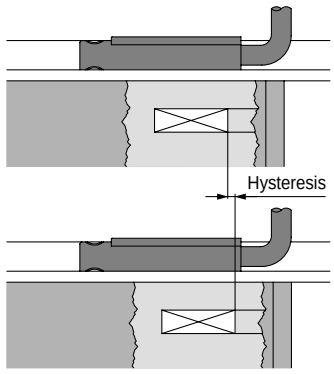
Auto Switches Specifications

Auto Switch Hysteresis

Hysteresis is the distance between the position at which slider movement operates an auto switch to the position at which reverse movement turns the switch off. This hysteresis is included in part of the operating range (one side).

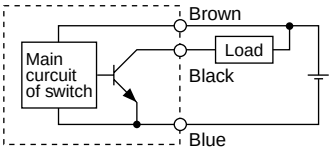


Note) Hysteresis may fluctuate due to the operating environment.
Please contact SMC if hysteresis causes an operational problem.

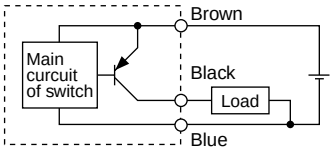
Switches
Solid State Auto Switches/Connection and Example

Basic Wiring

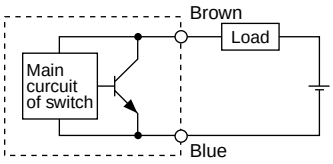
3-wire, NPN
(Power supply for switch and load are same)



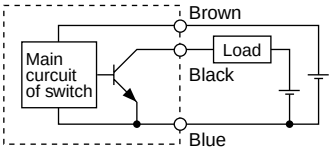
3-wire, PNP

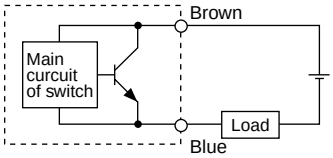


2-wire



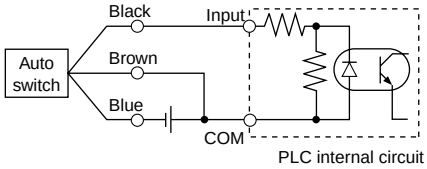
(Power supply for switch and load are separate)



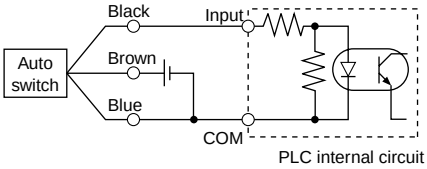


Example of Connection with PLC (Sequence Controller)

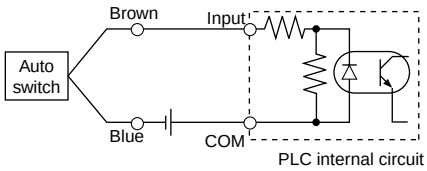
3-wire, NPN/Sink input specifications



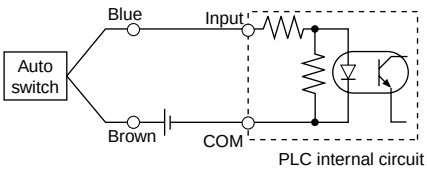
3-wire, PNP/Source input specifications



2-wire



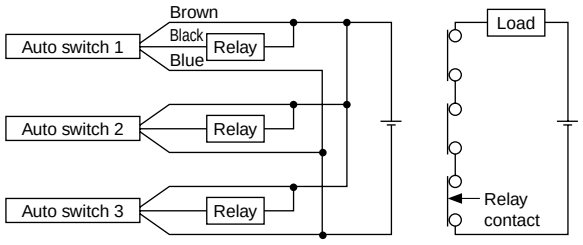
2-wire



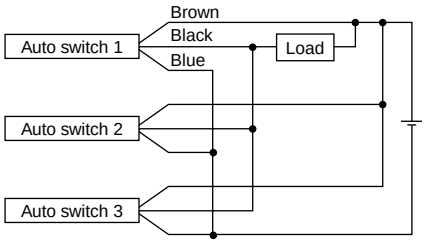
Connect according to the applicable PLC input specifications, as the connection method will vary depending on the PLC input specifications.

Example of AND (Series) and OR (Parallel) Connection

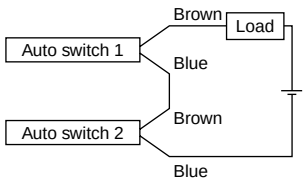
AND connection for 3-wire NPN output



OR connection for 3-wire NPN output



2-wire with 2-switch AND connection

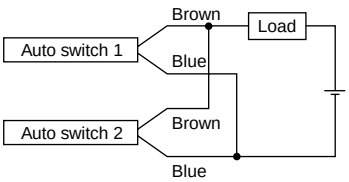


When two auto switches are connected in series, a load may malfunction because the load voltage will decline when in the ON state. The indicator lights will light up when both of the auto switches are in the ON state.

Load voltage at ON = Power supply voltage – Residual voltage x 2 pcs.
= 24 V – 4 V x 2 pcs.
= 16 V

Example: Power supply is 24 VDC
Internal voltage drop in auto switch is 4 V.

2-wire with 2-switch OR connection



When two auto switches are connected in parallel, malfunction may occur because the load voltage will increase when in the OFF state.

Load voltage at OFF = Leakage current x 2 pcs. x Load impedance
= 1 mA x 2 pcs. x 3 kΩ
= 6 V

Example: Load impedance is 3 kΩ.
Leakage current from auto switch is 1 mA.

Switches
Solid State Auto Switch

Applicable Actuators

D-M9 (F9)	**Series LXF, LXP, LXS, LZ***
D-Y7G,Y7H	**Series LJ1 (non-standard motor)**

* Not attachable for series LXF/ball screw.

Auto Switch Specifications

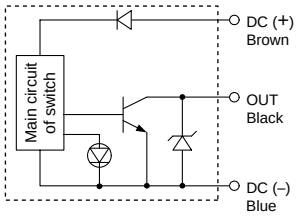
Auto switch model	**D-M9N**	**D-M9P**	**D-M9B**	**D-F9G**	**D-F9H**
Contact	N.O. (A contact)			N.C. (B contact)	
Electrical entry direction	In-line				
Wiring type	3-wire		2-wire	3-wire	
Output type	NPN	PNP	—	NPN	PNP
Applicable load	IC circuit, Relay, PLC		24 VDC relay, PLC	IC circuit, Relay, PLC	
Power supply voltage	5, 12, 24 VDC (4.5 to 28 V)		—	5, 12, 24 VDC (4.5 to 28 V)	
Current consumption	10 mA or less		—	10 mA or less	
Load voltage	28 VDC or less	—	24 VDC (10 to 28 VDC)	28 VDC or less	—
Load current	40 mA or less		2.5 to 40 mA	40 mA or less	80 mA or less
Internal voltage drop	0.8 V or less at 10 mA (2 V or less at 40 mA)		4 V or less	1.5 V or less (0.8 V or less at 10 mA load current)	0.8 V or less
Leakage current	100 μA or less at 24 VDC		0.8 mA or less	100 μA or less at 24 VDC	
Indicator light	Red LED illuminates when turned ON.			Red LED illuminates when turned OFF.	

- Lead wires — Oilproof heavy-duty vinyl cord: ø2.7 x 3.2 ellipse (D-M9□)/ø2.7 (D-F9□)/ø3.4 (D-Y7□), 3 cores (Brown, Black, Blue), 2 cores (Brown, Blue).
- Insulation resistance — Over 50 MΩ at 500 VDC Mega (between lead wire and case)
- Withstand voltage — 1000 VAC 1 minute (between lead wire and between case)
- Ambient temperature — –10 to 60°C ● Operating time — 1 ms or less ● Impact resistance — 1000 m/s^2

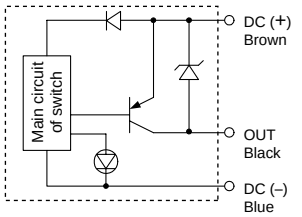
Auto switch model	**D-Y7G**	**D-Y7H**
Contact	N.C. (B contact)	
Electrical entry direction	In-line	
Wiring type	3-wire	
Output type	NPN	PNP
Applicable load	IC circuit, Relay, PLC	
Power supply voltage	5, 12, 24 VDC (4.5 to 28 V)	
Current consumption	10 mA or less	
Load voltage	28 VDC or less	
Load current	40 mA or less	80 mA or less
Internal voltage drop	1.5 V or less (0.8 V or less at 10 mA load current)	0.8 V or less
Leakage current	100 μA or less at 24 VDC	
Indicator light	Red LED illuminates when turned OFF.	

Auto Switch Internal Circuit
Lead wire colors inside ( ) are those prior to conformity with IEC standards.

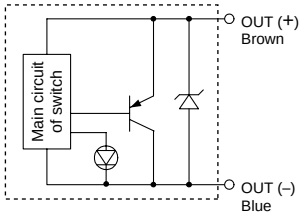
D-M9N



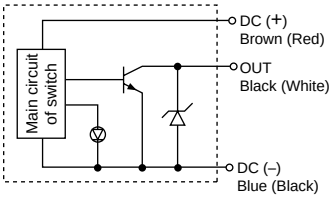
D-M9P



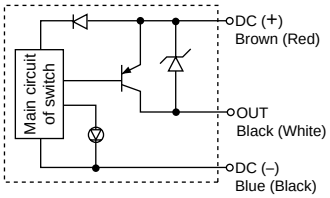
D-M9B



D-F9G, D-Y7G



D-F9H, D-Y7H



Switches
Proximity Switches
Applicable switch models: Series LTF

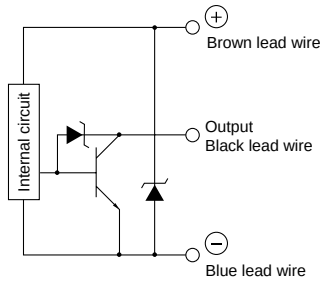
Proximity Switches

Switch specifications

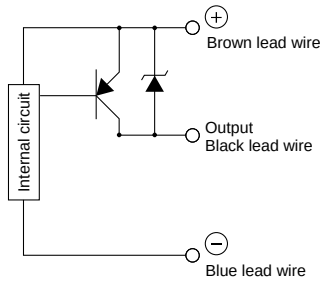
Part no.		LTF-SSG□	LTF-SSG□P
Repeatability		Direction of detecting axis, Perpendicular to detecting axis: 0.04 mm or less	
Power supply voltage		12 to 24 VDC ±10%, Ripple P-P 10% or less	
Current consumption		15 mA	
Output		NPN Maximum load current: 100 mA Maximum applied voltage: 30 VDC Residual voltage: 1 V or less (At 100 mA inrush current) 0.4 V or less (At 16 mA inrush current)	PNP Maximum load current: 100 mA Maximum applied voltage: 30 VDC Residual voltage: 1 V or less (At 100 mA inrush current) 0.4 V or less (At 16 mA inrush current)
Maximum response frequency		500 Hz	
Indicator light		Red LED (lights up when ON)	
Environmental resistance	**Ambient temperature**	–10° to 55°C	
	Ambient humidity	45 to 85% RH	
	Noise resistance	Power line: 240 Vp, pulse width of 0.5 μs	
Detecting distance fluctuation	**Temperature characteristics**	Within +15/–10% of detecting distance at 20°C within ambient temperature range	
	Voltage characteristics	Within ±2% with ±10% fluctuation of operating voltage	

Proximity switch internal circuit

LTF-SSG□

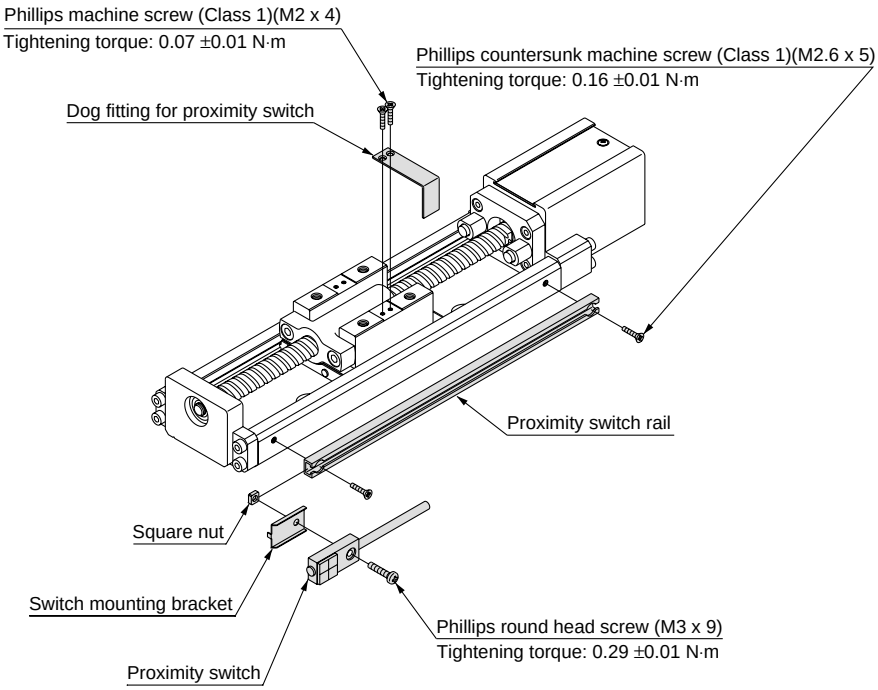


LTF-SSG□P



Be sure to use the mounting screws included, and mount the proximity switch as shown in the drawing to the right.
Mount the dog fitting for proximity switch as illustrated to the right.
Always use the proper tightening torque and use a thread locking agent on screws to prevent loosening.

Proximity Switch/Dog Fitting for Proximity Switch Mounting



Proximity Switches

Switch part numbers (Proximity Switches)

Description	Model	Note	SUNX Corporation Part no.
Proximity Switches	LTF-SSGA	N.O. (A contact) NPN	GXL-N12FT
	LTF-SSGB	N.C. (B contact) NPN	GXL-N12FTB
	LTF-SSGAP	N.O. (A contact) PNP	GXL-N12FT-P
	LTF-SSGBP	N.C. (B contact) PNP	GXL-N12FTB-P
Proximity switch rail Note)	LTF-SR6-100	For LTF6 Stroke: 100	—
	LTF-SR6-200	For LTF6 Stroke: 200	—
	LTF-SR6-300	For LTF6 Stroke: 300	—
	LTF-SR6-400	For LTF6 Stroke: 400	—
	LTF-SR6-500	For LTF6 Stroke: 500	—
	LTF-SR6-600	For LTF6 Stroke: 600	—
	LTF-SR8-100	For LTF8 Stroke: 100	—
	LTF-SR8-200	For LTF8 Stroke: 200	—
	LTF-SR8-300	For LTF8 Stroke: 300	—
	LTF-SR8-400	For LTF8 Stroke: 400	—
	LTF-SR8-500	For LTF8 Stroke: 500	—
	LTF-SR8-600	For LTF8 Stroke: 600	—
	LTF-SR8-700	For LTF8 Stroke: 700	—
	LTF-SR8-800	For LTF8 Stroke: 800	—
	LTF-SR8-900	For LTF8 Stroke: 900	—
	LTF-SR8-1000	For LTF8 Stroke: 1000	—
Proximity switch rail Note)	LTF-DG6-GX	For LTF6	—
	LTF-DG8-GX	For LTF8	—

Note) Mounting screws and brackets are supplied as accessories.

Switches
Proximity Switches
Applicable switch models: Series LXF, LXS

Applicable switch models

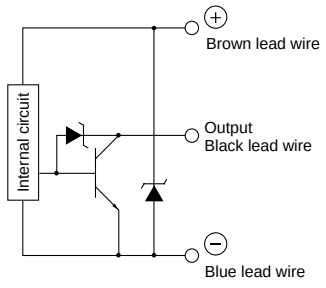
Applicable model	Model type	Part no.	Switch type		
LXF LXS	G	GXL-8F	Standard	N.O. (A contact)	3 wire
	GD	GXL-8FI	Varying frequencies	N.O. (A contact)	3 wire
	GB	GXL-8FB	Standard	N.C. (B contact)	3 wire
	GDB	GXL-8FIB	Varying frequencies	N.C. (B contact)	3 wire
	GU	GXL-8FU	Standard	N.O. (A contact)	2 wire
	GUB	GXL-8FUB	Standard	N.C. (B contact)	2 wire

Switch specifications (SUNX Corporation)

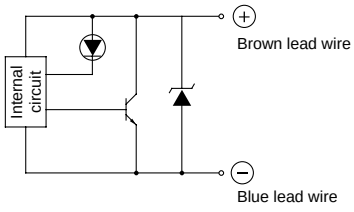
Part no.		GXL-8F(I)(B)	GXL-8FU	GXL-8FUB
Repeatability		Direction of detecting axis, Perpendicular to detecting axis: 0.04 mm or less		
Power supply voltage		12 to 24 VDC ±10%, Ripple P-P 10% or less		
Current consumption		15 mA	0.8 mA or less (when output is OFF)	
Output		NPN Maximum load current: 100 mA Maximum applied voltage: 30 VDC Residual voltage: 1 V or less	2 wire solid state DC Load current: 3 to 70 mA Residual voltage: 3 V or less	
Maximum response frequency		500 Hz	1 kHz	
Indicator light		Red LED (lights up when ON)	Green LED (stable detection) Red LED (unstable detection)	
Environmental resistance	Ambient temperature	–10° to 55°C	–25° to 70°C	
	Ambient humidity	45 to 85% RH		
	Noise resistance	Power line: 240 Vp, pulse width of 0.5 ms		
Detecting distance fluctuation	Temperature characteristics	Within +15/–10% of detecting distance at 20°C within ambient temperature range		
	Voltage characteristics	Within ±2% with ±10% fluctuation of operating voltage		
Cable		□0.08 mm 3 wire heavy duty cable 1 m	□0.15 mm 2 wire heavy duty cable 1 m	

Proximity switch internal circuit

GXL-8F(I)(B)

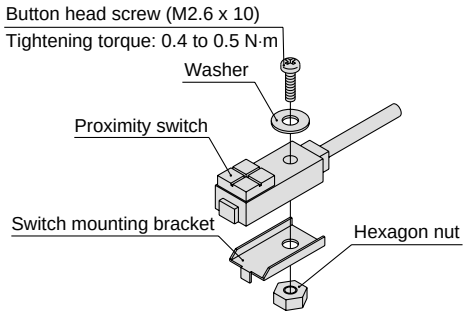


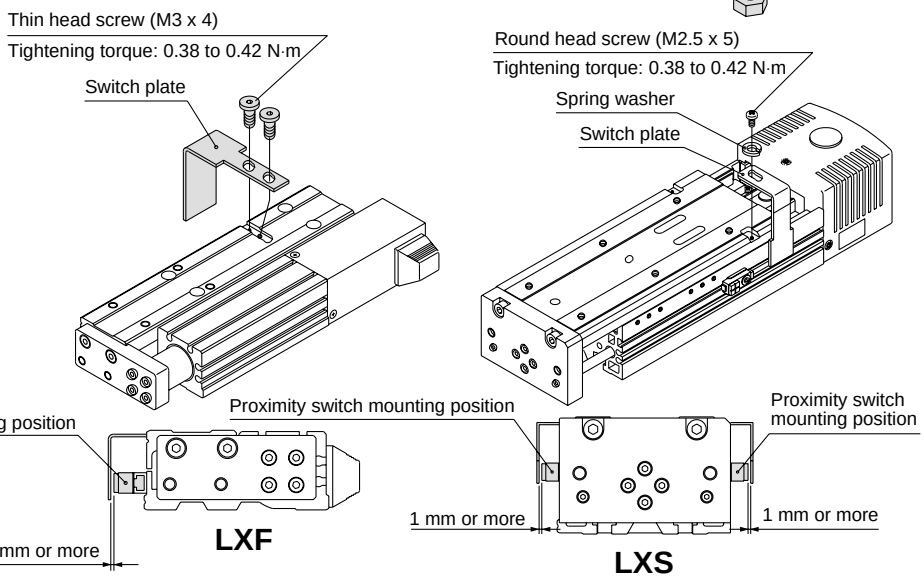
GXL-8FU(B)(I)



Proximity Switch/Switch Plate Mounting

Be sure to use the mounting screws included, and mount the proximity switch as shown in the drawing to the right.
Mount the switch plate as shown below.
Always use the proper tightening torque and use a thread locking agent on screws to prevent loosening.
The switch body is made of PBT and acrylic resin. Select a thread locking agent that will not affect these materials.





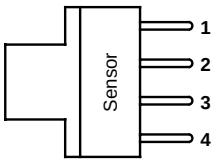
SMC

Switches
Photo Micro Sensor
Applicable switch models: Series LTF

Standard Photo Micro Sensor for Home Position (OMRON Corporation)

Rating

Power supply voltage	5 to 24 VDC ±10%, Ripple (p-p) 10% or less	
Current consumption	35 mA or less	
Control output	5 to 24 VDC load current (Ic) 100 mA, Residual voltage 0.8 V or less Load current (Ic) 40 mA, Residual voltage 0.4 V or less	
Ambient temperature	Operation: –25 to 55°C (When stored: –30 to 80°C)	
Ambient humidity	Operation: 5 to 85%RH (When stored: 5 to 95%RH)	
Part no.	EE-SX674	EE-SX674P
Output type	NPN	PNP
Part no. of connector with code	EE-1010	
Applicable actuator	**LTF**	



Terminal arrangement

1	Brown	Vcc ⊕
2	White	L*
3	Black	OUTPUT
4	Blue	GND (OV) ⊖

* Normally ON when light is blocked. However, if the Ⓛ terminal and ⊕ terminal are shorted, it changes to ON when light enters.

Output level circuit

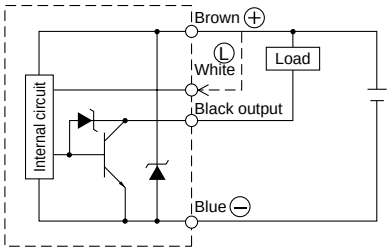
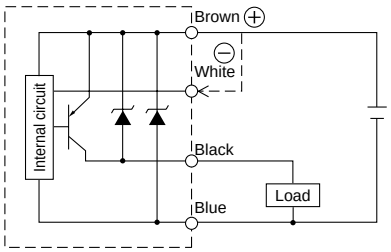
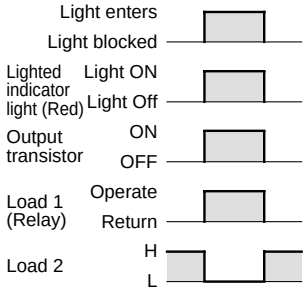
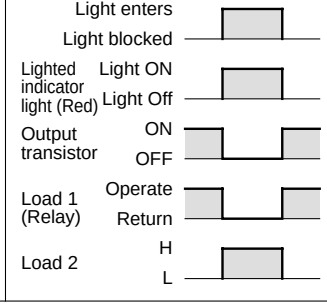
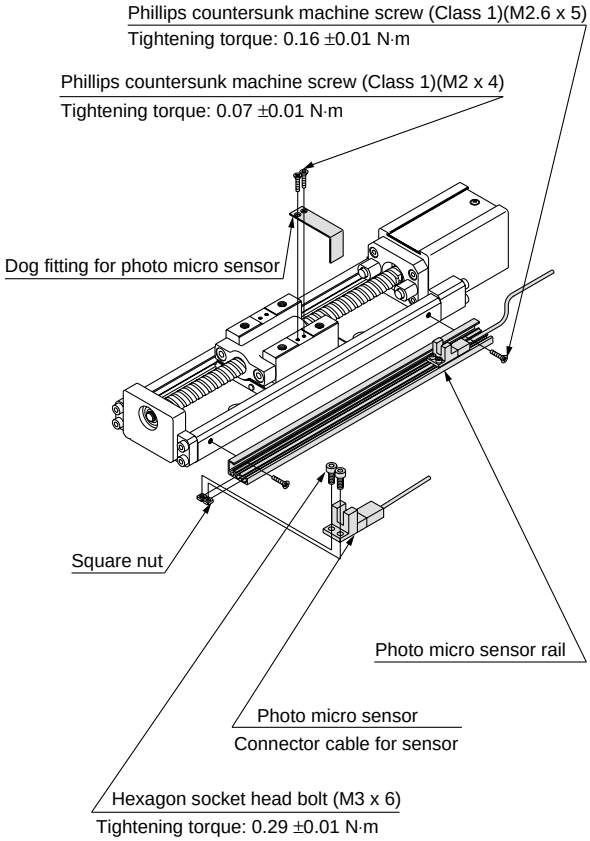
Operating condition of output transistor	ON when light enters	ON when light is blocked
Output circuit	**NPN**  * Normally ON when light is blocked. However, if the Ⓛ terminal and ⊕ terminal are shorted, it changes to ON when light enters.	
	PNP 	
Time chart	("L" and "+" shorted) 	("L" and "+" open) 

Photo Micro Sensor/Dog Fitting for Photo Micro Sensor Mounting



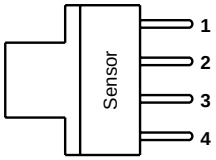
Be sure to use the attached mounting screws. Mount the photo micro sensor as illustrated to the right.
Mount the dog fitting for photo micro sensor as illustrated to the right.
Be sure to observe the prescribed tightening torque. Use special adhesive for screws for locking.

Switches
Photo Micro Sensor
Applicable switch models: Series LXF, LXP, LXS, LG1 (non-standard motor)

Standard Photo Micro Sensor for Home Position (OMRON Corporation)

Rating

Power supply voltage	5 to 24 VDC ±10%, Ripple (p-p) 10% or less			
Current consumption	35 mA or less			
Control output	5 to 24 VDC load current (Ic) 100 mA, Residual voltage 0.8 V or less Load current (Ic) 40 mA, Residual voltage 0.4 V or less			
Ambient temperature	Operation: –25° to 55°C (When stored: –30° to 80°C)			
Ambient humidity	Operation: 5 to 85%RH (When stored: 5 to 95%RH)			
Part no.	EE-SX672 equivalent	EE-SX673 equivalent	EE-SX674	EE-SX674P
Output type	NPN			PNP
Applicable actuator	**LXF**	**LXP, LXS**	**LG1** (non-standard motor)	

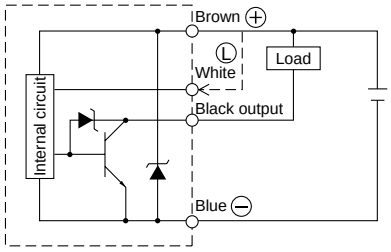
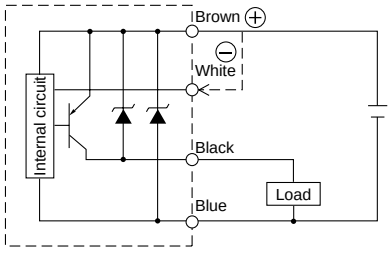
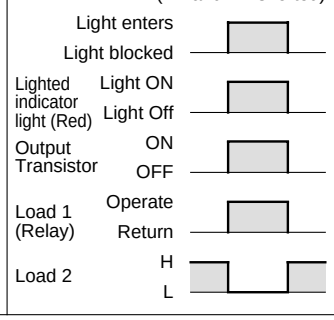
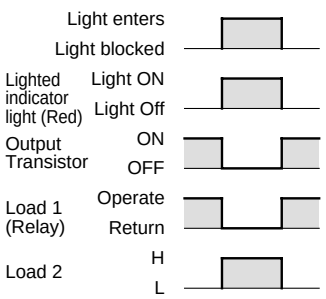


Terminal arrangement

1	Brown	Vcc ⊕
2	White	L*
3	Black	OUT PUT
4	Blue	GND (OV) ⊖

* Normally ON when light is blocked. However, if the Ⓛ terminal and ⊕ terminal are shorted, it changes to ON when light enters.

Output level circuit

Operating condition of output transistor	ON when light enters	ON when light is blocked
Output circuit	**NPN**  * Normally ON when light is blocked. However, if the Ⓛ terminal and ⊕ terminal are shorted, it changes to ON when light enters.	
	PNP 	
Time chart	("L" and "+" shorted) 	("L" and "+" open) 

Proximity Switches and Photo Micro Sensors Precautions

Be sure to read before handling.
Refer to the main pages for precautions on respective series.

Photo Micro Sensors and Proximity Switches for Home Position

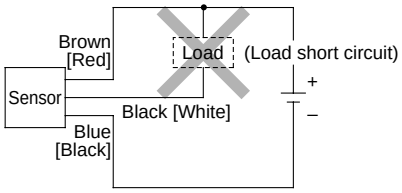
Incorrect Usage

⚠Caution

1. Do not operate beyond the rated voltage range.
If applying voltage over the rated voltage range, equipment may be damaged.

2. Avoid incorrect wiring such as polarity of power supply.
Otherwise, equipment may be damaged.

3. Do not short circuit the load. (Do not connect to power supply.)
Otherwise, equipment may be damaged.



Other

⚠Caution

1. Power lines and high voltage lines should not be in the same piping or duct with wiring of the photo micro sensor, as the system may malfunction or be damaged due to induction. Separate wiring or individual piping is required to avoid such trouble.

2. If operating with a small induction load such as a relay, wire as shown in the figure below. (In this case, be sure to connect a reverse voltage suppression diode.)