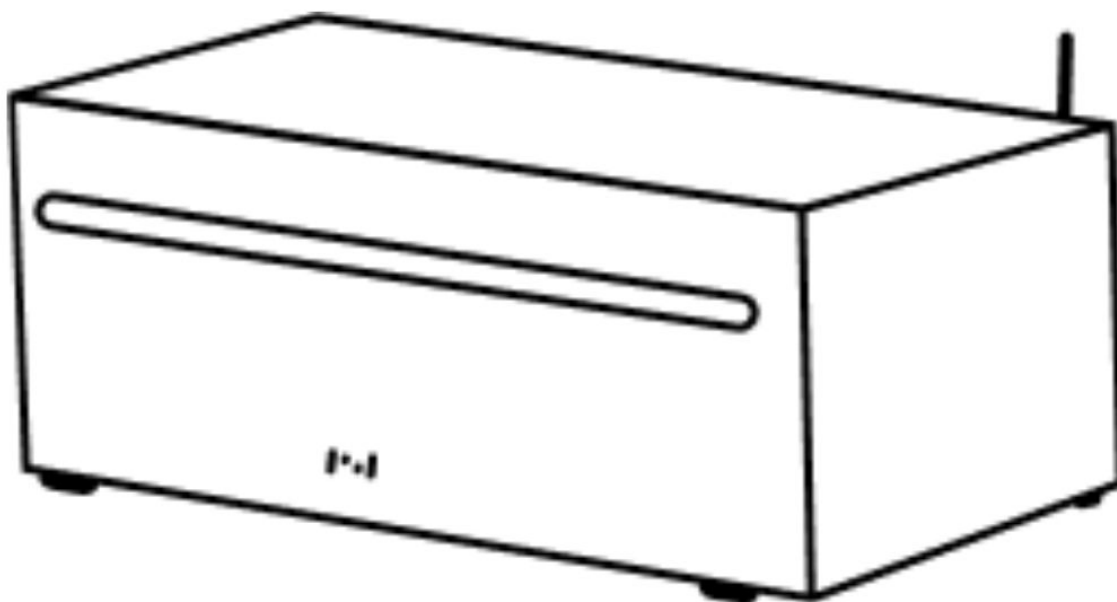


# USER GUIDE

## **GRID BATTERY**

Get affordable and green energy



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## 1. Legal Notice and Disclaimers

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This document does not serve as a substitute for, nor is it intended to supersede, any local, state, provincial, federal, or national laws, regulations, or codes pertinent to the installation, electrical safety, and utilization of battery systems. Nelinor assumes no liability for adherence or non-adherence to such laws or codes in relation to battery system installation.

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## 2. Overview

Prior to undertaking any actions concerning the battery system, it is imperative that you thoroughly review this document, which encompasses technical information, safety information, installation guidelines, handling and transportation guidelines, information about storage location and environmental recommendations, troubleshooting, and disposal protocols.

**Your complete understanding of this document is crucial for safe and effective operation of the battery system.**

The battery system comprises a Li-ion battery storage system with an integrated control module. The battery can be connected to the Internet through WiFi for maintenance and firmware updates. Importantly, it must only be used as stationary equipment and is designed for indoor use under the conditions outlined in the section "*Storage location and environment*".

Any modifications or changes to the battery system, including alterations or adjustments, must not be carried out without obtaining prior written consent from Nelinor. Unauthorized modifications will result in the nullification of guarantees and warranty claims. Nelinor shall bear no responsibility for any damages resulting from such unauthorized alterations.

## 3. Safety

The Grid Battery system is designed to provide reliable power storage and management using lithium iron phosphate (LiFePO<sub>4</sub>) batteries. While the battery cells themselves are not accessible to users, it is essential to follow safety precautions to ensure safe operation and prevent potential hazards. Please adhere to the following safety guidelines.

### NOTE!

**Always turn off the unit before unplugging it and never touch the terminals (metal tips of the plug) right after unplugging it. Always wait a minimum of 10 seconds before touching the terminals.**

Normal Operation:

- Follow Manufacturer Instructions: Always operate the Grid Battery system according to the manufacturer's instructions and guidelines.
- Routine Maintenance: Schedule regular maintenance and inspections as recommended by the manufacturer or qualified technicians.
- Inspect for Damage: Before use, carefully inspect the battery modules for any signs of defects, cracks, breakage, or damage. If any issues are detected or if the modules fail to operate correctly, do not use them.
- Avoid Cleaning Solvents: Refrain from using cleaning solvents on the battery modules, as these may damage their components.

General Safety Practices:

- Keep Children and Unauthorized Personnel Away: Restrict access to the Grid Battery system to authorized personnel only. Keep it out of reach of children and pets.
- Do Not Modify: Do not modify, alter, or attempt to enhance the Grid Battery system's performance without manufacturer authorization.
- Proper Disposal: Follow local regulations and the manufacturer's recommendations for the proper disposal of the Grid Battery system at the end of its life cycle.
- Emergency Response: Ensure that you have access to emergency contact information and procedures in case of accidents or unexpected events involving the Grid Battery system.
- No User Access: Do not attempt to open or access the battery cells within the Grid Battery system. These components are not intended for user interaction.
- Avoid Physical Damage: Avoid physical damage to the Grid Battery system by preventing heavy objects from falling or being placed on top of it.
- Temperature Control: Ensure that the Grid Battery system is installed in an environment with adequate temperature control to prevent overheating or freezing.

#### Emergency Situations:

- **Fire or Smoke:** In the event of a fire or the release of smoke from the Grid Battery system, immediately evacuate the area and contact emergency services.
- **Battery Cell Breakage or Leakage:** In the unlikely event of battery cell breakage or leakage, the battery can release corrosive electrolytes. Contact with the liquid or gas may cause skin irritation and chemical burns.

If you come in contact with the substance, adhere to the following steps:

- **Inhalation:** If you inhale the substance, immediately evacuate the contaminated area and seek immediate medical assistance.
- **Eye Contact:** In case of contact with the eyes, rinse them with a continuous flow of water for a duration of 15 minutes, and promptly seek medical attention.
- **Skin Contact:** If the substance comes into contact with your skin, thoroughly wash the affected area with soap and water, and promptly seek medical attention.
- **Ingestion:** If you accidentally ingest the substance, induce vomiting and seek immediate medical assistance.
- **Power Outage:** If there is a power outage or system malfunction, contact the manufacturer's support or a qualified technician for assistance. Do not attempt to disassemble or repair the system without proper training and authorization.

The battery must be removed from service in the following situations:

- The battery shows physical damage or is swollen.
- The battery emits an odor.
- It becomes significantly hotter than usual.
- The battery makes unusual sounds.
- The battery is leaking.

When removing a damaged battery from service, ensure that the battery or device is not near other flammable materials. If possible, move the battery or device to a safe location, such as outdoors. Monitor to ensure that the battery does not ignite. If the situation leads to the battery igniting or producing smoke, follow the instructions in the "*Emergency situations*" section. Return the damaged battery or device to the product's retailer or inquire with the retailer about where the battery can be returned.

#### Hazard Reporting:

If you notice any unusual noises, odors, or abnormalities with the Grid Battery system, report them to the support center immediately. Do not ignore potential warning signs.

## 4. Installation

#### Pre-Installation Planning

- Verify that your Grid Battery system is compatible with your existing electrical system.
- Check local regulations and obtain any necessary permits or approvals.
- Ensure you have all the required tools, equipment, and materials.
- Plan the location for the battery, ensuring it meets safety and environmental requirements.
- Ensure proper ventilation and temperature control for the battery.
- Clear any obstacles and ensure adequate space for installation.

#### Installation Steps

- Carefully place the battery in its designated location.
- Ensure proper ventilation and temperature control for the battery.
- Clear any obstacles and ensure adequate space for installation.
- Connect the battery system to the electrical panel according to the manufacturer's instructions.
- Ensure all electrical connections are secure and properly torqued.
- Verify that all safety features, such as circuit protection and emergency shutdown, are correctly installed and functioning.
- Conduct a thorough system test to ensure proper installation and functionality.

#### Installation Instructions:

Note! In Finland, you will need permission from your local electricity grid company to connect the Grid Battery to the grid.

- Install the antenna onto the Grid Battery
- Install the Shelly power meter if it was included in the package. Use the Shelly meter instructions found in the package.

#### Installation with Solar Panels:

- Install the Grid Battery in the same connection point as the on-grid inverter.
- The Grid Battery should start and stop using the same switch as the on-grid inverter.

#### Installation without additional devices:

- Install the Grid Battery in the same way you would install an on-grid inverter.
- The Grid Battery should be connected to an external switch or circuit breaker for turning it on/off.

## 5. Technical Information

### BATTERY PACK INFORMATION

Capacity: 7.2 kWh  
Accessible Capacity: 7 kWh  
Nominal Voltage of a Single Cell: 3.2 V  
Battery Cell Class: A  
Battery Chemistry: LiFePo4  
Battery Cells: 8  
Capacity of a Single Cell: 280 Ah  
Number of Battery Cell Cycles (at 80% remaining capacity): 6000 cycles

### POWER MODULE INFORMATION

Model: P2  
AC Output Voltage: 230 V  
AC Output Power (Discharging): 1.8 kW  
AC Input Voltage: 230 V  
AC Input Power (Charging): 1.8 kW - 2.1 kW  
AC Frequency Range: 47-63 Hz  
DC Input Range: 23 VDC - 28 VDC  
AC to DC Conversion Efficiency: 93%  
AC Synchronization Time: 2 Seconds  
Overload: 105-115%

Network Standards: 50549-1

Values are based on an environmental temperature of 24°C and a load of 75%.

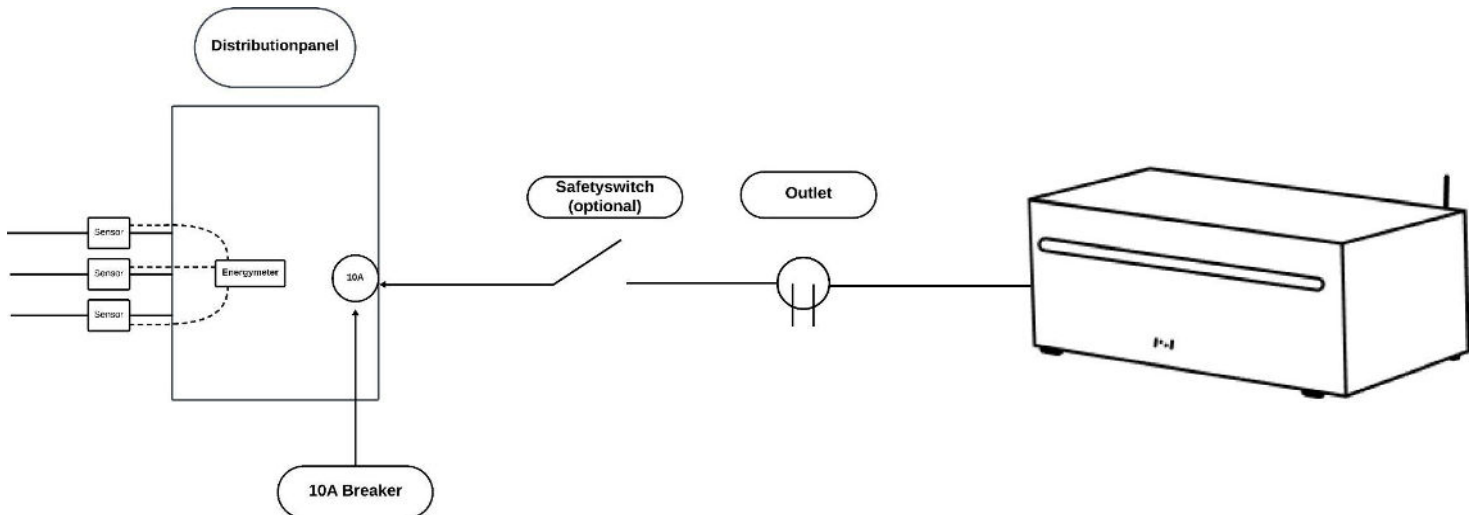
### BMS FEATURES

Access via local Wi-Fi network  
Remote access via the internet  
Battery cell balancing  
Temperature monitoring  
Android and iOS app  
Real-time reporting  
Individual cell reporting  
LED charging indicator  
Remote ON/OFF control  
ON/OFF button

### ENVIRONMENTAL & MECHANICAL DETAILS

Operating Temperature: 0°C-50°C  
Storage Temperature: -20°C - 60°C  
Installation Environment: Indoor IP20  
Dimensions (H/W/D): 25cm60cm24cm  
Noise Level: 40-55 dBA  
Weight: 59 kg  
Certifications: CE, TUV, BC EN/EN62368-1

## 6. Installation scheme



## 7. Handling and transportation

- **Protection from Damage:** The battery modules and their components must be shielded from any potential damage during transportation and handling. Handle them with care to prevent any harm or degradation of the system.
- **Weight Consideration:** Be cautious of the system's weight, which may pose an injury risk. Always handle the system with care, ensuring safe lifting and transportation practices.
- **Avoid impacts:** Do not pull, push, bump, drop or step on the battery modules, as this can cause physical damage.
- **No Unrelated Objects:** Never insert unrelated objects into any part of the battery modules. Doing so can compromise the integrity of the modules.
- **Avoid Fire:** Under no circumstances should you throw the battery modules into a fire, as this can lead to hazardous situations.
- **Avoid Water Exposure:** Do not immerse the battery modules in water or seawater. Water contact can cause damage and affect the functionality of the modules.
- **Protect from Oxidizers:** Keep the battery modules away from strong oxidizers, as exposure to these substances can be harmful.
- **No Short Circuits:** Never short circuit the battery modules, as this can result in dangerous electrical discharge.

## 8. Storage location and environment

- **IP Classification:** The Grid Battery is designed for indoor storage in an environment that aligns with the IP20 classification. This classification indicates protection against foreign objects with a diameter of 12 mm or larger. However, it does not provide protection against water. The battery system is suitable for installation in dry indoor environments.
- **Rubber Feet:** The Grid Battery is equipped with four 5mm rubber feet. Ensure that the battery is placed on a stable and level surface.
- **Ventilation:** Maintain at least a 20 cm clearance on the left side of the battery, where the cooling fan is situated. This clearance is necessary to allow for adequate ventilation, which in turn ensures efficient cooling of the battery components during both operation and storage.
- **Avoid Sunlight:** Do not store the battery modules directly under the sun, as extreme heat and exposure to sunlight can adversely affect their performance and safety.
- **Humidity Consideration:** The battery modules should not be stored in a high-humidity environment, as moisture can lead to corrosion and other issues.
- **Temperature Range:** Store the battery modules in an environment with a temperature range between -20°C to +60°C. Extreme temperatures can negatively impact the modules' performance and lifespan.

## 9. Operation

Read the user manual thoroughly and understand the system's safety guidelines before you start operating your Grid Battery system. It's crucial to ensure safety.

If you encounter any issues or emergencies, immediately contact a professional technician or the manufacturer's support.

## 10. Basic Battery System Operation

To get started with your Grid Battery system:

- Ensure the battery is correctly installed and connected to your electrical system by a qualified technician.
- Make sure the power meter is connected to the same WiFi and subnet as the one you will use for the Grid Battery.
- Power on the battery system.
- Download the mobile app and follow the steps.

## 11. Signals

- ON/OFF button flashes when a WiFi AP is active.
- The Cooling fan is working all the time regardless of ON/OFF status.
- The battery level is indicated with the green led lights on the front. When the battery is charging, it will flash blue, and when the battery is discharging, it will flash red.

## 12. Connecting to WiFi and Changing WiFi Connection

- When turning on the Grid Battery for the first time the ON/OFF button on the back should be flashing indicating that the battery is ready to be connected to the WiFi network.
- When you want to reset the WiFi connection or change connection you simply hold down the power button for 3-5 seconds until the lights start flashing indicating that the battery has disconnected from the WiFi and is ready to be connected again.

## 13. Using the Mobile Phone App

The Grid Battery comes with a mobile phone app for remote monitoring and control. Follow these steps to use the app:

- Download and install the official "Nelinor" app provided by the manufacturer from your app store.
- Connect the app to your Grid Battery system by following the setup instructions provided in the app. NOTE! The Grid Battery and the power meter need to be connected to the same WiFi and subnet.
- Once connected, you can use the app to monitor and control various aspects of your battery system such as battery level, charge and discharge, choosing operating mode, viewing historical and real time data, monitor cell life and temperature.

## 14. Charging and Discharging Control

Your Grid Battery system offers options for controlling when the battery charges and discharges which can help you maximize energy savings. Choose the charging and discharging logics ("operating modes") through the mobile app.

The Grid Battery has 2 different settings for charging and discharging. By combining different settings you have 4 different operating modes that you can choose between to fit your needs.

Charge logics:

- Charge from the grid when the price is low.
- Charge from excess energy production.

Discharge logics:

- Discharge to cover your own consumption.
- Sell excess energy when the price is high.

Operating Modes:

- Charge from excess energy and cover your own consumption.
- Charge from the grid when the price is low and cover your own consumption.
- Charge from excess energy and sell when the price is high.
- Charge from the grid when the price is low and sell when the price is high.
- Both = The Grid Battery automatically switches between operating modes to maximize the effectiveness.

## 15. Reebooth Sequence

- Turn off the unit and wait until the led lights turn off.
- Unplug the battery and wait 20 seconds.
- Plug in the battery.
- Turn on the unit.

**Note! Do not touch the terminals on the plug directly after unplugging it.**

## 16. Troubleshooting

If you encounter issues with your Grid Battery, this troubleshooting guide will help you identify and resolve common problems. Before proceeding, ensure your safety by following the recommended precautions and guidelines. If the problem persists or is beyond your ability to resolve, contact a qualified technician or your battery manufacturer's support team for assistance.

Battery Does Not Power On

- Check Power Source: Ensure that the battery is connected to a power source and that the power source is functional.
- Inspect Connections: Examine the battery's electrical connections, including cables and connectors, for any loose or damaged components. Have an electrician reconnect or replace them as needed.
- Battery Reset: Some batteries may have a reset button or procedure. Refer to your user manual for instructions on how to perform a reset.

Reduced Battery Capacity

- Check Charging: Ensure that the battery is being charged correctly and has reached a full charge cycle.

If not, review the charging process and consider adjusting charging parameters if applicable.

- Age and Wear: Batteries degrade over time. If your battery is several years old, reduced capacity may be normal. In such cases, consider replacing the battery if necessary.
- Environmental Conditions: Extreme temperatures can affect battery capacity. Ensure that the battery is stored and operated within the recommended temperature range.

Overheating or Excessive Heat

- Cooling System: Ensure that the cooling system, such as fans or vents, is functioning correctly and is not obstructed. Provide adequate ventilation to dissipate heat.
- Temperature Control: Check the temperature settings and operating conditions. Adjust settings to maintain the battery within the recommended temperature range.
- Environmental Factors: Avoid placing the battery in direct sunlight or near heat sources. Extreme environmental conditions can lead to overheating.
- Online access: If the connection with the WiFi breaks try to add it again. If the WiFi is too far away then you can use a WiFi repeater to get a stronger signal.

## 17. Disposal

When the time comes to dispose of your Grid Battery, it is crucial to do so responsibly and in compliance with local regulations to protect the environment and ensure safety. Follow these guidelines for proper disposal:

- Before attempting to dispose of the Grid Battery yourself, it is strongly recommended to contact a professional or your battery manufacturer's authorized service center. They can provide guidance on the appropriate disposal methods and may offer recycling or disposal services.
- Check with your local authorities or waste management agencies to understand the specific regulations and guidelines for disposing of batteries. Different regions may have varying rules and requirements for battery disposal.
- Whenever possible, consider recycling as the preferred method of disposal. Batteries contain materials that can be harmful to the environment if not disposed of properly. Recycling helps recover valuable resources and minimizes environmental impact.
- Disposal Facilities If recycling is not an option or if you are instructed to dispose of the battery, ensure it is taken to an authorized disposal facility or a designated collection point. Do not dispose of the battery with regular household waste or in landfills.
- Before disposing of the battery, make sure to follow safety precautions to remove it from your system correctly. Disconnect the battery according to the manufacturer's instructions, and be cautious not to damage the battery during removal.
- Label the battery clearly with information such as "Used Battery," "For Disposal," or any other relevant instructions to help disposal personnel handle it correctly.
- Handle the battery with care during the disposal process to avoid any physical damage or leakage of hazardous materials. Wear appropriate protective gear if necessary.

- In some jurisdictions, you may be required to report the disposal of certain types of batteries or hazardous materials. Be sure to follow any reporting requirements mandated by local authorities.
- Remember that responsible disposal of batteries is not only a legal obligation but also an ethical responsibility.

By disposing of your Grid Battery properly, you contribute to protecting the environment and reducing the potential harm caused by hazardous materials. Always prioritize safety and environmental responsibility when disposing of your Grid Battery. Following these guidelines ensures that the battery is handled, recycled, or disposed of in a manner that minimizes harm to the environment and complies with local regulations.