

## BUSBYR GES48120M220-500P

# BUSBYR 12000W Hybrid Solar Inverter User Manual

Model: GES48120M220-500P

## 1. INTRODUCTION AND OVERVIEW

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This manual provides essential instructions for the installation, operation, and maintenance of your BUSBYR 12000W Hybrid Solar Inverter, Model GES48120M220-500P. This advanced inverter is designed to convert 48V DC power into 120V single-phase or 240V split-phase AC power, delivering 12,000W continuous output and up to 24,000W surge capacity. It features dual MPPT solar charging with 99.9% efficiency, supporting up to 6,000W + 6,000W PV input and a maximum DC voltage of 500V. The inverter is suitable for both on-grid and off-grid solar systems, providing reliable power for homes, cabins, RVs, and workshops.

Key features include flexible battery compatibility (AGM, GEL, Lead-acid, Li-ion, LiFePO4), battery-free operation, smart WiFi and APP monitoring, and multiple charging and output modes with a built-in UPS function for uninterrupted power.

# Multi-Scenario **Application**

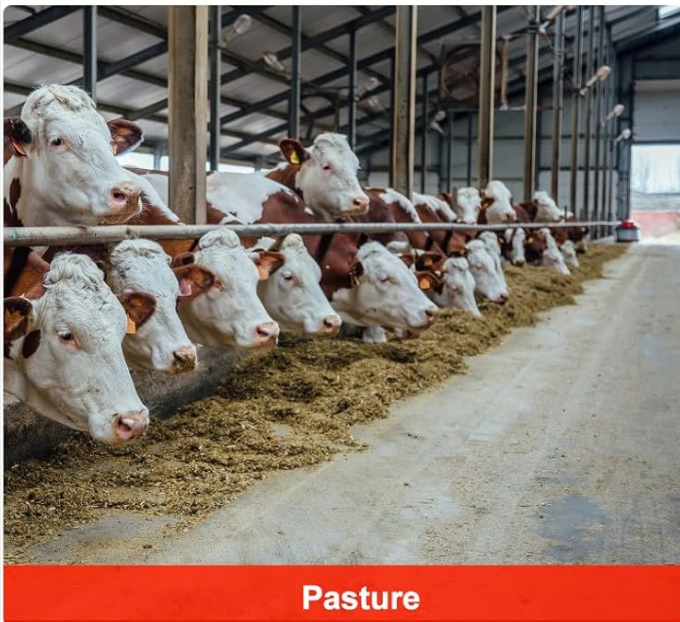


Image: The BUSBYR Hybrid Solar Inverter is suitable for various applications, including household use, farm use, pasture operations, and small business activities, demonstrating its versatility in different power environments.

## 2. SAFETY INSTRUCTIONS

Please read and understand all safety instructions before installing or operating the inverter. Failure to follow these instructions may result in electric shock, fire, serious injury, or death.

- Installation must be performed by qualified personnel.
- Ensure all wiring is correctly sized and properly terminated.
- Do not disassemble the inverter. There are no user-serviceable parts inside.
- Keep the inverter away from flammable materials and ensure adequate ventilation.
- Wear appropriate personal protective equipment (PPE) during installation and maintenance.
- Verify DC input voltage and polarity before connecting to the inverter.
- The inverter includes built-in protections against short-circuit, over/under voltage, overload, and reverse polarity.

# All Round **Protection** for you and your devices



Image: The inverter features comprehensive protection mechanisms, including overload protection, short circuit protection, battery protection, overheating protection, overcurrent protection, and high/low voltage protection, ensuring safety for the unit and connected devices.

### 3. PACKAGE CONTENTS

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Upon unpacking, please verify that all items listed below are included and undamaged. If any items are missing or damaged, contact your supplier immediately.

# Dimensions and Accessories



Image: The package includes the BUSBYR Hybrid Solar Inverter, a user manual, warranty card, WiFi BOX, Parallel COM cable, dust net, and cable lugs & screws for installation.

- BUSBYR 12000W Hybrid Solar Inverter
- User Manual
- Warranty Card
- WiFi BOX
- Parallel COM Cable
- Dust Net
- Cable Lugs & Screws for mounting

## 4. PRODUCT OVERVIEW

The BUSBYR Hybrid Solar Inverter features a robust design with an intuitive interface for easy monitoring and control.

### 4.1 Front Panel



**BUSBYR**®

HYBRID SOLAR CHARGE INVERTER

 The product is indoor product, it is forbidden to use it outdoors.



Image: Front view of the BUSBYR Hybrid Solar Inverter, highlighting the integrated LCD display for system status and control, along with LED indicators for AC OUT, CHARGE, and FAULT conditions.

The front panel includes a clear LCD display that provides real-time information on PV input, battery status, load power, and operational alerts. LED indicators show the current status of AC output, battery charging, and any system faults.

## 4.2 Dimensions

The inverter measures approximately 28 x 20 x 8.5 inches and weighs 59.4 pounds. Ensure the installation location can support its weight and dimensions, allowing for proper ventilation.

## 5. SETUP AND INSTALLATION

Proper installation is critical for the safe and efficient operation of your inverter. Refer to the detailed wiring diagram and ensure all connections are secure and comply with local electrical codes.

### 5.1 Mounting

Mount the inverter vertically on a sturdy wall or surface using the provided mounting brackets and screws. Ensure there is sufficient clearance around the unit for airflow and heat dissipation.

### 5.2 Wiring Connections

The inverter supports various input and output connections:

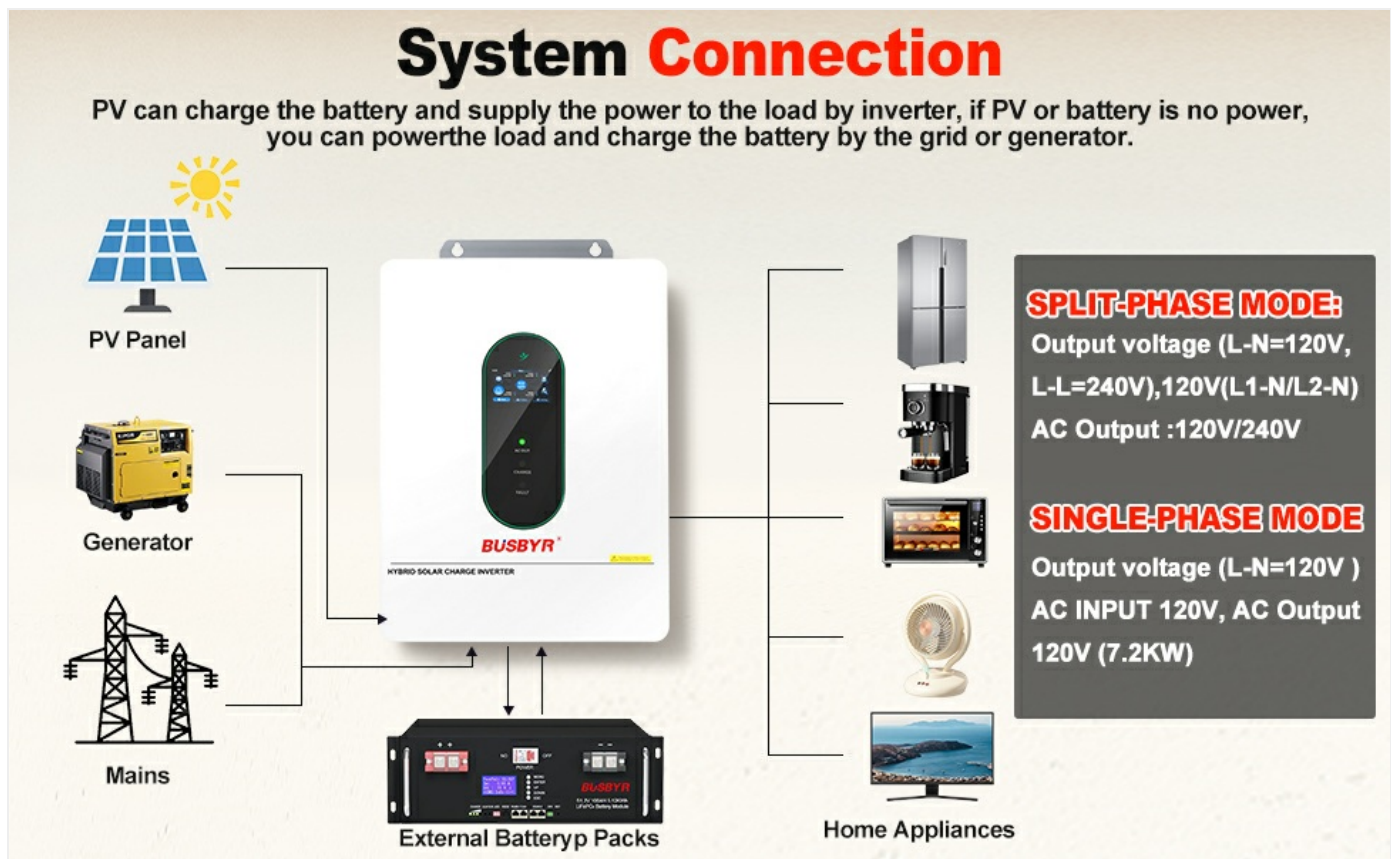


Image: Detailed system connection diagram showing PV panel, generator, mains, external battery packs, and home appliances connected to the BUSBYR Hybrid Solar Inverter for both split-phase and single-phase configurations.

- **Solar (PV) Input:** Connect your solar panels to the dual MPPT inputs. The inverter supports up to 6000W x 2 PV

input, with a maximum DC voltage of 500V and a maximum PV charging current of 220A. Recommended cable: 10 AWG/6mm<sup>2</sup>.

- **AC Input (Grid/Generator):** Connect the utility grid or a generator for AC charging and bypass operation. Rated voltage: 120V, Max input voltage: 500V AC. Recommended cable: 10 AWG/6mm<sup>2</sup>.
- **AC Output (Inverter Power):** Connect your loads to the AC output. The inverter provides 12000W rated output power, with output voltage options of 110V/120V (single-phase) or 240V (split-phase). Recommended cable: 10 AWG/6mm<sup>2</sup>.
- **Battery Connection:** Connect a 48V battery bank. Supported battery types include Lead-Acid and Lithium. Recommended cable: 2 AWG/25mm<sup>2</sup>. Recommended fuse/breaker: 200A.

## 6. OPERATING MODES

The BUSBYR Hybrid Solar Inverter offers flexible operating modes to optimize power usage based on your needs and available energy sources.

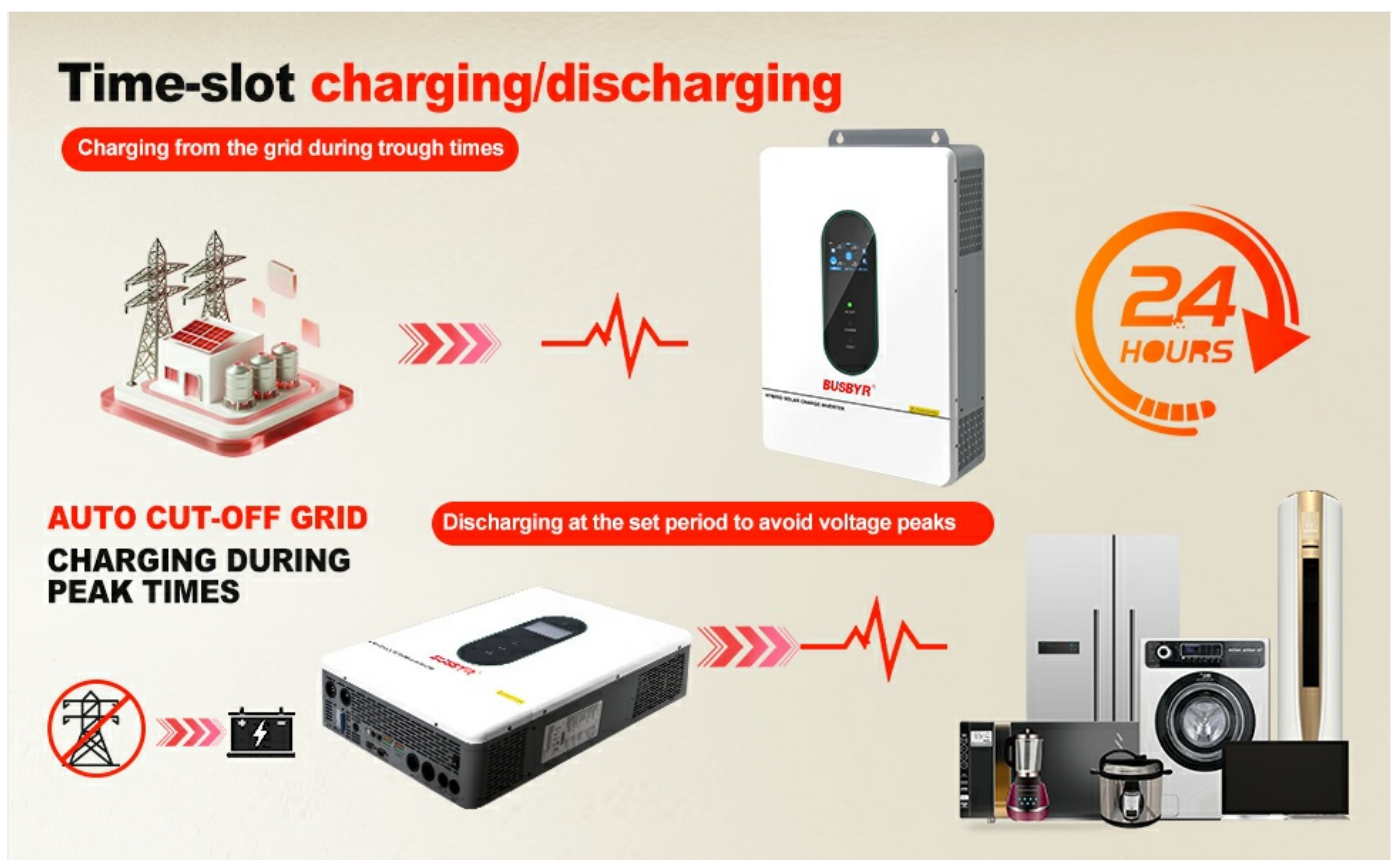


Image: Illustration of the inverter's multi-mode operation, including four AC output modes and four battery charging modes such as Hybrid Charging, Solar Priority, Utility Priority, and Solar Only.

### 6.1 Charging Modes

- **Solar Only:** Prioritizes solar power for charging batteries.
- **Grid Priority:** Uses grid power to charge batteries when available, supplementing with solar.
- **Solar Priority:** Maximizes solar power for charging, using grid only when solar is insufficient.
- **Hybrid Charging:** Intelligently combines solar and grid power for optimal battery charging.

### 6.2 Output Modes

- **Bypass Mode:** Loads are powered directly by the grid or generator.
- **Inverter Mode:** Loads are powered by the inverter, drawing from batteries or solar.

The built-in Uninterruptible Power Supply (UPS) ensures seamless switching between power sources, providing continuous power during outages.

## 7. MONITORING AND CONNECTIVITY

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The inverter features smart monitoring capabilities, allowing you to track system performance remotely.



Image: The inverter supports smart WiFi and APP monitoring, enabling users to view PV input, battery charging status, load power, and system alerts remotely via a smartphone application connected through the WiFi module.

- **WiFi & APP Monitoring:** Connect the included WiFi BOX to the inverter and download the dedicated smartphone application to monitor your system in real-time from anywhere.
- **Data Display:** The app provides detailed information on PV input, battery charging status, load power consumption, and system alerts.
- **Communication Interfaces:** The inverter supports CAN, USB, WiFi, and RS485 for smart integration with other systems.

## 8. BATTERY COMPATIBILITY

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The BUSBYR Hybrid Solar Inverter is designed to work with a wide range of 48V battery types, offering flexibility for various energy storage solutions.

# Compatible with **Various Batteries**



Image: The inverter is compatible with various 48V battery types, including Flooded (FLD), AGM, GEL, Sealed Lead Acid (SLD), LiFePO4 (LI), and user-defined battery settings, allowing for diverse energy storage configurations.

- **Supported Types:** 48V AGM, GEL, Lead-acid, Li-ion, and LiFePO4 batteries.
- **Battery-Free Operation:** The inverter can also operate without batteries, allowing direct solar + grid hybrid supply to loads, which is useful for specific applications or during battery maintenance.

## 9. SPECIFICATIONS

Below are the technical specifications for the BUSBYR 12000W Hybrid Solar Inverter.

Feature	Specification
Model Number	GES48120M220-500P
Rated Power	12000W (Continuous)

Feature	Specification
Surge Power	24000W
DC Input Voltage	48V DC
AC Output Voltage	110V/120V AC (Single-Phase), 240V AC (Split-Phase)
Waveform	Pure Sine Wave
Max PV Input Power	6000W + 6000W (Dual MPPT)
Max DC Voltage (PV)	500V DC
Max PV Charging Current	220A
MPPT Efficiency	99.9%
Battery Compatibility	48V AGM, GEL, Lead-acid, Li-ion, LiFePO4
Product Dimensions	28 x 20 x 8.5 inches
Item Weight	59.4 pounds
Communication Interfaces	CAN, USB, WiFi, RS485

## 10. TROUBLESHOOTING

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This section provides guidance for common issues. For more complex problems, refer to the full user manual or contact technical support.

- **No Power:** Check all circuit breakers, fuses, and battery connections. Ensure the battery voltage is within the operating range.
- **No AC Output:** Verify AC output breaker. Check for overload conditions. Ensure the inverter is in Inverter Mode if operating off-grid.
- **PV Charging Issues:** Check solar panel connections and ensure they are receiving adequate sunlight. Verify PV input voltage and current on the display.
- **Error Codes:** Refer to the specific error code displayed on the LCD for detailed explanations and corrective actions in the comprehensive manual.
- **Overload Protection:** If an overload occurs, the inverter will shut down. Reduce the load and restart the inverter.

## 11. MAINTENANCE

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

- **Cleaning:** Periodically clean the inverter's exterior with a dry, soft cloth. Ensure ventilation openings are free from dust and debris.
- **Connections:** Annually inspect all electrical connections for tightness and signs of corrosion.
- **Firmware Updates:** Check the manufacturer's website or app for available firmware updates to ensure your inverter has the latest features and bug fixes.
- **Battery Inspection:** If using lead-acid batteries, regularly check electrolyte levels and terminal conditions.

## 12. WARRANTY AND SUPPORT

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The BUSBYR 12000W Hybrid Solar Inverter comes with a manufacturer's warranty. Please refer to the included Warranty Card for specific terms and conditions, including warranty period and coverage details.

For technical assistance, troubleshooting beyond this manual, or warranty claims, please contact BUSBYR customer support. Contact information can typically be found on the Warranty Card or the official BUSBYR website.

