
■ Rotary Encoders
■ Connector/Sockets
■ Switching Mode Power Supplies
■ Control Switches/Lamps/Buzzers
■ I/O Terminal Blocks & Cables
■ Stepper Motors/Drivers/Motion Controllers
■ Graphic/Logic Panels
■ Field Network Devices
■ Laser Marking System (Fiber, Co_2, Nd: YAG)
■ Laser Welding/Cutting System
■ Temperature Controllers
■ Temperature/Humidity Transducers
■ SSR/Power Controllers
■ Counters
■ Timers
■ Panel Meters
■ Tachometer/Pulse (Rate) Meters
■ Display Units
■ Sensor Controllers

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