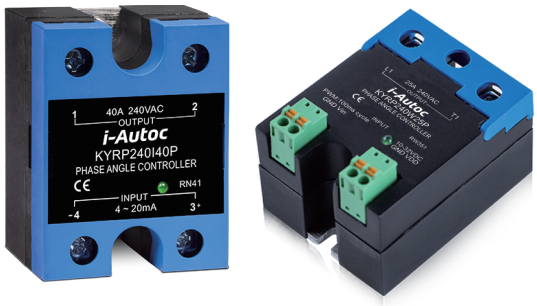
# KYR Series Single Phase AC Voltage Regulator Module

## Product Description

- Load Current: 25A, 40A, 60A, 80A, 100A, 125A
- SCR Output
- Control Model: 0-5VDC, 0-10VDC, 4-20mA, PWM
- Phase-Shift Control Output
- LED Indicator
- RoHS Compliant




## Product Selection

| KYR | P | 240 | L | 25 | P | (XXX) |
|---|---|---|---|---|---|---|
| KYR Series | Output Type<br>P: Phase-Shift Control Output | Load Voltage<br>240: 176~280VAC<br>480: 200~530VAC | Control Mode<br>L: 0~5VDC<br>H: 0~10VDC<br>I : 4~20mA<br>W: PWM | Load Current<br>25: 25Amp<br>40: 40Amp<br>60: 60Amp<br>80: 80Amp<br>100: 100Amp<br>125: 125Amp | P: IP20 Safety Cover | Customized Code |

| Load Voltage Calculation Formula | |
|---|---|
| **Control Mode** | **Load Voltage**(1) |
| L: 0~5VDC | $U_{LOAD}^2=U_{AC}^2\times V_{CONTROL}/5$ |
| H: 0~10VDC | $U_{LOAD}^2=U_{AC}^2\times V_{CONTROL}/10$ |
| I : 4~20mA | $U_{LOAD}^2=U_{AC}^2\times(I_{CON}-4)/16$ |
| W: PWM(@100ms cycle) | $U_{LOAD}^2=U_{AC}^2\times$占空比 |

Note: (1) $U_{LOAD}$ indicates the voltage at both ends of the load, and $U_{AC}$ indicates the power grid voltage, $V_{CONTROL}$ indicates the control voltage, $I_{CON}$ indicates the control current.

## Technical Specifications

| Input Specifications (Ta=25°C) | Condition | Symbol | Model | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| Auxiliary Power Supply Voltage | | | | 10 | 12/24 | 32 | VDC |
| Auxiliary Power Supply Current(Typ) | | | | | | 25 | mA |
| **Voltage Control** | **Condition** | **Symbol** | **Model** | **Min** | **Typ** | **Max** | **Unit** |
| Control Voltage | | $U_c$ | L | 0 | | 5 | VDC |
| | | | H | 0 | | 10 | VDC |
| Turn-on Voltage | | $U_{c\ on}$ | L | | | 0.15 | VDC |
| | | | H | | | 0.25 | VDC |
| Turn-off Voltage | | $U_{c\ off}$ | L | 0.05 | | | VDC |
| | | | H | 0.1 | | | VDC |
| Input Impedance | | | L | | 30 | | kΩ |
| | | | H | | 60 | | kΩ |
| **Current Control**(2) | **Condition** | **Symbol** | **Model** | **Min** | **Typ** | **Max** | **Unit** |
| Control Current | | $I_c$ | | 4 | | 20 | mA |
| Turn-on Current | | $I_{c\ on}$ | | | | 4.9 | mA |
| Turn-off Current | | $I_{c\ off}$ | | 4.1 | | | mA |
| Input Impedance | @20mA | | | | 290 | | Ω |

| PWM Control[3] | Condition | Symbol | Model | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| Period | | | | | 100 | | ms |
| Amplitude | | | | 10 | 12/24 | 32 | VDC |
| Control Current | | $I_c$ | | | | 15 | mA |

Note: (2) Current control type, the drive voltage should be more than 6V.
(3) Control mode such as other cycles of PWM requirements, can be customized.

| Output Specifications (Ta=25°C) | Condition | Symbol | Model | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| Load Voltage | | $U_e$ | 240 | 176 | | 280 | VDC |
| | | | 480 | 200 | | 530 | VDC |
| Load Current | | $I_e$ | 25A | 0.1 | | 25 | A |
| | | | 40A | 0.1 | | 40 | A |
| | | | 60A | 0.1 | | 60 | A |
| | | | 80A | 0.1 | | 80 | A |
| | | | 100A | 0.1 | | 100 | A |
| | | | 125A | 0.1 | | 125 | A |
| Off-State Leakage Current | @ Rated Load Voltage | $I_{lk}$ | | | | 5 | mA |
| | @220VAC/50Hz | $I_{lk}$ | | | 1.6 | | mA |
| Operational Frequency | | f | | 47 | 50/60 | 63 | Hz |
| Output Power | | | | 0 | | 99 | % |
| Transient Overvoltage | | $U_p$ | 240 | | 600 | | Vpk |
| | | | 480 | | 1200 | | Vpk |
| Non-repetitive Surge Current | @10ms | $I_{TSM}$ | 25A | | 250 | | Apk |
| | | | 40A | | 500 | | Apk |
| | | | 60A | | 700 | | Apk |
| | | | 80A | | 800 | | Apk |
| | | | 100A | | 1000 | | Apk |
| | | | 125A | | 2250 | | Apk |
| Maximum $I^2t$ for Fusing | @10ms | $I^2t$ | 25A | | 312 | | $A^2s$ |
| | | | 40A | | 1250 | | $A^2s$ |
| | | | 60A | | 2450 | | $A^2s$ |
| | | | 80A | | 3250 | | $A^2s$ |
| | | | 100A | | 5000 | | $A^2s$ |
| | | | 125A | | 25000 | | $A^2s$ |
| Minimum Off-State dv/dt | | dv/dt | | | 500 | | V/μs |

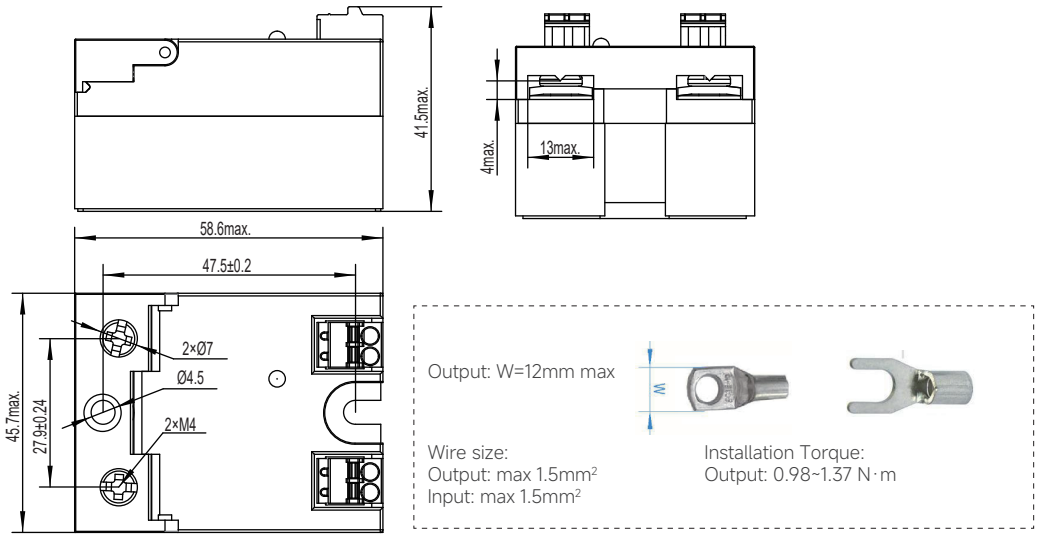
| General Specifications (Ta=25°C) | Condition | Symbol | Model | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| Dielectric Strength | 50/60Hz, Input/Output | $V_{ISO}$ | | | 4000 | | Vrms |
| | 50/60Hz, Input,Output/Base | | | | 2500 | | Vrms |
| Insulation Resistance | @500VDC | $R_{ISO}$ | | | 1000 | | MΩ |
| Operating Temperature | | $T_{OPR}$ | | -40 | | +70 | ℃ |
| Storage Temperature | | $T_{SPR}$ | | -40 | | +100 | ℃ |
| Weight | | | | | 120 | | g |
| LED Indication | | | Green | When the product is connected, LED lights up | | | |

## Applications

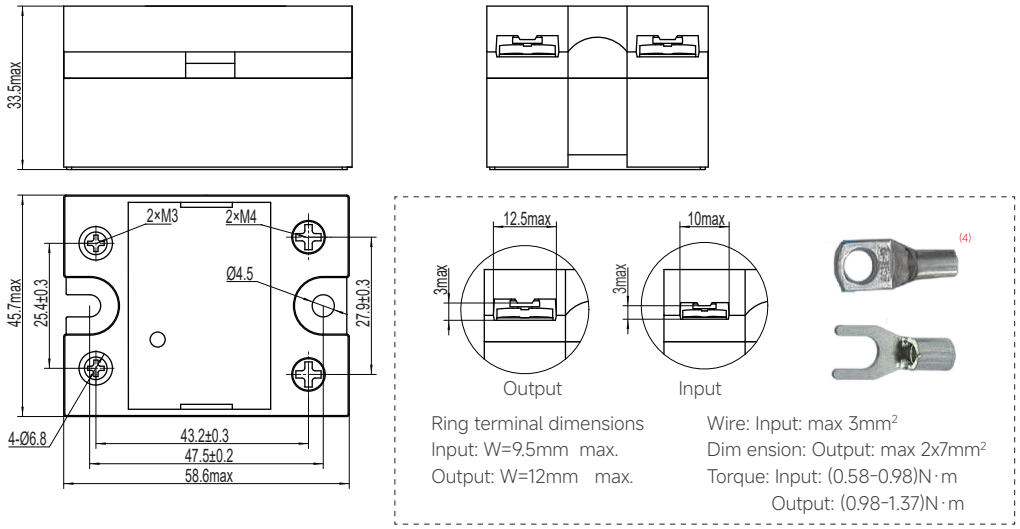
Temperature chamber, plastic machinery, incubator, dimmer, solar panel welding machine, and etc.

## Outline Dimensions



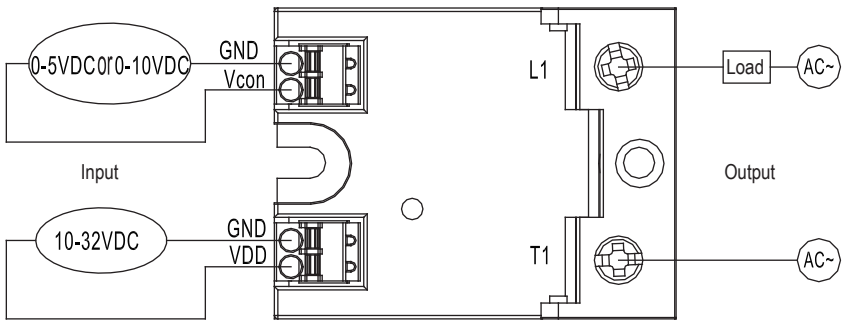

Voltage Control、PWM Control




Note: (4) When SSR is connected to the cold rolled copper nose of TYPE TO1, the IP20 protection cover shall be removed first.After wiring is completed, install the IP20 protection cover.

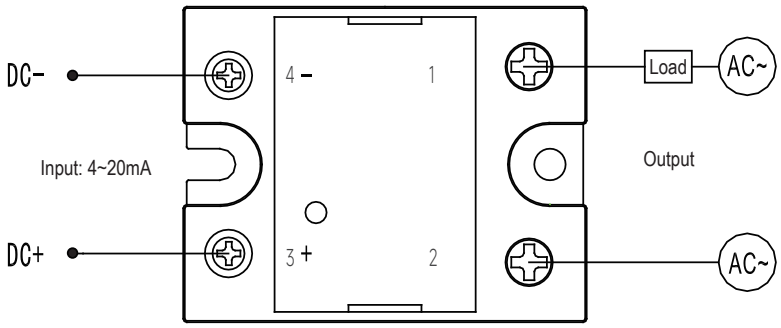
Current Control

## Wiring Diagram

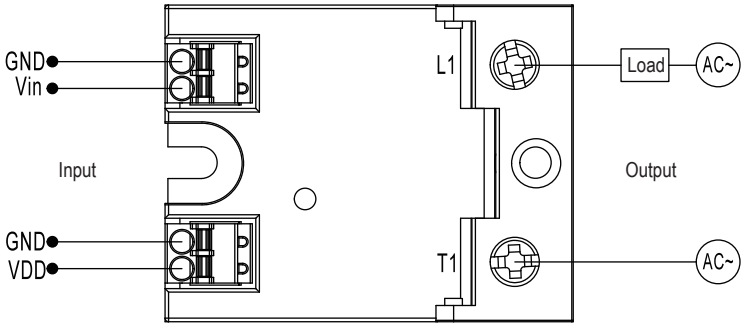



Voltage Control (5)

Note: (5) The auxiliary power supply GND and the input control GND should be connected internally to the earth ground; if the external control signal and the power supply are not connected together to the earth ground, then both should be connected to each GND respectively.




Current Control



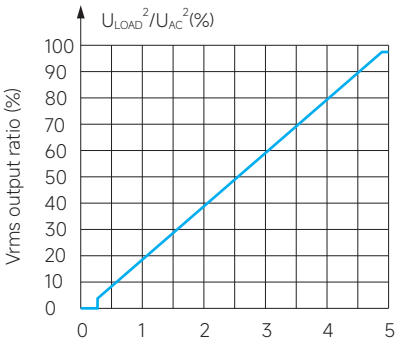

PWM Control

VDD: connects to the positive terminal of the auxiliary power supply ranging from 10 to 32VDC

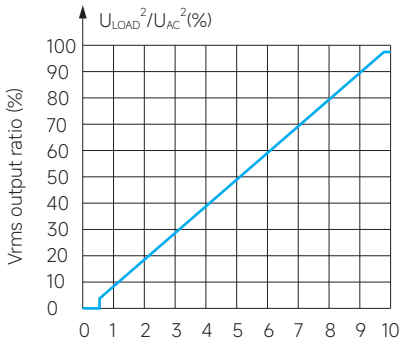
Vin: Connect to PWM output positive terminal

GND: The auxiliary power supply GND and the control signal GND are shorted in common ground, for example, the external control signal and the power supply are not in common ground If yes, connect the GND signals of the two devices respectively.

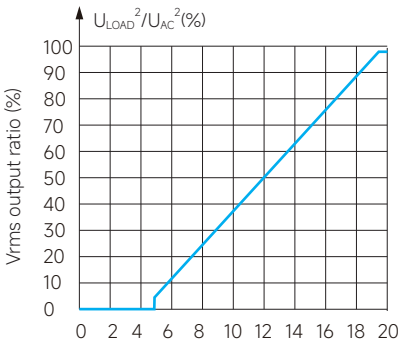
## Output / Proportional Control Features




0~5VDC Voltage Control



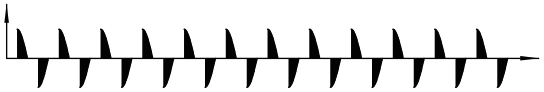

0~10VDC Voltage Control



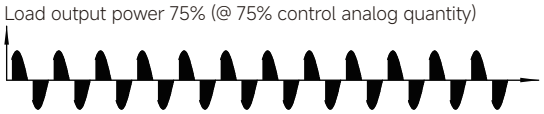

4~20mA Current Control

Load output power 25% (@ 25% control analog quantity)

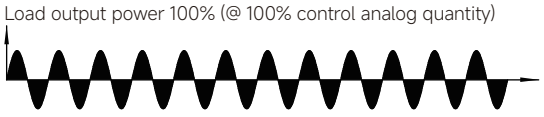
Load output power 50% (@ 50% control analog quantity)



Load output power 75% (@ 75% control analog quantity)

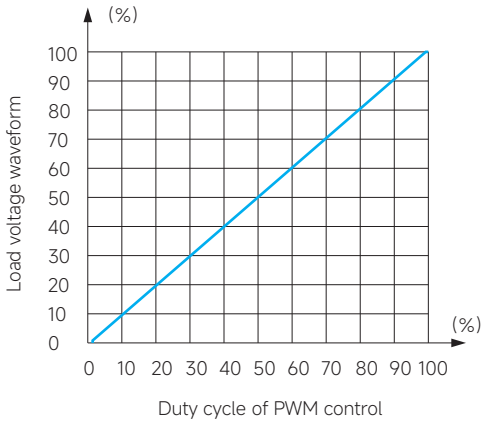


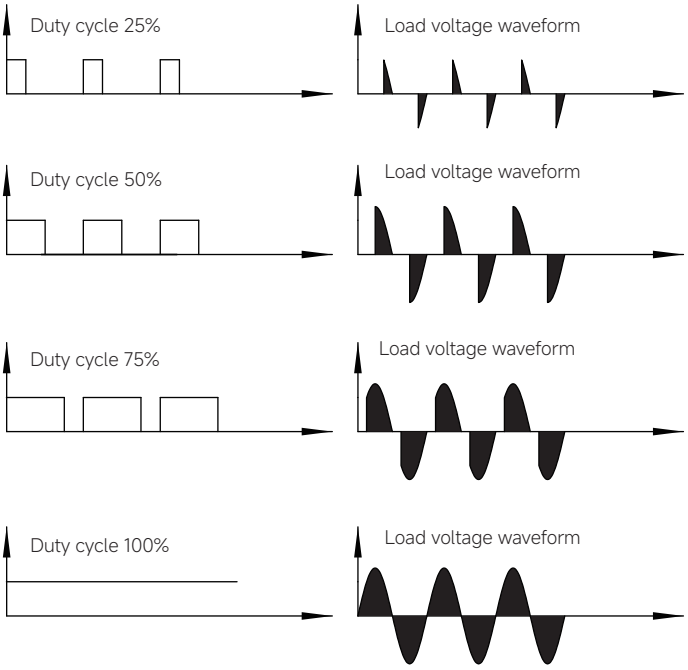
Load output power 100% (@ 100% control analog quantity)



Analog quantity and waveform diagram of voltage at both ends of the load

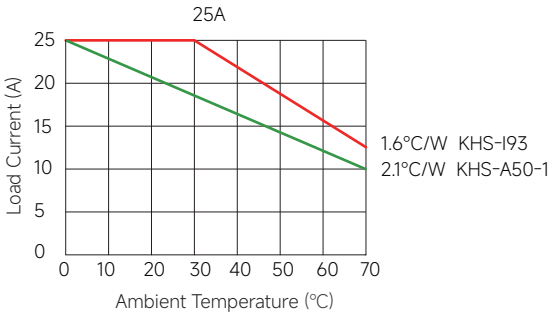
 

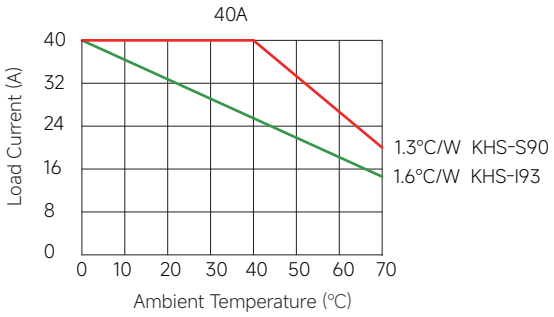


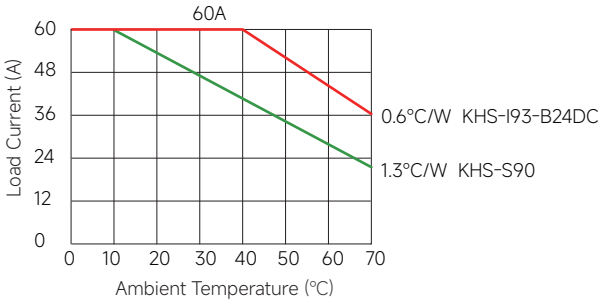



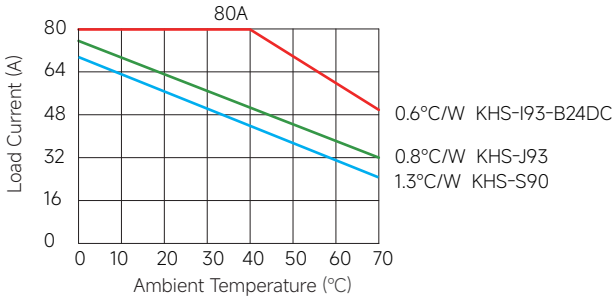

PWM Waveforms

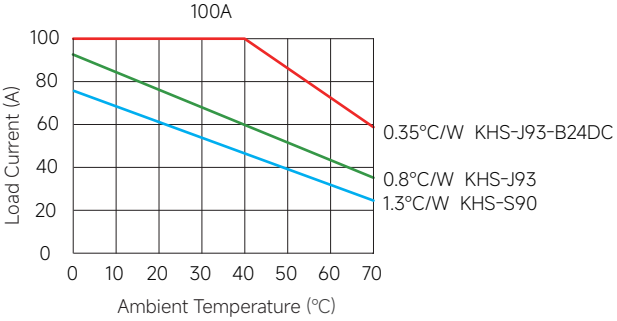
## Thermal Derating Curve

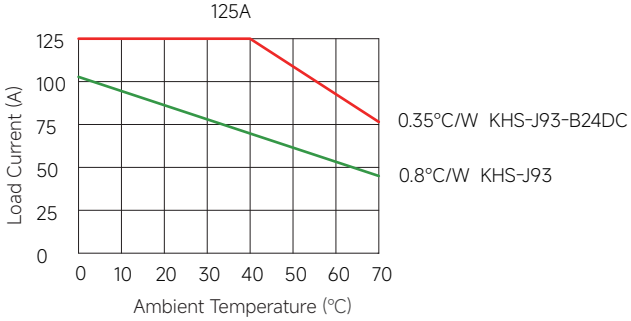


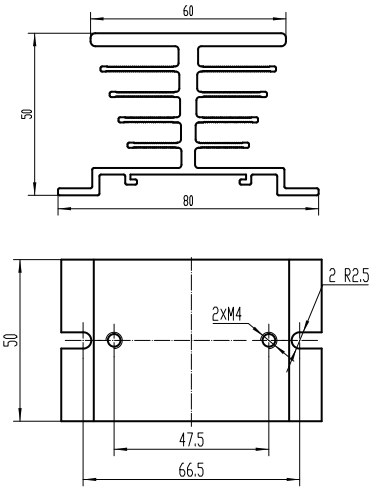



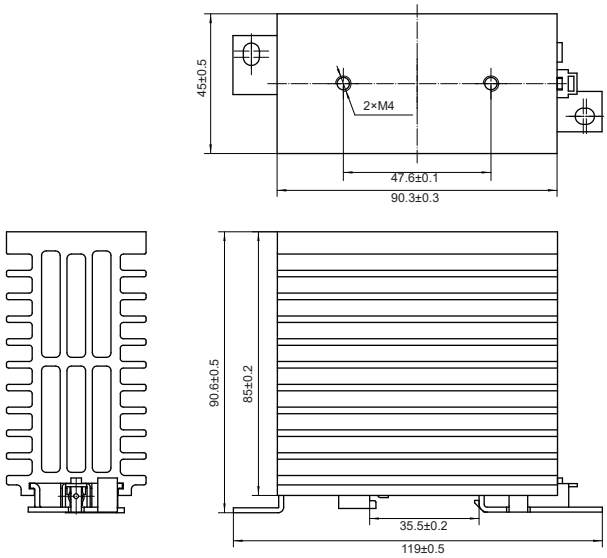



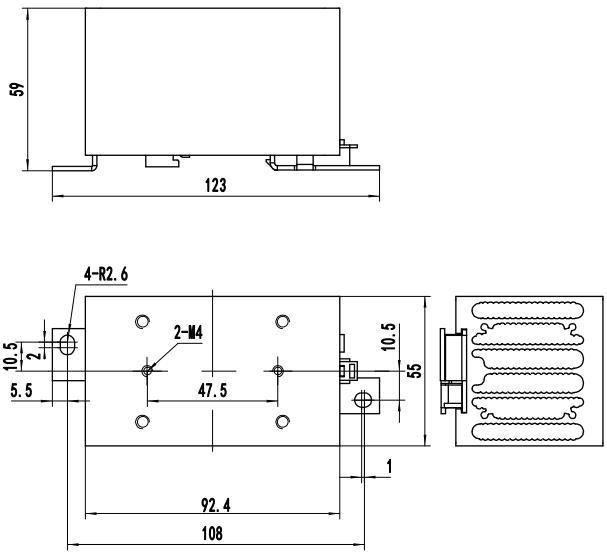
The above temperature curve is configured with radiator models as follows:



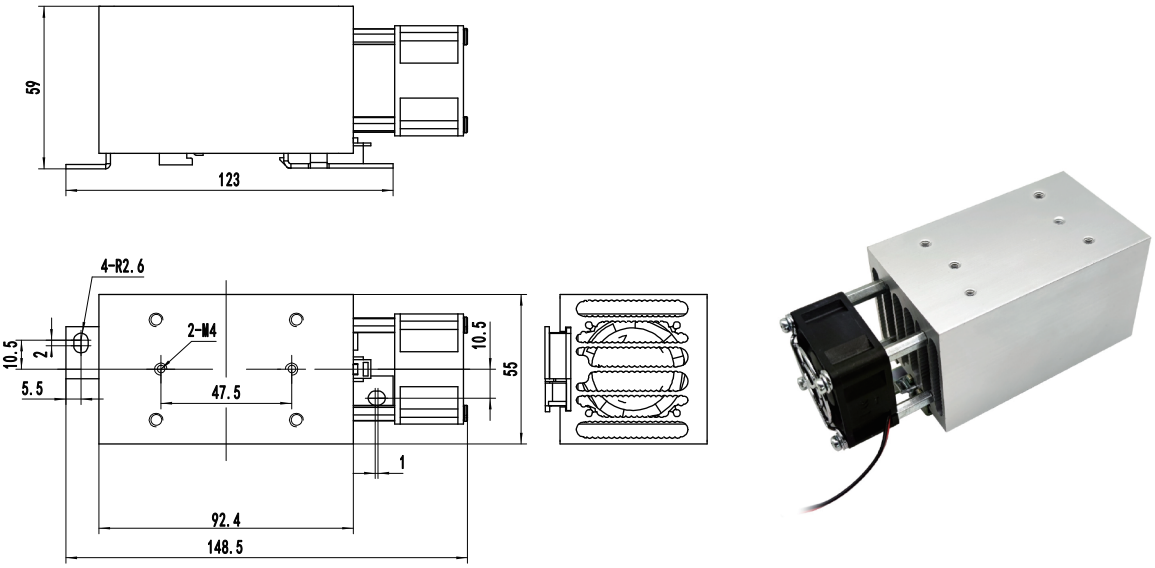

KHS-A50-1



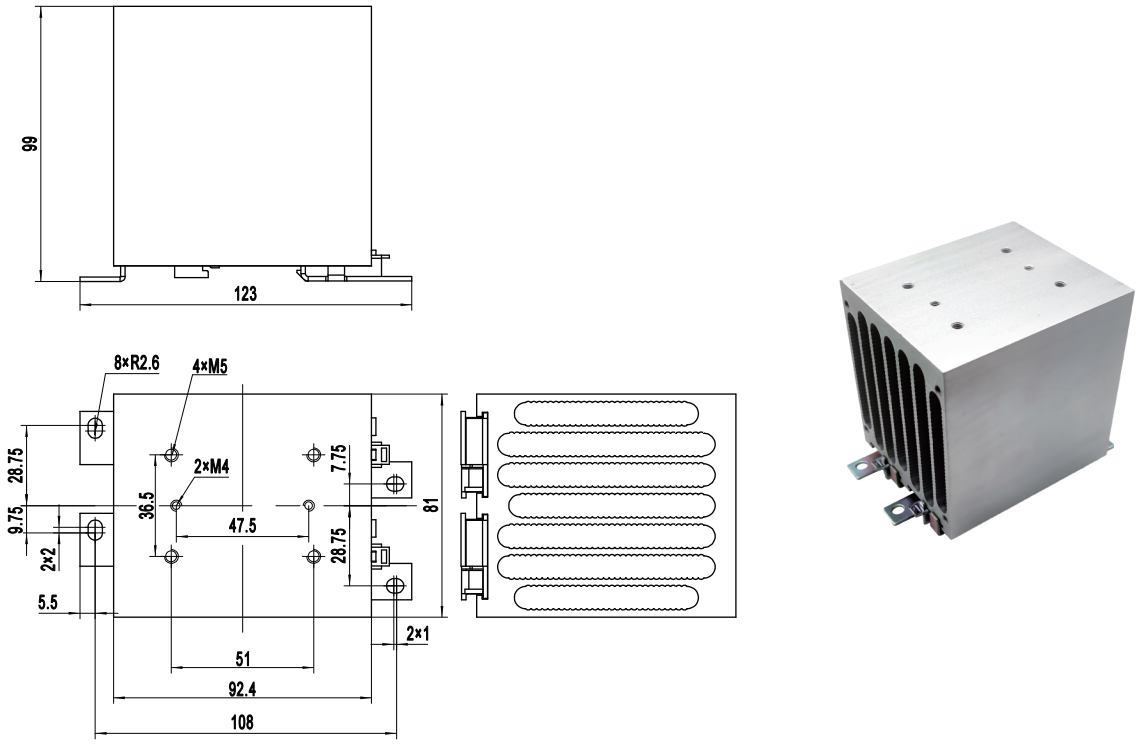

KHS-S90



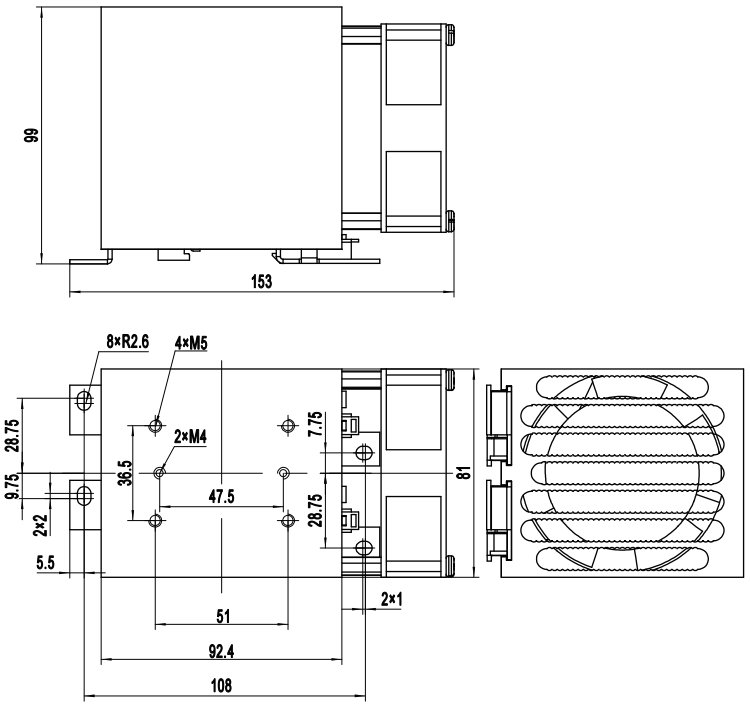

KHS-I93

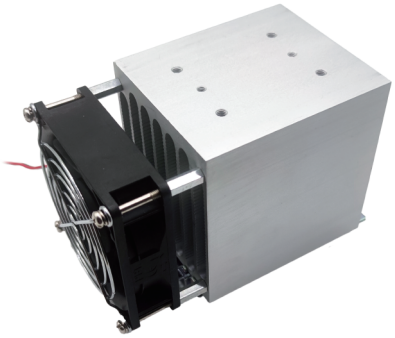



KHS-I93-B24DC




KHS-J93



KHS-J93-B24DC

## General Notes

1. The heat generated by the relay operation must be dissipated through the base plate. It is essential to ensure that the relay base plate is in close and secure contact with the heat sink, and that thermal pads or thermal paste are applied to the contact surfaces.
2. The relay terminal should ensure reliable connection. Otherwise, it may cause the overheating of relay and lead to the damage.
3. The recommended installation torque for screw fast connection terminals is 0.5N·m, the recommended installation torque for M3 terminals is (0.58 ~ 0.98) N·m, and the recommended installation torque for M4 terminals is (0.98 ~ 1.37) N·m.
4. When the operation temperature is above 25℃, please consider the derating as per the Thermal Derating Curve.
5. Please ensure reliable grounding when using the SSR.
6. Use M4 screws when assembling the relay and heatsink.
7. This product is suitable for resistive loads. If you need to control inductive loads, please consult our technical personnel.

## ! Warnings

1. The product may be hot, allow the product to cool before touching.
2. Disconnect all power before installing or working with this equipment.
3. Verify all connections and replace all covers before turning on power.