

HUBLiON

GOLF CART LITHIUM BATTERY

USER MANUAL

HUB-51.2V-105-LFP



Application scenarios: Golf Carts, Sightseeing Cars, Patrol Cars, Low Speed Vehicle and All Terrain Vehicles



Golf Carts



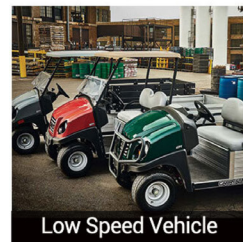
Sightseeing Cars



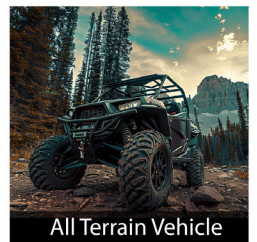
Patrol Cars



Small Electric Vehicle



Low Speed Vehicle



All Terrain Vehicle

READ BEFORE INSTALL

WARNING:

- DO NOT install or service this battery unless you are properly trained.
- DO NOT touch or connect to the terminals unless the battery is manually turned off.
- DO NOT open or attempt to service the battery. There are no user serviceable parts inside.
- DO NOT pressure wash, submerge, or use chemical agents to clean your battery.
- Working with lithium batteries can be dangerous. Safety gear such as protective eyewear, insulated gloves, and insulated tools are required for safe installation.
- Use only with components that have the same voltage and current rating as the battery.
- Charge battery before use.
- Damage to the battery, system components, or property due to incorrect or improper installation is not covered by the warranty.
- Do not short circuit or connect with reverse polarity; damage from improper connections is not covered by warranty.
- **Important:** Inspect your new battery for any damage that may have occurred during shipping. If there are any visible signs of damage, DO NOT CONTINUE and contact your dealer.

BATTERY COMPONENTS



	ITEM	Note
1	LCD+3M cable	Display for showing voltage, current, SOC% and warning or error codes
2	Terminals Covers	Protection from electrical shorts
3	Fixed Mount	Mounting feet for mounting battery in vehicle
4	Lifting Handle	For lifting battery in and out of vehicle
5	Relief Valve	Waterproof explosion-proof pressure relief valve
6	Battery Positive	M8 terminal post
7	Battery Power Switch	Power switch with activation
8	Communication Interface	CAN + upgrades + LCD Gauge
9	Buzzer Port	Optional
10	Battery Negative	M8 terminal post

COMPONENTS



LCD METER (SOC DISPLAY)

- Batteries are only compatible with SOC meters.
- The voltage will vary based on the current load or charge placed on the battery.
- The Battery SOC meter does not require calibration by the end user. The SOC meter performs self-calibration at the end of each full charge cycle. Accuracy is +/- 5%.
- Please monitor the SOC % rather than battery voltage when determining when to charge



ROUND DESIGN LCD DISPLAY

- Displays voltage, capacity, current and SOC, warning or error codes.
- The displays SOC color changes with the SOC%
- Instal display in vehicle for easy visual access
- Includes 3m long cable for vehicle installation



BLUETOOTH MONITORING

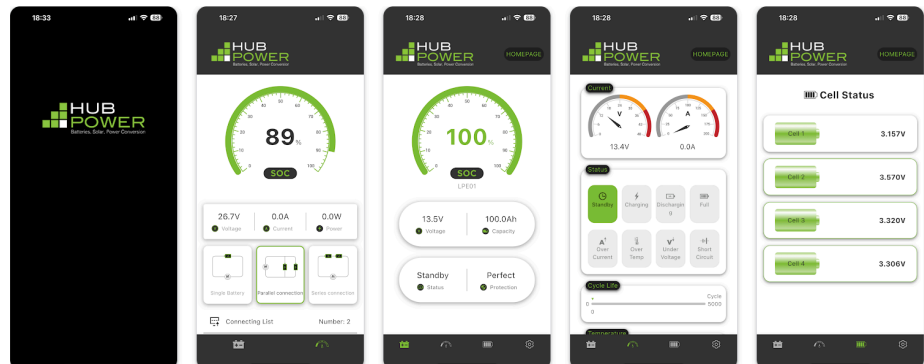
- Go to the Google app and apple store to install our APP *Hub Power*
- The Bluetooth APP displays the current, total voltage, SOC %, temperature, cycles etc.



IOS



Android



FUNCTIONS



POWER BUTTON

The power button controls flow of power in and out of the battery. It functions as a safety device to allow for safe handling of the battery during installation and maintenance. It also serves as a way to completely disconnect the battery during storage to prevent unnecessary battery discharge over extended periods of storage.

BATTERY CHARGER



Please use provided charger or an appropriate lithium battery charger to charge the battery. This will ensure optimal charging and will extend the battery's service life.

DO NOT CONNECT DC OUTPUT CABLES TO BATTERY WITH REVERSE POLARITY > Doing so will cause irreversible damage and is not covered under warranty.

CHARGER INSTRUCTIONS

1. Connect the DC output ring terminals to the battery terminals. Red to red (+ve) and black to black (-ve).
2. Connect AC input plug to AC power outlet.
3. Charger LED will blink red when charging and be steady green when complete.
4. Cold temperature charging: If battery temperature is below 0°C, battery automatically heats up to 5°C before charging begins

CHARGER INDICATOR

1. Waiting Mode: LED (RED) or (GREEN) flash
2. Capacity<80%: LED (RED) flash
3. Capacity>80%: LED (Yellow) flash
4. Capacity>100%: LED (Green) light
5. Fully Charged: LED (Green) on always



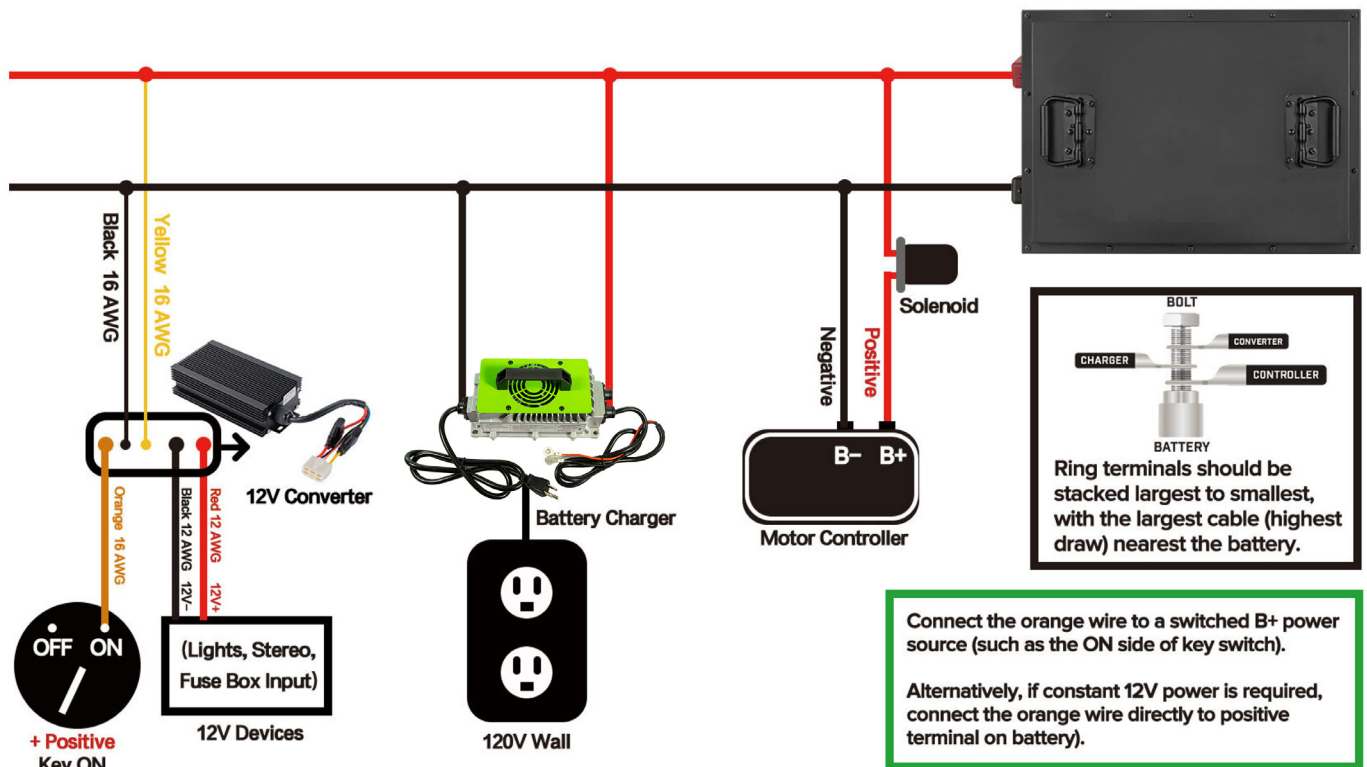
CHARGE TIME

The charge time can be calculated by the formula below:

Ah capacity of Battery / Charging Amps of Charger, Example : $105\text{Ah} / 15\text{A} = 7 \text{ hours}$ (assuming the battery is fully depleted)

- The battery charger is not a float charger or battery maintainer, and will not hold the battery at 100% after a charge. It is normal for the state of charge to drop as low as 70-80% before the charger begins a new cycle.
- Battery has no need to be completely discharged and charged with each use. Charging every day will not harm the battery and topping off or partially charging to extend range is perfectly acceptable.

HOW TO CONNECT THE BATTERY IN THE GOLF CART



CHARGE

1. When the battery power is low, battery should be charged in a timely manner to prevent low voltage cut off and as a result, the inability to operate the vehicle. A special process must be followed if battery is over-discharged. Contact your dealer for support. Different types of battery chargers cannot be mixed (i.e. a battery charger for Lead Acid batteries cannot charge a lithium battery properly). Before connecting the charger to the external power supply, confirm whether the grid voltage and frequency match the charger.
2. When charging, installing, un-installing or performing maintenance on the battery, you need to wear rubber gloves for insulation protection.
3. Make sure there is no foreign matter or corrosion is visible on the charger connectors and battery connector before operation.
4. When the battery is connected to a battery charger, it needs to be connected properly per image above to avoid any arcing.
5. When charging starts, check to make sure that the battery is charging normally on the APP or LCD Display..
6. When the battery is fully charged, it should stop charging automatically. Periodically monitor your charge to ensure battery is charging as expected.



If an abnormal condition occurs that you cannot resolve, please contact your dealer or Hub Power directly for Technical Support.

WARNING AND ERROR CODES



WARNING AND ERROR CODES WILL SHOW UP ON THE ROUND LCD DISPLAY WHEN THEY OCCUR.

AT THE BOTTOM OF THE ROUND LCD DISPLAY IN RED.

CODE REFERENCE GUIDE

CODE	EXPLANATION	MEANING
0-01	Over charge 1 level protection	Battery will be fully charged soon
0-02	Over charge 2 level protection	Battery is fully charged
0-04	Over cell voltage over discharge 1 level protection	Battery cells are overcharged
0-08	Over discharge 2 level protection	Battery has been over discharged
0-10	Over voltage 1 level protection	Battery is fully charged
0-11	Over voltage protection + over cell voltage	Battery is fully charged and battery cells are at their voltage limit
0-12	Over sum voltage 1 level protection +over cell voltage 2 level protection	Battery is in charged protection, fully charged already
0-20	Over sum voltage 2 level protection	Battery is fully charged
1-0C	Battery temperature is below 0°C	Battery must be warmed up to 5°C to allow charging
1-04	Low temperature warning	Operation temperature is below 0°C
1-08	Low temperature charge protection	Battery is trying to be charged below 0°C
2-02	Over current 1 level protection	Battery over current protection enabled
2-40	Low SOC warning	Battery power is running out
2-80	Low SOC 2 level warning	Battery power is running out
2-C0	Low SOC 1 and 2 level warnings	Battery power is running out
6-10	Switch discount MOS	Battery is charging but switch is off

ACTIONS TO TAKE BASED ON WARNING OR ERROR CODE

CODE	ACTION
0-01	Finish charging to SOC of 100% and then unplug the charger.
0-02	Unplug charger if still attached to the battery terminal. Ensure that the charger is unplugged from the AC outlet first.
0-04	You need to charge the battery soon.
0-08	You need to charge the battery immediately.
0-10	Unplug charger if still attached to the battery terminal. Ensure that the charger is unplugged from the AC outlet first.
0-11	Unplug charger if still attached to the battery terminal. Ensure that the charger is unplugged from the AC outlet first.
0-12	Do not try to charge the battery. Unplug charger if still attached to the battery terminal. Ensure that the charger is unplugged from the AC outlet first.
0-20	Unplug charger if still attached to the battery terminal. Ensure that the charger is unplugged from the AC outlet first.
1-0C	Warm up battery to 5°C or above to allow for battery charging. Plug in charger to warm battery above 5°C.
1-04	You need to warm up the battery. Plug the charger in an AC outlet and warm the battery to 5°C.
1-08	You need to stop trying to charge battery below 0°C. Plug in charger to warm battery to 5°C so charging can begin.
2-02	You need to cycle the battery on/off. You need to check the electrical system to find the source of the overcurrent.
2-40 2-80 2-C0	You need to charge the battery soon or you may be stranded.
6-10	You need to turn the battery on.

IF YOU ARE UNABLE TO FIX YOUR ERROR, PLEASE CONTACT HUB POWER AT:
SALES@HUBPOWER.CA OR 604-420-7737

CHARGE FAILURE

1. Disconnect the plug of the battery and charger, visually check whether the connecting the battery terminals are connected to charger terminals.
2. Check to see if the charger plug's connection to the wall outlet is loose or whether the pin of the plug terminal is retracted, If it is found that there is a loose plug connection to the wall outlet, unplug and re-insert plug into wall outlet to ensure tight contact. If plug terminal pin is retracted or broken, please contact our after-sales technical personnel.
3. Use a multi meter to measure whether the voltage at both ends of the positive and negative poles of the battery harness are normal (51.2V or above); If the voltage is below 51.2V ensure charger is plugged in an applying current to the battery. If charger is not applying current, contact Hub Power.

DISCHARGE FAILURE

1. Confirm whether the remaining power of the battery is low (AH or SOC% is low). If the remaining power is insufficient, the battery needs to be charged with the battery charger.
2. Check whether battery terminal connections are loose between the vehicle motor wires and the battery terminal or whether the battery terminal is damaged. If terminal connections are loose tighten, if the battery terminal is damaged, contact Hub Power.
3. If steps 1 and 2 are unable to fix the issue, turn power off using battery power switch. After the switch is powered off, unplug and connections to the battery terminals. Then, use a multi meter to measure whether the voltage at the battery terminals is above 51.2V. If below 51.2V, charge battery. If the battery will not take a charge, contact Hub Power.
4. Battery SOC% may not be reading accurately: use the charger to charge the battery to 100% SOC and 58.4V. The battery system will calibrate the SOC. If the SOC% doesn't re-calibrate, contact Hub Power.

BATTERY STORAGE

1. It is always good practice to turn the key off to your golf cart when not in use.
2. For long term storage, fully charge the battery, unplug the AC power source to the charger, and turn off the power button.
3. When the battery is stored, it is charged about 60-80% SOC.
4. During long term storage, the calibrated SOC may drift, and must be fully charged to re-calibrate.
5. The battery must be charged at least once every 6 months. Failure to charge for 6 months may permanently damage the lithium cells, and is not covered under warranty. If your golf cart will be stored below -20°C, remove the battery from the cart and store in ambient temperature above -20°C.
6. Avoid storage conditions where the battery is still powering loads. This may drain the battery to unrecoverable voltage and will void the warranty.
7. Do not invert the battery and avoid mechanical impact and heavy pressure to the battery.
8. When the battery is stored, other items shall not be stacked above the battery.
9. The self discharge of lithium-ion battery is affected by the ambient temperature and humidity. High temperature and humidity will accelerate the self discharge of the battery. The storage environment temperature should be 5°C ~ 45°C in a clean, dry and ventilated room, avoid water contact, avoid contact with corrosive substances, and keep away from fire and heat sources.

MAINTENANCE

1. If there is a lot of dust, metal shavings or other debris on the battery pack, use compressed air to clean it in time, and avoid using water or water-soaked objects for cleaning.
2. During charging and discharging, try to avoid water or other conductive objects splashing on the upper cover and terminals of the battery; Battery must avoid water spray or submersion during use, such as exposure to rain..
3. Estimate the charging time and discharging time of the battery according to the actual use state of the battery or battery pack. Pay attention and observe whether the battery or battery pack is in abnormal state at the end of charging and discharging, such as low voltage.
4. Check whether the cables attached to the battery and battery terminals are falling off, rusty or deformed. Also, ensure that the series parallel wiring harness attached to battery pack has no signs of abnormal wear (cuts in cable housing, exposed wires, etc.).
5. Check the battery shell for cracks, deformation, terminal looseness and other abnormalities.
6. Check the insulation resistance of the battery pack and the vehicle body to ensure proper isolation.
7. When carrying out maintenance, if you see battery leakage, contact Hub Power immediately.
8. Perform standard discharge and charge maintenance on the battery every three to 6 months.

PRECAUTIONS

1. Before using the battery pack, please read the operation manual carefully to understand to use the battery and precautions.
2. Keep the battery or battery pack away from dangerous goods or materials, such as corrosive chemicals, dangerous mechanical equipment, high temperature environment etc.
3. Do not open the battery cover under any circumstances. Any battery maintenance must be performed by authorized professionals.
4. Be sure to use the original battery charger or a certified lithium battery charger.
5. When the battery pack is at a low SOC, it must be charged in reasonable time period. When not in use, follow the battery storage procedure above.
6. Avoid squeezing and piercing the battery, avoid placing the battery in a high temperature environment or baking, and avoid exposing the battery to excessive vibration and external impact.
7. DO NOT CONNECT the positive and negative terminals of the battery directly. Avoid any metal or other conductive objects contacting with the positive and negative terminals of the battery. Illegal operation may cause personal injury or property loss.
8. DO NOT install this battery in series or parallel with other lithium battery models or manufacturers or types of batteries (flooded, lead acid, etc.) Any damage caused will void the warranty.
9. Damage due to water spray, rain, etc. voids the battery warranty.