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> inBEKEA 5KVA 4000W Solar Hybrid Inverter User Manual

inBEKEA 5KVA

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Model: 5KVA

INTRODUCTION

This manual provides essential information for the safe and efficient operation of your inBEKEA 5KVA 4000W Solar Hybrid Inverter. Please read this manual thoroughly before installation and use, and retain it for future reference. This multi-function inverter/charger combines the functions of an inverter, solar charger, and battery charger to provide uninterruptible power support. It features a comprehensive LCD display for user-configurable settings such as battery charging current, AC/Solar charger priority, and acceptable input voltage.

PRODUCT FEATURES

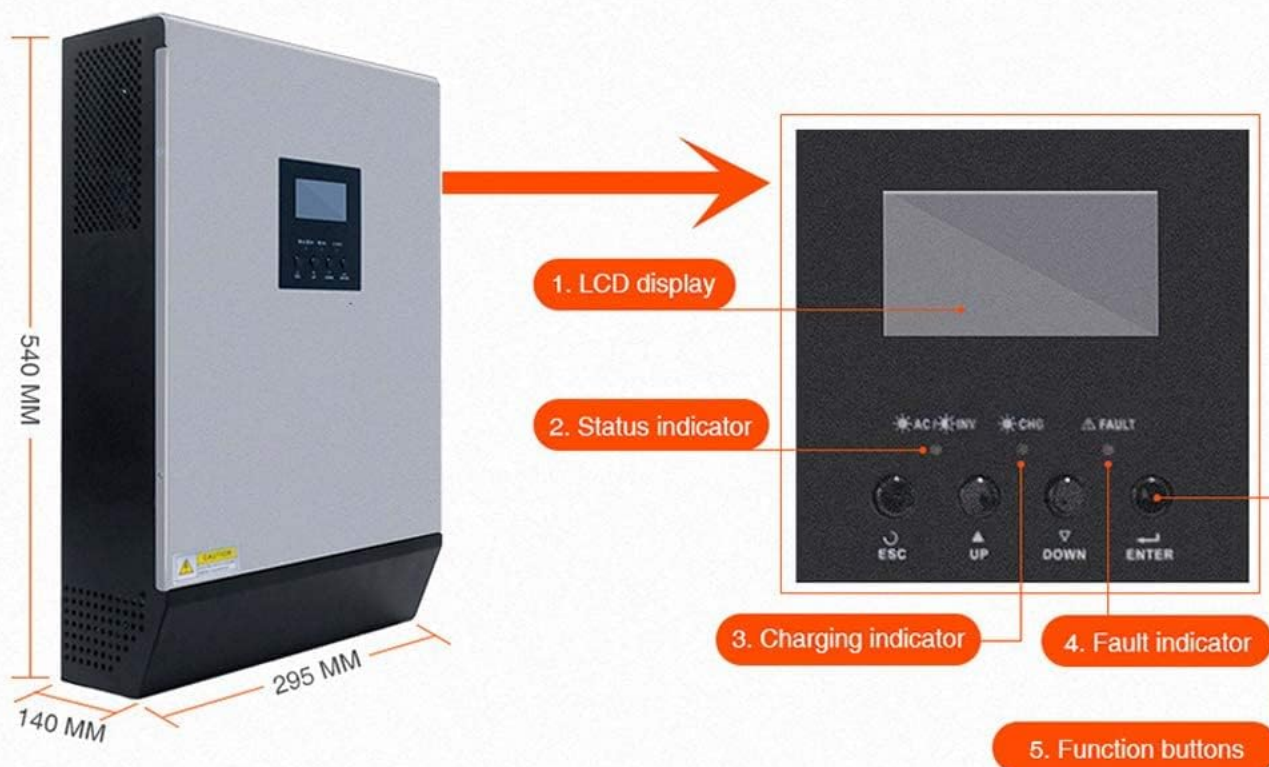
- Pure sine wave output.
- Integrated PWM solar charge controller.
- Configurable input voltage range for various applications (home appliances, personal computers).
- Adjustable AC/Solar charger priority via LCD settings.
- Automatic restart upon AC recovery.
- Comprehensive protection against overload, over-temperature, and short circuits.
- Configurable AC/Solar input priority via LCD settings.
- Compatibility with mains voltage or generator power.
- Smart charging system for optimized battery performance.
- Cold start function.
- Parallel operation capability for up to 6 units (available for 4KVA/5KVA models).

PRODUCT OVERVIEW

Front Panel and Indicators



Product Overview



LED Indicator

LED Indicator			Messages
AC / INV	Green	Solid On	Output is powered by utility in Line mode.
		Flashing	Output is powered by battery or PV in battery mode.
CHG	Green	Solid On	Battery is fully charged.
		Flashing	Battery is charging.
FAULT	Red	Solid On	Fault occurs in the inverter.
		Flashing	Warning condition occurs in the inverter.

Image Description: This image displays the front panel of the inverter, highlighting key user interface elements. It shows the LCD display, status indicators (AC/INV, CHG, FAULT), and five function buttons (ESC, UP, DOWN, ENTER).

LED Indicators

LED Indicator	Color	Messages
AC / INV	Green	Solid On: Output is powered by utility in Line mode. Flashing: Output is powered by battery or PV in battery mode.
CHG	Green	Solid On: Battery is fully charged. Flashing: Battery is charging.
FAULT	Red	Solid On: Fault occurs in the inverter. Flashing: Warning condition occurs in the inverter.

Function Keys

Function Key	Description
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Function Key	Description
ESC	To exit setting mode
UP	To go to previous selection
DOWN	To go to next selection
ENTER	To confirm the selection in setting mode or enter setting mode

Rear Panel Connections

Function Keys

Function Key	Description
ESC	To exit setting mode
UP	To go to previous selection
DOWN	To go to next selection
ENTER	To confirm the selection in setting mode or enter setting mode



Image Description: This image illustrates the rear panel of the inverter, labeling all input and output ports. These include AC Input, RS232 Port, PV Input, Power Switch, Circuit Breaker, AC Output, Dry Contact (Genset Starter), and Battery Input.

1. AC Input
2. RS232 Port (Communication)
3. PV Input (Solar Panel Connection)
4. Power Switch
5. Circuit Breaker
6. AC Output

7. Dry Contact (Genset Starter)
8. Battery Input

SETUP AND INSTALLATION

System Diagram

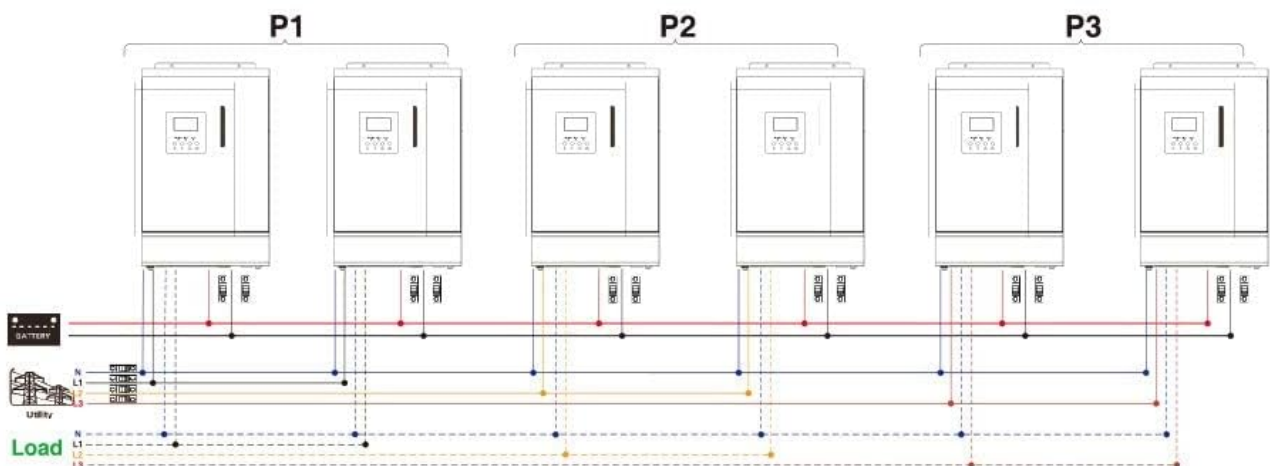


Parallel Function

Parallel Operation in Single phase
Six inverters in parallel
Power Connection



Parallel Operation in 3 phase
Six inverters in parallel
Power Connection



System Diagram

OFF-GRID SYSTEM

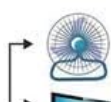




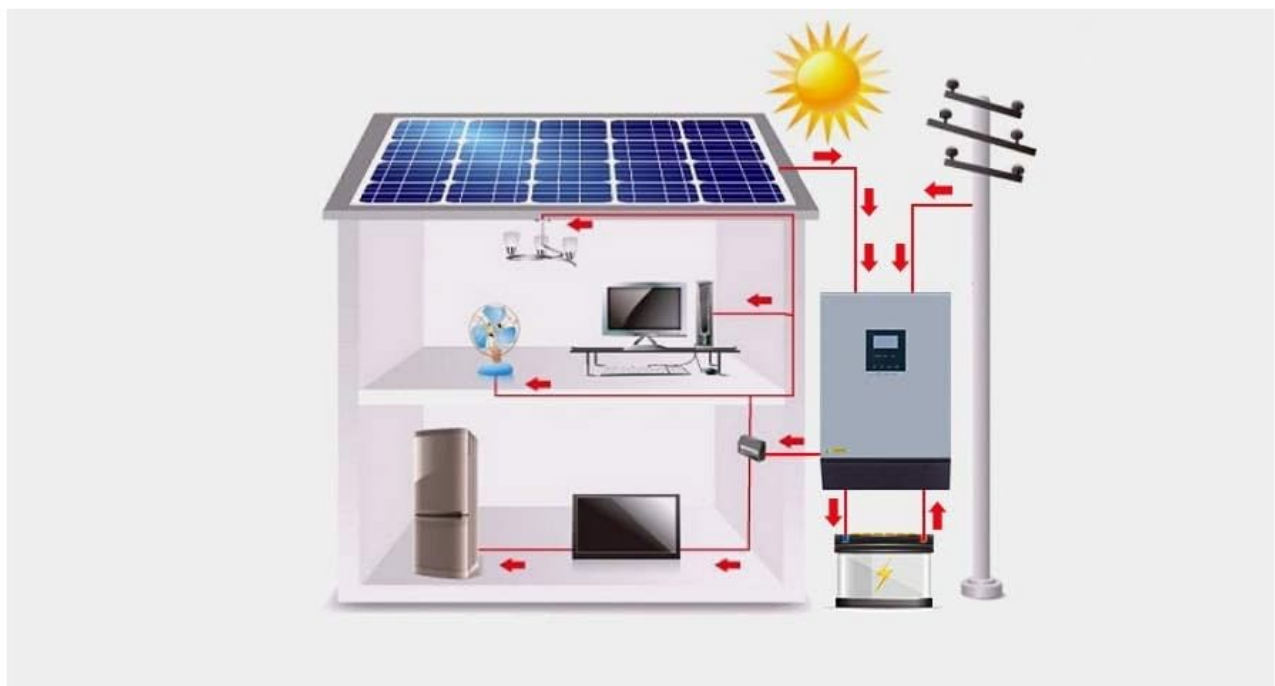
Image Description: This diagram illustrates two main concepts: parallel operation for single-phase and three-phase systems, showing how multiple inverters connect to a load. It also includes a system diagram for an off-grid setup, detailing connections between PV panels, generator, utility, battery, inverter, and home appliances.

The inverter can be integrated into an off-grid system as shown in the diagram. Ensure all connections are made securely and according to local electrical codes.

Parallel Function

The 5KVA model supports parallel operation for increased power output or for three-phase systems. Up to 6 units can be connected in parallel. Refer to the system diagram for single-phase and three-phase parallel connection examples.

PV Connection



When selecting proper PV modules, please be sure to consider below parameters:

1. Open circuit Voltage (Voc) of PV modules not exceeds max. PV array open circuit voltage of inverter.
2. Open circuit Voltage (Voc) of PV modules should be higher than min. battery voltage.

INVERTER MODEL	ISolar SPL 5K
Maximum PV Array Power	2400W

Max. PV Array Open Circuit Voltage	90VCD	
Maximum Solar Charge Current	50A	
Maximum Power (Pmax)	200W	Max. PV module numbers in series
Max. Power Voltage Vmpp(V)	30.9V	$2 \times 30.9V \approx 60 \sim 72VDC$
Max. Power Current Impp(A)	8.42A	PV module numbers in parallel
Open Circuit Voltage Voc(V)	37.7V	$6 \times 8.42 < 50A$
Short Circuit Current Isc(A)	8.99A	Total PV module numbers $2 \times 6 = 12$



Battery Connection

5KVA model supports 48VDC system model and at least 200Ah capacity battery for 5KVA model.

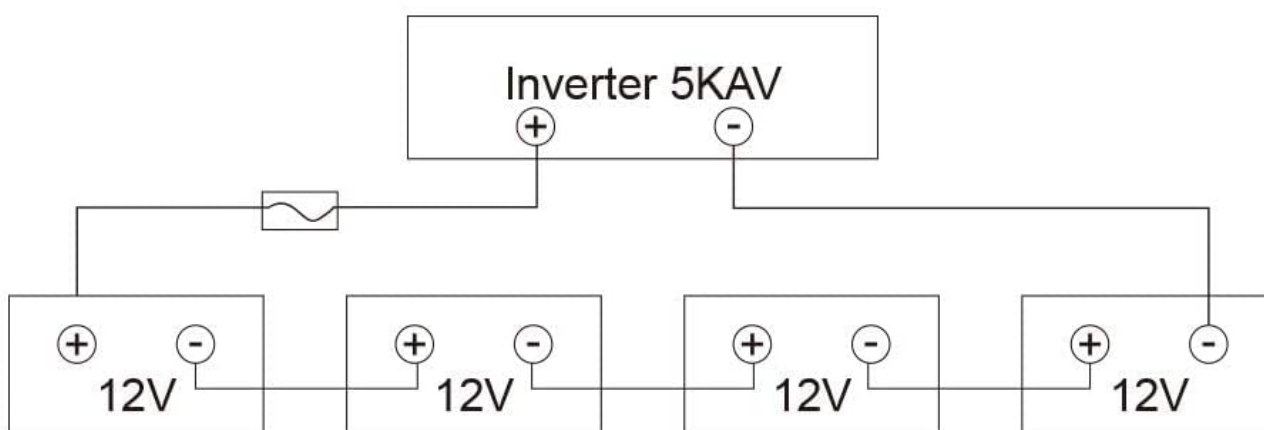


Image Description: This image provides guidance on connecting PV panels to the inverter. It includes a diagram showing solar panels on a roof connected to the inverter, which then powers household appliances. Below the diagram, there's a table detailing PV module selection criteria for the iSolar SPL 5K model, including maximum PV array power, open circuit voltage, solar charge current, and maximum power (Pmax).

When selecting appropriate PV modules, consider the following:

- The Open Circuit Voltage (Voc) of PV modules should not exceed the maximum PV array open circuit voltage of the inverter (90VDC).
- The Open Circuit Voltage (Voc) of PV modules should be higher than the minimum battery voltage (48VDC).

iSolar SPL 5K PV Configuration Guidelines

Parameter	Value	Notes
Maximum PV Array Power	2400W	
Max. PV Array Open Circuit Voltage	90VCD	
Maximum Solar Charge Current	50A	
Maximum Power (Pmax)	200W	Max. PV module numbers in series
Max. Power Voltage Vmpp(V)	30.9V	$2 \times 30.9V \approx 60 \sim 72VDC$
Max. Power Current Impp(A)	8.42A	PV module numbers in parallel
Open Circuit Voltage Voc(V)	37.7V	Total PV module numbers
Short Circuit Current Isc(A)	8.89A	$2 \times 6 = 12$

Battery Connection



PV Connection



When selecting proper PV modules, please be sure to consider below parameters:

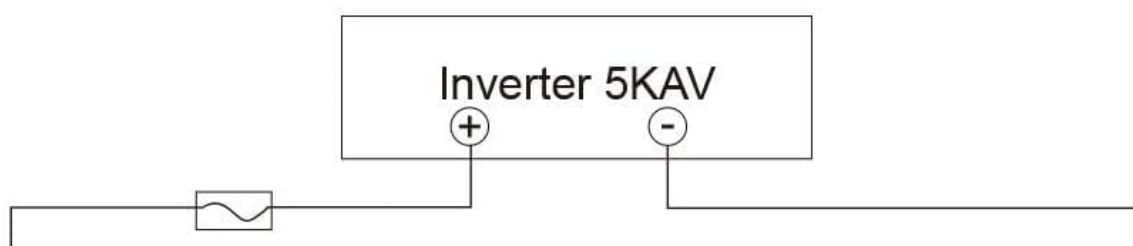
1. Open circuit Voltage (Voc) of PV modules not exceeds max. PV array open circuit voltage of inverter.
2. Open circuit Voltage (Voc) of PV modules should be higher than min. battery voltage.

INVERTER MODEL	ISolar SPL 5K	
Maximum PV Array Power	2400W	
Max. PV Array Open Circuit Voltage	90VCD	
Maximum Solar Charge Current	50A	
Maximum Power (Pmax)	200W	Max. PV module numbers in series $2 \times 30.9V \approx 60 \sim 72VDC$
Max. Power Voltage Vmpp(V)	30.9V	
Max. Power Current Impp(A)	8.42A	PV module numbers in parallel $6 \times 8.42 < 50A$ Total PV module numbers $2 \times 6 = 12$
Open Circuit Voltage Voc(V)	37.7V	
Short Circuit Current Isc(A)	8.99A	



Battery Connection

5KVA model supports 48VDC system model and at least 200Ah capacity battery for 5KVA model.



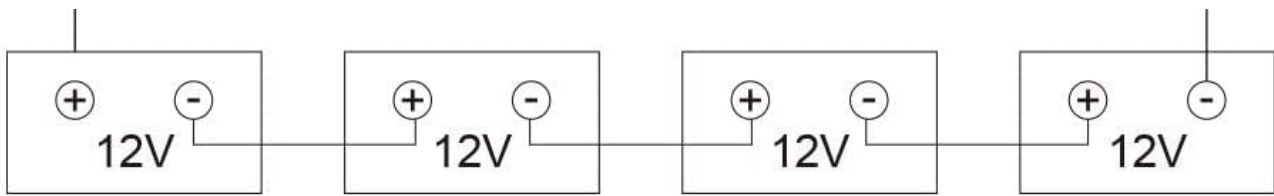


Image Description: This image shows a diagram for connecting batteries to the 5KVA inverter. It illustrates four 12V batteries connected in series to achieve the required 48VDC system voltage for the inverter.

The 5KVA model supports a 48VDC battery system. It is recommended to use batteries with at least 200Ah capacity for optimal performance with the 5KVA model. Ensure correct polarity when connecting batteries.

OPERATING INSTRUCTIONS

After completing all physical connections (PV, Battery, AC Input, AC Output), ensure the power switch on the rear panel is in the OFF position before connecting to power sources. Once all connections are verified, turn on the power switch.

LCD Display and Settings

The comprehensive LCD display allows users to configure various operational parameters. Use the **ESC**, **UP**, **DOWN**, and **ENTER** buttons to navigate through the menu and adjust settings such as:

- Battery charging current.
- AC/Solar charger priority.
- Acceptable input voltage range (for personal computers or home appliances).
- AC/Solar input priority.

Refer to the detailed product manual (physical copy) for a complete list of LCD settings and their functions.

MAINTENANCE

Regular maintenance ensures the longevity and optimal performance of your inverter. Always disconnect all power sources before performing any maintenance.

- **Cleaning:** Keep the inverter's ventilation openings clear of dust and debris to ensure proper airflow. Use a dry cloth to clean the exterior. Do not use liquid cleaners.
- **Connections:** Periodically check all electrical connections (battery, PV, AC input/output) for tightness and corrosion. Loose connections can lead to overheating or system malfunction.
- **Battery Health:** Monitor battery voltage and performance. Ensure batteries are maintained according to their manufacturer's guidelines.
- **Environment:** Ensure the inverter is operating within its specified temperature and humidity ranges. Avoid direct sunlight and excessive moisture.

TROUBLESHOOTING

This section provides solutions to common issues you might encounter. For problems not listed here, please contact customer support.

Common Issues and Solutions

- **Inverter not turning on:**
 - Check if the power switch is in the ON position.

- Verify battery connections and ensure battery voltage is sufficient (48VDC).
- Check the circuit breaker on the rear panel.

- **No AC output:**

- Check for overload conditions. Reduce the load if necessary.
- Verify AC output connections.
- Check the FAULT indicator. If solid red, a fault has occurred.

- **Battery not charging:**

- Ensure PV panels are connected correctly and receiving sunlight.
- Check AC input connection if AC charging is enabled.
- Verify battery charging current settings via the LCD.
- Check the CHG indicator. If not flashing, charging is not active.

- **FAULT indicator is ON/Flashing:**

- A solid red light indicates a fault. Refer to the full manual for specific fault codes if available on the LCD.
- A flashing red light indicates a warning. Check for conditions like over-temperature or minor voltage fluctuations.
- Disconnect all power, wait a few minutes, and restart the inverter. If the fault persists, contact support.

SPECIFICATIONS



PWM 5KVA Solar Inverter

- ✓ **4000W** Rated Power
- ✓ **48V** Battery Voltage
- ✓ **50A** Charging Current
- ✓ **60A** AC Charger
- ✓ Max **90VDC** PV Input
- ✓ Max **2400W** PV Array Power
- ✓ MPP Range @ Operating Voltage **60~72VDC**
- ✓ **Parall up to 6 units**



Max PV Input
90VDC



Max Output Power
4000W, Pure Sine Wave



Battery Voltage
48VDC



Genset Starter
Yes, Dry Contact



Output Voltage
230 VAC



Solar Charge Current
50A



Parallel Support
Yes, up to 6



AC Charge Current
60A



Communication
USB, RS232

Image Description: This image provides a summary of the PWM 5KVA Solar Inverter's key specifications. It lists 4000W Rated Power, 48V Battery Voltage, 50A Charging Current, 60A AC Charger, Max 90VDC PV Input, Max 2400W PV Array Power, MPP Range @ Operating Voltage 60~72VDC, and Parallel capability up to 6 units.

Parameter	Value
Rated Power	5000VA / 4000W
AC Output Voltage	230VAC

Parameter	Value
Selectable Voltage Range (Personal Computers)	170-280 VAC
Selectable Voltage Range (Home Appliances)	90-280 VAC
Frequency Range	50Hz/60Hz (Auto Sensing)
AC Voltage Regulation (Batt. Mode)	230VAC±5%
Surge Power	10000VA
Efficiency (Peak)	93%
Transfer Time (Personal Computer)	10ms
Transfer Time (Home Appliances)	20ms
Waveform	Pure sine wave
Battery Voltage	48VDC
Floating Charge Voltage	54VDC
Overcharge Protection	60VDC
Maximum AC Charge Current	60A
Maximum PV Array Open Circuit Voltage	90VDC
Maximum Solar Charge Current	50A
Maximum PV Array Power	2400W
MPP Range @ Operating Voltage	60-72VDC
Standby Power Consumption	2W
Dimensions (D*W*H)	128 x 272 x 355 mm
Net Weight	9.8 kgs
Communication Ports	USB, RS232
Parallel Support	Up to 6 units (4KVA/5KVA models only)

WARRANTY INFORMATION

This product is covered by a standard manufacturer's warranty against defects in materials and workmanship. The warranty period typically begins from the date of purchase. Please retain your proof of purchase for warranty claims. The warranty does not cover damages resulting from:

- Improper installation or operation not in accordance with this manual.
- Unauthorized modifications or repairs.
- Accidental damage, misuse, abuse, or neglect.
- Natural disasters or external factors beyond the manufacturer's control.

For specific warranty terms and conditions, please refer to the warranty card included with your product or contact the

manufacturer directly.

CUSTOMER SUPPORT

If you require technical assistance, have questions about installation, or need to report a problem, please contact our customer support team.

Please have the following information ready when contacting support:

- Product Model: **inBEKEA 5KVA Solar Hybrid Inverter**
- Date of Purchase
- Detailed description of the issue
- Any error messages displayed on the LCD

Contact information for support can typically be found on the product packaging, the manufacturer's official website, or the warranty card.