

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.

※△ symbol represents caution due to special circumstances in which hazards may occur.

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.

Warning

- 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.
- Do not connect, repair, or inspect the unit while connected to a power source.
Failure to follow this instruction may result in fire.
- Check 'Connections' before wiring.
Failure to follow this instruction may result in fire.
- Do not disassemble or modify the unit.
Failure to follow this instruction may result in fire.
- 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

- Use the unit within the rated specifications.
Failure to follow this instruction may result in fire or product damage.
- Use dry cloth to clean the unit, and do not use water or organic solvent.
Failure to follow this instruction may result in fire.
- 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.
- 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.

Operation Indicator

tem	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 0.3 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

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°C, storage: -20 to 60°C			
	Ambient humidity	35 to 85%RH, storage: 35 to 85%RH			
Noise immunity	±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 (approx. 50G) in each X, Y, Z direction for 3 times				
Protection structure	IP40 (EC 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

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

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

For reflection from the surface of wall and flat

※For protection of interference

Transmission direction should be opposite between 2 sets.

Baffle should be installed between 2 sets.

It should be installed out of the interference distance.

Functions

TEST (stop transmission function)

Interference protection

Light ON/Dark ON mode

Switching of Lighting/Flashing of Job indicator

Control output pulse by TEST input

TEST	ON	Switch	OFF
①	Light ON	Light ON	t is ON when it is light ON.
②	Light ON	Light OFF	t is ON when it is light OFF.
③	Light ON	Light OFF	t is ON when it is light OFF.
④	Light ON	Light OFF	t is ON when it is light OFF.

	Operation mode SW	Frequency A, B indicator
Sensor ① (transmission frequency A)	① ② ③ ④	Frequency A (green)
Sensor ② (transmission frequency B)	① ② ③ ④	Frequency B (yellow)

	Operation mode SW	Control output operation
Light ON	① ② ③ ④	t is ON when it is light ON.
Dark ON	① ② ③ ④	t is ON when it is light OFF.

	Operation mode SW	Job indicator operation
Lighting	① ② ③ ④	Lighting indicator
Flashing	① ② ③ ④	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.
LED displays for synchronous line malfunction	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.
	Synchronous line incorrect connection or disconnection	Check the wiring.
LED displays for over current	Break of synchronous circuit of emitter or receiver	Contact our company.
	Control output line is shorten	Check the wiring.
	Over load	Check the rated load capacity.

Cautions during Use

- Follow instructions in 'Cautions during Use'. Otherwise, It may cause unexpected accidents.
- 12-24VDC 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 0V 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.
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/Socket

Switching Mode Power Supplies

Control Switches/Lamps/Buzzers

I/O Terminal Blocks & Cables

Stepper Motors/Drivers/Motion Controllers

Graphic/Logic Panels

Field Networking Devices

Laser Marking System (Fiber, Co., 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

DRW161003AC