MEAN WELL RST-5000-24

MEAN WELL RST-5000 Series 5000W Power Supply with Single Output

Model: RST-5000-24

1. Introduction

The MEAN WELL RST-5000 series is a 5000W single output enclosed type AC/DC power supply designed for industrial applications. This series operates with a wide range three-phase AC input (3-phase 3-wire/Δ196~305VAC or 3-phase 4-wire/Y 340~530VAC) and provides various DC output models. The RST-5000-24 model delivers 4800W output power at 24VDC.
Each model features a built-in fan with speed control, allowing operation up to 70°C. The RST-5000 offers design flexibility through built-in functions such as output programming, active current sharing, remote ON-OFF control, and auxiliary power.

2. Specifications

Below are the key specifications for the MEAN WELL RST-5000 series power supply. For detailed electrical characteristics, refer to the specification table image.



Figure 2.1: Detailed specifications for RST-5000-24, RST-5000-36, and RST-5000-48 models, including DC output, rated current, ripple & noise, voltage adjust range, regulation, setup time, input range, power factor, efficiency, AC current, leakage current, and protection features.

- **Brand:** MEAN WELL
- **Model:** RST-5000-24
- **Output Wattage:** 4800 Watts
- **Compatible Devices:** Personal Computer and other industrial applications requiring stable DC power.
- **Item Dimensions (L x W x H):** 18.9 x 8.31 x 3.31 inches (480 x 211 x 84 mm)
- **Item Weight:** 5 Kilograms

- **Input Voltage:** 3-phase 3-wire/Δ196~305VAC or 3-phase 4-wire/Y 340~530VAC
- **Cooling:** Built-in fan with speed control
- **Operating Temperature:** Up to 70°C

3. Safety and EMC

This power supply is designed to meet various safety and EMC standards. Always ensure proper installation and grounding to prevent electrical hazards and ensure optimal performance.

- **Withstand Voltage:** I/P-O/P:3KVAC, I/P-FG:2KVAC, O/P-FG:0.5KVAC.
- **Isolation Resistance:** I/P-O/P, I/P-FG, O/P-FG:100M Ohms / 500VDC / 25°C / 70% RH.
- **EMC Emission:** Conducted (BS EN/EN55032 CISPR32 Class B), Harmonic Current (BS EN/EN61000-3-2 Class A).
- **EMC Immunity:** Radiated (BS EN/EN61000-4-3 Level 3), EFT/Burst (BS EN/EN61000-4-4 Level 3), Surge (BS EN/EN61000-4-5 Level 4), Conducted (BS EN/EN61000-4-6 Level 3), Magnetic Field (BS EN/EN61000-4-8 Level 4), Voltage Dips and Interruptions (BS EN/EN61000-4-11 >95% interruptions 250 periods).

Important Safety Notes:

- Before installation, ensure the AC input is disconnected.
- Do not operate the unit in environments exceeding the specified temperature and humidity ranges.
- Ensure proper ventilation and clearance around the unit for effective cooling.
- Only qualified personnel should perform installation and maintenance.

4. Setup: AC Power Connection

The RST-5000 series supports both 3-phase 3-wire (Δ) and 3-phase 4-wire (Y) AC input configurations. Refer to the diagrams below for correct wiring.

4.1. 3-phase 3-wire / Δ 196~305VAC Connection

Figure 4.1: Wiring diagram for 3-phase 3-wire (Delta) AC input. Connect L1, L2, L3 to the corresponding terminals and FG to the frame ground.

4.2. 3-phase 4-wire / Y 340~530VAC Connection

Figure 4.2: Wiring diagram for 3-phase 4-wire (Wye) AC input. Connect N, L1, L2, L3 to the corresponding terminals and FG to the frame ground.

Note: The RST-5000 can also be operated by 1-phase or 2-phase 196~305VAC input. However, this may lead to larger ripple and noise. For such applications, please contact MEAN WELL for specific guidance.

5. Operating Instructions

5.1. Remote Sense

The remote sense function compensates for voltage drop on the cable between the power supply and the load, up to 0.3V. If the remote sense function is not required, +S and +V of the output terminal, as well as -S and -V, need to

be connected as factory default setting.



Figure 5.1: Diagram showing connections for remote sense. Sense wires should be twisted in pairs to minimize noise pickup.

5.2. Voltage Adjustment

The output voltage can be adjusted using the built-in potentiometer (SVR) or via external voltage programming.

- **Using SVR:** Set DIP switch position-3 to ON. The output voltage can then be trimmed by SVR.
- **Output Voltage Programming:** Set DIP switch position-3 to OFF. The output voltage can be trimmed from 20~120% of the nominal voltage by applying an external voltage between PV+ and PV- on CN313 or CN314.



Figure 5.2: Diagram illustrating voltage adjustment connections and a graph showing output voltage percentage versus external voltage (VDC).

5.3. Current Adjustment

The output current can be adjusted for overload protection (OLP) or constant current level programming.

- **Default Overload Protection (OLP) Value:** Set DIP switch position-2 to ON. The output current is set to its default value.
- **Constant Current Level Programming:** Set DIP switch position-2 to OFF. The constant current level can be trimmed from 20~100% of the rated current by applying an external voltage between PC+ and PC- on CN313 or CN314.



Figure 5.3: Diagram illustrating current adjustment connections and a graph showing constant current level percentage versus external voltage (VDC).

5.4. Overload Protection (OLP) Mode

The RST-5000 offers two modes for overload protection:

- **Continuous Constant Current Mode:** Set DIP switch position-1 to ON. The RST-5000 will work in continuous constant current mode when the output is overloaded and the output voltage is greater than 50% of the rated output voltage.
- **Delay Shutdown Mode:** Set DIP switch position-1 to OFF. The RST-5000 will shut down after 5 seconds of constant current operation when the output is overloaded or short-circuited.

5.5. Remote ON-OFF Control

The power supply can be turned ON or OFF using the "Remote ON-OFF" function. Refer to the table below for control logic.

Between Remote ON-OFF F (CN313 or CN314 pin10) and 12V-AUX(CN315 pin1)	Output Status
Switch close (Short)	power supply ON
Switch open (Open)	power supply OFF

Table 5.1: Remote ON-OFF Control Logic.



Figure 5.4: Diagram showing connections for remote ON-OFF control.

5.6. Alarm Signal Output

There are four alarm signals on CN315, and each signal can select two types of output circuit.

- **Relay contact output:** (OTP1-GND), (DC-OK1-DC-OK1-GND), (AC-FAIL1-GND, AC-FAIL1), (FAN-FAIL1-GND, FAN-FAIL1). Normally open contact "Short" when the alarm arises. Relay contact rating (maximum) is 30V/1A resistive.
- **Open collector output:** (DC-OK2-GND, DC-OK2), (AC-FAIL2-GND, AC-FAIL2), (OTP2-GND, OTP2), (FAN-FAIL2-GND, FAN-FAIL2). An external voltage source is required for this function. The maximum sink current is 10mA and the maximum external voltage is 20V.



Figure 5.5: Diagram illustrating the connections for alarm signal outputs, including relay contact and open collector types.

5.7. Current Sharing

The RST-5000 has a built-in active current sharing function and can be connected in parallel, up to 4 units, to provide higher output power. The voltage difference among each output should be minimized (less than 0.2V). The total output current must not exceed the value determined by the following equation:

Maximum output current in parallel operation = (Rated current per unit) × (Number of units) × 0.9

When the total output current is less than 5% of the total rated current, or 5% of (Rated current per unit) × (Number of units), the current shared among units may not be fully balanced.



Figure 5.6: Diagram showing how to connect multiple RST-5000 units for active current sharing. +S, -S and CS+, CS-, RC+ and RC- are connected mutually in parallel.

- When the remote sense function is used in parallel operation, the sensing wire must be connected only to the master unit.
- Wires of the remote sense function should be kept at least 30 cm from input wires.

6. Block Diagram

The block diagram illustrates the internal functional components of the RST-5000 power supply, including the EMI filter, rectifiers, PFC, power switching, control circuit, and protection features.



Figure 6.1: Functional block diagram of the RST-5000 power supply.

7. Performance Curves

7.1. Derating Curve

The derating curve shows the maximum permissible output load as a function of ambient temperature. Ensure the power supply operates within these limits to prevent overheating and ensure longevity.



Figure 7.1: Graph illustrating the derating curve, showing the relationship between load percentage and ambient temperature.

7.2. Static Characteristics

The static characteristics graph indicates the power supply's performance under varying input voltage conditions.



Figure 7.2: Graph showing the static characteristics, specifically the efficiency versus load for the 48V model.

8. Maintenance

The RST-5000 series power supply is designed for reliable operation with minimal maintenance. However, periodic checks can help ensure optimal performance and longevity.

- **Cleaning:** Ensure the ventilation openings and fan are free from dust and debris. Use compressed air or a soft brush to gently clean the fan and heatsinks. Do not use liquid cleaners.
- **Environmental Conditions:** Verify that the operating environment remains within the specified temperature and humidity ranges.
- **Connections:** Periodically check all input and output connections to ensure they are secure and free from corrosion.
- **Fan Operation:** Listen for unusual noises from the fan, which could indicate a malfunction. The fan speed is controlled automatically based on temperature.

Warning: *Always disconnect the AC input power before performing any maintenance or cleaning. Only qualified personnel should attempt internal repairs.*

9. Troubleshooting

If the power supply is not functioning as expected, review the following common issues and solutions before contacting support.

Problem	Possible Cause	Solution
No output voltage	No AC input power; Overload protection activated; Remote ON-OFF engaged (OFF state); Internal fault.	Check AC input connections and circuit breaker. Reduce load. Check remote ON-OFF control settings. Disconnect load and restart. If problem persists, contact support.
Output voltage unstable or incorrect	Incorrect voltage adjustment setting; Remote sense wiring issue; Load fluctuations; Over-temperature protection.	Verify SVR or external voltage programming settings. Check remote sense connections. Ensure load is stable. Check for proper ventilation and ambient temperature.
Overheating	Insufficient ventilation; Ambient temperature too high; Overload condition; Fan malfunction.	Ensure adequate clearance around the unit. Reduce ambient temperature. Reduce load. Check fan for obstructions or failure.
Alarm signal active	Over-temperature, DC-OK, AC-FAIL, or FAN-FAIL condition.	Identify the specific alarm (refer to Section 5.6). Address the underlying issue (e.g., cooling for over-temperature, input power for AC-FAIL).

10. Warranty and Support

For warranty information and technical support, please refer to the official MEAN WELL website or contact your authorized distributor. Ensure you have your product model number (RST-5000-24) and serial number ready when seeking assistance.
Manufacturer: MEAN WELL

Global Trade Identification Number (GTIN): 04711287438092

For further details and the latest documentation, visit the official MEAN WELL website: www.meanwell.com