Single-phase Top/Bottom Terminal SSR with Integrated Heatsink [Current Input Type]

SRH1 Series

INSTRUCTION MANUAL

TCD210092AC

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.
- ⚠ 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, combustion 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.
Failure 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.

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

01. Use the unit within the rated specifications.
Failure 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 shock.
03. Keep the product away from metal chip, dust, and wire residue which flow into the unit.
Failure 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.
- Install the unit in the well ventilated place.
- Ground to 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 I^2t is under the 1/2 of SSR I^2t. 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.
- 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. 2,000 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.

SRH1 - ❶ ❷ ❸ ❹ - N

❶ Rated input
A: 4 -20 mA

❷ Rated load voltage
2: 100 - 240 VAC～
4: 200 - 480 VAC～

❸ Rated load current
Number: Rated load current (unit: A)

❹ Function
No-mark: Zero cross turn-on
R: Random turn-on

Product Components

- Product
- Instruction manual

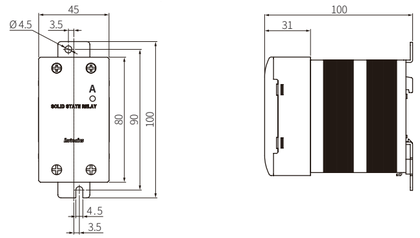
Dimensions

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

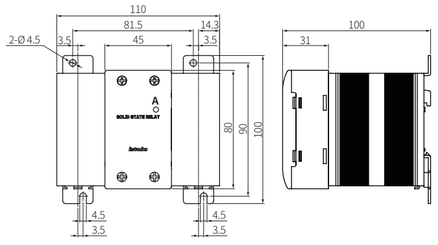
A	Input indicator (green)

- When installing to the panel, tightening the screw with a torque of 1.8 to 2.5 N m.

■ Rated load current 20 / 30 A

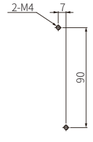


■ Rated load current 60 A

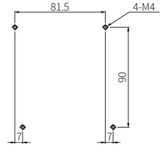


■ Panel cut-out

- Rated load current 20 / 30 A



- Rated load current 60 A

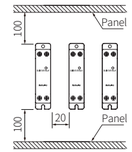


Cautions during Installation

⚠ Caution High Temperature
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.

■ 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.

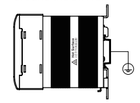


■ DIN rail mounting

- For attachment, hang the upper part of the Rail lock on the rear of the product to the DIN rail, and push the product toward the DIN rail.
- For detachment, Press the product down, and pull it forward.

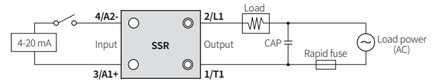
■ Grounding

- Ground the DIN rail.



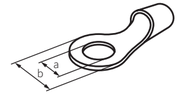
Connections

- When connecting the CAP (capacitor), it is appropriate for EMC.
  Rated load voltage 100 - 240 VAC～: 1 uF / 250 VAC～
  Rated load voltage 200 - 480 VAC～: 0.47 uF / 500 VAC～



Cautions for Wiring

- Unit: mm, When connecting the wire to the terminal, use the round crimp terminal.



Size	Input	Output
a	≥ 3.5 mm	≥ 5.0 mm
b	≤ 7.0 mm	≤ 12.0 mm

Specifications

■ Input

Rated input current	**4 - 20 mA**
Max. allowable input current	50 mA
Pick-up current	≥ 4.2 mA
Static off current	≤ 4.0 mA
Power factor	≥ 0.9 (difference between voltage phase and current phase: ≤ 25 °)
Start-up time	60 Hz: 200 ms / 50 Hz: 250 ms
Operating time	60 Hz: 16.6 ms / 50 Hz: 20 ms
Operating mode[01]	Phase control (power equality division type / phase equality division type) Cycle control (variable cycle / fixed cycle)

01) You can change operation mode by jumper pin. Default is Phase control (power equality division type). For more information, see the 'Operation Mode.'

■ Output

Rated load voltage range		**100 - 240 VACrms～ (50 / 60 Hz)**			**200 - 480 VACrms～ (50 / 60 Hz)**		
Allowable load voltage range		90 - 264 VACrms～ (50 / 60 Hz)			200 - 528 VACrms～ (50 / 60 Hz)		
Rated load current	Resistive load (AC-51)[01]	20 Arms	30 Arms	60 Arms	20 Arms	30 Arms	60 Arms
Min. load current		0.5 Arms			0.5 Arms		
Max. 1 cycle surge current (60 Hz)		300 A	500 A	1000 A	300 A	500 A	1000 A
Max. non-repetitive surge current (I^2t, t = 8.3 ms)		350 A^2s	1000 A^2s	4000 A^2s	350 A^2s	1000 A^2s	4000 A^2s
Peak voltage (non-repetitive)		600 V			1000 V		
Leakage current (Ta = 25 °C)		≤ 10 mArms (240 VAC～/ 60 Hz)			≤ 10 mArms (480 VAC～/ 60 Hz)		
Output ON voltage drop [Vpk] (max. load current)		≤ 1.6 V					
Static off state dv/dt		500 V/μs					

01) AC-51 is utilization category at IEC60947-4-3.

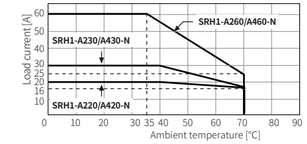
■ General specifications

Output range (phase control)	0 - 99 %
Frequency reading function	YES
Dielectric strength (Vrms)	Between the charging part and the case : 4000 VAC～ 50 / 60 Hz for 1 min
Insulation resistance	≥ 100 MΩ (500 VDC= megger)
Indicator	Input indicator (green)
Vibration	0.75 mm double amplitude at frequency of 10 to 55 Hz in each X, Y, Z direction for 1 hour
Ambient temperature[01]	-20 to 70 °C, storage: -20 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	≥ 1×0.5 mm2 (1×AWG 20), ≤ 1×16 mm2 (1×AWG 6) or ≤ 2×1.5 mm2 (2×AWG 16)
Output terminal connection[02]	≥ 1×1.5 mm2 (1×AWG 16), ≤ 1×16 mm2 (1×AWG 6) or ≤ 2×6 mm2 (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	CE UKCA cULus EAC
Weight	Rated load current 20 / 30 A: ≈ 410 g Rated load current 60 A: ≈ 680 g

01) See 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.

SSR Derating Curve

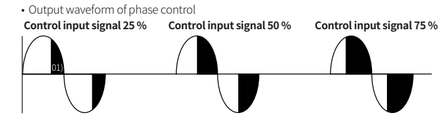
- Be aware that the ambient temperature and the derating curve is different by the rated input voltage when using the product.
- ⚠ Since the effectiveness of the heat radiation is decreased when SSRs are installed closely, be sure to supply less than 50 % of the rated load current.
- SSR derating curves obtained approval from the UL certification authority.



Operation Mode

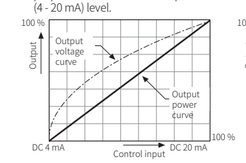
■ Phase control

- Output waveform of phase control

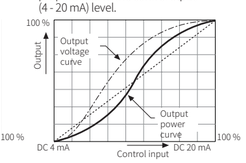


01) The output capacity on the load.

- Power equality division type
  : controls the output power which is proportional to the control input (4 - 20 mA) level.

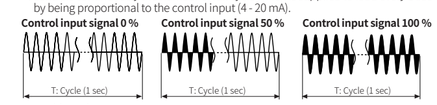


- Phase equality division type
  : controls the phase angle which is proportional to the control input (4 - 20 mA) level.

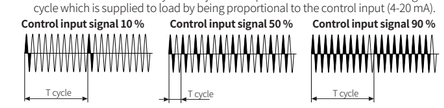


■ Cycle control

- Fixed cycle
  : controls continuously the number of full cycle which is supplied to load every 1 sec by being proportional to the control input (4 - 20 mA).

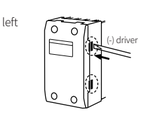


- Variable cycle
  : controls fast and accurately the subject with optimized the number of AC voltage cycle which is supplied to load by being proportional to the control input (4-20 mA).



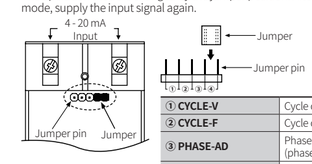
■ Detach front cover

Press the front cover connections (4 parts) at the right and left side with (-) driver, and front cover is detached.
⚠ Before detaching the front cover, be sure to cut off the load current and input.



■ Jumper pin setting

The operation mode is changed by the jumper position. After changing the operation mode, supply the input signal again.



① CYCLE-V	Cycle control (variable cycle)
② CYCLE-F	Cycle control (fixed cycle)
③ PHASE-AD	Phase control (phase equality division type)
④ PHASE-PD (default)	Phase control (power equality division type)

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