

# Forward-moving electric forklift

---



Instructions for use

# I Preface

This manual is to help forklift operators to quickly understand and master the performance, characteristics and structure of the forklift and its correct operation methods so as to give full play to the effectiveness of this forklift.

The manual introduces the maintenance adjustment and repair so that the forklift operators and maintenance personnel can maintain the forklift reasonably so that they can keep the forklift in good condition for a long time and eliminate it quickly when it breaks down.

## II Scope of application and environmental mirror conditions

EQ series of forward-moving electric forklift truck is a three-pivot counterbalanced truck (Figure 1) with battery as the energy source and standing operation. Because of its small size, light weight and easy operation, it can work in narrow access floors and areas with complicated environment, and is an ideal tool for loading and unloading palletized goods in warehouses, workshops or factories. This forklift truck adopts polyurethane cast steel wheels with small wheel diameter, which is suitable for walking on flat and hard working ground. This forklift can be used with pallets and containers to implement unitized transportation in factories, or to undertake inter-process operation or inlet/outlet operation of working apparatus, which can effectively reduce the bumping damage of fragile parts and reduce the stacking area of working apparatus, thus achieving the purpose of improving product quality, saving infrastructure investment and improving handling efficiency.

In view of the above advantages of EQ type forklift, it can be used in containers, ships, carriages and low-ceilinged rooms in addition to the general indoor conditions, so it can be called "container forklift".

The environmental conditions are not more than 1000 meters above sea level, ambient temperature not more than 40°C, and relative air humidity not more than 90%.

Power supply voltage is 22-26V range can work normally.

EQ reach truck



### III Main technical parameters

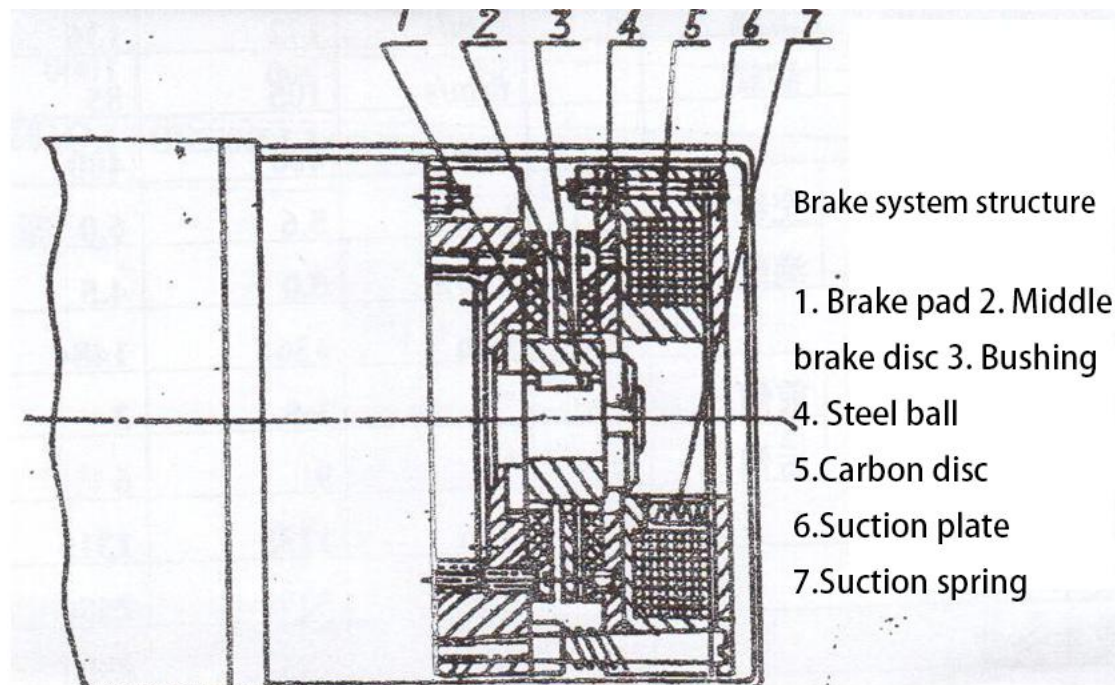
Table 1

Project Name			CPD0.5SB	EQ1025
Rated load capacity		KG	500	1000
Standard lifting height		MM	2500	2500
Maximum lifting speed	No load	MM/S	172	136
	Fully loaded	MM/S	105	85
Load Center		MM	500	500
Minimum turning radius		MM	1364	1484
Wheelbase		MM	1255	1315
Maximum travel speed	No load	KM/H	6	5.6
	Fully loaded	KM/H	4.5	5.0

Gantries tilt angle		°	3	2
		°	6	9
Full length of forklift		MM	2295	2480
Full width of forklift		MM	1090	1090
Forklift full height		MM	2050	2050
Fork length/extendable length		MM	1000/650	1000/650
Wheel size	Front Wheel	MM	φ180*50	φ180*50
	Rear Wheel	MM	φ250*80	φ250*80
Battery capacity		V/AH	24/210	24/210
Motor power	Upgrade	KW	2.2	2.2
	Pulling	KW	0.75	0.75
Empty car weight		KG	800	1150

#### IV Structure and adjustment of forklifts

In the process of using this forklift, users are required to make correct adjustment and assembly and disassembly on the basis of familiarity with the structure and principle of each department. If the adjustment or assembly is improper, it will affect the performance of the forklift and accelerate the wear of the parts and cause the early damage of the battery motor and electric appliances, so it is required to pay serious attention to the adjustment, assembly and use in strict accordance with the technology.



#### 4.1 Drive wheel steering system

4.1.1 The transmission device of the driving part adopts "in-wheel motor type" or "wheelside reducer", the advantages of this structure are simple transmission, convenient maintenance, compact structure, and combined with the steering mechanism into one, so as to obtain the smallest steering radius.

Braking using the motor disk brake (Figure 2), the principle is the middle brake pad through the sleeve and motor shaft fixed, disk, suction cup, brake pad, etc. are fixed through the bolt and motor end cover. When the disk coil is not connected to power, the suction disk overcomes the spring pressure to make contact between the brake pad and the middle brake pad, so as to achieve the purpose of braking.

The braking mechanism is adjusted and qualified at the factory, and the braking force ensures that the forklift truck brakes at full speed and full load, and the distance does not exceed 1 meter. For long use or after disassembly, the gap and uniformity of the brake disc need to be recalibrated to prevent the tilting of the brake disc, which makes the motor run with brake and thus causes the motor to be burned up by overload.

The steering device uses the transmission drive part to steer, which can make the forklift steer flexible and run balanced.

#### 4.1.2 Fork gantry

The inner and outer gantry adopt parallel structure. The fork frame moves up and down in the inner gantry, and the inner gantry moves up and down in the outer gantry. Through the lifting cylinder and tilting cylinder, the fork of the gantry tilts forward, backward, lifts and drops.

#### 4.1.3 Lifting cylinder

The lifting cylinder is a piston cylinder, the surface of the piston rod is finely ground and hard chrome plated, the surface should be kept undamaged when using, and the piston in the cylinder has three reliable seals. If you find that there is oil flowing out from the upper hole of the cylinder when lifting, it means that the seal at the piston is worn out and must be replaced.

#### 4.1.4 Hydraulic control system

The hydraulic part uses MHS type hydraulic power unit, which has good sealing, no oil leakage, easy to load and unload and change.

The oil pipe is made of rubber. The hose adopts JB1887-77 standard C type buckling type.

Multi-way directional valve has two handle operations (lifting and tilting). One of the relief valve has been adjusted in the factory to overload shall not exceed 20% of the rated lifting weight, the operator shall not be adjusted at will.

The tilting cylinder is double-acting piston type, the end of the piston with adjusting threads, depending on the adjusting nut, adjusted to 3° for the front tilt, 6° for the rear tilt, the nut will be locked after the adjustment, and to prevent loosening in operation.

Hydraulic oil requires good lubricity and viscosity, not easy to oxidize, pure quality, and no corrosive effect on parts. Therefore, this forklift uses No. 20 mechanical oil and No. 22 turbine oil

(GB446-3).

The main properties of No.20 mechanical oil.

Kinematic Viscosity	(CST)	17-23
Relative Viscosity	(E)	26-33
Flash Point	No less than°C	170
Condensation point	No higher than°C	-15

It can also be used Lan Thick 40-1 hydraulic oil, 22 turbine oil. However, it is not allowed to mix different grades of oil, and the oil will be replaced once after every 1200-1500 hours of work and the oil tank and oil circuit will be cleaned.

#### 4.2 Electrical control system

EQ series forklift truck adopts "centralized control by handlebar", the electrical components are installed in the switch box at the end of the handlebar, when operating, turn on the power with the key, slowly turn the cams on both sides of the switch box, change the potentiometer and resistance value of the switch box, and turn on the DC contactor for forward and reverse control at the same time, then the forward and reverse direction can be easily implemented from zero to maximum travel. The stepless travel speed change from zero to the maximum speed can be easily implemented. When braking is needed, it is only necessary to return the handle to the top and drive the travel switch to work, then the forklift truck can be braked, its structure is simple, reliable and convenient to maintain. When the forklift is not used at the end of work, the electric lock should be closed and the key should be removed. Its electrical principle.

### **V battery use and maintenance**

#### 5.1 General knowledge of charging

The forklift battery is charged at the factory, so users can use it directly. When the power is less than 30-40%, it should be charged in time, and the charge can be chosen to be charged at night, generally about 10 hours. The charger used in this factory is adjusted at the factory, so users can use it directly. If you adjust the voltage, it will damage the battery and charger.

#### 5.2 Replenish battery fluid

After users use it for a period of time, they should check whether the battery liquid needs to be replenished (see battery scale), the temperature of electrolyte filled into the battery should be lower than 21°C or higher than 32°C, and the liquid surface height should be higher than 15-20 mm on the protection plate, at this time the temperature of electrolyte in the battery rises, it must be left for 3-4 hours to make the temperature drop to 30°C before charging, if the electrolyte temperature is too high in the hot summer season, it can be If the electrolyte temperature is too high in the hot summer season, artificial cooling can be used, but the resting time should not exceed 12 hours.

#### 5.3 Normal charging

After fully charged (the specific gravity of the electrolyte is about 0.10 higher than the original specific gravity), if the specific gravity of the electrolyte is not within the above range,

distilled water or 1.29 specific gravity of concentrated sulfuric acid can be used to adjust (the liquid level should still be kept higher than the protection plate 15-20 mm), then use the second stage of charging electrolyte to continue charging for 1 hour to make the electrolyte even, if it is still not within the range, it should continue to adjust until it is adjusted to the above.

#### 5.4 Battery maintenance

a. After the battery is discharged (i.e., after the discharge is terminated, the single is at 10.5 volts and the specific gravity of the electric fluid is lower than 1.15), it should be charged immediately, not later than 24 hours at most.

b. The battery should not be overcharged.

c. The appearance of the battery should be kept clean, wipe the pole bolts and apply a layer of petroleum jelly or butter.

d. Always check the electrolyte level, if the electrolyte is not enough, use distilled water to replenish it, and charge it for 20-30 minutes to make the electrolyte fully mixed, avoid adding electrolyte to make the concentration too high and damage the battery.

e. The small hole on the cover of the charged battery should be kept open frequently.

f. The new battery is valid for 1 year from the date of delivery.

g. Before charging the new battery, the battery cover should not be loosened to ensure that the battery tank is isolated from the outside air.

h. The used battery, when not in use, should be fully charged and stored, and replenished once a month.

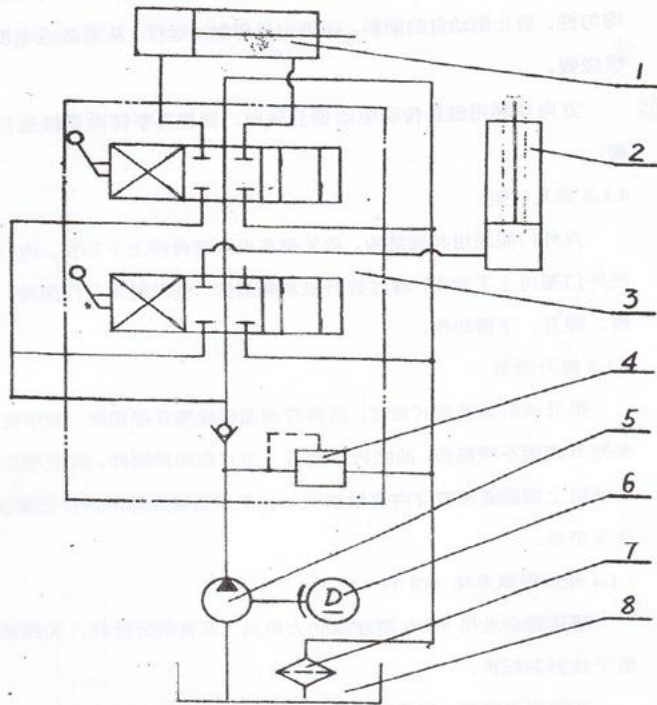
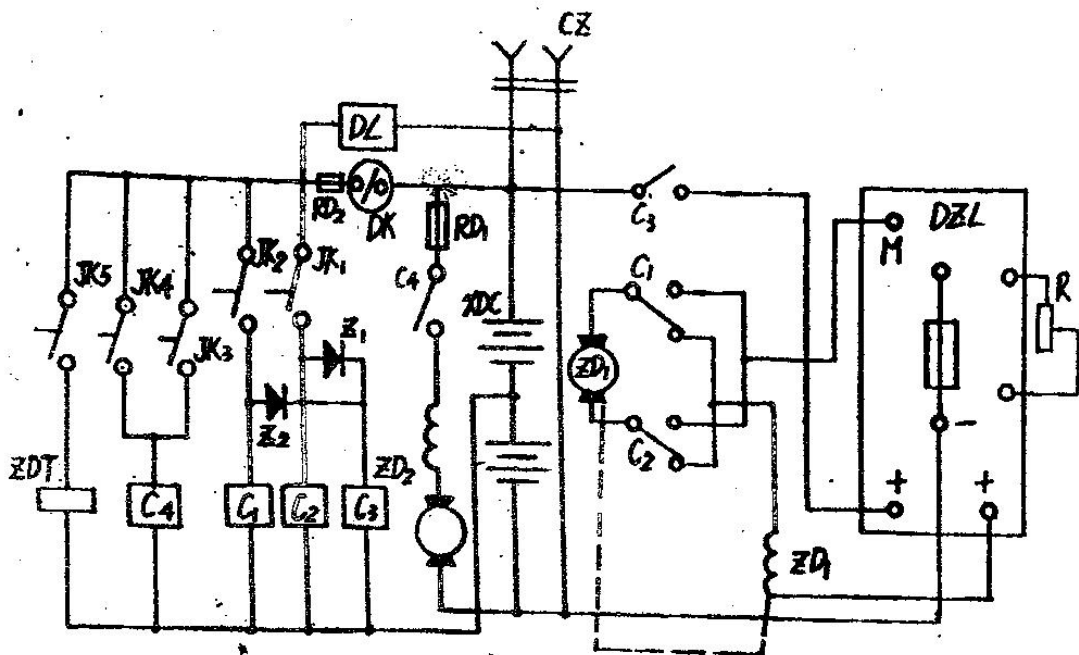


Figure 3: Hydraulic system diagram

1. Tilt cylinder
2. Lifting cylinder
3. Multi-way directional valve
4. Relief valve
5. Gear oil pump
6. Motor
7. Oil filter
8. Oil cylinder





**Figure Stepless speed control principle diagram**

Serial number	Code	Name	Model and specifications	Quantity
1	R	Potentiometer	RJ1/4W 0-250K	1
2	DZL	Speed governor	1N-02-08--14	1
3	XDC	Battery	DG-210	12
4	ZDT	Brakes	Motor included	1
5	ZD2	DC Motor	3KW	1
6	ZD	DC Motor	XQ-0.75KW	1
7	C1-C3	DC Contactors	QCC100A/24V	3
8	C4	DC Contactors	Motor Package 24V	1
9	RD2	Control line fuse	Ø1.0	1
10	RD1	Oil pump motor fuse	Ø0.31	1
11	DK	Power failure switch	JK414	1
12	Z1 Z2	Diodes	2CZ 5A/200V	2
13	JK1-JK4	Microswitch	US10NO51C2	4
14	JK5	Travel Switch	Z150Q-B	1
15	DL	Power indicator	24V	1

**VI. Fault Remarks**

Fault phenomenon	Reason	Troubleshooting
Reduced drive wheel speed or drive motor overload	<ol style="list-style-type: none"> <li>1. Battery voltage is reduced, or the resistance at the connector is increased</li> <li>2. Carbon accumulation between the rectifier pieces of the motor</li> <li>3. improper adjustment of the motor brake or gap changes make the motor run with the brake</li> <li>4. foreign objects stuck in the drive head gears and bearings, etc.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check the voltage when the load is re-charged clean the connector</li> <li>2. Clean up the rectifier</li> <li>3. readjust the gap to 0.35mm per side</li> <li>4. clean and re-lubricate</li> <li>5. Replace the new motor</li> </ol>
Lifting powerless or unable to lift	<ol style="list-style-type: none"> <li>1. Excessive wear of gear pump and pump body</li> <li>2. The spring of the relief valve in the</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace worn parts or oil pump</li> <li>2. Replace the spring or realign</li> </ol>

	<p>multi-way directional valve fails or the adjustment point changes</p> <ol style="list-style-type: none"> <li>3. The valve stem and body of the multiway reversing valve are worn and leak too much oil</li> <li>4. Hydraulic pipeline oil leakage</li> <li>5. Hydraulic oil temperature is too high or too thin</li> <li>6. The gantry skeleton has stuck phenomenon</li> <li>7. Wear of piston seal</li> </ol>	<p>it</p> <ol style="list-style-type: none"> <li>3. Chrome plating and fine grinding configuration of the valve stem</li> <li>4. Check the oil leakage and repair</li> <li>5. Replace the hydraulic oil that does not meet the requirements or stop to check the cause of the increase in oil temperature</li> <li>6. check and adjust</li> <li>7. replace seals</li> </ol>
Brake Failure	<ol style="list-style-type: none"> <li>1. Brake button and brake part of the circuit is broken</li> <li>2. Brake disk coil internal disconnection</li> <li>3. Brake is loose or the brake pad gap is too large</li> <li>4. The voltage is too low and the disk does not operate</li> </ol>	<ol style="list-style-type: none"> <li>1. check for replacement</li> <li>2. replace the disk</li> <li>3. Reinstall and adjust</li> <li>4. re-charge</li> </ol>
The gantry tilts on its own or tilts with difficulty	<ol style="list-style-type: none"> <li>1. Excessive wear on tilt cylinder wall and seals</li> <li>2. Failure of multiway directional valve stem spring</li> <li>3. piston stuck on cylinder wall or piston rod bent</li> <li>4. Excessive dirt buildup in the tilting cylinder or over-pressurized seal</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace the seal or cylinder</li> <li>2. Replace the spring</li> <li>3. Replace damaged parts</li> <li>4. Clean and adjust</li> </ol>
Insufficient oil pump pressure or low speed	<ol style="list-style-type: none"> <li>1. Damaged seal in the pump groove, too much oil leakage inside</li> <li>2. Gear wear</li> <li>3. Low speed of oil pump motor</li> <li>4. Foreign body blockage in the pipe</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace</li> <li>2. replace the oil pump</li> <li>3. Check the rectifier, exclude the carbon between the pieces, adjust the carbon brush position</li> <li>4. check and clean</li> </ol>
Electrical action is not normal	<ol style="list-style-type: none"> <li>1. Damage or failure of the speed control mechanism or improper combination travel position</li> <li>2. Main circuit fuse or control circuit fuse blown</li> <li>3. Excessive reduction of battery voltage</li> <li>4. contactor contact burnt</li> <li>5. contact does not operate</li> </ol>	<ol style="list-style-type: none"> <li>1. Repair or replace the combination travel switch</li> <li>2. Replace the same type of fuse</li> <li>3. re-charge</li> <li>4. Repair the contacts, adjust the position or replace the contactor</li> <li>5. Check the attractor coil circuit for interruption or replace the contactor</li> </ol>

## VII. Maintenance Schedule

Parts	Inspection content	Interval time		
		3 Months	6 Months	12 Months
Racks and forks	Inspection of load-bearing elements	Yes		
	Check whether the bolts and nuts are tensioned	Yes		
	Checking the movement of supports and machines	Yes		
Brakes	Checking brake performance	Yes		
	Check the wiring for wear and tear	Yes		
	Check braking power		Yes	
Wheels	Check for wear and tear	Yes		
	Check if the bearings are running properly		Yes	
	Check if the connection is fixed reliably	Yes		
Steerage	Check for freedom of movement		Yes	
	Checking the directional movement (turning)	Yes		
	Check for normal rebound to vertical position		Yes	
Electrical Systems	Check micro switch	Yes		
	Check connectors and cables		Yes	
	Check the main switch	Yes		
	Check the horn	Yes		
	Check the emergency brake button	Yes		
	Check Insurance			Yes
Hydraulic s System	Checking performance	Yes		
	Check oil level		Yes	
	Checking for leaks and wear on joints	Yes		
	Oil change/filtration			Yes
	Check the performance of the pressure limiting valve			Yes
	Check the performance of the restrictor valve			Yes
Cylinder	Check for leaks	Yes		
	Checking the wear of seals	Yes		
Motor	Check the brush for wear and tear	Yes		
	Check starter motor relay		Yes	
Battery	Check electrolyte density and liquid level	Yes		
	Check component voltage	Yes		
	Check the tightness of the battery box and terminals	Yes		
	Check the cable		Yes	
	Apply Vaseline to lubricate the terminal		Yes	
Check	Check the lifting speed of the forks			Yes
	Checking safety devices	Yes		
	Lift test of rated load	Yes		

**Machine lubrication table**

Lubrication point	Lubricant type	Interval time	
		3 Months	6Month
Wheels and rollers	Lithium-based grease	Yes	
Lifting chain	Mechanical oil	Yes	
Column guide	Lithium-based grease		Yes
Hydraulic unit	Viscosity of lubricating oil 40°Ccst32		Yes

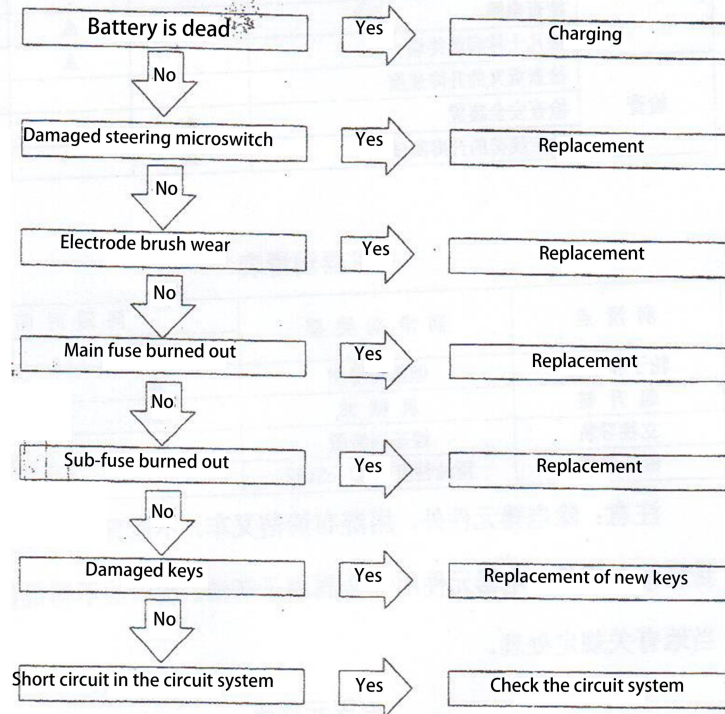
**Note: Except for the electrical components, clean the forklift with a damp cloth, not directly with water, steam or flammable liquid spray. Use non-metal brushes to clean electrical components. Waste oil should not be dumped indiscriminately and should be handled according to the local regulations.**

#### Hydraulic components table

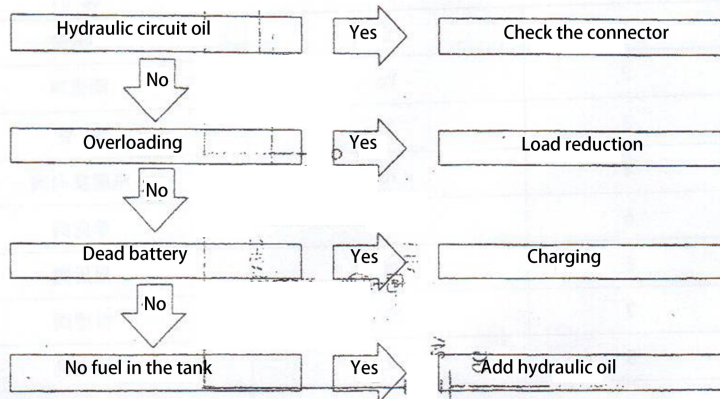
Serial number	Symbols	Explanation
1	c	Lifting cylinder
2	vp	Restrictor valve
3	h	Oil pipe
4	vm	Electromagnetic directional valve
5	vc	One-way valve
6	vf	Pressure limiting valve
7	vk	Constant velocity valve
8	m	Pump motors
9	p	Pump
10	f	Filter
11	t	Fuel tank

## Question Answers

### Machine won't start



### Fork rack does not lift



### Wear parts

Serial	Codename	Name and specification	Materials	Parts	Quantity
1					

No.					
1	GB/T1235	O-ring 26*2.4	Rubber I-2	Tilting cylinder	
2	GB/T1235	O-ring 60*5.7	Rubber I-2	Tilting cylinder	
3	EQ0.5T	Anti-vibration gasket	Rubber I-2 Oil	Tilting oil	1
4	GB/T1235	O-seal 60*3.1	Resistant	cylinder	3
5	JB/EQ4264	YX Seal D40	Rubber	Tilting oil	1
6	GB/T10708.3	Dustproof ring D40	Polyurethane	cylinder	1
7		Boneless dust ring	Polyurethane	Lifting cylinder	1
8		D40	Rubber I-2	Lifting cylinder	2
9	EQ-0.5T	O-ring D50*2.65	Rubber I-2	Lifting cylinder	2
10		O-ring D45*2.65	Rubber I-2	Lifting cylinder	2
11		O-ring D50*3.1	Rubber I-2	Lifting cylinder	2
12		O-ring D20*3.1	Polyurethane	Lifting cylinder	2
		YX seal for hole D50		Lifting cylinder	1
13		Boneless dust ring	Polyurethane	Lifting cylinder	1
14		D45	Rubber I-2	Lifting cylinder	2
15	EQ-1T	O-ring D55*2.65	Rubber I-2	Lifting cylinder	2
16		O-ring D50*2.65	Rubber I-2	Lifting cylinder	2
17		O-ring D55*3.55	Rubber I-2	Lifting cylinder	2
18		O-ring D20*3.1	Polyurethane	Lifting cylinder	2
		YX seal for hole D50		Lifting cylinder	1
19	EQ-1T	Rollers	45	Inner door	
20	CBD-1B.5.1	Drive wheels	Pressed Parts	frame	4
21	CBD-1B.5.3	Face Seals(I)	Rubber	Drive section	1
22	CBD-1B.5.10	End Seals (II)	Rubber	Drive section	1
23	EQ-1T	Front wheels	Pressed Parts	Drive section	1
				Front	2
				wheel set	