

# Autonics

## THIN TYPE AREA SENSOR BWP SERIES

M A N U A L



Thank you very much for selecting Autonics products.  
For your safety, please read the following before using.

### Caution for your safety

※Please keep these instructions and review them before using this unit.

※Please observe the cautions that follow;

**Warning** Serious injury may result if instructions are not followed.

**Caution** Product may be damaged, or injury may result if instructions are not followed.

※The following is an explanation of the symbols used in the operation manual.

**Caution:** Injury or danger may occur under special conditions.

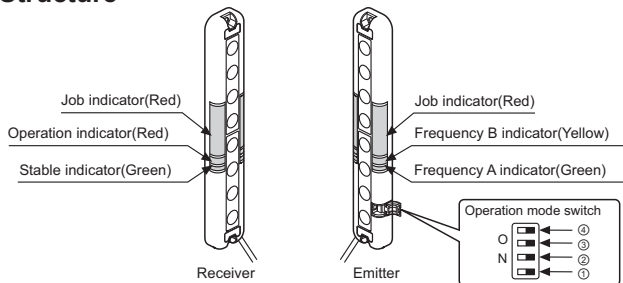
### Warning

- In case of using this unit with machinery (Ex: nuclear power control, medical equipment, ship, vehicle, train, airplane, combustion apparatus, safety device, crime/disaster prevention equipment, etc) which may cause damages to human life or property, it is required to install fail-safe device. It may cause a fire, human injury or damage to property.
- This unit is not safety sensor protecting from damages of property or injury from dangerous parts of mechanical equipment, but it is the sensor detecting a normal object or irruption into the working area regardless of safety.
- Do not use it as safety equipment for the cutter or press.
- This unit does not follow any international safety standard. Please check the safety standard of the country the product is used.
- Please note that we do not take any responsibilities for the problem related to overseas' laws or <Product liability(PL)> is happened by using as follows:
  - ① Safety equipment for protecting a hand or other parts of worker at dangerous area.
  - ② Interlock on mechanical equipment.
  - ③ Safety sensor on mechanical equipment for stopping it when detecting a hand or other parts of worker.
  - ④ Using for detecting a hand or other parts of worker at dangerous area and controlling door or window.

### Caution

- This unit shall not be used outdoors. It might shorten the life cycle of the product or give an electric shock. Use this product inside only. Do not use the product outdoors or location subject to temperatures or humidity outside. (Ex: rain, dirt, frost, sunlight, condensation, etc.)
- Do not wire this in power ON status. It may cause an electric shock.
- Please use this in the rated specifications. It may cause malfunction or the life cycle shorter.
- Please ground Frame Ground(F.G.) terminal when supplying power by switching power.
- Avoid using this unit where there are fluorescent light with high frequency, high speed start or signal light affecting to sensing ability.
- It may do not able to shade the light by reflecting from surface of a wall when installing it in 0.3m from wall or flat parts. Please keep < Installation >.
- It may cause malfunction from interference when using them closely in parallel. Please keep < Installation >.
- Please install emitter and receiver in same direction. The emitting light is not transferred to receiver if installed in opposite direction.
- Avoid using this unit where there are severe vibration. It may cause a fire and malfunction.
- In cleaning the unit, do not use water or an oil-based detergent. It may cause an electric shock or fire.
- Please make power and output line shorten as possible, or it may cause malfunction by surge etc.

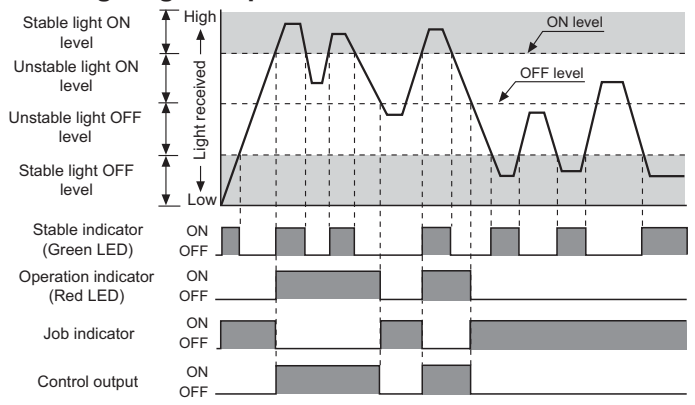
### Structure



#### 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 mode, but in case of Dark ON mode, it is opposite operation against Light ON mode.

### Indicator display

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
Over current	—	—	●	●	●	●	OFF

#### Display classification list

- Lighting
- Light out
- Flashing by 0.3sec.
- Flashing simultaneously by 0.3sec.
- Cross-flashing by 0.3sec.

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

※The above specifications are subject to change without notice.

### Ordering information

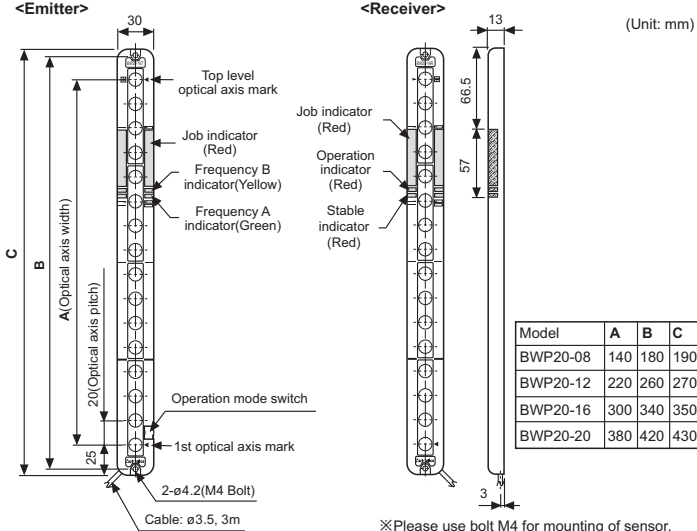
BWP 20 - 08 T P	Output	NPN open collector output
		PNP open collector output
Appearance	T	Emitter
	R	Receiver
Number of optical axis	08 to 20	8 to 20 pcs
Optical axis pitch	20	20mm pitch
Plastic case Area sensor		

### Specifications

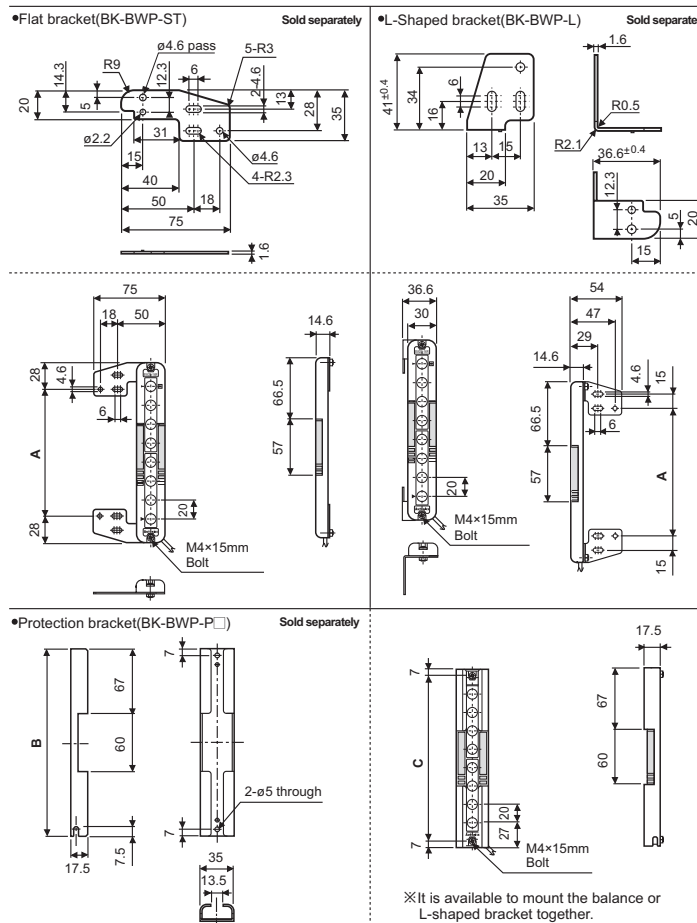
Model	BWP20-08(P)	BWP20-12(P)	BWP20-16(P)	BWP20-20(P)
Sensing type	Transmitte beam type			
Sensing distance	0.1 to 5m			
Sensing target	Opaque materials of min. ø30mm			
Optical axis pitch	20mm			
Number of optical axis	8pcs	12pcs	16pcs	20pcs
Sensing width	140mm	220mm	300mm	380mm
Power supply	12-24VDC ±10%(Ripple P-P: Max. 10%)			
Protection circuit	Built-in			
Current consumption	Emitter: Max. 80mA, Receiver: Max. 80mA			
Control output	NPN open collector output ≒ Load current: Max. 150mA(Max. 30VDC), Residual voltage: Max. 1V PNP open collector output ≒ Load current: Max. 150mA, Output voltage: Min. (Power supply-2.5)V			
Operation mode	Light ON/Dark ON switching			
Short-circuit protection	Built-in			
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: Sunlight: Max. 10,000lx Ambient temperature: -10 to +55°C, Storage: -20 to +60°C Ambient humidity: 35 to 85%RH, Storage: 35 to 85%RH			
Noise strength	The square wave noise by the noise simulator(Voltage: ± 240V, Period: 10ms, Pulse width: 1μs)			
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/s <sup>2</sup> (50G) in X, Y, Z directions for 3 times			
Protection	IP40(IEC standard)			
Material	Case: PC/ABS, Lens: PMMA			
Cable	Emitter: ø3.5mm, 4P, 3m / Receiver: ø3.5mm, 4P, 3m (AWG 24, Core wire diameter: 0.08mm, No. of core wire: 40, Insulator out diameter: ø0.1mm)			
Unit weight	Approx. 0.43kg(For 20 optical axis)			

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

### Dimensions



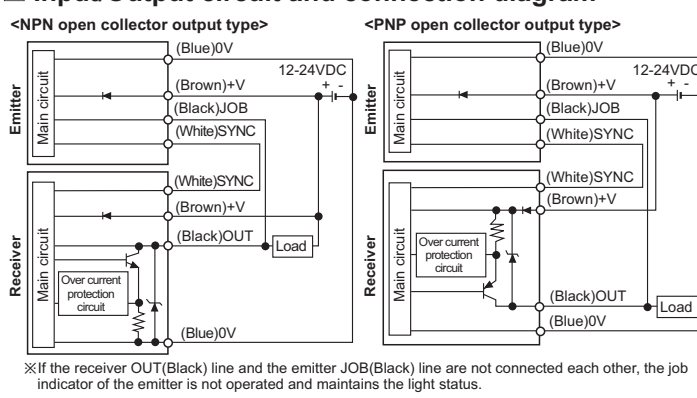
#### Bracket dimension



Model	A	BK-BWP-P		
		Bracket model	B	C
BWP20-08	134	BK-BWP-P08	194	180
BWP20-12	214	BK-BWP-P12	274	260
BWP20-16	294	BK-BWP-P16	354	340
BWP20-20	374	BK-BWP-P20	434	420

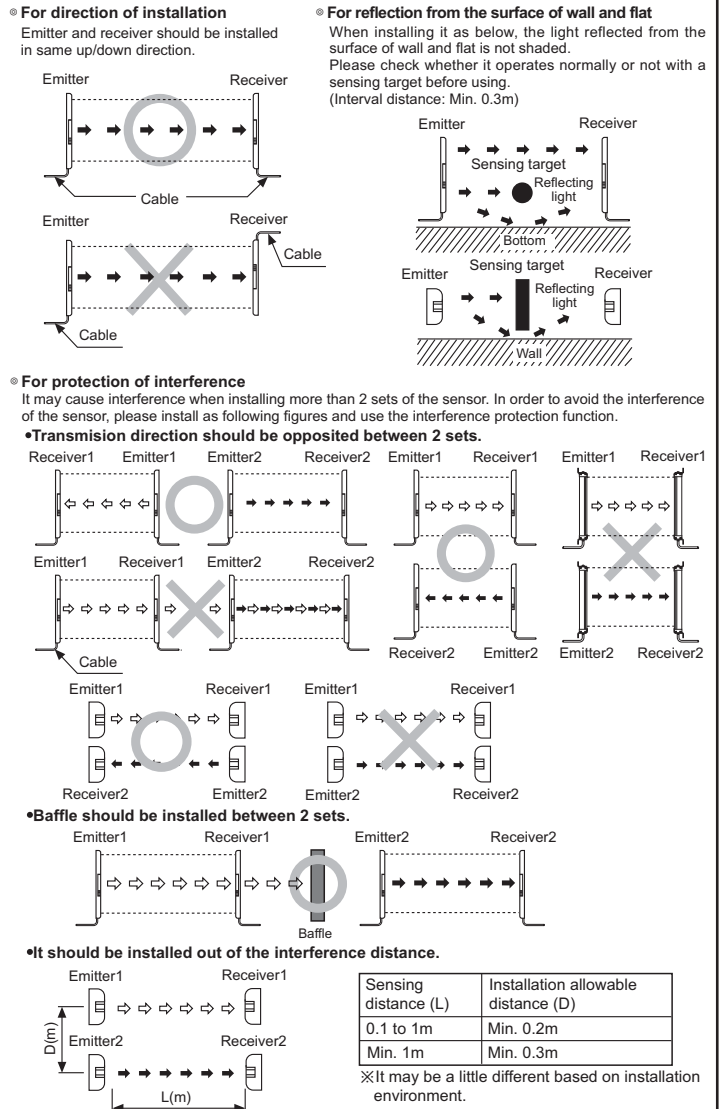
※Bracket is sold separately.

### Input/Output circuit and connection diagram



※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



### Functions

**TEST (Stop transmission function) functions**  
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 by TEST input**

**Interference protection function**  
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.

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

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

Operation mode switch	Frequency A, B indicator
Light ON	Frequency A (Green), Frequency B (Yellow)
Dark ON	Frequency A (Green), Frequency B (Yellow)

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.

Operation mode switch	Job indicator operation
Lighting	Lighting indicator
Flashing	Flashing indicator

### Troubleshooting

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

### Caution for using

- Please make the interval enough between 2 sets or exchange the positions of emitter and receiver in order to remove interference as occurring interference by the emitter of another set when using emitter/receiver more than 2sets closely.
  - Please install this sensor at proper height (Min. approx. 0.3m) from flat part because malfunction may be caused due to certain amount of light received by light reflected when installing it close to flat part.
  - Avoid using this unit where there are fluorescent light with high frequency, high speed start or signal light affecting to sensing ability.
  - Please use a single conduit or separated wiring as it may cause malfunction or mechanical problem when installing the wiring of the sensor with high voltage lines.
  - Avoid using this unit where there are places with corrosive gas or dust, or it may cause malfunction.
  - Please make power and output line shorten as possible, or it may cause malfunction by surges etc.
  - Please clean the sensor cover with dry cloth when it is stained by dirt etc., but do not use organic materials such as thinners.
  - When using switching power supply as the source of supplying power, Frame Ground (F.G.) terminal shall be grounded and a condenser for removing noise shall be installed between 0V and F.G. terminal.
  - Installation environment
    - ① It shall be used indoor
    - ② Altitude max. 2,000m
    - ③ Pollution degree 2
    - ④ Installation category I/II
- ※It may cause malfunction if above instructions are not followed.

### Major products

- Proximity sensors
- Area sensors
- Door/Door side sensors
- Counters
- Rotary encoders
- Power controllers
- Panel meters
- Temperature controllers
- Switching power supplies
- Temperature/Humidity transducers
- Tachometer/Pulse(Rate) meters
- Stepping motors/drivers/motion controllers
- Laser marking system(CO<sub>2</sub>, Nd:YAG)
- Laser welding/soldering system
- Photoelectric sensors
- Fiber optic sensors
- Pressure sensors
- Timers
- Display units
- Sensor controllers
- Graphic/Logic panels
- Field network devices

**Autonics Corporation**  
http://www.autonics.com

Satisfiable Partner For Factory Automation

HEAD QUARTERS :  
41-5, Yongdang-dong, Yangsan-si, Gyeongsang, 625-847, Korea

OVERSEAS SALES :  
Bldg. 402 3rd Fl., Bucheon Techno Park, 193, Yakdae-dong, Woomin-gu, Bucheon-si, Gyeonggi-do, 420-734, Korea  
TEL: 82-32-616-0730 / FAX: 82-32-329-9728  
E-mail: sales@autonics.com

The proposal of a product improvement and development : product@autonics.com

EP-KE-77-0007D