USER MANUAL

ELECTRIC COUNTER BALANCED FORKLIFT STACKER

MODEL: HILO-CB

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Welcome to use Electric Truck.

Please read this instructions manual carefully before using the electric balance truck.

This manual works for electric balance truck, and we reserve our rights for technical reform.

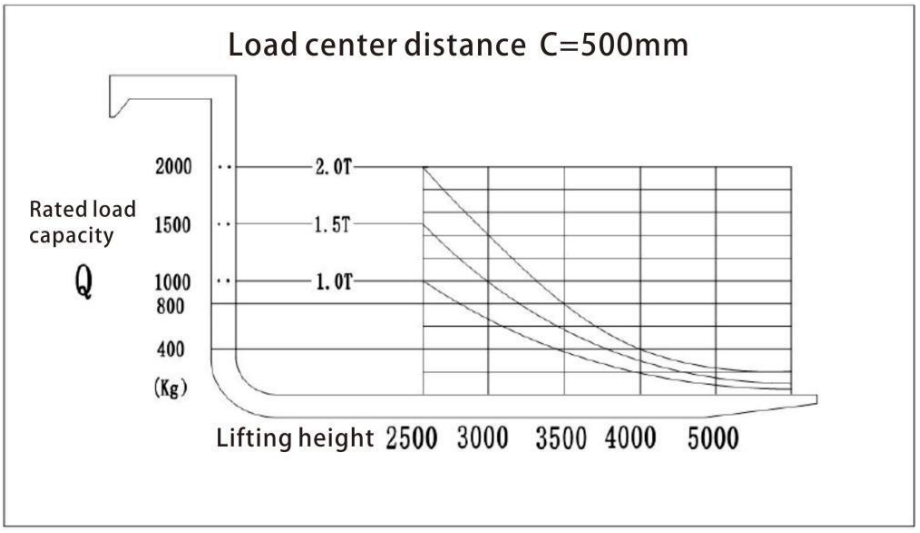
Pictures and object maybe slightly different, please in kind prevail.

Warning

Vehicle operators must obey the certificate ISO3691 “Safety Specifications for Motor Vehicles”when operating and untrained personnel are prohibited from operating the vehicle.

According to the certificate ISO3691 “Safety Specifications for Motor Vehicles”, the regulation for the rated load and lifting height of electric balance truck are as follows:

The rated load as shown below:



Please use it strictly according to the load curve. Overloading is forbidden.

Note:

When the height is over 500mm, the truck must move in the lowest speed and the continuous moving distance is no more than 2m.

If not obeying the rules, will lead to:

A: Dangerous to driver or other workers

B: Destroy the trucker and goods.

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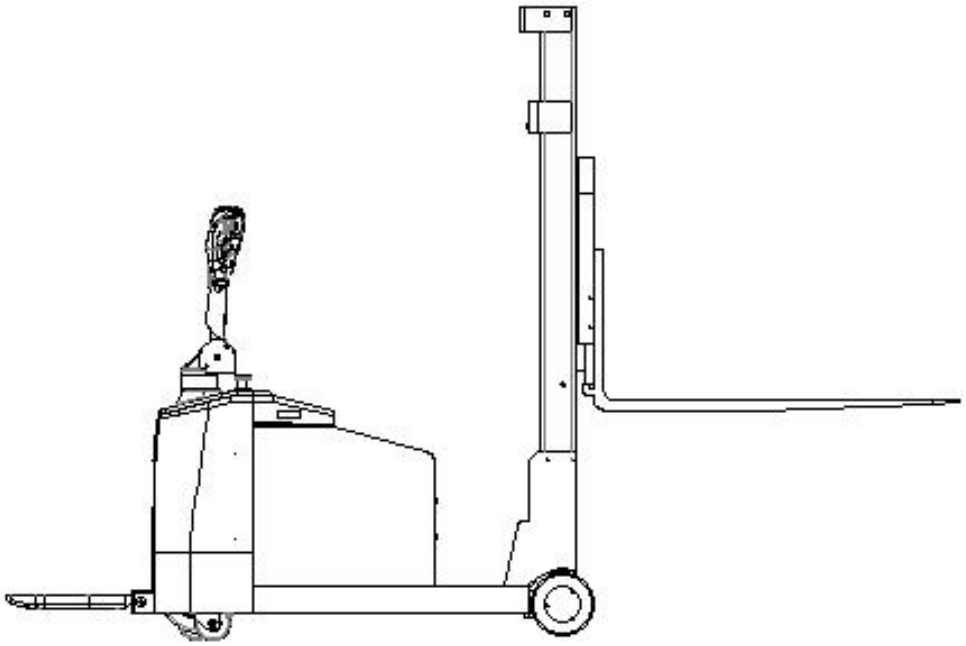
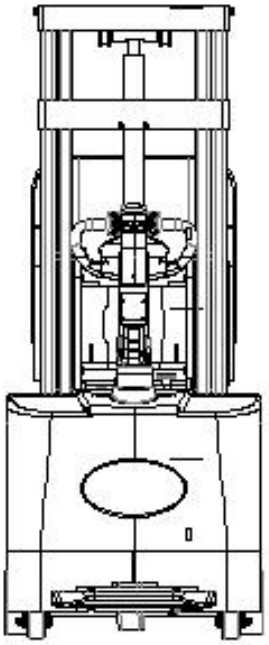
1. Outline Drawings





2.Usage and Scope of Use

Electric balance truck adopts battery as power source, DC (AC) motor as power source, DC (AC) motor as power, drives the truck to move through gear rotation The fork lifts up by DC motor and hydraulic rotation, pushing the cylinder up and down to lift the cargo. Since the truck's moving and lifting is driven by electric power, it has the ability of labor saving, high efficiency, stable cargo carrying, simple operating, safety, reliability, low noise and no pollution.

The truck is suitable for cargo stacking and handling on hard, flat floors.

Using environment:

A: The altitude does not exceed 1200m;

B: Surrounding temperature range from -25℃ to 40℃.

C: When the temperature is 40℃, the relative humidity cannot higher than 50%. In a low temperature environment, higher relative humidity is acceptable.

D: Using in hard and flat floor.

E: Forbidden to use the truck in corrosive environments such as flammable, explosive or acid and alkali.

3.Structure Instruction

(Reference to main component structure diagram, schematic diagram)

The truck is consisted of frame, door frame, fork, lifting oil pump, operating handle, steering equipment, driving wheel, battery assembly, hydraulic driving unit, electric controller system and so on.

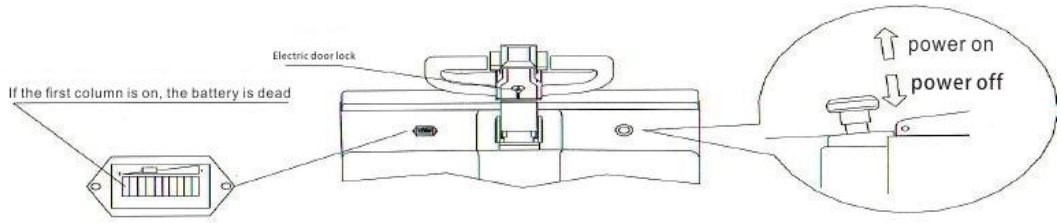
4.Instructions for Use and Operation

The electric balance truck is driven by batteries, which are used to transport goods and stack goods in short distances. Proper use and operation will bring great convenience to your work. Improper methods of operation and use will damage the truck or pose a danger to your personal safety and cargo.

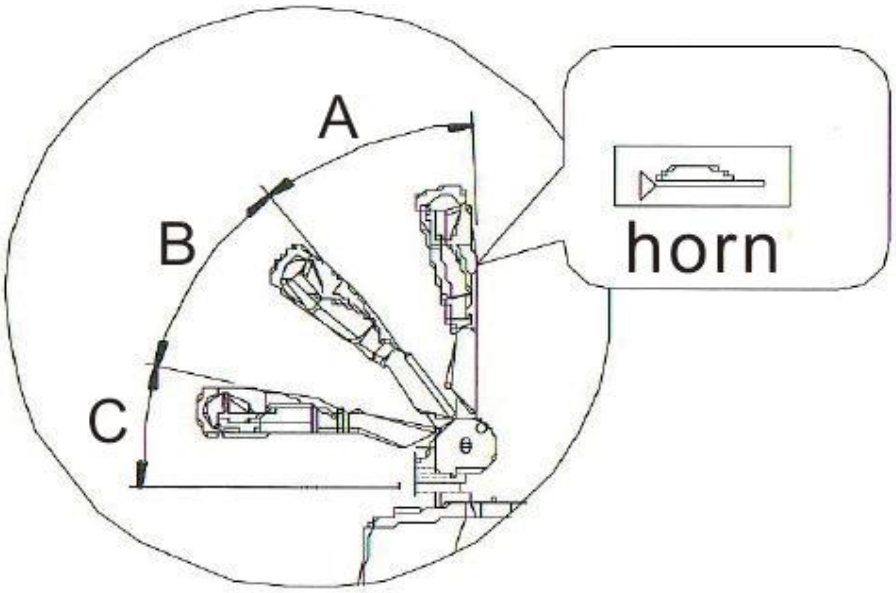
1. Before use:

1.1 Please check if the truck is normal before use: whether there is oil leakage in the hydraulic pipeline, whether the support wheels can work normally and whether there is any obstruction. It is strictly forbidden to use the faulty truck.

1.2 Check if the battery has electricity. The method is as shown in Figure 1. Pull out the main power switch to open the main power supply, open the electric door lock, check the electric energy meter on the instrument panel of the truck. If the 0 end is bright, it indicates the battery is no power, needing charging. It is strictly forbidden to use the truck without electricity. This will greatly reduce the battery charging. It is strictly forbidden to use the vehicle without electricity. That will greatly reduce the service life of the battery, and even damage it.



1.3 Check if the brake is normal; check whether the vehicle's lifting, lowering, front and rear driving is normal; check whether the emergency reverse action is normal. The method is shown in Figure 2:



Move the operating handle to position A or C as shown in Figure 2. Press the up and down button on the operating handle to see if the fork is lifting properly. Then move the operating handle to the position B in Figure 2, slowly start the truck and press the handle to the horizontal position to see if the truck can drive and brake normally;
Move the operating handle to position B as shown in Figure 2. Press the emergency reverse switch button on the top of the operating handle to see if the truck can drive forward.Through the above inspection, if no any problem, the truck can be put into use. If there is a fault, please repair it immediately, and it is strictly forbidden to use the faulty one.

2. While using

2.1 Note: The car is equipped with a electromagnetic brake device at the shaft end of the drive wheel motor, and a cam and a micro switch are arranged on the rotating shaft of the steering arm. When the rotating shaft of the rotating arm is equipped with a cam and a micro switch and when the rotating arm is 30o±20o At the time (as shown in Fig. 2), the stacker can be powered on. If it is greater or less than this angle, the stacker will be powered off and braked. At this time, the cargo can be lifted. When the cargo is lifted, the vehicle cannot drive, ie: As shown in Fig. 2, when the operating handle is in the zone Aor the zone C, the vehicle can only be lifted or lowered, not moving; when the operating handle is in the zone B, the vehicle can also be lifted up and down and driving. In the following text description, the working position of the handle is no longer particularly claimed, that is, the vehicle handle in the zone A or the zone C, the vehicle cannot travel, and the vehicle can only be lifted and lowered, and the handle must be in the Zone B when driving the stacker.

2.2 Handling and stacking operations:

Pull out the main power switch to open the main power supply as shown in Figure 2. Open the electric door lock, drive the vehicle to the vicinity of the cargo pile (The fork head is 300mm away from the cargo pile), press the down button to adjust the fork height to In the proper position, and insert the fork slowly into the cargo pallet as slowly as possible. Press the ascending button, making the fork 200-300mm away from the ground, drive the vehicle to the shelf position and slowly stop at the head of the fork 300mm away from the shelf. Press the up button to make the fork rise to the appropriate height of the shelf (The bottom of the tray is about 100mm above the shelf.). Move the goods to the exact position of the shelf slowly, press the down button, place the goods on the shelf carefully and make the fork disengage the cargo. Start the vehicle slowly, move the fork out of the cargo pallet (The head of the fork is 300mm away from the shelf.), and lower the fork to about 300mm from the ground to drive the vehicle away from the shelf. During the driving , please pay attention to the obstacles around, and speed down when turning.

2.3 Removal of goods from the shelves:

Pull out the main power switch as shown in Figure 2, open the main power supply and electric door lock, and drive the vehicle to the vicinity of the shelf (the head of the fork is 300mm away from the shelf). Press the down button to adjust the fork height to the appropriate height. Insert the fork slowly into the cargo pallet as slowly as possible, press the ascending button, lifting the cargo to the bottom of the cargo pallet 100mm from the shelf and start the vehicle to move the cargo out of the shelf slowly (the fork head is 300mm away from the shelf)). Press the down button, descending the fork to the height of 200-300mm from the ground, drive the vehicle away from the shelf, to the proper position, then slowly stop the vehicle, press down the button and put the cargo down, making the fork completely detach goods and moving the fork out of the cargo pallet.

3. Deal with the abnormal conditions during use:

3.1 The fork can be raised when the up button is pressed, and keep rising when the up button is released, because it is in the out of control state. At this time, the power main switch should be pressed immediately to cut off the power. And then move the vehicle to a safe location and manually lower the cargo to overhaul the vehicle's electrical circuits.
3.2 If the brake is found to be malfunctioning during use, it must be stopped immediately and the vehicle should be inspected.
3.3 If the operator is pushed to the wall or other objects while reversing. As long as the emergency reverse switch button on the top of the handle is pressed, the vehicle will automatically travel to the opposite direction, avoiding hurting operator.

4. After use:

After the use, park the vehicle in a certain parking position and charge the vehicle. Moreover, maintain the truck as specified in clause 6.

5.Maintenance

Note: It is forbidden to repair the vehicle without professional training.

1.1 The satisfactory use of the vehicle depends on careful maintenance. When neglecting maintenance, it may endanger personal safety, damage to the vehicle and finance. Therefore, when using, you should always do routine inspections, eliminate abnormal phenomena in time, and do not use faulty vehicles so as to ensure safety and extend the service life of the vehicle.
1.2 Maintenance: The maintenance of the car is generally divided into three levels, namely daily maintenance, primary maintenance and secondary maintenance.

Daily maintenance: It should be cleaned once a day. The main process is to keep the surface of the car clean and the surface of the battery, check whether the power cord is firm and the chain is tight.

First-level maintenance: It should be done once a week. Maintenance content: Besides daily maintenance content, it is important to check whether the working conditions of each component are normal, whether the fasteners are loose, whether the chain is tight or not, and whether the chain joint connecting pin is bent or not, whether the outer door frame moves up and down, whether the hydraulic joint leaks oil, whether the mechanical part has abnormal wear, and whether the electric part has abnormal temperature rise and spark, etc. If it is found to be abnormal, it should be adjusted and removed in time.

Secondary maintenance: It should be carried out on schedule, and the vehicle should be fully inspected according to the following requirements.

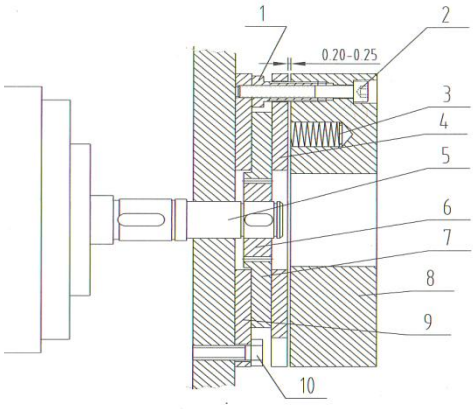
a. Mechanical maintenance: once every six months, the main content is to add lubrication to the transmission gears and bearings of the drive wheel, and to each rotary joint. Check whether the fasteners are tight, whether the wheels are flexible or not. Whether the fork lift is normal. Clean the dirt and dust accumulated on the friction plate of the electromagnetic brake and adjust the gap between the friction plates to a suitable distance. The maintained vehicle's running noise should be no more than 70 decibels.

b. Hydraulic maintenance: Check every 12 months whether the cylinder is in normal condition, whether there is internal leakage or leakage, and whether the hydraulic joint and hydraulic hose are reliable and leak-free. Whether the hydraulic oil is clean or not. The hydraulic oil is usually replaced once every 12 months, based on ISO oil standards. HL-N46 or HL-N68 is used when the ambient temperature is -5~40°C, and HV-N46 or HV-N68 low temperature hydraulic oil is used when the ambient temperature is -35°C~-5°C. The replaced waste oil should be dealt in accordance with local regulations.

c. Electrical maintenance: Check every three months. First check whether the specific gravity of the battery electrolyte is appropriate [Tropical region: the specific gravity is 1.24 (at 25 °C), other regions: the specific gravity is 1.26 (at 25 °C)], Whether the terminal is clean. Otherwise the specific gravity of the electrolyte must be adjusted according to the regulations, clean the terminal, apply a little Vaseline, and tighten the screw properly. Then check whether the electrical connectors are reliable, whether the switch is normal, and check whether the electrical insulation is normal (the insulation resistance of the electrical part and the car body should be greater than 0.5). Remove dirt, dust, and carbon deposits from the motor, check the brush wear, and replace the brush as appropriate.

6.3 Adjustment of brake clearance:

1. hollow screw 2. connecting screw
3. spring 4. armature 5. motor shaft
6. spline sleeve 7. friction plate
8. electromagnetic coil
9. cover mounting 10. screws mounting



The structure of the brake is shown in the figure. When the car is used for a period of time, the brake performance will decrease with the wear of the brake pad, or the brake pad will not release the brake. In this case, the brake clearance needs to be adjusted.

As shown in the figure, in the braking state, first check the gap between the brake pad and the magnetic steel with a feeler gauge. If the clearance is longer than 0.5mm, adjust the clearance. Before adjusting, clean the dirt and dust on the friction plate.

When adjusting, first loosen the connecting screw 2, then adjust the length of the adjusting screw 1, and then tighten the fastening screw. After adjustment, the gap between the brake pad and the magnetic steel should be between 0.2-0.3mm. When adjusting, pay attention to the balance adjustment of the three adjusting screws, so that the gap between the brake pad and the magnetic steel is evenly distributed. After adjustment, turn on the brake with 24V DC power, the brake's crisp suction sound could be heard.

6.Common faults and troubleshooting methods

No.	Fault	Cause	Elimination method
1	Stacker does not move (contactor does not work)	Control circuit fuse has burned out	Replace
		Poor contact or damage to the power switch	Repair or replacement
		Main circuit fuse has been blown.	Replace
		The electric lock switch is in poor contact or damaged.	Repair or replacement
		The battery connection is loose.	Tightening
	Stacker does not move (contactor works)	Drive rim magnetic brake does not pull, the vehicle is in brake state.	Repair or replacement
		The travel motor has a carbon brush wear or poor contact between the steering gear and the carbon brush.	Repair or replacement
		The travel motor excitation coil is broken or the line end is bad.	Repair or replacement
		Contactor is not good.	Repair or replacement
		MOSFET tube board is faulty	Repair or replacement
2	Stacker can only advance (or retreat)	Contactor is poorly contacted or burned out.	Repair or replacement
		The board is faulty.	Repair or replacement
3	Stacker truck can't stop While driving.	Contactor is damaged; moving contact is not reset.	Emergency power off, replace Contact.
4	Brake failure	The micro switch mounting bolt is loose or damaged.	Adjust or tighten the bolt, or replace the micro switch.
		Electromagnetic brake wiring is loose or the magnetic brake is damaged.	Tighten the bolt or repair the disc type magnetic brake.

		Electromagnetic brake pad wear.	Replace the brake pad
5	Steering stuck	Steering bearing is damaged.	Replace bearing
		The steering gear bearing is short of oil or excessive dust.	Cleaning the bearing
6	The drive wheel is heavy and noisy, and the motor is overloaded.	The gear and bearing are stuck with foreign objects.	Clean or replace the bearing.
		There is a gap in the bearing installation, or the collar is detached.	The collar is Detached. Reinstalled, and Adjust the gap.
		Front wheel bearing is damaged.	Replace bearing
7	Fork does not rise.	Overload use	Reduce load
		The relief valve pressure is too low.	Higher the pressure
		Lift cylinders have abnormal internal leaks.	Replace seals
		The hydraulic oil is not enough.	Add the hydraulic oil appropriately.
		Battery voltage is not enough.	Charge the battery
		The handlebar is not in the horizontal or vertical position, the pump motor is not energized.	Improper operation
		Oil pump motor is damaged.	Repair or replacement
		Oil pump is damaged.	Repair or replacement
		Rise button switch is damaged	Repair or replacement
		Electric lock is not open or damaged	Repair or replacement
		The battery voltage is seriously insufficient.	Charging
8	The fork does not fall after the it rises.	Overload deformation of the inner door frame	Repair or replacement
		Outer door frame overload deformation	Repair or replacement
		Gantry wheel stuck	Repair or replacement
		Door guide bar bending	Repair or adjust
		Back oil hole blockage	Cleaning
		Hydraulic station solenoid valve out of control.	Exclude solenoid valve failure
9	Battery	Individual single-channel battery is	Repair or

	terminal voltage is reduced (after charging)	damaged.	replacement
		Battery liquid level is low.	Adding electrolyte
		There are impurities in the electrolyte.	Change the electrolyte.

7. Battery maintenance and charging

1. Initial charging

Note: The charging environment should have good ventilation and no open flame, otherwise it will cause an explosion.

1.1 Unused batteries should be charged initially before use. Wipe the surface of the battery clean before initial charging, check and tighten the bolts to ensure reliable connection.

1.2 Unplug the sealing cap and replace the capping fluid plug and open the lid.

1.3 Under the condition that the charging equipment can work normally, the sulfuric acid electrolyte with a density of 1.260±0.005 (25 °C) and temperature less than 30 °C is poured into the battery, and the liquid level is higher than the protection plate by 15~25 (mm). In order to reduce the temperature at which the electrolyte rises due to the chemical reaction, the electrolyte is sufficiently infiltrated into the plates, and the cells are allowed to stand for 3 to 4 hours, not more than 8 hours. The initial charge can be performed until the liquid temperature drops below 35 °C. (If necessary, it can be cooled in the cold water tank.) After standing, the liquid level should be reduced to make up the electrolyte.

1.4 Sulfuric acid electrolyte is made of battery sulfuric acid and distilled water in accordance with national standard GB4554-84. Do not substitute industrial sulfuric acid or tap water. The standard temperature of the electrolyte (25 ° C) is converted according to the following formula.

$D25=Dt+0.0007(t-25)$

Where: D25: electrolyte density at 25 ° C.

Dt: measured density of electrolyte at t °C.

t: electrolyte temperature at which density is measured.

1.4 Dry the electrolyte splashed on the surface of the battery, connect the positive and negative terminals of the battery pack to the positive and negative terminals of the DC power supply (charger), and turn on the power; first charge with 28A (phase 1 current). When the voltage reaches 28.8V (12*2.4V=28.8V), the second stage 14A current is used to continue charging. The temperature of the electrolyte during charging should not exceed 45 °C.

When it is close to 45 °C, the charging current should be reduced or the charging should be suspended. Wait until the liquid temperature drops below 35 °C and continue charging. However, it is necessary to extend the charging time appropriately.

1.6 Basis for sufficient power: In the second stage, the voltage is up to 31.2V (12*2.6V=31.2V), the voltage change is not more than 0.005 (V); the electrolyte density is 1.280±0.005 (25°C). The battery is considered fully charged when there is no significant change in the two hours and there are fierce bubbles in the air. Its charging capacity is 4 to 5 times larger than the rated capacity.

1.7 In order to accurately control the sulfuric acid content in the electrolyte, the electrolyte density of each battery should be checked at the end of charging; if there is any discrepancy, it should be adjusted with distilled water or sulfuric acid with a density of 1.40, and adjust the electrolyte density and liquid level are adjusted to the specified values within the two hours' charging.

1.8 After the initial charging is completed, wipe the surface of the battery clean and close the lid of the clamshell liquid plug before it can be put into use.

2. Use and maintenance

2.1 In order to ensure the battery life, all batteries that are put into use should be in a fully charged state; batteries that are undercharged cannot be used. Pay close attention to the degree of discharge during use, and prohibit excessive discharge - that is, the voltage drops to 1.7V / only (when the total voltage drops to 1.7V * 6 * 2 = 20.4V). The discharge should be stopped when the electrolyte density drops to 1.17 and the battery needs to charging instantly; do not leave for a long time. This kind of supplementary electric power that needs to be frequently performed during use is called ordinary charging.

2.2 Ordinary charging: The normal charging current is 40A according to the first stage current and 20A in the second stage. The charging method is the same as the initial charging. The charging amount is 130~140% of the discharging power, and the charging time is about 15 hours.

2.3 Normally used batteries should avoid overcharging, but the battery must be overcharged in the following cases, that is, equalized charging.
a. "Lost battery" in the battery pack - refers to the battery whose voltage value is lower than other batteries during the discharge and the repaired battery. (In the balanced charging, the positive and negative terminals of the backward battery should be connected separately to the positive and negative terminals of the DC power supply.)
b. Normally used batteries are charged once every 2~3 months.
c. Batteries that have not been used for a long time should be balanced before use.

2.4 Balanced charging:

a. Charge with a current of 6A.

b. The charging voltage reaches 31.2V (12*2.6V=31.2V), and then reduce the half of current (ie 3A) there is air bubble in the electro-hydraulic.

c. Charge to a fully charged state for 0.5 hours and then charge with 1.5A for 1 hour.

d. Stopping charging for 0.5 hours and then charge with a current of 1.5 A for 1 hour.

e. Repeat several times according to rule d until the charger is turned on, and the battery has a strong bubble.

3. Storage

The battery should be placed in a clean, dry and ventilated warehouse at 5~40 °C. The effective storage period is two years. During the storage period, it must be kept in accordance with the following requirements.

a. It is not exposed to direct sunlight and should not be less than 2m away from the heat source.

b. Avoid contact with any harmful substances, and any metal impurities should not fall into the battery.

c. Do not invert and do not subject to any mechanical impact or heavy pressure.

d. It is not allowed to store with electrolyte. In special cases, the electrolyte should be fully stored to adjust the density and liquid level of the electrolyte to the specified value. One month after the storage period has to be recharged according to the normal charging method.

8. Packaging, transportation

The car is packed in pallets. It is not allowed to be turned over or inverted during transportation. It is not allowed to collide when lifting and loading. Do not damage the outer surface of the vehicle when unpacking.

9. Warning (precautions)

1. Read the instructions carefully and master the vehicle performance before operating the vehicle.
2. It is strictly forbidden to press the ascending or descending button when driving the vehicle to walk. It is strictly forbidden to switch the ascending and descending button frequently, which will cause damage to the vehicle and the cargo!
3. Do not shake the handle in the form of rapid and high frequency!
4. Do not load heavy objects on the fork in a high speed!
5. Do not overload. The vehicle will not work properly when overloaded!
6. The center of gravity of the cargo shall be evenly distributed on the two forks. Otherwise the fork may be damaged or the cargo may fall during operation.
7. Do not load loose or unstable goods!
8. Do not leave the goods on the body for a long time!

9. It is strictly forbidden to make sharp turns on narrow passages. At this time, slow down and slow turn to ensure the safety of personnel and goods.
10.When the stacker is not in use, the fork should be lowered to the lowest position.
11. It is strictly forbidden to place any part of the body under heavy objects and forks!
12. This stacker is suitable for use on flat ground or flat work platforms. Long-term parking on slopes is strictly prohibited.
13. Overload or over-slope operation is strictly prohibited. Failure to do so may result in slippage of the wheel, damage to the wheels and the motor, and the safety of the cargo and the person.
14. It is strictly forbidden to repair by one without training.
15. It is strictly forbidden to use the car under the specified voltage of 20.4V.
16. It is strictly forbidden to directly connect the power plug to the AC power.
17. When the lifting height of the fork exceeds 500mm, the car must travel at the lowest speed and the continuous walking distance must not exceed 2m.

10. Packing List

Packing List for Electric Stacker

NO.	Model	Quantity	N.W.（kg）	Dimension（L*W*H）	Note
1	Electric Stacker	1			Complete machine
2	Documents	1			Technical doc, accessories and spare parts,

Note: 1.The following documents are included in the technical paper bag.

Instruction manual	1 pc
Packing list	1 copy
Certificate	1 pc

2. Accessories and spare parts

NO.	Item	Using position	Model specifications	Quantity	Note
1	electric lock key	electric lock		**2pcs**	
2	charging plug and socket	Charger		**1**set	No Built-in charger
3	fuse	contactor	**200A**	**1**pc	