

Autonics

Single-Phase, Detachable Type SSR

SR1 SERIES

INSTRUCTION MANUAL



Thank you for choosing our Autonics product.
Please read the following safety considerations before use.

Safety Considerations

⚠ Please observe all safety considerations for safe and proper product operation to avoid hazards.

⚠ symbol represents caution due to special circumstances in which hazards may occur.

Warning Failure to follow these instructions may result in serious injury or death.

Caution Failure to follow these instructions may result in personal injury or product damage.

Warning

1. Fail-safe device must be installed when using the unit with machinery that may cause serious injury or substantial economic loss. (e.g. nuclear power control, medical equipment, ships, vehicles, railways, aircraft, combustion apparatus, safety equipment, crime/disaster prevention devices, etc.)
Failure to follow this instruction may result in fire, personal injury, or economic loss.

2. Install on a device panel to use.
Failure to follow this instruction may result in electric shock or fire.

3. Do not connect, repair, or inspect the unit while connected to a power source.
Failure to follow this instruction may result in electric shock or fire.

4. Check 'Connections' before wiring.
Failure to follow this instruction may result in fire.

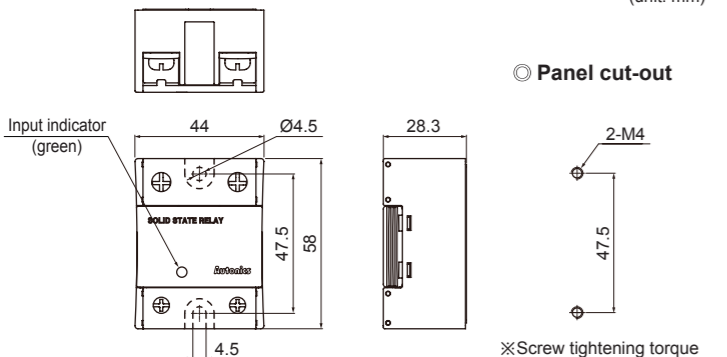
5. Do not disassemble or modify the unit.
Failure to follow this instruction may result in electric shock or fire.

Caution

- Use the unit within the rated specifications.**
Failure to follow this instruction may result in fire or product damage.
- Use dry cloth to clean the unit, and do not use water or organic solvent.**
Failure to follow this instruction may result in electric shock or fire.
- Do not use the unit in the place where flammable/explosive/corrosive gas, humidity, direct sunlight, radiant heat, vibration, impact, or salinity may be present.**
Failure to follow this instruction may result in fire or explosion.
- Keep metal chip, dust, and wire residue from flowing into the unit.**
Failure to follow this instruction may result in fire or product damage.
- Since leakage current still flows right after turning off the power or in the output OFF status, do not touch the load terminal.**
Failure to follow this instruction may result in electric shock.

Dimensions

(unit: mm)



⚠ When installing multiple SSRs, please keep space between SSRs for heat radiation. When installing SSRs horizontally (input part and output part on the same height), please supply less than 50% of the rated load current.

⚠ The above specifications are subject to change and some models may be discontinued without notice.
⚠ Be sure to follow cautions written in the instruction manual and the technical descriptions (catalog, homepage).

Model

| Model | Rated input voltage | Rated load current | Rated load voltage | Function | |
|-------------|---------------------|--------------------|--------------------|--------------------|--------------------|
| SR1-1210-N | 4-30VDC | 10A | 24-240VAC | Zero cross turn-on | |
| SR1-4210-N | 90-240VAC | 10A | | | |
| SR1-1215-N | 4-30VDC | 15A | | | |
| SR1-4215-N | 90-240VAC | 15A | | | |
| SR1-1220-N | 4-30VDC | 20A | | | |
| SR1-4220-N | 90-240VAC | 20A | | | |
| SR1-1225-N | 4-30VDC | 25A | | | |
| SR1-4225-N | 90-240VAC | 25A | | | |
| SR1-1230-N | 4-30VDC | 30A | | | |
| SR1-4230-N | 90-240VAC | 30A | | | |
| SR1-1240-N | 4-30VDC | 40A | 48-480VAC | Zero cross turn-on | |
| SR1-4240-N | 90-240VAC | 40A | | | |
| SR1-1250-N | 4-30VDC | 50A | | | |
| SR1-4250-N | 90-240VAC | 50A | | | |
| SR1-1275-N | 4-30VDC | 75A | | | |
| SR1-4275-N | 90-240VAC | 75A | | | |
| SR1-1410-N | 4-30VDC | 10A | | | Zero cross turn-on |
| SR1-1410R-N | 4-30VDC | 10A | | | Random turn-on |
| SR1-4410-N | 90-240VAC | 10A | | | Zero cross turn-on |
| SR1-1415-N | 4-30VDC | 15A | | | Zero cross turn-on |
| SR1-1415R-N | 4-30VDC | 15A | Random turn-on | | |
| SR1-4415-N | 90-240VAC | 15A | Zero cross turn-on | | |
| SR1-1420-N | 4-30VDC | 20A | Zero cross turn-on | | |
| SR1-1420R-N | 4-30VDC | 20A | Random turn-on | | |
| SR1-4420-N | 90-240VAC | 20A | Zero cross turn-on | | |
| SR1-1425-N | 4-30VDC | 25A | Zero cross turn-on | | |
| SR1-1425R-N | 4-30VDC | 25A | Random turn-on | | |
| SR1-4425-N | 90-240VAC | 25A | Zero cross turn-on | | |
| SR1-1430-N | 4-30VDC | 30A | Zero cross turn-on | | |
| SR1-1430R-N | 4-30VDC | 30A | Random turn-on | | |
| SR1-4430-N | 90-240VAC | 30A | Zero cross turn-on | | |
| SR1-1440-N | 4-30VDC | 40A | Zero cross turn-on | | |
| SR1-1440R-N | 4-30VDC | 40A | Random turn-on | | |
| SR1-4440-N | 90-240VAC | 40A | Zero cross turn-on | | |
| SR1-1450-N | 4-30VDC | 50A | Zero cross turn-on | | |
| SR1-1450R-N | 4-30VDC | 50A | Random turn-on | | |
| SR1-4450-N | 90-240VAC | 50A | Zero cross turn-on | | |
| SR1-1475-N | 4-30VDC | 75A | Zero cross turn-on | | |
| SR1-1475R-N | 4-30VDC | 75A | Random turn-on | | |
| SR1-4475-N | 90-240VAC | 75A | Zero cross turn-on | | |

Cautions during Use

- Follow instructions in 'Cautions during Use'. Otherwise, it may cause unexpected accidents.
- 4-30VDC signal input should be insulated and limited voltage/current or Class 2, SELV power supply device.
- Attach a heat sink or install the unit in the well ventilated place.
To attach the heat sink, use Thermal Grease as below or that of equal specification.
⚠ Thermal Grease: GE TOSHIBA (YG6111), KANTO-KASEI (FLOIL G-600), SHINETSU (G746)
- Ground to the heat sink, panel, or DIN rail.
Failure to follow this instruction may result in electric shock.
- While supplying power to the load or right after turning off the power of the load, do not touch the body and heat sink.
Failure to follow this instruction may result in a burn due to the high temperature.
- In order to protect the product from the short-circuit current of the load, use rapid fuse of which I²t is under the 1/2 of SSR I²t. When short-circuited, replace the fuse to those of same specification with the used rapid fuse.
- Install dummy resistance in parallel with the load, to keep the sum of current flowing in the load and dummy resistance being over SSR minimum load current.
- When using random turn-on model for phase control, install noise filter between the load and the power of the load.
- Do not use near the equipment which generates strong magnetic force or high frequency noise.
- This unit may be used in the following environments.
 - Indoors (in the environment condition rated in 'Specifications')
 - Altitude max. 2,000m
 - Pollution degree 2
 - Installation category III

Specifications

Input

| | | |
|-------------------------------|--------------------|-------------------------------------|
| Rated input voltage range | 4-30VDC | 90-240VACrms ~ (50/60Hz) |
| Allowable input voltage range | 4-32VDC | 85-264VACrms ~ (50/60Hz) |
| Max. input current | 18mA | 18Arms (240VACrms ~) |
| Pick-up voltage | Min. 4VDC | Min. 85VACrms ~ |
| Drop-off voltage | Max. 1VDC | Max. 10VACrms ~ |
| Turn-on time | Zero cross turn-on | Max. 0.5 cycle of load source + 1ms |
| | Random turn-on | Max. 2 cycle of load source + 1ms |
| Turn-off time | Zero cross turn-on | Max. 0.5 cycle of load source + 1ms |
| | Random turn-on | Max. 2 cycle of load source + 1ms |

Output

| | | | | | | | | |
|---|-----------------------------|---------------------|---------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| Rated load voltage range | 24-240VACrms ~ (50/60Hz) | | | | | | | |
| Allowable load voltage range | 24-264VACrms ~ (50/60Hz) | | | | | | | |
| Rated load current (AC-51) ^{*1} | 10Arms | 15Arms | 20Arms | 25Arms | 30Arms | 40Arms | 50Arms | 75Arms |
| | 10Arms | 15Arms | 20Arms | 25Arms | 30Arms | 40Arms | 50Arms | 75Arms |
| Min. load current | 0.15Arms | 0.2Arms | 0.2Arms | 0.5Arms | 0.5Arms | 0.5Arms | 0.5Arms | 0.5Arms |
| Max. 1 cycle surge current (60Hz) | 160A | 250A | 400A | 1000A | 1000A | 1000A | 1000A | 1000A |
| Max. non-repetitive surge current (I ² t, t=8.3ms) | 130A ² s | 300A ² s | 910A ² s | 4000A ² s | 4000A ² s | 4000A ² s | 4000A ² s | 4000A ² s |
| Peak voltage (non-repetitive) | 600V | | | | | | | |
| Leakage current (Ta=25°C) | Max. 10mArms (240VAC~/60Hz) | | | | | | | |
| Output on voltage drop [Vpk] (max. load current) | Max. 1.6V | | | | | | | |
| Static off state dv/dt | 500V/μs | | | | | | | |

| | | | | | | | | |
|---|--|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| Rated load voltage range | 48-480VACrms ~ (50/60Hz) | | | | | | | |
| Allowable load voltage range | 48-528VACrms ~ (50/60Hz) | | | | | | | |
| Rated load current (AC-51) ^{*1} | 10Arms | 15Arms | 20Arms | 25Arms | 30Arms | 40Arms | 50Arms | 75Arms |
| | 10Arms | 15Arms | 20Arms | 25Arms | 30Arms | 40Arms | 50Arms | 75Arms |
| Min. load current | 0.5Arms | 0.5Arms | 0.5Arms | 0.5Arms | 0.5Arms | 0.5Arms | 0.5Arms | 0.5Arms |
| Max. 1 cycle surge current (60Hz) | 300A | 500A | 500A | 1000A | 1000A | 1000A | 1000A | 1000A |
| Max. non-repetitive surge current (I ² t, t=8.3ms) | 350A ² s | 1000A ² s | 1000A ² s | 4000A ² s | 4000A ² s | 4000A ² s | 4000A ² s | 4000A ² s |
| Peak voltage (non-repetitive) | 1200V (Zero cross turn-on), 1000V (Random turn-on) | | | | | | | |
| Leakage current (Ta=25°C) | Max. 10mArms (480VAC~/60Hz) | | | | | | | |
| Output on voltage drop [Vpk] (max. load current) | Max. 1.6V | | | | | | | |
| Static off state dv/dt | 500V/μs | | | | | | | |

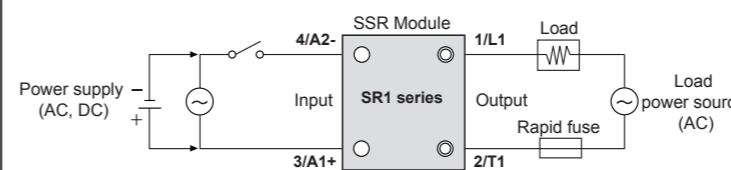
General specifications

| | |
|----------------------------|--|
| Dielectric strength (Vrms) | 2500VAC 50/60Hz 1 min (input-output, input/output-case) |
| Insulation resistance | Over 100MΩ (at 500VDC megger) (input-output, input/output-case) |
| Indicator | Input indicator: green LED |
| Vibration | Mechanical 0.75mm amplitude at frequency of 10 to 55Hz (for 1 min) in each X, Y, Z direction for 1 hour |
| | Malfunction 0.5mm amplitude at frequency of 10 to 55Hz (for 1 min) in each X, Y, Z direction for 10 min |
| Shock | Mechanical 300m/s ² (approx. 30G) in each X, Y, Z direction for 3 times |
| | Malfunction 100m/s ² (approx. 30G) in each X, Y, Z direction for 3 times |
| Environment | Ambient temp. -30 to 80°C (in case of the rated input voltage 90-240VAC ~: -20 to 70°C), storage: -30 to 100°C (The rated load current capacity is different depending on ambient temperature. Refer to 'SSR Derating Curve'.) |
| | Ambient humi. 45 to 85%RH, storage: 45 to 85%RH |

| | |
|------------------------------|--|
| Input terminal connection | Min. 1×0.5mm ² (1×AWG20), max. 1×1.5mm ² (1×AWG16) or 2×1.5mm ² (2×AWG16) |
| Output terminal connection | Min. 1×1.5mm ² (1×AWG16), max. 1×16mm ² (1×AWG6) or 2×6mm ² (2×AWG10) ⚠ Use wires compliant with load current capacity to connect to the terminal. |
| Input terminal fixed torque | 0.75 to 0.95N·m |
| Output terminal fixed torque | 1.6 to 2.2N·m |
| Approval | CE, UL |
| Weight ^{*1} | Approx. 111g (approx. 73g) |

⚠ *1: The weight includes packaging. The weight in parenthesis is for unit only.
⚠ Environment resistance is rated at no freezing or condensation.
⚠ For wiring the terminal, round terminal must be used.

Connections



⚠ Use terminals of size specified below.

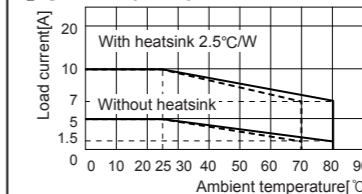
| Terminal type | Input | Output |
|---------------|------------|-------------|
| a | Min. 3.5mm | Min. 5.0mm |
| b | Max. 7.0mm | Max. 12.0mm |

SSR Derating Curve

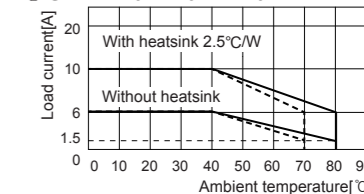
⚠ Be sure that the ambient temperature and the derating curve is different by the rated input voltage.

—: Rated input voltage 4-30VDC (SR1-1□□□-N)
- - -: Rated input voltage 90-240VAC (SR1-4□□□-N)

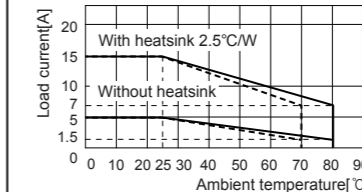
SR1-1210/4210-N



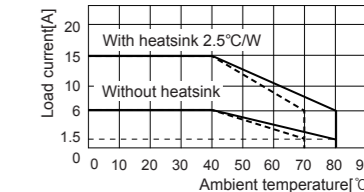
SR1-1410/1410R/4410-N



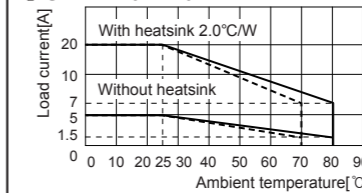
SR1-1215/4215-N



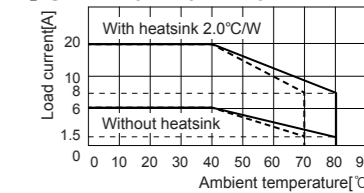
SR1-1415/1415R/4415-N



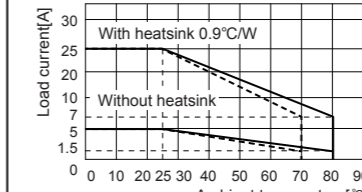
SR1-1220/4220-N



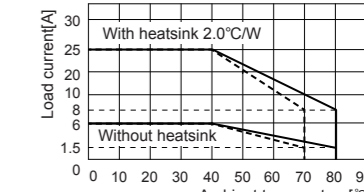
SR1-1420/1420R/4420-N



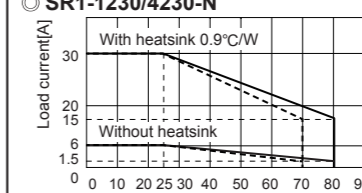
SR1-1225/4225-N



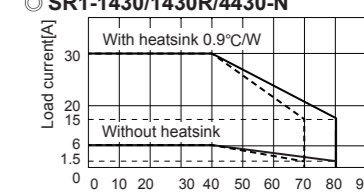
SR1-1425/1425R/4425-N



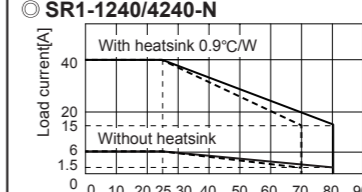
SR1-1230/4230-N



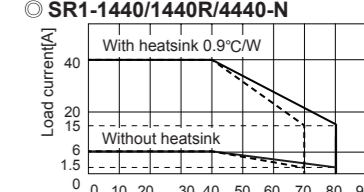
SR1-1430/1430R/4430-N



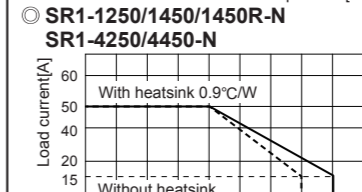
SR1-1240/4240-N



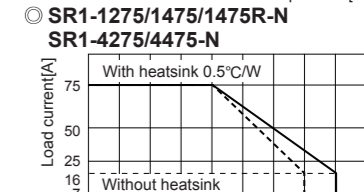
SR1-1440/1440R/4440-N



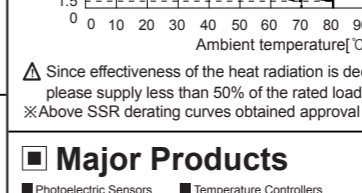
SR1-1250/1450/1450R-N



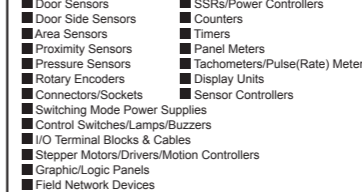
SR1-1275/1475/1475R-N



SR1-4250/4450-N



SR1-4275/4475-N



⚠ Since effectiveness of the heat radiation is decreased when multiple SSRs are installed closely, please supply less than 50% of the rated load current.
⚠ Above SSR derating curves obtained approval from the UL certification authority.

Major Products

- Photoelectric Sensors
- Fiber Optic Sensors
- Door Sensors
- Door Side Sensors
- Area Sensors
- Proximity Sensors
- Pressure Sensors
- Rotary Encoders
- Connectors/sockets
- Switching Mode Power Supplies
- Control Switches/Lamps/Sensors
- I/O Terminal Blocks & Cables
- Stepper Motors/Drivers/Motion Controllers
- Graphic/Logic Panels
- Field Network Devices
- Laser Marking System(Fiber, Co., Nd:YAG)
- Laser Welding/Cutting System
- Temperature Controllers
- Temperature/Humidity Transducers
- SSRs/Power Controllers
- Counters
- Timers
- Panel Meters
- Tachometers/Pulse(Rate) Meters
- Display Units
- Sensor Controllers

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