2 / 3-Phase SSR with Detachable / Integrated Heatsink

SR2 / SR3 / SRH2 / SRH3 Series INSTRUCTION MANUAL

TCD210095AC

Autonics

Thank you for choosing our Autonics product.

Read and understand the instruction manual and manual thoroughly before using the product.

For your safety, read and follow the below safety considerations before using. For your safety, read and follow the considerations written in the instruction manual, other manuals and Autonics website.

Keep this instruction manual in a place where you can find easily. The specifications, dimensions, etc. are subject to change without notice for product improvement. Some models may be discontinued without notice. Follow Autonics website for the latest information.

Safety Considerations

• Observe all 'Safety Considerations' for safe and proper operation to avoid hazards. • Λ symbol indicates caution due to special circumstances in which hazards may occur.

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

- 01. 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, combusti apparatus, safety equipment, crime/disaster prevention devices, etc.)
- Failure to follow this instruction may result in personal injury, economic loss or fire. 02. Do not use the unit in the place where flammable/explosive/corrosive gas, high humidity, direct sunlight, radiant heat, vibration, impact or salinity may be present. Failure to follow this instruction may result in explosion or fire.
- 03. Install the unit on DIN rail or panel to use. Failure to follow this instruction may result in fire or electric shock.
- 04. Do not connect, repair, or inspect the unit while connected to a power source.
- Failure to follow this instruction may result in fire or electric shock. 05. Check 'Connections' before wiring.
- ailure to follow this instruction may result in fire.
- 06. Do not disassemble or modify the unit.
- Failure to follow this instruction may result in fire or electric shock.

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

- 01. Use the unit within the rated specifications.
- ailure to follow this instruction may result in fire or product damage
- 02. Use a dry cloth to clean the unit, and do not use water or organic solvent. Failure to follow this instruction may result in fire or electric shoc 03. Keep the product away from metal chip, dust, and wire residue which flow
- into the unit. ailure to follow this instruction may result in fire or product damage. 04. 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

Cautions during Use

- · Follow instructions in 'Cautions during Use'. Otherwise, it may cause unexpected accidents. - 4 - 30 VDC==, 24 VAC \sim model supply 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 the heatsink, 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 burn due to high temperature of the surface.
- 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
- This unit may be used in the following environments
- Indoors (in the environment condition rated in 'Specifications')
- Altitude max. 2,000 m
- Pollution degree 2
- Installation category III

Ordering Information

This is only for reference, the actual product does not support all combinations For selecting the specified model, follow the Autonics website.

| SR | 0 | 0 | - | 3 | 4 | 6 | 6 | | |
|----------|-----------|-----------|------|---|------------|----------------------|-----------|-------|--|
| 🛛 Туре | | | | (| 🛛 Numb | per of the | e control | phase | |
| No marl | k: detach | able heat | sink | | 2: 2-phas | e | | | |
| H: Integ | rated hea | atsink | | | 3: 3-phas | e | | | |
| 🖸 Rate | dinput | voltage | | | 4 Rated | l load vo | ltage | | |
| 1:4-30 | VDC== | | | | 2: 24 - 24 | $0 \text{VAC} \sim$ | | | |
| 2· 24 VA | C~ | | | | 4: 48 - 48 | $0 \text{VAC} \sim$ | | | |

4:90 - 240 VAC~

Rated load current (resistive load)
 G Function

- Number: rated load current (unit: A)
 - R: Random turn-on

Product Components

- Product
- Instruction manual

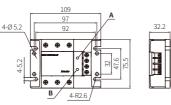
No mark: Zero cross turn-on

Dimensions

• Unit: mm, For the detailed drawings, follow the Autonics website.

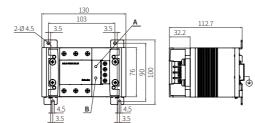
A Input indicator (green) B Alarm indicator (red) • When installing to the panel, tightening the detachable heatsink type screw with a torque of 2.5 to 3 N m, in case of the integrated heatsink type screw, the tightening torque with 1.35 N m.

Detachable heatsink type

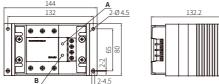


Integrated heatsink type

Rated load current 15 / 30 / 40 A

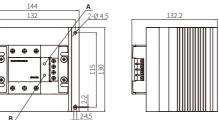


Rated load current 50 A









Panel cut-out

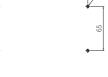
Detachable heatsink type

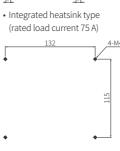


 Integrated heatsink type (rated load current 15 / 30 / 40 A)



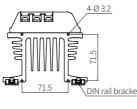
 Integrated heatsink type (rated load current 50 A)

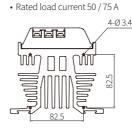




Cooling fan mounting hole

• Rated load current 30 / 40 A





Cautions during Installation

A Caution High Temperature

hile supplying power to the load or right after turning off the power of the load, on to touch the body and heat sink. Failure to follow this instruction may result i urn due to high temperature of the surface.

Spacing

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

Specifications of cooling fan

Autonics does not provide or sell a cooling fan. Buy directly a cooling fan.

| Lood conscitu | Coolingfortune | ci | Rated air flow ⁰¹⁾ | | |
|---------------|------------------|---------------|-------------------------------|------|--|
| Load capacity | Cooling fan type | Size | m³/min | CFM | |
| 30 / 40 A | AC Fan | 80 × 80 mm | 0.68 | 24.0 | |
| | DC Fan | 00 × 00 11111 | 1.25 | 44.0 | |
| 50 / 75 A | AC Fan | 92 × 92 mm | 1.13 | 40.0 | |
| | DC Fan | 92 × 92 mm | 1.80 | 63.5 | |

01) The cooling fan should be over the rated air flow value

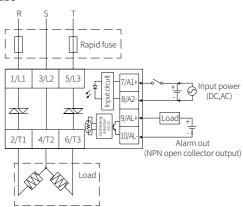
Grounding

· Be sure to ground the bolts for grounding.



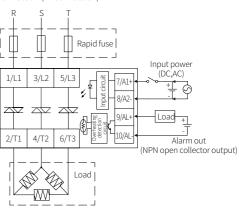
Connections

- For DC signal input models, 8 and 10 terminals are connected inside.
- For AC signal input models, 8 and 10 terminals are insulated inside.
- 2-phase

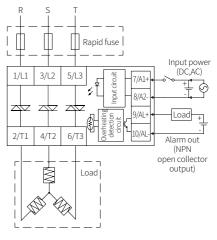


3-phase

• Delta connection (\triangle connection)

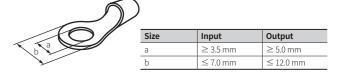


Star connection (Y connection)



Cautions for Wiring

 ${\mbox{ \bullet}}$ Unit: mm, When connecting the wire to the terminal, use the round crimp terminal.



Specifications

Input

| Rated input v | voltage range | 4 - 30 VDC | 24 VACrms~ (50/60 Hz) | 90 - 240 VACrms \sim (50/60 Hz) | |
|---|-------------------|-------------------------------------|--|--|--|
| Allowable input voltage range | | 4 - 32 VDC== | 19 - 26.4 VACrms~ (50/60 Hz) | 85 - 264 VACrms~ (50/60 Hz) | |
| Max. input current | | 25 mA | 15 mA | 25 mA | |
| Operating voltage | | \geq 4 VDC== | ≥ 19 VACrms~ | \geq 85 VACrms \sim | |
| Releasing vo | Releasing voltage | | \leq 4 VACrms \sim | \leq 10 VACrms \sim | |
| Operating time Zero cross turn-on | | \leq 0.5 cycle of load power+1 ms | \leq 1.5 cycle of load power + 1 ms | \leq 1.5 cycle of load power + 1 ms | |
| ume | Random turn-on | \leq 1 ms | - | - | |
| Releasing time | | \leq 0.5 cycle of load power+1 ms | \leq 1.5 cycle of load power + 1 ms | \leq 1.5 cycle of load power + 1 ms | |

Output

| Dated load ve | lto go von go | 24 240.14 | Cuma /EC | V(CO H=) | | | |
|---|--|---|-----------------------|----------|--------------------|-----------------------|--|
| Rated load vo | | 24 - 240 VACrms~ (50/60 Hz) | | | | | |
| Allowable loa | d voltage range | 24 - 264 VACrms~ (50/60 Hz) | | | | | |
| Rated load currentResistive load (AC-51)01) | | 15 Arms | 30 Arms | 50 A | Arms | 75 Arms | |
| Min. load cur | rent | 0.15 Arms | 0.2 Arm: | s 0.5 | Arms | 0.5 Arms | |
| Max. 1 cycle s (60 Hz) | surge current | 250 A | 400 A | 100 | 0 A | 1000 A | |
| Max. non-repetitive surge current (l ² t, t = 8.3 ms) | | 340 A ² s | 1000 A ² 5 | s 400 | 0 A ² s | 4000 A ² s | |
| Peak voltage | (non-repetitive) | 600 V | | | | | |
| Leakage curr | ent (Ta = 25 °C) | \leq 10 mArms (240 VAC \sim /60 Hz) | | | | | |
| Output ON vo (max. load cu | ltage drop [Vpk] rrent) | ≤ 1.6 V | | | | | |
| Static off stat | e dv/dt | 500 V/μs | | | | | |
| | | | | | | | |
| Rated load vo | oltage range | 48 - 480 VACrms \sim (50/60 Hz) | | | | | |
| Allowable load voltage range | | 48 - 528 VACrms~ (50/60 Hz) | | | | | |
| Rated load current | Resistive load (AC-51) ⁰¹⁾ | 15 Arms | 30 Arms | 40 Arms | 50 Arms | 75 Arms | |
| Min. load cur | rent | 0.5 Arms | | | | | |
| Max. 1 cycle s (60 Hz) | surge current | 300 A | 500 A | 500 A | 1000 A | 1000 A | |
| | | | | | | | |

| rate to the retaining of the second sec | | | | | | | |
|--|---------------------------------------|--|-----------------------|-----------------------|-----------------------|-----------------------|--|
| Rated load current | Resistive load (AC-51) ⁰¹⁾ | 15 Arms | 30 Arms | 40 Arms | 50 Arms | 75 Arms | |
| Min. load current | | 0.5 Arms | | | | | |
| Max. 1 cycle surge current (60 Hz) | | 300 A | 500 A | 500 A | 1000 A | 1000 A | |
| Max. non-repetitive surge current (I ² t, t = 8.3 ms) | | 350 A ² s | 1000 A ² s | 1000 A ² s | 4000 A ² s | 4000 A ² s | |
| Peak voltage (non-repetitive) | | 1200 V (zero cross turn-on), 1000 A (random turn-on) | | | | | |
| Leakage current (Ta = 25 °C) | | \leq 10 mArms (480 VAC \sim /60 Hz) | | | | | |
| Output ON voltage drop [Vpk] (max. load current) | | ≤1.6 V | | | | | |
| Static off stat | e dv/dt | 500 V/µs | | | | | |
| 01) AC-51 is utiliza | tion category at IEC609 | 47-4-3 | | | | | |

Alarm output (overheat prevention function)

| Rated input voltage range | 4 - 30 VDC== | 24 VACrms~ (50/60 Hz) | 90 - 240 VACrms \sim (50/60 Hz) | |
|---------------------------|-----------------|--------------------------|-----------------------------------|--|
| Load voltage | \leq 30 VDC== | \leq 30 VDC== | \leq 30 VDC== | |
| Load current | \leq 100 mA | \leq 50 mA | \leq 50 mA | |
| Turn-off time | \leq 20 ms | \leq 40 ms | \leq 40 ms | |

Overheat prevention function is when SSR internal temperature is overheated, the load output is cut off to
prevent internal device damage and also the alarm indicator and alarm output turn ON.

General specifications

| Dielectric strength (Vrms) : 24-240 VAC~ | Rated load current 15 / 30 A - Between the charging part and the case : 2500 VAC ~ 50/60 Hz for 1 min Rated load current 50 / 75 A - Between the charging part and the case : 4000 VAC ~ 50/60 Hz for 1 min |
|--|--|
| Dielectric strength (Vrms) : 48-480 VAC \sim | Between the charging part and the case : 4000 VAC $\sim 50/60$ Hz for 1 min |
| Insulation resistance | \geq 100 M Ω (500 VDC= megger) (input-output, input/output-case) |
| Indicator | Input indicator (green), alarm indicator (red) |
| Vibration | 0.75 mm double amplitude at frequency of 10 to 55 Hz in each X, Y, Z direction for 1 hour |
| Vibration (malfunction) | 0.5 mm double amplitude at frequency of 10 to 55 Hz in each X, Y, Z direction for 10 min |
| Shock | 300 m/s ² (\approx 30 G) in each X, Y, Z direction for 3 times |
| Shock (malfunction) | 100 m/s ² (\approx 10 G) in each X, Y, Z direction for 3 times |
| Ambient temperature ⁰¹⁾ | -30 to 80 °C (in case of the rated input voltage 90 - 240 VAC~: -30 to 70 °C), storage: -30 to 100 °C (no freezing or condensation) |
| Ambient humidity | 45 to 85%RH, storage: 45 to 85%RH (no freezing or condensation) |
| Input terminal connection / alarm output terminal connection | \geq 1×0.5 mm ² (1×AWG 20), \geq 1×1.5 mm ² (1×AWG 16) or \leq 2×1.5 mm ² (2×AWG 16) |
| Output terminal connection ⁰²⁾ | \geq 1×1.5 mm ² (1×AWG 16), \geq 1×16 mm ² (1×AWG 6) or \leq 2×6 mm ² (2×AWG 10) |
| Input terminal fixed torque | 0.75 to 0.95 N m |
| Output terminal fixed torque | 1.6 to 2.2 N m |
| Approval | C € ヒĂ 。 𝒫 տ EHI |

01) Refer to the 'SSR Derating Curve' in the product manual because the capacity of the rated load current is differ depending on the ambient temperature.02) Connect the wire met the capacity of the load current to the output terminal.

| | | Weight (packaged) |
|-----------------------------|-----------|---------------------|
| Detachable heatsink type | | ≈ 275 g (≈ 365 g) |
| Integrated heatsink type | 15/30/40A | ≈ 686 g (≈ 896 g) |
| | 50 A | ≈ 1268 g (≈ 1508 g) |
| | 75 A | ≈ 2064 g (≈ 2354 g) |

SSR Derating Curve

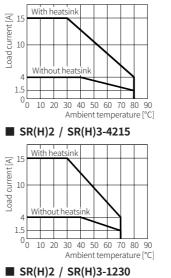
• The heatsink of the curves is dedicated for the SRH2/SRH3.

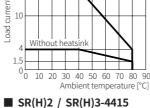
- Install SR2 / SR3 Series on the metal plate (min. 130×120 mm).
- Be aware that the ambient temperature and the derating curve is different by the rated input voltage when using the product.
- Men installing multiple SSRs, be sure to keep space between SSRs for heat radiation. When installing SSRs horizontally (input part and output part on the same height), be sure to supply less than 50 % of the rated load current.
 SSR derating curves obtained approval from the UL certification authority.

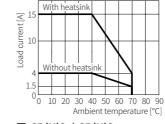
SR(H)2 / SR(H)3-1215

SR(H)2 / SR(H)3-1415 / 1415R / 2415

With heatsink



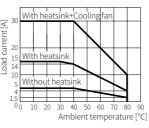




SR(H)2 / SR(H)3-1430 / 1430R / 2430

1.5

With heatsink+Cooling fan



SR(H)2 / SR(H)3-4230

