

Autonics

Area Sensor

BW SERIES

INSTRUCTION MANUAL



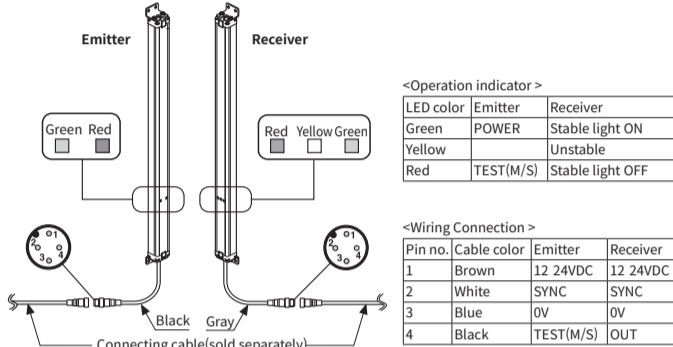
Thank you for choosing our Autonics product.
Please read the following safety considerations before use.

Specifications

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. Ø50mm
Optical axis pitch	20mm	40mm
Number of optical axes	8 to 48	4 to 24
Sensing height	140 to 940mm	20 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	
Control output	NPN or PNP open collector output • Load voltage: max. 30VDC • 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	Timing method by synchronous line	
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 hours	
Shock	500m/s ² (approx. 50G) in each X, Y, Z direction for 3 times	
Environment	Ambient illu.: Ambient light: max. 100,000lx (receiver illumination) 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	CE	
Weight*	BW20-48: approx. 2.1kg (approx. 1.4kg) BW40-24: approx. 2.1kg (approx. 1.4kg)	

*1: The weight includes packaging. The weight in parenthesis is for unit only.
*2: The temperature and humidity of environment resistance is rated at non-freezing or condensation.

Structure



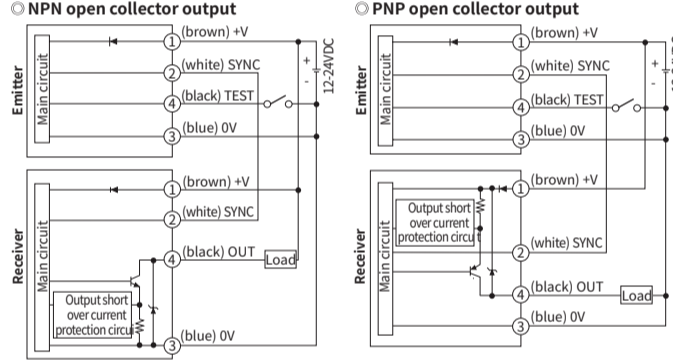
Connecting Cable (sold separately)

Cable length(L) ≥ 40 mm

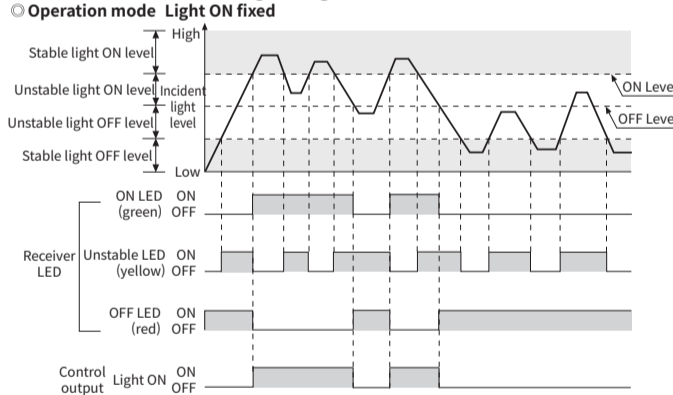
Type	Model	L	Cable color
Emitter	CID4 3T	3m	Black
	CID4 5T	5m	
	CID4 7T	7m	
	CID4 10T	10m	
	CID4 15T	15m	
Receiver	CID4 3R	3m	Gray
	CID4 5R	5m	
	CID4 7R	7m	
	CID4 10R	10m	
	CID4 15R	15m	

*Connecting cable is sold separately as one set, each of emitter's and receiver's.

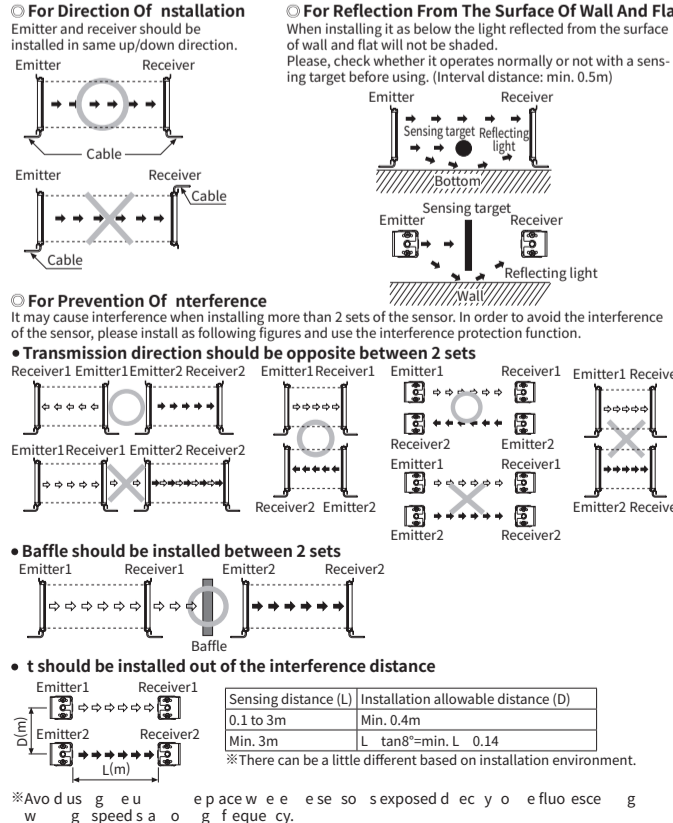
Input-Output Circuit and Connections



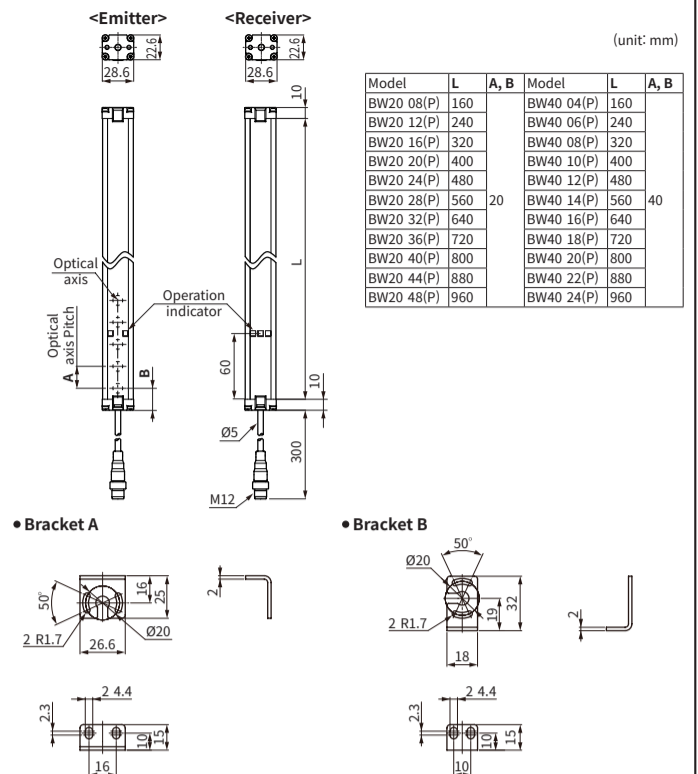
Operation Timing Diagram



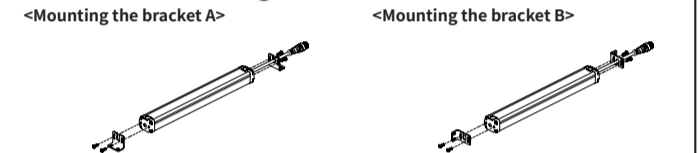
Installation



Dimensions



Bracket Mounting



Optical Axis Pitch/Number of Optical Axis/Sensing Height

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	20mm	BW40 04(P)	4	120mm	40mm
BW20 12(P)	12	220mm	20mm	BW40 06(P)	6	200mm	40mm
BW20 16(P)	16	300mm	20mm	BW40 08(P)	8	280mm	40mm
BW20 20(P)	20	380mm	20mm	BW40 10(P)	10	360mm	40mm
BW20 24(P)	24	460mm	20mm	BW40 12(P)	12	440mm	40mm
BW20 28(P)	28	540mm	20mm	BW40 14(P)	14	520mm	40mm
BW20 32(P)	32	620mm	20mm	BW40 16(P)	16	600mm	40mm
BW20 36(P)	36	700mm	20mm	BW40 18(P)	18	680mm	40mm
BW20 40(P)	40	780mm	20mm	BW40 20(P)	20	760mm	40mm
BW20 44(P)	44	860mm	20mm	BW40 22(P)	22	840mm	40mm
BW20 48(P)	48	940mm	20mm	BW40 24(P)	24	920mm	40mm

Operation Indicator

Item	Emitter Indicator		Receiver Indicator			Control output Light ON
	Green	Red	Green	Yellow	Red	
Power ON	☀	●	—	—	—	—
MASTER operation	☀	●	—	—	—	—
SLAVE operation	☀	●	☀	—	—	—
Test input	☀	☀	—	—	—	—
Break of emitter	☀	☀	—	—	—	—
Break of light emitting element	☀	☀	☀	●	●	OFF
Install mode	Normal installation	●	☀	●	●	OFF
	Hysteresis installation	●	☀	●	●	OFF
	Abnormal installation	●	☀	●	●	OFF
Stable light ON	—	—	☀	●	●	ON
Unstable light ON	—	—	☀	●	●	ON
Unstable dark ON	—	—	☀	☀	☀	OFF
Stable dark ON	—	—	☀	●	●	OFF
Break of receiver	—	—	☀	☀	☀	OFF
Control output overcurrent	—	—	☀	☀	☀	OFF
Synchronous line noise	—	—	☀	●	●	OFF
Emitter failure (time out)	—	—	☀	●	●	OFF

Display classification list
 ☀ Light ON
 ☀ Light OFF
 ● Flashing by 0.5 sec
 ● or ● Flashing simultaneously by 0.5 sec

Troubleshooting

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

Cautions during Use

- Use the sensor in a safe manner. If used incorrectly, it may cause unexpected accidents.
- 12-24VDC power supply should be supplied to the sensor. Do not connect to AC.
- Use the sensor with the rated power supply.
- Use the sensor in a safe manner. Do not touch the sensor when the power is on.
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Safety Considerations

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Warning: Use the sensor in a safe manner. Do not touch the sensor when the power is on.

Caution: Use the sensor in a safe manner. Do not touch the sensor when the power is on.

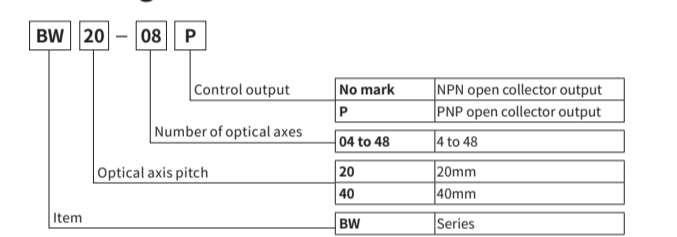
Warning

- 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.)
- 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.
- Do not connect, repair, or inspect the unit while connected to a power source.
- Check Connections before wiring.
- Do not disassemble or modify the unit.
- This product is not safety sensor and does not observe any domestic nor international safety standard.

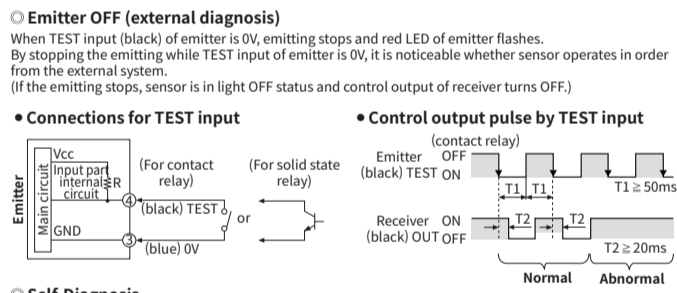
Caution

- Use the unit within the rated specifications.
- Use dry cloth to clean the unit, and do not use water or organic solvent.
- Do not use a load over the range of rated relay specification.

Ordering Information



Function



Self-Diagnosis

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

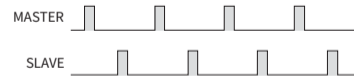
Diagnosis items

- Emitter: ① Damage in light emitter, ② Emitter failure (Time out), Malfunction of MASTER/SLAVE line (Operation in MASTER)
 - Receiver: ① Damage in light receiver, ② Control output over current, Malfunction, disconnection, or circuit break of synchronous line.
- *Operation indicator displays each diagnosis items in different way. Refer to "Operation Indicator".

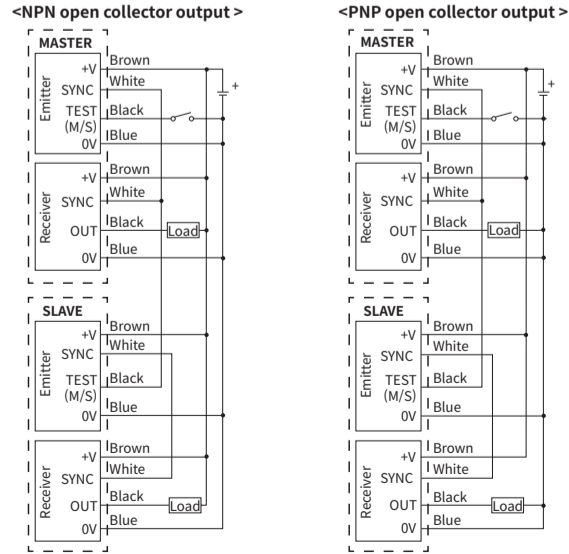
Interference Protection

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 the light interference.

Time chart for MASTER/SLAVE transmission pulse



MASTER/SLAVE connections



*Connect (ES)M/S of Slave to SYNC of Master.

*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).