

3-Phase Solid State Relay HSR-3D/3A

HANYOUNG NUX

INSTRUCTION MANUAL

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.
- If the FAN does not work, check the SSR, as it may break down.

Suffix code

Model	Code	Content
HSR	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	3-Phase Solid State Relay
Control phase	3	3-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
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

Classification	DC input type (low voltage)						
	HSR-3D102Z HSR-3D102R	HSR-3D202Z HSR-3D202R	HSR-3D302Z HSR-3D302R	HSR-3D402Z HSR-3D402R	HSR-3D502Z HSR-3D502R	HSR-3D702Z HSR-3D702R	
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: 14 mA (±3)						
	Rated load voltage	100 - 240 VAC					
Output	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	1.5 V	1.8 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/s ² (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)	400						

※ Weight when packed

Classification	DC input type (high voltage)						
	HSR-3D104Z HSR-3D104R	HSR-3D204Z HSR-3D204R	HSR-3D304Z HSR-3D304R	HSR-3D404Z HSR-3D404R	HSR-3D504Z HSR-3D504R	HSR-3D704Z HSR-3D704R	
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)						
	Rated load voltage	100 - 440 VAC					
Output	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	315 A	315 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	1.95 V	1.8 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/s ² (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)	400						

※ Weight when packed

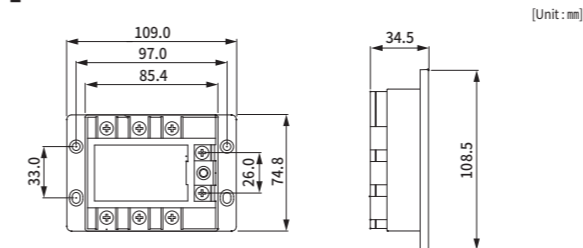
Classification	AC input type (low voltage)						
	HSR-3A102Z HSR-3A102R	HSR-3A202Z HSR-3A202R	HSR-3A302Z HSR-3A302R	HSR-3A402Z HSR-3A402R	HSR-3A502Z HSR-3A502R	HSR-3A702Z HSR-3A702R	
Input	Power voltage	100 - 240 VAC					
	Operating voltage range	90 - 264 VAC					
	Impedance	Max. 40 kΩ					
	Operating voltage	Min. 75 VAC					
	Reset voltage	Max. 50 VAC					
Input current	240 VAC / 9 mA (±4)						
	Rated load voltage	100 - 240 VAC					
Output	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	1.5 V	1.8 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/s ² (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)	400						

※ Weight when packed

Classification	AC input type (high voltage)						
	HSR-3A104Z HSR-3A104R	HSR-3A204Z HSR-3A204R	HSR-3A304Z HSR-3A304R	HSR-3A404Z HSR-3A404R	HSR-3A504Z HSR-3A504R	HSR-3A704Z HSR-3A704R	
Input	Power voltage	100 - 240 VAC					
	Operating voltage range	90 - 264 VAC					
	Impedance	Max. 72 kΩ	Max. 72 kΩ	Max. 72 kΩ	Max. 72 kΩ	Max. 40 kΩ	Max. 40 kΩ
	Operating voltage	Min. 75 VAC					
	Reset voltage	Max. 40 VAC					
Input current	240 VAC / 9 mA (±4)						
	Rated load voltage	100 - 440 VAC					
Output	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	315 A	315 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	1.95 V	1.8 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/s ² (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)	400						

※ Weight when packed

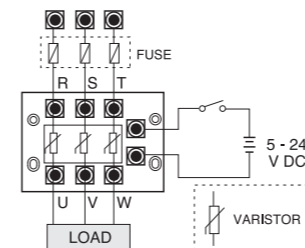
Dimensions



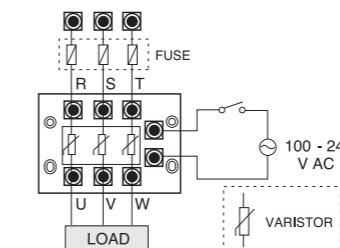
Application circuits

Input terminals: **R S T**
Output terminals: **U, V, W**

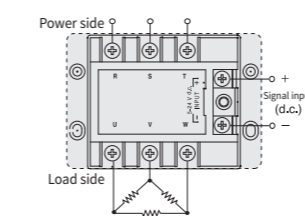
DC input type (10 A ~ 40 A)



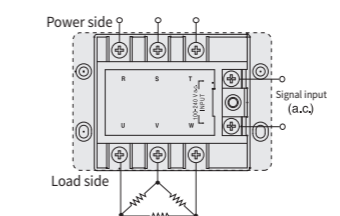
AC input type (10 A ~ 40 A)



DC input type (50 A ~ 70 A)

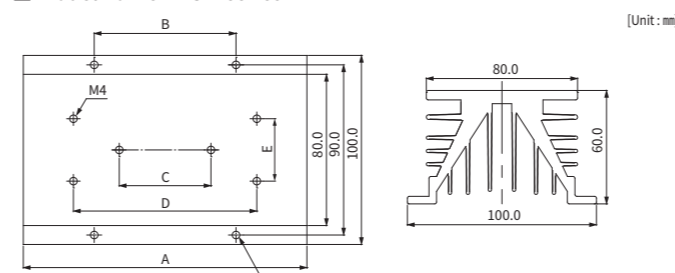


AC input type (50 A ~ 70 A)



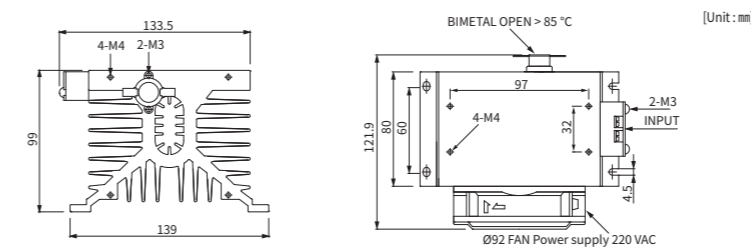
Heat Sinks

Model name : HSM series

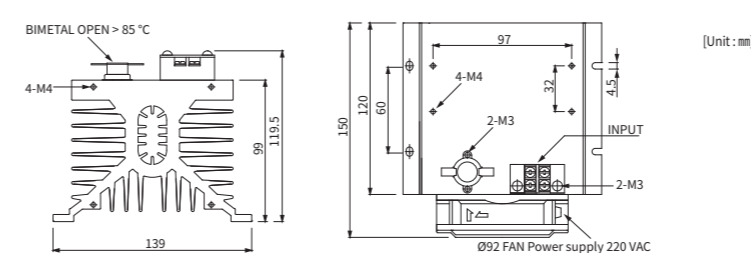


Model	Applicable Model	Capacity(A)	A	B	C	D	E	Weight
HSM-150	HSR-3□10□□ HSR-3□20□□	10 A 20 A	150.0	75.0	48.5	97.0	32.0	768 g
HSM-200	HSR-3□30□□ HSR-3□40□□	30 A 40 A	200.0	100.0	-	97.0	32.0	1,030 g
HSM-250	HSR-3□50□□ HSR-3□70□□	50 A 70 A	250.0	125.0	-	97.0	32.0	1,284 g

Model name : HSN80-F series



Model name : HSN120-F series

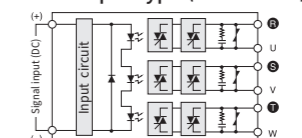


Model	Applicable Model	Capacity(A)	Weight
HSN80-F	HSR-2□50□□ HSR-2□70□□	50 A 70 A	1,474 g 2,052 g

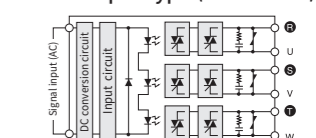
※ The above contents are subject to change without prior notice for performance improvement.

Equivalent circuits

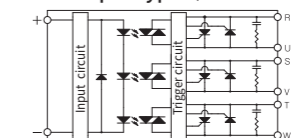
DC input type (10 A ~ 40 A)



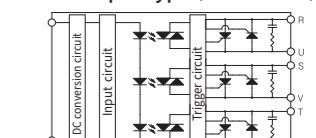
AC input type (10 A ~ 40 A)



DC input type (50 A ~ 70 A)

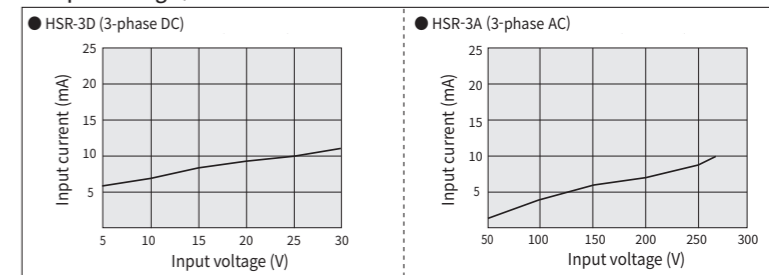


AC input type (50 A ~ 70 A)

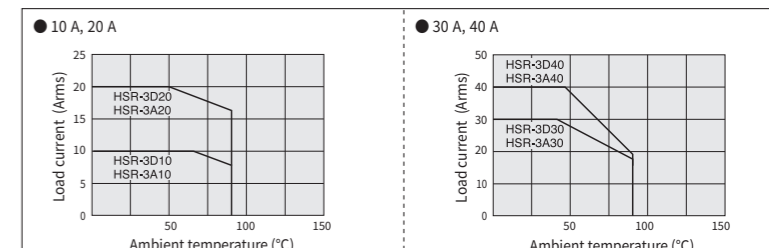


Load Current Characteristics

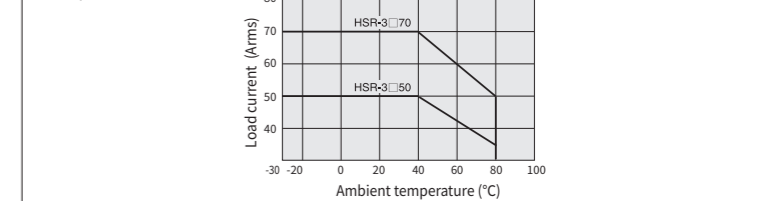
Input Voltage / Current Characteristics



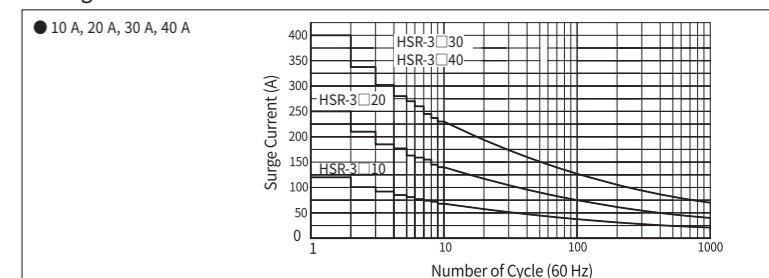
Load Current Characteristics



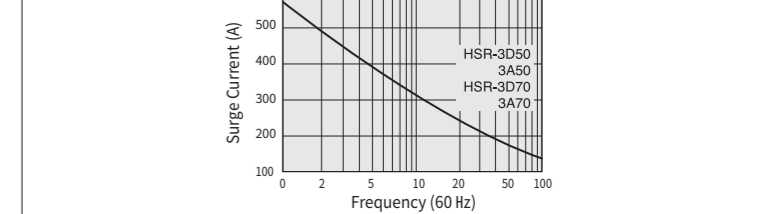
50 A, 70 A



Surge Current Characteristics



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, SSR damage may occur if the environment temperature rises or if the ventilation does not work well (environment temperature: over 40 °C)
- The normal SSR element is damaged at the maximum temperature of 125 °C or more.
- When the temperature of heat sink is 85 °C or higher, the temperature of the element reaches around 125 °C. Therefore, during operation, measure the temperature of heat sink.
- When you connect SSR 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.