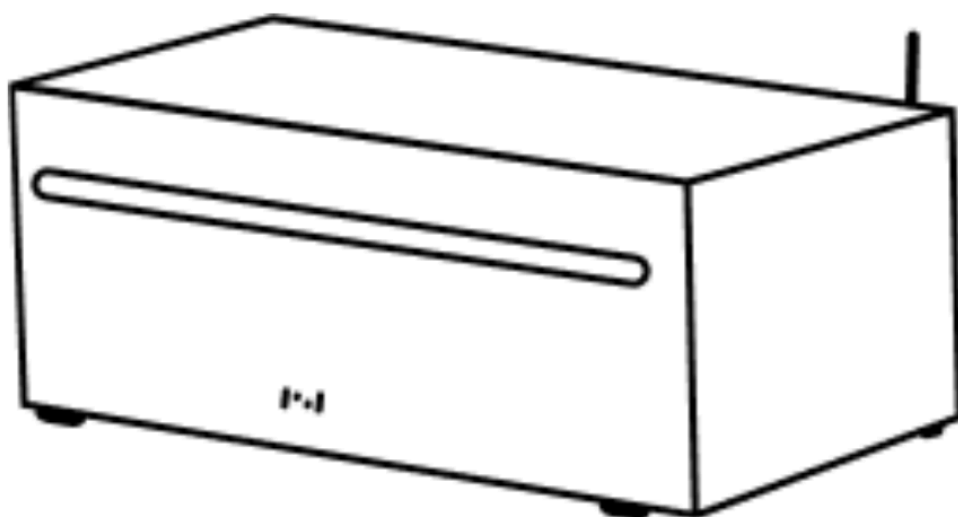


GRID BATTERY

GES7-P2

User Guide



WWW.NELINOR.COM

 **Nelinor app**



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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.

Please be advised that specifications may be subject to alteration without prior notice. While every effort has been exerted to ensure the completeness, accuracy, and currency of this document, Nelinor reserves the right to introduce improvements under specific circumstances without advance notification. It is imperative to acknowledge the recognition of all trademarks associated with this document.

Additionally, Nelinor reserves the rights to utilize the Grid Battery for participation in the frequency reserve market and frequency containment market at its discretion.

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 (LiFePO₄) 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:

- Restrict access to the Grid Battery system to authorized personnel only. Keep it out of reach of children and pets.
- Do not modify, alter, or attempt to enhance the Grid Battery system's performance without manufacturer authorization.
- Follow local regulations and the manufacturer's recommendations for the proper disposal of the Grid Battery system at the end of its life cycle.
- Ensure that you have access to emergency contact information and procedures in case of accidents or unexpected events involving the Grid Battery system.
- 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 to the Grid Battery system by preventing heavy objects from falling or being placed on top of it.
- Ensure that the Grid Battery system is installed in an environment with adequate temperature control to prevent overheating or freezing.
- When transporting the Grid Battery product, local laws and regulations must be followed.
- Refrain from lifting and moving the Grid Battery more than necessary during installation.

Emergency Situations:

- In the event of a fire or the release of smoke from the Grid Battery system, immediately evacuate the area and contact emergency services.
- 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.
- If there is a power outage, the battery will shut off automatically. Wait until the power outage is over and check that your battery has restarted after the power outage.
- If a system error occurs, contact the manufacturer's support or a qualified technician. Do not attempt to disassemble or repair the system without appropriate 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.
- Read and understand section 8 of the user guide and ensure that the battery installation site fits the proper storage location and environment recommendations.
- Check local regulations and obtain any necessary permits or approvals.
- Ensure you have all the required tools, equipment, and materials.
- Clear any obstacles and ensure adequate space for installation.

Installation steps for countries where installation by electrician is needed:

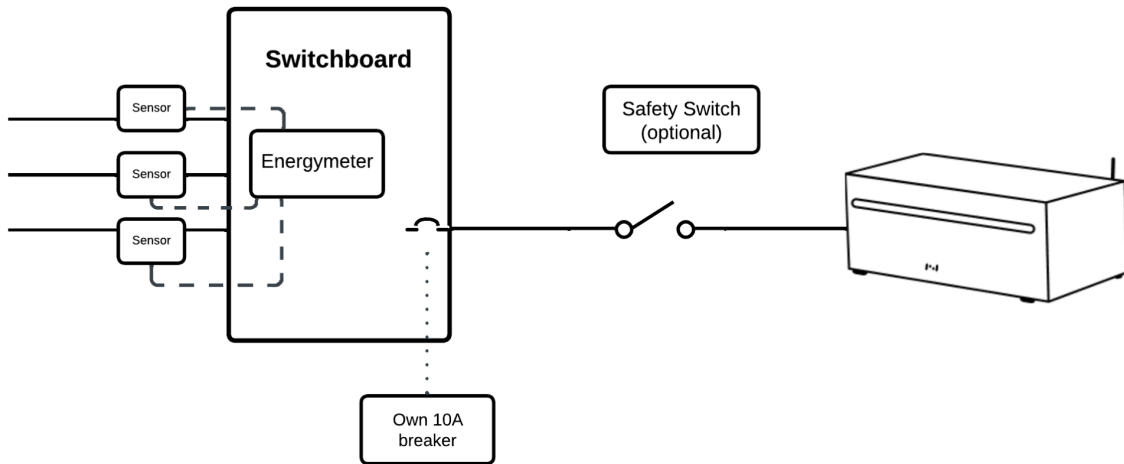
- Place the antenna supplied with the battery in position.
- Carefully place the battery in its designated location. Connect the power cable to the power cable lock.
- Attach the battery power cable lock by pulling on the red locking mechanism while inserting it into the battery.
- Mark the breaker.
- Connect the battery system to the electrical panel behind its own breaker.
- Ensure that all electrical connections are securely attached and tightened correctly.
- Perform a thorough system test to ensure proper installation and operation.

Note!

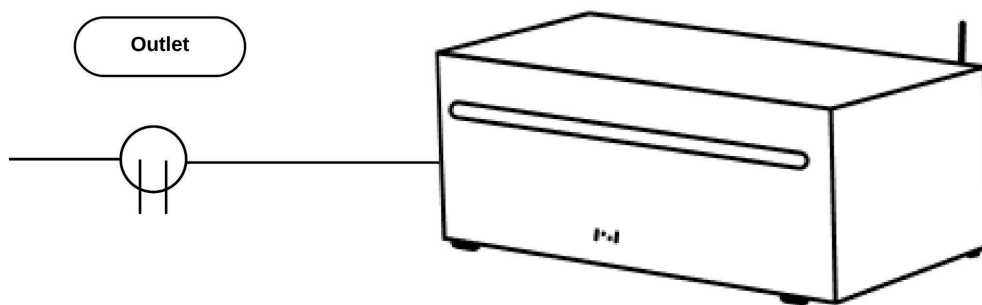
- **In some countries, you need permission from the local electricity distribution company to connect Grid Battery to the grid. Always check your local guidelines and regulations before installing the battery.**
- **When you want to turn off your battery or cut off power using the fuse box, remember to first turn off the battery either with the ON/OFF button or through the application. It is important to ensure that the battery is turned off before proceeding with other actions.**
- **Battery can be left disconnected from AC power for a maximum of a month and only if it was over 60% state of charge. If the energy level is under 30%, the battery must stay connected to an AC power source.**

5. Installation scheme

Countries where an electrician is needed (e.g. Finland & Sweden).



Countries where plug n' play is accepted (e.g. Germany & France).



6. Grid Battery (GES7-P2) 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%

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): 26.5cm 60cm 25cm
Noise Level: 40-55 dBA
Weight: 60 kg
Certifications: CE, EN/EN62368-1
Network Standard: 50549-1

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

7. Handling and transportation

Nelinor is not liable for damages or injuries sustained as a result of improper handling or misuse of the Grid Battery. It is imperative to adhere to all safety guidelines provided in the user manual to ensure the integrity of the product and the safety of personnel involved in its installation and transportation.

Should any uncertainties arise regarding the proper handling procedures or local regulations, it is advised to seek clarification from authorized personnel or regulatory authorities before proceeding. Remember, prioritizing safety is paramount in all aspects of handling the Grid Battery product.

- 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.
- 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.
- Do not pull, push, bump, drop or step on the battery modules, as this can cause physical damage.
- Never insert unrelated objects into any part of the battery modules. Doing so can compromise the integrity of the modules.
- Under no circumstances should you throw the battery modules into a fire, as this can lead to hazardous situations.
- Do not immerse the battery modules in water or seawater. Water contact can cause damage and affect the functionality of the modules.
- Keep the battery modules away from strong oxidizers, as exposure to these substances can be harmful.
- 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 in front of the ventilation holes for the inverter on the left side and the back side of the battery. 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.

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.

When you first turn on the battery don't worry if the battery does not show the right state of charge. After the first full discharge or charge it will show the right data.

During first use, the battery should not be left alone and should be under supervision of the user for the first full charge and discharge cycles.

10. Signals

- The ON/OFF button flashes when a WiFi connection is possible.
- The battery level is indicated by the green LEDs on the front panel.
- When the battery is charging, the front panel LED flashes blue, and when the battery is discharged, it flashes red.
- If the battery lights up purple or yellow, it is in standby mode or lacks a WiFi connection.
- The back panel LED lights up blue when the battery is connected to WiFi and green when it is connected to the server.
- The cooling fan operates continuously regardless of the ON/OFF status.

11. 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.
- Connect your phone or tablet to the same WiFi network.
- Open your application and follow the instructions.
- Once you have found your battery in the application and established a direct connection, you are ready to connect it to WiFi.
- In the top right corner of the application, there are three dots that take you to a menu where you can find WiFi settings, where you can enter the WiFi password for the battery (see pictures in paragraph 17).
- When the battery and energy meter are connected to the same WiFi network, the battery will search for the meter and establish a connection between them.
- If you want to reset the WiFi connection or change the connection, press and hold the power button for 5 seconds until the lights start flashing, indicating that the battery has been disconnected from the WiFi network and is ready to be reconnected.

12. 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 "Neliner" 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.

13. 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.

14. Advanced parameters

The advanced parameters are only meant for the electrician that does the installation and for special occasions where more

Reeboot Sequence

- Put the battery into standby by pressing the ON/OFF button shortly or by pressing the ON/OFF button in the app. (The ON/OFF button in the app turns gray when the battery is in standby mode.)
- 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.

15. 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.

16. 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.

17. Pictures

WiFi Setup

1



2

