

LS-10K-H1 Hybrid Inverter Product Manual

GUANGXI Energy Technology Co., Ltd.

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

Table of Contents

- [1. Product Overview](#)
 - [2. Key Features](#)
 - [3. Technical Specifications](#)
 - [4. Product Appearance & Dimensions](#)
 - [5. Operating Principles](#)
 - [6. Safety Features](#)
 - [7. Certifications & Standards](#)
 - [8. Warranty & Service](#)
 - [9. Ordering Information](#)
 - [10. Contact Information](#)
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Product Overview

The LS-10K-H1 is GUANGXI' s next-generation single-phase hybrid inverter designed specifically for residential solar-plus-storage systems. This product integrates photovoltaic inversion, energy storage management, and intelligent energy dispatch functions, supporting three-way energy input/output from solar, grid, and battery to provide homeowners with efficient, reliable, and economical clean energy solutions.

The LS-10K-H1 employs advanced dual-MPPT technology with a maximum conversion efficiency of 97.6%, supporting a wide battery voltage range of 150-550V DC. Built-in AFCI arc fault protection and rapid shutdown functions ensure safe system operation. The product has passed major global market certifications including CE, UL1741, IEC62109, and VDE, enabling worldwide deployment.

Typical Application Scenarios

- **Residential Villas** - Provide clean energy for detached homes, reducing electricity bills
 - **Rural Off-Grid** - Offer independent power solutions for remote areas
 - **Small Commercial** - Supply economical and reliable power for small shops, clinics, and offices
 - **Backup Power Systems** - Ensure uninterruptible power supply for critical loads
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Key Features

1. High-Efficiency Energy Conversion

The LS-10K-H1 employs advanced three-level topology and optimized MPPT algorithms, achieving a maximum conversion efficiency of 97.6% and European efficiency of 97.3%. Wide input voltage range (150-550V DC) accommodates various PV modules and battery systems. Dual-MPPT design supports string connection from different orientations or tilt angles, maximizing power generation.

2. Flexible Energy Storage Integration

Supports lithium battery connection with a wide voltage range of 150-550V, compatible with mainstream battery types including LFP (Lithium Iron Phosphate) and NCM (Nickel Cobalt Manganese). Maximum charge/discharge power of 10kW enables rapid charging and discharging. Built-in BMS communication interface (CAN/RS485) monitors battery status in real-time, ensuring safe operation.

3. Intelligent Energy Management

Built-in AI intelligent energy management system supports multiple operating modes including self-consumption priority, backup priority, and time-of-use arbitrage. Automatically optimizes charge/discharge strategies based on weather forecasts, usage patterns, and electricity price fluctuations to maximize economic benefits. Supports remote monitoring and OTA firmware upgrades for continuous system performance optimization.

4. Fast Backup Power Switching

Automatically switches to backup mode within 10 milliseconds during power outages, imperceptible to household appliances. Supports whole-home load power supply, including air conditioning, refrigerators, lighting, and security systems. Backup capacity can be flexibly configured according to needs, ensuring continuous operation of critical loads.

5. Comprehensive Safety Protection

Built-in AFCI arc fault protection detects and shuts down arc faults within 0.5 seconds. Supports rapid shutdown function, reducing system voltage to safe levels (<80V) within 30 seconds in emergencies. Multiple electrical protections including overvoltage, undervoltage, overcurrent, short circuit, over-temperature, and insulation resistance detection ensure safe system operation.

6. Compact and Elegant Design

Product dimensions of only 540×420×180mm and weight of 25kg, wall-mounted installation saves space. IP65 protection rating adapts to various indoor and outdoor

installation environments. Operating noise below 25dB, quiet as a library. Streamlined appearance design integrates perfectly with modern home environments.

Technical Specifications

PV Input Parameters

Parameter	Specification
Max DC Input Power	13kW
Max Input Voltage	600V DC
MPPT Operating Voltage Range	150-550V DC
Start-up Voltage	180V DC
Number of MPPT Trackers	2
Max Input Current per MPPT	13A
Short Circuit Current per MPPT	20A
Max MPPT Efficiency	99.9%

AC Output Parameters

Parameter	Specification
Rated Output Power	10kW
Max Output Power	11kW (10 minutes)
Rated Output Voltage	230V AC (configurable 220V/240V)
Output Voltage Range	184-276V AC
Rated Output Frequency	50Hz/60Hz (configurable)
Output Frequency Range	45-55Hz / 55-65Hz
Rated Output Current	43.5A
Power Factor	>0.99
Total Harmonic Distortion (THD)	%
Max Conversion Efficiency	97.6%
European Efficiency	97.3%

Battery Parameters

Parameter	Specification
Battery Type	Lithium Battery (LFP/NCM)
Battery Voltage Range	150-550V DC
Max Charge Power	10kW
Max Discharge Power	10kW
Max Charge Current	25A
Max Discharge Current	25A
Battery Communication Interface	CAN / RS485
Battery Protection	Overcharge, overdischarge, overcurrent, over-temperature protection

Backup Power Parameters

Parameter	Specification
Backup Switching Time	<10ms
Backup Output Power	10kW
Backup Output Voltage	230V AC \pm 5%
Backup Output Frequency	50Hz/60Hz \pm 0.5%
Backup Mode	Whole-home backup / Critical load backup

Protection Functions

Protection Type	Description
AFCI Arc Fault Protection	Detects and shuts down arcs within 0.5 seconds
Rapid Shutdown	Reduces to safe voltage (<80V) within 30 seconds
Overvoltage Protection	Automatic disconnection on input/output overvoltage
Undervoltage Protection	Automatic disconnection on input/output undervoltage
Overcurrent Protection	Automatic current limiting on input/output overcurrent
Short Circuit Protection	Automatic disconnection on input/output short circuit
Over-Temperature Protection	Automatic derating or shutdown when temperature exceeds limit
Insulation Resistance Detection	Real-time insulation resistance monitoring, abnormal alarm
Anti-Islanding Protection	Automatic grid disconnection upon grid failure
Ground Fault Protection	Ground fault detection and alarm

Communication & Monitoring

Parameter	Specification
Communication Interface	Wi-Fi / Ethernet / RS485
Monitoring Platform	GUANGXI Smart Energy APP
Data Update Frequency	5 seconds
Historical Data Storage	25 years
Remote Control	Supported (on/off, mode switching, parameter setting)
Firmware Upgrade	OTA remote upgrade supported
Alarm Notification	APP push, email, SMS

Environmental & Mechanical Parameters

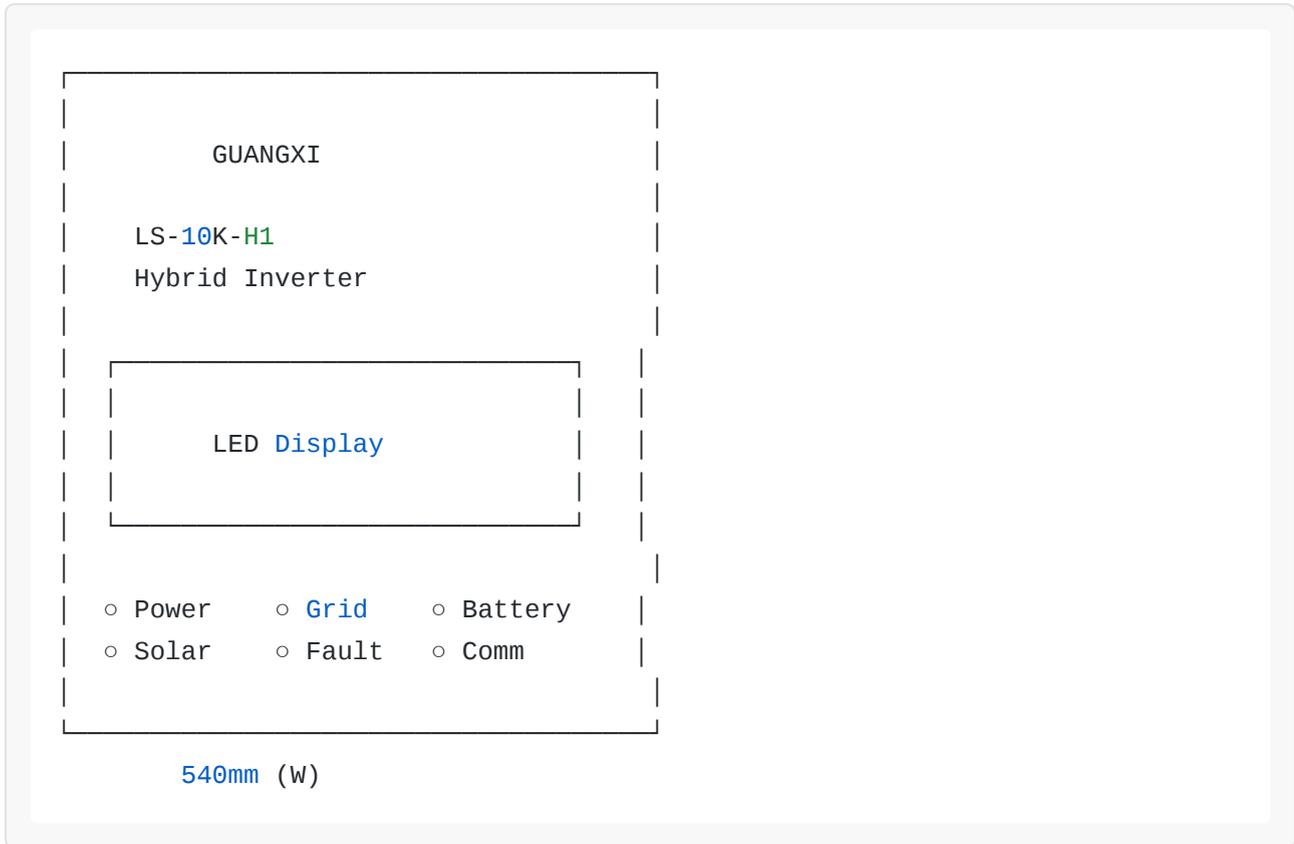
Parameter	Specification
Operating Temperature	-25°C ~ +60°C
Storage Temperature	-40°C ~ +70°C
Relative Humidity	0-95% (non-condensing)
Altitude	≤4000m (derating required >2000m)
Protection Rating	IP65
Cooling Method	Natural cooling + intelligent fan
Operating Noise	<25dB
Dimensions (W×H×D)	540×420×180mm
Net Weight	25kg
Installation Method	Wall-mounted

Certifications & Standards

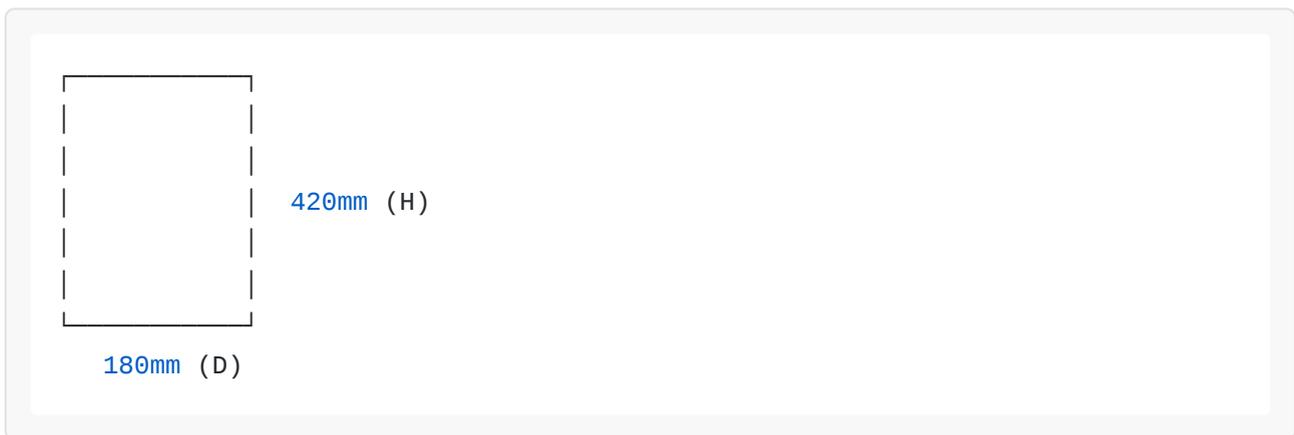
Certification/Standard	Description
CE	European Union safety certification
UL1741	North American grid-tied inverter standard
IEC62109	International PV inverter safety standard
VDE-AR-N 4105	German grid connection standard
G98/G99	UK grid connection standard
AS/NZS 4777	Australia/New Zealand grid connection standard
CEC	California Energy Commission certification
RoHS	EU environmental directive

Product Appearance & Dimensions

Front View



Side View



Terminal Layout

Top Connection Area (left to right):

1. **PV1 Input** - PV string 1 connection (+/-)

2. **PV2 Input** - PV string 2 connection (+/-)
3. **Battery Interface** - Battery pack connection (+/-)
4. **AC Output** - Grid-tied/backup output (L/N/PE)
5. **AC Input** - Grid input (L/N/PE)

Bottom Communication Area (left to right):

1. **Wi-Fi Antenna** - Wireless communication interface
2. **Ethernet** - Wired network interface
3. **RS485** - Battery/meter communication interface
4. **USB** - Local debugging interface

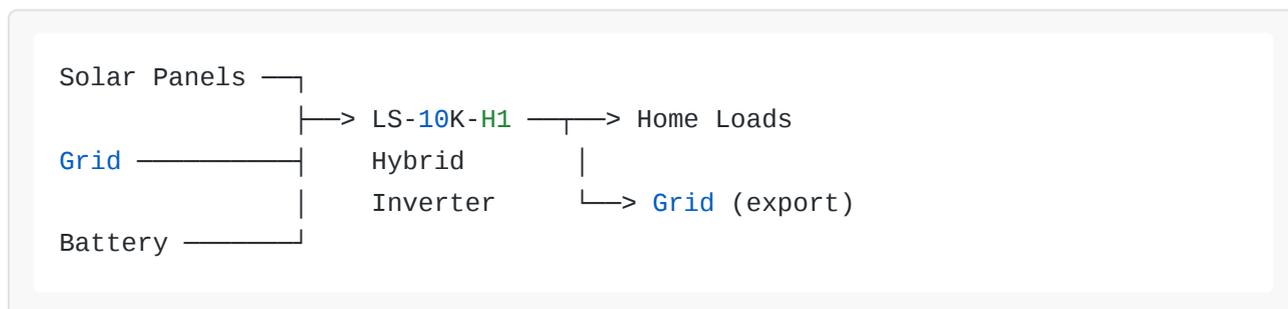
Installation Dimensions

- **Wall-mount hole spacing (horizontal):** 480mm
- **Wall-mount hole spacing (vertical):** 360mm
- **Wall-mount bolt specification:** M8×60mm
- **Minimum installation clearance:** 100mm left/right, 200mm top/bottom

Operating Principles

System Architecture

The LS-10K-H1 hybrid inverter is the core device of home solar-plus-storage systems, coordinating energy flow between solar, grid, battery, and loads. System architecture is as follows:



Operating Modes

Mode 1: Self-Consumption Priority

Application Scenario: Daytime with sunlight, aiming to maximize self-consumption rate

Energy Flow:

1. Solar power prioritizes home load consumption
2. Excess power charges battery
3. After battery is full, excess power exports to grid
4. At night or on cloudy days, battery discharges to supply loads
5. When battery is insufficient, purchase power from grid

Advantage: Maximizes self-consumption rate, reduces grid purchase

Mode 2: Backup Priority

Application Scenario: Unstable grid, need to ensure backup capacity

Energy Flow:

1. Solar power prioritizes battery charging to set capacity (e.g., 80%)
2. After battery is full, solar power supplies loads
3. Excess power exports to grid
4. During outages, battery discharges to supply critical loads

Advantage: Ensures backup capacity, continuous power during outages

Mode 3: Time-of-Use Arbitrage

Application Scenario: Large peak-valley price difference, aiming to profit from storage arbitrage

Energy Flow:

1. Daytime solar power supplies loads, excess charges battery
2. During off-peak periods (e.g., night), purchase grid power to charge battery

3. During peak periods (e.g., evening), battery discharges to supply loads
4. Avoid purchasing grid power during peak periods

Advantage: Leverages peak-valley price difference, reduces electricity bills

Mode 4: Off-Grid Mode

Application Scenario: No grid connection, completely reliant on solar and battery

Energy Flow:

1. Daytime solar power supplies loads, excess charges battery
2. At night or on cloudy days, battery discharges to supply loads
3. When battery is insufficient, limit load power or shut down non-critical loads

Advantage: Complete energy independence, no grid connection required

Intelligent Energy Dispatch Algorithm

The LS-10K-H1 features a built-in AI intelligent energy dispatch algorithm that automatically optimizes charge/discharge strategies based on:

1. **Weather Forecast** - Predicts solar power generation for next 24-48 hours
 2. **Usage Patterns** - Learns household electricity consumption patterns, predicts load demand
 3. **Price Fluctuations** - Optimizes charge/discharge timing based on peak-valley pricing
 4. **Battery Status** - Monitors battery SOC and SOH, optimizes charge/discharge power
 5. **Grid Status** - Detects grid voltage and frequency, ensures safe grid connection
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Safety Features

1. AFCI Arc Fault Protection

Arc faults are a leading cause of fires in PV systems. The LS-10K-H1 features built-in AFCI (Arc Fault Circuit Interrupter) protection that monitors DC-side arc signals in real-time, detecting and shutting down arc faults within 0.5 seconds to prevent fire hazards.

Operating Principle:

- High-frequency sampling detects current waveform anomalies
- AI algorithm identifies arc characteristic signals
- Immediately disconnects DC input upon arc detection
- Alarms and logs fault information

2. Rapid Shutdown Function

Complies with NEC 2017 690.12 rapid shutdown requirements. In emergencies (e.g., fire, maintenance), rapid shutdown can be triggered via external switch or APP remote control, reducing module-side voltage to safe levels (<80V) within 30 seconds to protect firefighters and maintenance personnel.

3. Anti-Islanding Protection

When the grid fails, the inverter must detect and disconnect from the grid within 2 seconds to prevent “islanding effect” that endangers grid maintenance personnel. The LS-10K-H1 employs dual detection algorithms—Active Frequency Drift (AFD) and Reactive Power Variation (RPV)—ensuring fast and accurate anti-islanding protection.

4. Insulation Resistance Detection

Automatically detects insulation resistance of PV modules and battery before daily startup, ensuring insulation resistance $\geq 1\text{M}\Omega$. Refuses to start and alarms when insulation resistance is insufficient, preventing leakage and electric shock hazards.

5. Over-Temperature Protection

Features multiple built-in temperature sensors that monitor power device, transformer, and heatsink temperatures in real-time. Automatically derates when temperature exceeds 75°C, automatically shuts down when temperature exceeds 85°C. Intelligent fan automatically adjusts speed based on temperature to ensure cooling efficiency.

6. Battery Safety Management

Communicates with battery BMS via CAN/RS485 interface, monitoring battery voltage, current, temperature, and SOC in real-time. Immediately stops charging/discharging and alarms upon detecting battery anomalies (overvoltage, undervoltage, overcurrent, over-temperature). Supports battery equalization charging to extend battery lifespan.

Certifications & Standards

The LS-10K-H1 has passed the following major global market safety and performance certifications:

European Market

- **CE** - European Union safety certification
- **VDE-AR-N 4105** - German low-voltage grid connection standard
- **IEC 62109-1/2** - PV inverter safety standard
- **IEC 62116** - Anti-islanding protection test standard
- **EN 61000-6-1/2/3/4** - Electromagnetic compatibility standard

North American Market

- **UL 1741** - Grid-tied inverter safety standard
- **UL 1741 SA** - California Rule 21 smart inverter standard
- **IEEE 1547** - Distributed generation grid interconnection standard

- **FCC Part 15** - Electromagnetic interference standard
- **CEC** - California Energy Commission certification

UK Market

- **G98** - Small-scale generation grid connection standard (≤ 3.68 kW single-phase)
- **G99** - Large-scale generation grid connection standard (> 3.68 kW single-phase)
- **UKCA** - UK Conformity Assessed marking

Australia/New Zealand Market

- **AS/NZS 4777.2** - Grid-tied inverter standard
- **AS/NZS 3000** - Electrical installation standard
- **CEC Approved** - Clean Energy Council of Australia certification

Other Certifications

- **RoHS** - EU environmental directive (Restriction of Hazardous Substances)
 - **WEEE** - EU Waste Electrical and Electronic Equipment directive
 - **ISO 9001** - Quality management system certification
 - **ISO 14001** - Environmental management system certification
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Warranty & Service

Standard Warranty

- **Inverter Main Unit:** 10-year limited warranty
- **Communication Module:** 5-year limited warranty
- **Accessories (cables, brackets, etc.):** 2-year limited warranty

Warranty Coverage

During the warranty period, GUANGXI provides free repair or replacement service for product failures caused by material or workmanship defects. Warranty coverage includes:

- Power devices (IGBT, MOSFET, diodes, etc.)
- Control circuit boards
- Communication modules
- Display screens
- Heatsinks and fans
- Terminal blocks

Warranty Exclusions

The following situations are not covered by warranty:

- Failures caused by installation not following installation manual requirements
- Damage caused by force majeure such as lightning, fire, flood
- Unauthorized disassembly, modification, or repair
- Use beyond rated parameters (overvoltage, overcurrent, over-temperature, etc.)
- Natural aging and normal wear

Extended Warranty Service

After the warranty period ends, customers can purchase extended warranty service to extend the warranty period to 15 or 20 years. Extended warranty service includes:

- Free fault diagnosis
- Free repairs (materials and labor)
- Free firmware upgrades
- Priority technical support

Technical Support

GUANGXI provides global 24/7 technical support services:

- **Online Support:** Official website live chat, email support
 - **Phone Support:** Global customer service hotline (multilingual)
 - **On-site Support:** On-site service within 48 hours for severe failures
 - **Remote Diagnosis:** Remote diagnosis and troubleshooting via APP
 - **Training Services:** Product training for installers and users
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Ordering Information

Product Model

LS-10K-H1 - 10kW Single-Phase Hybrid Inverter (standard configuration)

Standard Package Contents

- LS-10K-H1 inverter main unit ×1
- Wall-mount installation bracket ×1
- Installation bolt kit ×1
- Wi-Fi antenna ×1
- Quick installation guide ×1
- Warranty card ×1

Optional Accessories

- **DC Switch** - PV input-side isolation switch (recommended)
- **AC Switch** - AC output-side isolation switch (recommended)
- **Smart Meter** - For metering export power and time-of-use arbitrage
- **Backup Box** - Critical load backup switching box
- **Extension Cables** - PV/battery/AC extension cables

Compatible Battery Recommendations

The LS-10K-H1 is compatible with the following battery systems:

- **GUANGXI LS-B10** - 10kWh wall-mounted energy storage (recommended)
- **GUANGXI LS-B14** - 14kWh wall-mounted energy storage (recommended)
- **GUANGXI LS-B21** - 21kWh wall-mounted energy storage (recommended)
- **Third-party Batteries** - Lithium batteries supporting CAN/RS485 communication (compatibility testing required)

Ordering Process

1. **Consultation** - Contact GUANGXI sales team or local distributor
 2. **Solution Design** - Provide roof area, electricity consumption, etc., to receive customized solution
 3. **Order Confirmation** - Confirm product model, quantity, and accessories, sign contract
 4. **Production & Delivery** - Standard products delivered in 7-14 days, customized products in 21-30 days
 5. **Installation & Commissioning** - Installation and commissioning completed by GUANGXI certified installers
 6. **Acceptance & Grid Connection** - Grid connection and power generation begins after acceptance
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Contact Information

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Regional Offices

- **North America Office:** San Jose, California, USA
- **Europe Office:** Munich, Germany
- **Australia Office:** Sydney, Australia
- **Southeast Asia Office:** Singapore

Disclaimer

All information and specifications in this product manual are based on the latest data at the time of product release. GUANGXI reserves the right to change product specifications and design without prior notice. Actual product performance may vary depending on installation conditions, environmental factors, and usage methods.

Images and diagrams in this manual are for reference only. Actual products are subject to physical appearance. Before installing and using this product, please carefully read the complete “Installation & Commissioning Guide” and “User Manual” and comply with local electrical safety codes.

GUANGXI is not responsible for any loss or damage caused by installation and use not in accordance with manual requirements.

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