Autonics

Area Sensor BW SERIES

INSTRUCTION MANUAL





Thank you for choosing our 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. st $m{\Lambda}$ 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 personal injury, economic loss or fire.

 2. 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.
- 3. Do not connect, repair, or inspect the unit while connected to a power source. Failure to follow this instruction may result in fire.
- 4. Check 'Connections' before wiring.
- Failure to follow this instruction may result in fire
- 5. Do not disassemble or modify the unit. Failure to follow this instruction may result in fire
- 6. This product is not safety sensor and does not observe any domestic nor international safety standard.

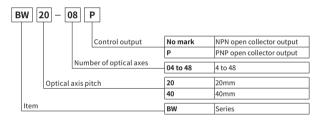
Do not use this product with the purpose of injury prevention or life protection, as well as in the place where economic loss maybe present.

⚠ 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 a load over the range of rated relay specification.
 Failure to follow this instruction may result in fire, relay broken, contact melt, insulation failure

Ordering Information



Function

O Emitter OFF (external diagnosis)

When TEST input (black) of emitter is 0V, emitting stops and red LED of emitter flashes. By stopping the emitting while TEST input of emitter is 0V, it is noticeable whether sensor operates in order from the external system.

(If the emitting stops, sensor is in light OFF status and control output of receiver turns OFF.)

• Connections for TEST input

• Control output pulse by TEST input (contact relay) (For solid state (black) TEST ON T1 T1 ON TOFF

(black) OUT OFF

O Self-Diagnosis

(For contact relay)

(black) TEST

(blue) 0V

The unit regularly executes self-diagnosis during operation. If error occurs, control output turns OFF and the operation indicator displays the status.

Diagnosis items

T2 ≥ 20ms

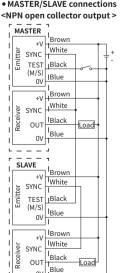
Abnormal

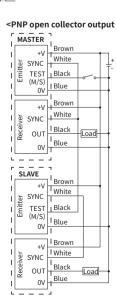
Interference Protection In case of using 2 sensors in parallel in order to extend sensing width, it may cause sensing error because as light interference.

This function is operating a sensor as MASTER and another sensor as SLAVE to avoid these sensing errors by



• MASTER/SLAVE connections





*Connect '(TEST)M/S' of SLAVE emitter to 'SYNC' of MASTER.

 $\ensuremath{\mathrm{\%The}}$ above specifications are subject to change and some models may be

0V Blue

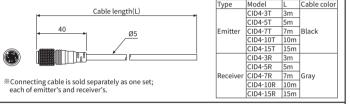
discontinued without notice.

**Be sure to follow cautions written in the instruction manual and the technical descriptions (catalog, homepage).

Model	BW20-□(P) BW40-□(P)				
Sensing method	Through-beam type				
Sensing distance	0.1 to 7m				
Min. sensing target	Opaque material of min. Ø30mm Opaque material of min. Ø				
Optical axis pitch	20mm	40mm			
Number of optical axes	8 to 48	4 to 24			
Sensing height	140 to 940mm	120 to 920mm			
Response time Max. 10ms					
Power supply	12-24VDC== ±10% (ripple P-P: max. ±10%)				
Current consumption	Emitter: max. 120mA, Receiver: max. 120mA				
Operation mode	Light ON fixed				
,	NPN or PNP open collector output Load voltage: max. 30VDC= . Load current: max. 100mA Residual voltage - NPN: max. 1VDC=, PNP: max. 2.5VDC				
Protection circuit	Reverse polarity protection circuit, output short over current protection circuit				
Light source	Infrared LED (850nm modulated)				
Insulation resistance	Over 20MΩ (at 500VDC megger)				
Synchronization type					
Self-diagnosis	Emitter/Receiver monitoring, direct light monitoring, over current monitoring				
Interference protection	Interference protection by master/slave function				
Noise immunity	±240V the square wave noise (pulse width 1µs) by the noise simulator				
Dielectric strength	1,000VAC 50/60Hz for 1minute				
Vibration	1.5mm amplitude at frequency of 10 to 55Hz (for 1 min) in each X, Y, Z direction for 2 hour				
	500m/s² (approx. 50G) in each X, Y, Z direction for 3 times				
	Ambient light: max. 100,000lx (receiver illum	nination)			
Ambient temp.	-10 to 55°C, storage: -20 to 60°C				
Ambient humi.	35 to 85%RH, storage: 35 to 85%RH				
Protection structure	IP65 (IEC standard)				
Material	Case: Aluminum, • Front cover, sensing part: Acrylic				
Cable	Ø5mm, 4-wire, 300mm, M12 connector				
Accessory	Bracket A: 4, Bracket B: 4, Bolt : 8				
Approval	C€				
Weight ^{®1}	BW20-48: approx. 2.1kg (approx. 1.4kg)	BW40-24: approx. 2.1kg (approx. 1.4kg			

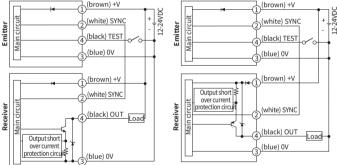
Structure LED color Emitter Receive Stable light ON Green Red Green Red Yellow Gree TEST(M/S) Stable light OFF Pin no. Cable color Emitter Receiver 12-24VDC 12-24VDC SYNC Black Gray/

Connecting Cable (sold separately)



■ Input·Output Circuit and Connections

OPNP open collector output O NPN open collector output

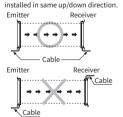


Operation Timing Diagram

Operation mode: Light ON fixed ON Level Unstable light ON level OFF Level Jnstable light OFF leve Stable light OFF level Receiver Unstable LED ON (yellow) OFF OFF LED (red) OFF Control Light ON OFF

Installation

© For Direction Of Installation Emitter and receiver should be installed in same up/down direction.

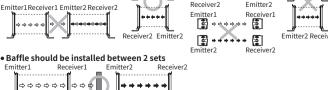


O For Reflection From The Surface Of Wall And Flat When installing it as below the light reflected from the surface of wall and flat will not be shaded. Please, check whether it to operates normally or not with a sensing target before using. (Interval distance: min. 0.5m)

Emitter Receiver

O For Prevention Of Interference

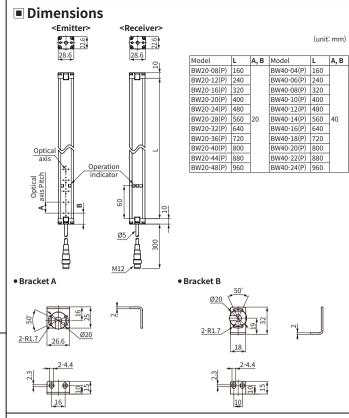
• Transmission direction should be opposite between 2 sets **3** +++++ **3** ++++ **5**



It should be installed out of the interference distance

	Emitter1	Receiver1		
	- 3 + + + +		Sensing distance (L)	Installation allowable distance (D)
E	_	_	0.1 to 3m	Min. 0.4m
à	Emitter2	Receiver2	Min. 3m	L×tan8°=min. L×0.14
	- (m)	++2	*There can be a little	e different based on installation envi

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



Bracket Mounting <Mounting the bracket A> <Mounting the bracket B>

Optical Axis Pitch/Number of Optical Axis/Sensing Height

Number of optical axes	•		•		•		•	•
D -	Model	Number of optical axes	Sensing height	Optical axis pitch	Model	Number of optical axes	Sensing height	Optical axis pitch
	BW20-08(P)	8	140mm		BW40-04(P)	4	120mm	
:	BW20-12(P)	12	220mm		BW40-06(P)	6	200mm	
Sensing height	BW20-16(P)	16	300mm		BW40-08(P)	8	280mm	
	BW20-20(P)	20	380mm		BW40-10(P)	10	360mm	
1	BW20-24(P)	24	460mm		BW40-12(P)	12	440mm	
Optical axis pitch	BW20-28(P)	28	540mm	20mm	BW40-14(P)	14	520mm	40mm
3 Optical axis pitci	BW20-32(P)	32	620mm		BW40-16(P)	16	600mm	
	BW20-36(P)	36	700mm		BW40-18(P)	18	680mm	
<u>II</u> ① → III	BW20-40(P)	40	780mm		BW40-20(P)	20	760mm	
Ţ Ţ	BW20-44(P)	44	860mm		BW40-22(P)	22	840mm	
	BW20-48(P)	48	940mm		BW40-24(P)	24	920mm	
8 8								

Operation Indicator

		Emitter		Receiver	Receiver			
Item Power ON		Indicato	Indicator		Indicator			
		Green	Red	Green	Yellow	Red	output Light ON	
		₩			-	-	_	
MASTE	MASTER operation		•		T-	—		
SLAVE operation		₩	₩		T-	I—	<u> </u>	
Test input		₩	•		T-	T-		
Break	Break of emitter		●		_	_		
Break	Break of light emitting element		•	(D)	▶	(D)	OFF	
= e	Normal installation		•	≎	•	•	OFF	
nstall	Hysteresis installation	•	•	•	₽	•	OFF	
Abnormal installation		•	•	•	•	•	OFF	
Stable	Stable light ON		_	\$	•	•	ON	
Unstal	Unstable light ON		_	\$	\ \	•	ON	
Unstal	ole dark ON		_	•	₽	₽	OFF	
Stable	Stable dark ON Break of receiver		_	•	•	≎	OFF	
Break			_	₽	•	●●	OFF	
Control output overcurrent		I —	_	•	•	₩	OFF	
Synch	Synchronous line noise			•	•	•	OFF	
Emitter failure (time out)				1	•	•	OFF	
Displa	y classification list							
✡	Light ON			₽◀		Flashing by		
Light OFF			(▶(quence-Flashing by 0.5 sec		
	Flashing by 0.5			$lackbox{1}{\circ}$	Cross-	Flashing tw	ice by 0.5 sec	
	or 🕽 🚺 🕽 Flashing simult	aneously b	y 0.5 sec					

Troubleshooting

Malfunction	Cause	Troubleshooting		
	Power supply	Supply the rated power.		
Not operating	Incorrect cable connection or disconnection	Check the wiring.		
	Rated connection failure	Use it within rated sensing distance.		
let enerating	Pollution by dirt of sensor cover	Remove dirt by soft brush or cloth.		
Not operating sometimes	Connector connection failure	Check the assembled part of the connector.		
	Out of rated sensing distance	Use within the rated sensing distanc		
Control output is OFF even though there is no target object.	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 break of light emitting element	Break of light emitting element			
LED displays for failure of emitter	Break of light emitting circuit Contact Autonics Corp.			
LED displays for failure of receiver	Break of light emitting receiving element			
LED displays for	Synchronous line incorrect connection or disconnection	Check the wiring.		
synchronous line	Break of synchronous circuit of emitter or receiver	Contact Autonics Corp.		
LED displays for	Control output line is shorten	Check the wiring.		
control output over current	Over load	Check the rated load capacity.		
LED displays for emitter malfunction	Emitter malfunction	Treat after checking the emitter disp LED.		

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.
- 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') 2 Altitude max. 2,000m ③Pollution degree 2 ④Installation category II
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