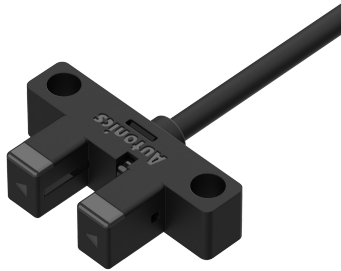


# Groove-depth 6.5 mm Cable Type Photomicro Sensors



## BS3 Series


**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

- Ultra compact size
- Select appearance depending on the installation environment (K, F, R, U, L type)
- Minimize malfunction and improve visibility
  - Minimize sensing part, gap and flush of the body to reduce malfunctions caused by a foreign substance
  - Built-in the operation indicator can be checked in many directions
- Selectable models for the operation of indicator
  - Indicator turns ON under the light received condition
  - Indicator turns ON under the light interrupted condition
- Resistant structure for shock and vibration
  - Shock 15,000 m/s<sup>2</sup> (approx. 1,500 G)
  - Vibration 10 to 2,000 Hz (1.5 mm double amplitude)
- Selectable operation modes (Light ON/Dark ON)
- High-frequency response : 2 kHz

### 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 disassemble or modify the unit.**  
Failure to follow this instruction may result in fire.
- 04. Do not connect, repair, or inspect the unit while connected to a power source.**  
Failure to follow this instruction may result in fire.
- 05. Check 'Connections' before wiring.**  
Failure to follow this instruction may result in fire.

** 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.

### Cautions during Use

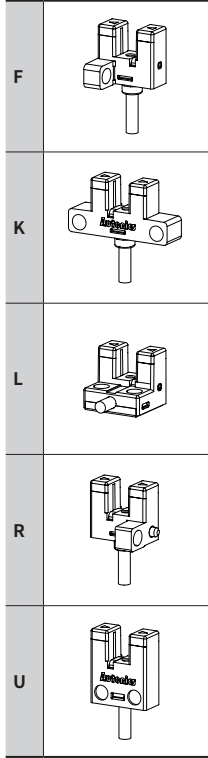
- Follow instructions in 'Cautions during Use'. Otherwise, it may cause unexpected accidents.
- Use the product, 0.5 sec after supplying power. When using separate power supply for the sensor and load, supply power to sensor first.
- The power supply should be insulated and limited voltage/current or Class 2, SELV power supply device.
- Wire as short as possible and keep it away from high voltage lines or power lines to prevent surge and inductive noise.
- When using a sensor with a noise-generating equipment (e.g., switching regulator, inverter, and servo motor), ground F.G. terminal of the equipment.
- 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

## Ordering Information

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

**BS 3 - ① 1 ② - ③**

### ① Appearance



### ② Indicator

M: Turns ON under the light received condition  
R: Turns ON under the light interrupted condition

### ③ Control output

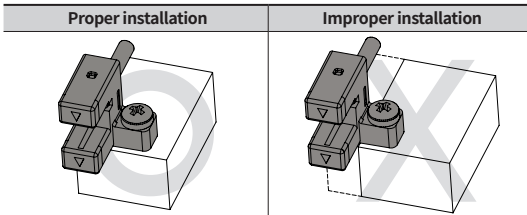
No mark: NPN open collector output  
P: PNP open collector output

## Cautions during Installation

- Refer to the table below when installing the sensor with screws. Purchase screws and washers separately.

| Screw | Spring washer | Flat washer (small round) | Tightening torque |
|-------|---------------|---------------------------|-------------------|
| M2    | Use           | ∅ 4.3 mm                  | 0.15 N m          |
| M3    | Use           | ∅ 6 mm                    | 0.49 N m          |

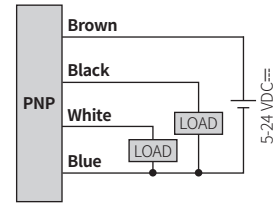
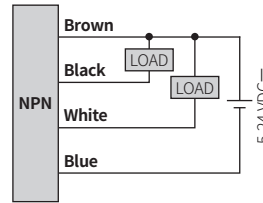
- In case of F and R type, as shown below, make sure that the bottom of the product and the mounting surface are in direct contact with each other.



## Connections

For wiring, refer to the table below.

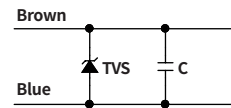
| Color | Function         |
|-------|------------------|
| Brown | +V               |
| Black | Light ON (OUT 1) |
| White | Dark ON (OUT 2)  |
| Blue  | 0V               |



### ■ Surge

△ Be sure to remove the surge before using the product.

When the surge occurs in the power lines, connecting the TVS diode (TVS) and capacitor (C) to protect your device.

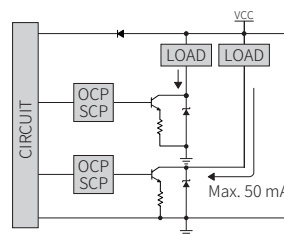


- TVS diode  
 $V_{RWM}$  (reverse stand-off voltage): 30 to 35 VDC≐  
 $P_D$  (power dissipation):  $\geq 6.5$  W

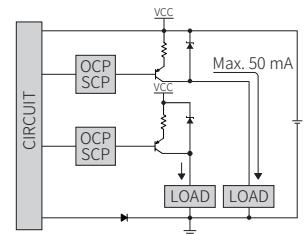
- Capacitor  
Capacitance: 0.1 to 1  $\mu$ F

## Inner Circuit

### ■ NPN open collector output



### ■ PNP open collector output



- OCP (over current protection circuit), SCP (short circuit protection circuit)
- If short-circuit the control output terminal or supply current over the rated specification, normal control signal is not output due to the protection circuit.
- The operation indicator (red) flashes when the overcurrent or short occurs in the circuit.

## Operation Timing Chart

| Model          | Indicator turns ON under light received condition | Indicator turns ON under light interrupted condition |
|----------------|---|--|
| Received light | Received<br>Interrupted                           | Received<br>Interrupted                              |
| Light ON       | Operation indicator                               | ON<br>OFF  |
|                | Transistor output                                 | ON<br>OFF  |
| Dark ON        | Operation indicator                               | ON<br>OFF  |
|                | Transistor output                                 | ON<br>OFF  |

