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BlueStars SSR-40AA

BlueStars SSR-40AA Solid State Relay Instruction Manual

Model: SSR-40AA

1. Introduction

This manual provides essential information for the safe and effective installation, operation, and maintenance of the BlueStars SSR-40AA Solid State Relay. Please read this manual thoroughly before using the product and retain it for future reference.

2. Safety Information

WARNING: Electrical Hazard. Improper installation or use can result in serious injury or death. Only qualified personnel should perform installation and maintenance.

- Always disconnect power before installing, wiring, or servicing the relay.
- Ensure all wiring complies with local and national electrical codes.
- Verify input and output voltage and current ratings match your application requirements.
- Install appropriate overcurrent protection (fuses or circuit breakers) for both control and load circuits.
- Solid State Relays can generate heat. Ensure adequate ventilation or a heat sink is used, especially for high current applications, to prevent overheating.
- Do not operate the relay in environments exceeding its specified ambient temperature range.

3. Product Overview

The BlueStars SSR-40AA is a single-phase AC-to-AC Solid State Relay designed for switching electrical loads without mechanical contact. It offers fast switching speeds and high isolation between the control and load circuits. This device is suitable for various automation applications requiring reliable and quiet switching.



Image 3.1: Two BlueStars SSR-40AA Solid State Relays, showing the input and output terminals and model labeling.

Key Features:

- **Fast Switching:** Enables rapid control of electrical loads.
- **High Isolation:** Provides enhanced safety between control and load circuits.
- **No Moving Parts:** Contributes to extended lifespan and noiseless operation.
- **Durable Construction:** Equipped with a heat-dissipating metal back plate and copper terminal lugs for superior conductivity.
- **Environmental Resistance:** Designed for use in environments requiring spark-proof, moisture-proof, and anti-corrosion properties.



Image 3.2: Close-up view of the SSR-40AA relay, indicating the heat-dissipating metal back plate and copper terminal output for efficient operation.



Image 3.3: Two SSR-40AA relays illustrating key features such as spark-proof, super quiet operation, moisture-proof design, and anti-corrosion properties.

4. Specifications

Parameter	Value
Model	SSR-40AA
Control Method	AC to AC
Control Voltage (Input)	70-280 VAC
Load Voltage (Output)	24-480 VAC
Rated Load Current	40 Amps

Parameter	Value
Insulation Resistance	1000 MΩ / 500 VDC
Ambient Temperature	-30°C to +70°C
Off Leakage Current	≤5 mA
Connector Type	Screw Terminals
Contact Type	Normally Open
Mounting Type	Screw Mount
Product Dimensions	Approximately 1 x 1 x 1 inches
Weight	Approximately 7.05 ounces

5. Package Contents

Each package contains:

- BlueStars SSR-40AA Solid State Relay (quantity as purchased)

6. Installation

The SSR-40AA Solid State Relay is designed for straightforward installation. Follow these steps carefully:

1. **Power Disconnection:** Ensure all power to the control circuit and the load circuit is disconnected before beginning installation.
2. **Mounting:** Mount the SSR-40AA securely using screws. For applications involving significant current, attach the relay to an appropriate heat sink to dissipate heat effectively.
3. **Wiring the Control Circuit:** Connect the AC control power supply (70-280 VAC) to the control terminals (labeled 'CONTROL 70~280 VAC' or similar, typically smaller terminals). Observe polarity if indicated, though AC control typically does not have strict polarity.
4. **Wiring the Load Circuit:** Connect the AC load power supply (24-480 VAC) and the load to the output terminals (labeled 'OUTPUT 24~480 VAC' or similar, typically larger terminals). The relay acts as a switch in series with the load.
5. **Verification:** Double-check all wiring connections for tightness and correctness according to the wiring diagram.

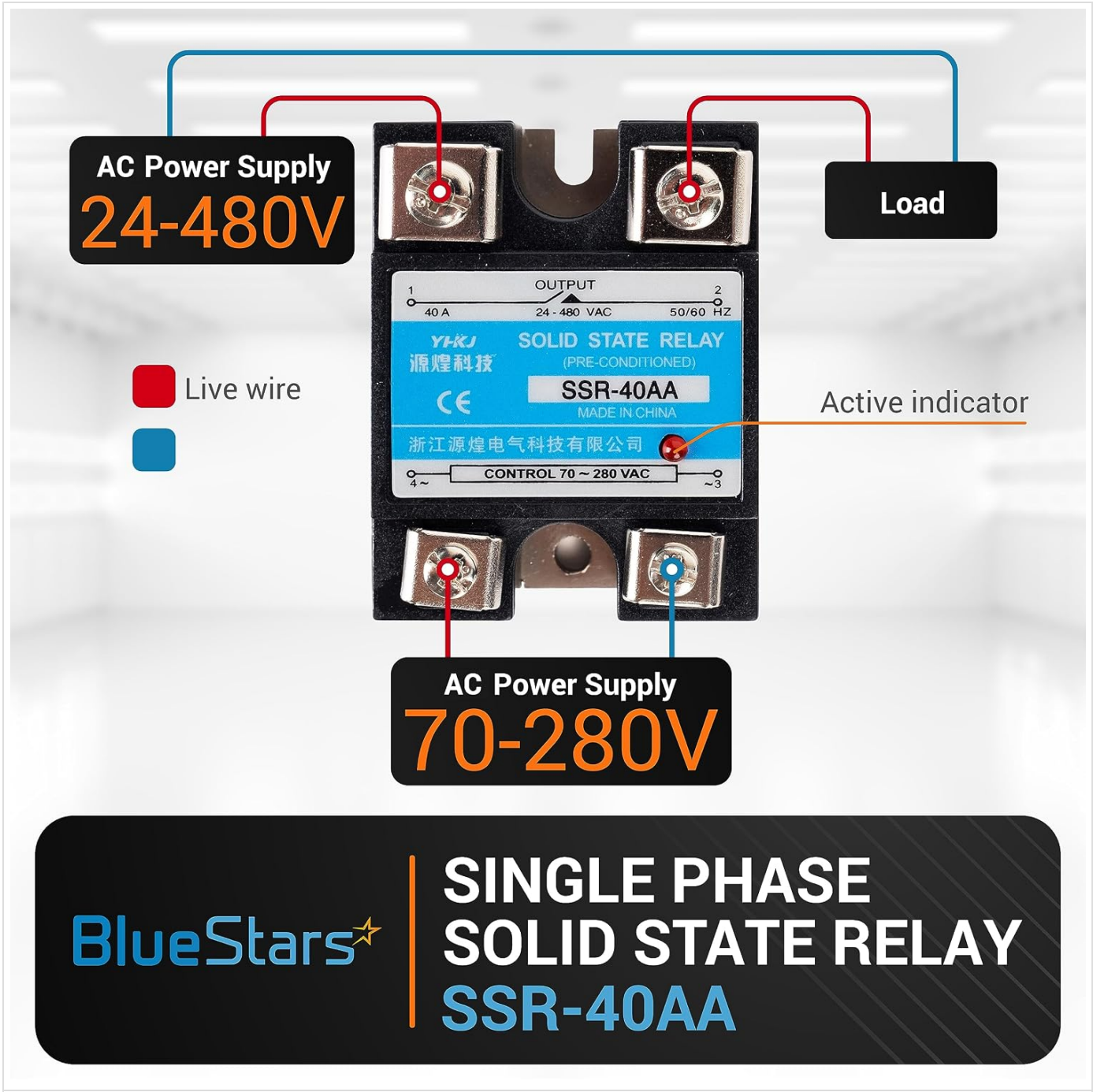


Image 6.1: Wiring diagram illustrating the connection of the AC power supply (70-280V) to the control input, and the AC power supply (24-480V) to the output terminals in series with the load. The active indicator light is also shown.



Image 6.2: An example of multiple solid state relays installed within an electrical panel, demonstrating typical wiring connections in an industrial setting.

7. Operation

Once properly installed and wired, the BlueStars SSR-40AA operates by switching the load circuit on or off based on the presence or absence of the control voltage.

- **Applying Control Voltage:** When the specified AC control voltage (70-280 VAC) is applied to the control terminals, the internal semiconductor switch closes, allowing current to flow through the load circuit.
- **Removing Control Voltage:** When the control voltage is removed, the internal semiconductor switch opens, interrupting the current flow to the load.
- **Indicator Light:** The relay typically includes an active indicator light (often an LED) that illuminates when the control voltage is applied and the relay is in the 'ON' state.

8. Applications

The BlueStars SSR-40AA Solid State Relay is suitable for a wide range of applications in both household and industrial automation due to its fast switching and durability. Common applications include:

- Temperature control systems
- Heating and cooling systems
- Computer Numerical Control (CNC) machinery
- Remote control setups
- Industrial process control
- Motor control (within specified ratings)



Image 8.1: A collage depicting various applications where solid state relays are commonly used, including refrigeration systems, industrial control panels, solar power installations, and complex circuit boards.

9. Maintenance

Solid State Relays generally require minimal maintenance due to their lack of moving parts. However, periodic checks are

recommended to ensure optimal performance and longevity:

- **Visual Inspection:** Regularly inspect the relay and its connections for any signs of damage, discoloration, or loose wiring.
- **Temperature Monitoring:** Ensure the operating temperature remains within the specified range. Excessive heat can reduce the lifespan of the relay. Verify that any heat sinks are clean and free of obstructions.
- **Environmental Conditions:** Confirm that the operating environment remains within the relay's specified conditions (e.g., moisture, dust).
- **Cleaning:** If necessary, gently clean the exterior of the relay with a dry, soft cloth. Do not use liquids or abrasive cleaners.

10. Troubleshooting

If the SSR-40AA Solid State Relay is not functioning as expected, consider the following troubleshooting steps:

Problem	Possible Cause	Solution
Relay does not turn ON (load remains OFF)	No control voltage Control voltage too low Incorrect wiring Internal failure	Verify control voltage is present and within 70-280 VAC. Check all control circuit wiring connections. Test the relay with a known good control signal. Replace the relay if internal failure is suspected.
Relay does not turn OFF (load remains ON)	Control voltage not removed Internal failure (short circuit) Excessive leakage current	Ensure control voltage is completely removed. Check for residual voltage on control terminals. Replace the relay if internal failure is suspected.
Relay overheats	Insufficient heat sinking Overcurrent condition High ambient temperature	Install a larger heat sink or improve ventilation. Verify load current does not exceed 40 Amps. Ensure ambient temperature is within -30°C to +70°C.
Load flickers or operates erratically	Unstable control signal Loose connections Electrical noise	Ensure a stable and clean control signal. Tighten all wiring connections. Consider adding filtering to the control circuit if electrical noise is present.

11. Warranty and Support

BlueStars provides a lifetime protection for this product, ensuring coverage for any defects or issues that may arise during its operational life. For technical assistance, warranty claims, or further inquiries, please contact BlueStars customer support through the official channels provided at the point of purchase or on the BlueStars website.

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