

BS5-P Series Push Button Type Photomicro Sensors

Push Button Type Photomicro Sensors

■ Features

- Button operation enables accurate detection regardless of material, color, or reflectance of target object
- Optimized for transport detection of semiconductor wafer enclosures (FOUP, FOSB, etc.)
- Optical detection of button operation guarantees mechanical life cycle of 5 million operations
- Total of 4 red LED indicators (side:2, top:2) for higher visibility of operation status
- Increased product durability with steel mounting brackets
- Emitter OFF function and check stable operation functions
- Power supply reverse polarity protection circuit, output short-circuit protection circuit

⚠ Please read "Caution for your safety" in operation manual before using.



■ Specifications

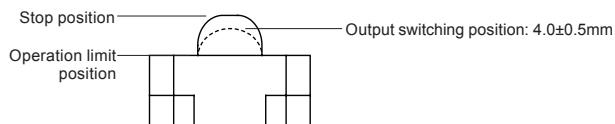
Model	NPN open collector output	BS5-P1ML	BS5-P1MD
	PNP open collector output	BS5-P1ML-P	BS5-P1MD-P
Operation method※1		Push button type	
Button operation※2	Stop position	5.0±0.4mm	
	Output switching position	4.0±0.5mm	
	Operation limit position	Below 0mm	
Operation load※3		Max. 3N (max. 0.3kgf)	
Power supply		12-24VDC ±10% (ripple P-P: max. 10%)	
Current consumption		Max. 35mA	
Light source		Infrared LED (940nm)	
Operation mode		Light ON (Output OFF when button is pushed)	Dark ON (Output ON when button is pushed)
Control output		NPN or PNP open collector output ·Load voltage: Max. 26.4VDC ·Load current: Max. 50mA ·Residual voltage: Max. 1V	
External input※4	NPN output	Emitter OFF: short at 0V or max. 0.25V (outflow current max. 30mA) Emitter ON: open (leakage current max. 0.4mA)	
	PNP output	Emitter OFF: short at +V or min. -0.25V of +V (absorption current max. 30mA) Emitter ON: open (leakage current max. 0.4mA)	
	Response	Under 1ms	
Protection circuit		Reverse polarity protection, output short-circuit protection	
Indicator		Operation indicator: red LED	
Insulation resistance		Min. 20MΩ (at 250VDC megger)	
Noise strength		±240V of square wave noise (pulse width:1 μs) from the noise simulator	
Dielectric strength		1,000VAC at 50/60Hz for 1min.	
Vibration		1.5mm amplitude at 10 to 55Hz frequency in each X, Y, Z direction for 2 hours	
Shock		500m/s ² (approx. 50G) in each X, Y, Z direction for 3 times	
Mechanical life cycle		Min. 5,000,000 operations (1 operation = stop position - operation limit position - stop position)	
Environ-ment	Ambient illuminance	Fluorescent lamp: max. 1,000lx (receiver illuminance)	
	Ambient temperature	-20 to 55°C, storage: -25 to 70°C	
	Ambient humidity	35 to 85%RH, storage: 35 to 85%RH	
Protection structure		IP40 (IEC standard)	
Material		Case: Polycarbonate + Glass fiber, Button: Polyoxymethylene, Sleeve: SUS304 (steel use Stainless 304)	
Cable		Ø3mm, 4-wire, length: 1m (AWG 28, core diameter: 0.08mm, no. of core wires: 19, insulator diameter: Ø0.88mm)	
Weight※5		Approx. 50g (approx. 30g)	

※1: Detection occurs when the button is pushed and the light source is blocked.

※2: Stop position: position of the button without any applied pressure

Output switching position: position where the output switches ON/OFF

Operation limit position: position of the button when fully pushed



※3: Pressure required to push the button from stop position to output switching position

※4: External input when using emitter OFF function or check stable operation functions.

※5: The weight includes packaging. The weight in parentheses is for unit only.

※The temperature and humidity of environment resistance are rated at non-freezing or condensation.

(A) Photoelectric Sensors

(B) Fiber Optic Sensors

(C) Door/Area Sensors

(D) Proximity Sensors

(E) Pressure Sensors

(F) Rotary Encoders

(G) Connectors/
Connector Cables/
Sensor Distribution
Boxes/ Sockets

(H) Temperature
Controllers

(I) SSRs / Power
Controllers

(J) Counters

(K) Timers

(L) Panel
Meters

(M) Tacho /
Speed / Pulse
Meters

(N) Display
Units

(O) Sensor
Controllers

(P) Switching
Mode Power
Supplies

(Q) Stepper Motors
& Drivers
& Controllers

(R) Graphic/
Logic
Panels

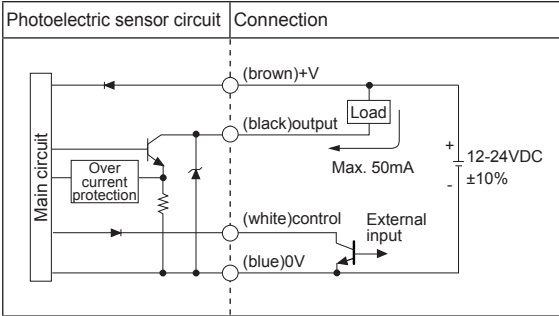
(S) Field
Network
Devices

(T) Software

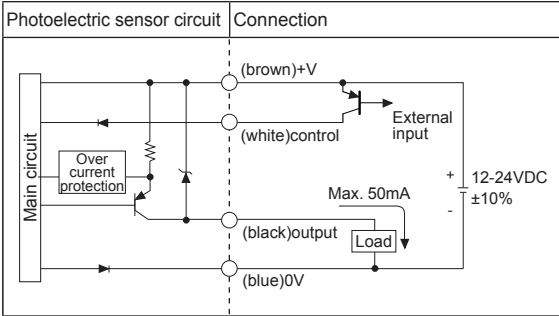
BS5-P Series

Control Output Diagram

• NPN open collector output



• PNP open collector output

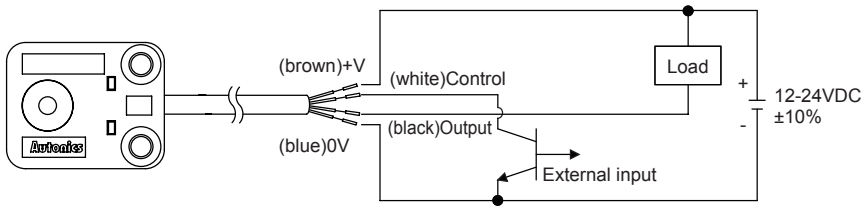


Operation Mode

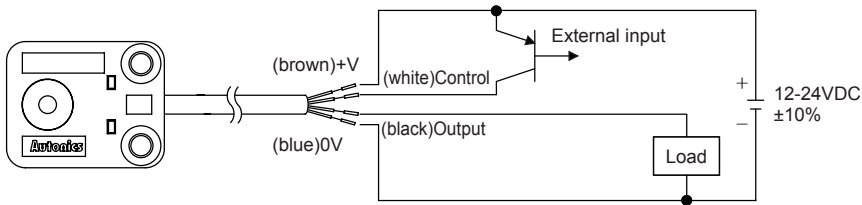
Operation mode	Light ON(Output OFF when button is pushed)		Dark ON(Output ON when button is pushed)	
Button position	Pushed Raised		Pushed Raised	
Receiver operation	Received light Interrupted light		Received light Interrupted light	
Operation indicator (redLED)	ON OFF		ON OFF	
Transistor output	ON OFF		ON OFF	

Connections

• NPN open collector output



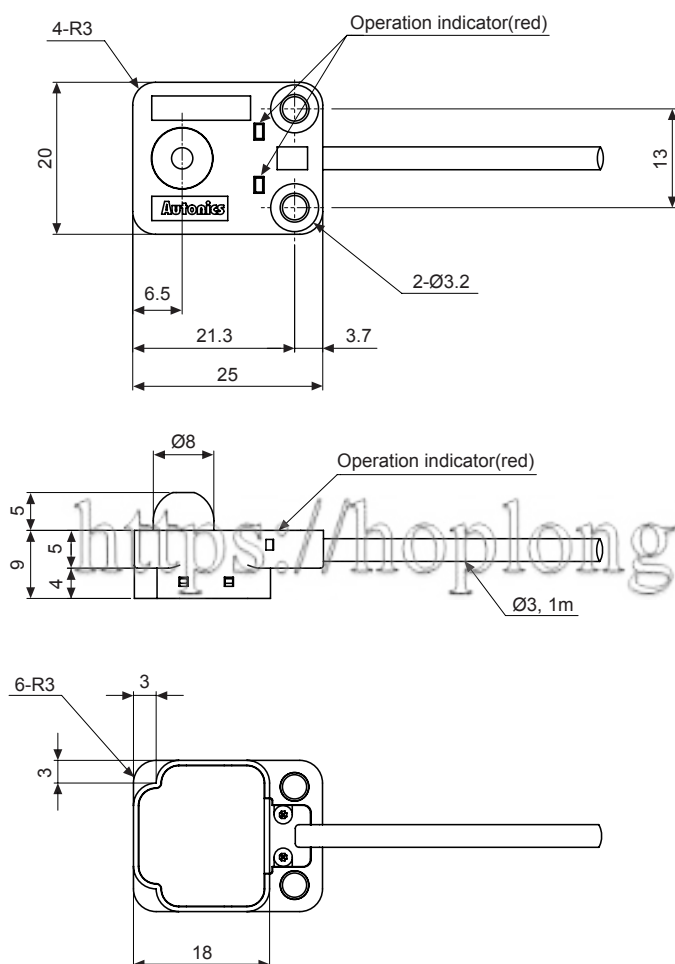
• PNP open collector output



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■ Dimensions

(unit: mm)

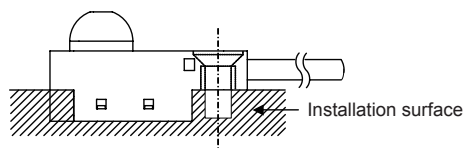


■ Installation

Use M3 countersunk screws to install the unit. The tightening torque should be less than 0.59N·m (6.0kgf·cm). Installation methods differ depending on the installation surface.

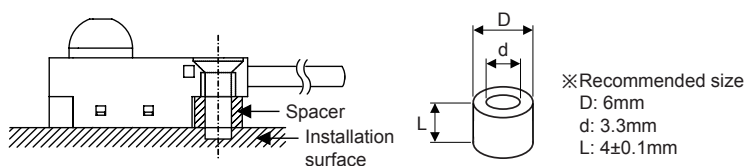
1) Installation on non-flush surface

Install the sensor after fitting the sensor in the opening as shown in the figure below.



2) Installation on flush surface

Insert a spacer between the installation surface and the mounting surface of the sensor as shown in the figure below.



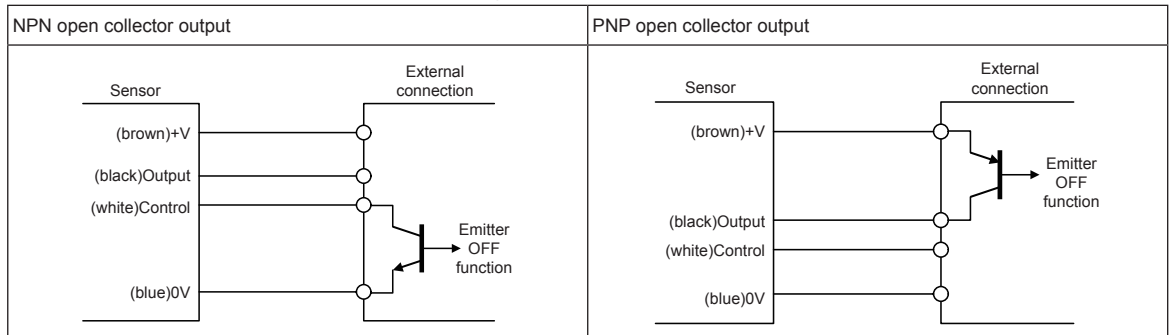
(A)	Photoelectric Sensors
(B)	Fiber Optic Sensors
(C)	Door/Area Sensors
(D)	Proximity Sensors
(E)	Pressure Sensors
(F)	Rotary Encoders
(G)	Connectors/ Connector Cables/ Sensor Distribution Boxes/ Sockets
(H)	Temperature Controllers
(I)	SSRs / Power Controllers
(J)	Counters
(K)	Timers
(L)	Panel Meters
(M)	Tacho / Speed / Pulse Meters
(N)	Display Units
(O)	Sensor Controllers
(P)	Switching Mode Power Supplies
(Q)	Stepper Motors & Drivers & Controllers
(R)	Graphic/ Logic Panels
(S)	Field Network Devices
(T)	Software

BS5-P Series

■ Functions

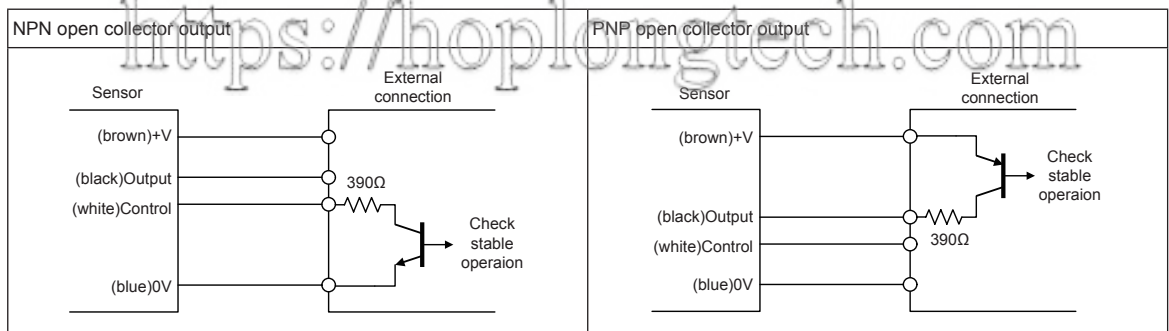
● Emitter OFF function

The emitter LED can be turned ON/OFF without pushing the button, to test for stable operation of the receiver.



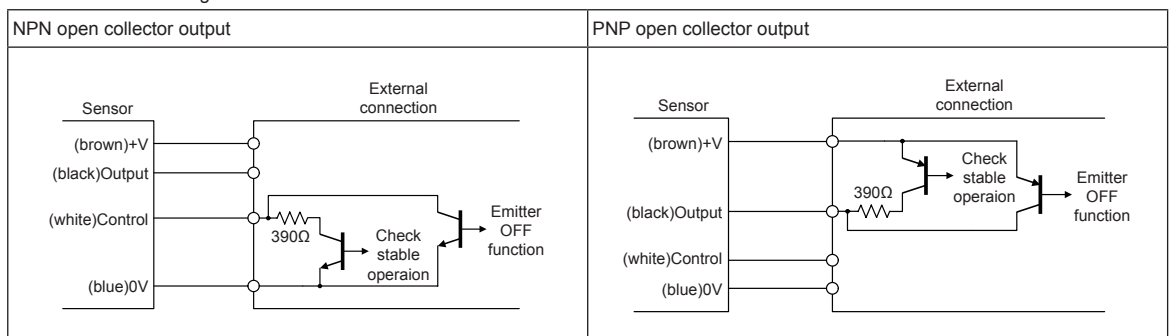
● Check stable operation function

Reduces the LED intensity by approximately 20% while button is not pushed, and check that the receiver is still receiving light (same transistor ON status as at 100%) This ensures that sensor will not malfunction due to changing light intensity.



● Simultaneous use of emitter OFF and check stable operation function

Follow the circuit diagram below:



※When using the emitter OFF function and check stable operation function simultaneously, the transistor used should be able to open and close 50mA/10V and resistance should be over 1/8W. Failure may cause product damage.