Single-Phase Solid State Relay

HSR-2D/2A

INSTRUCTION MANUAL

HANYOUNG NUX

Thank you for purchasing Hanyoung Nux products. Please read the instruction manual carefully before using this product, and use the product correctly.
Also, please keep this instruction manual where you can view it any time.

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MC1001KE220701

Safety information

Please read the safety information carefully before the use, and use the product correctly.
The alerts declared in the manual are classified into **Danger, Warning** and **Caution** according to their importance

⚠ **DANGER**	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury
⚠ **WARNING**	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury
⚠ **CAUTION**	Indicates a potentially hazardous situation which, if not avoided, may result in minor injury or property damage

⚠ DANGER

The input/output terminals are subject to electric shock risk. Never let the input/output terminals come in contact with your body or conductive substances.

⚠ WARNING

- When used in equipment with a high risk of personal injury or property damage (examples: medical devices, nuclear control, ships, aircrafts, vehicles, railways, combustion devices, safety devices, crime/disaster prevention equipment etc.) install double safety devices and prevent accidents. Failure to do so may result in fire, personnel accident or property damage.
- Please read the safety information carefully before the use, and use the product correctly.
- If there is a possibility that a malfunction or abnormality of this product may lead to a serious accident, install an appropriate protection circuit on the outside and plan to prevent accidents.
- Please supply the rated power voltage, in order to prevent product breakdowns or malfunctions.
- To prevent electric shocks and malfunctions, do not supply power until the wiring is completed.
- Please disassemble the product after turning OFF the power.
- Any use of the product other than those specified by the manufacturer may result in personal injury or property damage.
- Please use this product after installing it to a panel, because there is a risk of electric shock.

⚠ CAUTION

- Please make sure that the product specifications are the same as you ordered.
- Please use the product in places where corrosive gases (especially harmful gases, ammonia, etc.) and flammable gases are not generated.
- Please use the product in places without liquids, oils, chemicals, steam, dust, salt, iron, etc. (pollution degree 1 or 2).
- Please avoid places where large inductive interference, static electricity,magnetic noise are generated.
- Please avoid places with heat accumulation caused by direct sunlight, radiant heat, etc.
- When water enters, short circuit or fire may occur, so please inspect the product carefully.
- Do not connect anything to the unused terminals.
- For DC types, please wire correctly, after checking the polarity of the terminals.
- When using the SSR, the product may be damaged if the specified heat sink is not used. Be sure to use the specified heat sink.
- When disposing of the product, treat it as industrial waste.

Suffix code

Model	Code							Content
HSR	□	□	□	□	□	□	□	Single-Phase Solid State Relay
Control phase	2							Single-phase
Input control voltage		D						4 - 32 VDC
		A						90 - 264 VAC
Rated load current			10					10 A
			20					20 A
			30					30 A
			40					40 A
			50					50 A
			70					70 A
Rated load voltage				2				90 - 264 VAC
				4				90 - 480 VAC
Operation method (switching mode)					Z			Zero cross switching
					R			Random switching
Heat sink						-		Without heat sink
						-T		With heat sink (only for 50A, 70A)

Specifications

■ DC input type (low voltage)

Classification		HSR-2D102Z / HSR-2D102R	HSR-2D202Z / HSR-2D202R	HSR-2D302Z / HSR-2D302R	HSR-2D402Z / HSR-2D402R	HSR-2D502Z / HSR-2D502R	HSR-2D702Z / HSR-2D702R
Input	Power voltage	5 - 24 VDC					
	Operating voltage range	4 - 32 VDC					
	Impedance	Max. 4 kΩ					
	Operating voltage	Min. 3 VDC					
	Reset voltage	Max. 1.5 VDC					
	Input current	Constant current method: 10 mA (±3)					
Output	Rated load voltage	100 - 240 VAC					
	Load voltage range	90 - 264 VAC					
	Peak voltage (non-repetition)	600 V	600 V	600 V	600 V	800 V	800 V
	Rated load current	10 A	20 A	30 A	40 A	50 A	70 A
	Frequency	50/60 Hz					
	Surge current	125 A	260 A	315 A	315 A	580 A	580 A
	Leakage current	15 mA	15 mA	15 mA	Max. 20 mA	Max. 20 mA	Max. 20 mA
	ON state voltage drop	1.3 V	1.6 V	1.8 V	1.8 V	1.8 V	1.8 V
	Min. operating current	1 A	1 A	1 A	1 A	0.5 A	0.5 A
Response speed	Zero cross switching	1/2 cycle + 1 ms max.					
	Random switching	Max. 1 ms					
Insulation resistance		500 VDC, 100 MΩ (input/output and among cases)					
Dielectric strength		2500 VAC (60 Hz for one minute)					
Vibration resistance		10 - 55 Hz, double amplitude: 1.5 mm, Each X· Y· Z axis for 2 hours					
Shock resistance		1000 m/s² (about 100 G), Each X· Y· Z axis for 3 times					
Storage temperature		-30 ~ 90 °C					
Ambient temperature & humidity		-20 ~ 80 °C, 45 ~ 85 % R.H.					
Approval		CE				-	
Weight (g)		150					

※ Weight when packed

■ AC input type (low voltage)

Classification		HSR-2A102Z / HSR-2A102R	HSR-2A202Z / HSR-2A202R	HSR-2A302Z / HSR-2A302R	HSR-2A402Z / HSR-2A402R	HSR-2A502Z / HSR-2A502R	HSR-2A702Z / HSR-2A702R
Input	Power voltage	100 - 240 VAC					
	Operating voltage range	90 - 264 VAC					
	Impedance	Max. 40 kΩ					
	Operating voltage	Min. 72 VAC	Min. 72 VAC	Min. 72 VAC	Min. 72 VAC	Min. 75 VAC	Min. 75 VAC
	Reset voltage	Max. 40 VAC					
	Input current	240 VAC / 9 mA(±4)					
Output	Rated load voltage	100 - 240 VAC					
	Load voltage range	90 - 264 VAC					
	Peak voltage (non-repetition)	600 V	600 V	600 V	600 V	800 V	800 V
	Rated load current	10 A	20 A	30 A	40 A	50 A	70 A
	Frequency	50/60 Hz					
	Surge current	125 A	260 A	315 A	315 A	580 A	580 A
	Leakage current	15 mA	15 mA	15 mA	15 mA	Max. 20 mA	Max. 20 mA
	ON state voltage drop	1.3 V	1.6 V	1.8 V	1.8 V	1.8 V	1.8 V
	Min. operating current	1 A	1 A	1 A	1 A	0.5 A	0.5 A
Response speed	Zero cross switching	1/2 cycle + 1 ms max.					
	Random switching	Max. 1 ms					
Insulation resistance		500 VDC, 100 MΩ (input/output and among cases)					
Dielectric strength		2500 VAC (60 Hz for one minute)					
Vibration resistance		10 - 55 Hz, double amplitude: 1.5 mm, Each X· Y· Z axis for 2 hours					
Shock resistance		1000 m/s² (about 100 G), Each X· Y· Z axis for 3 times					
Storage temperature		-30 ~ 90 °C					
Ambient temperature & humidity		-20 ~ 80 °C, 45 ~ 85 % R.H.					
Approval		CE				-	
Weight (g)		150					

※ Weight when packed

■ DC input type (high voltage)

Classification		HSR-2D104Z / HSR-2D104R	HSR-2D204Z / HSR-2D204R	HSR-2D304Z / HSR-2D304R	HSR-2D404Z / HSR-2D404R	HSR-2D504Z / HSR-2D504R	HSR-2D704Z / HSR-2D704R
Input	Power voltage	5 - 24 VDC					
	Operating voltage range	4 - 32 VDC					
	Impedance	Max. 4 kΩ					
	Operating voltage	Min. 3 VDC					
	Reset voltage	Max. 1.4 VDC					
	Input current	Constant current method: 10 mA (±3)					
Output	Rated load voltage	100 - 440 VAC					
	Load voltage range	90 - 480 VAC					
	Peak voltage (non-repetition)	800 V	1200 V	1200 V	1200 V	1200 V	1200 V
	Rated load current	10 A	20 A	30 A	40 A	50 A	70 A
	Frequency	50/60 Hz					
	Surge current	170 A	250 A	350 A	370 A	580 A	580 A
	Leakage current	Max. 20 mA	Max. 20 mA	Max. 20 mA	Max. 20 mA	Max. 20 mA	Max. 20 mA
	ON state voltage drop	1.3 V	1.6 V	1.8 V	1.8 V	1.8 V	1.8 V
	Min. operating current	1 A	1 A	1 A	1 A	0.5 A	0.5 A
Response speed	Zero cross switching	1/2 cycle + 1 ms max.					
	Random switching	Max. 1 ms					
Insulation resistance		500 VDC, 100 MΩ (input/output and among cases)					
Dielectric strength		2500 VAC (60 Hz for one minute)					
Vibration resistance		10 - 55 Hz, double amplitude: 1.5 mm, Each X· Y· Z axis for 2 hours					
Shock resistance		1000 m/s² (about 100 G), Each X· Y· Z axis for 3 times					
Storage temperature		-30 ~ 90 °C					
Ambient temperature & humidity		-20 ~ 80 °C, 45 ~ 85 % R.H.					
Approval		CE				-	
Weight (g)		150					

※ Weight when packed

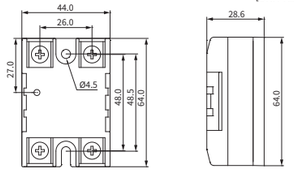
■ AC input type (high voltage)

Classification		HSR-2A104Z / HSR-2A104R	HSR-2A204Z / HSR-2A204R	HSR-2A304Z / HSR-2A304R	HSR-2A404Z / HSR-2A404R	HSR-2A504Z / HSR-2A504R	HSR-2A704Z / HSR-2A704R
Input	Power voltage	100 - 240 VAC					
	Operating voltage range	90 - 264 VAC					
	Impedance	Max. 4 kΩ					
	Operating voltage	Min. 80 VAC	Min. 80 VAC	Min. 80 VAC	Min. 80 VAC	Min. 75 VAC	Min. 75 VAC
	Reset voltage	Max. 40 VAC					
	Input current	240 VAC / 9 mA(±4)					
Output	Rated load voltage	100 - 440 VAC					
	Load voltage range	90 - 480 VAC					
	Peak voltage (non-repetition)	800 V	1200 V	1200 V	1200 V	1200 V	1200 V
	Rated load current	10 A	20 A	30 A	40 A	50 A	70 A
	Frequency	50/60 Hz					
	Surge current	170 A	250 A	350 A	370 A	580 A	580 A
	Leakage current	Max. 20 mA	Max. 20 mA	Max. 20 mA	Max. 20 mA	Max. 20 mA	Max. 20 mA
	ON state voltage drop	1.3 V	1.6 V	1.8 V	1.8 V	1.8 V	1.8 V
	Min. operating current	1 A	1 A	1 A	1 A	0.5 A	0.5 A
Response speed	Zero cross switching	1/2 cycle + 1 ms max.					
	Random switching	Max. 1 ms					
Insulation resistance		500 VDC, 100 MΩ (input/output and among cases)					
Dielectric strength		2500 VAC (60 Hz for one minute)					
Vibration resistance		10 - 55 Hz, double amplitude: 1.5 mm, Each X· Y· Z axis for 2 hours					
Shock resistance		1000 m/s² (about 100 G), Each X· Y· Z axis for 3 times					
Storage temperature		-30 ~ 90 °C					
Ambient temperature & humidity		-20 ~ 80 °C, 45 ~ 85 % R.H.					
Approval		CE				-	
Weight (g)		150					

※ Weight when packed

Dimensions

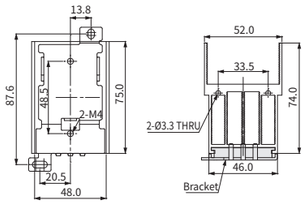
[UNIT : mm]



HEAT SINK

■ Model name: HSP series

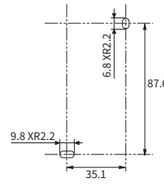
● 10 A



Model	Applicable Model	Capacity(A)	Weight
HSP-10	HSR-2□10□□	10 A	208 g

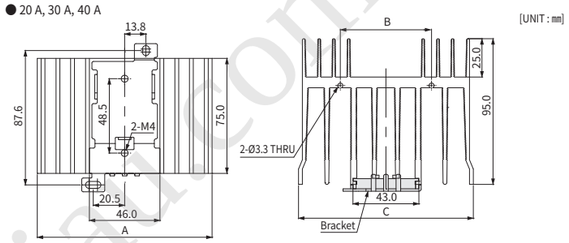
● Panel cutout (10 ~ 40 A)

[UNIT : mm]



● 20 A, 30 A, 40 A

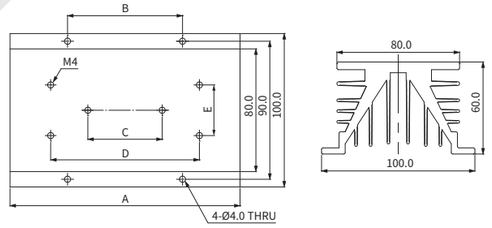
[UNIT : mm]



Model	Applicable Model	Capacity(A)	A	B	C	Weight
HSP-20	HSR-2□20□□	20 A	85.0	59.5	85.0	404 g
HSP-40	HSR-2□30□□	30 A	114.0	59.5	114.0	570 g
	HSR-2□40□□	40 A				

■ Model name: HSM series

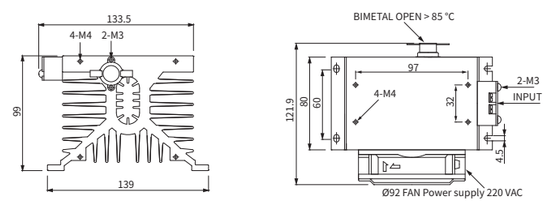
[UNIT : mm]



Model	Applicable Model	Capacity(A)	A	B	C	D	E	Weight
HSM-70	HSR-2□10□□	10 A	70.0	35.0	48.5	-	-	364 g
HSM-110	HSR-2□20□□	20 A	110.0	55.0	48.5	-	-	568 g
	HSR-2□30□□	30 A						
HSM-150	HSR-2□40□□	40 A	150.0	75.0	48.5	97.0	32.0	768 g

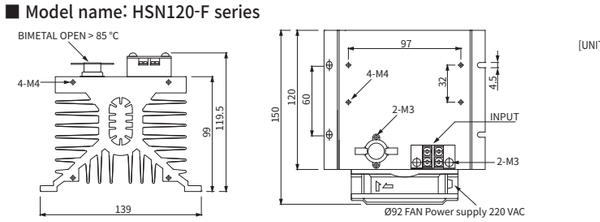
■ Model name: HSN80-F series

[UNIT : mm]



■ Model name: HSN120-F series

[UNIT : mm]



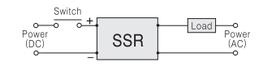
Model	Applicable Model	Capacity(A)	Weight
HSN80-F	HSR-2□50□□	50 A	1,474 g
HSN120-F	HSR-2□70□□	70 A	2,052 g

※ The above contents are subject to change without prior notice for performance improvement.

Application circuits

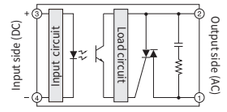
■ AC input type (10 A ~ 40 A)

■ DC input type (10 A ~ 70 A)

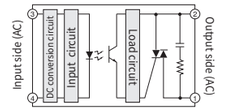


Equivalent circuits

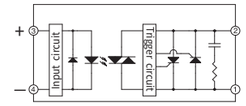
■ DC input type (10 A ~ 40 A)



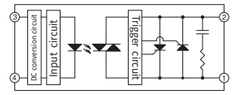
■ AC input type (10 A ~ 40 A)



■ DC input type (50 A ~ 70 A)



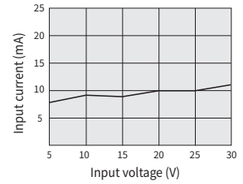
■ AC input type (50 A ~ 70 A)



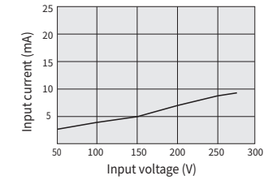
Load Current Characteristics

■ Input Voltage / Current Characteristics

● HSR-2D (single-phase DC)

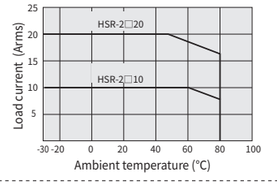


● HSR-2A (single-phase AC)

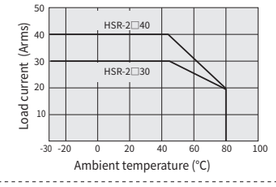


■ Load Current Characteristics

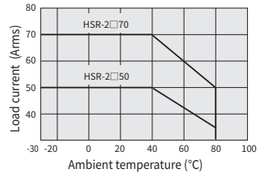
● 10 A, 20 A



● 30 A, 40 A

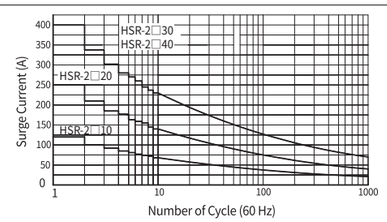


● 50 A, 70 A

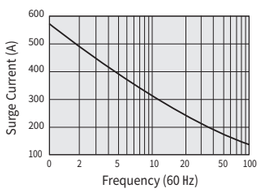


■ Surge Current Characteristics

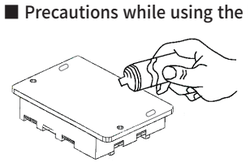
● 10 A, 20 A, 30 A, 40 A



● 50 A, 70 A



■ Precautions while using the heat sinks



- Using standard heat sink and heat-dissipation grease is mandatory for this product.
- Even the standard heat sink is used, HSR damage may occur if the environment temperature rises or if the ventilation does not work well (environment temperature : over 40 °C)
- The normal HSR element is damaged at the maximum temperature of 125 °C or more. When the temperature of heat sink is 85 ° C or higher, or more, the temperature of the element reaches around 125 °C. Therefore, during operation, measure the temperature of heat sink.
- When you connect HSR to the heat sink, heat-transmitting grease is needed for smooth heat transmission.
- To prevent separation by vibration, tighten up with bolts.
- Before installation, be sure to apply heat-dissipation grease to the contact surface using the standard heat sink, as shown in the above picture. Do not use on insulation boards (wood, plastic, rubber)

※ For further information, please visit our homepage (www.hanyoungnux.com) and refer to the user's manual in the archive.