



HIO BATTERY

USER MANUAL

FOR GOLF CART LITHIUM BATTERIES

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MODELS COVERED



Model	Part #
38.4V 100Ah	HIO38100G
51.2V 54Ah	HIO51054C
51.2V 105Ah	HIO51105C
51.2V 105Ah	HIO51105S
70.4V 105Ah	HIO70105S
76.8V 105Ah	HIO76105G

MEET YOUR BATTERY



Legend	Descriptions
1 (P+)	Positive Terminal
2 (OFF/ON)	Power Button Port
3 (CAN)	COM(CAN) Port
4 (BT)	Bluetooth Antenna
5 (VENT)	Safety Vent
6 (DISP)	LCD Display Port
7 (BZ)	Buzzer Port
8 (P-)	Negative Terminal
9	Lifting Handles

BATTERY COMPONENTS & ACCESSORIES

CHARGER

GENERAL

- ⚠ DO NOT USE UNAPPROVED BATTERY CHARGERS OR TENDERS
 - ➡ To protect your battery, ensure optimal charging and extend battery lifecycle, use only genuine HIO Battery lithium chargers or chargers specifically approved by HIO Battery.
- ⚠ DO NOT CONNECT DC OUTPUT CABLES TO THE BATTERY WITH REVERSED POLARITY
 - ➡ Such an action will result in permanent damage and will not be covered by the warranty.



CHARGING INSTRUCTIONS

1. Turn off the cart and battery before charging.
2. For onboard chargers, connect the AC input to the vehicle's charge port; for offboard chargers, plug the charger into an AC power outlet.
3. Do not charge the battery below 32°F (0°C).
4. The charger's LED will blink red during charging and turn solid green when charging is complete.
5. Disconnect the AC power after charging is complete.
6. Ensure all connections are secure before use.

TIME & CAPACITY

The charge time can be estimated using the following formula:

$$\text{Charge Time (hours)} = \frac{\text{Battery Capacity (Ah)}}{\text{Charger Output (Amps)}}$$

Example: For a 105Ah battery and an 18A charger:
 $105\text{Ah} / 18\text{A} = 5.8$ hours (assuming the battery is fully depleted).

Our HIO battery charger is not designed as a float or battery maintainer and will not keep the battery at 100% continuously after charging is complete. When left plugged in, the charger will automatically start a new charging cycle once the battery level drops below a certain point. It is normal for the state of charge to decrease to around 90% before the charger restarts. While plugged in, the charger helps maintain the battery at a safe and healthy charge level.

It is a common misconception that lithium batteries develop a “memory” and need to be fully discharged and charged after each use. This does not apply to HIO lithium batteries. Charging the battery nightly will not cause harm and will keep it topped off, ensuring it’s ready for your next adventure. It’s also perfectly fine to top off or partially charge the battery to extend your range.

All HIO battery chargers can accept an AC input ranging from 100 to 250 VAC, single-phase, at either 50 or 60 Hz.

LCD SCREEN (SOC METER)

METER LEGENDS

- ◆ Battery Voltage
 - ➡ The voltage will vary based on the current load or charge placed on the battery.
- ◆ Battery Current
 - ➡ The discharge current (in amperes) is shown as a negative value, while the charging current is displayed as a positive value.
- ◆ State of Charge
 - ➡ The state of charge is shown as a percentage, with 0% indicating empty and 100% indicating full.

Low Battery Alerts

- ➡ A warning message is displayed when SOC drops below 20%.
- ➡ A critical alert is displayed when SOC drops below 10%.

STANDBY & SLEEP MODE

The meter may turn off and enter standby mode after a few minutes of inactivity. After approximately 30 minutes of inactivity, it will enter sleep mode. Press the top touch button to wake the meter.



METER CALIBRATION

The HIO Battery SOC meter does not require user calibration. It self-calibrates after each full charge cycle and during rest periods. Typical accuracy is $\pm 2.7\%$.

Lithium batteries have a relatively flat voltage curve, SOC % provides a more reliable indication of remaining capacity than voltage. Use SOC % rather than battery voltage to decide when to charge.

To maximize battery life and avoid fully depleting the battery, it is recommended to keep the battery above 20% whenever possible. Although the BMS protects against deep discharge, maintaining a higher SOC is recommended.

Monitor your SOC % as you would your vehicle's fuel gauge. The further you are from a charging opportunity, the more battery reserve you should keep.

POWER SWITCH

The external power switch is designed to provide convenient on/off control and is commonly installed on the dash for easy access. It also serves as a safety feature for installation and maintenance.

To turn the battery on, press and release the power button. The green indicator light will turn on.

To turn the battery off, press and release the power button again. The green indicator light will turn off.

It is recommended to turn the battery off after each use and turn it back on before operation.

Note:

- ➡ If the battery does not power on, ensure the battery is charged and the power button is operated correctly.
- ➡ The power switch must be on for the battery to supply power.
- ➡ Always turn the battery off before installation, maintenance, or wiring.

PORTS

 DO NOT connect the ports incorrectly.

- ➡ Handle all ports with care. DO NOT force the connectors into the ports.
- ➡ Before connecting, carefully check the number of pins on the ports and connectors to ensure they are inserted into the correct ports. *(For example, CAN port has three pins, DIS port has four pins)*

DISPLAY PORT

The DIS display port is used to connect the LCD display, authorized hot charger, and upper computer for diagnostics.

CAN PORT

The CAN port is reserved for diagnostics and communication with compatible chargers or motor controllers, and is intended for authorized use only.

POWER SWITCH PORT

The power switch port is used to connect an external power switch for turning the battery on or off.

BUZZER PORT

The buzzer port is used to connect a buzzer for audible alerts.

Note:

Some third-party chargers are CAN-enabled and require a CAN connection to operate. These chargers will not function unless connected to the CAN port.

The charger provided with this battery does not require a CAN connection.

FEATURES & MAINTENANCE

POWER SAVE MODE

Your HIO battery is designed to enter POWER SAVE MODE after prolonged periods of inactivity. This feature helps prevent the battery from being fully depleted if the cart is left unused for an extended time. The POWER SAVE MODE will be activated when the battery is idle for 18 hours.

The battery can be activated by toggling the battery power switch (OFF → ON), pressing the display power button, connecting a charger, drawing current, or via Bluetooth (features may vary by version).

STORAGE

Turn off the cart key when the vehicle is not in use.

If the cart will not be used for an extended period, fully charge the battery, disconnect the charger from AC power, and turn the battery off.

For long-term storage:

- ➡ Fully charge the battery.
- ➡ Disconnect all cables from the battery.
- ➡ Turn off the battery's power button.

Storage requirements:

- ➡ The battery must be recharged at least every 6 months during storage.
- ➡ Store the battery in a clean, dry environment away from moisture and direct sunlight.
- ➡ The recommended storage temperature range is 32–113°F (0–45°C).
- ➡ If the battery is stored in temperatures below -4°F (-20°C), remove it from the cart and store it in a warmer environment. Do not store the battery in temperatures above 113°F (45°C), as prolonged exposure to high temperatures may accelerate battery degradation and reduce service life.

BEFORE USE AFTER STORAGE

Before using the battery after long-term storage, fully charge it regardless of the displayed state of charge (SOC),

Charging must be performed within the temperature range of 32–131°F (0–55°C).

SOC may drift over time and requires a full charge to recalibrate.

Before operation, perform the following checks:

- ➡ Fully charge the battery before use.
- ➡ Verify the SOC reading is reasonable after charging.
- ➡ Turn on the battery and verify normal operation.
- ➡ Ensure all cables and connectors are securely connected.
- ➡ Check for any loose, damaged, or corroded connections.
- ➡ Inspect the battery for any visible damage or abnormalities.

CLEANING

Your battery contains sensitive electronic components. Please follow the guidelines below when cleaning.

- ⚠ DO NOT use a pressure washer. High-pressure water may damage the battery seal and enclosure, which is not covered under warranty.
- ⚠ DO NOT use excessive water during cleaning.
- ⚠ DO NOT use any chemicals to clean your battery.
 - ➡ Before cleaning, ensure the battery is powered off.
 - ➡ Protect all ports (including CAN, DISP, and other connectors) by covering them with the protective caps or a plastic cover.
 - ➡ Avoid allowing water or moisture to enter any ports or connectors.

The recommended cleaning methods are:

- ➡ Use a leaf blower or compressed air to remove dust and debris.
- ➡ Wipe the battery with a clean, damp cloth.
- ➡ Ensure the battery is completely dry before reconnecting or operating.
- ➡ Clean the battery periodically, especially in dusty or dirty environments.

OPERATING TEMPERATURE

Your battery is designed to operate within a specified temperature range. Extreme temperatures may affect performance, charging capability, and overall battery life.

LOW TEMPERATURE

- ◆ The battery is equipped with a temperature sensor that will shut down the system when the internal temperature drops below -4°F (-20°C) to prevent cell damage.
- ◆ The battery can discharge at temperatures as low as -4°F (-20°C), but it will not accept any charge (including plug-in or regenerative charging) below 32°F (0°C).

HIGH TEMPERATURE

- ◆ The battery can operate in temperatures up to 131°F (55°C) under certain conditions.
- ◆ High temperatures may accelerate battery aging, reduce performance, and trigger protective shutdown.

Note:

- ➡ All temperature values refer to the internal battery temperature, NOT the ambient air temperature.
- ➡ The internal temperature may differ significantly from ambient conditions, as the battery warms up and cools down more slowly than the surrounding air.

BMS ERROR CODES

Code	Error Name	Tier
COV	Cell Over Voltage	1
CUV	Cell Under Voltage	1
COC	Charge Over Current	1
SC	Short Circuit	1
LOCK	Software Lock	1
DOC	Discharge Over Current	1
POV	Pack Over Voltage	2
PUV	Pack Under Voltage	2
COT	Charge Over Temperature	2
CUT	Charge Under Temperature	2
DOT	Discharge Over Temperature	2
DUT	Discharge Under Temperature	2

ERROR TIER

Tier 1 — Series Fault, problem will not resolve without external help, contact HIO Support:

- ➡ The same error persists after normal operating conditions are restored.
- ➡ The system remains locked or unresponsive.
- ➡ A short circuit fault is reported.
- ➡ Cell-level voltage faults occur.

Tier 2 — Most other faults are caused by environmental or usage conditions and will automatically clear once conditions return to normal.

BLUETOOTH GUIDE



To connect to the battery via Bluetooth:

1. Download our app (Search keyword: “E-BMS Battery”) from the Google Play Store for Android or App Store for iOS on your device.
2. Open the app and select the battery you wish to connect to — Fig. 1. Make sure the Bluetooth ID shown in the app matches the serial label on the battery. If you don't see your battery, pull down to refresh or click “Filter” and then enter the Bluetooth ID. (The last few digits are usually sufficient)
— Fig. 2.
3. After a quick loading popup, you are then connected to your battery. — Fig. 3.

If you encounter any issues that require our support, please include screenshots such as Fig. 3 Refer to the Warranty Guide for detailed instructions, if possible, or include multiple screenshots that capture the full home page.

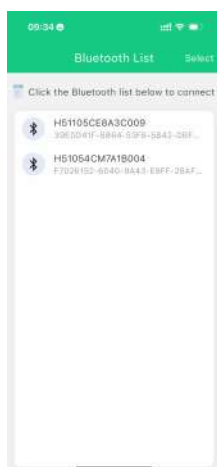


Fig 1

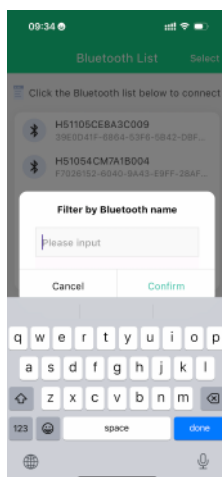


Fig 2



Fig 3

SUPPORT & WARRANTY

If you experience any issues, our support team will help diagnose the problem and provide warranty assistance if needed.

For support, please submit a request through our website:

<https://hiobattery.com/pages/warranty>

You may also contact us directly at:

support@hiobattery.com 855-HIO-BATT

Our team typically responds within one business day.

REQUIRED INFORMATION

To help us assist you as quickly as possible, please provide the following:

1. A clear description of the issue, including when it occurred and under what conditions.
2. Two screenshots of the Bluetooth app home screen showing all battery information. See the Bluetooth Guide for connection instructions.
 - ➡ If the Bluetooth name does not match the BT ID, provide a photo of the battery serial label. — Fig. 1
 - ➡ If the battery cannot be connected via Bluetooth, Turn on the battery switch, Use a multimeter to measure the terminal voltage and provide a photo of the reading. — Fig. 2



Fig 1: Serial Sticker



Fig 2

**FOR MORE INFORMATION
AND SUPPORT**

VISIT WWW.HIOBATTERY.COM

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