

TYKOOL[®]

User Guide & Warranty

LITHIUM LAWN MOWER BATTERIES

Group U1 Series

For more information & support please visit: <http://www.tykoolbattery.com>
Customer Service Email: aftersale@tykoolbattery.com
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A Message to Our Customers

Dear Rider and Powersports Enthusiast,

On behalf of the entire TYKOOL team, thank you for placing your trust in us. We know you have choices when it comes to powering your ride, and we are honored that you chose TYKOOL.

Who We Are: The Powersports Specialists TYKOOL is more than just a battery manufacturer; we are a professional team dedicated exclusively to the powersports industry. Our mission is to deliver the extreme performance of Lithium Iron Phosphate (LiFePO₄) technology backed by dependable quality and dedicated customer care.

Unrivaled Compatibility & Choice We take pride in offering the world's most comprehensive SKU lineup of powersports lithium batteries. Whether you are riding a vintage cruiser, a modern superbike, or a heavy-duty UTV, TYKOOL is engineered to be the perfect, direct-replacement fit for your machine.

Engineered for Your Specific Needs To better serve our diverse community, we have developed two distinct product tiers:

The STD (Standard) Series: Specifically designed for riders looking to upgrade from traditional lead-acid batteries. It ends the frustrating cycle of annual battery replacements and lowers your long-term cost of ownership.

A Message to Our Customers

The PRO Series: Built for professional users, enthusiasts, and those with modified vehicles who demand the absolute limits of performance and durability.

Your Role in Peak Performance To ensure your TYKOOL battery delivers thousands of reliable starts, we ask that you read this guide thoroughly. Critical performance depends on a healthy environment: please follow our instructions to verify your vehicle's charging system during installation and adhere to our recommended charging and maintenance protocols.

Thank you again for choosing TYKOOL. We are committed to continuous innovation and look forward to supporting your adventures on and off the road.

Ride safe and ride strong,

A handwritten signature in black ink that reads "Kevin Hsiang". The signature is written in a cursive, flowing style.

Operations Director @TYKOOL

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Warnings:



BEFORE USING THIS PRODUCT, PLEASE CAREFULLY READ AND UNDERSTAND THE SAFETY INFORMATION. Failure to follow these safety instructions may result in ELECTRICAL SHOCK, EXPLOSION, FIRE, potentially leading to SERIOUS INJURY, DEATH, or PROPERTY DAMAGE.



Fire: Do not cover the battery or place objects on top. Keep away from flammables. Tighten terminals to 70-90 in-lbs to prevent high-resistance overheating and fire risk.



Explosion: Use ONLY LiFePO₄-compatible chargers. STOP USE IMMEDIATELY if charging voltage exceeds 15.0V. Do not charge/discharge if the battery is swollen, melted, frozen, or outside operating temperatures. Never allow voltage to drop below 9.8V. Do not short-circuit or incinerate.



Electrical Shock: This device can deliver a harmful shock. Do not submerge or expose to water.



Shipping: SHIPPING DAMAGED LITHIUM BATTERIES IS ILLEGAL. If the battery is swollen or melted, contact a local certified recycling center for disposal immediately.

Installation & Safety Verification

1. Pre-Installation Inspection & Verification (MANDATORY)

At TYKOOL, we want you to enjoy thousands of reliable starts. Since our advanced LiFePO4 technology interacts differently with your vehicle than traditional lead-acid batteries, these quick pre-installation checks are designed to ensure your vehicle's charging system is healthy and ready to protect your new investment.

Physical Check: Visually inspect the product for any signs of damage, such as cracks or dents. Ensure the battery terminals are free of dirt, oxidation, or corrosion.

Charge Status: Before installing the product, make sure it is fully charged.

Vehicle System Check: You **MUST** verify your vehicle's charging system status with a multimeter before final terminal connection.

Please refer to the included 148mm x 105mm "**PRE-INSTALL SAFETY CHECKLIST**" CARD .

Running Test: Set your multimeter to 20V DC. While the engine is running at the suggested RPM (WOP), the voltage must not exceed 14.8V.

Critical Warning:

Detection of voltage over **15.0V** indicates a faulty regulator.

Continued use will trigger a BMS shutdown to prevent damage.

This situation may **void the warranty**. This limit is set to safeguard your vehicle's expensive electronic components from power surges.

2. Physical Installation Steps

Orientation: The product can be installed in any horizontal or vertical orientation except with the terminals facing downwards.

Securement: Secure the battery firmly to the battery tray or case, ensuring the battery wires can easily reach both terminals.

Connection: Using the included fasteners, connect the POSITIVE (+) wire to the positive terminal and the NEGATIVE (-) wire to the negative terminal. Always ensure correct polarity.

Torque: Use 70-90 in-lbs of torque to hold the battery connections securely. **DO NOT OVERTIGHTEN.** Loose connections can lead to performance degradation, overheating, and potential fire hazards.

Battery Technology Selection Guide:

LiFePO4 vs. Lead-Acid

1. Underlying Technology: Chemical Buffer vs. Digital Management

In the powersports industry, transitioning from Lead-Acid to Lithium Iron Phosphate (LiFePO4) is a shift from Passive Chemistry to Active Digital Management.

Lead-Acid (Traditional): Rely on slow chemical reactions. Due to their chemical buffering effect, they possess a certain degree of "shock resistance," meaning that even when a vehicle experiences rectifier aging or failure that passively exposes the battery to voltages above 15V, the lead-acid battery may still appear to be functioning normally. However, this shock resistance comes at the cost of internal damage (sulfation) and a significantly shortened lifespan.

TYKOOL LiFePO4 (Advanced): Controlled by an integrated Battery Management System (BMS). It is a precision electronic device. The BMS acts as a "Digital Fuse," prioritizing the safety of the cells and your vehicle's expensive electronics over continuous operation during an electrical fault.

2. Why Choose TYKOOL LiFePO4?

High Performance & Consistency: Unlike lead-acid batteries that lose cranking power as they drain, TYKOOL lithium batteries provide a high, stable current until the battery is nearly empty.

Easy State-of-Charge (SOC) Monitoring: With a much flatter discharge curve, the battery voltage remains stable, allowing for more predictable and readable power levels through our integrated monitoring.

Superior ROI (Return on Investment): While the initial purchase price is higher, the extended lifecycle—lasting as long as 3 to 5 traditional batteries—results in a significantly lower "cost per start" and fewer maintenance hassles.

3. Mandatory Compatibility & Risk Warning

The "Safety vs. Inconvenience" Trade-off

A BMS-initiated shutdown is a protective action, not a product defect. When your vehicle's charging system fails (e.g., regulator failure pushing voltage too high), the BMS will "lock" the battery to prevent a fire or the destruction of your motorcycle's expensive ECU and electronics. While this causes a temporary loss of power, it saves you from catastrophic repair costs.

Vehicle Compatibility Check (CRITICAL: to protect your vehicles)

Over-Voltage Risk: You **MUST** ensure your vehicle's regulator does not output more than 15.0V. Continuous exposure to high voltage can lead to cell swelling or casing melt.

Installation Torque: Terminals must be tightened to 70-90 in-lbs using proper tools. Loose connections in high-vibration environments can cause electrical arcing, leading to terminal melting and fire hazards.

Summary

Choosing TYKOOL means choosing a smarter, lighter, and more durable power source. However, this high-performance technology requires a healthy vehicle environment. By following our installation and voltage checks, you protect your investment and ensure thousands of reliable starts.

4. Compatibility Statement

TYKOOL batteries are **NOT drop-in replacements for Yuasa® Conventional or Yumicron** battery series. These batteries may be designed for older AC or half-wave systems will damage the battery internal BMS. You **MUST** install a full-wave DC rectifier before use. Exposure to voltage exceeding 15.0V will result in "Over-Voltage" failure and damage the battery.

Charging Instructions

To ensure the safety, performance, and maximum lifespan of your TYKOOL battery, please adhere strictly to the following charging protocols.

1. Charger Compatibility & Specifications

Required Voltage: Use only a dedicated DC lithium battery charger with a regulated output of 14.60 Volts.

Charging Profile: Ensure the charger utilizes a CC/CV (Constant Current / Constant Voltage) charging profile specifically designed for Lithium Iron Phosphate (LiFePO₄).

The Lead-Acid Warning: Do NOT use traditional lead-acid chargers unless they have a specific "Lithium" mode. Standard lead-acid chargers often feature a "Desulfation" or "Recovery" mode that uses high-voltage pulses. These pulses can exceed 15.0V, potentially damaging the BMS or causing the battery to enter a permanent protection lock.

2. The Charging Process

Preparation: Visually inspect the battery terminals for cleanliness. Ensure they are free of oxidation or debris.

Connection: Connect the Positive (+) charger lead to the positive battery terminal and the Negative (-) charger lead to the negative battery terminal. **Torque Safety:** If charging while the battery is installed in a vehicle, ensure the terminals are tightened to 70-90 in-lbs to prevent arcing due to loose connections.

Cell Balancing: Allow the charger to complete the full cycle until it indicates a "Full" status. This final stage is critical as it allows the internal BMS to perform Cell Balancing, ensuring all four internal cells maintain equal voltage for a longer service life.

3. Environmental & Safety Constraints

Temperature: For optimal safety, do not charge the battery if the ambient temperature is below 0°C (32°F) or above 45°C (113°F).

Supervision: While TYKOOL batteries utilize advanced safety technology, it is recommended to charge the battery in a well-ventilated area away from flammable materials.

4. Recommended Charger Specifications

Selecting a charger with the correct output current (Amps) is vital for maintaining the internal health of the lithium-ion cells. Please select your charger based on the following technical requirements:

Regulated Voltage: The charger must provide a fixed and stable output of 14.60V DC.

Amperage Compatibility: Select a charger with an output current (Amps) that matches the recommended rating for your specific battery capacity. Refer to your battery's technical data label for the specific "Recommended Charging Current."

Heat & Longevity: Although lithium-ion technology allows for quick charging, utilizing a charger with an amperage significantly higher than recommended can generate excessive internal heat and may reduce the battery's total cycle life.

Smart Circuitry: Always use a "smart" lithium-specific charger that includes an automatic cut-off feature to prevent overcharging and to avoid triggering the BMS high-voltage protection lock.

Charger Selection Recommendations

Charger Selection

Battery Models (pro)	Capacity	14.6V1A	14.6V2A	14.6V3A	14.6V5A	14.6V10A
U1-S-400	8AH	Not advised	OK (Slow)	OK	OK	AVOID
U1-M-480,U1R-M-480	12AH	Not advised	OK (Slow)	OK (Slow)	OK	OK
U1-L-800	28AH	Not advised	Not advised	OK (Slow)	OK (Slow)	OK

IMPORTANT: Use ONLY dedicated LiFePO4 (Lithium Iron Phosphate) chargers. NEVER use lead-acid chargers with desulfation or pulse modes.

BMS Guide

The product is equipped with an advanced Battery Management System (BMS) that monitors internal lithium-ion cells and manages critical safety parameters. The BMS is designed to disconnect the battery in the event of a fault to prevent electrical shock, explosion, fire, or property damage.

BMS Protective Functions

Safety Disconnection: The BMS prevents over-charging, over-discharging, over-current, and short circuits.

Advanced Cell Balancing: Automatically maintains voltage equilibrium among individual cells to ensure optimal battery performance and significantly extend service life.

Manual Fault Recovery Guide

If a protection event occurs, the BMS will lock the output. Please follow the manual recovery process below:

Protection Trigger	Correct Recovery Procedure	Diagnostic Requirement
Over-Charge Over-Voltage	Please apply an external electrical load for recovery.(e.g., turn on headlights)	CRITICAL: Check if system charging voltage exceeds 15.0V.
Over-Discharge	Please apply a charger for recovery.	Ensure voltage is above 12.8V before installation .If voltage remains at 0V after charging, ensure the original voltage was not below 9.8V.
Over-Current Short-Circuit	Please remove the external load for recovery.	Verify terminals are torqued to 70-90 in-lbs.

CRITICAL ADVISORY:

BMS LIMITATIONS & EXTERNAL ELECTRICAL FAILURES

The Role and Limits of the Battery Management System (BMS)

This product is equipped with an advanced BMS designed to monitor internal cells and disconnect in case of a fault to prevent fire or catastrophic failure. However, the BMS is an electronic component with physical tolerance limits. It is NOT a substitute for a properly functioning vehicle charging system or correct installation.

Critical External Risk Factors:

1. Excessive Over-Voltage (Regulator Failure)

The Threshold: Detection of voltage over 15.0V indicates a potential issue with your vehicle's regulator.

The Risk: Continuous exposure to faulty charging systems (>15.0V) can overwhelm the BMS protection circuits.

Consequences: Persistent over-voltage can lead to electrolytic breakdown within the cells, causing cell swelling, internal heat accumulation, or even melting of the battery enclosure. Such damage is caused by the vehicle's electrical system and is not a battery defect.

2. Vibration & Loose Connections

Torque Requirement: All connections must be secured to 70-90 in-lbs of torque using proper tools.

Arcing Risk: In high-vibration environments (e.g., V-Twin motorcycles), loose terminals can cause electrical arcing.

Consequences: Arcing generates extreme localized heat that can melt the battery terminals and casing before the BMS can intervene. This can lead to sudden power loss or smoking hazards.

BMS: IMPORTANT NOTICE REGARDING LIABILITY:

A BMS-initiated shutdown is a protective safety action triggered by external electrical faults (e.g., regulator failure, loose connections, or short circuits)

Such incidents are vehicle-side issues and are not battery manufacturing defects. Under no circumstances is TYKOOL responsible for consequential damages, including but not limited to towing fees, labor costs, or roadside assistance.

Technical Specifications

	U1-S-400	U1-M-480	U1R-M-480	U1-L-800
Compatible models	BCI Group U1 (200A)	BCI Group U1 (300A)	BCI Group U1R	BCI Group U1 (350A)
BatteryType	Lithium - Ion Battery			
Chemistry Type	Lithium Iron Phosphate (LiFePO4)			
Nominal Voltage (V)	12.8			
Capacity (Ah)	8	12	12	28
Watt-Hours (Wh)	102.4	153.6	153.6	358.40
Cold Cranking Amps (A)	400	480	480	800
Continuous Discharge Current	16A (Max)	24A (Max.)	24A (Max.)	56A (Max.)
Max. Charging Voltage (V)	14.6V			
Charging Current (A)	8A (Max)	8A (Max)	12A (Max)	28A (Max)
Operating Temperature	-20°C to 60°C			
Charging Temperature	-10°C to 50°C			
Storage Temperature	-20°C to 60°C			
Housing Protection	IP66			
Dimensions: Inches	5.59*3.4*5.7	5.59*3.4*5.7	5.59*3.4*5.7	5.59*3.4*5.7
Weight: lb	3.96	5.1	5.1	8.8

TYKOOL Lawn Mower LiFePO₄ Battery Compatibility Guide

Version: v1.0 Date: 2026-01-18

Covered Products: TYKOOL 12.8V LiFePO₄ Lawn Mower Batteries (U1/Group U1 family)

Intended Audience: End users, service technicians, distributors

1. Purpose & Scope

This guide defines how to verify charging - system compatibility between TYKOOL LiFePO₄ (LFP, 4 - series) batteries and small gasoline - engine lawn equipment (yard tractors/riding mowers/walk - behind types). It also provides in - field identification, measurement SOP, risk control and retrofit recommendations. It does not apply to: purely electric tools charged by external chargers, 48V/36V traction mowers, or lead - acid maintenance scenarios.

2. Terms & Abbreviations

LiFePO₄ (LFP): Lithium iron phosphate chemistry.

4S: 4 cells in series; nominal 12.8V; full - charge upper limit ≈14.6V (≈3.65V/cell).

BMS: Battery Management System with OVP/UVP/OCP/SCP.

Unregulated charging system (DC - only / Dual - Circuit): Output voltage rises with engine RPM; no constant - voltage control.

Regulated system (Rectifier-Regulator present): Uses a finned aluminum/black module for rectification and regulation.

Load dump: A high-voltage transient when the generator loses load suddenly while producing current.

Compatibility Guide

3. Compatibility Principles (Prescriptive)

- 1) Prefer regulated systems equipped with a proper rectifier-regulator.
- 2) Unregulated systems are risky: their output increases with RPM and may exceed the LFP permissible limit (~14.6V), easily tripping BMS over-voltage protection (OVP) causing engine stall or intermittent charging. It causes continuous damage to the battery and significantly reduces battery life.
- 3) When BMS disconnects, load-dump transients (brief spikes above 14V) may occur and stress on-board electronics; peak values vary by platform, so source-risk reduction is prioritized (retrofit a regulator or replace with a regulated assembly).
- 4) Judge by charging-system type, not by model/year labels: the same mower model may ship with different charging options across batches.

4. Quick Visual Check (No Disassembly)

Goal: Decide “regulated or not” in 30 seconds.

A. Harness & connector cues: - A finned aluminum/black module near the flywheel/block with multiple wires → very likely regulated. - Only a small in-line diode “black lump” on the harness (often on a red wire), or a red/black pair where the red leg has a single diode → typically unregulated DC-only / Dual-Circuit.

B. Meter pre-screen (recommended): - Measure battery terminal voltage at idle and at 3600 RPM. If the 3600-RPM reading is plainly above 14.6V (or keeps climbing without a stable plateau), treat it as unregulated or regulator-fault.

Note: Visual details vary by brand/year. Presence of a rectifier-regulator and the 3600-RPM measurement are the final check.

Compatibility Guide

5. Compatibility Matrix

Type of Charging system	Battery-terminal V @ 3600 RPM (no extra loads)	TYKOOL LFP compatibility	Recommendation
Regulated (with rectifier-regulator)	≤14.6V and stable	Compatible	Use directly; enable low/high-temp protections; periodic health check of the regulator
Regulated	14.7–15.2V slightly high	Caution	Check regulator & grounds; replace with a unit holding 14.4±0.2V plateau if needed
Unregulated DC-only / Dual-Circuit	Voltage rises with RPM, may exceed 14.6V	Not recommended	Prefer retrofitting a rectifier- regulator; or temporarily disconnect charge lead and maintain with an external LFP battery charger.
Regulator failure / wiring fault	Large ripple or abnormal rise	Incompatible	Troubleshoot first, then reconnect LFP battery

Compatibility Guide

6. Field Measurement SOP

Tools: DMM ($\geq 0.1\%$ accuracy preferred), tachometer (optional), insulated gloves

Steps:

- 1) **Visual check:** correct polarity, no loose/corroded terminals.
- 2) **Start engine:** log idle voltage.
- 3) **Ramp to 3600 RPM (or rated speed):** record voltage behavior.
- 4) **Turn off lights/accessories and repeat Step 3** (exclude load effects).
- 5) **If exceeding TYKOOL BMS OVP or trending upward continuously** → **incompatible, follow Section 8.**

Key thresholds: - TYKOOL U1-series BMS OVP: 15.2V (typ.).

Example: U1 family OVP = **15.2V**; release threshold per BMS design (absent a model-specific figure, assume a **14.6–14.8V** typical reset band for conservative judgement). - If a datasheet is unavailable on site, treat **14.6V** as the upper limit not to be sustained.

7. Risks & Notices (ANSI Z535 Structure)

WARNING — Load-dump risk: With unregulated charging at high RPM, if BMS trips OVP and disconnects, transients above **14V** may occur and stress ignition, lighting or dash electronics. **Do not connect an LFP** battery until regulation is confirmed.

CAUTION — **Temperature & environment:** Operate/store within datasheet temperature windows; for cold cranking, use pre-heat strategy or a model with built-in low-temp heating.

Compatibility Guide

8. Recommended Engineering Actions

Plan A (preferred) — Retrofit to a regulated system

- Selection: a **rectifier-regulator** matching the engine and flywheel pole-count/harness. - Verification: after replacement, repeat the SOP at **3600 RPM**; confirm a **14.4±0.2V** regulation plateau.

Plan B (temporary) — Disconnect charge lead + external charger

- Isolate the engine charging lead; use the battery only for cranking/ignition. - Maintain with a LiFePO₄-compatible smart charger (CV **14.4–14.6V**, temp management, storage mode). - If the unit has an electric PTO clutch/large lighting loads, prefer Plan A.

Key thresholds: - TYKOOL U1-series BMS OVP: 15.2V (typ.).

Example: U1 family OVP = **15.2V**; release threshold per BMS design (absent a model-specific figure, assume a **14.6–14.8V** typical reset band for conservative judgement). - If a datasheet is unavailable on site, treat **14.6V** as the upper limit not to be sustained.

9. FAQ

Q1: Lead-acid worked fine before; why does LFP trip protection?

A: Lead-acid tolerates higher short-term charge voltages and has no BMS cut-off. LFP requires strict 14.2–14.6V limiting; overshoot or sustained over-voltage will trigger OVP.

Q2: How to quickly decide if my riding mower needs a retrofit?

A: Look for a finned rectifier-regulator first; then measure at 3600 RPM. If either check fails (no regulator or terminal voltage clearly >14.6V), retrofit is advised.

Compatibility Guide

Q3: I saw claims of “spiking to tens of volts”. True?

A: Load dump in automotive standards can reach tens of volts or more, but platforms vary widely. Our user guide uses mechanism-level warnings + engineering mitigation (prioritize regulation and avoid BMS trip events).

10. Other statement for comatibility

Compatibility statement: This product must be connected to a regulated 12V charging system. If uncertain, complete the checks and measurements in this guide first.

Measurement tip: Use the 3600-RPM battery-terminal reading as the criterion; readings exceeding the 15.2V OVP indicate incompatibility (or imminent protection trip).

Installation note: U1R-M-480 has reversed terminal polarity vs.other U1 models. Verify markings before wiring. No reverse connection.

Symptom clue: Stall at high RPM / dash resets / PTO clutch chatter → first check for BMS OVP cut-off and unregulated charging.

11.Model cues often seen with unregulated systems (identify by system type to be sure):

Note: Hints only; not definitive. Always confirm by visual regulator check + 3600-RPM measurement.

- Craftsman LT1000 / LT2000 (some years; single-cyl B&S)
- John Deere L100 family (some configs: manual 5-speed + single-cyl B&S + no electric PTO)
- MTD / Yard Machines 13-chassis (pre-2010 batches)
- Other earlier small-engine platforms (circa 1990–2015)

Part I: Warranty Policy (English)

TYKOOL Powersports Battery 1-Year Limited Prorated Warranty

1. Warranty Statement

TYKOOL warrants to the original purchaser that this lithium iron phosphate (LiFePO₄) battery product (the "Product") will be free from defects in materials and workmanship for a Prorated Term of 1 Years from the date of purchase. This warranty is valid only for the original purchaser and is non-transferable.

2. Coverage Structure & Term

The warranty coverage follows a prorated schedule based on the duration of ownership. In the event of a confirmed **manufacturing defects**, the remedy is provided as follows:

Year 1 (Months 1 - 12): Free Replacement.

TYKOOL will replace the defective battery free of charge.

Note: The replacement unit assumes the remainder of the original warranty period. It does not start a new 1-year term.

3. Validation & Eligibility

To ensure warranty validity, one of the following conditions must be met:

Proof of Purchase (Primary): The warranty period commences on the Date of Purchase shown on a valid receipt or Order ID.

No Receipt Protocol (Secondary): In the strict absence of a receipt, the warranty period commences on the Manufacturing Date laser-coded on the battery casing.

4. Warranty Exclusions & Eligibility Limits

To maintain your warranty eligibility, please avoid the following conditions, as they are excluded from coverage:

4.1. Electrical System Failures & Over-Voltage (>15.0V)

The "15V Rule": Damage caused by a faulty vehicle charging system is NOT a battery defect.

Operation under charging voltages exceeding 15.0 Volts falls outside the scope of this limited warranty. This limit is set to safeguard your vehicle's expensive electronic components from power surges.

Evidence: This is identifiable by melted casings, bulging, or thermal oxidation (discoloration) of the battery terminals.

4.2. Improper Charging & Maintenance

Incompatible Chargers: Use of lead-acid chargers with "Desulfation" or "Pulse" modes, or any charger exceeding 14.6V Voltage output or exceeding maximum charging current written on the technical specification chart on this user guide.

Over-Discharge (<9.8V): Allowing voltage to drop below 9.8V due to lack of maintenance or parasitic drain (e.g., alarms, clocks). This causes irreversible chemical damage.

4.3. Unreasonable electrical modifications to vehicles.

4.4. Product malfunctions caused by use other than starting vehicles.

4.5. Installation & Physical Damage

Torque: Terminals not torqued to 70-90 in-lbs, resulting in loose connections and heat damage.

Physical Abuse: Cracks, dents, or stripped terminals from impact or overtightening.

Modifications: Opening the case, bypassing the BMS, or removing the laser-coded serial No. on the battery case.

5. Compatibility Statement

TYKOOL batteries are NOT drop-in replacements for Yuasa® Conventional or Yumicron battery series. Because these original batteries are designed for older AC or half-wave systems with the vehicles. Battery damage may be caused by the AC or half-wave charging system.

6. Limitation of Liability

TYKOOL's liability is strictly **limited to the replacement** of the battery per these terms. TYKOOL shall NOT be liable for any special, indirect, incidental, or consequential damages, including but not limited to towing fees, roadside assistance, labor costs, loss of time, or damage to other vehicle components.

7. Warranty claim Process

TYKOOL employs a streamlined digital process to minimize shipping costs and handle hazardous materials safely.

Initiate Claim:

Amazon Customers: Email aftersale_amz@tykoopower.com with your Order ID or a valid receipt.

Official Site Customers: Email aftersale@tykoolbattery.com with your Order ID or a valid receipt.

Digital Evidence: Provide a video showing the laser-coded number and a live voltage reading, plus clear photos of the terminals, sometimes clear photos of the battery charger used by user will be required to be provided.

Safe Decommissioning & Disposal Authorization

Process: Upon initial approval of your claim, you will be instructed to perform Safe Decommissioning or Certified Recycling. TYKOOL prioritizes your safety and environmental protection.

Required Action: You must provide one of the following as proof of decommissioning:

Certified Recycling: A video or photo showing the battery being handed over to a local certified battery recycling center, or a scan of the recycling receipt.

Authorized Terminal Decommissioning: If recycling is unavailable, our team may instruct you to record a video of "Safe Terminal Decommissioning" (e.g., clipping the terminal tabs or marking the serial number as 'VOID' as per specific support instructions).

CRITICAL SAFETY WARNING: DO NOT drill into the battery casing, puncture, or incinerate the unit. DO NOT ship hazardous or damaged lithium batteries via standard mail.

Part II: A Critical Implementation Guide (SOP)

To ensure your safety and warranty eligibility, please perform this simple 3-step check during installation.

Technical Diagnosis: The "3-Step Voltage Check"

Before approving any claim, verify the battery status using the following table. This distinguishes between a "bad battery" and a "faulty vehicle charging system."

Phase	Action	Ideal Range (Pass)	Alert Range (Fail)	Diagnosis & Next Step
1. Resting	Engine off	13.1V - 13.5V	< 12.8V	Low Charge. Charge the battery first. If voltage drops rapidly after charging, proceed to claim.
2. Starting	During Cranking	> 9.5V	< 8.0V	Weak Start. Could be battery or starter motor.
3. Running Engine running at target RPM	@ 3000- 3600 RPM for Riding Lawn Mowers	13.6V - 14.7V	> 15.0V	OVER-VOLTAGE. Regulator failure. Excluded from warranty. Repair vehicle before replacement.

Additional Important Safety Warnings

Operation. Operating temperature range is -4°F(-20°C) to 140°F(60°C). Charging temperature range is 14°F(-10°C) to 122°F(50°C). Do not operate outside the recommended temperature ranges.

Storage. Recommended storage temperature range is -4°F(-20°C) to 140°F(60°C). Do not exceed 140°F(60°C) under any circumstances. For optimal lifespan, store at 25°C and maintain a state of charge above 70%. Self-discharge rate is less than 1%/month. Storing the battery for more than 6 months without charging is not recommended.

Charging. This product is a 12V lithium-ion battery. Do not use chargers with pulse charging or desulfation features. For optimal performance, we recommend using only the 12V lithium battery mode of DC charging. If using a third-party charger, it must be compatible with 12V LiFePO4 batteries, have a charging voltage of 14.6V. Use caution with low-quality chargers, as they can pose severe electrical risks, leading to personal injury, property damage, shortened product life, and product failure. TYKOOL is not responsible for the safety of using accessories or chargers not approved by TYKOOL. If the battery overheats, deforms, swells, or emits smoke or odor during charging, stop using it immediately and contact support.

Connections. Ensure all connections to the product are secure. Use 70-90 inch-pounds of torque to properly secure connections. Loose connections can lead to performance degradation and overheating due to resistance, potentially causing the enclosure to melt or potentially leading to a fire.

Retrofit. Lithium-ion batteries are significantly lighter than lead-acid batteries of comparable capacity. Some equipment is designed to utilize the weight of lead-acid batteries for weight distribution. Using this product as a replacement battery may affect the weight distribution of the equipment.

Understand the consequences of changing the weight distribution and ensure safe weight distribution. You assume full responsibility and liability for any damage, injury, or accident resulting from decreased stability.

Handle this product with care. Damage from impact may occur. Do not use a damaged product, including a cracked enclosure. Moisture and liquids can damage the product. Do not handle the product or any electronic components near liquids. Store the product in a dry location. If the product becomes wet, do not operate it. If the product is running and becomes wet, stop using it immediately. Modifications. Do not attempt to alter, modify, or repair any part of the product. Disassembling the product may result in injury, death, or property damage. If the product is damaged, malfunctions, or comes into contact with any liquids, stop using it and contact TYKOOL. Never disable the internal Battery Management System (BMS) for any reason. Any modifications will void your warranty.

Cleaning. Disconnect and remove this product before cleaning. If exposed to liquids or any contaminants, immediately dry the product. Use a soft, lint-free (microfiber) cloth. Do not use high-pressure water to clean the battery.

Personal Protection. Use this product only as intended. In case of an emergency, have someone present when using this product. When working near batteries, wear full protective gear, including eye protection and protective clothing. Wash hands after handling batteries and related materials. Do not wear any metal objects, including tools, watches, or jewelry, when handling batteries, as they can cause sparks or short circuits, leading to electric shock, fire, explosion, and resulting injury, death, or property damage.

Proposition 65. The battery terminals, and related accessories contain chemicals known to the State of California to cause cancer, birth defects, and other reproductive harm.

Minors. If the "Purchaser" intends for a minor to use the product, the adult Purchaser agrees to provide detailed instructions and warnings to any minor prior to use. The "Purchaser" agrees to indemnify TYKOOL for any accidental use or misuse by a minor.

Choking Hazard. Product accessories may pose a choking risk to children. Keep children away from unsupervised access to this product or any accessories. This product is not a toy

Ventilation. This product does not release gases during normal use and does not require special ventilation. However, it is crucial to minimize exposure to extreme temperatures or restricted airflow around the product. Maintain at least 0.50 inches (12.7 mm) of clearance around the product to allow for adequate air circulation.

Medical Devices. This product may emit electromagnetic fields. It contains magnetic components that may interfere with pacemakers, defibrillators, or other medical devices. Consult your doctor before use. If you suspect this product is interfering with medical equipment, stop using it immediately and consult your doctor.

Disposal. This product must be recycled or disposed of separately and not with household waste. Discarding this product in household trash is illegal under state and federal environmental laws. Please take this product to a local battery recycling center.

Explosive Environments. Observe all signs and instructions. Do not operate this product in any area with potential explosive environments, including fueling areas or areas containing chemicals or particulates (such as grain, dust, or metal powders)

Radio Frequency Interference. This product complies with regulations governing radio frequency emissions. Radiation from this product may negatively affect the operation of other electronic equipment, potentially causing them to malfunction.