

English

OMRON

Model
G3PE
Solid State Relay

INSTRUCTION MANUAL

Thank you for purchasing an OMRON product. Confirm product which must be required and read this manual throughly for correct use before actually use it.
This manual should be ready to use any time whenever required.

OMRON Corporation

Safety Precautions

Definition of Precautionary Information

WARNING

Indicates a potentially hazardous situation which, if not avoided, will result in minor or moderate injury, or may result in serious injury or death.
Additionally there may be significant property damage.

CAUTION

A potentially hazardous situation by misuse, may result in property damage only accident.

WARNING

Hazard by electric shock may occur.
Do not touch the G3PE's case (the side where "HAZARDOUS VOLTAGE" is indicated) while the power supply turned on.
(For only single phase 5□□ series)

CAUTION

The G3PE may occasionally rupture in case of a short circuit. To protect against short-circuit accident, install a protective device, such as a quick-burning fuse or a circuit breaker or the like, on the power supply.

Minor hazard by burns may occasionally occur.
Do not touch the G3PE or the heat sink either while the power supply is ON, or immediately after the power is turned OFF.
The G3PE and the heat sink will be hot.

Minor hazard by electric shock may occasionally occur.
Do not touch the G3PE's main circuit terminals immediately after the power is turned OFF. The internal snubber circuit is charged.

Minor hazard by electric shock may occasionally occur.
Do not touch the G3PE's terminal (Charging part) while the power supply turned on, and always attach the terminal cover after completing wirings.

Precautions for Safe Use

Transporting

Do not use or store the G3PE in the following transporting. Doing so may result in damage, malfunction, or deterioration of performance characteristics.

- Conditions under which the G3PE will be exposed to water.
- High temperatures or high humidity.
- Without proper packing.

Operating and Strage Locations

Do not use or store the G3PE, in the following locations. Doing so may result in damage, malfunction, or deterioration of performance characteristic.

- Locations subject to rain or water drops.
- Locations subject to exposure to water, or oil, or chemicals.
- Locations subject to high temperatures or high humidity.
- Locations subject to ambient temperatures outside the range from -30 to +100 centigrade.
- Locations subject to relative humidity outside the range 45% to 85% or locations subject to condensation as the result of severe changes in temperature.
- Locations subject to corrosive or flammable gasses.
- Locations subject to dust (especially iron dust) or salts.

Handling

- Must need an air convection for G3PE or the heatsink, Less convection air produsses a heating on G3PE abnormal and causes a short-circuit failure and burning.
- Do not use the G3PE with its heat radiation fins being bent due to dropping. Bent fins may lower the heat radiation performance, leading to trouble.
- Do not carry out the mounting work with hand stained with oil or metal powder. Otherwise, trouble may be caused.
- During using SSR, install the heatsink or heat plate. Without these may lower the heat radiation performance, leading to trouble.

Mounting

- Mount the G3PE in the specified orientation. If the G3PE is mounted in any other orientation, abnormal heat generation may cause output elements to short or may cause burning.
- Be sure to prevent the ambient temperature from rising due to the heat radiation of the G3PE. If the G3PE is mounted inside a panel, install a fan so that the interior of the panel is fully ventilated.
- Be sure that the G3PE clicks into place when mounting it to DIN Track. The G3PE may fall if it is not mounted correctly.

- Do not lard foreign matters during installing heatsink. This case may lower the heat radiation performance, leading to trouble.
- Wiring
 - Use a wire an adequate size for current to be applied. Abnormal heating of wire may cause burning.
 - Do not use any wires with damaged sheaths. These may cause electric shock leakage.
 - Confirm it wire for G3PE is not used in pipe or duct for high voltage power supply. Induction will be generated and cause malfunction or damages.
 - Abnormal heat generated by terminals may occasionally result in fire damage. When tightening terminal screws, be sure that no non-conductive foreign matter is caught in screw.
 - For G3PE relays of 35A or higher, use crimp terminals of an appropriate size for the wire diameter for M5 terminals.
 - Do not use G3PE with the screw of the terminal loosened. It causes damaging by fire by abnormal generation of heat of the terminal.
 - Be sure to conduct wiring with the power supply turned OFF. Touching the terminals when they are charged may occasionally result in minor electric shock.

Using
 - Select a load within the rated range. Inappropriate load may cause misoperation, trouble or burning.
 - Select the power supply within the rated frequency range. Inappropriate power frequency may cause misoperation, trouble or burning.
 - This product adopts the circuit what prevent rupture of Photocoupler by the agency of compulsory turning output element on against surge-voltage that input to load side. If user uses this product to motor load, it have prospects of malfunction. Then, avoid use to the motor load.

Mounting
 - To avoid the risk of electric shock or equipment damage a minimum distance to conductive parts of 5mm is required, (for only single phase G3PE-515B, 525B series)

Precautions for Correct Use

G3PE uses electronics parts mounting on PCB, so that any dropping and vibration, physical shock beyond the standard level should be prevented, otherwise the initial characteristic will be not injured.

Terminal screw must be tightened with regulation torque, Less convection air produces a heating on G3PE abnormal and causes a short-circuit failure and burning.
(M3.5 0.59~1.18N·m ; M4 0.98~1.47N·m ; M5 1.57~2.45N·m)

Do not supply a high voltage/current to the input and output. Short circuit failure or burning must be occurred on G3PE.

Do not use or store the G3PE, in the following locations. Doing so may result in damage, malfunction, or deterioration of performance characteristic.

- Locations subject to static electricity or other forms of noise.
- Locations subject to strong electromagnetic fields.
- Locations subject to possible exposure to radioactivity.

Mounting

Since this G3PE weights heavy, install the rails firmly. Mount the DIN rails of G3PE also firmly. Loose mounting may cause dropping. Fix both the ends by end-plates.

<Mounting Condition>

Vertical Direction

Horizontal Direction

Vertical Direction

Horizontal Direction

Note : For horizontal mounting, the load current must be 50% lower than the rated one (refer to Engineering Data). In case stick installation, please reference the data of characteristic data. Install it that the marking can be read easily.

Mounting to Control Panel

Since this component weights heavy, install the rails firmly. Mount the DIN rails of compornent also firmly. Loose mounting may cause dropping. Fix both the ends by end-plates.

If SSRs are mounted inside an enclosed panel, the radiated heat of the SSR will stay inside, thus not dropping the carry-current capacity of the SSRs but also adversely affecting other electronic device mounted inside. Open some ventilation holes on the upper and lower sides of the control panel before use. The following illustrations provide a recommended mounting example of SSRs.

SSR Mounting Pitch (Panel Mountin)

Single phase

Vertical direction

80mm min.

60mm min.

30mm min.

Three phases

Duct

10mm min

80mm min

80mm min

Relations between SSR and duct (Depth of duct)

Duct Depth

Counter measure(1)

Counter measure(2)

Duct or air flow obstruction

The depth of SSR

Vertical direction

SSR

Duct or air flow obstruction

SSR

Duct or air flow obstruction

Air flow

SSR

Do not surrounded the SSR with the duct in the depth direction, or otherwise the heat radiation of the SSR will be adversely affected.

Use a short duct in the depth direction.

If the height of the ducts can not be lowered, place the SSR on a metal base so that they are not surrounded by the ducts.

Ventilation Outside the Control Panel

SSR

Air inlet

Be aware of air flow

Duct or air flow obstruction

SSR

Ventilation outlet

SSR

- ※If the air inlet or air outlet has a filter, clean the filter regularly to prevent it from cogging to ensure an efficient flow of air.
- ※Do no locate any objects around the air inlet or air outlet, otherwise the objects may obstruct the proper ventilation of the control panel.
- ※A heat exchanger, if used, should be located in front the G3PEs to ensure the efficiency or the heat exchanger.
- ※When attaching a heat sink to the SSR, apply Silicone Grease or equivalent heat conductive grease on the heat sink.
- (Momentive Performance materials: YG6260, ShinetsuSilicon: G746, etc.) Tighten the mounting screws of the heat sink with a torque of 2.0N·m.
- ※Please reduce the ambient temperature of G3PEs. The rated load current of a G3PE is measured at an ambient temperature of 40°C (There are some products at an ambient temperature of 25°C).
- ※A G3PE uses semiconductor in the output element. This causes the temperature inside the control panel to increase due to heating resulting from the passage of electrical current through the load. To the restrict heating, attach a fan to the ventilation outlet or air inlet of the control panel to ventilate the panel. This will reduce the ambient temperature of the G3PEs and thus increase reliability.

Single phase

Load current(A)	15A	25A	35A	45A
Required number of fans per SSR	0.23	0.39	0.54	0.70

Example: For 10 SSRs with load currents of 15A, 0.23×10=2.3
Thus, 3 fans would be required.

Two phases

Load current(A)	15A	25A	35A	45A
Required number of fans per SSR	0.47	0.78	1.09	1.40

Example: For 10 SSRs with load currents of 25A, 0.78×10=7.8
Thus, 8 fans would be required.

Three phases

Load current(A)	15A	25A	35A	45A
Required number of fans per SSR	0.70	1.16	1.63	2.09

Example: For 10 SSRs with load currents of 35A, 1.63×10=16.3
Thus, 17 fans would be required.

※Size of fans: 92mm, Air volume: 0.7m³/min, Ambient temperature of control panel: 30°C

※If there are other instruments that generate heat in the control panel other than SSRs, additional ventilation will be required.

EMC Ditective Compliance

EMC directives can be complied with under the following conditions.

Single phase (2□□ SERIES)

A capacitor must be connected to the load power supply.

The input cable must be less than 3 m.

Single phase (5□□ SERIES)

A capacitor must be connected to the input power supply.

A capacitor, varistor and toroidal core must be connected to the load power supply.

The input cable must be less than 3 m.

Three phases (2□□B, 5□□B SERIES)

A capacitor must be connected to the input power supply.

A capacitor and toroidal core must be connected to the load power supply.

The input cable must be less than 3 m.

INPUT

G3PE

OUTPUT

LOAD

3 m Max.

Recommended Capacitor : 1 μF , 250VAC

INPUT

G3PE

OUTPUT

LOAD

3 m Max.

Recommended Capacitor : 0.54 μF , 500VAC (LOAD)
0.1 μF , 250VAC (INPUT)
Recommended Varistor : 470V, 1750A
Recommended Toroidal core : NEC/TOKIN:ESD-R-25B or equivalent

INPUT

G3PE

OUTPUT

LOAD

3 m Max.

Recommended Capacitor : 1 μF , 250VAC (240V LOAD)
0.54 μF , 500VAC (480V LOAD)
0.1 μF , 250VAC (INPUT)
Recommended Toroidal core : NEC/TOKIN:ESD-R-25B or equivalent

EMI

This is a class A product. In residential areas it may cause radio interference, in which case the user may be required to take adequate measures to reduce interference.

Fuses

Connect quick-break fuse in series with the load as a short-circuit protection measure. Use one of the fuses in the following table or one with equivalent or better characteristics.

Recommended Fuses

G3PE rated load current	Applicable SSR	FUSE (IEC60269-4)
15A	G3PE-□15B SERIES	32A
25A	G3PE-□25B SERIES	
35A	G3PE-□35B SERIES	63A
45A	G3PE-□45B SERIES	

Suitability for Use

OMRON shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of the products in the customer's application or use of the product.
Take all necessary steps to determine the suitability of the product for the systems, machines, and equipment with which it will be used.
Know and observe all prohibitions of use applicable to this product.

NEVER USE THE PRODUCTS FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

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