



3600W bidirectional inverter Specification

Product Model: ZI48A-3K6W

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Fujian Geekey Technology LTD

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1. Scope of application

This specification applies to the ZI48A_3K6W 3600W bidirectional inverter produced by Fujian Zhenge Technology Co., Ltd., and specifies its performance indicators, functional features, user instructions, and safety precautions.

The ZI48A_3K6W is a 3600W bidirectional inverter with integrated charging and discharging capabilities, capable of efficient conversion between DC and AC power. With sufficient power, this product offers strong load adaptability and compatibility, making it suitable for household electricity use, portable outdoor power sources, emergency power during outages, UPS systems, charging of high-capacity battery packs, and various other scenarios. It is compatible with most appliances on the market, providing stable and reliable power supply.

2. Product model

The ZI48A_3K6W is a bidirectional inverter with pure sine wave AC output capability, providing high-quality AC power. It can also be used as a high-power fast charger, supporting flexible battery charging and discharging mode switching. In this specification, the term "product" specifically refers to the ZI48A_3K6W bidirectional inverter manufactured by our company. The meaning of its model number is explained as follows:

i : 1 letter, "Z" is the abbreviation of the company name, representing Zhenge Technology Co., Ltd.

ii : 1 letter, "I" indicates that the product type is a bidirectional inverter

iii : 2 digits, "48" represents the rated input voltage of 48V

iv : 1 letter, "A" indicates the output voltage RMS value is 120VAC, where "A" is 120VAC and "B" is 220VAC

v : 3 characters, "3K6W" represents a rated output power of 3600W

3. Specifications

3.1 Inverter Mode

Parameters	Conditions	Specifications	Unit
DC Input Voltage Range	Configurable	32 – 64	VDC

AC Output Voltage	Rated Load	120 ± 10%	VAC
Output Frequency	Adjustable	50 ± 1% / 60 ± 1%	Hz
Peak Output Power	Duration ≤ 10ms	6000	W
Rated Output Power	Continuous Operation	3600	W
Maximum Conversion Efficiency	Typical Conditions	≥ 90%	%
Output Voltage THD	Resistive Load	< 5%	—

3.2 Charging Mode

Parameter	Condition	Specification	Unit
AC Input Voltage Range	—	96-144	VAC
DC Output Voltage Range	Configurable	32-64	VDC
Maximum Charging Current	Adjustable	30	A
Charging Current Adjustment Range	—	0-30	A
Maximum Charging Power	—	2000	W
Input Power Factor Rated Load	Rated Load	> 0.99	—
Charging Efficiency	Typical Condition	≥ 90%	%

3.3 Protection Functions

Protection Type	Trigger Condition	Response Mechanism
Short-Circuit Protection	Output Short Circuit	Delay 5s, automatic retry; locks after 3 failures, manual restart required
Overload Protection	> 3600W	Shutdown after 5s; > 6000W, shutdown within 10ms
Overvoltage Protection	DC Input > 68V or AC Output > 132V V	Automatically cuts off output
Undervoltage Protection	DC Input < 30V	Automatically cuts off output
Overtemperature Protection	Heatsink Temperature ≥ 65 ° C	Shutdown
	Transformer Temperature ≥ 70 ° C	Charging derating; ≥ 90 ° C Shutdown
Surge Protection	Lightning/ Switching Transients	Built-in MOV and TVS suppression

3.4 Working Environment

Project	Parameters
Operating Temperature	-20°C ~ +50°C
Storage Temperature	-20°C ~ +85°C
Operating Humidity	20% ~ 90% RH
Storage Humidity	10% ~ 90% RH

4. Functional characteristics

4.1 Flexible Charging and Discharging Switching

Implements a shared hardware circuit for both charging and discharging, supports bidirectional energy flow, with fast switching response and high space utilization.

4.2 Fully Isolated Design

Power circuits and control circuits use electrical isolation design, effectively preventing high voltage from entering the control end, enhancing system safety and stability.

4.3 Pure Sine Wave Output

Outputs a clean sine wave with total harmonic distortion (THD) <5%, compatible with precision electronic devices, avoiding interference or damage.

4.4 High-Efficiency Energy Conversion

Equipped with advanced soft-switching quasi-resonant technology to achieve nearly lossless switching, greatly reducing electromagnetic interference and temperature rise, significantly lowering energy loss.

4.5 Soft Start Function

Both charging and discharging processes feature a soft start mechanism, effectively suppressing inrush current and protecting the load and system.

4.6 Protection Functions

Supports real-time fault diagnosis and alarms, ensuring safe shutdown in case of abnormalities.

4.7 Self-Check Function

Supports power-on self-check to test sampling circuits, power modules, and key functions, automatically alarming if anomalies are detected.

4.8 Cooling Measures

Built-in temperature-controlled fan and large heat sinks, with automatic fan control based on temperature, achieving efficient cooling and low-noise operation.

4.9 Remote Monitoring

Supports RS485 interface with standard Modbus protocol, allowing remote parameter setting and status monitoring.

4.10 Firmware Upgrade

The device supports firmware upgrades via the reserved communication interface through a host computer. The upgrade process features breakpoint resume and verification mechanisms to ensure safe and reliable updates.

5. Instructions for use

5.1 Discharge process

1. Connect a battery pack within the voltage range of 32VDC-64VDC and check if the battery pack is functioning properly.
2. According to the wiring diagram below, connect the battery positive to the PCBA at "**1** Battery Positive" and the battery negative to "**2** Battery Negative."
3. Connect the AC load positive to **5** AC Output L and the negative to **4** AC Output N.
4. Connect the "**3** 485 Screen" as shown in the picture and turn it on. Connect **11** External NTC and **10** External NTC.
5. Start inverter mode via 485 communication.

5.2 Charging process

1. Connect a battery pack with an input voltage range of 32VDC–64VDC and check whether the battery pack is functioning properly.
2. According to the wiring diagram below, connect the battery positive to '**1** Battery Positive' on the PCBA and the battery negative to '**2** Battery Negative'.
3. Connect the live (L) and neutral (N) wires of the AC power supply to '**8** AC Input L' and '**7** AC Input N' in the picture, respectively.
4. Connect '**3** 485 Display' as shown in the picture and turn it on. Also, connect the

external NTC sensors '**11** External NTC' and '**10** External NTC'.

5. Connect the AC power supply to start charging.

Related Matters:

1. Be aware that the PCBA has multiple high-voltage areas; do not touch.
2. Even after disconnecting for five minutes, energy stored in the capacitors still exists; do not touch internal components after disconnecting.
3. Ensure that the input DC voltage is less than or equal to the specified maximum voltage. Excessive voltage may damage the equipment.
4. Trickle charge for 3 seconds before charging, then enter different charging modes based on the current battery status.
5. Make sure all six **12**-fan units are properly connected. The fans will start when power exceeds 500W.
6. Ensure both temperature sensors are properly connected, especially that the external temperature sensor is securely installed and does not move.
7. When the inverter is discharging normally and charging is needed, disconnect the load (appliances) before connecting to the mains. There is no need to turn off the inverter during this process. Otherwise, excessive current surge may damage the inverter.
8. When the inverter is charging normally and discharging is needed, disconnect from the mains before connecting the load (appliances). There is no need to turn off the inverter during this process. Otherwise, it may damage the inverter.

5.3 Communication Control

Through the RS485 interface, the standard Modbus protocol is implemented, allowing the setting of parameters for the inverter's operation and the monitoring of data during its operation.

5.4 Fan Control

Start Conditions:

1. Power > 500W
2. Heat sink temperature > 40°C
3. Transformer temperature > 40°C

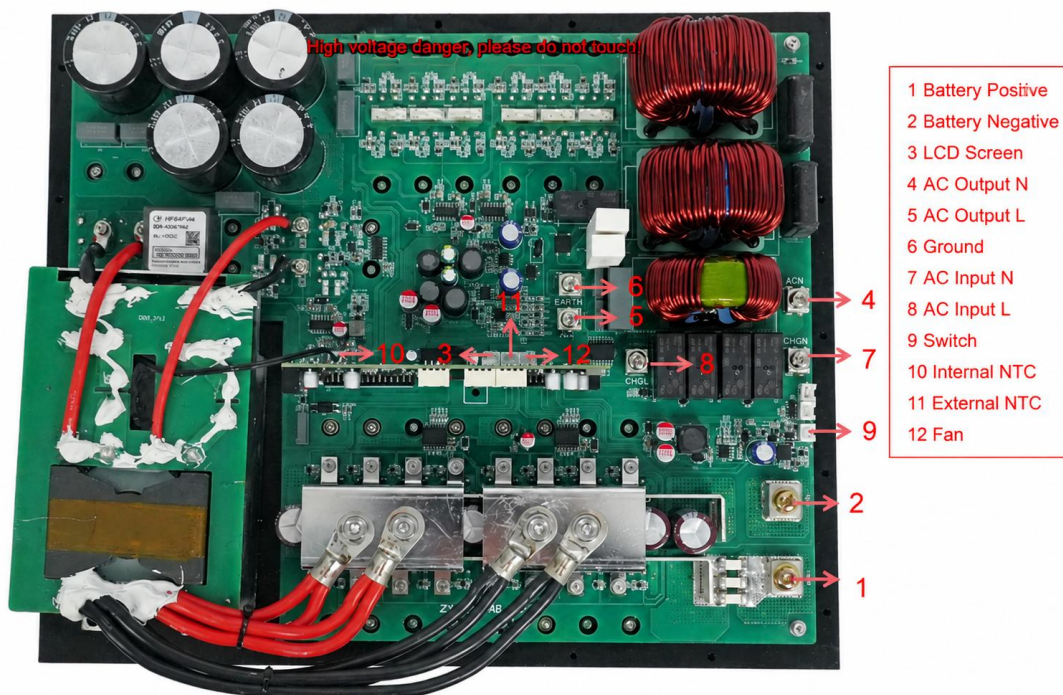
If any of the above conditions are met and sustained for 3 seconds, the fan will start.

Stop Conditions:

1. Power $\leq$ 200W;
2. Heat sink temperature $\leq$ 30°C;
3. Transformer temperature $\leq$ 30°C;

If all three conditions are met simultaneously and sustained for 2 minutes, the fan will stop running.

5.5 Interface definition



5.6 Common Questions and Solutions

The appliance (load) is not working, and the inverter indicator light is red.

Cause	Suggested Solution
Overload	1. Reduce load: Ensure the total power of all operating appliances is less than the rated power of the inverter. 2. Manual recovery: After fault lockout, discharge function needs to be restored via 485 communication commands.

AC Overcurrent	1. Reduce load: Check and reduce the total power of appliances connected on the AC side to ensure it does not exceed limits. 2. Manual recovery: After fault lockout, discharge function needs to be restored via 485 communication commands.
DC Overcurrent	1. Reduce load: Check and reduce DC side load to ensure power is within the rated range. 2. Manual recovery: After fault lockout, discharge function needs to be restored via 485 communication commands.
Overtemperature	1. Immediate shutdown: Turn off all loads and power down the inverter using the button. 2. Sufficient cooling: Move the device to a cool, ventilated place and let it cool for at least 15 minutes. 3. Restart with reduced load: When restarting, connect fewer or lower-power appliances.
Lowtemperature	1. Improve environment: Move the inverter to a warmer place (e.g., indoors). 2. Check sensor: Ensure the temperature sensor (NTC) wiring is secure and undamaged. Note: The rated operating temperature range of this device is -20℃ to 50℃.
Undervoltage	Battery voltage <30V Charge or replace: Immediately charge the battery or replace it with one having a voltage of 32V or above.
Overvoltage	Replace battery: Battery voltage is too high; replace with a battery that meets specifications.
Bus Overvoltage	1. Check input source: Measure battery terminal voltage, ensure it does not exceed the inverter's maximum input voltage. 2. Manual reset: Disconnect the inverter from the battery, wait for 1 minute, then reconnect and restart.
Short Circuit	1. Inspect wiring: Immediately power off the inverter and carefully check all output lines and appliances for short circuits. 2. Reduce load: Remove possibly faulty appliances and try restarting. 3. Recovery mechanisms: - Automatic recovery: If the device detects a short circuit, it will attempt to recover automatically after a 5-second delay. If it fails consecutively, it will lock permanently. - Manual recovery: After lockout, completely disconnect power (disconnect battery) and then power on to restart. - Monitoring period: After successful recovery, the device enters a 10-minute monitoring period; if another short occurs during this period, it will lock immediately.
Internal Device Fault	Return for repair: Internal components may be faulty. Please contact after-sales service or arrange a return for professional inspection and repair.
Excessive Load Power	1. Adjust usage mode: During inverter battery charging, turn off high-power loads or ensure total running load power $\leq 2000W$. 2. Manual recovery: After a fault occurs, discharge function must be restored

	via 485 communication commands.
External Storage Damage	Return for repair: The device's storage unit is abnormal and cannot self-repair; return to the factory for replacement or repair.

During charging, the inverter indicator light is red

Cause	Suggested workaround
Overload	1. Check for Matching: Confirm whether the inverter's power and current output capabilities meet the requirements of the battery system. 2. Manual recovery: resume discharge work through 485 communication.
AC overcurrent	1. Check the charger: Confirm that the rated current of the connected charger does not exceed the set value of the inverter. 2. Manual recovery: resume discharge work through 485 communication.
DC Overcurrent	1. Check the charger: Confirm that the rated current of the connected charger does not exceed the set value of the inverter. 2. Manual recovery: resume discharge work through 485 communication.
Overtemperature	1. Shutdown cooling: Turn off charging and shut down, move the device to a cool place to cool for 15 minutes. 2. Load Mitigation Restart: Retry the start after reducing the possible secondary load.
Low temperature	1. Improve the environment: Move the equipment to an environment with a temperature above -20°C. 2. Check the sensor: Check if the temperature sensor (NTC) connection is reliable. Note: The operating temperature range is -20°C~50°C.
Battery overvoltage	Check mains power: Measure whether the mains input voltage is abnormally too high.
Bus overvoltage	1. Check mains power: Measure whether the mains input voltage is abnormally high. 2. Manual recovery: Disconnect the mains power and battery, wait for one minute and then power on again to start.
Short circuit	1. Troubleshoot the line: Check the wiring of the charging circuit and the load end. 2. Recovery Mechanism: - Automatic recovery: The device automatically retries with a delay of 5 seconds, and locks if it fails multiple times. - Manual recovery: After locking, the power needs to be turned off (disconnect the mains power and battery) and then power on and restart. - Monitoring period: There is a 10-minute monitoring period after recovery, during

	which the short circuit will be directly locked.
Equipment internal fault	return to factory maintenance: contact after-sales service or arrange return to factory inspection and repair.
Excessive load power	1. Reduce the power: If you need to use a load during charging, make sure its total power $\leq 2000W$. 2. Manual recovery: resume discharge work through 485 communication.
External Memory Damage	Return to Factory Repair: Contact after-sales service or arrange a return to factory inspection for repair.
Full Completion	Check Mains Power: If this prompt appears when the battery is not full, check if the mains input voltage is too high.

6. Safety Guidelines

6.1 Precautions

Please read all safety signs before operating.
Make sure to disconnect the power before maintenance.
Install in a dry, ventilated, and level location.
Do not touch internal components while operating.

6.2 Dangerous Operations

Non-professionals are prohibited from disassembling or repairing
Do not reverse the battery polarity or mix different types of batteries
Do not cover the ventilation openings (such as with blankets or cloth)
Do not use damaged power cords

6.3 Safety Warnings

- Electric Shock Hazard
 - Even after the power is turned off, internal capacitors may still carry a charge. Please wait for them to discharge before operating.
 - Power Input
 - Please use a power supply that meets the specifications. When replacing a fuse, use one of the same type.
 - Explosion Risk
- Do not use in flammable or explosive environments.

Appendix

Product Display

