# **Autonics**

# **Area Sensor BW SERIES**

#### INSTRUCTION MANUAL





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

#### Safety Considerations

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**∆Warning** a u e o fo ow ese s uc o s may esu se ous u y o dea ⚠Caution a u e o fo ow ese s uc o s may esu pe so a u y o p oduc 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.)
- a u e o fo ow s s uc o may esu pe so a u y, eco om c osso fi e.

  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.

  a u e o fo ow s s uc o may esu exposo o fi e.
- 3. Do not connect, repair, or inspect the unit while connected to a power source.
- a u e o fo ow s s uc o may esu fi e.
  4. Check Connections before wiring.
- a u e o fo ow s s uc o may esu

  5. Do not disassemble or modify the unit.
- a u e o fo ow s s uc o may esu fi e.

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

Do o use spoduc w epu pose of u y peve o o fepoeco, as we as pace w e e eco om c oss maybe pese.

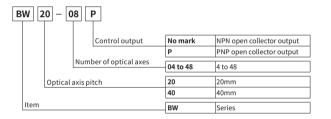
#### **⚠** Caution

#### 1. Use the unit within the rated specifications.

- a u e o fo ow s s uc o may esu fi e o p oduc damage.

  2. Use dry cloth to clean the unit, and do not use water or organic solvent.
- a u e o fo ow s s uc o may esu
- 3. Do not use a load over the range of rated relay specification.
  a u e o fo ow s s uc o may esu fi e, e ay b oke
- fie, eayboke, coac me, sua ofaue

# Ordering Information



# Function

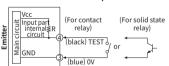
## O Emitter OFF (external diagnosis)

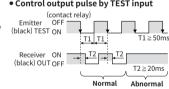
When TEST input (black) of emitter is 0V, emitting stops and red LED of emitter flashes. By stopping the emitting while TEST input of emitter is 0V, it is noticeable whether sensor operates in order from the external system.

(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





O Self-Diagnosis

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

Diagnosis items

\* Emitter: \*Damage in light emitter

\*Emitter failure (Time out)

\*Malfunction of MASTER/SLAVE line
(Operation in MASTER)

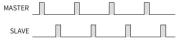
\*Operation in indicator displays each diagnosis items in different way. Refer to \*III Operation In Michael Comparison of the Comparison of th

nterference Protection

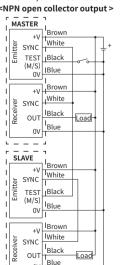
In case of using 2 sensors in parallel in order to extend sensing width, it may cause sensing error because as light interference.

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

• Time chart for MASTER/SLAVE transmission pulse

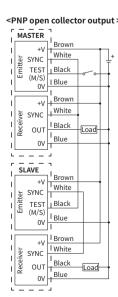


# • MASTER/SLAVE connections



0V Blue

descriptions (catalog, homepage).



\*Co ec ( ES )M/S of S AVE em e o SYNC of MAS ER.

 $\ensuremath{\mathrm{\%The}}$  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 Specifications hrough-beam type ensing method .1 to 7m Opaque material of min. Ø30 n. sensing target Opaque material of min. Ø50mr Optical axis pitch Sensing height 140 to 940mm 120 to 920mm 12-24VDC ±10% (ripple P-P: max. ±10%) Emitter: max. 120mA, Receiver: max. 120mA ver supply urrent consumption Light ON fixed 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

Reverse polarity protection circuit, output short over current protection circuit infrared LED (850mm modulated) ontrol output Light source Over 20MΩ (at 500VDC megger) Insulation resistance iming method by synchronous line mitter/Receiver monitoring, direct elf-diagnosis nterference protection ng, direct light monitoring, over current me nterference protection by master/slave function Noise immunity :240V the square wave noise (pulse width 1µs) by the noise simulator ielectric strength 1,000VAC 50/60Hz for 1minute 1.5mm amplitude at frequency of 10 to 55Hz (for 1 min) in each X, Y, Z direction for 2 hc 500m/s $^2$  (approx. 506) in each X, Y, Z direction for Z times Ambient light: max. 100,000k (receiver illumination) 10 to 55°C, storage: -20 to 60°C Shock Environment 25 to 85%RH, storage: 35 to 85%RH P65 (IEC standard) rotection structure • Case: Aluminum, • Front cover, sensing part: Acrylic Ø5mm, 4-wire, 300mm, M12 connector racket A: 4, Bracket B: 4, Bolt : 8 BW20-48: approx. 2.1kg (approx. 1.4kg)

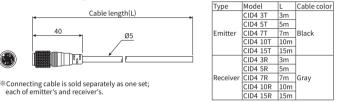
1: The weight includes packaging. The weight in parenthesis is for unit only.
The temperature and humidity of environment resistance is rated at non-freezing or condensation Structure LED color Emitter Receive Stable light ON Green Red Green POWER Red Yellow Gree Unstabl TEST(M/S) Stable light OFF Pin no. Cable color Emitter Receiver 12 24VDC 12 24VDC SYNC

BW40-24: approx. 2.1kg (approx. 1.4kg)

TEST(M/S) OUT

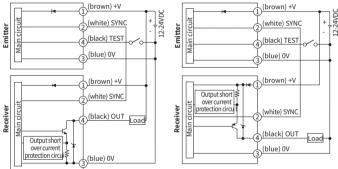
Connecting Cable (sold separately)

Black Gray

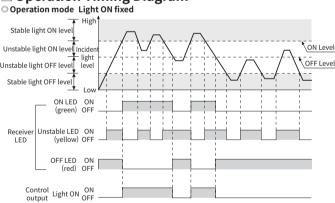


## ■ Input·Output Circuit and Connections

O NPN open collector output OPNP open collector output

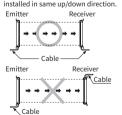


## Operation Timing Diagram



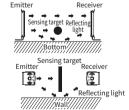
# Installation

○ For Direction Of nstallation 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 perates normally or not with a sensing target before using. (Interval distance: min. 0.5m)



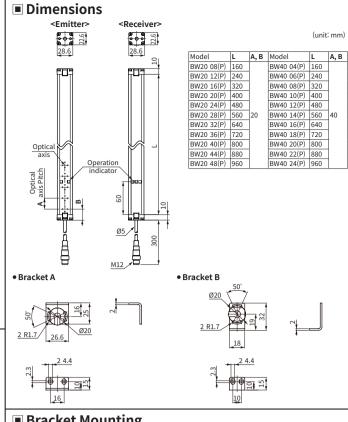
○ For Prevention Of nterference

• Transmission direction should be opposite between 2 sets **3** +++++ **3** ++++ **5** Emitter1 Receiver1 8 Emitter2 Receiv **3** ---- **3** Receiver2 Baffle should be installed between 2 sets

Receiver1 Emitter2 Receiver2

t siloutu be ilistatteu out	or the interference	e distance
Emitter1 Receiver1		
+ C + + + + + + + + + + + + + + + + + +	Sensing distance (L)	Installation allowable distance (D)
	0.1 to 3m	Min. 0.4m
Emitter2 Receiver2	Min. 3m	L tan8°=min. L 0.14
	*There can be a little	e different based on installation envir

e p ace w e e e se so s exposed d ec y o e fluo esce g g speeds a o g f eque cy.



# Bracket Mounting <Mounting the bracket A> <Mounting the bracket B> -2-

## Optical Axis Pitch/Number of Optical Axis/Sensing Height

Number of optical axes								
		Number of optical axes	beight	Optical axis pitch	Model	Number of optical axes	hoight	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	
<b>1 1 1 1 1 1 1 1 1 1</b>	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)	BW20 32(P)	32	620mm		BW40 16(P)	16	600mm	
	BW20 36(P)	36	700mm		BW40 18(P)	18	680mm	
<u>∏</u> ① → <u> </u>	BW20 40(P)	40	780mm		BW40 20(P)	20	760mm	
Ţ	BW20 44(P)	44	860mm		BW40 22(P)	22	840mm	
A A	BW20 48(P)	48	940mm		BW40 24(P)	24	920mm	
8								

#### Operation Indicator

1				Emitter		F	Receiver			
Item		Indicator		I	Indicator			Control		
				Green	Red	(	Green	Yellow	Red	output Light ON
-	Powe	r ON		₽			_	_	<b> </b> -	_
-	MAST	ER operation	ı	₽	•		_	<b>—</b>	T-	
-	SLAVI	E operation		₽	₽		_	<b>—</b>	T-	
-	Test i	nput		₽	•		_	<u> </u>	T-	_
-	Break	of emitter		<b>D</b>	<b>●</b>		_	_		_
-	Break	of light emi	tting element	▶	•		Ð	<b>●</b>	▶	OFF
-	= 0	Normal ins	tallation		•	3	ф.		•	OFF
-	nstall	Hysteresis	installation	•	•			₩	•	OFF
-		Abnormal i	nstallation	•	•		•	•	•	OFF
┨	Stabl	e light ON		_	_	3	¢-			ON
-	Unsta	able light ON				3	ф.	₩	•	ON
-	Unsta	able dark ON		<b>—</b>		•	•	≎	⇔	OFF
-	Stabl	e dark ON			_	•	•	•	≎	OFF
-	Break	of receiver		_	_		₽₽	•	●●	OFF
-	Contr	rol output ov	ercurrent	I —			₽	•	⇔	OFF
-	Synch	nronous line	noise	<u> </u>			)	•	•	OFF
1	Emitt	er failure (tir	ne out)			(	<u> </u>	<b>1</b>	1	OFF
-		ay classificat	ion list							
-	≎		Light ON			₽●		Cross F	lashing by	0.5 sec
-	Light OFF									
ı	•		Flashing by 0.5				◑◑	Cross F	lashing tw	ice by 0.5 sec
-		or 🕽 🕽 🕽	Flashing simulta	aneously by	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.		
Not operating	Pollution by dirt of sensor cover	Remove dirt by soft brush or cloth.		
sometimes	Connector connection failure	Check the assembled part of the connector.		
	Out of rated sensing distance	Use within the rated sensing distance		
Control output is OFF even though there is	There is an obstacle to cut off the light emitted between emitter and receiver	Remove the obstacle.		
no target object.	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	g 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 displ LED.		

# Cautions during Use

1. o ow s uc o s Cau o s du g Use . O e w se, may cause u expec ed acc de s. 2. 12-24VDC powe supp y s ou d be su a ed a d m ed vo age/cu e o C ass 2, SE V powe supp y dev ce.

Sulps epoduc,1secafe suppy gpowe.

We us gsepa a epowe suppy fo ese so a doad, suppy powe ose so fis.

4. We us gsw c g mode powe suppy o suppy e powe, g ou d .G. e m a a d co ec a co de se be wee 0Va d .G. e m a o emove o se.

5. W e co ec g a DC e ay o o e duc ve oad, emove su ge by us g d odes o va s o s. 6. We as soo as poss bead keep away fom govoage eso powe es, opeve su ge

s u may be used e fo ow ge v o me s. ① doos( eevo me codo aed Spec fica os) ②A ude max. 2,000m

③ o u o deg ee 2 ④ s a a o ca ego y

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