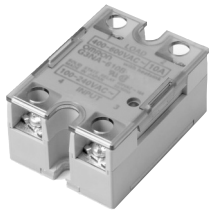
Solid State Relays (600 VAC Models)
G3NA-6

New Models Available at 600 VAC Load Voltage Line with 10 A, 25 A and 50 A Output Current

- Load voltage range: 180 to 660 VAC
- Lower input current: 7 mA max at 24 VDC
- All models are same dimensions as G3NA series.
- Built-in varistor effectively absorbs external surges.
- Operation indicator enables monitoring operation.
- Protective cover for greater safety.
- Certified by UL, CSA.





Ordering Information

■ List of Models

Isolation	Zero cross function	Indicator	Applicable output load (See note 1.)	Rated input voltage	Model
Photocoupler	Yes	Yes	10 A at 400 to 600 VAC	5 to 24 VDC	**G3NA-610B DC5-24**
				100 to 240 VAC	**G3NA-610B AC100-240**
			25 A at 400 to 600 VAC	5 to 24 VDC	**G3NA-625B DC5-24**
				100 to 240 VAC	**G3NA-625B AC100-240**
			50 A at 400 to 600 VAC	5 to 24 VDC	**G3NA-650B DC5-24**
				100 to 240 VAC	**G3NA-650B AC100-240**

Note: 1. The applicable output load depends on the ambient temperature. Refer to *Load Current vs. Ambient Temperature* in *Engineering Data.*

2. Loss time increases under 400 VAC. (Refer to *Precautions for Correct Use.*) Confirm operation with the actual load.

■ Accessories (Order Separately)

One-touch Mounting Plates

Model
R99-12 FOR G3NA

Heat Sinks

Slim Models Enabling DIN-track Mounting

Model	Applicable maximum load current
Y92B-N50	10 A
Y92B-N100	20 A
Y92B-N150	40 A
Y92B-P250N	50 A

Low-cost Models

Model	Applicable maximum load current
Y92B-A100	20 A
Y92B-A150N	40 A
Y92B-A250	40 A

Specifications

■ Ratings

Input (at an Ambient Temperature of 25°C)

Model	Rated voltage	Operating voltage	Impedance (See note 1.)	Voltage level	
				Must operate voltage	Must release voltage
G3NA-6□□B	5 to 24 VDC	4 to 32 VDC	7 mA max.	4 VDC max.	1 VDC min.
	100 to 240 VAC	75 to 264 VAC	72 kΩ±20%	75 VAC max.	20 VAC min.

Note: 1. The input impedance is measured at the maximum value of the rated supply voltage (for example, with the model rated at 100 to 240 VAC, the input impedance is measured at 240 VAC).

2. Refer to *Temperature Characteristics (for Must Operate Voltage and Must Release Voltage)* in *Engineering Data* for further details.

Output

Model	Applicable load				
	Rated load voltage	Load voltage range	Load current (See note 1.)		Inrush current
			With heat sink (See note 2.)	Without heat sink	
G3NA-610B	400 to 600 VAC	360 to 660 VAC	0.5 to 10 A (at 40°C)	0.5 to 4 A (at 40°C)	150 A (60 Hz, 1 cycle)
G3NA-625B			0.5 to 25 A (at 40°C)	0.5 to 4 A (at 40°C)	220 A (60 Hz, 1 cycle)
G3NA-650B			0.5 to 50 A (at 40°C)	0.5 to 6 A (at 40°C)	440 A (60 Hz, 1 cycle)

Note: 1. The load current varies depending on the ambient temperature. Refer to *Load Current vs. Ambient Temperature* under *Engineering Data*.

2. When an OMRON Heat Sink (refer to *Options*) or a heat sink of the specified size is used.

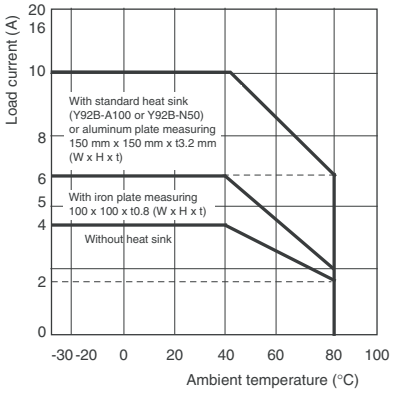
■ Characteristics

Item	G3NA-610B-UTU	G3NA-625B-UTU	G3NA-650B-UTU
Operate time	1/2 of load power source cycle + 1 ms max. (DC input) 3/2 of load power source cycle + 1 ms max. (AC input)		
Release time	1/2 of load power source cycle + 1 ms max. (DC input) 3/2 of load power source cycle + 1 ms max. (AC input)		
Output ON voltage drop	1.8 V (RMS) max.		
Leakage current	10 mA max. (at 400 VAC) 20 mA max. (at 600 VAC)		
Insulation resistance	100 MΩ min. (at 500 VDC)		
Dielectric strength	4,000 VAC, 50/60 Hz for 1 min		
Vibration resistance	Destruction: 10 to 55 to 10 Hz, 0.75-mm single amplitude (1.5-mm double amplitude)		
Shock resistance	Destruction: 1,000 m/s^2		
Ambient temperature	Operating: −30°C to 80°C (with no icing or condensation) Storage: −30°C to 100°C (with no icing or condensation)		
Ambient humidity	Operating: 45% to 85%		
Weight	Approx. 120 g		

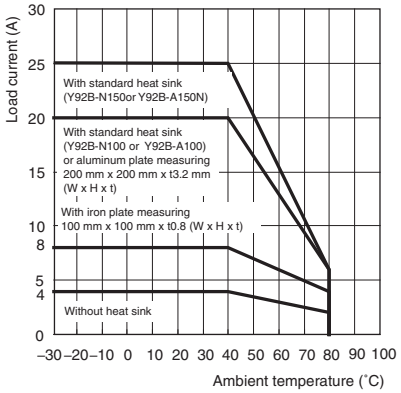
Engineering Data

Load Current vs. Ambient Temperature

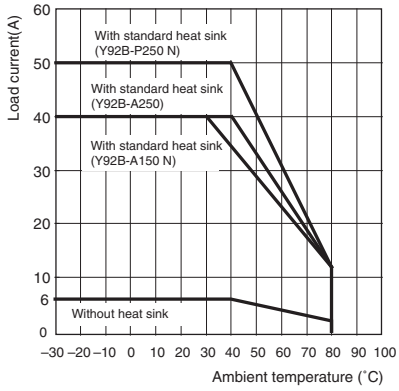
G3NA-610B



G3NA-625B



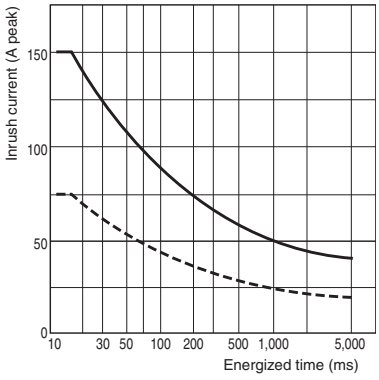
G3NA-650B



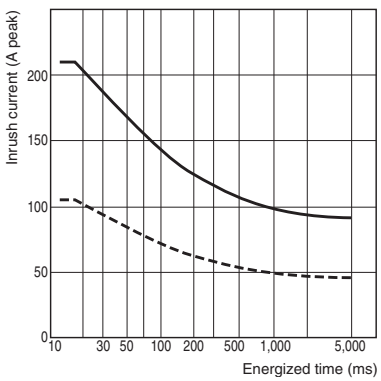
One Cycle Surge Current

The values shown by the solid line are for non-repetitive inrush currents.
Keep the inrush current below the values shown by the dotted line if it occurs repetitively.

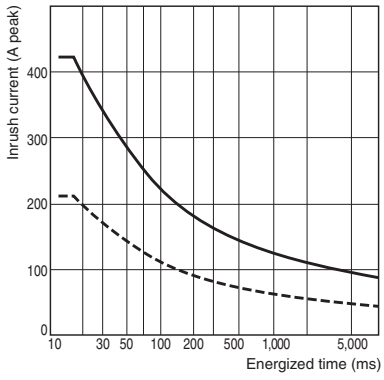
G3NA-610B



G3NA-625B



G3NA-650B



Thermal Resistance Rth (Back of Junction SSR) (Examples)

Model	Rth (°C/W)
G3NA-6□□B	0.37

Thermal Resistance Rth of Heat Sinks (Examples)

Model	Rth (°C/W)
Y92B-N50	2.8
Y92B-N100	1.63
Y92B-N150	1.38
Y92B-P250N	1.12
Y92B-A100	1.63
Y92B-A150N	1.37
Y92B-A250	1.25

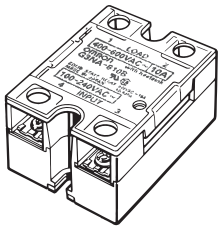
Note: When using a commercially available heat sink, use one with a thermal resistance equal to or less that the OMRON Heat Sink.

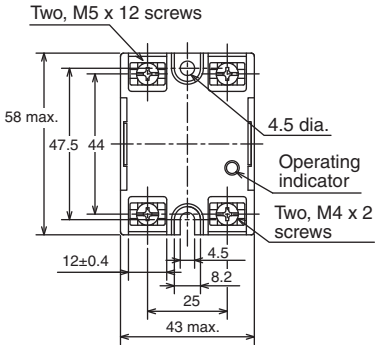
Dimensions

■ Relays

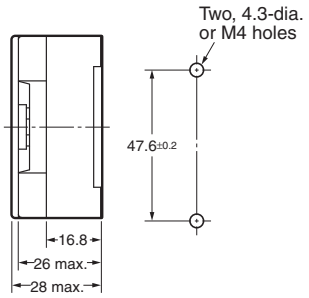
Note: All units are in millimeters unless otherwise indicated.

G3NA-610B, G3NA-625B

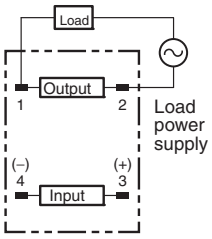




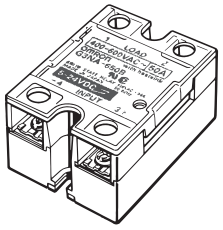
Mounting Holes

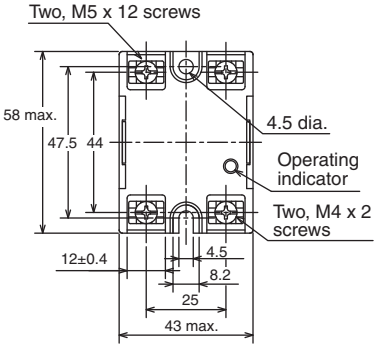


Terminal Arrangement/ Internal Connections (Top View)

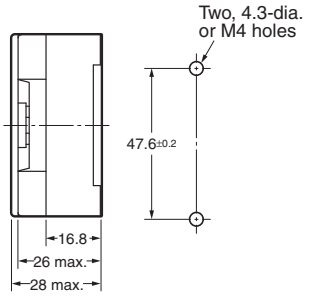


G3NA-650B

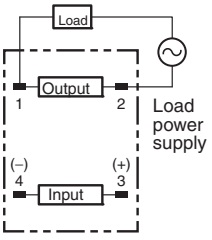




Mounting Holes



Terminal Arrangement/ Internal Connections (Top View)

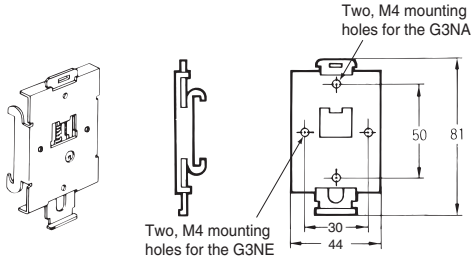


■ Optional Accessories (Order Separately)

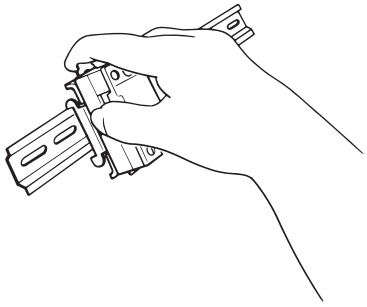
One-touch Mounting Plate

The One-touch Mounting Plate is used to mount the G3NA to a DIN Track.

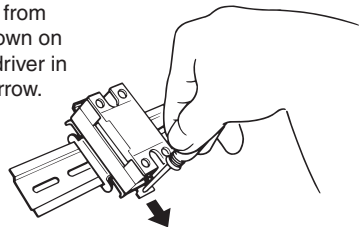
R99-12 FOR G3NA (for the G3NA and G3NE)



To mount the Relay to DIN Track, first mount it to the One-touch Mounting Plate and then attach it to the DIN Track as shown in the diagram.



To remove the Relay from the DIN Track, pull down on the tab with a screwdriver in the direction of the arrow.



- When a Relay is mounted to DIN Track, use it within the rating for a Relay without a heat sink.
- Use the following DIN Tracks: PFP-100N or PFP-100N2.

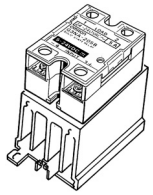
Heat Sinks

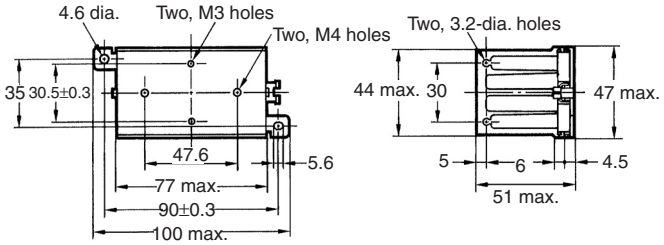
Y92B-N50 Heat Sink (for max. 10 A load current)

Type G3NA-610B is recommended for max. 10 A with this heat sink.

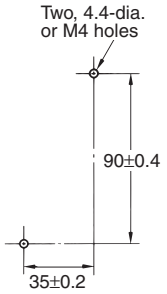
For upright standing to the ground, a 30% derating of the load current is required (from the *Load Current vs. Ambient Temperature* graphs).

The orientation indicated by the external dimensions is not the correct mounting orientation. When opening mounting holes, refer to the mounting hole dimensions.





Mounting Holes



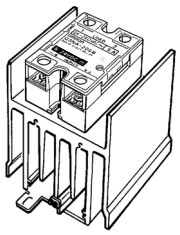
Weight: approx. 200 g

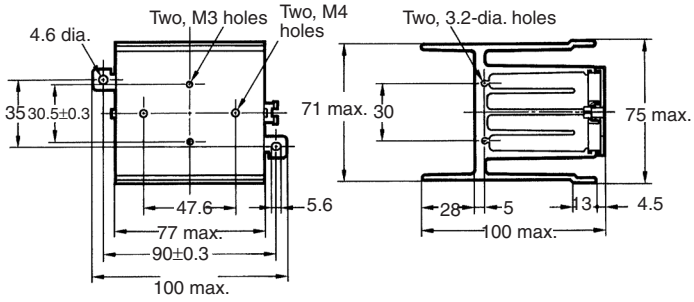
Y92B-N100 Heat Sink (for max. 20 A load current)

Type G3NA-625B is recommended for 20 A with this heat sink.

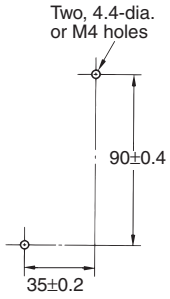
For upright standing to the ground, a 30% derating of the load current is required (from the *Load Current vs. Ambient Temperature* graphs).

The orientation indicated by the external dimensions is not the correct mounting orientation. When opening mounting holes, refer to the mounting hole dimensions.





Mounting Holes



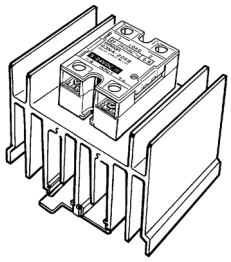
Weight: approx. 400 g

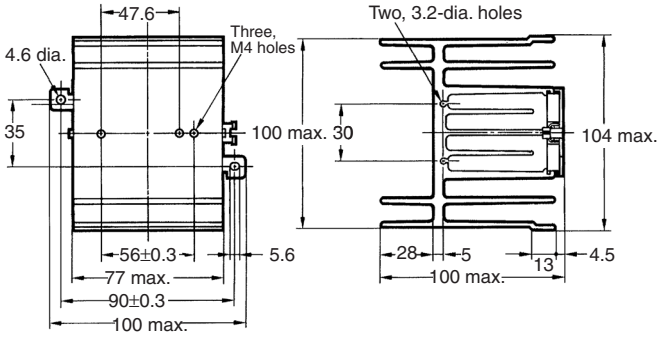
Y92B-N150 Heat Sink (for max. 40 A load current)

Type G3NA-625B is recommended for max. 25 A and G3NA-650B for max. 40 A with this heat sink.

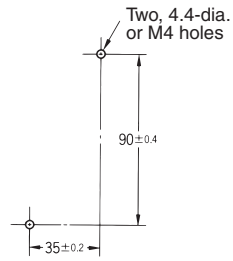
For upright standing to the ground, a 30% derating of the load current is required (from the *Load Current vs. Ambient Temperature* graphs).

The orientation indicated by the external dimensions is not the correct mounting orientation. When opening mounting holes, refer to the mounting hole dimensions.





Mounting Holes



Weight: approx. 560 g

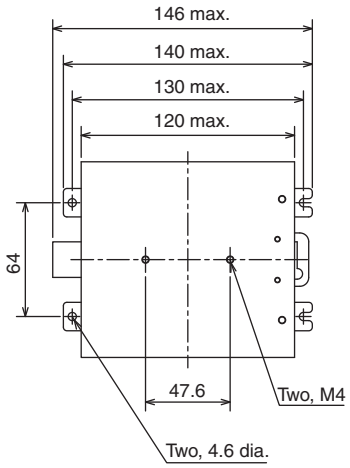
Y92B-P250N (for max. 50 A load current)

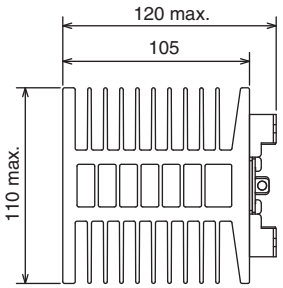
Type G3NA-650B is recommended for max. 50 A with this heat sink.

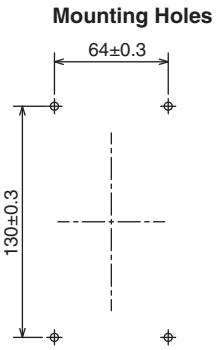
For upright standing to the ground, a 30% derating of the load current is required (from the *Load Current vs. Ambient Temperature* graphs).

The orientation indicated by the external dimensions is not the correct mounting orientation. When opening mounting holes, refer to the mounting hole dimensions.



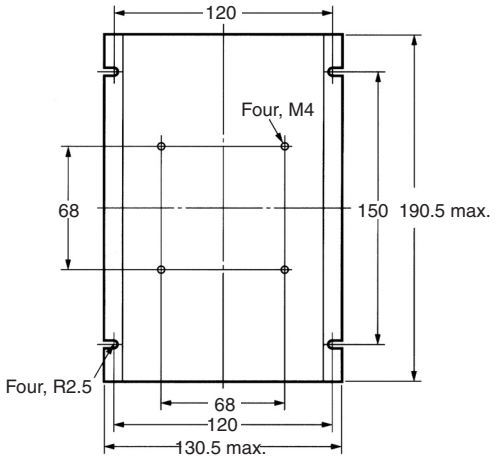


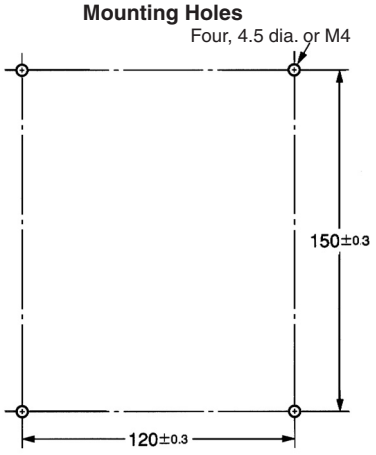




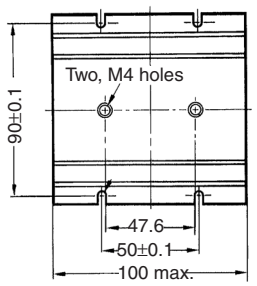
Other Heat Sinks

Y92B-P250 Heat Sink (for max. 50 A load current)



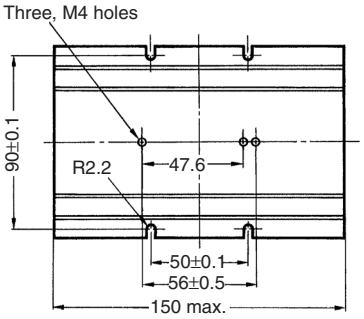


Y92B-A100 Heat Sink (for max. 20 A load current)



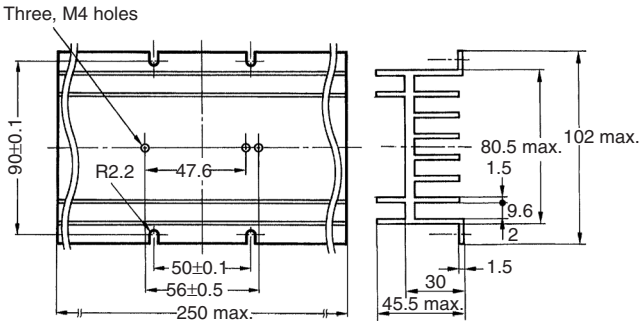
Weight: approx. 210 g

Y92B-A150N Heat Sink (for max. 40 A load current)



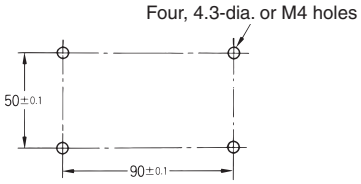
Weight: approx. 310 g

Y92B-A250 Heat Sink (for max. 40 A load current)



Weight: approx. 510 g

Mounting Holes
Y92B-A100
Y92B-A150N
Y92B-A250



For upright standing to the ground, a 30% derating of the load current is required (from the *Load Current vs. Ambient Temperature* graphs).

The orientation indicated by the external dimensions is not the correct mounting orientation. When opening mounting holes, refer to the mounting hole dimensions.

Safety Precautions

⚠ CAUTION

Touching the charged section may occasionally cause minor electric shock. Do not touch the G3NA terminal section (the charged section) when the power supply is ON. Be sure to attach the cover before use.



⚠ CAUTION

The G3NA and heat sink will be hot and may occasionally cause minor burns. Do not touch the G3NA or the heat sink either while the power supply is ON, or immediately after the power is turned OFF.



⚠ CAUTION

The internal snubber circuit is charged and may occasionally cause minor electric shock. Do not touch the G3NA's main circuit terminals immediately after the power is turned OFF.



⚠ CAUTION

Be sure to conduct wiring with the power supply turned OFF, and always attach the terminal cover after completing wiring. Touching the terminals when they are charged may occasionally result in minor electric shock.



⚠ CAUTION

Do not apply a short-circuit to the load side of the G3NA. The G3NA may rupture. To protect against short-circuit accidents, install a protective device, such as a quick-burning fuse, on the power supply line.



■ Precautions for Safe Use

Although OMRON continuously strives to improve the quality and reliability of our relays, the G3NA contains semiconductors, which are generally prone to occasional malfunction and failure.
Maintaining safety is particularly difficult if a relay is used outside of its ratings. Always use the G3NA within the rated values. When using the G3NA, always design the system to ensure safety and prevent human accidents, fires, and social damage even in the event of G3NA failure, including system redundancy, measures to prevent fires from spreading, and designs to prevent malfunction.

1. G3NA malfunction or fire damage may occasionally occur. Do not apply excessive voltage or current to the G3NA terminals.

2. Heat Dissipation

- Do not obstruct the airflow to the G3NA or heat sink. Heat generated from an G3NA error may occasionally cause the output element to short, or cause fire damage.
- Be sure to prevent the ambient temperature from rising due to the heat radiation of the G3NA. If the G3NA is mounted inside a panel, install a fan so that the interior of the panel is fully ventilated.
- Mount the G3NA in the specified orientation. If the G3NA is mounted in any other orientation, abnormal heat generation may cause output elements to short or may cause burning.
- Do not use the G3NA if the heat sink fins are bent, e.g., as the result of dropping the G3NA. Heat dissipation characteristics will be reduced, possibly causing G3NA failure.
- Apply a thin layer of Toshiba Silicone's YG6260 or Sinetsu Silicone's G746, or a similar material to the heat sink before mounting
- If a material with high thermal resistance, such as wood, is used, heat generated by the G3NA may occasionally cause fire or burning. When installing the G3NA directly into a control panel so that the panel can be used as a heat sink, use a panel material with low thermal resistance, such as aluminum or steel.
- Use the specified heat sink or one with equivalent or better characteristics. Abnormal heat generation may cause output elements to short or may cause burning.

3. Wire the G3NA and tighten screws correctly, observing the following precautions
Heat generated by a terminal error may occasionally result in fire damage. Do not operate if the screws on the output terminal are loose.

- Abnormal heat generated by wires may occasionally result in fire damage. Use wires suitable for the load current.
- Abnormal heat generated by terminals may occasionally result in fire damage. Do not operate if the screws on the output terminal are loose.

Tightening Torque

Screw size	Tightening torque
M4	1.2 N·m
M5	2.0 N·m

- Abnormal heat generated by terminals may occasionally result in fire damage. When tightening terminal screws, be sure that no non-conductive material is caught in screw.
- For G3NA Relays of 50 A or higher, use crimp terminals of an appropriate size for the wire diameter for M5 terminals.
- Use wires that are suitable for the load current and voltage. Abnormal heat generated by the wires may result in fire damage or melting of the sheath, causing electric shock.
- Do not use any wires with damaged sheaths. These may cause electric shock or leakage.
- Do not place wiring in the same conduit or duct as high-voltage lines. Induction may cause malfunction or damage.
- Use wires of an appropriate length, otherwise malfunction and damage may result due to induction.
- Mount the DIN Track securely. Otherwise, the DIN Track may fall.
- Be sure that the G3NA clicks into place when mounting it to DIN Track. The G3NA may fall if it is not mounted correctly.
- Do not mount the G3NA when your hands are oily or dirty, e.g., with metal powder. These may cause G3NA failure.
- Tighten the G3NA screws securely.
Tightening torque: 0.78 to 0.98 N·m
- Abnormal heat generation may cause output elements to short or may cause burning.
- Tighten the heat sink screws securely.
Tightening torque: 0.98 to 1.47 N·m
- The G3NA may fall if it is not mounted correctly.

4. Operating Conditions

- Only use the G3NA with loads that are within the rated values. Using the G3NA with loads outside the rated values may result in malfunction, damage, or burning.
- Use a power supply within the rated frequency range. Using a power supply outside the rated frequency range may result in malfunction, damage, or burning.
- Never apply voltage or current to the I/O terminals that exceeds the rated range. Doing so may result in malfunction, damage, or burning.

5. Do not transport the G3NA under the following conditions. Failure or malfunction may occur.

- Conditions under which the G3NA will be exposed to water
- High temperatures or high humidity

Operating and Storage Locations

Do not use or store the G3NA in the following locations. Doing so may result in damage, malfunction, or deterioration of performance characteristics.

- Do not use or store in locations subject to direct sunlight.
- Do not use in locations subject to ambient temperatures outside the range −30 to 80°C.
- Do not use in locations subject to relative humidity outside the range 45% to 85% or locations subject to condensation as the result of severe changes in temperature.
- Do not store in locations subject to ambient temperatures outside the range −30 to 100°C.
- Do not use or store in locations subject to corrosive or flammable gases.
- Do not use or store in locations subject to dust (especially iron dust) or salts.
- Do not use or store in locations subject to shock or vibration.
- Do not use or store in locations subject to exposure to water, oil, or chemicals.
- Do not use or store in locations subject to high temperatures or high humidity.
- Do not use or store in locations subject to salt damage.
- Do not use or store in locations subject to rain or water drops.

■ Precautions for Correct Use

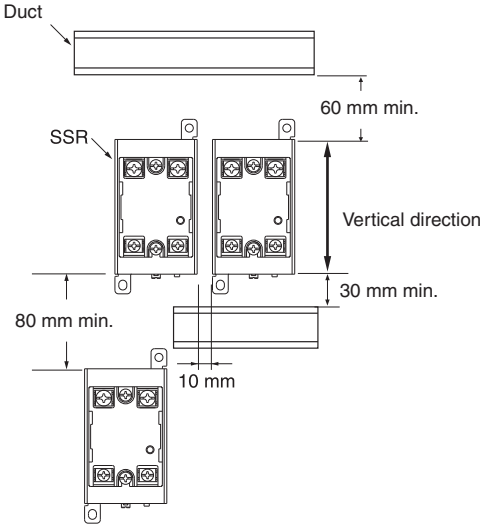
Please observe the following precautions to prevent failure to operate, malfunction, or undesirable effect on product performance.

Before Actual Operation

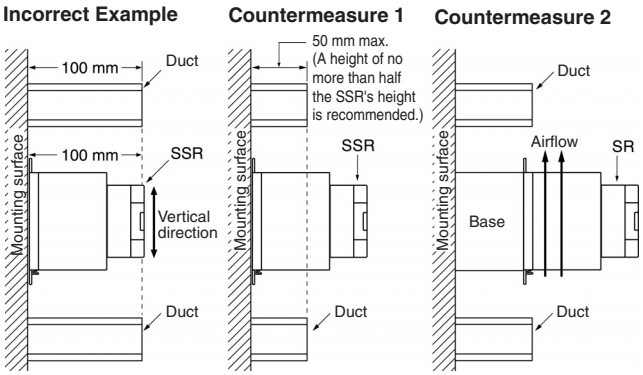
1. The G3NA in operation may cause an unexpected accident. Therefore it is necessary to test the G3NA under the variety of conditions that are possible. As for the characteristics of the G3NA, it is necessary to consider differences in characteristics between individual SSRs.
2. Unless otherwise specified, the ratings in this catalog are tested values in a temperature range between 15°C and 30°C, a relative humidity range between 25% and 85%, and an atmospheric pressure range between 88 and 106 kPa (standard test conditions according to JIS C5442). It will be necessary to provide the above conditions as well as the load conditions if the user wants to confirm the ratings of specific G3NAs.

Mounting Method

SSR Mounting Pitch (Panel Mounting)



Relationship between SSRs and Duct Height

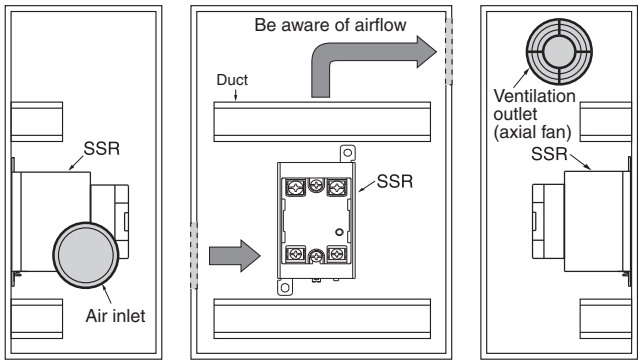


Do not surround the SSR with ducts, otherwise the heat radiation of the SSR will be adversely affected.

Use short ducts.

If the ducts cannot be shortened, place the SSR on a metal base so that it is not surrounded by the ducts.

Ventilation Outside the Control Panel



If the air inlet or air outlet has a filter, clean the filter regularly to prevent it from clogging to ensure an efficient flow of air.

Do not 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 of the SSRs to ensure the efficiency of the heat exchanger.

- Please reduce the ambient temperature of SSRs.
  The rated load cuρρεντ οφ αν ΣΣΡ ισ μεασυρεδ ατ αν αμβιεντ τεμπερατυρε οφ 40°C.
- An SSR uses a 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 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 SSRs and thus increase reliability. (Generally, each 10°C reduction in temperature will double the expected life.)

(Reference)

Load current (A)	5 A	10 A	20 A	40 A	75 A	90 A
Required number of fans per SSR	0.08	0.16	0.31	0.62	1.2	1.44

Example: For 10 SSRs with load currents of 10 A,

0.16 x 10 = 1.6

Thus, 2 fans would be required.

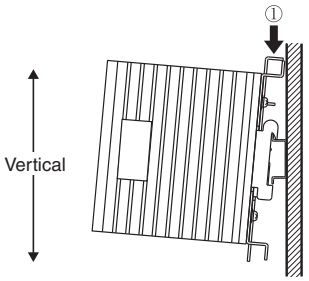
Size of fans: 92 mm^2, Air volume: 0.7 m^3/min,
Ambient temperature of control panel: 30°C

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

High-capacity Heat Sink (Y92B-P250N)

DIN-track Mounting

- Assembled DIN Tracks are heavy. Mount the DIN Tracks securely. Be sure that the Heat Sink is securely locked to the DIN Track.
- Attach End Plates (PFP-M, order separately) to both ends of the Units on the DIN Track to hold them in place.
- To mount a Heat Sink to a DIN Track, press down at the point indicated by arrow 1 in the diagram and then press in the Heat Sink at the point indicated by arrow 2.



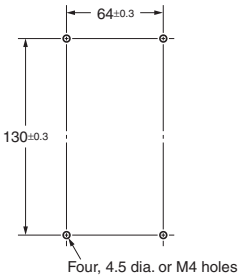
Applicable DIN Track

Mounting is possible on TE35-15Fe (IEC 60715) DIN tracks. DIN tracks from the following manufacturers can be used.

Manufacturer	Thickness: 1.5 mm	Thickness: 2.3 mm
Schneider	AM1-DE2000	---
WAGO	210-114 or 210-197	210-118
PHOENIX	N35/15	N35/15/15-2.3

Direct Mounting

- Prepare mounting holes as shown in the diagram. Tightening torque: 0.98 to 1.47 N·m

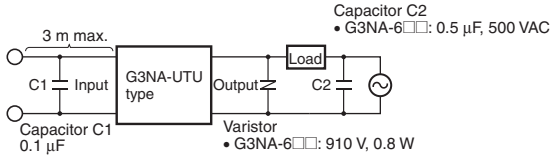


Operating Conditions

- Do not apply currents exceeding the rated current otherwise, the temperature of the G3NA may rise excessively.
- As protection against accidents due to short-circuiting, be sure to install protective devices, such as fuses and no-fuse breakers, on the power supply side.
- Do not apply overvoltages to the input circuit or output circuit. Failure or burning may result.
- Do not drop the G3NA or otherwise subject it to abnormal shock. Malfunction or failure may result.
- Keep the cooling system running continuously during the ON/OFF operation of the SSR. This is to allow residual heat to dissipate while the SSR is OFF.

Noise Terminal Voltage According to EN55011

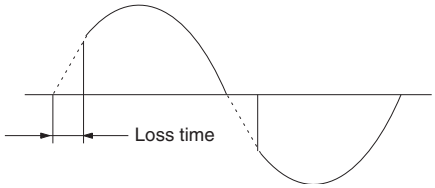
The G3NA-UTU complies with EN55011 standards when a capacitor is connected to the load power supply as shown in the following circuit diagram.



- Connect capacitor C1 to both sides of the input terminals for a G3NA with a DC input.
- Connect capacitor C2 to both sides of the load power supply output.
- Connect the varistor to both sides of the G3NA output terminals.
- Do not use an input line that is longer than 3 m.

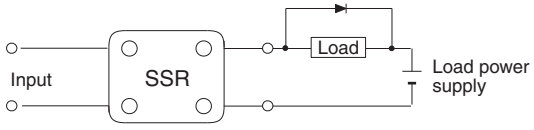
Loss Time

The loss time will increase when the G3NA is used at a low applied voltage or current. Be sure that this does not cause any problems.



Using DC Loads

For a DC or L load, a diode should be connected in parallel the load to absorb the counter electromotive force of the load.



■ Precautions on Operating and Storage Environments

1. Operating Ambient Temperature

The rated value for the ambient operating temperature of the G3NA is for when there is no heat build-up. For this reason, under conditions where heat dissipation is not good due to poor ventilation, and where heat may build up easily, the actual temperature of the G3NA may exceed the rated value resulting in malfunction or burning.

When using the G3NA, design the system to allow heat dissipation sufficient to stay below the *Load Current vs. Ambient Temperature* characteristic curve. Note also that the ambient temperature of the G3NA may increase as a result of environmental conditions (e.g., climate or air-conditioning) and operating conditions (e.g., mounting in an airtight panel).

2. Transportation

When transporting the G3NA, observe the following points. Not doing so may result in damage, malfunction, or deterioration of performance characteristics.

- Do not drop the G3NA or subject it to severe vibration or shock.
- Do not transport the G3NA if it is wet.
- Do not transport the G3NA under high temperatures or humidity.
- Do not transport the G3NA without packing it properly.

3. Vibration and Shock

Do not subject the G3NA to excessive vibration or shock. Otherwise the G3NA may malfunction and internal components may be deformed or damaged, resulting in failure of the G3NA to operate.

To prevent the G3NA from abnormal vibration, do not install the G3NA in locations or by means that will subject it to vibration from other devices, such as motors.

4. Solvents

Do not allow the G3NA or the resin portion of the Fan's thermostat to come in contact with solvents, such as thinners or gasoline. Doing so will dissolve the markings on the G3NA.

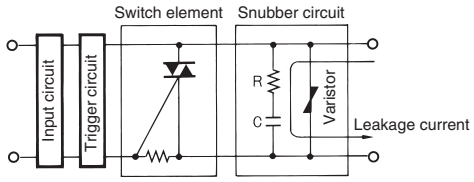
5. Oil

Do not allow the G3NA terminal cover to come in contact with oil. Doing so will cause the cover to crack and become cloudy.

■ Operation

1. Leakage Current

A leakage current flows through a snubber circuit in the G3NA even when there is no power input. Therefore, always turn OFF the power to the input or load and check that it is safe before replacing or wiring the G3NA.



2. Screw Tightening Torque

Tighten the G3NA terminal screws properly. If the screws are not tight, the G3NA will be damaged by heat generated when the power is ON. Perform wiring using the specified tightening torque.

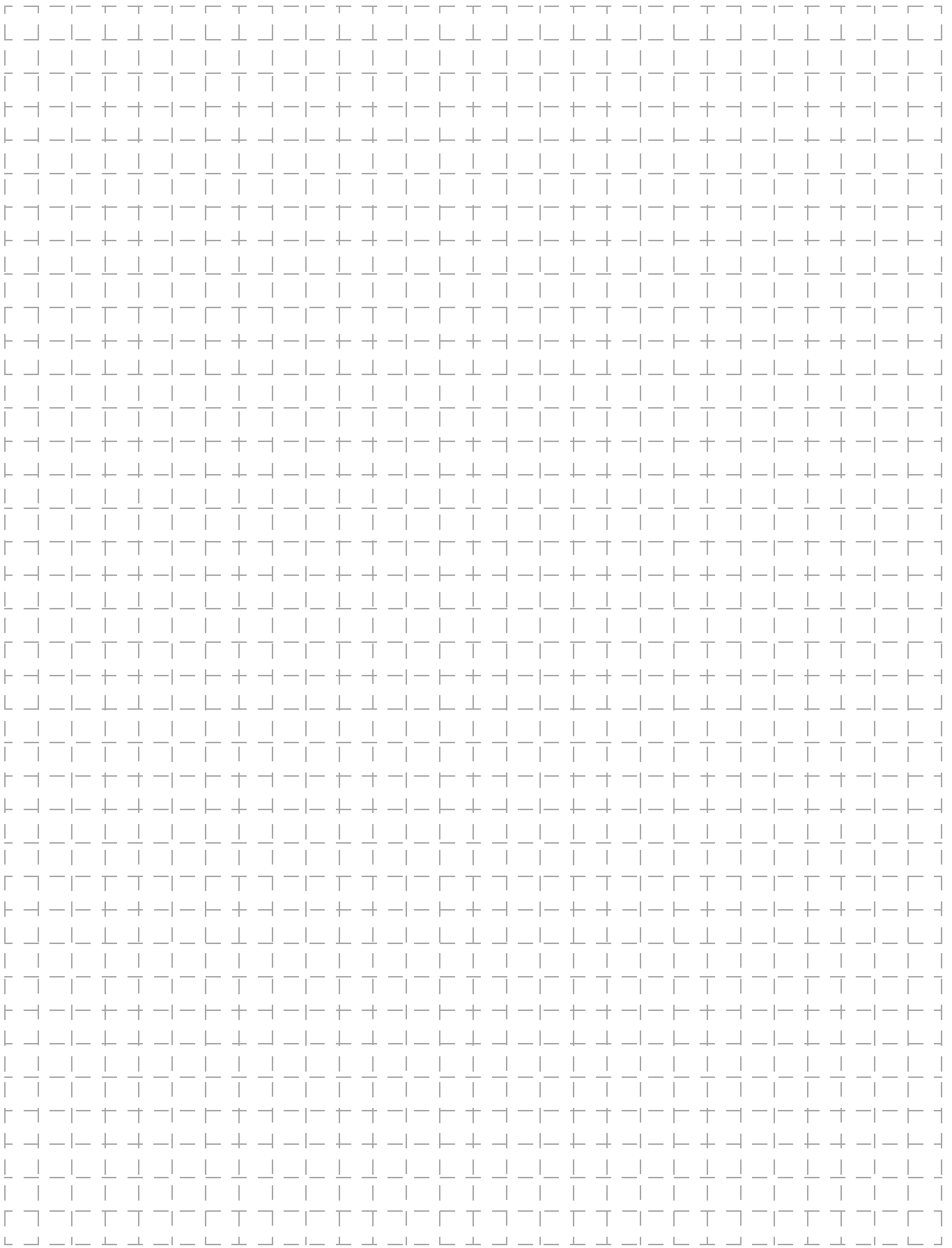
3. Handling Relays

Do not mount the G3NA when your hands are oily or dirty, e.g., with metal powder. These may cause G3NA failure.

4. Do Not Drop

Be careful not to drop a Relay or Heat Sink onto any part of your body while working. Injury may result. This is particularly true for the High-capacity Heat Sink (Y92B-P250N), which weighs 2.5 kg.

MEMO



Omron Electronic Components, LLC

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