COTEK SD3500-148

COTEK SD3500-148 GFCI Pure Sine Wave Inverter Instruction Manual

Model: SD3500-148 GFCI

1. Introduction

The COTEC SD3500-148 GFCI Pure Sine Wave Inverter is designed to convert 48VDC battery power into 120VAC pure sine wave electricity, suitable for sensitive electronics and various applications. This inverter features a dual GFCI outlet, an integrated AC circuit breaker, and an automatic transfer switch (ATS) for reliable power supply. It supports parallel connectivity for power expansion and offers advanced communication options for monitoring and control.

2. Safety Information

Read all instructions and warnings before installing or operating this inverter. Failure to follow these instructions may result in electric shock, fire, serious injury, or death. Keep this manual for future reference.

- **Electrical Hazard:** This unit produces high voltage. Do not open the inverter casing. Refer all servicing to qualified personnel.
- **Battery Safety:** Work in a well-ventilated area. Batteries can produce explosive gases. Do not smoke or allow sparks or flames near batteries. Wear eye protection and protective clothing.
- **Wiring:** Ensure all wiring is correctly sized and properly terminated. Use 4/0 AWG wire for DC connections not longer than 5 feet for optimal performance, especially at full capacity. Incorrect wiring can cause overheating and fire.
- **Grounding:** Proper grounding is essential. Ensure the inverter is correctly grounded according to local electrical codes. Be cautious with bonded grounds; some inverters may not operate correctly with them.
- **Installation Environment:** Install the inverter in a dry, cool, and well-ventilated area, away from direct sunlight, heat sources, and flammable materials.
- **Overload Protection:** Do not exceed the inverter's rated output power. Overloading can damage the unit and connected appliances.

3. Features

The SD3500-148 GFCI inverter incorporates several advanced features for enhanced performance and reliability:

- **Pure Sine Wave Output:** Provides clean, stable power suitable for all types of loads, including sensitive electronics.
- **Dual GFCI 120VAC Outlets:** Equipped with two Ground Fault Circuit Interrupter outlets for safety.
- **Automatic Transfer Switch (ATS):** Seamlessly switches between inverter power and utility/generator AC input.
- **Built-in AC Circuit Breaker:** Provides protection for the AC output.
- **Parallel Redundancy Design:** Allows for power expansion by connecting multiple inverters of the same model.
- **RS-232 Communication Port:** Enables monitoring and control via a computer or optional remote.
- **Input & Output Isolation:** Ensures safety and reduces interference.
- **Power Saving Modes:** Selectable modes to optimize energy consumption.
- **Comprehensive Protections:** Includes reverse polarity (fuse), under/over voltage, short circuit, overload, over temperature, and over voltage protection.
- **DIP Switch Configuration:** Allows customization of various settings.

4. Setup

4.1 Physical Installation

Mount the inverter in a secure, well-ventilated location. Ensure adequate clearance around the unit for airflow, especially around the cooling fans. The inverter can be mounted horizontally or vertically.

Figure 1: Rear panel of the SD3500-148 GFCI inverter, illustrating the DC input terminals, AC input/output connections, GFCI outlets, and communication ports.

Figure 2: Side view of the SD3500-148 GFCI inverter, highlighting the dual cooling fans for thermal management.

4.2 Electrical Connections

All electrical connections should be performed by a qualified electrician. Ensure all power sources are disconnected before making any connections.

- **DC Input (Battery):** Connect the 48VDC battery bank to the DC input terminals on the inverter's rear panel. Observe correct polarity (positive to positive, negative to negative). Use appropriate gauge wiring (e.g., 4/0 AWG for runs under 5 feet) and ensure connections are tight.
- **AC Output (Load):** Connect your AC loads to the dual GFCI outlets or hardwire to the AC output terminals.
- **AC Input (Utility/Generator):** If using the Automatic Transfer Switch (ATS) function, connect your utility or generator AC power to the AC input terminals.
- **Grounding:** Connect the inverter's chassis ground terminal to a reliable earth ground.

4.3 DIP Switch Configuration

The inverter features DIP switches for customizing various operational parameters, such as output voltage, power saving mode, and communication settings. Refer to the detailed specifications table for specific DIP switch functions and recommended settings for your application.

Figure 3: Excerpt from the SD3500 series specifications, detailing features and various model specifications, including notes on DIP switch configurations.

5. Operation

5.1 Powering On/Off

After all connections are secure and verified, switch the inverter's main power switch to the 'ON' position. The inverter will perform a self-test, and the LED indicators will illuminate to show its status. To power off, switch the main power switch to 'OFF'.

5.2 LED Indicators

The inverter is equipped with LED indicators to display its operational status and any fault conditions. Refer to the LED Status table for detailed explanations.

Figure 4: LED Status table for the SD3500 series, indicating different operational states and fault conditions via green, orange, and red LED signals.

5.3 Power Saving Mode

The inverter offers selectable power saving modes to reduce idle power consumption. These modes can be configured via DIP switches or the optional remote control (CR-10). In power saving mode, the inverter will periodically check for load and enter a low-power state if no significant load is detected.

5.4 Automatic Transfer Switch (ATS)

The built-in ATS allows the inverter to automatically switch between battery power and an external AC source (utility or generator). This ensures an uninterrupted power supply to connected loads. The transfer time is typically very fast, often less than 4ms, depending on the mode (STS, ATS).

Figure 5: Transfer Time Table for the SD3500 series, detailing switching speeds for different transfer switch modes (ATS, STS).

5.5 Parallel Operation

The SD3500 series supports parallel redundancy design, allowing multiple inverters of the same model to be connected to increase total power capacity or provide redundancy. This feature is ideal for applications requiring higher wattage or enhanced reliability. Consult the advanced manual for detailed instructions on parallel setup.

6. Maintenance

Regular maintenance ensures the longevity and optimal performance of your inverter.

- **Cleaning:** Keep the inverter's exterior clean and free from dust and debris. Ensure ventilation openings and cooling fans are unobstructed. Use a dry cloth for cleaning.

- **Fan Inspection:** Periodically check the cooling fans for proper operation and cleanliness. If fans become noisy or stop working, they may need replacement by a qualified technician.
- **Connection Checks:** Annually inspect all electrical connections (DC input, AC input/output, ground) for tightness and corrosion. Tighten any loose connections.
- **Battery Maintenance:** Follow the battery manufacturer's maintenance guidelines for your battery bank. Ensure batteries are properly charged and maintained.

7. Troubleshooting

If the inverter is not operating as expected, refer to the LED Status table (Figure 4) for diagnostic information. Common issues and their potential solutions are listed below:

- **No Output Power:**
  - Check DC input voltage; ensure it is within the specified range (40.0-64.0VDC for 48V models).
  - Verify DC input connections for correct polarity and tightness.
  - Check the inverter's main power switch is 'ON'.
  - Inspect the AC output circuit breaker on the inverter.
  - Look for fault indications on the LED status panel (e.g., OVP, UVP, OLP, OTP).
- **Overload Protection (OLP):**
  - The inverter has detected an excessive load. Reduce the connected load.
  - Disconnect all loads, power cycle the inverter, and reconnect loads one by one.
- **Over Temperature Protection (OTP):**
  - The inverter is overheating. Ensure adequate ventilation and clear any obstructions from the cooling fans.
  - Reduce the load on the inverter.
  - Allow the unit to cool down before restarting.
- **Under Voltage Protection (UVP):**
  - The battery voltage is too low. Recharge or replace the battery bank.
  - Check DC wiring for excessive voltage drop.
- **RS-232 Communication Issues:**
  - Ensure DIP Switch 8 is in the 'OFF' (0) position for RS-232 communication.
  - The power switch must be set to 'ON', not 'REMOTE', for RS-232. 'REMOTE' is for the optional LCD remote module only.
  - Verify the RS-232 cable pinout is correct as described in the manual.

8. Specifications

Key technical specifications for the COTEC SD3500-148 GFCI Pure Sine Wave Inverter:

- **Model:** SD3500-148 GFCI
- **Output Power (Continuous):** 3500 Watts
- **Peak Output Power:** 4200 Watts (0.2 sec)
- **Input Voltage:** 48 VDC (Operating Range: 40.0-64.0 VDC)
- **Output Voltage:** 120 VAC

- **Output Frequency:** 50 / 60 Hz selectable
- **Output Waveform:** Pure Sine Wave
- **Efficiency (Max):** 90%
- **Total Harmonic Distortion (THD):** <3% @ linear load
- **No Load Power Consumption:** <1.4A (DC)
- **AC Circuit Breaker:** 35A
- **Transfer Switch Time (ATS):** <10ms (Normal), <4ms (STS)
- **Operating Temperature:** -20°C to 40°C (de-rating above 40°C)
- **Dimensions (WxHxD):** 283x125x496 mm (11.14x5.04x19.53 inches)
- **Weight:** 24.8 Pounds (11.25 kg)
- **Safety Standards:** Certified UL 458 (UL only for hardwire)

Figure 6: Comprehensive technical specifications for the SD3500 series, including electrical parameters, protection features, and environmental ratings.

Figure 7: Mechanical drawings of the SD3500 series inverter, showing overall dimensions in millimeters and inches.

9. Warranty and Support

COTEK products are designed for reliability and performance. For warranty information, please refer to the warranty card included with your product or visit the official COTEC website. For technical support, troubleshooting assistance, or to inquire about replacement parts, please contact COTEC customer service or an authorized service center. When contacting support, please have your product model number (SD3500-148 GFCI) and serial number available.