

Autonics

Cross-beam Area Sensor BWC 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 "Caution for your safety" to avoid accidents or damages as using it correctly.

- ※The meaning of "Warning" and "Caution" is as follows;
- Warning** In case a serious injury or death may be occurred.
- Caution** In case a little injury or damage of this unit may be occurred.
- ※The meaning of the mark on the product and manual is as follows;
- ▲ is a caution mark for danger in special condition.

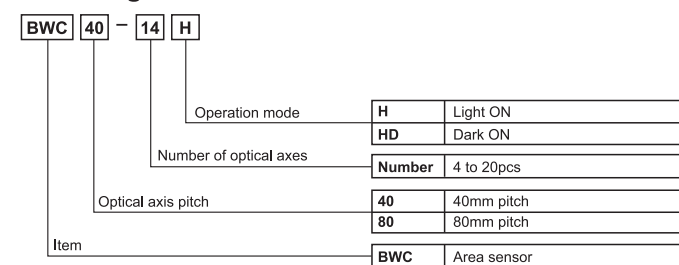
Warning

- 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 intrusion 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)> are 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 sensing 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

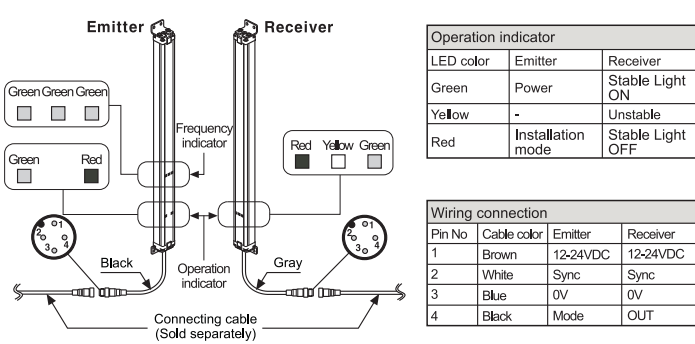
Caution

- This unit shall not be used outdoors. It may 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 the outdoor environment such as temperatures or humidity. (Ex: rain, dirt, frost, sunlight, condensation, etc.)
- Do not wire this in power ON status. It may cause an electric shock.
- Please observe the rated specifications. It may cause malfunction or shorten the life cycle of the product.
- Do not use this unit where there are severe vibration. It may cause fire or malfunction.
- In cleaning the unit, do not use water or organic solvent. It may cause an electric shock or fire.

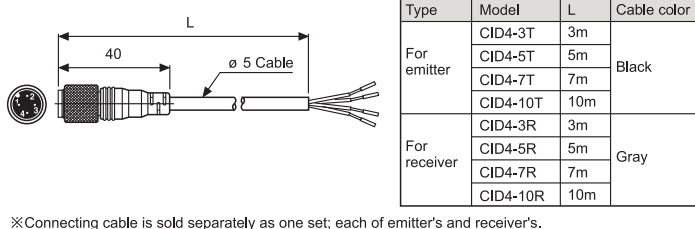
Ordering information



Structure



Connection cable



Function

- Transmitted light frequency changing function**
You can change transmitted light frequency to prevent interference from several units. To change transmitted light frequency, input 0V to 4th terminal (Black) MODE (for over 1 sec) during normal operation. Frequency type is displayed by frequency indicator.

Frequency	Frequency indicator		
	Green1	Green2	Green3
Frequency A	●	○	○
Frequency B	○	●	○
Frequency C	○	○	●
Frequency D	○	○	○
Frequency E	○	○	○

- Installation mode function**
This function is for stable installation. To enter installation mode, supply power with inputting 0V to 4th terminal (Black) MODE.

Item	Emitter operation indicator			Receiver operation indicator			Control output
	Green	Red	Yellow	Green	Yellow	Red	
Normal installation	●	○	○	○	○	○	OFF
Hysteresis section	○	○	○	○	○	○	OFF
Abnormal installation	○	○	○	○	○	○	OFF

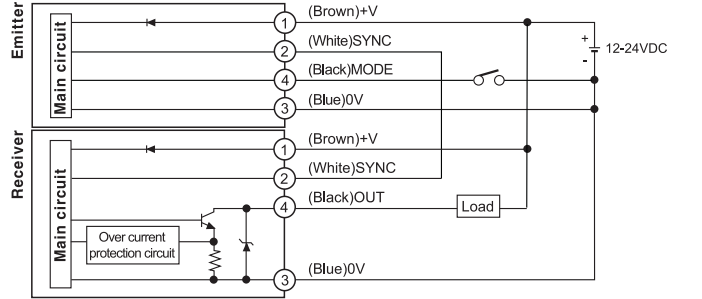
- Self-diagnosis function**
If there is checked malfunction during normal operation by regular self-diagnosis, control output turns OFF and operation indicator displays the state. (Refer to "Operation indicator display".)

 - Diagnosis item
 - ① Break of light emitting element
 - ② Break of emitter
 - ③ Break of adjacent emitting element more than 2ea.
 - ④ Break of receiver
 - ⑤ Emitter failure
 - ⑥ Malfunction of synchronous cable

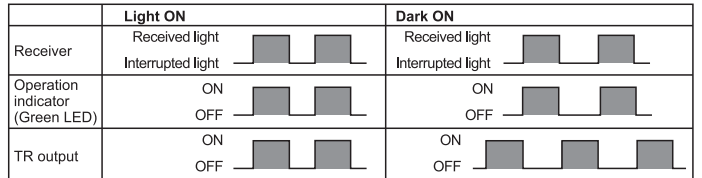
Specifications

Model	BWC40-□□H	BWC40-□□HD	BWC80-14H	BWC80-14HD
Sensing type	Through-beam type			
Sensing distance	1.0 to 7.0m			
Sensing target	Opaque material of min ø 50mm		Opaque material of min ø 90mm	
Optical axis pitch	40mm		80mm	
Number of optical axis	4/10/12/16/18/20pcs		14pcs	
Sensing height	120 to 760mm		1,040mm	
Beam pattern	3 Point cross beam netting type			
Power supply	12-24VDC± 10%(Ripple P-P: Max. 10%)			
Reverse polarity protection circuit	Built in			
Current consumption	Max. 100mA			
Control output	NPN open collector output · Load voltage: Max. 30VDC, · Load current: Max. 100mA, · Residual voltage: Max. 1V			
Operation mode	Light ON	Dark ON	Light ON	Dark ON
Short-circuit protection	Built-in			
Response	Max. 50ms			
Light source	Infrared LED(850nm modulated light type)			
Synchronization type	Timing method by synchronous cable			
Self-diagnosis	Transmitted-received light monitoring, direct light monitoring, output circuit monitoring			
Interference protection	Interference protection by frequency changing setting			
Environment	Ambient illumination: Ambient light: Max. 100,000lx			
	Ambient temperature: -10 to 55°C, Storage: -20 to 60°C			
	Ambient humidity: 35 to 85%RH, Storage: 35 to 85%RH			
Protection	IP65(IEC standard)			
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 ² (50G) in X, Y, Z directions for 3 times			
Material	Case: Aluminum, Sensing part and indicator: Acrylic			
Accessory	Bracket A: 4ea, Bracket B: 4ea, Fixing bolt: 8ea			
Cable	ø 5, 4wire, M12 connector			
Approval	CE			
Unit weight	Approx. 1.7kg (based on BWC80-14H)			

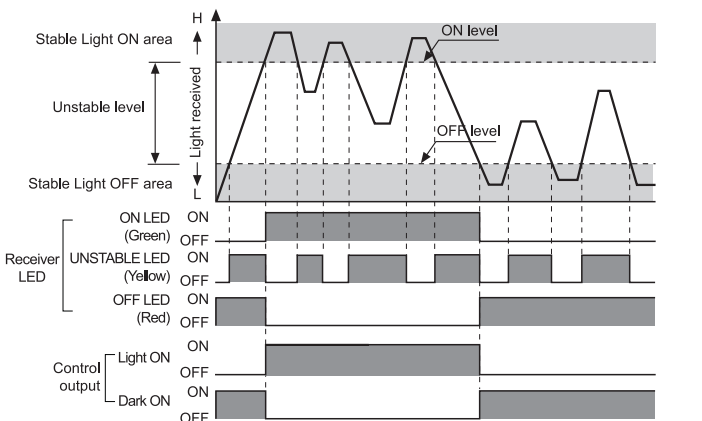
Control output diagram



Operation mode



Operation timing diagram



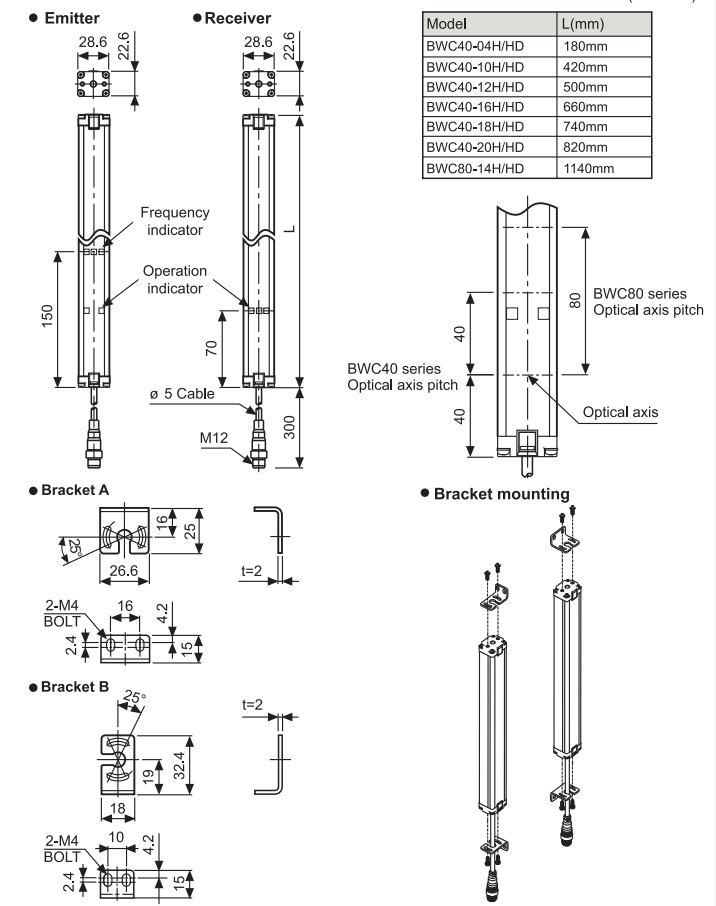
Installations

- For the first installation, enter installation mode.
 - ① Entry method for installation mode: Supply power with inputting 0V to 4th terminal (Black) MODE.
 - ② After entering installation mode, install the unit at the position where green LED of receiver operation indicator turns ON.
 - ③ After installation, re-supply power to the unit.
- For direction of installation**
Emitter and receiver should be installed in same up/down direction.
- For reflection from the surface of wall and flat**
When installing it as below, the light reflected from the surface of wall and flat is not shaded. Please check whether it operates normally or not with a sensing target before using. (Interval distance: Min. 0.5m)

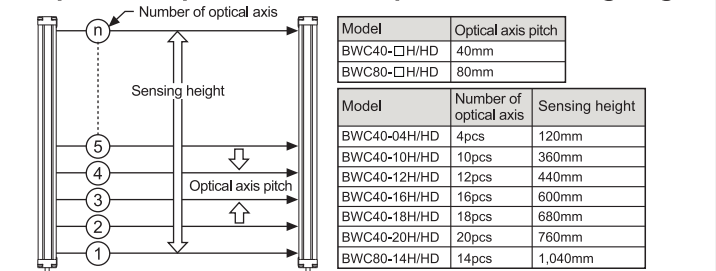
For protection of interference

- It may cause interference when installing more than 2 sets of the sensor. In order to avoid the interference of the sensor, please install as following figures and use the transmitted light frequency changing function.
 - Transmission direction should be opposite between 2 sets.**
 - Baffle should be installed between 2 sets.**
 - It should be installed out of the interference distance.**
- | Sensing distance (L) | Installation allowable distance (D) |
|----------------------|-------------------------------------|
| 1 to 3m | Min. 0.4m |
| Min. 3m | L x tan8° = Min. L x 0.14 |
- ※It may be a little different based on installation environment.

Dimensions



Optical axis pitch/Number of optical axis/Sensing height



Indicator display

Item	Emitter		Receiver			Control output	
	Indicator	Indicator	Green	Yellow	Red	Light ON	Dark ON
Power supply	●	○	●	○	○	ON	OFF
Break of emitter	○	○	○	○	○	OFF	ON
Break of light emitting element	○	○	○	○	○	OFF	ON
Break of adjacent emitting element more than 2ea.	○	○	○	○	○	OFF	ON
Stable light ON	○	○	○	○	○	ON	OFF
Unstable light ON	○	○	○	○	○	ON	OFF
Unstable light OFF	○	○	○	○	○	OFF	ON
Stable light OFF	○	○	○	○	○	OFF	ON
Break of receiver	○	○	○	○	○	OFF	ON
Control output over current	○	○	○	○	○	OFF	ON
Synchronous line malfunction	○	○	○	○	○	OFF	ON
Emitter failure(Time out)	○	○	○	○	○	OFF	ON

Troubleshooting

Malfunction	Cause	Troubleshooting
Non-operation	Power supply	Supply the rated power.
Non-operation in sometimes	Cable incorrect connection, or disconnection	Check the wiring connection
	Out of rated sensing distance	Use it within rated sensing distance.
Control output is OFF even though there is not a target object.	Pollution by dirt of sensor cover	Remove dirt by soft brush or cloth.
	Connector connection failure	Check the assembled part of the connector
Operation indicator displays break of emitter	Out of the rated sensing distance	Use it within the rated sensing distance.
	There is an obstacle to cut off the emitted light between emitter and receiver.	Remove the obstacle.
Operation indicator displays break of receiver	There is strong electric wave or noise generator such as motor, electric generator, or high voltage line, etc.	Put away the strong electric wave or noise generator.
	Break of emitter	Contact our company.
Operation indicator displays break of light emitting element	Break of receiver	Contact our company.
	Break of light emitting element	Contact our company.
Operation indicator displays emitter failure	Emitter failure	Contact our company.
	Bad wiring connection of synchronous cable in emitter and receiver	Check the wiring connection in emitter and receiver.
Check the wiring connection in emitter and receiver.	Control output line is shorted out.	Check the wiring connection.
	Over load	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. 0.5m) from flat part because malfunction may be caused due to certain amount of light reflected 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 II

Switching power supply (SMPS) +V, 0V, F.G., Sensor +V, 0V

Capacitor: C(0.001 to 0.1µF/400V) Condenser for removing noise

※It may cause malfunction if above instruction are not followed.

Major products

- Photoelectric sensors
- Fiber optic sensors
- Door sensors
- Door side sensors
- Area sensors
- Proximity sensors
- Pressure sensors
- Rotary encoders
- Connector/Sockets
- Switching mode power supplies
- Control switches/Lamps/Buzzers
- I/O Terminal Blocks & Cables
- Stepper motors/drivers/motion controllers
- Graphic/Logic panels
- Field network devices
- Laser marking system(Fiber, CO₂, Nd:YAG)
- Laser welding/soldering system
- Temperature controllers
- Temperature/Humidity transducers
- SSR/Power controllers
- Counters
- Timers
- Panel meters
- Tachometer/Pulse(Rate) meters
- Rotary encoders
- Sensor controllers
- Display units

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