Garden Tractor Battery

User Manual

⚠ DANGER

PIROR TO USE, READ AND UNDERSTAND PRODUCT SAFETY INFORMATION. Failure to follow the instructions may result in electrical shock, explosion, or fire, which may result in personal injury, damage to device or property. Do not discard this information.

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IMPORTANT: PLEASE READ BEFORE FIRST USE.

1. Quick User Guide

This guide should be read in conjunction with the main instructions included, but the following points will enable speedy deployment of your STIGA garden tractor batteries.

1.1 Your garden tractor battery will be supplied partially charged. This is because transportation regulations prohibit shipping a fully charged lithium battery. Please ensure the battery is fully charged before first use.

1.2 Garden tractor batteries should be charged by a specified lithium-ion battery charger. **DO NOT** use any other chargers without authorization from STIGA S.p.A to keep your battery away safety risk in charging.

1.3 Garden tractor battery is for individual use. **DO NOT** connect them in series, or parallel.

1.4 **DO NOT** use garden tractor battery for any cranking, or engine start. They are designed for motive power scenario on garden tractors. **Abuse** will take high risks on battery catch fire, or even explosion, which may result in personal injury, damage to device or property.

1.5 Always use an appropriate size cable and fuse based upon the expected current of your garden tractor. This ensures the electrical circuits within the garden tractor and the battery are protected at all times. Fit the fuse/s as close to the garden tractor battery **Positive/+** terminal as possible. If in doubt consult a qualified electrician or contact our technical sales for advice.

1.6 Improper disposal of garden tractor batteries may cause catch fire, explosion, or emission of toxic substances.

1.7 Garden tractor batteries must not be disposed of as **domestic waste**! Dispose of garden tractor batteries in an environmentally friendly way through suitable collection systems.

2. Safety Precautions

2.1 General Safety

Before installing, operating, and maintaining the garden tractor battery, read this document and observe all the safety instructions on the battery 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. DEFORD New Power Co., Ltd. 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 battery is used in environments that meet its design specifications. Otherwise, the battery 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 battery. The safety instructions in this document are only supplements to local laws and regulations.

2.2 Electrical Safety

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

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

2.3 Battery Safety

Do not expose batteries at high temperatures or around heat-generating sources, such as sunlight, fire sources, transformers, and heaters. The battery may catch a fire if overheated.

To avoid leakage, overheating, or fire, do not try to disassemble, diagnose, or repair batteries without authorization. Do not insert objects into batteries.

⚠ DANGER

The fire hazard of the lithium-ion battery 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.

Do not perform welding or grinding work around batteries to prevent fire caused by electric sparks or arcs.

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 short-circuit wiring terminals of batteries. Short circuits can cause a fire.

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:

- If a fire occurs, power off the battery if it is safe to do so.
- Extinguish the fire with carbon dioxide, FM-200 or ABC dry powder fire extinguishers.
- Overheating may cause batteries to deform and leak corrosive electrolyte or toxic gas. Keep away from the batteries to avoid skin irritation and chemical burns.

Flood Emergency Measures:

- Power off the battery if it is safe to do so.
- Do not use batteries that have been soaked in water. Contact a battery recycling company for disposal.

Dropped Battery Emergency Measures:

- If a battery is dropped or violently impacted during installation, internal damage may occur. Do not use such batteries; 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.

2.4 Storage and Transportation

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.

Ambient temperature is -20-35°C, relative humidity is 5%-90%. Keep batteries away from direct sunlight.

DO NOT store batteries for extended periods. Storing lithium batteries for extended periods may cause capacity loss.

NOTICE

- The product passes the certifications of the UN38.3 (UN38.3: Section 38.3 of the sixth Revised Edition of the Recommendations on the Transport of Dangerous Goods: Manual of Tests and Criteria) and SN/T 0370.2-2009 (Part 2: Performance Test of the Rules for the Inspection of Packaging for Exporting Dangerous Goods). This product belongs to Class 9 dangerous goods.

- 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.

In Transportation:

- If lithium-ion battery weighs more than 30Kg, it cannot be transported by air then.
- Maritime transport must comply with the International Maritime Dangerous Goods Code (IMDG Code).
- Road transport must comply with the International Carriage of Dangerous Goods by Road (ADR) or JT T617.
- Comply with the requirements of the transportation regulatory authorities in the countries of departure, route, and destination.

2.5 Maintenance and Replacement

DANGER

- Prior to maintenance, power off the equipment and strictly comply with the safety precautions in this document and relevant documents. Improper operation may cause an electric shock, which could result in personal injury, or serious property damage.

Maintain the battery with sufficient knowledge of this document and using proper tools and testing equipment.

Place temporary warning signs or erect fences to prevent unauthorized access to the maintenance site.

The battery can be powered on only after all faults are rectified. Failing to do so may escalate faults or damage the battery.

Do not open the battery 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 battery safely and correctly, take comprehensive precautionary measures, and be equipped with protective instruments.

Battery maintenance should be carried out or supervised by personnel who are familiar with batteries and the precautions required.

NOTICE

- If the battery is not used for a long time, store and recharge it according to this document.
- If the battery is faulty, contact our technical sales for support.

3. Product Specifications

3.1 Overview

Garden tractor batteries are designed for garden scenario like ride-on electric garden tractors. Garden tractor batteries combining high quality lithium-ion battery chemistry cell with advanced battery management system (BMS) ensures to provide you with incredibly long-lasting, reliable, and lightweight power source.

Garden tractor battery interface supports battery firmware update through CAN Bus.

3.2 Models

Garden tractor batteries include typical 2 models to meet various garden tractor requirements.

118361047/3

118361048/2

3.3 Technical Specifications

Technical Specifications	118361047/3	118361048/2
Battery Chemistry	Lithium-ion	
Nominal Voltage (V)	50.4	
Nominal Capacity (Ah)	30	40
Nominal Energy Capacity (Wh)	1512	2016
Type of Cell	Cylindrical 18650	
Cell Configuration	14S12P	14S16P
Cycle Life	500 cycles at 90% DOD, or 300 cycles at 100% DOD.	
Charge Voltage (V)	58.8 (4.2/cell)	
Charge Balancing (mA)	Passive, 30 mA – 50 mA	
Continuous Charge Current (A)	18 (10℃- 35℃)	
Recommended Charge Current (A)	6 - 9	8 - 12
Discharge Current (A)	70 (10% - 100% SOC)	
Peak Discharge Current (A)	90A in 2 seconds	
Discharge Cut-off Voltage (V)	39.2 (2.8/cell)	
Temperature in Charge (℃)	0℃- 50℃ (charge will be closed by BMS at <0℃, or >50℃)	
Low Temperature Charging	Prohibition	
Temperature in Discharge (℃)	-20℃- 70℃ (discharge will be closed by BMS at <-20℃, or >70℃)	
Storage Temperature (℃)	-20℃- 35℃ with 50% - 70% SOC	
Interface	CANopen	
BMS Power Consumption	10mA in wake-up mode, <1mA in dormant mode.	
Battery Box Material	Powder coated iron case	
Battery Terminals	Pin & sleeve receptacle, HV600	
Battery Dimensions (L x W x H)	520 x 345 x 220 mm	
Weight	26.5 Kg	29.1 Kg
Mounting Position	Upright	
Cooling	Natural Convection	
Ingress Protection (IP)	IP56	

4. Installation and Commissioning

4.1 Checking Before Installation

Before unpacking the battery, check the outer packing for damage, such as holes and cracks. If any damage is found or the battery is not what you requested, do not unpack the product and contact us as soon as possible.

After unpacking the battery, check that the deliverables are intact and complete, and free from any obvious damage. If any item is missing or damaged, contact us as soon as possible.

4.2 Installation Angle and Space

Garden tractor battery always need to installed upright. In order to maintain the best anti-vibration, heat dissipation performance. Do not install the battery at forward tilted, back tilted, side tilted, or upside down.

During installation, ensure that there is no flammable or explosive materials in battery compartment. Reserve adequate space for heat dissipation and safety isolation.

DO NOT install, or operate your battery in any corrosive environment, whether in acidic or alkaline. If in doubt consult a qualified electrician or contact us for advice.

4.3 Commissioning

After installation and electrical connection, the installer needs to double check below items before commissioning of a battery.

NOTICE

- Inspect all cables are in good condition without any broken. If not, the installer needs to change the broken cable with good one.

- Check torque value on all battery terminals or fuse with a torque wrench. **NOTE** all torque value needs to meet criteria to prevent any poor connection risk, which will cause low charge/discharge efficiency, battery overheat, accelerate degradation, or even cause safety risk.

- Inspect all polarity to ensure there is no reverse connection occurred. If yes, the installer needs to reconnect all batteries with correct polarity.

5. Charging and Maintenance

5.1 Battery Charging

It is recommended to select a specific lithium-ion battery charger designed for the garden tractor battery. It is always important to match your charger to deliver the correct voltage and current for the battery you are charging. For example, you wouldn't use a 72V charger to charge to the 48V garden tractor battery.

For first time use, or so long as the battery has been stored for a long time. You need to make the battery fully charged before use, the battery fuel gauge will study and calibrate by itself then.

⚠ WARNING

- **Keep charger away from children and pets.**
- **Use charger in a dry and well-vented place.**
- **Do not cover charger at charging up.**
- **Do not leave battery connected to charger constantly.**
- **Do not disassemble charger.**
- **Do not use charger when it is damaged, or charger cables are broken.**
- **Do not throw charger into fire or expose it to extreme temperatures.**
- **Do not deform charger, or modify it in any way.**
- **Use of improper extension cord could result in a risk of fire, or electric shock.**
- **To reduce risk of electric shock, unplug charger from outlet before attempting any maintenance or cleaning. Turning off controls will not reduce this risk.**

5.2 Battery Maintenance

For fault-free, safe, reliable, and long-lasting operation of your garden tractor battery, it is essential to carry out regular function checks and cleaning.

Table 6-2 Function check and cleaning

Interval	Actions
Every 1-2 months	Check for any functional errors of battery on dashboard.
Every 3-6 months	Carefully observe the battery for any visible damage.
	Carefully listen to any abnormal noise during operation of the battery.
	Check battery terminals are not corroded, or rusted. If yes, cleaning them by mixing baking soda with water.
	Check for any loose or damaged connections, or wires.
	Carefully clean the outside of battery with a clean, moist cloth. For tougher dirt, use a small amount of household dishwashing detergent on a moist cloth.

NOTICE

If you want to store your battery long term, please follow up below instructions to reduce battery ageing:

- Do not fully charge or fully discharge your battery — charge it to around 50%. If you store a battery is fully discharged, the battery could fall into a deep discharge state, which renders it incapable of holding a charge. Conversely, if you store it fully charged for an extended period of time, the battery may lose some capacity, leading to shorter battery life.
- Turn off your battery to avoid additional battery management system (BMS) energy consumption.
- If you plan to store your battery for longer than six months, charge it to 50% every 3 - 6 months.
- We recommend battery not-in-use go through a full maintenance cycle (charging to 100% SOC, discharging to 100% DOD, charging to 50% SOC) once every 6-12 months to maintain the battery's performance.

Tips

- Avoid temperature extremes, both high and low, when using or storing lithium batteries. Elevated temperatures can accelerate degradation of almost every battery component and can lead to significant safety risks, including fire or explosion. If in doubt contact our technical sales for advice.

6. Uninstallation and Disposal

6.1 Uninstallation

⚠ DANGER

- Improper uninstallation of the battery may cause catch fire, or electric shock.
- The battery must be only uninstalled by a well-trained electrician.

6.2 Disposal

NOTICE

- Improper transport of battery may cause catch fire, or emission of toxic substances.
- Transport the battery in their original packaging only. If you no longer have the original packaging, new packaging can be requested from us.
- Never transport damaged battery.
- Improper disposal of battery may cause catch fire, explosion, or emission of toxic substances.
- Do not dispose of battery in fire.
- The battery it contains must not be disposed of as domestic waste!
- Dispose of the battery it contains in an environmentally friendly way through suitable collection systems.