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1. General Safety

Symbol Conventions

The symbols that may be found in this document are defined as follows



Indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.



Indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.



Indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.



Indicates warning information about device or environment security which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results.

NOTICE is used to address practices not related to personal injury.



Supplements the important information in the main text.

NOTE is used to address information not related to personal injury, equipment damage, and environment deterioration.

Declaration

- Before installing, operating, and maintaining the equipment, read this document and observe all the safety instructions on the equipment and in this document.
- The "NOTICE", "WARNING", and "DANGER" statements in this document do not cover all the safety instructions. They are only supplements to the safety instructions. Huawei will not be liable for any consequence caused by the violation of general safety requirements or design, production, and usage safety standards.
- Ensure that the equipment is used in environments that meet its design specifications. Otherwise, the equipment may become faulty, and the resulting malfunction, component damage, personal injuries, or property damage are not covered under the warranty.
- Follow local laws and regulations when installing, operating, or maintaining the equipment. The safety instructions in this document are only supplements to local laws and regulations.

VEKEN will not be liable for any consequences of the following circumstances:

- Operation beyond the conditions specified in this document
- Installation or use in environments that cannot meet relevant international, national, or local standards
- Unauthorized modifications to the product or software code or removal of the product
- Failure to follow the operation instructions and safety precautions on the product and in this document
- Equipment damage due to force majeure, such as earthquakes, fire, storms, floods and debris flows
- Damage caused during transportation by the customer
- Damage caused by storage conditions that do not meet the requirements specified in related documents
- Damage to the hardware or data of the equipment due to customer's negligence, improper operation, or intentional damage
- System damage caused by improper operations of a third party or customer, including those in transportation, installation, and adjustment, alteration, or removal of identification marks

General Requirements



Improper operations on high-voltage equipment may cause an electric shock or fire, which could result in death, serious injury, or serious property damage. Perform standard operations as follows:

- Do not install, use, or operate outdoor equipment and cables (including but not limited to moving equipment, operating equipment and cables, inserting connectors to or removing connectors from signal ports connected to outdoor facilities, working at heights, and performing outdoor installation) in harsh weather conditions such as lightning, rain, snow, and level 6 or stronger wind.
- Observe the safety precautions specified in the warning signs and protection labels on the equipment.
- Use correct tools properly as required in this manual.
- Do not perform installation, cable connection, maintenance, or replacement when the equipment is energized.
- Do not clean the equipment with water.
- Do not open the host panel of the equipment.
- Check that the equipment is not damaged. For example, check that the battery is not dropped, bumped, or dented on the enclosure.
- Before handling a conductor surface or terminal, measure the contact point voltage and ensure that there is no risk of electric shock.
- Repaint any paint scratches caused during equipment transportation or installation in a timely manner. Equipment with scratches cannot be exposed to an outdoor environment for a long period of time.
- Ensure that battery terminal components are not affected during transportation. Do not hoist or move batteries by using battery terminals.
- Without prior consent from the manufacturer, do not alter the internal structure or installation procedure of the equipment.
- In the case of a fire, immediately leave the building or the equipment area, and turn on the fire alarm bell or make an emergency call. Do not enter the building on fire in any case.

NOTICE

- During transportation, turnover, installation, cable connection, and maintenance, comply with the national and local laws, regulations, and relevant standards.
- The materials and tools prepared by the customer must comply with the national and local laws, regulations, and relevant standards.
- Obtain approval from the national and local electric utility company before connecting the equipment to the grid.
- Understand the components and functioning of a grid-tied PV power system and relevant local standards.

 NOTE

- You shall not reverse engineer, decompile, disassemble, adapt, add code to the device software or alter the device software in any other way, research the internal implementation of the device, obtain the device software source code, infringe on Huawei's intellectual property, or disclose any device software performance test results.

2. Personnel Requirements

- Personnel who plan to install or maintain Huawei equipment must receive thorough training, understand all necessary safety precautions, and be able to correctly perform all operations.
- Only qualified professionals or trained personnel are allowed to install, operate, and maintain the equipment.
- Only qualified professionals are allowed to remove safety facilities and inspect the equipment.
- Personnel who will operate the equipment, including operators, trained personnel, and professionals, should possess the local national required qualifications in special operations such as high-voltage operations, working at heights, and operations of special equipment.
- Only professionals or authorized personnel are allowed to replace the equipment or components (including software).

 NOTE

- Professionals: personnel who are trained or experienced in equipment operations and are clear of the sources and degree of various potential hazards in equipment installation, operation, and maintenance
- Trained personnel: personnel who are technically trained, have required experience, are aware of possible hazards on themselves in certain operations, and are able to take protective measures to minimize the hazards on themselves
- Operators: operation personnel who may come in contact with the equipment, except trained personnel and professionals

3. Electrical Safety

Grounding Requirements

- For the equipment that needs to be grounded, install the protective earthing (PE) cable first when installing the equipment and remove the PE cable last when removing the equipment.
- Do not damage the ground conductor.
- Do not operate the equipment in the absence of a properly installed ground conductor.
- Ensure that the equipment is connected permanently to the protective ground. Before operating the equipment, check the electrical connection to ensure that it is securely grounded.

General Requirements



Before connecting cables, ensure that the equipment is intact. Otherwise, electric shocks or fire may occur.

- Ensure that all electrical connections comply with local electrical standards.
- Obtain approval from the local electric utility company before using the equipment in grid-tied mode.
- Ensure that the cables you prepared meet local regulations.
- Use dedicated insulated tools when performing high-voltage operations.

DC Operation



Do not connect or disconnect power cables with power-on. Transient contact between the core of the power cable and the conductor will generate electric arcs or sparks, which may cause fire or personal injury.

- Before connecting cables, switch of the disconnecter on the upstream equipment to cut of the power supply if people may contact energized components.
- Before connecting a power cable, check that the label on the power cable is correct.
- If the equipment has multiple inputs, disconnect all the inputs before operating the equipment.

Cabling Requirements

- When routing cables, ensure that a distance of at least 30 mm exists between the cables and heat-generating components or areas. This prevents damage to the insulation layer of the cables.
- Bind cables of the same type together. When routing cables of different types, ensure that they are at least 30 mm away from each other.
- Ensure that the cables used in a grid-tied PV power system are properly connected and insulated and meet specifications.
- The positions where cables are routed through pipes or holes must be protected to prevent the cables from being damaged by sharp edges or burrs.
- When the temperature is low, violent impact or vibration may damage the plastic cable sheathing. To ensure safety, comply with the following requirements:
- Cables can be laid or installed only when the temperature is higher than 0°C. Handle cables with caution, especially at a low temperature.
- Cables stored at subzero temperatures must be stored at room temperature for at least 24 hours before they are laid out.

ESD

NOTE

The static electricity generated by human bodies may damage the electrostatic- sensitive components on boards, for example, the large-scale integrated (LSI) circuits.

- Wear ESD gloves when handling the equipment. Do not wear clothes prone to static electricity.

4. Battery Safety

Declaration

The Company shall not be liable for equipment functional abnormality, component damage, personal safety accident, property loss, or other damage caused by the following reasons:

- The batteries are not charged as required during storage, resulting in capacity loss or irreversible damage to the batteries.
- A battery is damaged, falls, or leaks due to improper operations or incorrect connection.
- After being installed and connected to the system, the batteries are not powered on in time, which causes damage to the batteries due to overdischarge.
- Battery running parameters are incorrectly set
- The customer or a third party uses the batteries beyond the scenarios specified by the Company. For example, connect extra loads, or use with other batteries, including but not limited to batteries of other brands or batteries of different rated capacities.
- Damage is caused to batteries because the battery operating environment or external power parameters do not meet environment requirements. The actual operating temperature of batteries is too high or too low, or the power grid is unstable and experiences outages frequently.
- Batteries are frequently overdischarged due to improper maintenance, capacity is incorrectly expanded, or the batteries have not been fully charged for a long time.
- Batteries are not maintained based on the operation guide, such as failure to check battery terminals regularly.
- Batteries are stolen.
- The warranty period of batteries has expired.

Basic Requirements



- Do not expose batteries at high temperatures or around heat-generating sources, such as sunlight, fire sources, transformers, and heaters. The battery may cause a fire if overheated.
- To avoid leakage, overheating, or fire, do not disassemble, alter, or damage batteries. For example, do not insert foreign objects into batteries or place batteries in water or other liquids.
- The fire hazard of the lithium-ion/sodium-ion battery energy storage system is high. Consider the following safety risks before handling batteries:
 - Battery electrolyte is combustible, toxic, and volatile.
 - Battery thermal runaway can generate flammable gas and harmful gas such as CO and HF.
 - The concentration of flammable gas generated from battery thermal runaway may cause deflagration and explosion.
- The batteries must be stored separately inside the packaging. Do not store batteries together with other materials or in the open air. Do not stack batteries too high.
- Do not use batteries beyond the warranty period.
- Do not remove the battery packaging before use. Batteries should be charged during storage by professionals as required. Put batteries back to their packaging after charge during storage.
- Move batteries in the correct direction. Do not place a battery upside down or tilt it.
- Protect batteries from impact.
- Do not perform welding or grinding work around batteries to prevent fire caused by electric sparks or arcs.
- Use batteries within the temperature range specified in this manual.
- Do not use damaged batteries (such as damage caused when a battery is dropped, bumped, or dented on the enclosure). Damaged batteries may release flammable gases. Do not store damaged batteries near undamaged products.
- Do not place damaged batteries in close proximity to flammable materials. Do not approach the damaged batteries unless you are a professional.
- Monitor damaged batteries during storage for signs of smoke, flame, electrolyte leakage, or heat.

Personal Safety

- Wear proper personal protective equipment (PPE) during operation. If there is a probability of personal injury or equipment damage, immediately stop the operations, report the case to the supervisor, and take feasible protective measures.
- Use tools correctly to avoid hurting people or damaging the equipment.
- Do not touch the energized equipment, as the enclosure is hot.
- To ensure personal safety and normal use of the equipment, the equipment must be reliably grounded before use.
- When a battery is faulty, the temperature may exceed the burn threshold of the touchable surface. Therefore, avoid touching the battery.
- Do not disassemble or damage the battery. The released electrolyte is harmful to your skin and eyes. Avoid contact with the electrolyte.

- Do not place irrelevant objects on the top of the equipment or insert them into any position of the equipment.
- Do not place inflammables around the equipment.
- To prevent explosions and body injury, do not place batteries in a fire.
- Do not place the battery module in water or other liquids.
- Do not short-circuit wiring terminals of batteries. Short circuits can cause a fire.
- Batteries may cause electric shocks and high short-circuit currents. When using the battery, pay attention to the following points:

(a) Remove any metal objects from yourself, such as watches and rings.

(b) Use tools with insulated handles.

(c) Wear rubber gloves and boots.

(d) Do not place tools or metal parts on top of batteries.

(e) Before connecting or disconnecting battery terminals, disconnect the charging power supply.

(f) Check whether batteries are accidentally grounded. If it is accidentally grounded, remove the power supply from the ground. Touching any part of a grounded battery can cause an electric shock. If these grounding points are removed during installation and maintenance, the possibility of electric shocks can be reduced.

- Do not use water to clean electrical components inside or outside of a cabinet.
- Do not stand on, lean on, or sit on the top of the equipment.
- Do not damage the modules of the equipment.

Battery Installation Requirements

- Before installing batteries, check whether the packaging is intact. Do not use batteries with damaged packaging.
- During installation, ensure that the positive and negative electrodes of a battery are not short-circuited.
- During installation, ensure that the screws are tightened properly using a torque wrench and check them regularly.
- After installing the equipment, remove idle packing materials such as cartons, foam, plastics, and cable ties from the equipment area.

Hazardous and Toxicity Class



- Hazard: It may cause heat generation or electrolyte leakage if battery terminals contact with other metals. Electrolyte is flammable. In case of electrolyte leakage, move the battery from fire immediately.

- Toxicity: Vapor generated from burning batteries, may make eyes, skin, and throat irritate.

Battery Emergency Measures



- Avoid contact with leaked liquids or gases in the case of battery leakage or abnormal odor. Do not approach the battery. Contact professionals immediately. Professionals must wear safety goggles, rubber gloves, gas masks, and protective clothing.
- Electrolyte is corrosive and can cause irritation and chemical burns. Should you come into direct contact with the battery electrolyte, do as follows:

Inhalation: Evacuate contaminated areas, get fresh air immediately, and seek immediate medical attention.

Eye contact: Immediately flush your eyes with water for at least 15 minutes, do not rub your eyes, and seek medical attention immediately.

Skin contact: Wash the affected areas immediately with soap and water and seek medical attention immediately.

Ingestion: Seek immediate medical attention.

Fire Emergency Measures



- Power of the system if it is safe to do so.
- If any part of the batteries is submerged in water, do not touch the batteries to avoid electric shock.
- Do not use batteries that have been soaked in water. Contact a battery recycling company for disposal.

Dropped Battery Emergency Measures



- If a battery pack is dropped or violently impacted during installation, internal damage may occur. Do not use such battery packs; otherwise, safety risks such as cell leakage and electric shock may arise.
- If a dropped battery has obvious damage or abnormal odor, smoke, or fire occurs, evacuate the personnel immediately, call emergency services, and contact the professionals. The professionals can use fire extinguishing facilities to extinguish the fire under safety protection.
- If a dropped battery has no obvious deformation or damage and no abnormal odor, smoke, or fire occurs, contact the professionals to transfer the battery to an open and safe place, or contact a recycling company for disposal.

Battery Recycling

- Dispose of used batteries in accordance with local laws and regulations. Do not dispose of batteries as household waste.
- If the batteries leak or are damaged, contact technical support or a battery recycling company for disposal.
- If the batteries are out of service life, contact a battery recycling company for disposal.
- Do not expose batteries to high temperatures or direct sunlight.
- Do not expose batteries to high humidity or corrosive environments.

5. Storage Requirements

General Requirements

NOTE

- Record storage data such as temperature, humidity, and storage environment in compliance with the storage requirements in this manual.
- Do not store batteries for extended periods. Storing lithium batteries for extended periods may cause capacity loss. Generally, the irreversible capacity loss is 3% to 10% after lithium batteries are stored at the recommended storage temperature range for 12 months.
- The storage environment must comply with local regulations and standards.
- If a battery has been stored for longer than the allowed period, it must be checked and tested by professionals before use.
- Place batteries according to the signs on the packing case during storage. Do not put batteries upside down or sidelong.
- Stack battery packing cases in compliance with the stacking requirements on the external package.
- Handle batteries with caution to avoid damage.

The storage environment requirements are as follows:

- Ambient temperature: -10–55°C; recommended storage temperature: 20–30°C
- Relative humidity: 5% to 80%
- The batteries must be stored in a clean, dry, and well-ventilated place and be protected from dust and water vapor corrosion. The batteries must be protected against rain and water.
- Relative humidity: 5% to 80%
- Keep batteries away from direct sunlight.

6. Transportation Requirements

NOTE

The product passes the certifications of the UN38.3.

Loading and unloading:

- Load and unload the batteries in compliance with local laws, regulations, and industry standards. Reckless handling may cause short circuits or damage to batteries in the container, which may result in battery leakage, rupture, explosion, or fire.

Before transportation:

- Check that the batteries are intact and there is no obvious odor, smoke, or fire. Otherwise, the batteries cannot be transported.

NOTE

The product can be delivered to the site directly and transported by land and water. The packing case must be secured for transportation. Handle the product with care during loading, unloading, and transportation with moisture-proof measures in place. The actual capacity may vary depending on the environment conditions, such as temperature, transportation conditions, and storage conditions.

During transportation:

- The batteries cannot be transported by rail or air.
- Maritime transport must comply with the International Maritime Dangerous Goods Code (IMDG Code).
- Comply with the requirements of the transportation regulatory authorities in the countries of departure, route, and destination.

Comply with the international regulations on the transport of dangerous goods and the requirements of the transport regulatory authorities of the respective countries.

Protect the packing case with the product from the following situations:

- Being dampened by rains, snows, or falling into water
- Falling or mechanical impact
- Being upside-down or tilted

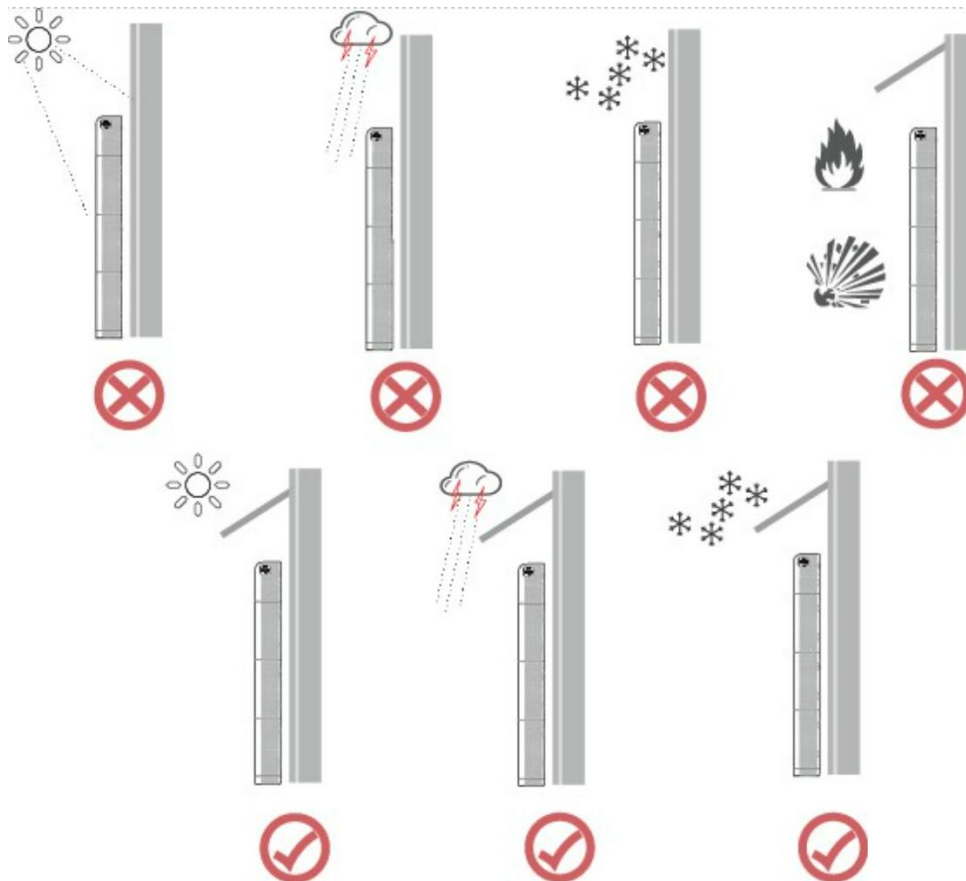
NOTE

If any of the preceding exceptions occurs, take the emergency measures.

7. Installation Environment Requirements

- The installation and use environment must meet relevant international, national, and local standards for lithium batteries, and are in accordance with the local laws and regulations.
- Ensure that the battery is not accessible to children and away from daily working or living areas, including but not limited to the following areas: studio, bedroom, lounge, living room, music room, kitchen, study, game room, home theater, sunroom, toilet, bathroom, laundry, and attic.
- When installing the battery in a garage, keep it away from the drive way. It is recommended that the battery be mounted on the wall higher than the bumper to prevent collision.
- When installing the battery in a basement, keep good ventilation. Do not place flammable or explosive materials around the battery. It is recommended that the battery be mounted on the wall to avoid contact with water.
- Install the battery in a dry and well-ventilated environment. Secure the battery on a solid and flat surface.
- Install the battery in a sheltered place or install an awning over it to avoid direct sunlight or rain.
- Install the battery in a clean environment that is free from sources of strong infrared radiation, organic solvents, and corrosive gases.
- For areas prone to natural disasters such as floods, debris flows, earthquakes, and typhoons/hurricanes, take corresponding precautions for installation.
- Keep the battery away from fire sources. Do not place any flammable or explosive materials around the battery.
- Keep the battery away from water sources such as taps, sewer pipes, and sprinklers to prevent water seepage.
- Do not install the battery in a position where it is easy to touch as the temperature of the chassis and heat sink is high when the battery is running.
- To prevent fire due to high temperature, ensure that the vents and the cooling system are not blocked when the battery is running.
- Do not expose the battery to flammable or explosive gas or smoke. Do not perform any operation on the battery in such environments.
- Do not install the battery on a moving object, such as ship, train, or car.
- In backup power scenarios, do not use the battery for the following situations:
 - a. medical devices substantially important to human life
 - b. Control equipment such as trains and elevators, which may cause personal
 - c. computer systems of social and public importance
 - d. locations near medical devices
 - e. other devices similar to those described above

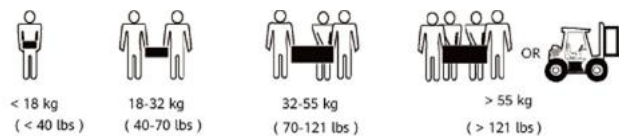
Do not install the battery outdoors in salt-affected areas because it may corrode. A salt-affected area refers to the region within 500 meters from the coast or prone to sea breeze. The regions prone to sea breeze vary with weather conditions (such as typhoons and monsoons) or terrains (such as dams and hills).



8. Mechanical Safety

Moving Heavy Objects

- Be cautious to avoid injury when moving heavy objects.



- When moving the equipment by hand, wear protective gloves to prevent injuries.

9. Commissioning

When the equipment is powered on for the first time, ensure that professional personnel set parameters correctly. Incorrect settings may result in inconsistency with local certification and affect the normal operation of the equipment.

10. Maintenance and Replacement



High voltage generated by the equipment during operation may cause an electric shock, which could result in death, serious injury, or serious property damage.

Prior to maintenance, power of the equipment and strictly comply with the safety precautions in this document and relevant documents.

- Maintain the equipment with sufficient knowledge of this document and using proper tools and testing equipment.
- Before maintaining the equipment, power it off and follow the instructions on the delayed discharge label to ensure that the equipment is powered off.
- Place temporary warning signs or erect fences to prevent unauthorized access to the maintenance site.
- If the equipment is faulty, contact your dealer.
- The equipment can be powered on only after all faults are rectified. Failing to do so may escalate faults or damage the equipment.
- Do not open the cover without authorization. Otherwise, electric shocks may occur, and the resulting faults are beyond warranty scope.
- Installation personnel, maintenance personnel, and technical support personnel must be trained to operate and maintain the equipment safely and correctly, take comprehensive precautionary measures, and be equipped with protective instruments.
- Before moving or reconnecting the equipment, disconnect the mains and batteries and wait for five minutes until the equipment powers off. Before maintaining the equipment, check that no dangerous voltages remain in the DC bus or components to be maintained by using a multimeter.
- Battery maintenance should be carried out or supervised by personnel who are familiar with batteries and the precautions required.
- When replacing batteries, replace them with batteries or battery strings of the same type.
- Take out all tools and parts from the equipment after maintenance is complete.
- If the equipment is not used for a long time, store and recharge batteries according to this document.