

Panasonic® QUICK INSTRUCTION MANUAL

Non-Contact Safety Door Switch SG-P Series

CMJE-SGP No.0077-95V

Thank you very much for purchasing Panasonic products.
Please read this Instruction Manual carefully and thoroughly for the correct and optimum use of this product. Kindly keep this manual in a convenient place for quick reference.

This document provides a brief summary of mounting, wiring, and other related information.
When using the product, refer to the **SG-P Series** Instruction Manual in addition to this manual.

1 SAFETY CAUTIONS Always observe

This section explains important rules that must be observed to prevent human injury and property damage.
■ The hazards that may occur if the product is used incorrectly are described and classified by level of harm.

⚠ WARNING Risk of death or serious injury.

⚠ CAUTION Risk of minor injury or property damage.

⚠ WARNING

Machine designer, installer, employer and operator

- The machine designer, installer, employer and operator are solely responsible to ensure that all applicable legal requirements relating to the installation and the use in any application are satisfied and all instructions for installation and maintenance contained in the instruction manual are followed.
- Whether this device functions as intended to and systems including this device comply with safety regulations depends on the appropriateness of the application, installation, maintenance and operation. The machine designer, installer, employer and operator are solely responsible for these items.

Engineer

- The engineer would be a person who is appropriately educated, has widespread knowledge and experience, and can solve various problems which may arise during work, such as a machine designer, installer or employer etc.

Operator

- The operator should read this instruction manual thoroughly, understand its contents, and perform operations following the procedures described in this manual for the correct operation of this device.
- In case this device does not perform properly, the operator should report this to the person in charge and stop the machine operation immediately. The machine must not be operated until correct performance of this device has been confirmed.

Operating environment

- Do not use this device outdoors.
- Do not use this device in an explosion-proof area.
- Do not install this device in the following places:
 - Areas with high humidity where condensation is likely to occur
 - Areas exposed to corrosive or explosive gases
 - Areas exposed to contact with water
 - Areas exposed to too much steam or dust
- Do not use this device near equipment that emits strong electromagnetic waves.

Machine in which this device is installed

- Do not install this device with a machine whose operation cannot be stopped immediately in the middle of an operation cycle by an emergency stop equipment.
- This device starts the performance after approximately 2 seconds from the power ON. Have the control system started to function with this timing.
- Do not use the device improperly or do not invalidate the settings after installing the device. Otherwise, the safety functions of the apparatus which uses this device may not work properly, resulting in death or serious injury.
- Do not install the switch body of this device on a movable door.
- When installing this device, always consider the time required to ensure a safe state and provide a distance equal to or longer than the correctly calculated safety distance between the apparatus which uses this device and the dangerous parts of the machine.
- Confirm that the response time of the entire machine is less than the calculated value before designing the equipment.

Wiring

- Be sure to carry out the wiring in the power supply OFF condition.
- All electrical wiring should conform to the regional electrical regulations and laws. The wiring should be done by engineer(s) having the special electrical knowledge.
- After completing wiring, check the wiring state before supplying power.
- Do not wire the controller in parallel with a high-voltage line or power line or use the same conduit as these lines. Doing so may result in malfunctioning due to induction.
- Do not apply stress such as excessive bending or pulling to a cable or the extracted part of a cable. In particular, when the temperature is low, cable materials harden, and when the temperature is high, the materials soften, and so take care that cables may break if they are subject to stress such as bending or pulling when the temperature is low or high.
- When connecting multiple switch bodies, arrange their layout so that the total cable length is 100 m or less. Furthermore, determine the distance between the switch bodies so that the maximum cable length between them is 20 m or less.
- When using only one switch body, arrange its layout so that the maximum cable length is 20 m or less.
- When extending the cable of this device, use 0.3 mm² or larger cable.
- When wiring, make sure that liquid such as water or oil does not intrude from the end of the cable.

Maintenance

- When replacement parts are required, always use only genuine supplied replacement parts. Using substitute parts from another manufacturer may cause the device not to detect objects, resulting in death or serious injury.
- The periodical inspection of this device must be performed by an engineer having the special knowledge.
- After maintenance or adjustment, and before starting operation, test this device following the procedure specified in "8 Maintenance".
- Clean this device with a clean cloth. Do not use any volatile chemicals.

Others

- Never modify this device. Modification may cause the device not to detect objects, resulting in death or serious injury.

⚠ CAUTION

Specifications

- This product has been developed / produced for industrial use only.
- Do not use this product outside the range of the specifications. Risk of an accident and product damage.
- There is also a risk of a noticeable reduction of service life.
- Use this device by installing suitable protection equipment as a countermeasure for failure, damage, or malfunction of this device.
- Before using this device, check whether the device performs properly with the functions and capabilities as per the design specifications.
- Note that this device may be damaged if it is subject to a strong shock (if it is dropped onto the floor, for example).
- Do not use the device near an apparatus that generates magnetic fields. Otherwise, the operating distance may be affected.
- Do not apply an excessive shock to the safety switch when opening or closing the door.
- Use of this device under the following conditions or environments is not presupposed. Please consult us if there is no other choice but to use this device in such an environment.
 - Operating this device under conditions or environments not described in this manual.
 - Using this device in the following fields: nuclear power control, railroad, aircraft, auto mobiles, combustion facilities, medical systems, aerospace development, etc.

Power supply

- Verify that the supply voltage fluctuations are within the rating.
- When using a commercial switching regulator for the power supply, be sure to ground the frame ground (F.G.) terminal of the power supply.
- When using the device, avoid the transient state that occurs when the power supply is turned ON.
- When connecting multiple devices together, connect all the devices to the same power supply.

Other precautions

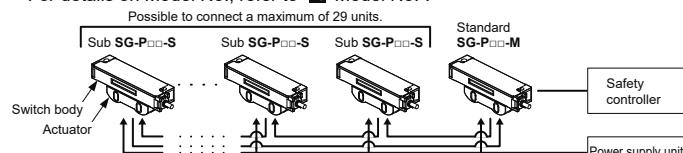
- Never attempt to disassemble, repair, or modify the product.
- When the product becomes unusable or unneeded, dispose of the product properly as industrial waste by abiding by the applicable law in the country.

2 CONTENTS OF PACKAGE

- Device : Switch body, Actuator 1 unit
- Quick Instruction Manual (Japanese / English, Chinese) 1 PC each

3 PRODUCT CONFIGURATION

- This device is configured on a switch body and an actuator.
- This device is available as the **SG-P□□-M** standard units and as the **SG-P□□-S** sub units. For one **SG-P□□-M** standard unit, up to a maximum of 29 **SG-P□□-S** sub units can be operated by connecting them in a cascade connection.
- For details on Model No., refer to "10 Model No."



- Note that the **SG-P□□-S** sub unit cannot be used alone. When using a single device, use the **SG-P□□-M** standard unit. When connecting multiple devices together, use the **SG-P□□-S** sub unit for the second unit onwards.
- The **SG-P□□-M** standard unit can be connected with all **SG-P□□-S** sub units.
- Be sure to use this device together with a safety device such as a safety controller.

4 NAME AND FUNCTION OF THE DEVICE

• Compact type

Name		Function
Indicator	Lights green	When the actuator is detected
	Lights red	When the actuator is not detected
	Blinks red	• Lockout state, error occurrence • When the teaching sequence was incorrect (only when using high code models)
	Blinks green	• When multiple units are connected, the actuator is not detected by other switch bodies. • When multiple units are connected, an error has occurred in other switch bodies.
	Lights yellow (Green, red simultaneous lighting)	After the power ON, self-diagnosis
	Alternately blinking red and yellow (lights red and blinks green)	When an actuator not paired is detected (only when using high code models)
Actuator detection surface		When the actuator is brought near to the surface, the switch body detects the actuator.
Switch body detection surface		When the actuator is brought near to the switch body, the switch body detects the actuator.

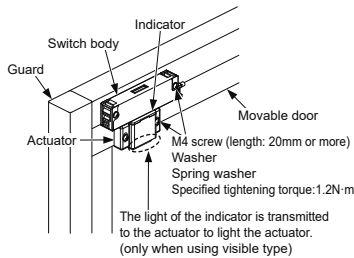
• Visible type

Name		Function
Indicator	Lights green	When the actuator is detected
	Lights red	When the actuator is not detected
	Blinks red	• Lockout state, error occurrence • When the teaching sequence was incorrect (only when using high code models)
	Blinks green	• When multiple units are connected, the actuator is not detected by other switch bodies. • When multiple units are connected, an error has occurred in other switch bodies.
	Lights yellow (Green, red simultaneous lighting)(Note)	After the power ON, self-diagnosis
	Alternately blinking red and yellow (lights red and blinks green)(Note)	When an actuator not paired is detected (only when using high code models)
Actuator detection surface		When the actuator is brought near to the surface, the switch body detects the actuator.
Switch body detection surface		When the actuator is brought near to the switch body, the switch body detects the actuator.

Note: When check the LED light transmitted to the actuator, depending on the angle, yellow lights may be separated into green and red.

5 MOUNTING

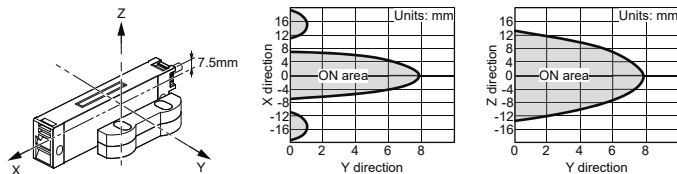
Mount the switch body on a machine unit or on a guard and mount the actuator on a movable door. Use M4 screw, washer and spring washer (to be prepared by the customer) to mount the device and firmly tighten them to the specified tightening torque. Visible type actuator is uniquely designed to light the indicator of the switch body by transmitting light through it. Even if the indicator of the switch body is hidden when the actuator is detected, the visibility is not degraded.



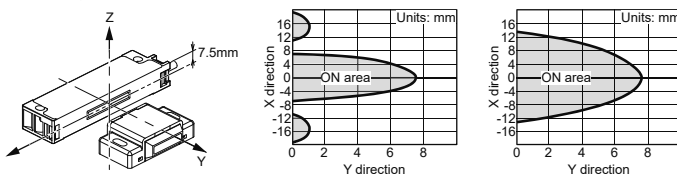
- Do not install the switch body of this device on a movable door.
- Mount the switch body carefully so that it does not come in contact with the movable door.
- Mount the switch body in a location where it cannot be reached or it is hidden so that it cannot be easily disabled. Or, mount the switch body in such a way that it cannot be removed with ordinary tools.
- For detailed information about minimizing the probability that it might be disabled, refer to relevant precautions described in ISO14119.

6 Sensing Area

- Compact type



- Visible type



The above figure represents typical data. Check the actual installation environment to make sure that there is no problem.

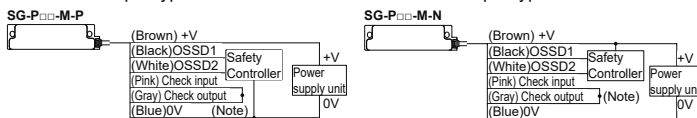
7 CONNECTING THE SWITCH BODY WITH THE CONTROLLER AND POWER SUPPLY UNIT

CAUTION

- If the power supply used for this device is shared by other devices, the device may be affected by noise emitted from other devices. Do not share the power supply used for this device with other devices.
- The power supply unit used for this device must satisfy the following requirements.
 - The power supply unit must be certified for use in your region.
 - The power supply unit must have the rated output voltage of 24 VDC $\pm 10\%$ and the ripple (P-P) of 10% or less.
 - The power supply with SELV (Secondary Extra Low Voltage) or PELV (Protective Extra Low Voltage) that comply with the RE Directive must be used. (When CE Marking is required)
 - The power supply must comply with Class 2 defined by UL508 or satisfy the output characteristics requirements of the limited voltage and current circuit.
 - The power supply unit must have reinforced insulation or double insulation between the primary circuit and secondary circuit.
 - When using a commercial switching regulator, the frame ground (F.G.) terminal must be connected to ground.
 - The power supply unit must have an output holding time of 20 ms or more.
 - If surges occur, take countermeasures such as connecting a surge absorber to the source of the surges.

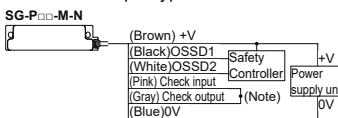
- Using Only One Switch Body

< For PNP output type >



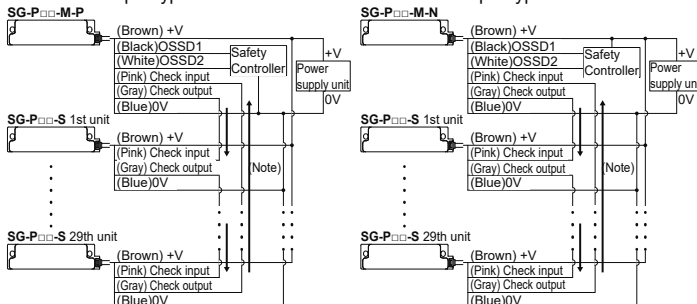
Note: Connect the check input line (pink) with the check output line (gray).

< For NPN output type >



- Using Multiple Units in Series Connection

< For PNP output type >



Note: For connecting multiple units, connect the check output line (gray) with the check input line (pink) of the SG-P-S sub unit connected next. Connect the check output line (gray) of the SG-P-S sub unit connected at the end with the check input line (pink) of the SG-P-M standard unit placed at the beginning.

8 MAINTENANCE

<Reference>

If you discover an abnormal condition, refer to "SG-P Series Instruction Manual" and inform your technician. If you are unsure what action to take, contact our office. Make a copy of the checklist, put a checkmark after checking each item, and retain the checklist.

- Daily Inspection

WARNING

Before starting work, inspect the following items and verify that there are no abnormalities. Operating this device without performing the inspection or without removing the abnormal condition may cause death or serious injury.

Check column	Inspection item
<input type="checkbox"/>	The switch body and the actuator are mounted according to the mounting and wiring specifications and the door and other structures where they are mounted are installed according to the installation conditions.
<input type="checkbox"/>	The door is not deformed or warped.
<input type="checkbox"/>	Check every door if the machine stops when the door opens.
<input type="checkbox"/>	There is no change in the installation environment that may affect the results of the risk assessment performed before this device was installed.
<input type="checkbox"/>	If seal was applied to the mounting screws, the seal must remain unchanged.
<input type="checkbox"/>	There is no scratch, dirt, or damage in this device.
<input type="checkbox"/>	There is no scratch, bent, or damage in the wiring.

- Periodic Inspection

WARNING

According to the periodic inspection frequency as specified in ISO 14119, inspect the following items and verify that there are no abnormalities. Operating this device without performing the inspection or without removing the abnormal condition may cause death or serious injury.

Inspection frequency

SIL3/PLe: At least once a month, SIL2/PLd: At least once a year

Check column	Inspection item
<input type="checkbox"/>	The structure of the machine does not prevent any safety mechanisms from causing the machine to stop or to make an emergency stop.
<input type="checkbox"/>	No modification has been made in the machine control system that obstructs the safety mechanisms.
<input type="checkbox"/>	There is no change in the installation environment of the switch body, the actuator and the door where they are mounted.
<input type="checkbox"/>	The response time of the overall system is equal to or less than the calculated value.
<input type="checkbox"/>	No screws or connectors related to the device are loose.

- Inspection after Maintenance

- When changes are made to the installation, wiring, or functions of the device.
- When the switch body or actuator is replaced.
- When changes are made to the settings of the safety devices such as the safety controller.
- When an abnormal condition is noticed during operation of this device.

9 Model No.

SG-P¹12-3-4

1 10: Low code, 20: High code

3 M: Standard, S: Sub

2 10: Compact type, 20: Visible type

4 P: PNP output, N: NPN output (Note)

Note: Provided only on the SG-P-M standard unit.

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