

User's Manual—Golf Cart Battery





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Please read all the contents of this user manual before installing the battery to your golf cart.

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Applicable Product Model

Model	GRF48100	GRF48200
Product photo		
Nominal voltage	51.2V	51.2V
Nominal Capacity	100Ah	200Ah
Total Energy	5.12kWh	10.24kWh
Cell arrangement form	1P16S	2P16S
Cycle life	>2000 times	>2000 times
Continuous discharge current	150A	300A
Peak discharge current(15s)	300A	600A
Continuous charge current	30A	60A
Standard Charging time	3.5h	3.5h
Operation temperature range	-20~60°C(-4~140°F)	-20~60°C(-4~140°F)
IP rate	IP65	IP65
Product weight	47kg (104lbs)	87kg (192lbs)
Product dimension (L*W*H)	490*324*237mm (19.3*12.8*9.3inch)	690*381*237mm (27.2*15*9.3inch)

Unboxing The Battery






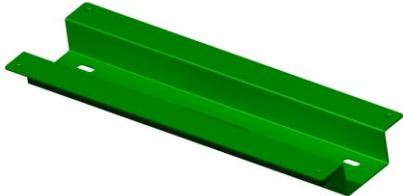


Before You Start



Please read all the safety and warranty information provided in this document prior to installing or operating the battery.

IMPORTANT: Remove all jewelry or other metallic objects from your hands and body during the installation and removal of the battery packs and peripherals.

Packing List

		
Battery Pack	Display Screen	Transit Harness
		
Charger(optional)	Discharge Power Cable(optional)	Fixed Bracket(optional)
		
User's Manual	Inspection Report	

Note: All optional accessories such as chargers need to be purchased separately!

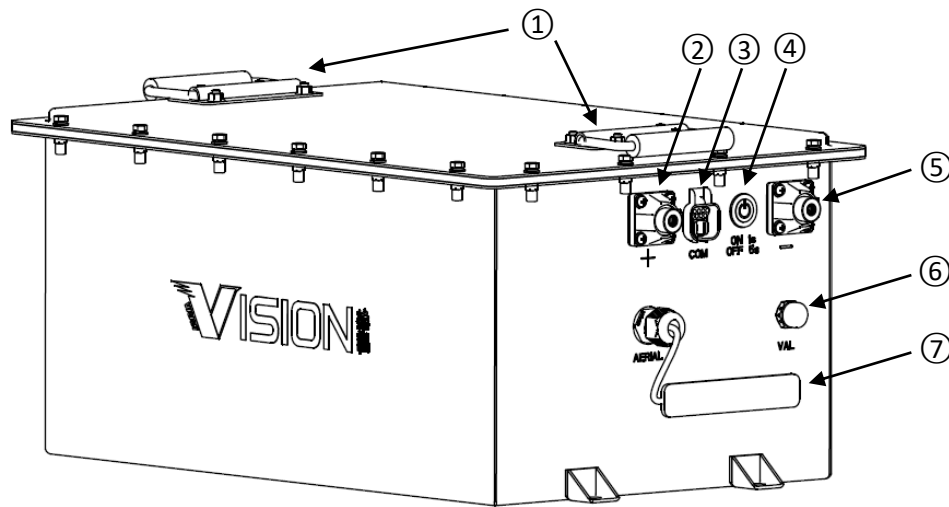
Unpacking

If possible, do not discard the packaging. This packaging is designed for the safe transportation of lithium-ion batteries compliant with global shipping regulations and can be reused if the battery must be transported to a new location.

Visual Inspection

Please inspect each battery carefully. Report any damage from shipping to Vision Center Power immediately.

Appearance and Structure



①	Handle	②	Discharge +
③	Charging and Communication Interface		
④	Switch	⑤	Discharge -
⑥	Breather Valve	⑦	4G Aerial

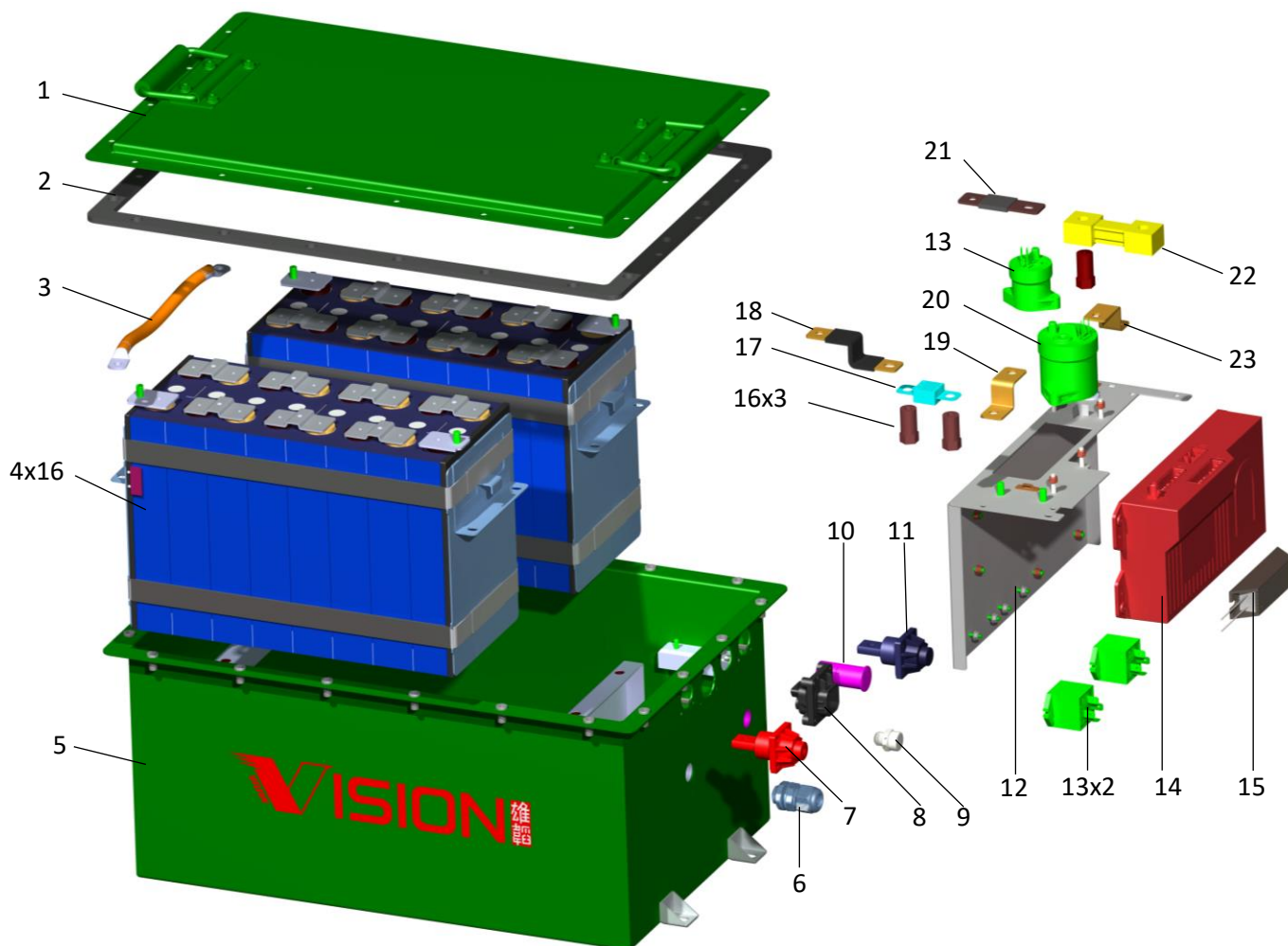
Note: The appearance of different models of products is similar, but the location of the feature distribution may be different!

Battery QR Code

Each battery case will paste a QR code, you can see the current SOC, voltage, temperature and other information of the battery through scan the code, you can also send this QR code information to Vision Center Power when necessary, we can use the cloud platform to monitor the battery in real time. Therefore, please make sure that this code is not damaged. If BMS is replaced, this code sticker needs to be replaced simultaneously.

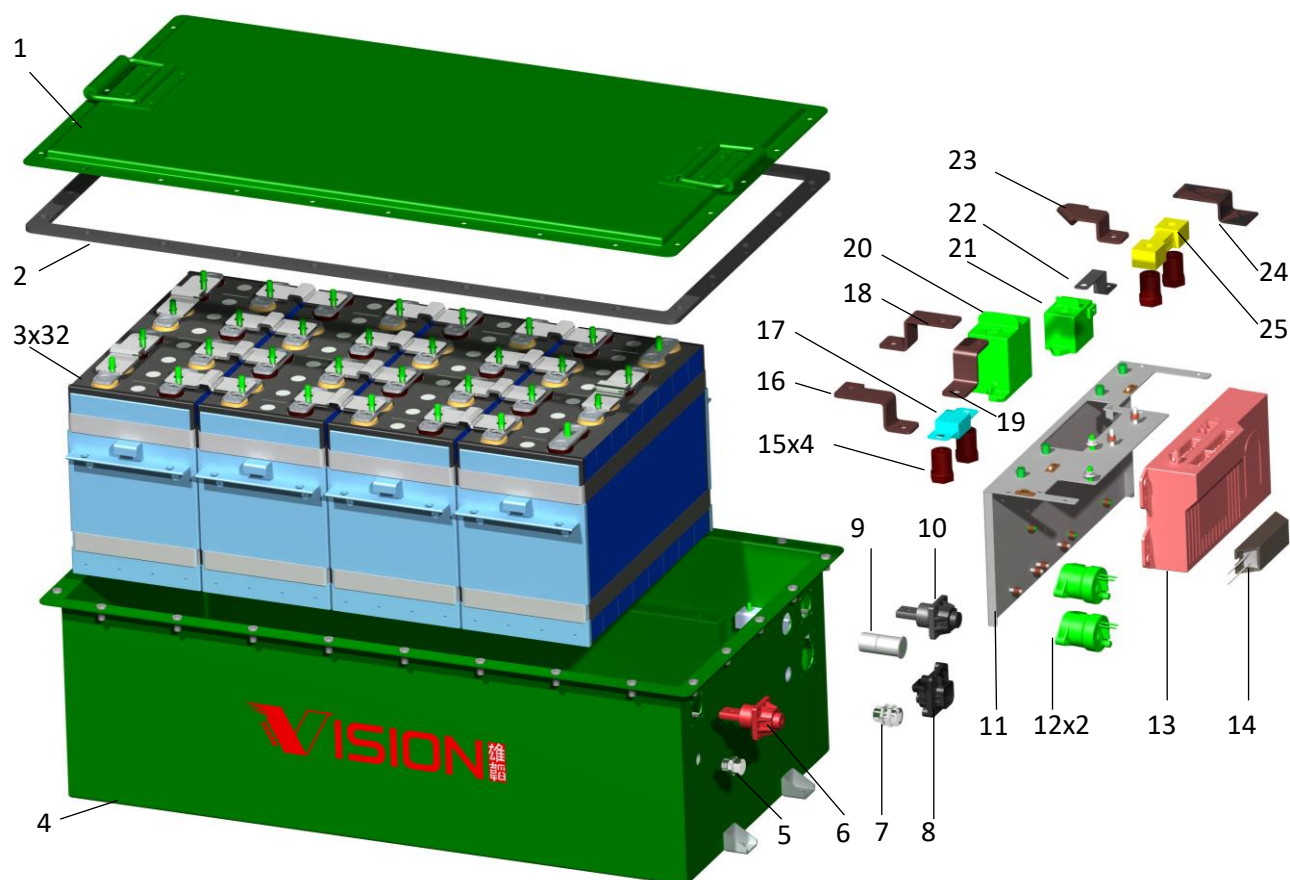
Internal Structure Explosion Diagram

GRF48100(51.2V 100Ah)



NO.	Material Name	Amount	NO.	Material Name	Amount
1	Box Cover	1	13	DC Relay	3
2	Waterproof Ring	1	14	BMS	1
3	Module Series Cable	1	15	Pre-charge Resistance	1
4	Cells	16	16	Post Insulator	3
5	Battery Box	1	17	Fuse	1
6	Aerial Interface	1	18	Positive Copper Bar 3	1
7	Positive Terminal	1	19	Positive Copper Bar 2	1
8	Charging and COM Interface	1	20	DC Relay	1
9	Anti-explosion Valve	1	21	Negative Copper Bar	1
10	Switch	1	22	Shunt	1
11	Negative Terminal	1	23	Positive Copper Bar 1	1
12	BMS Bracket	1			1

GRF48200(51.2V 200Ah)



NO.	Material Name	Amount	NO.	Material Name	Amount
1	Box Cover	1	14	Pre-charge Resistance	1
2	Waterproof Ring	1	15	Post Insulator	4
3	Cells	1	16	Positive Copper Bar	1
4	Battery Box	32	17	Fuse	1
5	Anti-explosion Valve	1	18	Positive Copper Bar	1
6	Positive Terminal	1	19	Positive Copper Bar	1
7	Aerial Interface	1	20	DC Relay	1
8	Charging and COM Interface	1	21	DC Relay	1
9	Switch	1	22	Charging Copper Bar	1
10	Negative Terminal	1	23	Negative Copper Bar	1
11	BMS Bracket	1	24	Negative Copper Bar	1
12	DC Relay	2	25	Shunt	1
13	BMS	1			

Discharge



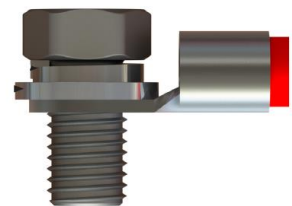
When connecting the battery to the discharge power harness of the vehicle, make sure that the positive and negative terminals are correctly connected. If accidentally reversed, it may damage the battery and void the warranty.

- Before installing the battery to the vehicle or removing it from the vehicle, first make sure the battery is in the sleep state.
- The maximum current loaded on the vehicle during operation cannot exceed the discharge ability range specified in this manual, otherwise the protection function may be triggered or the battery may be damaged.
- The proper specification of the discharge power harness should be selected according to the load current, otherwise it may cause serious heating.
- When the battery is installed on the car, it should be fixed securely to prevent collision and deformation during operation, which may result in short circuit risk.

Connection of Discharge Terminal

Use bolts when connecting the battery discharge terminal to the discharge wire harness. The specifications and torque information are as follows:

Type of bolt	Specification	Tightening torque
Hexagonal head with flat and spring washer	M8x1.25x20mm	18±1Nm



Wake-Up & Sleep

When you need to wake up the battery, press the switch for 1s to let it enter the discharge state. When the battery doesn't work for a long time, in order to prevent self-consumption current drain and extend storage life, it is recommended to let the battery enter the sleep state. In this case, you need to press the switch for 5s and then release it. The battery will automatically cut off the main circuit.



Charge

Indicator description of the charger	
Wait to charge	Alternating red and green flashes
Charging	Blinking red lamp
Charge complete	Steady green light



- Please use the original charger to connect the battery for charging; otherwise, charging failure or battery damage may occur.
- You should disconnect the AC plug from the power grid first before stop charging, and then disconnect the DC plug as required.
- When the DC plug of the charger is connected, the battery can still discharge normally.
- It is recommended to install the charger on the vehicle to minimize the number of plugs on the DC side.
- The suitable charging temperature range for batteries is 10-45°C(50-113°F), and charging in this range helps to increase discharge capacity and extend life.
- The battery comes with a heating system that automatically activates the heating function as needed when charging in cold areas, which may cause an extension of the charging time.
- It is recommended to charge in time when the power is less than 30% to ensure that the vehicle has enough power during operation.
- It is recommended that at least once in every three charges be full to 100%, otherwise there may be a problem of excessive error in the SOC display value.

Safety Information

- All installation should be performed by a qualified service technician.
- Use only insulative tools required for assembly.
- Dispose of the battery properly in accordance with local, state, and federal regulations.
- Extinguish any flames with a carbon dioxide, dry- powder fire extinguisher, and cover with copious amounts of water.
- Don't use with other types of batteries connected with the Vision products.
- Don't short circuit the battery terminals.
- Don't operate or store the battery beyond the operating limits.
- Don't over-charge or over-discharge the battery.
- Don't crush, puncture, or drop the battery.
- Don't immerse battery in water.
- Don't burn or expose battery to fire.
- Don't charge battery near flammable materials.
- Don't wear jewelry (i.e. rings, watches, bracelets, necklaces) when handling or working near the battery.

Before installation or maintenance of your batteries, the following equipment is required:

- Rubber gloves
- Safety goggles or other eye protection
- Insulated Torque Wrench / Philips Screwdriver
- Multimeter

Storage and Transportation

Storage

- When the battery is stored for a long time, it must be turn-off to enter the sleep state.
- Battery should be stored between 40%~60% SOC.
- It is recommended to store in a clean, dry, and ventilated environment with a relative humidity $\leq 75\%$.
- It is recommended to store in a temperature environment of $-20\sim 45^{\circ}\text{C}$ ($-4\sim 113^{\circ}\text{F}$) for no more than one month.
- It is recommended to store in a temperature environment of $-10\sim 35^{\circ}\text{C}$ ($14\sim 95^{\circ}\text{F}$) for no more than three month.
- Don't expose the battery to extreme temperature or sunlight over 60°C (140°F).
- Handle each battery carefully to avoid sharp impacts or extreme pressure on the case.
- If the storage time is more than 6 months, please charge the battery appropriately to prevent excessive self-discharge from causing cell capacity attenuation.

Transportation

- Violent loading and unloading should be strictly prohibited during transportation to prevent violent vibration, impact or extrusion.
- Protect against sun and rain during transportation.
- The packaging should be complete during transportation to ensure that the surface of the product is not easily subjected to mechanical damage.

Fault Information Query

Fault code table

Despite Vision batteries have high reliability, you may still encounter some abnormal conditions during use. If you find that the battery doesn't work properly, you need to use the information in the following table to preliminarily determine the fault type and contact Vision Center Power immediately.

Fault Code	Fault Name	Fault Description
1	Over-voltage(cells)	The voltage of some cells is out of the specified range.
2	Under-voltage(cells)	The voltage of some cells is below the specified range.
3	Over-voltage(battery)	The voltage of battery is out of the specified range.
4	Under-voltage(battery)	The voltage of battery is below the specified range.
5	Over-voltage difference	The voltage difference of cells is out of the specified range.
6	Over-current(discharge)	The discharge current of battery is out of the specified range.
7	Over-current(charge)	The charging current of battery is below the specified range.
8	Over-temperature	The temperature of battery is out of the specified range.
9	Under-temperature	The temperature of battery is below the specified range.
10	Over-temperature difference	The temperature difference in different parts of the battery is out of the specified range.
11	Low SOC	The SOC of the battery is too low.
12	BMS self-check fault	There are some faults in BMS's own hardware.
13	Cells' voltage collection fault	The cells voltage collection fails partially or completely.
14	Temperature collection fault	Module temperature collection fails partially or completely.
15	Contactor adhesion	Contactor fails to be disconnected due to adhesion failure.
16	Pre-charge failure	The battery fails to perform the pre-charge process during startup and cannot discharge normally.

Solutions to simple faults

- Under-voltage of the cells or battery: Charge the battery immediately with the matched charger.
- Over-voltage difference: Contact Vision after-sales personnel to inspection and repair the battery.
- Over-current(discharge): Check whether the parameters of the vehicle matching drive motor meet the requirements.

- Over-temperature or Under-temperature or Over-temperature difference: You are advised to stop battery's charging and discharging immediately until the battery temperature returns to the normal range.
- Low SOC: Charge the battery immediately with the matched charger.
- BMS self-check fault: Contact Vision after-sales personnel to inspection and repair the BMS.
- Collection fault of the cells' voltage or temperature: Contact Vision after-sales personnel to inspection and repair the battery.
- Contactor adhesion: Contact Vision after-sales personnel to replace the relay and inspection the battery.
- Pre-charge failure: Disconnect the battery back-end load and try to restart the battery. If the fault persists, contact Vision after-sales personnel to inspection the battery.

Situation of Warranty Violations



Performing any of the following actions will immediately void your warranty on the product and could lead to a potentially dangerous situation.

- When the battery is stored for a long time, it must be turn-off to enter the sleep state.
- External battery connections are incorrect, resulting in internal cells damage.
- Operating the battery in an environment where the temperature exceeds the specified limits.
- Pairing the battery with an incompatible device may create a risk of fire, electric shock, or personal injury.
- Charges or discharges a battery in excess of the maximum allowable continuous current.
- Due to improper operation caused by battery drop or impact, the outer box has obvious deformation.
- Let a third party repairman repair the battery without permission.