

# Slim Plastic Single-Beam Picking Sensors



## BWPK Series PRODUCT MANUAL

For your safety, read and follow the considerations written in the instruction manual, other manuals and Autonics website.

The specifications, dimensions, etc. are subject to change without notice for product improvement. Some models may be discontinued without notice.

### Features

- Flat and compact size : W 30 × H 140 × D 9.9 mm
- High strength PC / ABS plastic body
- Sensing distance switch (long / short mode switch)
- Mutual interference prevention function (frequency switching), Picking indicators on emitter and receiver, Light ON/Dark ON operation mode switch
- IP40 protection structure (IEC standard)

### Safety Considerations

- Observe all 'Safety Considerations' for safe and proper operation to avoid hazards.
- ⚠ symbol indicates caution due to special circumstances in which hazards may occur.

**⚠ Warning** Failure to follow instructions may result in serious injury or death.

**01. 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.

**02. 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.

**03. Do not connect, repair, or inspect the unit while connected to a power source.**

Failure to follow this instruction may result in fire.

**04. Check 'Connections' before wiring.**

Failure to follow this instruction may result in fire.

**05. Do not disassemble or modify the unit.**

Failure to follow this instruction may result in fire.

**06. 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** Failure to follow instructions may result in injury or product damage.

**01. Use the unit within the rated specifications.**

Failure to follow this instruction may result in fire or product damage.

**02. Use a dry cloth to clean the unit, and do not use water or organic solvent.**

Failure to follow this instruction may result in fire.

**03. 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 or contact failure.

### Cautions during Use

- Follow instructions in 'Cautions during Use'. Otherwise, It may cause unexpected accidents.
- 12 - 24 VDC≐ power supply should be insulated and limited voltage/current or Class 2, SELV power supply device.
- 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 0 V and F.G. terminal to remove noise.
- When connecting a DC relay or other inductive load, remove surge by using diodes or varistors.
- Wire as short as possible and keep away from high voltage lines or power lines, to prevent surge and inductive noise.
- This unit may be used in the following environments.
  - Indoors (in the environment condition rated in 'Specifications')
  - Altitude max. 2,000 m
  - Pollution degree 2
  - Installation category II

## Cautions during Installation

- Be sure to install this product by following the usage environment, location, and specified ratings. Consider the listed conditions below.
  - Installation environment and background (reflected light)
  - Sensing distance and sensing target
  - Direction of target's movement
  - Feature data
- If the installation environment has reflected light from the wall or floor, an interval distance of at least 0.3 m is required.
- When installing multiple sensors closely, it may result in malfunction due to mutual interference. Install it by referring to the interference protection and the installation method in the manual.
- Do not use in places where the light-receiving sensor is exposed to direct sunlight or where the ambient illumination is higher than the specification.
- Do not impact with a hard object or bend the cable excessively. That could decrease the product's water resistance.
- Use this product after the test. Check whether the indicator works appropriately for the positions of the detectable object.

## Ordering Information

This is only for reference, the actual product does not support all combinations. For selecting the specified model, follow the Autonics website.

**BWPK** ① - ② ③

### ① Optical axis pitch

25: Optical axis pitch (unit: mm)

### ② Optical axes

05: Optical axes

### ③ Control output

No-mark: NPN open collector

P: PNP open collector

## Product Components

- Product
- Instruction manual

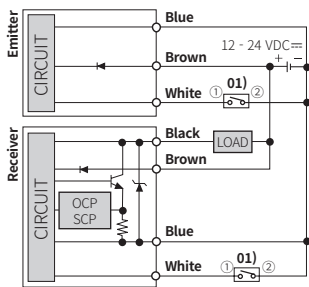
## Sold Separately

- Flat bracket (BK-BWPK-ST)
- Protection bracket (BK-BWPK-P)
- L-shaped bracket (BK-BWPK-L)

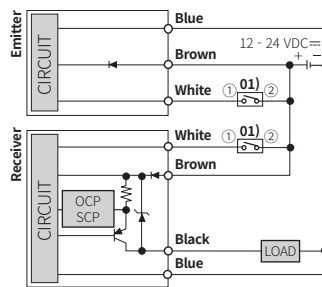
## Connections

Blue	0 V	Brown	+V	Black	OUT (receiver)	White	P.I. (emitter / receiver)
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### NPN open collector output



### PNP open collector output



01) Picking input (P.I.): Contact or transistor is ON, and picking indicator operates.



• Picking indicator

• When external picking input (P.I.) is short-circuited with OUT (black), it is operated same as ON/OFF status of control output.

• OCP (over current protection), SCP (short circuit protection)

## Setting Switch

Switch	No.	Function	Setting	
			ON	OFF
	①	[Emitter / receiver] Selection of transmission frequency	Frequency B <sup>01)</sup>	Frequency A
	②	[Emitter / receiver] Selection ON / flashing for Picking indicator	Flashing	ON
	③	[Emitter] Sensing distance mode [Receiver] Selection of Operation mode	Short mode Dark ON	Long mode Light ON

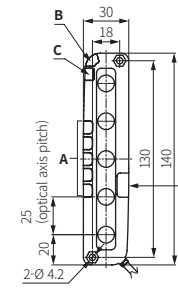
01) Frequency A, B indicators turn ON at the same time.

## Dimensions

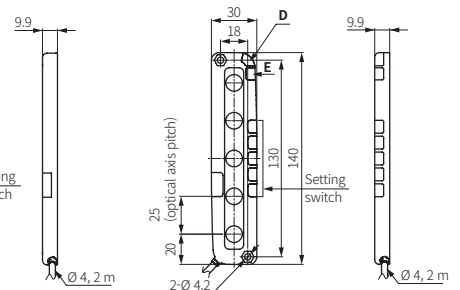
- Unit: mm, For the detailed drawings, follow the Autonics website.

A	Picking indicator (yellow)	B	Frequency A indicator (green)	C	Frequency B indicator (green)
D	Stable indicator (green)	E	Operation indicator (red)		

### Emitter



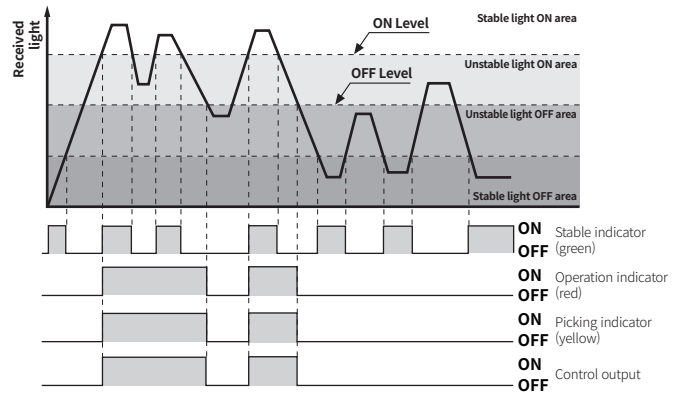
### Receiver



Model	Product length (L)	Number of optical axis	Sensing height
BWPK25-05(P)	140 mm	5	100 mm

## Operation Timing Chart

### Light ON mode



- In Dark ON mode, the waveforms are reversed.
- Picking indicator is operated by connecting picking input line and output line. (If not connecting these, picking indicator is OFF regardless of operation mode.)

## Operation Indicator

ON	OFF	Flashing at 0.3 sec interval	Flashing simultaneously at 0.3 sec interval
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Item	Emitter indicator			Receiver indicator			Control output
	Green	Green	Picking indicator	Green	Red	Picking indicator	
Power ON	☀	●	-	-	-	-	-
Frequency A operation	☀	●	-	-	-	-	-
Frequency B operation	☀	☀	-	-	-	-	-
Stable light ON	-	-	☀	☀	☀	☀	ON
Unstable light ON	-	-	☀	●	☀	☀	ON
Unstable light OFF	-	-	●	●	●	●	OFF
Stable OFF	-	-	●	☀	●	●	OFF
Flashing func. ON	-	-	☾	☀	☀	☾	ON
Over current	-	-	●	☾	☾	●	OFF

- 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.
- Malfunction of synchronous line and over current, control output is OFF regardless of the mode.

Specifications	
<b>Model</b>	BWPK25-05(P)
<b>Sensing method</b>	Through-beam
<b>Light source</b>	Infrared LED (850 nm modulated light)
<b>Sensing distance</b>	Long / Short mode (switch)
Long mode	0.1 to 3.0 m
Short mode	0.05 to 1.0 m
<b>Sensing target</b>	Opaque material
<b>Min. sensing target</b>	≥ Ø 35 mm
<b>Number of optical axes</b>	5
Sensing height	100 mm
Optical axis pitch	25 mm
<b>Response time</b>	≤ 30 ms
<b>Operation mode</b>	Light ON / Dark ON (switch)
<b>Functions</b>	Selection for sensing distance, selection for operation mode, Picking indicator ON / flashing
<b>Interference protection</b>	Interference protection by transmission frequency selection
<b>Synchronization type</b>	Timing method by synchronous line
<b>External picking input</b>	Non-contact or contact input NPN open collector output: lighting (0 - 2 V), light out (5 - 30 V or open) PNP open collector output: lighting (4 - 30 V), light out (0 - 3 V or open)
<b>Indicator</b>	Emitter / receiver: operation indicator (red, green, yellow)
<b>Approval</b>	CE UK ENEC
<b>Weight (packaged)</b>	≈ 180 g (≈ 220 g)
<b>Power supply</b>	12 - 24 VDC= (ripple P-P: ≤ 10 %)
<b>Current consumption</b>	Emitter / receiver: ≤ 60 mA
<b>Control output</b>	NPN / PNP open collector output model
Load voltage	≤ 30 VDC=
Load current	≤ 150 mA
Residual voltage	NPN: ≤ 1 VDC=, PNP: ≤ 2.5 VDC=
<b>Protection circuit</b>	Reverse power protection circuit, output short overcurrent protection circuit
<b>Insulation resistance</b>	≥ 20 MΩ (500 VDC= megger)
<b>Noise immunity</b>	± 240 V the square wave noise (pulse width: 1μs) by the noise simulator
<b>Dielectric strength</b>	Between the charging part and the case : 1,000 VAC~ 50 / 60 Hz for 1minute
<b>Vibration</b>	1.5 mm double amplitude at frequency of 10 to 55 Hz in each X, Y, Z direction for 2 hours
<b>Shock</b>	500 m/s <sup>2</sup> (≈ 50 G) in each X, Y, Z direction for 3 times
<b>Ambient illum. (receiver)</b>	Sunlight: 10,000 lx, incandescent lamp: 3,000 lx
<b>Ambient temp.</b>	-10 to 55 °C, storage: -20 to 60 °C (no freezing or condensation)
<b>Ambient humi.</b>	35 to 85 %RH, storage: 35 to 85 %RH (no freezing or condensation)
<b>Protection rating</b>	IP40 (IEC standard)
<b>Cable spec.</b>	Ø 4 mm, 4-wire, 2 m (emitter: 3-wire)
<b>Wire spec.</b>	AWG 22 (0.08 mm, 60-core), insulator diameter: Ø 1.25 mm
<b>Material</b>	Case: PC / ABS, sensing part: PMMA

## Troubleshooting

Malfunction	Cause	Troubleshooting
Non-operation	Power supply	Supply the rated power.
	Cable incorrect connection, or disconnection	Check the wiring connection.
	Out of rated sensing distance	Use it within rated sensing distance.
Non-operation in 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 not a target object.	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.
	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.
LED displays for over current	Control output line is shorted out.	Check the wiring connection.
	Over load	Check the rated load capacity.

## Functions

### ■ Interference protection (transmitted light frequency change)

When you install more than two products, there is a risk of mutual interference.

Change the frequency to prevent this interference.

Set one sensor as frequency A and the other as frequency B via the setting switch.

### ■ Sensing distance change (Long / Short mode)

This function is to change the product detection distance by mode setting for the installation environment.

When installing more than 3 sets of products closely, set as Short mode to minimize mutual interference. Set this function via the setting switch of the emitter.

### ■ Operation mode change (Light ON / Dark ON)

It is available to select with user's preference.

Set this function via the setting switch of the receiver.

- Light ON: The control output is ON when it is light ON

- Dark ON: The control output is ON when it is light OFF

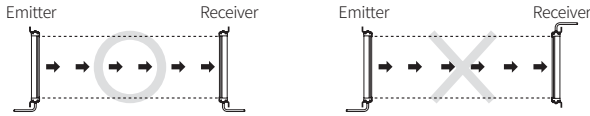
### ■ Picking indicator (ON / flashing)

Picking indicator is lighting or flashing to make out work sensing operation more easily. Set this function via the setting switches of the emitter / receiver.

## Installations

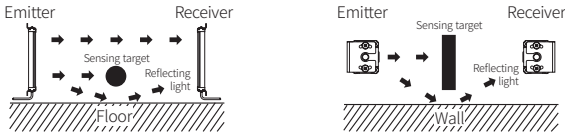
### ■ For direction of installation

Emitter and receiver should be installed in same up/down direction.



### ■ For reflection from the surface of wall and flat

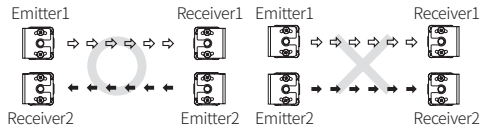
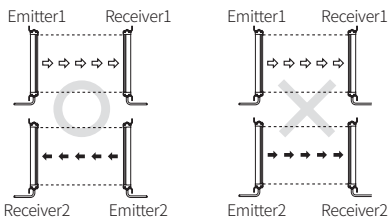
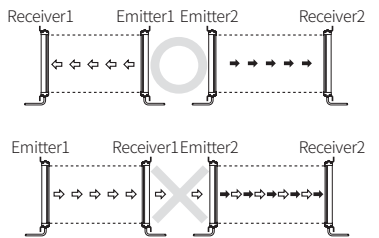
When installing it as below, the light reflected from the surface of wall and flat is not shaded. Please check whether it operates normally or not with a sensing target before using. (interval distance:  $\geq 0.3$  m)



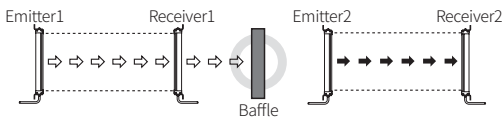
### ■ For protection of interference

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.

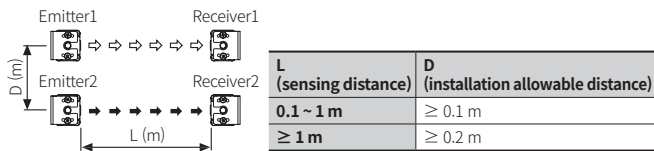


- Baffle should be installed between 2 sets.



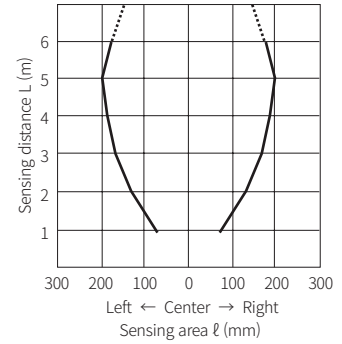
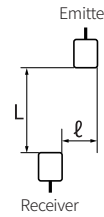
- It should be installed out of the interference distance.

: It may be a little different based on installation environment.  
: Avoid using the unit in the place where the sensor is exposed directly to the fluorescent light with high speed start or high frequency.

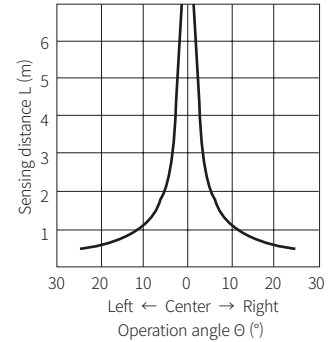
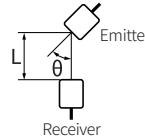


## Feature Data

### ■ Parallel shifting characteristic



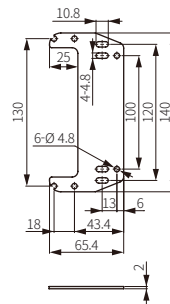
### ■ Angle characteristic



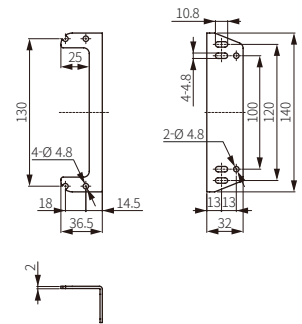
## Sold Separately: Bracket

- Unit: mm, For the detailed drawings, follow the Autonics website.

### ■ Flat bracket (BK-BWPK-ST)

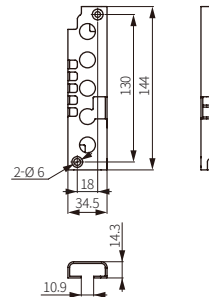


### ■ L-shaped bracket (BK-BWPK-L)



### ■ Protection bracket (BK-BWPK-P)

- Emitter



- Receiver

