LS-10K-H1 Hybrid Inverter Installation & Commissioning Guide

GUANGXI Energy Technology Co., Ltd.

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Applicable Product: LS-10K-H1 10kW Single-Phase Hybrid Inverter

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⚠ Important Safety Warnings

Please read all contents of this guide carefully before installing, operating, or maintaining this equipment.

Danger Warnings

- ⚡ **High Voltage Hazard**: High voltage DC and AC (up to 600V DC / 230V AC) inside the equipment may cause severe electric shock or death.
- 🔥 **Fire Risk**: Incorrect installation or wiring may cause fire.
- ⚠ **Professional Installation**: This equipment must be installed by licensed electrical engineers or GUANGXI-certified installers.
- 📋 **Comply with Codes**: Installation must comply with local electrical safety codes and grid connection standards.

Safety Precautions

1. **Power Off**: Disconnect all power sources (PV, grid, battery) before installation
2. **Personal Protection**: Wear insulated gloves, safety shoes, and goggles

3. **Tool Inspection**: Use insulated tools and ensure tools are in good condition
4. **Environment Check**: Ensure installation environment is dry with no flammable or explosive materials
5. **Team Work**: Equipment weighs 25kg, recommend two-person handling and installation
6. **Keep Children Away**: Prohibit children from approaching during installation and commissioning

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Pre-Installation Preparation

1. Tool List

Required Tools:

- Phillips screwdriver (PH2)
- Flat screwdriver (5mm)
- Wrench set (8-17mm)
- Electric drill and drill bit (Φ8mm)

- Spirit level
- Tape measure
- Multimeter (DC 600V / AC 300V)
- Insulation resistance tester (500V)
- Crimping pliers (for terminals)

Optional Tools:

- Infrared thermometer
- Clamp meter
- Oscilloscope (for advanced debugging)

2. Material List

Standard Accessories (included in package):

- LS-10K-H1 inverter main unit ×1
- Wall-mount installation bracket ×1
- Expansion bolts M8×60mm ×4
- Wi-Fi antenna ×1
- Quick installation guide ×1

Materials to Prepare:

- PV DC cable (4mm² or 6mm², recommend 6mm²)
- AC cable (4mm² or 6mm², recommend 6mm²)
- Battery DC cable (6mm² or 10mm², select based on battery current)
- MC4 connectors (for PV wiring)
- Wire terminals (OT terminals, compatible with M4 bolts)
- Cable trays and cable ties (for cable management)
- Waterproof tape (for outdoor wiring)

3. Pre-Installation Inspection

Package Inspection

- Check packaging box for damage or moisture
- Verify packing list to confirm all accessories are complete
- Check product nameplate to confirm model and serial number

Equipment Inspection

- Appearance: No obvious scratches, deformation, or damage
- Terminals: No looseness or corrosion
- Display screen: No cracks or damage
- Heatsink: No deformation or blockage

Site Inspection

- Installation wall: Load-bearing capacity ⩾50kg, flatness ⩽5mm
- Ambient temperature: -25°C ~ +60°C
- Relative humidity: ⩽95% (non-condensing)
- Ventilation: Good, no obstruction
- PV modules: Installed and wired
- Battery system: Installed and wired
- Grid connection: Grid connection application and approval completed

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Installation Location Selection

1. Installation Location Requirements

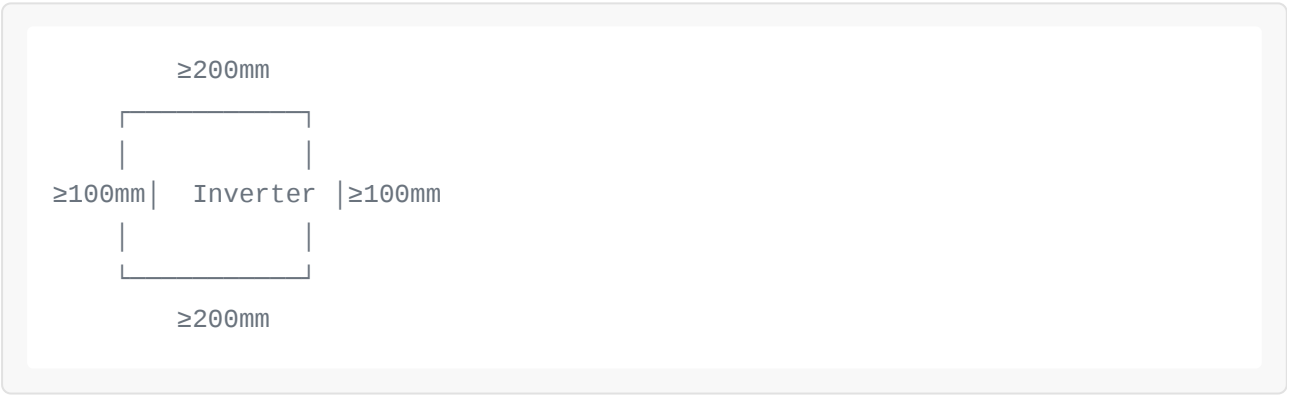
Environmental Requirements

- **Indoor Installation** (recommended):
    - Dry and ventilated room (e.g., garage, storage room, equipment room)

    - Avoid direct sunlight and rain
    - Ambient temperature: -25°C ~ +60°C
    - Relative humidity: ⩽95% (non-condensing)
- **Outdoor Installation** (requires protective cover):
    - Avoid direct sunlight (install under eaves or on north wall)
    - Avoid direct rain
    - Install rain cover or protective box
    - Regularly inspect waterproof sealing

Installation Clearance Requirements

To ensure cooling and maintenance, sufficient clearance must be maintained around the inverter:



- **Left clearance**: ⩾100mm
- **Right clearance**: ⩾100mm
- **Top clearance**: ⩾200mm
- **Bottom clearance**: ⩾200mm
- **Front clearance**: ⩾500mm (for maintenance and operation)

Installation Height

- **Recommended installation height**: 1.2-1.6m from ground (convenient for operation and display viewing)
- **Minimum installation height**: 0.5m from ground (prevent water immersion)
- **Maximum installation height**: 2.0m from ground (convenient for maintenance)

2. Installation Location Prohibitions

Strictly prohibited to install in the following locations:

- ❌ Near flammable or explosive materials
- ❌ Near heat sources (e.g., boilers, radiators)
- ❌ Near strong magnetic or electric fields
- ❌ Corrosive gas environment
- ❌ Dusty or salt spray environment
- ❌ Locations accessible to children
- ❌ Bedrooms or living rooms (operating noise may affect rest)

3. Cable Routing Planning

Plan cable routing before installation:

- **PV cables**: From rooftop modules to inverter, keep straight, avoid excessive length
- **Battery cables**: From battery to inverter, distance ⩽5m (reduce voltage drop)
- **AC cables**: From inverter to distribution box, comply with local electrical codes
- **Communication cables**: From inverter to router (if using wired network)

Cable Routing Principles:

- DC cables and AC cables run separately, spacing ⩾200mm
- Avoid cable crossing or bundling
- Use cable trays to protect cables
- Outdoor cables use UV-resistant sheath

Mechanical Installation

1. Installation Steps

Step 1: Mark Installation Holes

1. Use spirit level to determine horizontal position of installation bracket
2. Mark 4 installation holes on wall:
    - Horizontal spacing: 480mm
    - Vertical spacing: 360mm
3. Use spirit level to check if marks are level

Step 2: Drill Holes

1. Use Φ8mm drill bit to drill holes at marked positions
2. Drilling depth: 60-70mm
3. Clean dust and debris from holes

Step 3: Install Bracket

1. Insert expansion bolts into drilled holes
2. Align installation bracket with bolt holes
3. Tighten bolts with wrench (torque: 15-20N・m)
4. Use spirit level to check if bracket is level

Step 4: Mount Inverter

1. Two people lift inverter and align with installation bracket
2. Hook the hooks on the back of inverter into bracket slots
3. Push inverter downward to ensure hooks are fully engaged
4. Gently shake inverter to check if secure

2. Installation Precautions

- Ensure wall load-bearing capacity ⩾50kg

- Installation bracket must be level, deviation ⩽2°
- Expansion bolts must be tightened to prevent inverter from falling
- Inverter must be installed vertically, no tilting

Electrical Wiring

⚠ Wiring Safety Warnings

- **Power Off**: Disconnect all power sources before wiring
- **Check Voltage**: Use multimeter to confirm no voltage before wiring
- **Correct Polarity**: DC wiring must pay attention to positive and negative poles, reverse connection may damage equipment
- **Tighten Connections**: All terminals must be tightened (torque: 2.5-3.0N・m)
- **Insulation Treatment**: Bare wires must be wrapped with insulation tape

1. Wiring Sequence

Correct wiring sequence:

1. Ground wire (PE)
2. PV input (PV1, PV2)
3. Battery interface (Battery)
4. AC input (Grid)
5. AC output (Load/Backup)

Strictly prohibited to wire in reverse order, otherwise may cause equipment damage or safety accidents.

2. Ground Wire Connection

Grounding is the primary measure to ensure system safety and must be completed first.

Grounding Requirements

- Ground resistance: ⩽4Ω (recommend ⩽2Ω)
- Ground wire specification: ⩾6mm² copper wire
- Grounding method: TN-S or TT system

Wiring Steps

1. Use 6mm² yellow-green ground wire
2. Strip wire end 15mm, crimp OT terminal
3. Connect ground wire to PE terminal at bottom of inverter
4. Tighten bolt (torque: 2.5-3.0N・m)
5. Use insulation resistance tester to test ground resistance

3. PV Input Wiring

Pre-Wiring Inspection

1. Confirm PV modules have completed series wiring
2. Use multimeter to measure open-circuit voltage (Voc):
    - Single string voltage: 150-550V DC
    - Must not exceed 600V DC
3. Confirm correct polarity (red is positive, black is negative)

Wiring Steps

1. Open PV wiring cover at top of inverter
2. Connect PV positive cable to PV1+ terminal
3. Connect PV negative cable to PV1- terminal
4. If there is a second string, connect to PV2+ and PV2- terminals
5. Tighten terminal bolts (torque: 2.5-3.0N・m)
6. Close wiring cover

Cable Specifications

- **Recommended specification**: 6mm² PV-specific DC cable
- **Minimum specification**: 4mm² (only for short distance, ⩽10m)
- **Maximum current**: 13A per MPPT

4. Battery Interface Wiring

Pre-Wiring Inspection

1. Confirm battery system installation and wiring completed
2. Use multimeter to measure battery voltage:
    - Battery voltage: 150-550V DC
    - Must not exceed 600V DC
3. Confirm battery BMS communication interface type (CAN or RS485)

Wiring Steps

1. Open Battery wiring cover at top of inverter
2. Connect battery positive cable to BAT+ terminal
3. Connect battery negative cable to BAT- terminal
4. Tighten terminal bolts (torque: 2.5-3.0N・m)
5. Connect BMS communication wire (CAN or RS485)
6. Close wiring cover

Cable Specifications

- **Recommended specification**: 10mm² battery-specific DC cable
- **Minimum specification**: 6mm² (only for short distance, ⩽3m)
- **Maximum current**: 25A

5. AC Input Wiring (Grid)

Pre-Wiring Inspection

1. Confirm grid voltage and frequency meet requirements:
    - Voltage: 230V AC ±10% (configurable 220V/240V)
    - Frequency: 50Hz or 60Hz
2. Confirm distribution box has installed circuit breaker (recommend 40A)
3. Use multimeter to measure grid voltage

Wiring Steps

1. Open AC wiring cover at top of inverter
2. Connect grid live wire (L) to Grid_L terminal
3. Connect grid neutral wire (N) to Grid_N terminal
4. Connect grid ground wire (PE) to Grid_PE terminal
5. Tighten terminal bolts (torque: 2.5-3.0N・m)
6. Close wiring cover

6. AC Output Wiring (Load/Backup)

Wiring Steps

1. Connect load live wire (L) to Load_L terminal
2. Connect load neutral wire (N) to Load_N terminal
3. Connect load ground wire (PE) to Load_PE terminal
4. Tighten terminal bolts (torque: 2.5-3.0N・m)
5. Close wiring cover

System Configuration

1. Initial Startup

Startup Sequence

1. Close all DC and AC switches
2. Turn on battery switch
3. Turn on PV DC switch
4. Turn on grid AC switch
5. Inverter automatically powers on and performs self-check

Startup Display

- Power LED: Green (normal operation)
- Grid LED: Green (grid connected)
- Battery LED: Green (battery connected)
- Solar LED: Green (PV connected)
- Fault LED: Off (no fault)
- Comm LED: Flashing (communicating)

2. Wi-Fi Configuration

Method 1: APP Configuration (Recommended)

1. Download “GUANGXI Smart Energy” APP
2. Register and login account
3. Click “Add Device”
4. Scan QR code on inverter or enter serial number
5. Connect to inverter Wi-Fi hotspot (SSID: GUANGXI-XXXXXX)
6. Select home Wi-Fi network and enter password
7. Wait for connection success

Method 2: Web Configuration

1. Connect phone/computer to inverter Wi-Fi hotspot
2. Open browser and visit: http://192.168.10.1
3. Login (default username: admin, password: admin)
4. Enter “Network Settings”
5. Select home Wi-Fi network and enter password
6. Click “Save” and wait for connection success

3. Operating Mode Configuration

Self-Consumption Priority Mode

- **Application**: Maximize self-consumption rate
- **Configuration**: APP → Settings → Operating Mode → Self-Consumption Priority
- **Parameters**:
  - Battery charge power: 100% (10kW)
  - Battery discharge power: 100% (10kW)
  - Grid export: Enabled
  - Backup reserve: 20%

Backup Priority Mode

- **Application**: Ensure backup capacity
- **Configuration**: APP → Settings → Operating Mode → Backup Priority
- **Parameters**:
  - Battery charge power: 100% (10kW)
  - Battery discharge power: 50% (5kW)
  - Grid export: Disabled
  - Backup reserve: 80%

Time-of-Use Arbitrage Mode

- **Application**: Leverage peak-valley price difference

- **Configuration**: APP → Settings → Operating Mode → TOU Arbitrage
- **Parameters**:
  - Peak period: 17:00-22:00 (battery discharge)
  - Off-peak period: 23:00-07:00 (grid charge battery)
  - Mid-peak period: Other times (solar priority)

Commissioning & Testing

1. Functional Testing

PV Generation Test

1. Check PV input voltage and current on APP
2. Confirm PV power matches actual sunlight conditions
3. Observe MPPT efficiency (should be >99%)

Battery Charge/Discharge Test

1. Manually trigger battery charging (APP → Manual Control → Charge)
2. Observe battery charge power and current
3. Manually trigger battery discharging (APP → Manual Control → Discharge)
4. Observe battery discharge power and current

Grid Export Test

1. When PV power > load power, observe grid export power
2. Check if grid export meter is counting
3. Confirm grid export power matches APP display

Backup Power Test

1. Manually trigger backup mode (APP → Manual Control → Backup)
2. Observe backup switching time (<10ms)

3. Check if loads continue operating normally
4. Restore grid and observe automatic switching back

2. Safety Testing

Insulation Resistance Test

- PV+ to Ground: ⩾1MΩ
- PV- to Ground: ⩾1MΩ
- BAT+ to Ground: ⩾1MΩ
- BAT- to Ground: ⩾1MΩ

Ground Resistance Test

- Ground resistance: ⩽4Ω (recommend ⩽2Ω)

Protection Function Test

- Overvoltage protection: Simul ate overvoltage, inverter should shut down
- Undervoltage protection: Simulate undervoltage, inverter should shut down
- Overcurrent protection: Simulate overcurrent, inverter should limit current
- Over-temperature protection: Simulate over-temperature, inverter should derate or shut down

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Troubleshooting

Common Faults and Solutions

Fault Code	Fault Description	Possible Cause	Solution
E001	Grid overvoltage	Grid voltage too high	Wait for grid voltage to return to normal
E002	Grid undervoltage	Grid voltage too low	Wait for grid voltage to return to normal
E003	Grid overfrequency	Grid frequency too high	Wait for grid frequency to return to normal
E004	Grid underfrequency	Grid frequency too low	Wait for grid frequency to return to normal
E005	PV overvoltage	PV voltage >600V	Reduce PV string length
E006	PV undervoltage	PV voltage <150V	Increase PV string length or wait for sunlight
E007	Battery overvoltage	Battery voltage too high	Check battery BMS settings
E008	Battery undervoltage	Battery voltage too low	Charge battery or check BMS
E009	Overcurrent	Output current too high	Reduce load or check for short circuit
E010	Over-temperature	Internal temperature too high	Check ventilation and cooling
E011	Insulation fault	Insulation resistance <1MΩ	Check PV/battery insulation
E012	Arc fault	AFCI detected arc	Check PV wiring for loose connections

Fault Code	Fault Description	Possible Cause	Solution
E013	Communication fault	BMS communication lost	Check BMS communication cable
E014	Fan fault	Cooling fan malfunction	Replace fan
E015	EEPROM fault	Memory error	Contact technical support

Maintenance

1. Regular Maintenance Schedule

Maintenance Item	Frequency	Content
Visual Inspection	Monthly	Check for abnormal sounds, odors, or appearance damage
Cleaning	Quarterly	Clean heatsink dust and debris
Connection Check	Semi-annually	Check terminal tightness and cable condition
Performance Test	Annually	Test efficiency, protection functions, and insulation resistance
Professional Inspection	Every 2 years	Comprehensive inspection by certified technician

2. Cleaning Procedures

1. **Power Off**: Disconnect all power sources
2. **Wait**: Wait 10 minutes for internal capacitors to discharge
3. **Clean**: Use soft brush or compressed air to clean heatsink
4. **Inspect**: Check for loose or corroded connections
5. **Power On**: Restore power and check operation

3. Component Replacement

Fan Replacement

1. Power off and wait 10 minutes
2. Remove fan cover screws
3. Disconnect fan power cable
4. Remove old fan and install new fan
5. Connect fan power cable
6. Install fan cover and power on

Display Screen Replacement

1. Power off and wait 10 minutes
2. Remove display screen screws
3. Disconnect display cable
4. Remove old screen and install new screen
5. Connect display cable
6. Install screen and power on

Contact Information

Technical Support

Global Technical Support Center
Phone: +86-400-XXXX-XXXX (China)
Phone: +1-800-XXX-XXXX (North America)
Phone: +44-800-XXX-XXXX (Europe)
Email: support@guangxi-solar.com
Online Support: www.guangxi-solar.com/support

Emergency Support

24⁄7 Emergency Hotline

Phone: +86-771-XXXX-XXXX
Email: emergency@guangxi-solar.com

Disclaimer

This installation guide is for reference only. Actual installation must comply with local electrical safety codes and grid connection standards. GUANGXI is not responsible for any loss or damage caused by installation not in accordance with this guide.

Installation must be performed by licensed electrical engineers or GUANGXI-certified installers. Unauthorized installation may void warranty.

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