

# I. Preface

CTD series plug-in forklift trucks are loaded and unloaded forklift trucks powered by batteries, operated by standing (or walking) and lifted by hydraulic pressure. The car has the characteristics of compact structure, small size, light weight, flexible and simple operation, convenient maintenance and so on. It is an ideal tool for loading, unloading and stacking goods in warehouse workshop and factory area. Especially suitable for narrow passageways, and access to elevator floor operation.

The control parts of the vehicle operation are concentrated at the end of the handlebars, which is easy to operate and does not require full-time drivers.

This manual is a general specification. We reserve the right to modify the electric vehicle. If there is any discrepancy between the contents of the instructions and the objects, the instructions are for reference only.

## II. Main Technical Parameters

Model	CTD20
Bearing	2000kg
Load Center Distance	500mm
Elevation of standard gantry	2500mm
Minimum height of fork	85mm
Full-length pedal lift/drop	2000/2400mm
Body width	850mm
Maximum height of vehicle during gantry operation	3100mm
Static Height of the Vehicle when Portal Frame Retracts	1860mm
Minimum turning radius	1500mm
Maximum Speed Full/No Load	4/6 (km/h)
Maximum hoisting speed full/no load	80/130 (mm/s)
Maximum descent rate full load/no load	100/90 (mm/s)
Driving motor/hoist motor	1.2/2.2kw
Battery capacity	24V190AH
Dead weight	710-960kg

## III. Safety precautions

3.1 Before using this electric forklift truck, you should read the instructions carefully and be familiar with the structure and operation

method of the forklift truck before using it. If necessary, please contact our technicians by telephone.

3.2 When loading and unloading goods, forklift trucks should maintain the load center of the goods and strictly prohibit cargo overloading or unbalanced loading. Otherwise, it will lead to fork deformation or forklift damage, leading to safety accidents.

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3.3 When the forklift truck is moving and lifting goods, please make sure that there are no people standing around, so as to prevent the goods from slipping and injuring people.

3.4 When a forklift truck is moving, it cannot stand on a fork. Forklift truck should stop walking when lifting.

3.5 In the process of landing, the goods should keep a uniform speed drop, especially when the goods are landing at a height of 1.5M or above, do not stop and make a sudden descent, so as to avoid damaging the forklift, causing the forklift to overturn and the goods to slide.

3.6 When moving a forklift truck, please lower the fork to the lowest position and accelerate it evenly. Do not suddenly accelerate too fast, causing danger. Be careful not to hurt anyone at work.

3.7 Do not disassemble and repair at will. Non-professional maintenance will reduce the safety factor of the forklift.

3.8 After use, please maintain and maintain according to the rules.

3.9 Please do not damage the protective shield or other devices on the car body.

#### **4. Structure and Adjustment of Forklift Trucks**

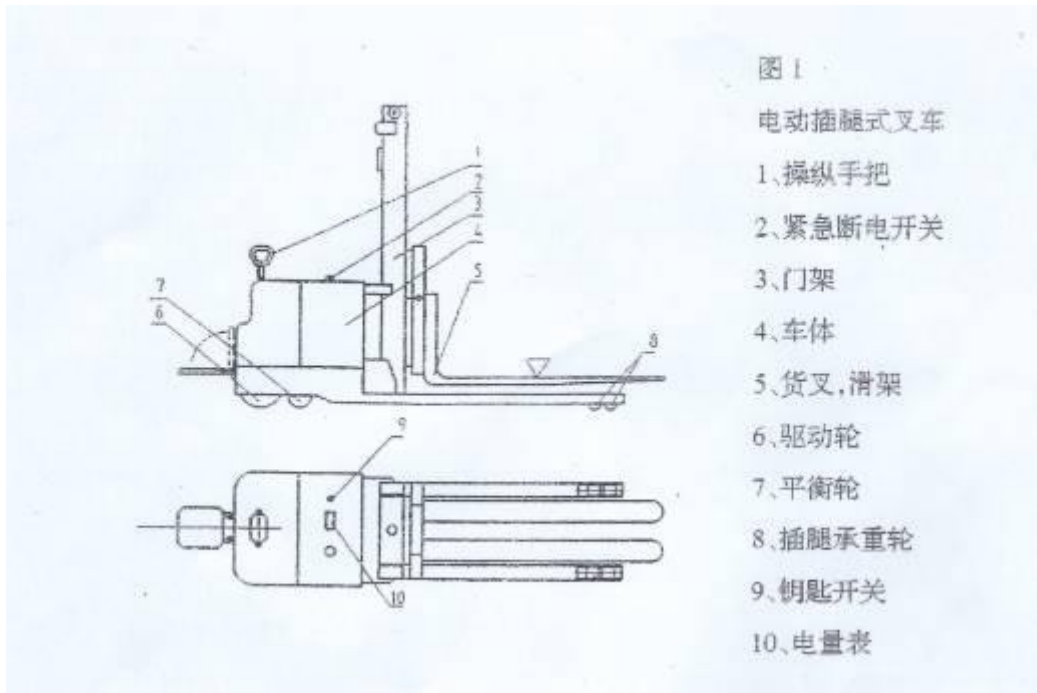
In the process of using this forklift truck, the user is required to make correct adjustment, assembly and disassembly on the basis of familiarity with the structural principle of each part. If not adjusted or assembled properly, it will affect the performance of forklift truck, accelerate the wear of parts, and lead to the early damage of batteries, motors and electrical appliances. Therefore, we should pay attention to it and adjust, assemble and use it strictly according to the technical

requirements. Non-professionals should not disassemble and assemble at will.

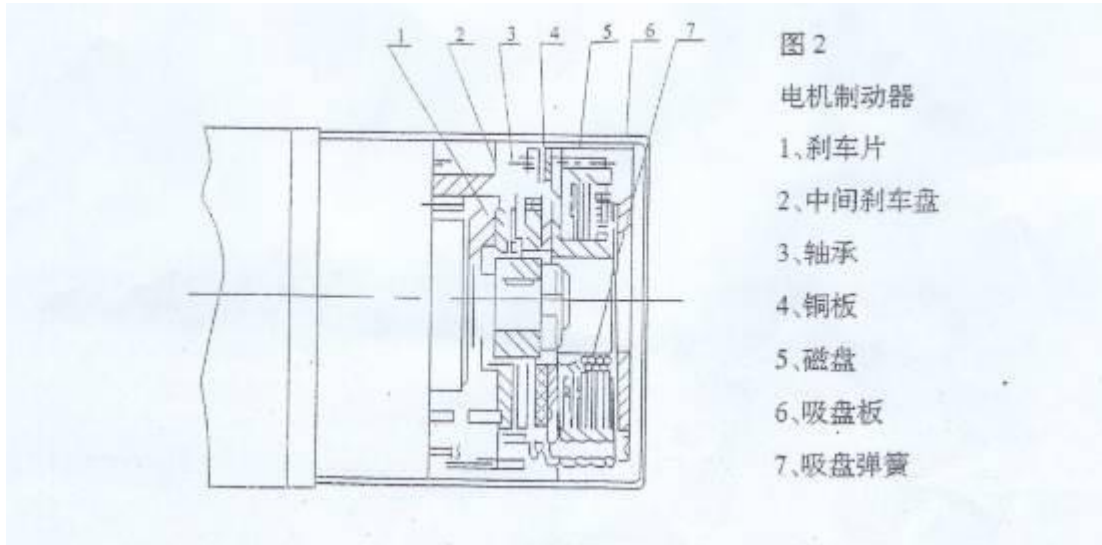
#### 4.1 Drive steering system

The driving device of the walking driving part adopts the "in-wheel motor" or "in-wheel reducer", which has the advantages of simple transmission, convenient maintenance, compact structure, and combined with the steering mechanism to obtain the minimum steering radius.

The motor disk brake (Figure 2) is used for braking. There are two forms: one is electrified brake, the other is power off brake. The principle is that the intermediate brake disc is fixed by the sleeve and the motor shaft. Disks, sucker brake discs, etc. are fixed by bolts and motor end discs. When the power supply is not connected, the gap between the two sides of the middle brake pad is about 0.35 mm, and the motor shaft can rotate freely. When the coil is connected to the power supply, the sucker overcomes the spring pressure and makes the brake pad contact with the intermediate brake pad, thus achieving the purpose of braking. The form of power-off braking is opposite to that of electric braking.



The brake machinery is qualified when it is out of the factory. The braking force ensures that the braking distance of forklift truck does not exceed 1.5 meters at full speed and full load. If it is used for a long time or disassembled and assembled, the clearance and uniformity of the brake disc should be re-adjusted to prevent the inclination of the brake disc and make the motor run with brake, thus causing overload damage to the motor.



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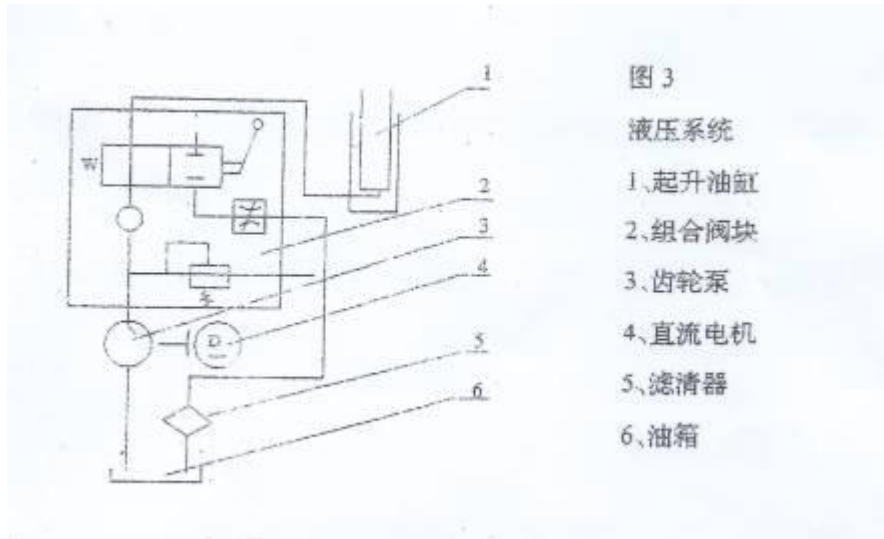
#### 4.2 Electronic control system

The electronic control system is divided into domestic electronic control system and imported electronic control system for users to choose. The braking mode of domestic electronic control system is manual button braking. The braking mode of imported electronic control system is to automatically reverse pulse current brake as long as the forward (backward) knob is loosened. The imported electronic control system is equipped with emergency Reverse Belly switch, whose function is detailed in 5. 4.

#### 4.3 Fork Door Frame

The internal and external portal frames adopt parallel structure. By lifting cylinder, the cargo fork rack moves up and down in the inner portal frame, and the inner portal rack moves up and down in the outer portal frame. When working, we should pay attention to whether the rollers are blocked or not. We should check the working condition of the bearings regularly, and add lubricant and adjust the clearance of the cargo fork rack.

#### 4.4 Hydraulic system (Figure 3)



4.4.1 The lifting cylinder is piston type. The surface of piston rod is plated with hard chromium and grinded. When used, the piston rod is not operated.

4.4.2 The rise and fall control adopts solenoid valve structure or hand control structure, which is reliable and simple in structure. Just press the upper and lower control buttons or push the joystick directly.

4.4.3 Hydraulic oil is required to have good lubricity and viscosity, not easy to oxidize, pure quality and no corrosion to parts. Therefore, the forklift truck uses No. 13 hydraulic oil. It can also use Lanzhu 40-1 hydraulic oil, No. 30 mechanical oil and No. 22 turbine oil. But it is not allowed to mix different grades of oil. The oil is replaced once every 1200-1500 hours, and the oil tank and pipeline are cleaned.

## V. Use of forklift trucks and safe operation of electrical equipment

The weight on the fork should be stable and put in good order. The center of gravity of the weight should be in the center of the two forks. The load should refer to the two-node load map labeled. It is forbidden to use the forklift in excess of the scope. The forklift should stop walking when lifting, and the fork should be lowered to the lowest position when the forklift truck travels for a long distance.

### 5.1 Start-up of forklift truck

Please read this manual carefully before starting the forklift.

Lift the emergency power off switch, insert the key into the lock and rotate clockwise to start the forklift.

Please check to make sure the battery is full and the indicator light is on.

## 5.2 Forklift forward and backward

Pull the control handle of the forklift to one side and swing down at an appropriate angle. (Leaving the vertical position but not pressing to the lowest position), then turn two knob switches with your thumb: if you turn the switch forward, the forklift will move forward; if you turn the switch backward, the forklift will retreat.

The forward and backward speed is controlled by the rotation angle of the knob switch. The rotation angle should be controlled a little bit when starting or when the surrounding space is small.

## 5.3 Routine parking of forklift trucks

When you need the forklift to stop smoothly, release your thumb, and the rotary switch will reset automatically. At this time, the reverse current will be generated through the controller, and the forklift will stop smoothly after a very small distance.

## 5.4 Belly Safety Switch

When the forklift truck retreats, if the body collides with the red belly switch, the forklift truck will stop immediately and move backward for a short distance in the forward direction, mainly to prevent your body from being crushed.

## 5.5 Fork Lift Switch

The forklift truck is divided into two lifting control modes, solenoid valve type: pressing the existing button on the control handle with your finger, the fork rises; pressing the button, the fork drops; and stopping the lifting immediately after releasing. Hand-operated valve type: push the handle forward, the fork will rise; pull the handle backward, the fork will fall; after loosening, the handle will automatically return to the middle, and the fork will stop rising and falling.

## 5.6 Electricity meter

When the battery discharges up to 70%, the flashlight gives a warning of "power reserve". At this time, the forklift truck should be charged. When the battery discharges up to 80%, the double flashlight flashes out "power exhaustion" alarm. At this time, the forklift truck must be charged immediately.

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## 5.7 Emergency switch

When unexpected conditions occur, such as out of control, you can immediately press the red emergency power switch, at this time, the power will be cut off immediately, all actions will stop.

## 5.8 Use of forklift trucks

Use the forklift according to the rules

If the forklift truck is loaded, it can not start or stop urgently, but should start slowly or stop routinely.

The speed of movement can be adjusted according to different conditions, such as whether there are other forklifts nearby, whether there are people, whether the ground is very flat or bumpy, etc.

If the front line of sight is blocked by the weight of the forklift truck, other operators can be turned to.

Cargo can be loaded in the following steps:

1. Move the forklift forward of the weight.
2. Raise the fork to an appropriate height below the bottom of the weight.
3. Move the forklift forward so that the fork reaches below the weight.
4. Lift the fork until the weight is loaded.
5. The forklift truck moves back together with the weight until the fork may drop.
6. Slowly lower the weight.

Heavy objects can be stacked in the following steps:

1. Move the forklift truck with heavy load to the front of the shelf.
2. Lift the weight to the appropriate position.
3. Forklift forward to the appropriate position;



4. Slowly reduce the weight, so that the lower bottom of the heavy pallet is sitting on the shelf;
5. Slowly move the forklift truck and its fork out of the stack.

On the way of carrying heavy goods, when encountering the up-and-down road surface, please pay attention to: when uphill road surface, heavy objects must be in front; but when downhill road surface, heavy objects must not be in front.

If the car is empty, please also pay attention when going up and down the slope: when going downhill, you can only move forward, not backward.

After use, forklift truck should be parked in a safe, smooth and reliable place.

When parking and leaving, the key should be taken out and kept properly.

After parking, the forklift should be moved artificially and possibly. When not in use, the forklift should be lowered to the lowest position.

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## **VI. Charging and Maintenance of Batteries**

### **6.1 Normal Charging of Batteries**

Batteries need to be charged regularly and in time. When in use, the double lights of the meter flashes out "power consumption" When alarming, it should be charged in time.

The normal charging current of the battery is shown in Table 4. During charging, the electro-hydraulic temperature should not exceed 45 degrees. Otherwise, the charging current should be reduced, manual cooling should be carried out, or the charging should be suspended. However, the initial charging battery should not be terminated within 2 hours, and the suspension of charging should be avoided as far as possible.

When charging, close the lock and pull the key out of the lock. Plug the charger plug directly into the charging socket (with the charging socket identification), press the charger switch, and the charger charges the battery.

Table 4

Phase I		Phase II	
Current (A)	Time (H)	Current (A)	Time (H)
14	8-10	7	8-10

**6.2 Random Charger**

The forklift truck is equipped with intelligent full-automatic charger, which will be adjusted according to the amount of battery storage.

The magnitude of charging current makes the charging process in the best charging state. After charging, the charger will automatically stop charging and turn off the power supply. It takes about 8-10 hours to recharge at a time.

**6.3** After discharge, the battery should be charged in the shortest time to avoid plate sulfation.

**6.4** Maintenance and maintenance of 6.4.1 accurately connect the positive and negative terminals of the battery, which should be fully contacted and reliable.

**6.4.1** Batteries should always be fully charged. Excessive charge and discharge or long-term non-charge after discharge will affect the life of batteries.

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**6.4.2** In order to prevent the irreversible sulfation of lead-acid batteries's plates and affect the life of batteries, batteries that are not used for a long time after injection of electrolyte should be charged once a month.

**6.4.3** When using the battery, check the electro-hydraulic quantity every ten days or so. Adjustment with ionized or distilled water High liquid level, do not use sulfuric acid and other liquids.

**6.4.4** The liquid orifice plug must be tightened to prevent loosening, and the surface of the battery should be kept clean.

6.4.5 In the cold season, the battery should not be discharged completely, so as not to damage the battery by freezing the electrolyte.

6.4.6 Batteries that are not used with liquids should be stored in dry and well ventilated places, away from alkaline logistics and heat sources, and avoid sunshine.

### Summary of rolling bearings

Table 5

Serial number	Bearing Model 1T/1.5T	Subordinate parts	Quantity per unit
1	6206-Z/6207-Z	Gantry roller	4
2	6204-Z/6205-Z	Chain roller	2
3	6206-Z/6207-Z	Fork roller	4
4	60104	front wheel	8
5	6010Z	Shock absorption mechanism	2
6	8111	Balance wheel	1
7	7107	Balance wheel	2
8	206	Driving wheel set	6
9	46122	Driving wheel set	2
10	104	Driving wheel set	2
11	60203	Driving wheel set	1
12	60202	Driving wheel set	1

## 8. Fault Backup Table

Table 6

Fault phenomenon	Reason	Elimination method
Driving wheel speed Reduce or drive motor overload	<ol style="list-style-type: none"> <li>1. The battery voltage is too low or the resistance at the junction is too high.</li> <li>2. Excessive carbon deposition between motor rectifiers.</li> <li>3. The improper adjustment of the motor brake makes the motor run with brake.</li> <li>4. Driving head gearbox and bearing lack lubrication.</li> <li>5. Motor armature short circuit.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check the voltage of the load and clean the connector.</li> <li>2. Clean up the rectifier</li> <li>3. Adjust brake clearance</li> <li>4. Check the cleaning and refill the lubricant.</li> <li>5. Replace the new motor.</li> </ol>
Lifting inability or inability to lift	<ol style="list-style-type: none"> <li>1. Excessive wear of gear pump and pump body.</li> <li>2. Change of adjustment point of relief valve and sealing valve in valve block.</li> <li>3. Oil leakage in hydraulic pipeline.</li> <li>4. Hydraulic oil temperature is too high and hydraulic oil is too thin.</li> <li>5. The gantry sliding frame is jammed.</li> <li>6. Oil pump motor speed is too low.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace worn parts or oil pumps.</li> <li>2. Replacement and readjustment.</li> <li>3. Check the oil spill and repair it.</li> <li>4. Replacement of substandard hydraulic oil and check the cause of oil temperature rise.</li> <li>5. Check and adjust.</li> <li>6. Check the motor and troubleshoot.</li> </ol>
Brake failure	<ol style="list-style-type: none"> <li>1. Brake button and part of the brake circuit break.</li> <li>2. Internal circuit break of brake disk coil.</li> <li>3. Brake loosening or excessive brake disc clearance.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check for replacement.</li> <li>2. Replace disk coils.</li> <li>3. Re-install and adjust.</li> <li>4. Recharge.</li> </ol>

	4. Voltage is too low, disk does not work.	
Electrical malfunction	<ol style="list-style-type: none"> <li>1. Damage and failure of the micro-switch at the end of the hand handle, or improper adjustment of the position of the micro-switch.</li> <li>2. Main circuit fuse or control circuit fuse is fused.</li> <li>3. The battery voltage is too low.</li> <li>4. Contact burning or too much dirt causes bad contact.</li> <li>5. The contacts do not move.</li> </ol>	<ol style="list-style-type: none"> <li>1. Repair and replace the micro switch.</li> <li>2. Replace the same type of fuse.</li> <li>3. Recharge.</li> <li>4. Repair shortcomings, adjust position or replace contactor.</li> <li>5. Check whether the circuit of the suction coil is interrupted or the contactor is replaced.</li> </ol>
Forklift trucks will start abruptly	Controller Failure	Replacement of Controller

### IX. Summary of Vulnerable Parts

Table 7

Serial number	Code name	Name and Specification	Material Science	Subordinate parts	4
1	CTD1.0, 19-04	front wheel	Polyurethane pressing parts	Leg insertion	2
2	CTD1.0, 12-05	Balance wheel	Polyurethane pressing parts	Box rack	1
3	CTD1.0, 10-02	Driving wheel	Polyurethane pressing parts	Driving wheel set	1

4	GB1235	O-ring 45*51*3.5	Rubber I-2	Lifting cylinder	1
		O-ring 60*55*3.1(1.5T)			1
		O-ring 70*60*3.1(1.5T)			1
5	GB1235	O-ring 60*50*5.7	Rubber I-2	Lifting cylinder	1
		O-ring 70*60*5.7(1.5T)			1
6	DH45	Dust-proof ring DH45	polyurethane	Lifting cylinder	1
7	Q/ZB248	Yx Sealing Ring 70*58*14(1.5T)	polyurethane	Lifting cylinder	1
		Yx Seal Ring 60*48*14(1T)			1
8	GB1235	O-ring 14*1.9	Rubber I-2	Valve group	2
		O-ring 16*2.4			1
9	QCC1-1	DC contactor	finished product	Electrical part	3
10	SPEED CONTROL	Speed Controller	finished product	Electrical part	1
11	JB982	Composite coil diameter 18	Press glue	Cylinder	1
		Composite washer diameter 14		Manifold block	1