



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 these instructions and review them before using this unit.
- Please observe the cautions that follow;
  - Warning** Serious injury may result if instructions are not followed.
  - Caution** Product may be damaged, or injury may result if instructions are not followed.
- The following is an explanation of the symbols used in the operation manual.
  - Caution:** Injury or danger may occur under special conditions.

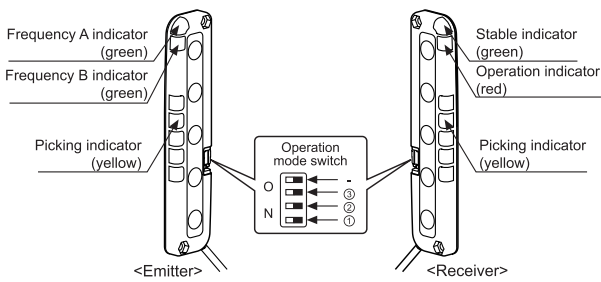
**Warning**

- 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 irruption 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)> is happened by using as follows;
  - Safety equipment for protecting a hand or other parts of worker at dangerous area.
  - Interlock on mechanical equipment.
  - Safety sensor on mechanical equipment for stopping it when detecting a hand or other parts of worker.
  - Using for detecting a hand or other parts of worker at dangerous area and controlling door or window.

**Caution**

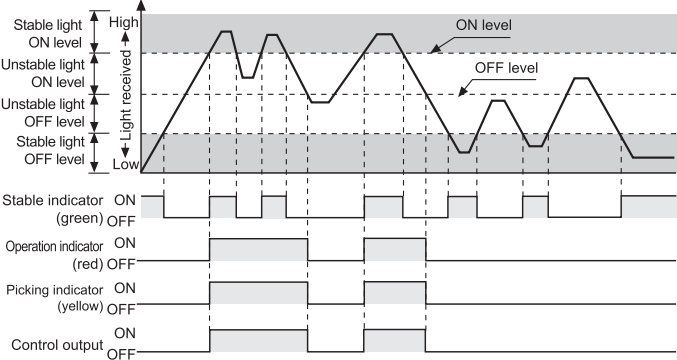
- This unit shall not be used outdoors. It might shorten the life cycle of the product or cause electric shock. Use this product inside only. Do not use the product outdoors or location subject to temperatures or humidity outside. (Ex: rain, dirty, frost, sunlight, condensation, etc.)
- Do not wire this in power ON status. It may cause electric shock.
- Please use this in the rated specifications. It may cause malfunction or the life cycle shorter.
- Please ground Frame Ground(F.G.) terminal when supplying power by switching power.
- Avoid using this unit where there are fluorescent light with high frequency, high speed start or signal light affecting to sensing ability.
- It may be not able to shade the light by reflecting from surface of a wall when installing it in 0.3m from wall or flat parts. Please keep <Installation>.
- It may cause malfunction from interference when using them closely in parallel. Please keep <Installation>.
- Please install emitter and receiver in same direction. The emitting light is not transferred to receiver if installed in opposite direction.
- Avoid using this unit where there are severe vibration. It may cause a fire and malfunction.
- In cleaning the unit, do not use water or an oil-based detergent. It may cause electric shock or fire.
- Please make power and output line shorten as possible, or it may cause malfunction by surge etc.

**Structure**



No	Function	Switch OFF	Switch ON
①	Selection of transmission frequency	Frequency A	Frequency B
②	Selection of operation indicator	Lighting indicator	Flashing indicator
③	Emitter	Selection of sensing distance mode	Long mode
④	Receiver	Selection of operation mode	Light ON

**Timing diagram operation**



The above diagram is the state of operation for Light ON, but in case of Dark ON, it is opposite operation against Light ON.  
Picking indicator is operated by connecting picking input line and output line. (If not connecting these, picking indicator is OFF regardless of operation mode.)

**Indicator display**

Item	Emitter Indicator		Receiver Indicator		Control output
	Green	Green	Picking Indicator	Picking indicator	
Power supply	●	●	-	-	-
FREQ. A operation	●	●	-	-	-
FREQ. B operation	●	●	-	-	-
Stable light ON	-	-	●	●	ON
Flashing function ON	-	-	●	●	ON
Unstable light ON	-	-	●	●	ON
Unstable light OFF	-	-	●	●	OFF
Stable light OFF	-	-	●	●	OFF
Over current	-	-	●	●	OFF

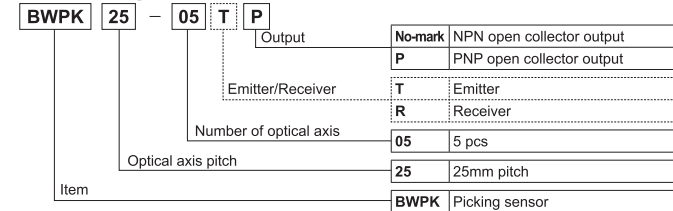
**Display classification list**

- Lighting
- Light out
- Flashing by 0.3sec.
- Flashing simultaneously by 0.3 sec.

The operations of 'Operation indicator' and 'Picking indicator(Red)' for stable light ON level, unstable light ON level, unstable light OFF level, and stable light OFF level are for Light ON. (In case of overcurrent, control output is OFF regardless of operation mode.)

The above specifications are subject to change and some models may be discontinued without notice.

**Ordering information**



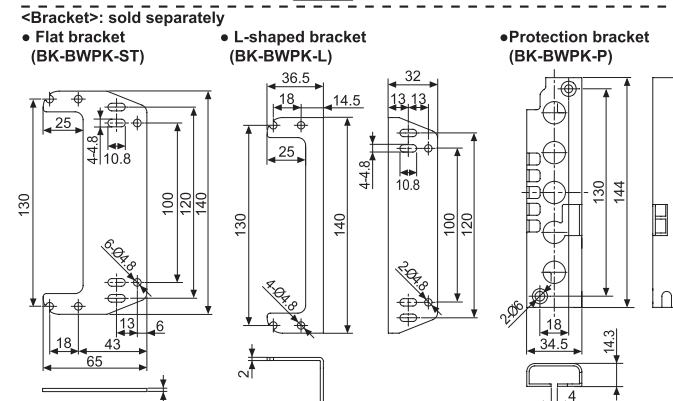
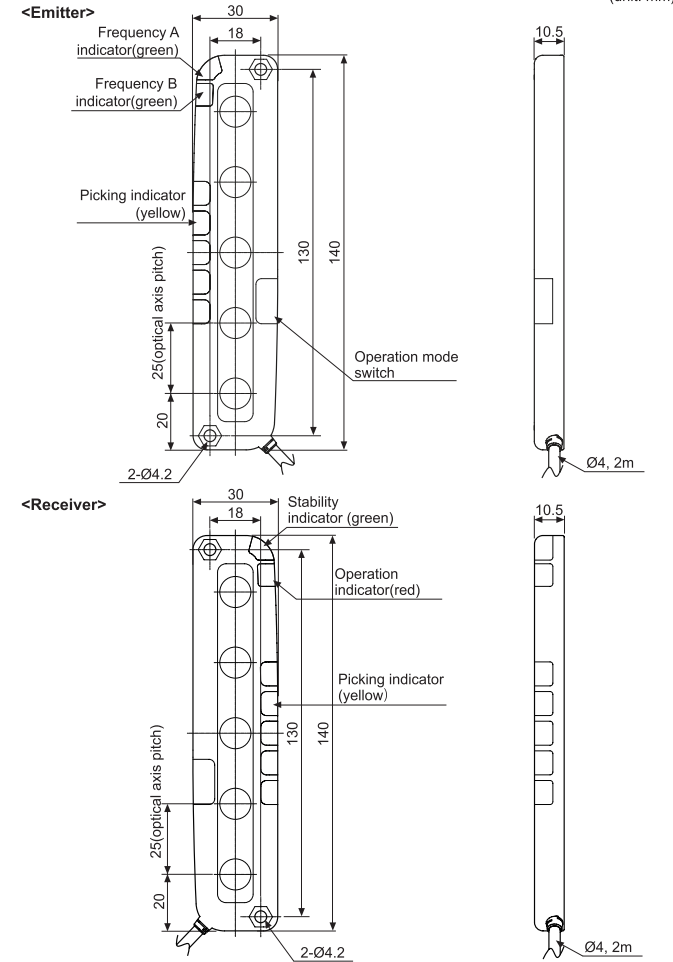
This information is intended for product management. (no need to refer when selecting a model)

**Specification**

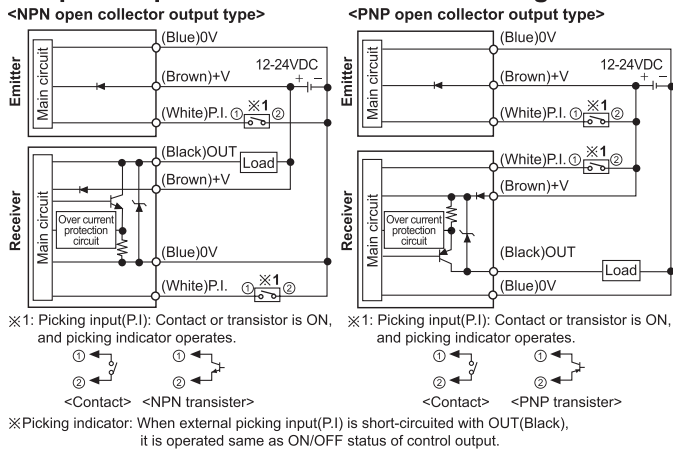
Model	NPN open collector output PNP open collector output	BWPK25-05 BWPK25-05P
Sensing type	Transmitted beam type	
Sensing distance	Long mode	0.1 to 3m
	Short mode	0.05 to 1m
Sensing target	Opaque materials of min. Ø35mm	
Optical axis pitch	25mm	
Number of optical axis	5pcs	
Sensing width	100mm	
Power supply	12-24VDC ±10%(ripple P-P: max. 10%)	
Protection circuit	Built-in	
Current consumption	Emitter: Max. 60mA, Receiver: Max. 60mA	
Control output	NPN or PNP open collector output • Load voltage: Max. 30VDC • Load current: Max. 150mA • Residual voltage - NPN: Max. 1V, PNP: Max. 2.5V	
Operation mode	Switching of Light ON/Dark ON by switch	
Short-circuit protection	Built-in	
Response time	Max. 30ms	
Light source	Infrared LED(850nm modulated)	
Interference protection	Interference protection by transmission frequency selection	
External picking input	Non-contact or contact input NPN open collector output: Lighting(0-2V), Light out(5-30V or open) PNP open collector output: Lighting(4-30V), Light out(0-3V or open)	
Environment	Ambient illumination	Sunlight: Max. 10,000lx, Incandescent lamp: Max. 3,000lx
	Ambient temperature	-10 to 55°C, Storage: -20 to 60°C
	Ambient humidity	35 to 85%RH, Storage: 35 to 85%RH
	Noise resistance	±240V the square wave noise(pulse width 1µs) by the noise simulator
	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 <sup>2</sup> (50G) in each of X, Y, Z directions for 3 times
	Protection	IP40(IEC standard)
	Material	Case: PC/ABS, Sensing part: PMMA
	Cable	Ø4.0mm, 4-wire, Length: 2m(emitter: Ø4.0mm, 3-wire, length: 2m) (AWG22, core diameter: 0.08mm, number of cores: 60, insulator diameter: Ø1.25mm)
Approval	CE	
Weight	Approx. 220g (approx. 180g)	

1: The weight is with packaging and the weight in parentheses is only unit weight.  
The temperature or humidity mentioned in Environment indicates a non freezing or condensation environment.

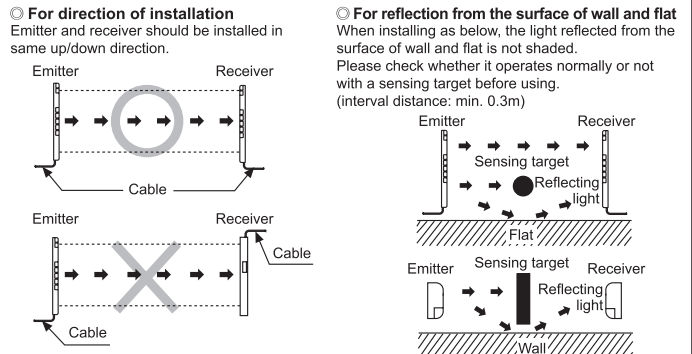
**Dimensions**



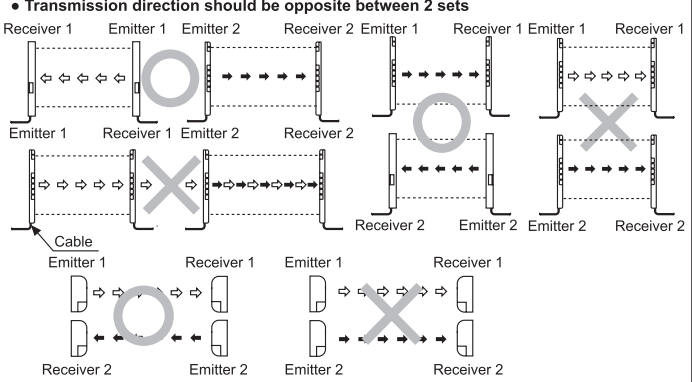
**Input/Output circuit and connection diagram**



**Installations**



**For prevention 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 interference prevention function not to let light of the other emitter in a receiver.



**Baffle should be installed between 2 sets**

**It should be installed out of the interference distance**

Sensing distance(L)	Allowable installation of distance(D)
0.1 to 1m	Min. 0.1m
Min. 1m	Min. 0.2m

It may be a little different based on installation environment.

**Function**

**Switching of Long/Short mode (selectable sensing distance)**  
The rated sensing distance is 3m for Long mode, 1m for short mode. It minimizes interference setting as short mode when using more than 3 sets closely together.

**Interference protection**  
In case of using 2 pcs of sensor in serial or parallel in order to extend sensing width, it may cause sensing error because of light interference. This function is operating a sensor in transmission frequency A and another sensor in transmission frequency B to avoid these sensing errors by the light interference.

**Light ON/Dark ON mode**  
The control output is ON when it is light ON in Light ON and the control output is ON when it is light OFF in Dark ON. It is available to select with user's preference.

**Switching of Lighting/Flashing of Picking indicator**  
Picking indicator is lighting or flashing to make out work sensing operation more easily.

Operation mode switch(Emitter)	Rated sensing distance
Long mode	3m
Short mode	1m

Operation mode switch(Emitter+Receiver)	Frequency A, B indicator(Emitter)
Sensor ① (Transmission frequency A)	Frequency A(green)
Sensor ② (Transmission frequency B)	Frequency B(green)

Operation mode switch(Receiver)	Control output operation
Light ON	It is ON when it is light ON.
Dark ON	It is ON when it is light OFF.

Operation mode switch(Emitter+Receiver)	Picking indicator operation
Lighting	Lighting indicator
Flashing	Flashing indicator

**Troubleshooting**

Malfunction	Cause	Troubleshooting
Non-operation	Power Cable incorrect connection or disconnection	Supply rated power. Check the wiring.
Non-operation in sometimes	Rated connection failure Pollution by dirt of sensor cover	Use it within rated sensing distance. Remove dirt by soft brush or cloth.
Control output is OFF even though there is not a target object.	Cable connection failure Out of rated sensing distance	Check the assembled part of the cable. Use it within rated sensing distance.
LED displays for over current	There is an obstacle to cut off the light emitted between emitter and receiver There is a strong electric wave or noise generator such as motor, electric generator, high voltage line etc. Control output line is shorten Over load	Remove the obstacle. Put away the strong electric wave or noise generator. Check the wiring. 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 occurring by the emitter of another set when using emitter/receiver more than 2 sets closely.
  - Please install this sensor at proper height (Min. approx. 0.3m) from flat part because it may be caused due to certain amount of light received 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 surge 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 mode 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
- It may cause malfunction if above instructions 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, CO<sub>2</sub>, Nd:YAG)
- Laser welding/soldering system
- Temperature controllers
- Temperature/Humidity transducers
- SSR/Power controllers
- Counters
- Timers
- Panel meters
- Tachometer/Pulse(Rate)meters
- Display units
- Sensor controllers

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