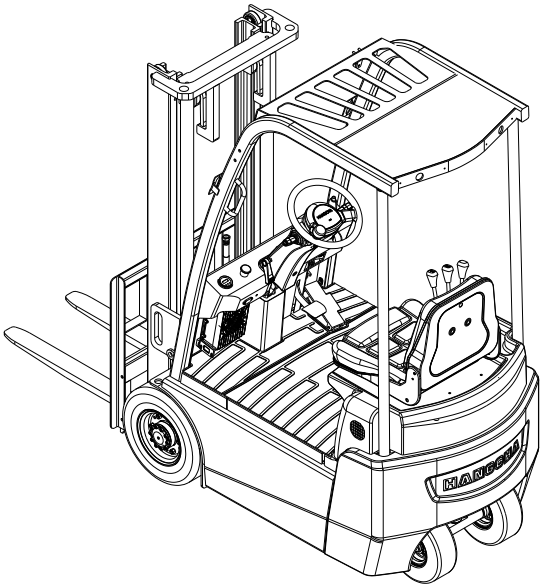
X *Series*

X Series three-wheel Electric Counterbalanced Forklift

CPDS05/06/07/08/09/10-XD2
CPDS05/06/07/08/09/10-XD2-I
CPDS06/08/10-XC2
CPDS06/08/10-XC2-I
CPDS06/08/10-X
CPDS06/08/10-X-I
CPDS13/15-XD2-SI

OPERATION AND MAINTENANCE MANUAL



HANGCHA GROUP CO., LTD.
01/2021

FOREWORD

Thank you very much for purchasing X series electric counterbalanced truck of Hangcha Group.

X series electric counterbalanced truck is a newly developed product of our company, it owns characteristics as beautiful shape, compact structure, small size, low gravity, good stability, superior performance, flexibility and small turning radius, so it is It is widely used in workplaces in small spaces. The whole vehicle is light in weight. It can enter the elevator without forks or with folding forks. Take the elevator to shuttle freely between floors. The whole vehicle adopts front-wheel drive and full AC control system, with strong power, high efficiency and high reliability.

This manual is brief introductions and correct operation of 0.5t ～ 1.5t X series electric counterbalanced truck, which will tell you how to operate safely and maintain preventively; relative persons must read and understand the manual before using the truck.

Due to the continuous updating and improvement of our products, there may be minor discrepancies between your forklift truck and this manual. For any questions, please contact Hangcha or your nearest dealer.

Model	Controller	Rated capacity(t) / Load centre(mm)
CPDS05/06-XD2	ACS24XS-350C -35P	(0.5/0.6)/ 400
CPDS07/08-XD2	ACS24XS-350C -35P	(0.7/0.8)/ 400
CPDS09/10-XD2	ACS24XS-350C -35P	(0.9/1.0)/ 400
CPDS05/06-XD2-I	ACS24XS-350C -35P	(0.5/0.6)/ 400
CPDS07/08-XD2-I	ACS24XS-350C -35P	(0.7/0.8)/ 400
CPDS09/10-XD2-I	ACS24XS-350C -35P	(0.9/1.0)/ 400
CPDS06-XC2	1232SE-2421	0.6/ 400
CPDS08-XC2	1232SE-2421	0.8/ 400
CPDS10-XC2	1232SE-2421	1.0/ 400
CPDS06-XC2-I	1232SE-2421	0.6/ 400
CPDS08-XC2-I	1232SE-2421	0.8/ 400
CPDS10-XC2-I	1232SE-2421	1.0/ 400
CPDS06-X	/	0.6/ 400
CPDS08-X	/	0.8/ 400
CPDS10-X	/	1.0/ 400
CPDS06-X-I	/	0.6/ 400
CPDS08-X-I	/	0.8/ 400
CPDS10-X-I	/	1.0/ 400
CPDS13-XD2-SI	ACS80S-35P/ACS80S-23P	1.3/500
CPDS15-XD2-SI	ACS80S-35P/ACS80S-23P	1.5/500

Ⓒ 01/2021 HANGCHA GROUP CO., LTD

Content

Foreword

1. Description of appearance and operating components..... 1

2. Displays and Controls.....2

Seat.....8

3. Nameplate and warning labels.....11

4. Technical Specifications.....12

5. Safety Instructions.....21

6. Forklift transporting and hoisting.....26

Transporting.....26

Hoisting.....26

7. Structure and stability of truck.....27

8. Running-in of the new truck..... 32

9. Daily maintenace.....33

10. Driving and operation..... 37

Driving..... 37

Travelling..... 37

Decrease speed.....37

Turning..... 37

Parking.....37

Loading..... 38

Stacking..... 38

Un-stacking load.....39

Check after operation.....39

11. Deposit.....40

12. Battery..... 41

Lead-acid batteries.....41

Specific gravity detection and conversion.....42

Check the electrolyte level and add distilled water.....43

Battery charging.....44

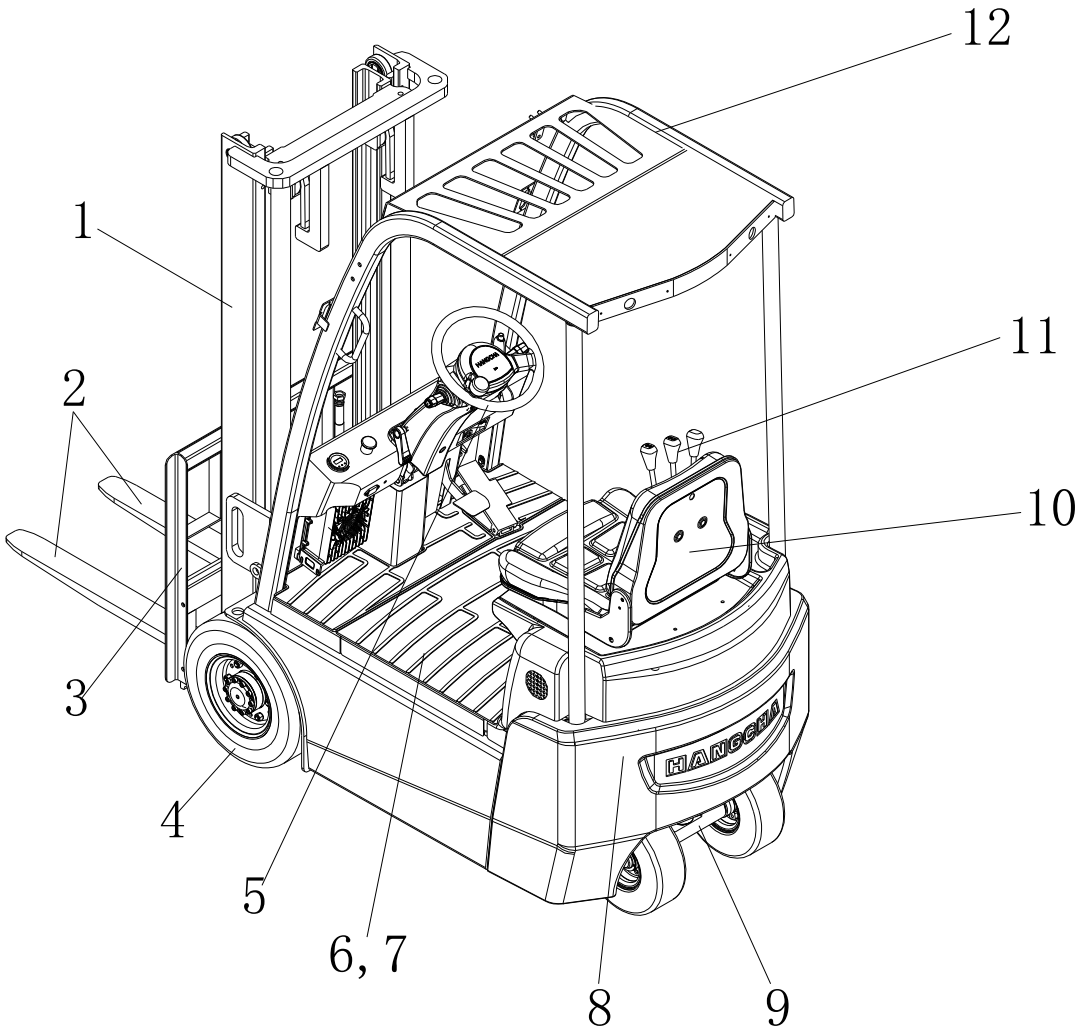
Battery replacement.....46

13. Lithium battery..... 48

Lithium battery parameter (CATL as standard).....48

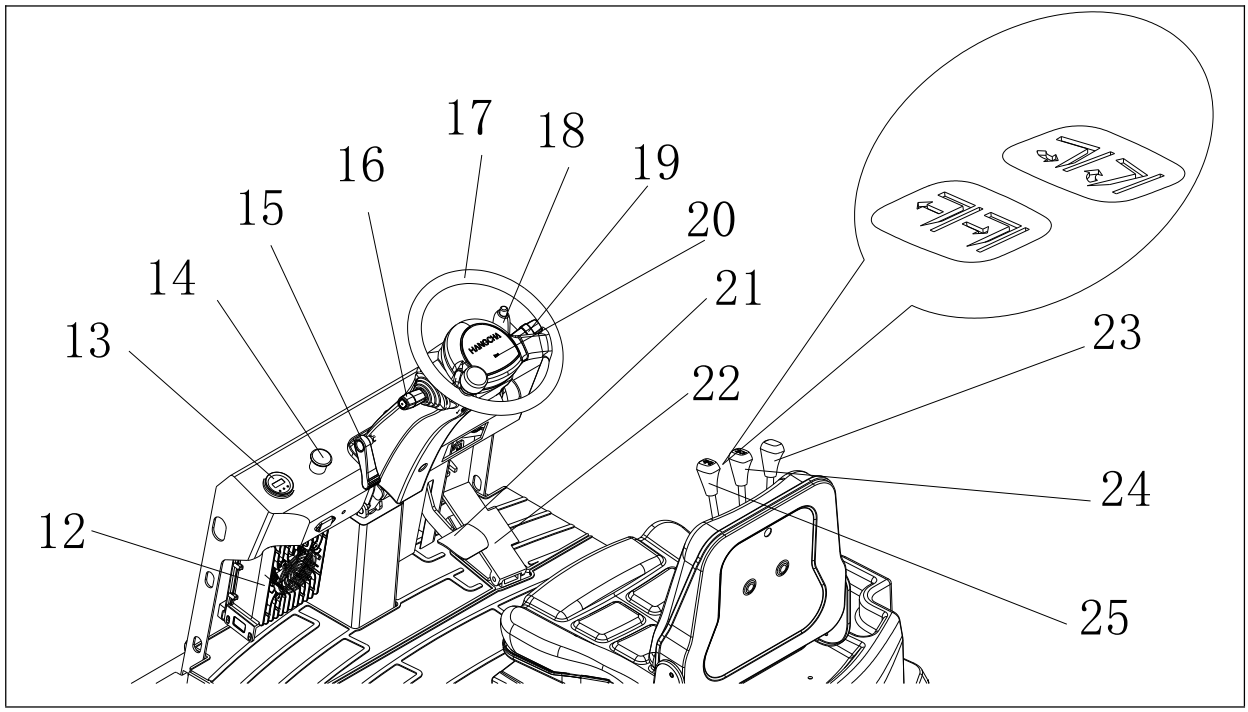
Safety instructions....49
Installation instructions....49
Basic terms for lithium ion battery....50
Instructions for Use....50
Maintenance....51
Emergency plan....51
Shineng Charger....52
On-board charger....58
Charging procedures： 59
14. Maintenance summarization....60
Preventive maintenance schedule....61
Replace the key safe parts periodically....70
Table for oil used in the truck....70
Table for bolts tight torque....71
15. The use, Install and Safety Rules of attachment....72
Attachment install....72
Attachment use....72
Check and maintenance....73
16. Battery automatic filling water system(Optional)....74
17. Related Safety Instruction and Standard(For CE)....78
Introduction to customer service hotline....80

1. Description of appearance and operating components



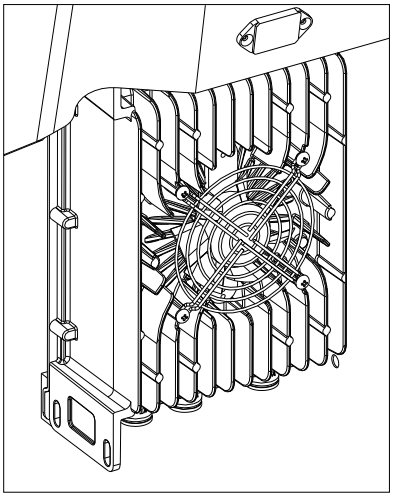
Item	Description	Item	Description
1	Mast	7	Pedal pad
2	Forks	8	Counterbalanced weight
3	Fork carriage	9	Steering axle
4	Front wheel	10	Seat
5	steering wheel	11	Operating lever
6	Storage battery	12	Overhead guard

2. Displays and Controls



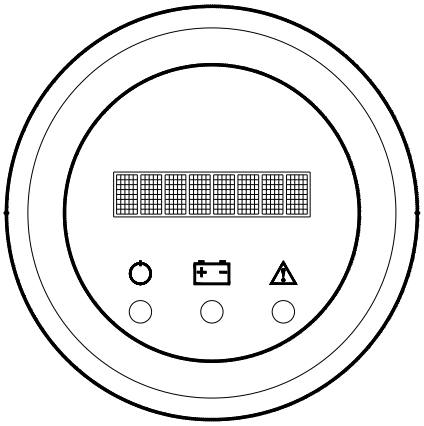
Item	Description	Item	Description
12	On-board charger	19	Combination light switch
13	Meter	20	Button
14	Emergency stop button	21	Brake pedal
15	Steering column positioning device	22	Accelerator pedal
16	Direction switch	23	Attachment lever
17	Steering wheel	24	Lift lever
18	Hand brake	25	Tilt lever

On-board charger[12]



The X series three-wheel forklift equipped with an on-board charger, which can be charged with a 10A national standard three-hole plug, and is very convenient.

Meter[13]



It displays the remaining battery capacity, service hours, travel speed and fault code etc.

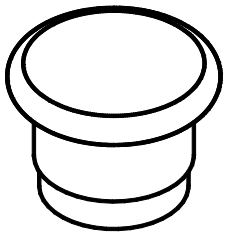
When the key is at “ON” position, power is on, the truck goes in to self-examine procedure, and the green, yellow and red lights will be on successively. Self-examine procedure lasts for 7 seconds, and then it ends and goes into display status.

The left green LED light is always on after power is on.

When discharge 80%, the middle yellow LED light will flash, it means charge needed.

If there is fault, the right red LED light will be on and shows a piece of fault message. Please refer to relevant fault code in the service manual for fault code and diagnosis information

Emergency stop button[14]

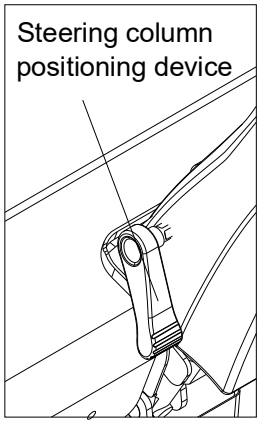


Switch power supply on or off.

Press the red button and the power of the truck will be cut off. Switch in clockwise and pull this button, power is on.

> ⚠ **Caution**
>
> - **The emergency stop switch cannot be used to replace the function of the key switch.**

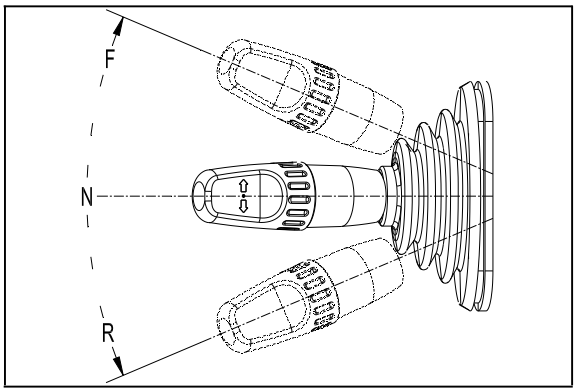
Steering column positioning device [15]



Adjusts and fixes the steering column to the required distance.

The tilting angle of the steering column is adjustable to suit individual operators. Turn the hand lever upward to release the steering column and locked by turning it downward.

Travel direction switch [16]



Sets the required travel direction.

The travel direction switch is used for switching between forward and backward moves. When the travel direction switch is pushed forward and accelerator pedal pressed, the forklift trucks moved forward. When the travel direction switch is pushed backward, the forklift trucks moved backward.

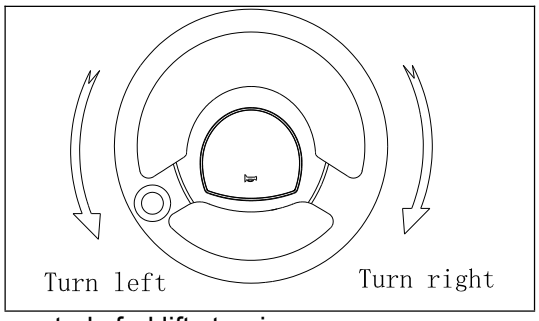
CAUTION

- **While traveling, if change the travel direction switch, electric braking will operate，speed will lower until stop， then travel to the opposite direction.**

WARNING

- **Turning the key switch "on" does not make the forklift truck move, if the travel direction switch is not in the neutral position or the accelerator pedal is being pressed. In this case, the travel direction switch should be returned to neutral and move you foot from the accelerator pedal. Then the truck can be operated.**

Steering wheel（17）

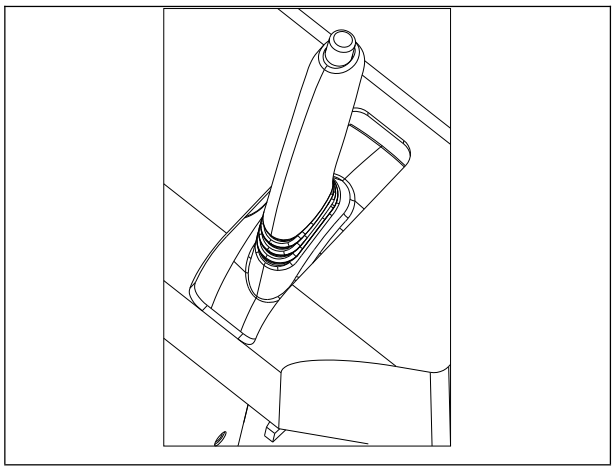


It controls forklift steering.

Steering wheel turns towards right, and the truck will turn right; Steering wheel turns towards left, and the truck will turn left.

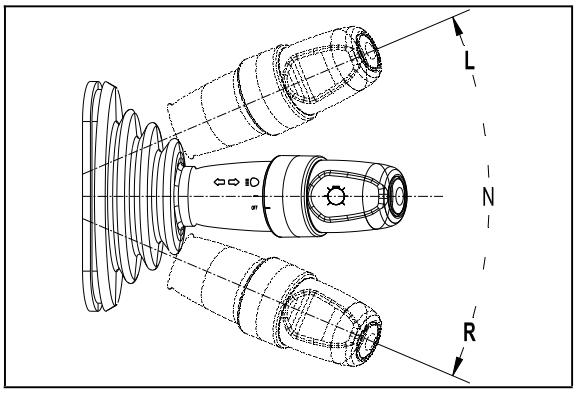
The steer wheels are located at the rear of the truck. These cause the rear of the truck to swing out left and right 90 degrees when a turn is made.

Parking brake lever（18）



Start or release the parking brake. Pull backward, parking brake starts; press the lock button and push forward, it can release parking brake.

Combined light switch [19]



Control the turn signal lights, headlights and front small lights working condition.

This combined light switch is composed of turning light switch and big/small lamp switch. Turning light indicates the traveling direction. When turn on the switch, the lamp flashes.

The light switch has two shifts. First shift small lights on; second shift headlights and small lights both up.

Forward	Left turning lamp flashes
Neutral	Lamp goes off
Backward	Right turning lamp flashes

CAUTION

- **The turn signal switch does not automatically return to the neutral position. Reset it by your hand.**

Brake pedal（21）

Perform a braking operation.

Depress the brake pedal, the forklift will be decelerated or stopped, and the brake light will be on.

Caution

- Never step the brake pedal and the accelerator pedal at one time, otherwise, it should damage the traveling motor.

Accelerator pedal [22]

Provides infinitely variable control travel speed.

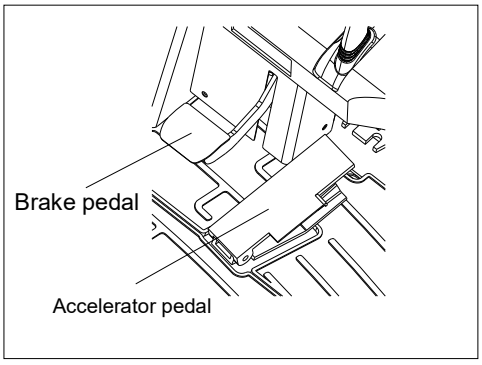
As the accelerator pedal is slowly pressed, the drive motor start turning and the forklift truck will start to move. According to the force applied to the pedal, the speed is adjusted with not steps.

CAUTION

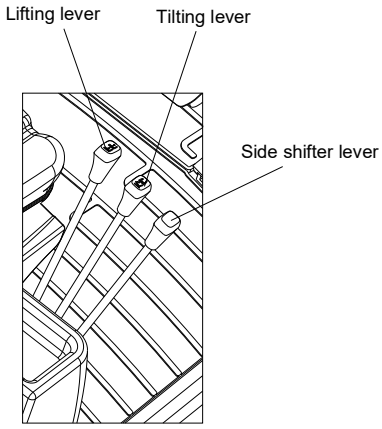
- **Loosen the accelerator pedal when truck is working, truck can make soft brake.**

WARNING

- **Before open the key switch to press the accelerator pedal, the more function digital indicator shall show alarm information. Then you must release the accelerator pedal.**

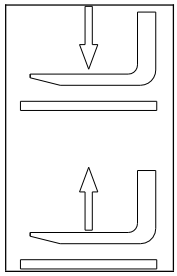


Lifting lever



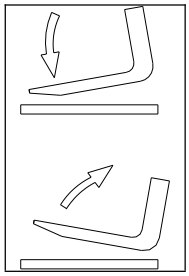
The levers include lifting lever, Tilting lever, Side shift lever.

Lifting lever [25]



The forks can be raised or fell by pulling backwards or pushing the lever. Lifting speed can be controlled by tilt backwards angle of lever and the lowering speed can be controlled by tilt forwards angle of the lever.

Tilting lever [24]



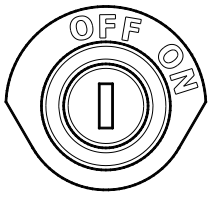
The forks can be tilted by operation of this tilt lever. Pulling on this lever backwards will tilt the forks backwards, and pushing it forwards will tilt the forks forwards. The tilt speed can be controlled by tilt angle of the lever.

Sideshifter lever [23]

Control the fork to move to left or right.

Push or pull this lever can realize the left/right movement of the mast.

Key switch

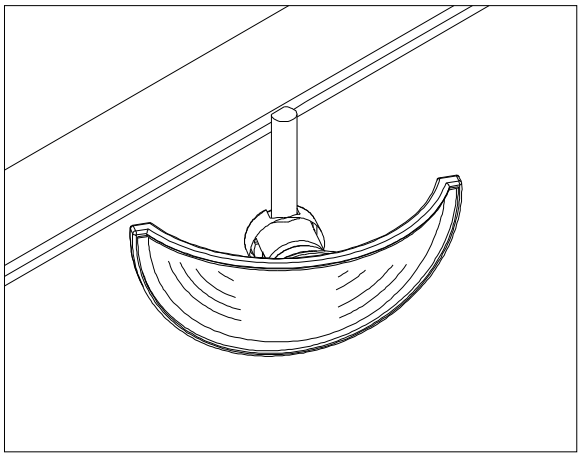


It connects and controls current.

Key switch has two positions, “OFF” and “ON”. When it is at “OFF” position, the truck functions will be prohibited. When turn the switch to “ON”, the current is connected.

When the driver leaves the truck, pull off the key switch can make sure the truck not start accidently.

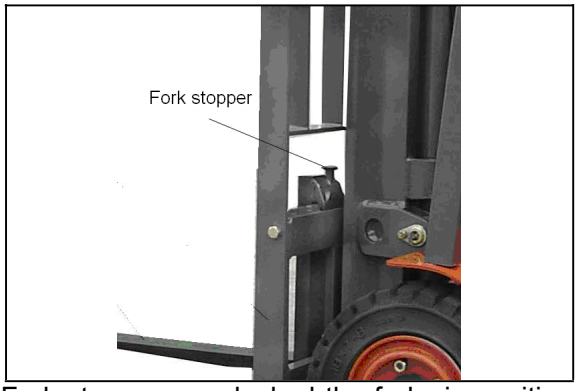
Rearview mirror



Used for observing rear condition or back up.

Adjust rearview mirror before operating forklift, and make sure the rearview mirror vision in the best position.

Fork stopper



Fork stoppers are locked the forks in position. To adjust fork spacing, pull up fork stoppers, turn 90°and shift the forks to the desired position. The fork spacing should be adjusting according to loads to be handled.

WARNING

- **The forks should be set symmetrically to machine centerline and fork stoppers should always be locked again.**

- **There are one gap on the below beam. It is used to attach goods.**
- **It is forbidden to lock the fork on the gap position, to prevent the fork fall off from the gap.**
- **In the middle of the above beam, a bolt used to prevent fork works here. Please change the bolt as soon as it is damaged.**

Change fork

Take down the old fork: Firstly, locate the fork to the middle, decline it to the ground and make the mast forward, then operate the truck traveling backward, the fork will be taken down.

Change new fork: Firstly, make the fork dead against the truck and forklift's mast to the bottom, then operate the truck traveling forward, aim at the two gaps and beams, and raise the mast. Adjust the position of the fork.

Overhead guard

The overhead guard used is strong enough to meet safety standard, and protects the operator from falling materials. The top gap is used to lift the batteries. It is forbidden for use a truck that does not with safeguard.

Safety step and safety grip

The safely steps are provided on both side of the truck body. The safely grip is provided on the front left pillar of the overhead guard. Use the safely step and safely grip when mounting and dismounting the truck.

Hydraulic oil reservoir cap

The hydraulic oil reservoir cap is located at the right rear end, below the battery hood; open the right side battery hood when adding oil. After fill in clean hydraulic fluid, tighten lock the cap.

Air leakage plug

There is an air leakage plug on the oil tank to let air in the tank goes out. You'd better often check the plug and see whether been jammed.

Head lights and combination lights

Two headlights and combination lights (turn signal, show width lamp) are installed at the front side of the truck. Take care of the lights, and wipe dirt, if any, and replace any damaged light immediately.

Rear combination lights

The combination lights at the rear side serve as turn signal, show width lamp, brake lamp, and back-up lamp. Pay attention to keep them from being damaged or covered with dust, if any, clean or replace immediately.

Rear big lamp [For CE or Option]

The rear big lamp is set on the safeguard. If it is broken, please replace a new one at once.

Rear big lamp switch [optional]

Rear big lamp switch (push\pull) has only one shift.

×—Means connected

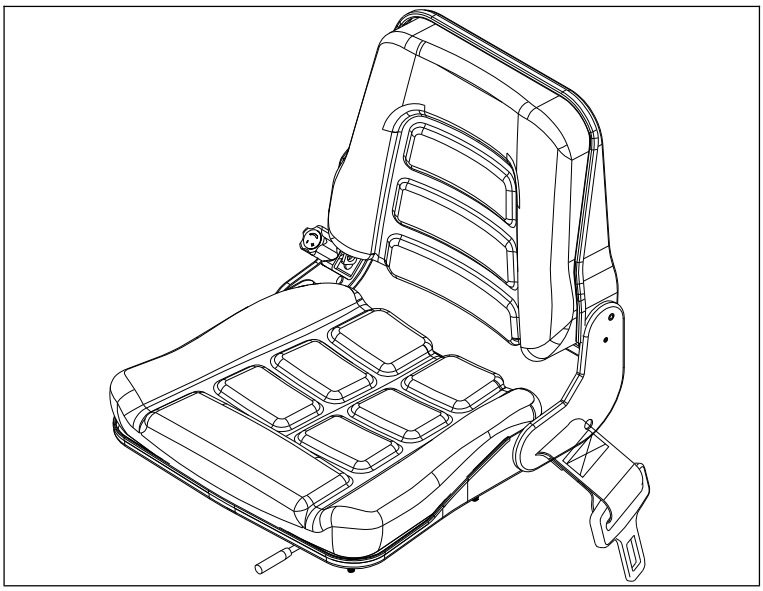
Connector / Position	Battery	Far light
0	×	
1	×	×

CAUTION

- **This light does not relate to key switch position, so please don't forget to turn off the rear big lamp when you leave the truck.**

Seat

Seat

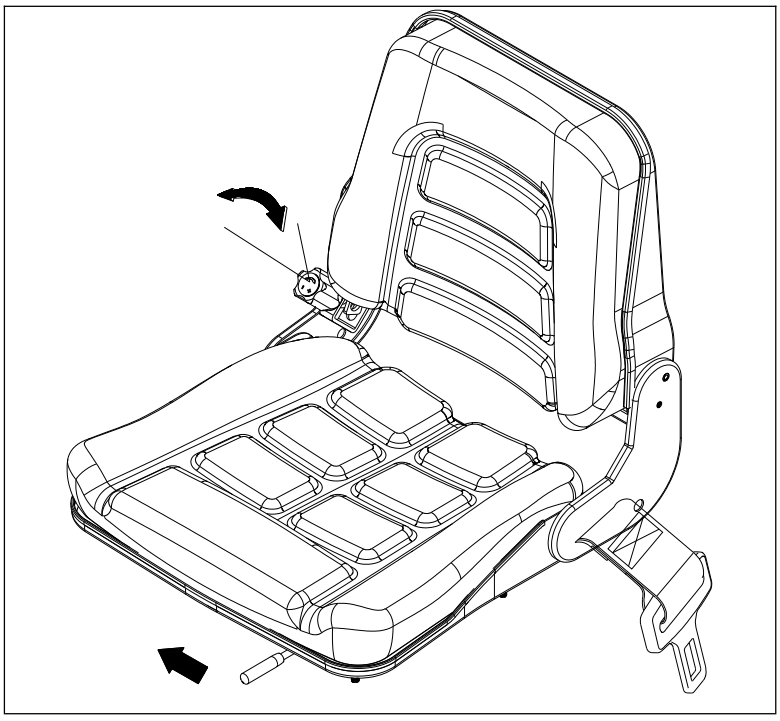


Seat adjusting lever

Seat adjusting lever is installed on the right of seat.

When adjusting seat position, push the adjusting rod to the left, and keep it fixed, slide the seat forward or backward to your needed position.

Then release the adjusting lever, the seat position will be fixed.



Seat bearing adjust

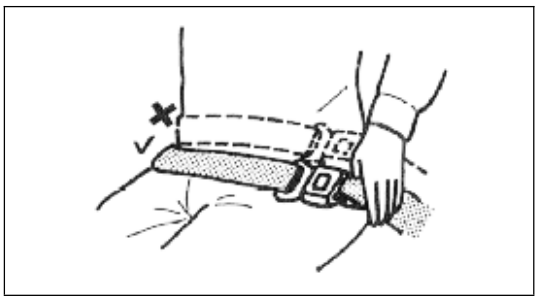
Adjust the weight adjusting knob on the left of seat, then the suspension bearing could be adjusted according to driver's weight.

It is better to sit on the seat for adjustment.

Warning

- Before adjusting the seat, you'd better turn off the key switch.
- Stop the truck to adjust the seat.
- It is not allowed to adjust the seat during driving to avoid accidents
- Make sure the lever is moved completely to separate the seat structure before the forward and rearward adjustment of the seat and angle
- After adjustment, each lever should be back in place. Before using the truck, make sure the lock of every part is reliable.

Fasten seat belt



Belt was huddled up in the box. There is a secondary action to draw out the belt. So you may meet some trouble due to not be familiar with it.

One kind of seat: it needs to press the white circular button (with the words: press to release) by one hand, then the belt can be pulled out by the other hand and inserted into the socket.

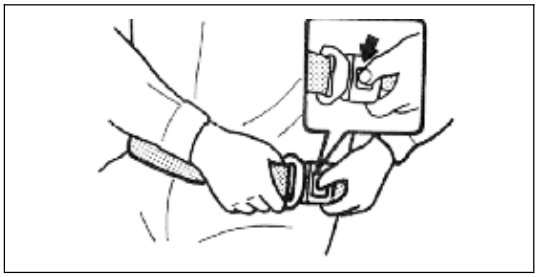
You may also meet another seat: the belt box is adjustable. Rotate the belt box forward, the belt can not be drawn out. Rotate the belt box backward, the belt is drawn out. Insert the belt into the socket of the other side. Rotate the belt box forward again and then the belt is in normal working position.

Please fasten the belt when get on the truck. Meanwhile, let the back and waist close to the seat. Don't tie the seat in the abdomen.

Please don't have the seat backrest tilted excessively. Otherwise, the belt can not be extended correctly.

Prohibit use the belt knotted or twisted. To tie the belt in the daily operation will protect you when the truck turn over and reduce the harm.

Unfasten the belt



Use left pollex to press the red button (with the word PRESS) in the socket, it's untied.

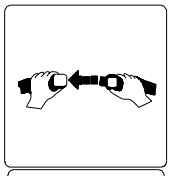
Check the belt

Check if the bolt that fixed belt is loosened. Don't press the belt in the hard or frangible objects and prevent from grinding with the sharp blade to avoid damage.

It is prohibited to remove any parts of the belt. The belt used frequently needs to be checked frequently. If abnormal condition occurs, please change a new belt immediately. The service life of the belt is three years, so reject it in advance if it's abnormal.

How to act in unusual situations：

– Fasten seat belt, stay in the seat.



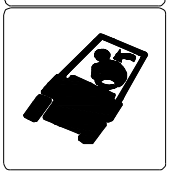
– Do not jump.



– Lean forward, hold on tight steering wheel, brace feet.



– Lean your body away from impact.

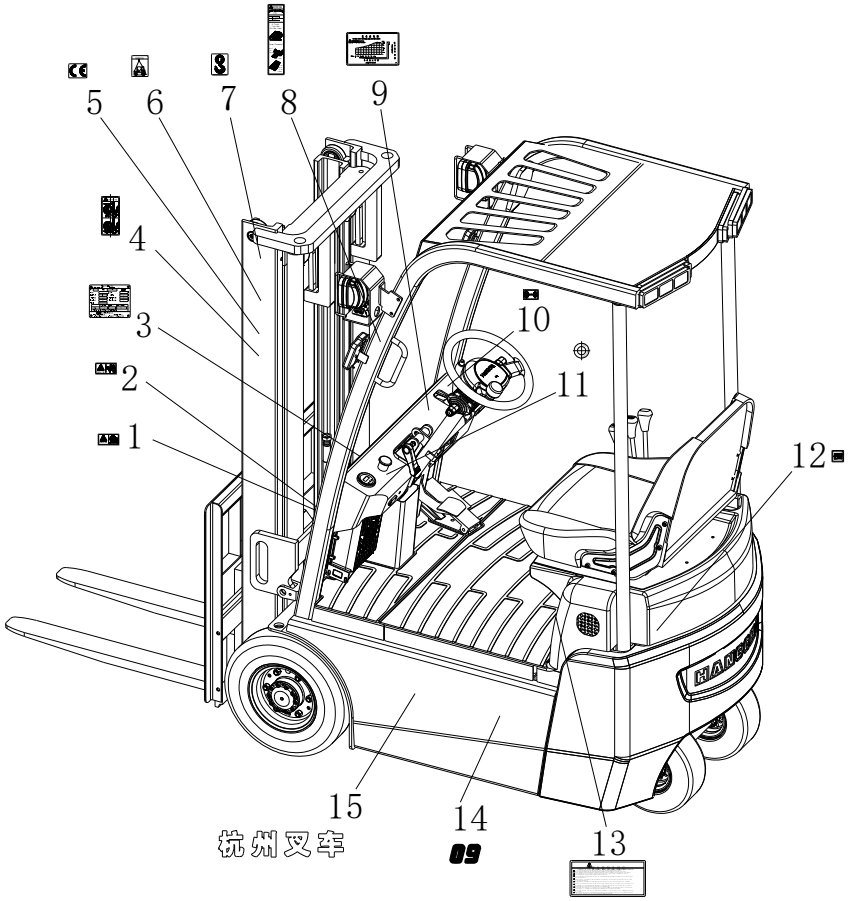


Warning

- **If the truck is about to tip over, never undo the restraint belt and try to jump out. This will only increase the risk of serious injury or death.**

3. Nameplate and warning labels

Labels, like warning label, load curve and nameplate, must be clear and readable. Replace when necessary.



No.	Description
1	Warning label：No climbing
2	Warning label：Be careful when lifting the mast
3	Nameplate
4	Waning label: Never stand on the forks or stay under the forks.
5	CE label
6	Lifting method label: The lifting method when loading and unloading by crane.
7	Lifting label: The fixing point when using crane to load and unload.
8	Warning label: Measures to be taken when the forklift rolls over
9	Load curve label
10	Hand brake label
11	Emergency stop label
12	Hydraulic oil filler label
13	Warning label: Please follow the safety instructions
14	Series and tonnage label
15	HANGCHA logo

4. Technical Specifications

All technical instructions are only for forklifts of standard specifications. Our company reserves the right to make technical changes and supplements.

Serial number	Item		unit	CPDS05-XD2	CPDS06-XD2	CPDS07-XD2
1	Rated lifting capacity		kg	500	600	700
2	Load center distance		mm	400	400	400
3	Standard mast lifting height (maximum/free)		mm	2500/100	2500/100	2500/100
4	Maximum lifting speed (laden//empty)		mm/s	210	210	240
5	Mast Tilt angle (front/back)		（°）	4/8	4/8	5/10
6	Maximum travel speed(laden//empty)		km/h	9/10	9/10	10/12
7	Maximum grade ability (laden)		%	12	12	12
8	Minimum outside turning radius		mm	1220	1220	1465
9	Minimum ground clearance		mm	75	75	75
10	Maximum braking distance		m	2.5	2.5	2.5
10	Dimensions	Length(to fork face)	mm	1378	1378	1646
		Width	mm	830	830	900
		Height to overhead guard	mm	1930	1930	1930
11	Service weight(include battery)		kg	1440	1440	1560
12	Standard battery （voltage/capacity）		V/Ah	24/168	24/168	24/294
13	Motor	Driven Motor (AC)	kW	1.5	1.5	3
		Pump Motor (AC)	kW	2.5	2.5	4
		Turn to (DC)	kW	0.22	0.22	0.3
14	Controller			ACS24XS-350C-35P		
15	Tire	Front×2		4.00-8/2	4.00-8/2	4.00-8/2
		Rear×2		3.50-5/2	3.50-5/2	3.50-5/2

Serial number	Item		unit	CPDS08-XD2	CPDS09-XD2	CPDS10-XD2
1	Rated lifting capacity		kg	800	900	1000
2	Load center distance		mm	400	400	400
3	Standard mast lifting height (maximum/free)		mm	2500/100	2500/100	2500/100
4	Maximum lifting speed (laden//empty)		mm/s	250	240	240
5	Mast Tilt angle (front/back)		（°）	5/10	5/10	5/10
6	Maximum travel speed(laden//empty)		km/h	10/12	10/12	10/12
7	Maximum grade ability (laden)		%	12	12	12
8	Minimum outside turning radius		mm	1465	1465	1465
9	Minimum ground clearance		mm	75	75	75
10	Maximum braking distance		m	2.5	2.5	2.5
10	Dimensions	Length(to fork face)	mm	1646	1646	1646
		Width	mm	900	900	900
		Height to overhead guard	mm	1930	1930	1930
11	Service weight(include battery)		kg	1550	1680	1740
12	Standard battery （voltage/capacity）		V/Ah	24/294	24/336	24/400
13	Motor	Driven Motor (AC)	kW	3	3	3
		Pump Motor (AC)	kW	4	4	4
		Turn to (DC)	kW	0.3	0.3	0.3
14	Controller			ACS24XS-350C-35P		
15	Tire	Front×2		4.00-8-6PR/2	4.00-8/2	4.00-8/2
		Rear×2		4.00-8-6PR/2	3.50-5/2	3.50-5/2

Serial number	Item		unit	CPDS05-XD2-I	CPDS06-XD2-I	CPDS07-XD2-I
1	Rated lifting capacity		kg	500	600	700
2	Load center distance		mm	400	400	400
3	Standard mast lifting height (maximum/free)		mm	2500/100	2500/100	2500/100
4	Maximum lifting speed (laden//empty)		mm/s	210	210	240
5	Mast Tilt angle (front/back)		（°）	4/8	4/8	5/10
6	Maximum travel speed(laden//empty)		km/h	9/10	9/10	10/12
7	Maximum grade ability (laden)		%	12	12	12
8	Minimum outside turning radius		mm	1220	1220	1465
9	Minimum ground clearance		mm	75	75	75
10	Maximum braking distance		m	2.5	2.5	2.5
10	Dimensions	Length(to fork face)	mm	1378	1378	1646
		Width	mm	830	830	900
		Height to overhead guard	mm	1930	1930	1930
11	Service weight(include battery)		kg	1380	1380	1525
12	Standard battery （voltage/capacity）		V/Ah	24/120	24/120	24/250
13	Motor	Driven Motor (AC)	kW	1.5	1.5	3
		Pump Motor (AC)	kW	2.5	2.5	4
		Turn to (DC)	kW	0.22	0.22	0.3
14	Controller			ACS24XS-350C-35P		
15	Tire	Front×2		4.00-8-6PR/2	4.00-8/2	4.00-8/2
		Rear×2		4.00-8-6PR/2	3.50-5/2	3.50-5/2

Serial number	Item		unit	CPDS08-XD2-I	CPDS09-XD2-I	CPDS10-XD2-I
1	Rated lifting capacity		kg	800	900	1000
2	Load center distance		mm	400	400	400
3	Standard mast lifting height (maximum/free)		mm	2500/100	2500/100	2500/100
4	Maximum lifting speed (laden//empty)		mm/s	240	240	240
5	Mast Tilt angle (front/back)		（°）	5/10	5/10	5/10
6	Maximum travel speed(laden//empty)		km/h	10/12	10/12	10/12
7	Maximum grade ability (laden)		%	12	12	12
8	Minimum outside turning radius		mm	1465	1465	1475
9	Minimum ground clearance		mm	75	75	75
10	Maximum braking distance		m	2.5	2.5	2.5
10	Dimensions	Length(to fork face)	mm	1646	1646	1663
		Width	mm	900	900	900
		Height to overhead guard	mm	1930	1930	1930
11	Service weight(include battery)		kg	1550	1650	1710
12	Standard battery （voltage/capacity）		V/Ah	24/250	24/250	24/250
13	Motor	Driven Motor (AC)	kW	3	3	3
		Pump Motor (AC)	kW	4	4	4
		Turn to (DC)	kW	0.3	0.3	0.3
14	Controller			ACS24XS-350C-35P		
15	Tire	Front×2		4.00-8-6PR/2	4.00-8/2	4.00-8/2
		Rear×2		4.00-8-6PR/2	3.50-5/2	3.50-5/2

Serial number	Item		unit	CPDS06-XC2	CPDS08-XC2	CPDS10-XC2
1	Rated lifting capacity		kg	600	800	1000
2	Load center distance		mm	400	400	400
3	Standard mast lifting height (maximum/free)		mm	2500/100	2500/100	2500/100
4	Maximum lifting speed (laden//empty)		mm/s	210	250	240
5	Mast Tilt angle (front/back)		（°）	4/8	5/10	5/10
6	Maximum travel speed(laden//empty)		km/h	9/10	10/12	10/12
7	Maximum grade ability (laden)		%	12	12	12
8	Minimum outside turning radius		mm	1220	1465	1465
9	Minimum ground clearance		mm	75	75	75
10	Maximum braking distance		m	2.5	2.5	2.5
10	Dimensions	Length(to fork face)	mm	1378	1646	1646
		Width	mm	830	900	900
		Height to overhead guard	mm	1930	1930	1930
11	Service weight(include battery)		kg	1440	1550	1740
12	Standard battery （voltage/capacity）		V/Ah	24/168	24/294	24/400
13	Motor	Driven Motor (AC)	kW	1.5	3	3
		Pump Motor (AC)	kW	2.5	4	4
		Turn to (DC)	kW	0.22	0.3	0.3
14	Controller			1232SE-2421		
15	Tire	Front×2		4.00-8-6PR/2	4.00-8/2	4.00-8/2
		Rear×2		4.00-8-6PR/2	3.50-5/2	3.50-5/2

Serial number	Item		unit	CPDS06-XC2-I	CPDS08-XC2-I	CPDS10-XC2-I
1	Rated lifting capacity		kg	600	800	1000
2	Load center distance		mm	400	400	400
3	Standard mast lifting height (maximum/free)		mm	2500/100	2500/100	2500/100
4	Maximum lifting speed (laden//empty)		mm/s	210	250	240
5	Mast Tilt angle (front/back)		（°）	4/8	5/10	5/10
6	Maximum travel speed(laden//empty)		km/h	9/10	10/12	10/12
7	Maximum grade ability (laden)		%	12	12	12
8	Minimum outside turning radius		mm	1220	1465	1475
9	Minimum ground clearance		mm	75	75	75
10	Maximum braking distance		m	2.5	2.5	2.5
10	Dimensions	Length(to fork face)	mm	1378	1646	1663
		Width	mm	830	900	900
		Height to overhead guard	mm	1930	1930	1930
11	Service weight(include battery)		kg	1380	1550	1710
12	Standard battery （voltage/capacity）		V/Ah	24/120	24/250	24/250
13	Motor	Driven Motor (AC)	kW	1.5	3	3
		Pump Motor (AC)	kW	2.5	4	4
		Turn to (DC)	kW	0.22	0.3	0.3
14	Controller			1232SE-2421		
15	Tire	Front×2		4.00-8-6PR/2	4.00-8/2	4.00-8/2
		Rear×2		4.00-8-6PR/2	3.50-5/2	3.50-5/2

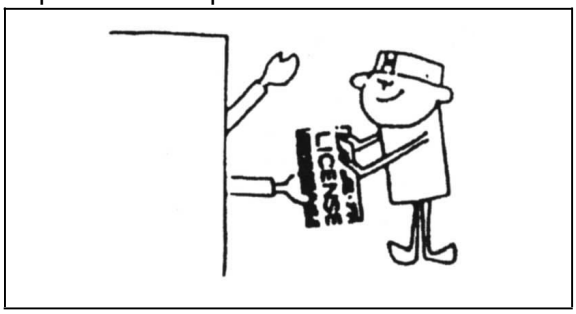
Serial number	Item		unit	CPDS06-X	CPDS08-X	CPDS10-X
1	Rated lifting capacity		kg	600	800	1000
2	Load center distance		mm	400	400	400
3	Standard mast lifting height (maximum/free)		mm	2500/100	2500/100	2500/100
4	Maximum lifting speed (laden//empty)		mm/s	210	250	240
5	Mast Tilt angle (front/back)		（°）	4/8	5/10	5/10
6	Maximum travel speed(laden//empty)		km/h	9/10	10/12	10/12
7	Maximum grade ability (laden)		%	12	12	12
8	Minimum outside turning radius		mm	1220	1465	1465
9	Minimum ground clearance		mm	75	75	75
10	Maximum braking distance		m	2.5	2.5	2.5
10	Dimensions	Length(to fork face)	mm	1378	1646	1646
		Width	mm	830	900	900
		Height to overhead guard	mm	1930	1930	1930
11	Service weight(include battery)		kg	1440	1550	1740
12	Standard battery （voltage/capacity）		V/Ah	24/168	24/294	24/400
13	Motor	Driven Motor (AC)	kW	1.5	3	3
		Pump Motor (AC)	kW	2.5	4	4
		Turn to (DC)	kW	0.22	0.3	0.3
14	Controller			/		
15	Tire	Front×2		4.00-8-6PR/2	4.00-8/2	4.00-8/2
		Rear×2		4.00-8-6PR/2	3.50-5/2	3.50-5/2

Serial number	Item		unit	CPDS06-X-I	CPDS08-X-I	CPDS10-X-I
1	Rated lifting capacity		kg	600	800	1000
2	Load center distance		mm	400	400	400
3	Standard mast lifting height (maximum/free)		mm	2500/100	2500/100	2500/100
4	Maximum lifting speed (laden//empty)		mm/s	210	250	240
5	Mast Tilt angle (front/back)		（°）	4/8	5/10	5/10
6	Maximum travel speed(laden//empty)		km/h	9/10	10/12	10/12
7	Maximum grade ability (laden)		%	12	12	12
8	Minimum outside turning radius		mm	1220	1465	1475
9	Minimum ground clearance		mm	75	75	75
10	Maximum braking distance		m	2.5	2.5	2.5
10	Dimensions	Length(to fork face)	mm	1378	1646	1663
		Width	mm	830	900	900
		Height to overhead guard	mm	1930	1930	1930
11	Service weight(include battery)		kg	1380	1550	1710
12	Standard battery （voltage/capacity）		V/Ah	24/120	24/250	24/250
13	Motor	Driven Motor (AC)	kW	1.5	3	3
		Pump Motor (AC)	kW	2.5	4	4
		Turn to (DC)	kW	0.22	0.3	0.3
14	Controller			/		
15	Tire	Front×2		4.00-8-6PR/2	4.00-8/2	4.00-8/2
		Rear×2		4.00-8-6PR/2	3.50-5/2	3.50-5/2

Serial number	Item		unit	CPDS13-XD2-SI	CPDS15-XD2-SI
1	Rated lifting capacity		kg	1300	1500
2	Load center distance		mm	500	500
3	Standard mast lifting height (maximum/free)		mm	3000/135	3000/135
4	Maximum lifting speed (laden//empty)		mm/s	250	240
5	Mast Tilt angle (front/back)		（°）	5/8	5/8
6	Maximum travel speed(laden//empty)		km/h	12/13	12/13
7	Maximum grade ability (laden)		%	12	12
8	Minimum outside turning radius		mm	1680	1710
9	Minimum ground clearance		mm	90	90
10	Maximum braking distance		m	2.5	2.5
10	Dimensions	Length(to fork face)	mm	1800	1830
		Width	mm	1030	1030
		Height to overhead guard	mm	2065	2065
11	Service weight(include battery)		kg	2430	2540
12	Standard battery （voltage/capacity）		V/Ah	80/125	80/125
13	Motor	Driven Motor (AC)	kW	5	5
		Pump Motor (AC)	kW	8	8
		Turn to (DC)	kW	/	/
14	Controller				
15	Tire	Front×2		18×7-8-2	18×7-8-2
		Rear×2		15×4.5-8/2	15×4.5-8/2

5. Safety Instructions

1. Only trained and authorized operator shall be permitted to operate the truck.



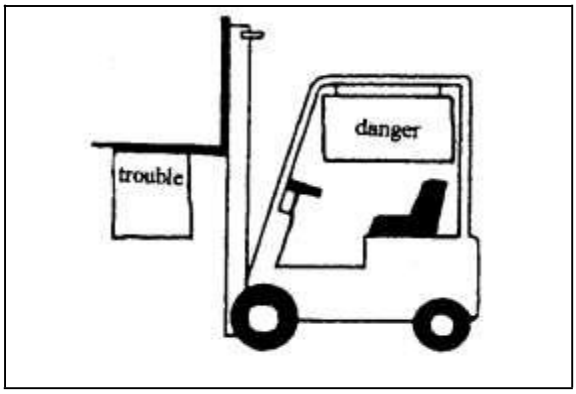
2. Inspect the truck at periodic intervals for oil or water leak, deformation, lousiness, etc. If neglected, short life of components will be caused and in the worst case a fatal accident would occur.

- Make sure having replaced good parts during periodic check.
- Wipe off oil, grease or water from the floor board, pedal and hand controls, if any.
- Strictly prohibit smoking or any spark nearby the storage battery when checking it.
- If maintenance on high position, such as mast, front and rear lamp, please be careful to prevent from falling down or being clamped.
- Be careful do not be scalded when inspecting the motor, controller and etc.

3. Whenever fault occurs, you must stop the forklift, hang a mark of “danger” or “Fault”, take off the key, meanwhile, and inform the manager.

Only after the Fault is removed, you may use the forklift.

- If problem occurs when lifting goods, going uphill and downhill, or leakage of storage battery electrolyte, hydraulic oil, brake fluid, repair personnel should be organized for immediately repair.



4. Operator must wear helmet, safety shoes and work clothes.

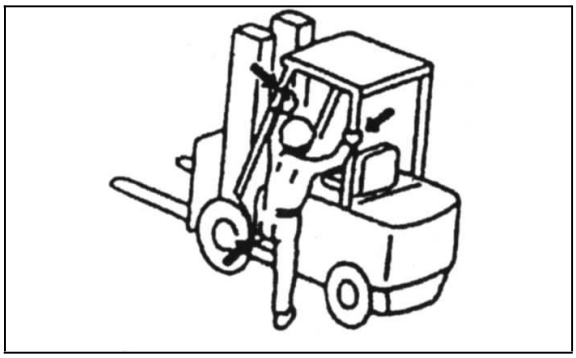
5. Because there will bring exploding gas in the bosom of the battery, prohibit any flame nearby it absolutely.

- Do not let any tools close the two terminal of the battery to avoid spark or short circuit.

6. The work road surface for forklift should be stable and smooth cement concrete, or similar road suitable for truck moving. Pre-check the land condition of working ground.

- The considered climatic conditions when the forklift designs are： air temperature -20℃——50℃；wind speed should be no more than 5m/s; air relative humidity should be no more than 90%(air temperature20℃).
- It’s forbidden to use truck under a circumstance of flammability and easy to blast.

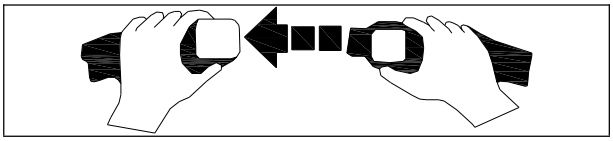
7. Never mount or dismount the moving truck. Use the safety step(s) and safety grip facing the truck when mounting or dismounting the truck.



8. Never attempt to work the controls unless properly seated.

– Before staring, adjusting the seat so you can get easy access to all hand and foot controls.

9. Before staring up, make sure that：

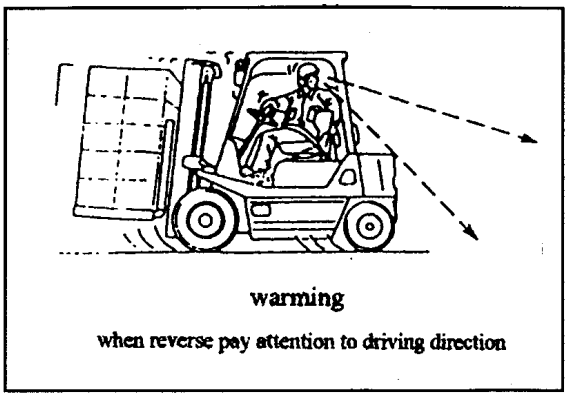


– Please fasten safety belt.
– Hand brake is released.
– The forward-reverse lever is in neutral.
– Before staring, make sure no one is under, on and close to the truck.
– Don’t step the accelerate pedal or control the lifting lever or tilting lever before turning on power.

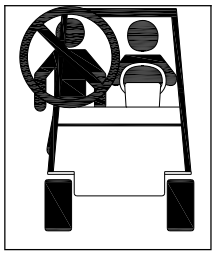
10. Operate the controls smoothly. Avoid sudden stops or turns.

– It is dangerous to make a sharp brake. Otherwise the truck has the possibility of overturn.

11. Pay attention to the route of the truck, be sure to make a wide sight.



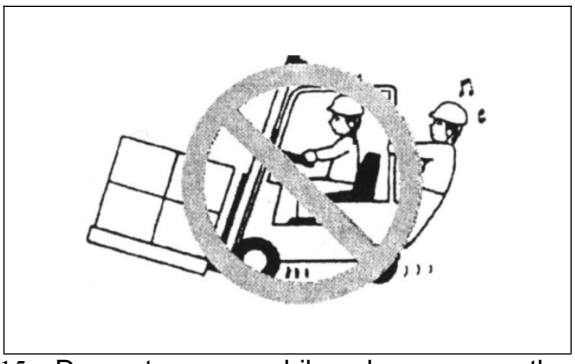
12. Never allow other person(s) to ride on the forks, pallets or on the truck.。



13. According to the shape and material of loaded goods, select a proper attachment and tools.

– Avoid hoisting the load, with wire rope hung on the forks or attachment, since the wire rope may slide off. If needed, qualified personnel may be allowed to perform with a hook or crane arm attachment.
– Take care not to protrude the forks out of the load. The protruded fork tips may damage or turn over the adjacent load.

14. Know the rated capacity of your lift truck and its attachment, if any, and never exceed it. Do not use a man as an additional counterweight.



15. Do not use mobile phones or other electronic products while driving, and focus on work.

16. Keep your head, hands, arms, feet and legs within the confines of the operator's compartment. Never stretch out for any reason.

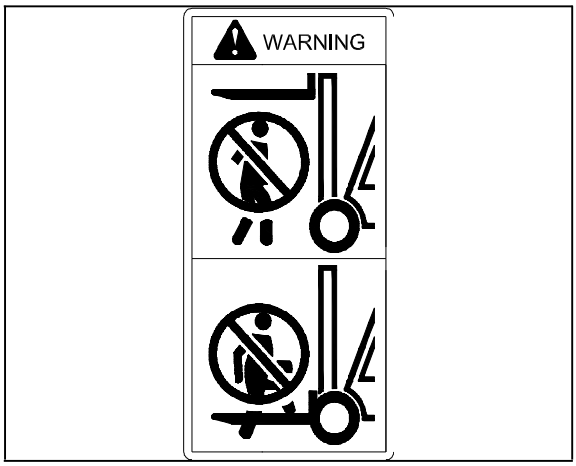


17. The pallet and skid used should be strong enough to endure the load. Never use damaged or deformed ones.

18. We offer all type of attachment, such as rotating roll clamp, bale clamp, side shifter, and crane jib. You should refit the truck under ours license if you want. It is forbidden to refit it by yourself.

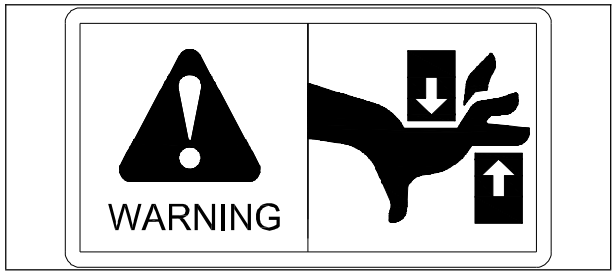
19. Safeguard protect you do not be hurt by the goods fallen. Load bracket protects you load goods smoothly. It is forbidden to use truck without safeguard or load bracket.

20. It is forbidden to walk down the fork or the attachment. It is forbidden to walk up the fork or stand on the fork.



21. It is forbidden to put your hands, arms or head stretch between the mast and safeguard. Once clamped, the life has danger.

– It is forbidden to put your hands in inner and outer mast.



22. The goods is liable to drop turning or passing rough road when it departures the center. And the forklift may turn over more probably.

23. Don't stack loads on forks in such a way that the top of loads exceeds the load backrest height. If unavoidable, make the load stable securely. When handling bulky loads restrict your vision, operate the truck in reverse or have a guide. When you have a guide, make sure you understand hand, flag, whistle or other signals. When operating with long loads such as lumber, pipe, etc., or in the case of the large-sized model or the truck with spreader, be extremely careful of load end swing at corners or in narrow aisles. Be alert for fellow workers.

24. Use minimum forward and reverse tilt when stacking and un-stacking loads. Never

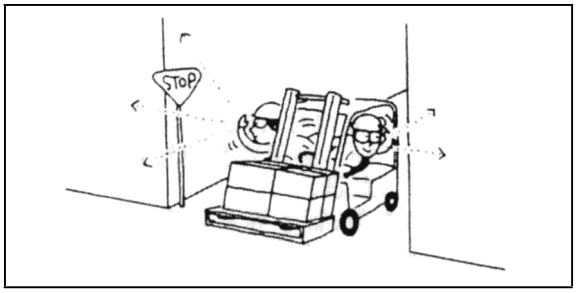
tilt forward unless load is over stack or at low lift height.

- When stacking loads on a high place, once make the mast vertical at a height of 15 to 20 cm above the ground and then lift the load farther. Never attempt to tilt the mast beyond vertical when the load is raised high.
- To un-stack loads from a high place, insert forks into the pallet and drive backwards, then lower the load. Tilt the mast backwards after lowering. Never attempt to tilt the mast with the load raised high.

25. It is dangerous to travel with forks higher than appropriate position regardless of whether loaded or not. Keep the good traveling posture. (When traveling, the forks should be 15 to 30 cm above the ground or floor.) Do not operate the side shift mechanism, if equipped, when the forks are raised and loaded, since this will cause the truck to be unbalanced.

26. Watch for branches, cables, doorways, or overhangs. Be caution when working in congested areas.

- Slow down and sound horn at cross aisles and other locations where vision is restricted.
- When making a turn, be sure the speed of the truck is lower than the 1/3 max of allowable speed.

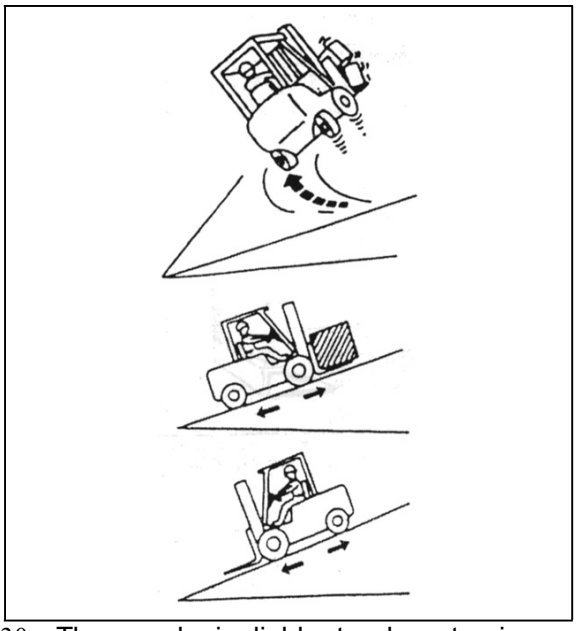


27. Affirm keeping some distance from roadside and flat roof.

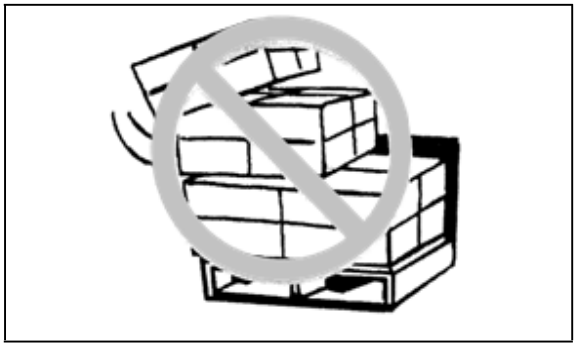
28. Before driving over a dock-board or bridge-plate, be sure that it is properly secured and strong enough to sustain the weight.

29. When operating loaded truck, have the rear end of your machine pointed downhill.

- When operating unloaded truck, have the rear end of your machine pointed upgrade.
- Do not make a turn on the grade, in order to avoid overturn.



30. The goods is liable to drop turning or passing rough road when it departures the center. And the forklift may turn over more probably.



31. Never lift loads with the truck inclined. Avoid loading work on a grade.

32. Never permit anyone to stand or walk under upraised forks or other attachments if machine is so equipped. If unavoidable, use a

safety stand or block to prevent a possibility of fork attachments falling down or moving unexpectedly.

33. Inspect the surface over which you will run. Look for holes, drop-offs, obstacles, and look for rough spots. Look for anything that might cause you to lose control, bog down or upset.

- Clear away trash and debris. Pick up anything that might puncture a tire or let the load lose balance.
- Slow down for wet and slippery roads. Stay away from the edge of the road.
- Do not operate the truck when the weather is execrable, such as windy, thunder storm, snow and typhoon etc. Especially when wind speed is higher than 5m/s, don't operate the truck outside.

34. An accumulator is required for controller. Forbid to touch within B+ and B- to prevent from wounding by electricity. Before checking or cleaning, please connect loads (contactor circuit or horn for example) between B+ and B- to discharge for capacitor of controller.

35. Pulling the hand brake when parking on flat. If necessarily parking on ramp, you should place the wedges under wheels.

- The forks descend and tilt a little forward, shut off key switch and take off key.
- Pull out the battery plug.
- The parking place must be far away from fireworks.

36. You can tow the forklift to the safe place with towing pin when the forklift can't run. Do not draw forklift whose steering system and braking system are damaged.

37. There is operation method and warning label on the truck. Please operate the truck obey the rules on the label and this manual. Often inspect the nameplate, and change it when damaged or lost.

38. Fire extinguisher must be prepared at working place. Users can select fire extinguisher along with truck, and it usually is fixed on rear supported leg of safety shelf, it is easy to pick.

- Driver and managers should be familiar with the position and usage of the extinguisher.

39. When moving the small parts, you should use the pallet, and it is not allowed to use the forks directly.

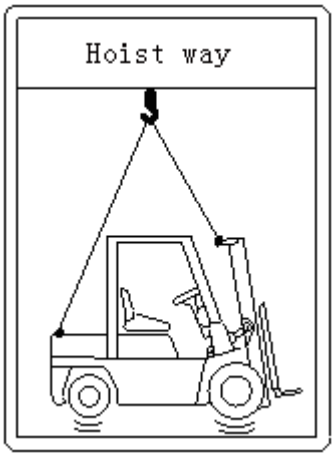
6. Forklift transporting and hoisting

Transporting

– The Fork Lift Truck is designed for material handling only, It is inappropriate for long-distance transportation. If needed, the Fork Lift Truck must be transported by ship, train or lorry, of 5T loading. Use a lifting pallet to hoist the truck.。

– Use the steel wire ropes to tie the holes in the two side of the outside mast's beam and the rear of truck's body, and then use the lifting device to hoist the truck.

Hoisting



Use the steel wire ropes to tie the holes in the two side of the outside mast's beam and the hook of the counter balance, and then use the lifting device to hoist the truck. The steel wire rope attach to the counterweight should through the safeguard gap, and make the safeguard not be distorted.

Warning

- **When hoist the truck, don't coil the overhead guard with the steel wire.**
- **The steel wire ropes and the lifting device must be very firm to support the truck because the truck is very heavy.**
- **Don't lift the truck by hoist the overhead guard.**
- **When lifting the truck, don't take yourself below the truck.**

7. Structure and stability of truck

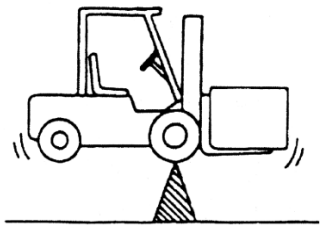
Prevent forklift tipping. It is very important for operator to clarify the function of truck's structure and stability to safe operation.

⚠ Caution **Truck structure**

The basic structure of the truck is lifting device (including mast and forks) and rear body (including tire).

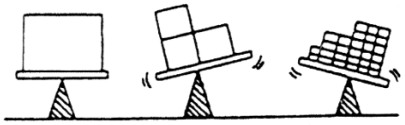
The lift truck keeps the balance of weight between the truck body and the load on the forks with the center of the front wheels as a fulcrum.

Relationship between the center of gravity of forklift and the center of gravity of loads is very important to maintain the stability of the truck.



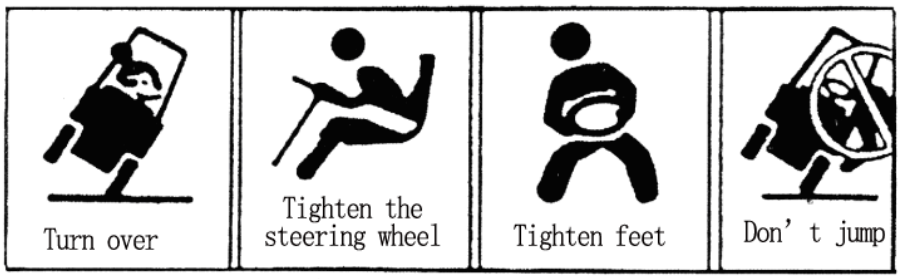
⚠ Caution **Load center**

The loads' shape is quite different, such as box, board and large roller. It is very important to distinguish the difference and the gravity center of loads for evaluating forklift and its stability.



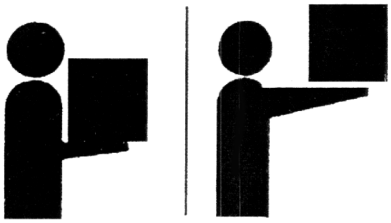
⚠ Warning

If the truck will turn over, do not attempt to get out of the truck，because the speed of overturn is much faster than you. You should hold the steering wheel handle, and this practice will let you in the seats.



Caution | **Maximum load and load center**

The load center distance is defined that: the distance between the load center and the fork carriage or the front of the fork carriage. The max. load means the maximum load the truck can charge at the normal load center distance. The relation between the max. load and load center distance shows on the capacity chart. You should reduce the weight of load if the load center distance inclines to the fork carriage.

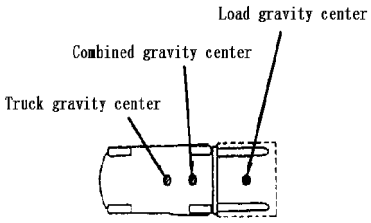


Caution | **Center of gravity and stability**

The combined center that is composed of the barycenter and the load center determine the stability of lift trucks.

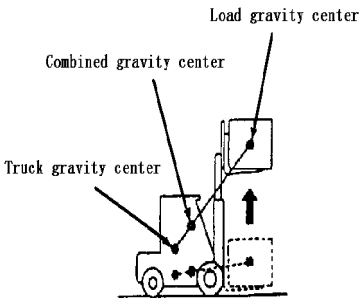
When unloaded, the barycenter does not change; when loaded, the barycenter is determined by the truck and the load's center.

The barycenter is also determined by the tilting and lifting of the mast.



The combined center is determined by the following factors:

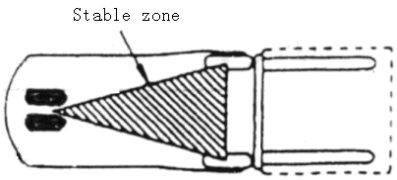
- Load's size, weight and shape;
- The lifting height;
- The tilting angle;
- Tyre inflation pressure;
- Acceleration, reducing speed and radius of turning;
- The road and grade's angle;
- The attachments.



⚠ Caution | **Stable zone of barycenter**

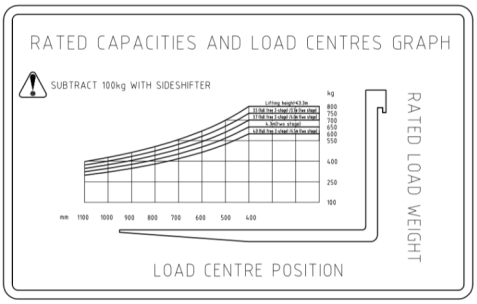
In order to make the truck stable, the combined gravity center must be in the triangle which is made up of two points that the two front wheels attach ground and the midpoint of the back driving axle.

If the combined gravity center is in the front driving axle, the two front wheels become two fulcrums, the truck will overturn. If the combined gravity center departures the triangle, the trucks shall overturn in the corresponding direction.

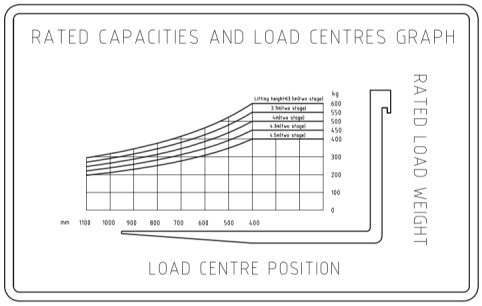


Caution | **Capacity chart**

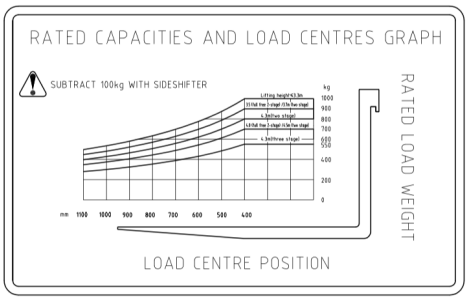
The chart given shows the relation between the load center and the weight of loads. Before loading, make sure that the load and the load center distance in the range of capacity chart. If the load's shape is complex, put the most weightily part on the middle of the forks, and close to the fork carriage.



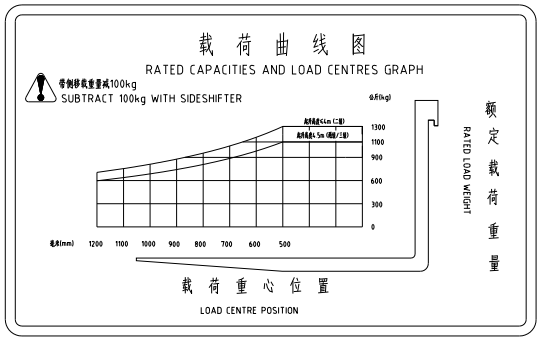
0.6t



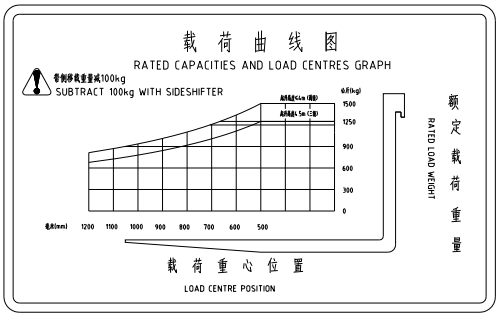
0.8t



1.0t



1.3t



1.5t

⚠ Caution **Velocity and acceleration**

One object will keep quiescence until force works on it. Also, a moving object will keep moving until force works on it .This is just inertia.

According to inertia, when truck starts moving, one force works backwards, and when truck stops moving, one force works forwards. So, it's dangerous to brake suddenly, because it causes one large force works forwards, and it's easy to cause truck overturn or load slide off.

When the forklift makes a turn, will exert a centrifugal force outward from the curve center. This strength pushes forklift outwards and causes it to turn over. About stability region is very small, so decelerate when turning. If the cargo transported at the high position, it's easy to turn over left or right.

8. Running-in of the new truck

We recommended operating the machine under light load conditions for the first stage of operation to get the most from it. Especially the requirements given below should be observed while the machine is in a stage of 100 hours of operation：

- Must prevent the new battery from over discharging when early used.
- Usually recharge when it discharges to 20%.
- Perform specified preventive maintenance services carefully and completely.
- Avoid sudden stop, starts or turns.
- Oil changes and lubrication are recommended to do earlier than specified.
- Limited load is 70%～80% of the rated load.

9. Daily maintenace

Careful, all-round maintenance will keep the forklift truck in good working condition. It guarantees the safety of the forklift and your personal safety at work.

Warning

- In addition to testing lights and checking operating performance, before checking the electrical system, turn off the key switch and disconnect the battery plug.
- Never use a forklift that has any kind of fault.
- Even a small fault can cause a serious accident.

1. Check for leakage of hydraulic oil, electrolyte and brake fluid

Check for oil spills or leakage around the hydraulic fittings, battery, and brake system by hand feeling or carrying out a visual inspection. Never use an open flame.

2. Replace tire

When the tire is damaged, replace it in time. Jack up the truck to make the tire just beyond ground and put a wood block under the chassis. Loosen hub nuts, replace new tire. Tighten the nut crossly and symmetrically.

Warning

a. When removing tire from wheel rim, do not remove rim set bots and nuts before releasing air;

b. Make sure that wooden blocks used to support lift truck are solid, one-piece units;

c. Never get under forklift while it is supported only by wooden blocks.

3. Check the fixing of the wheels

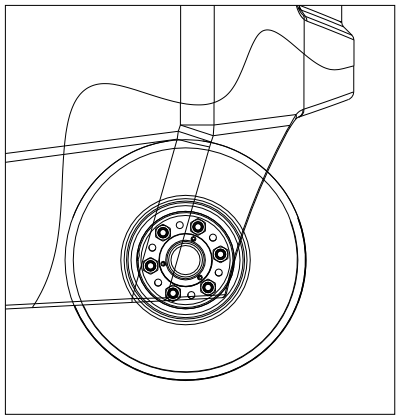
– Park the forklift as required

– Use a torque wrench to tighten the wheel fixing nuts crosswise.

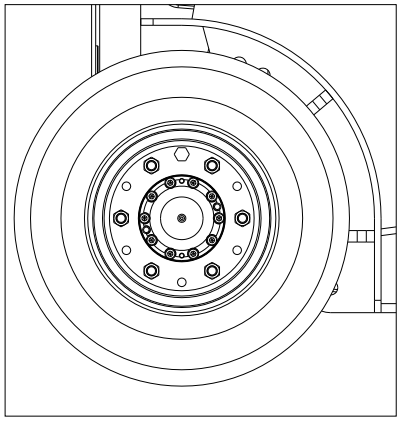
Bolt tightening torque:

Front wheel：4.00-8 / 2（0.5t~1.0t）	176Nm~212Nm
Front whee：18×7-8 （1.3t~1.5t）	176Nm~212Nm
Rear wheel：3.50-5 / 2（0.5t~1.0t）	22 Nm～29 Nm
Rear wheel：15×4.5-8（1.3t~1.5t）	176Nm~212Nm

Rear wheel



Front wheel



4. Check brake pedal

– Step the brake pedal, check it for slowness or block.

– The proper brake distance is less than 2.5m when free load.

– Adjust the height of pedal: adjust limit bolt and make the distance between the center of pedal to front base of 115mm～125mm.

– Adjust brake booster push rod clearance

to 1mm -3mm.

– The brake lamp should be lighted when the brake pedal steps on 10mm -20mm.

5. Check hand braking lever

The force of hand brake lever is adjusted by the bolt on the top of lever. The force increases when screwing clockwise, otherwise decreases.

After fastening the hand brake lever, then losses it to make sure it revert well.

> **Caution**
> - To step the brake pedal is helpful to tighten or loose the hand brake lever.

6. Check accelerate pedal

Step the accelerate pedal, the acceleration changes as the stroke changes, and revert well.

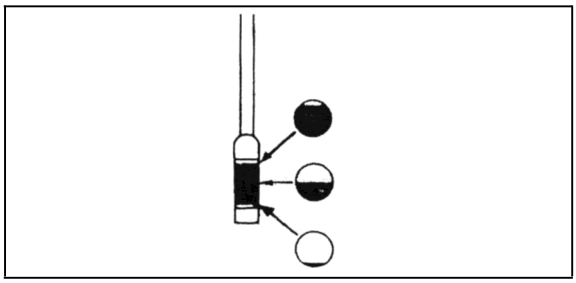
7. Check brake fluid

Open the brake lubricated cap cover. Check the fluid level in the range allowed. If lack, please add, and check if there is air mix into the pipe.

> **Caution**
> - **Please use brake fluid with one type, do not mix.**
> - **Don't spatter the brake oil onto the surface of paint otherwise the paint will be damaged.**
> - **When adding fluid, due should be taken to prevent dirt or water from entering the reservoir.**

8. Check hydraulic oil

Open the cover, unscrew the cap of hydraulic oil inside the right rear frame, pull out dipstick and check if the oil level is between the scales. Add oil when lacking. And then close the cover.



9. Replace hydraulic oil

Replace hydraulic oil once half year on schedule：

– Stop the truck on smooth ground;

– Turn steering wheel right to the bottom, and enable the fuel drain plug to have the enough space;

– Tilt mast backwards to the bottom, and fall the forks to the ground;

– Pull on the hand brake;

– Open the cover, loose the cap of hydraulic oil, pull out dipstick;

– Set a plate under the chassis, then loose the fuel drain plug, and discharge the old oil;

– Dispose the old oil according to local environmental protection laws;

– Screw off the fuel drain plug, add new hydraulic fluid, and inspect whether there is leakage;

– Start the truck, lifting forks for 3-5 times, and tilting the mast for 3-5 times;

– Add hydraulic oil to required scale.

10. Seat adjustment

Shift the adjusting lever to the right and move the driver's seat to a position which provides easy access to all foot and hand controls, and lock it tightly. Adjust the weight.

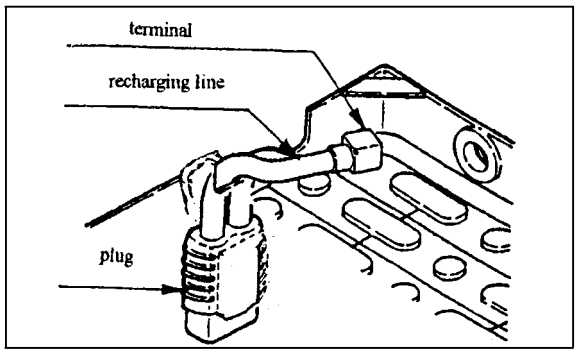
11. Check battery

Check whether the lockpin is installed firmly. That is whether the battery being fixed firmly.

Check proportion of electrolyte. Refer to

"battery" section.

Check the terminal connection for loose or damage. Otherwise it will be adjusted or replaced.



Plug in the battery plug and close the hood.

Turn on the key switch

12. Instrument check (include battery capacity and error diagnose)

Refer to instrument section.

13. Lifting lever, tilting lever, attachment lever

Check the lifting lever, tilting lever and attachment lever for looseness. Return position well.

14. Mast

Check the mast and the forks to insure that:

- The fork does not have crack and distortion. Forks were installed firmly and correctly;
- Check the oil cylinder, oil pipes for leakage;
- Check the rotation of idler wheel;
- Check the mast for crack or distortion;
- Lifting lever, tilting lever, attachment lever, check the mast whether works normally, whether have unusual sounds.

15. Mast lubrication

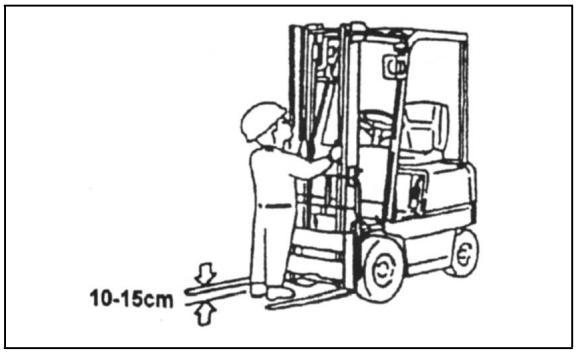
According to requirement of periodical maintenance and lubrication chart, you should grease lubrication to the orbit of mast on schedule.

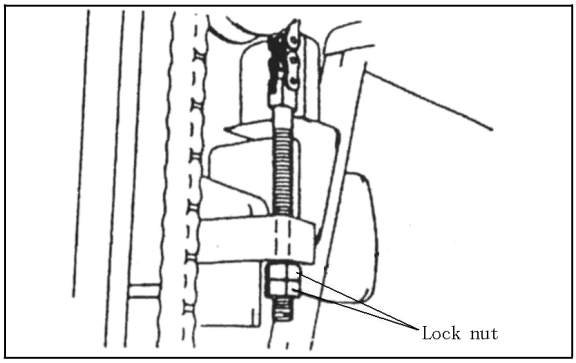
Adjust the lubricate schedule according to your working condition. Add times when busy.

To coordinate forklift's operation, grease lubrication to the guide pulley and in outer upright mounting.

16. Lift chain tension check

- Raise the fork about 10 cm -15 cm above the ground vertically.
- Push the middle of the chain with the thumb. Make sure the tension for the right and left chains are equal.
- Adjust the chain tension: loosen the lock nut and adjust the tension of two chains to equal by nut, then locked nut.





17. Check steering system

Turn the wheel right and left separately to check steering system.

18. Check turn light, horn and other lights

Make sure that the turn signal operates properly by pull/push turn signal switch.

Make sure that the sound of horn s properly by
press the horn button
Check the other lamp and back-up buzzer.

19. Battery maintenance

Refer to “battery” section.

20. Other

For instance, pay attention to abnormal noise.

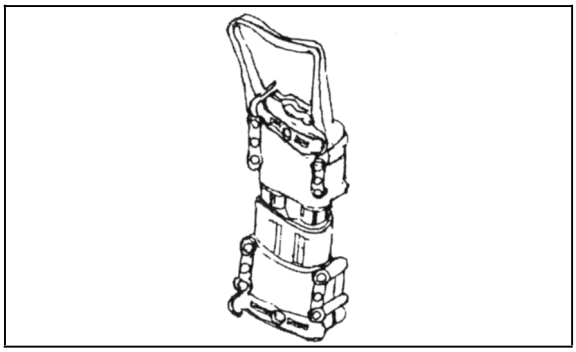
10. Driving and operation

Warning

- If any damage or fault is found, don't operate truck until being repaired.

Driving

– Open the hood, and insert the storage battery plug, then close the hood.



– Set the direction switch to neutral position.
– Turn on key switch
– Hold the steering wheel with left hand and turn on the key switch with right hand.
– Tilt back the mast
– Control the lifting lever to set the bottom of the fork 15cm-20cm above the ground. Control the tilting lever to fully tilt back the mast.
– Control direction lever
  - Forward： Push the direction lever forward.
  - Backward： Pull the direction lever backward.
– Loosen the hand brake lever
– Step the brake pedal and push the hand brake lever to the front position.
– Hold the steering wheel with your left hand and attach your right hand to it.

Travelling

Step the accelerate pedal slowly, the truck will travel forward or backward.

Decrease speed

Loosen the accelerate pedal slowly, and the truck will decelerate.

Caution

Decelerate the truck in the following situations:

- **Turning；**
- **Close the goods or pallet；**
- **Close the deposit area；**
- **Enter a narrow passage；**
- **The condition of road surface is bad.**

Warning

- **Don't step the accelerate pedal and brake pedal at the same time.**

Turning

Unlike general passenger-cars, the turning wheels are located at the rear of the truck. This cause the counterbalance swing out when turning.

Slow down the truck and turn the steering wheel toward the side which you are turning. The steering wheel should be turned a bit earlier than as with the front wheel steering car.

Caution

- **Drive the truck slowly and control the steering wheel carefully, assure there is enough space to steer.**

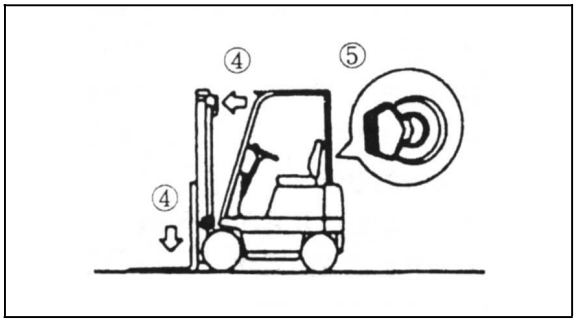
Parking

– Slow down and press the brake pedal to stop the truck.
– Place the shift lever in neutral.
– Pull up the hand brake lever.

– Down the forks on the ground, tilt mast forwards fully.
– Place the key switch in “OFF” to shut off the battery. Remove the key and keep it.

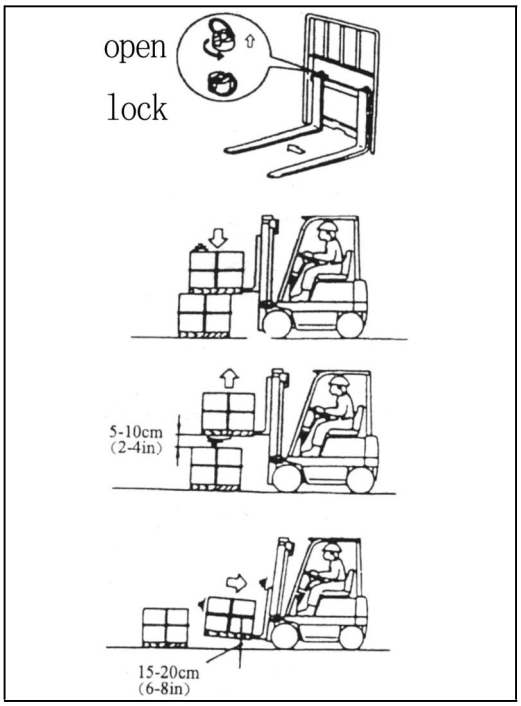
Caution

- Don’t dismount from the moving truck, never jump from the truck
- Don’t park the truck on the working road.



Loading

– The forks should be adjusted properly to maintain the balance of load.
– Place the truck right in front of the load to be handled.
– The pallet should be evenly positioned across both forks.
– Insert forks into the pallet as far as possible.
– To raise loads from the ground：
  - Firstly, lift the forks 5 cm ~10 cm off the ground or floor and make sure loads lay stably.
  - Then, tilt the mast backwards fully and lift forks up to 5 cm ~10 cm off ground then start running.
– When handling bulky loads which restrict your vision, operate the truck in reverse except when climbing grades.



Stacking

– When approaching the deposit area slow down your truck.
– Stop the truck right in front of the area where your load is to be deposited.
– Check the condition of the deposit area.
– Tilt the mast forward until forks become to horizontal. Raise forks until they are a little higher than the deposit position.
– Move forward to place the load directly over the desired area and stop the truck.
– Make sure your load is just over the desired area. Slowly lower the load into position. Make sure the load is securely stacked.
– Do necessary lift-tilt operations and then back away to make the forks leave loads.。
– After making sure the forks leave the load, lower the forks to the basic position (15 cm ~20 cm off the ground).
– Tilt the mast backwards.。

Caution

Decelerate the truck in the following situations：

- **Turning；**
- **Close the goods or pallet；**
- **Close the deposit area；**
- **Enter a narrow passage；**
- **The condition of road surface is bad.**

Warning

- **Never tilt the mast with loads upraised 2m or more.**
- **Don't leave or dismount from the truck when the load is raised high.**

Un-stacking load

– When approaching the area where the load is to be retrieved, slow down your truck.
– Stop the truck 30 cm far from the load.
– Check the condition of the load
– Tilt the mast forward until forks become horizontal. Elevate forks up to the position of the pallet.
– Make sure forks are positioned properly to the pallet. Move forward slowly to insert forks into the pallet as far as possible.

Caution

- **If the forks are hard to be fully inserted, use the following procedure: Move forward and insert 3/4 of the forks. Raise the forks 5 cm ~ 10 cm and move backward 10 cm ~ 20 cm with the pallet on the forks, and then fall the pallet to the stack.**

– Raise the forks 5 cm ~ 10 cm off the stack.
– Check all around the truck to insure that the path of travel is unobstructed and back away slowly.
– Lower forks to a height of 15 cm ~ 20 cm above the ground. Tilt the mast backward fully and move to the desired area.

Check after operation

Clean and check the truck after operation：

– Damage or leakage.
– Add grease if necessarily.
– Check the tyre if it is damaged or inserted with foreign body.
– Check the wheel hub nut if it is loose.
– Check the height of electrolyte surface.
– If you haven't lift the fork to the max. height in the day, you should lift it to the max. height 2～3 times.

Caution

- **If you find any fault, must repair it in time.**
- **It is forbidden to operate the forklift before repairing it completely.**

.

11. Deposit

Daily Depositing

- Park your truck at the area appointed, and block the wheels to prevent accidental roll.
- Make sure the shift lever on neutral position.
- Pull up the hand brake lever.
- Shut off key switch and operate the lift and tilt lever several times so that the inner pressure in the hydraulic tube will decrease.
- Cramp out the electrical outlet.
- Take out the key and deposit it in a safe position.

Deposit the truck for a long time

On the basic maintenance of the “daily depositing”, you should do the following maintenance and checks:：

- Take out plug to prevent discharge and place in shade.
- Brush antirust oil on those parts which is exposed such as piston rod and axle easy-rusted.
- Cover breather hole and so on which humidity easy to enter.
- Cover the whole truck with mantle.
- Add the oil(grease) to all lubrication points.
- Fill up the truck body and counter weight with stow-wood to reduce bearing of the two rear wheels.
- Operate the forklift once a week, and lift the forks to its max. height for several times.
- Check the proportion and the level of electrolyte once a month.
- Charge the battery equally once a month.

Warning

- **The stow-wood must be single and hard enough to support the truck.**
- **Don’t use a stow-wood higher than 300mm（11.81 inch）.**
- **Lift the truck to the height of placing on the stow-wood.**
- **Place two same size stow-woods under the left and right sides of the truck.**
- **After supporting the truck with stow-wood, swing the truck forward, backward, left, right, and check its safety.**

Working after long deposit

- Get rid of antirust oil.
- Discharge the gear oil from driving axle, decelerator box, and clean up the internal of them then add new oil.
- Charge the battery then install it to truck, and do not forget to connect the down-lead.
- Check carefully before starting, include start, advance, and back off, turning, lift, fall, tilt and so on.

12. Battery

Lead-acid batteries

It is important that the battery be properly charged in time, which will affect vehicle performance and battery life.

Over-discharge and over-charge will reduce battery life.

If there is abnormal situation such as odor, too fast electrolyte drop, high electrolyte temperature, please contact the agent or Hangcha after-sales service.

1.1 Maintenance precautions

（ 1 ） Maintenance personnel must undergo rigorous training.

（2）Never connect the battery's positive and negative terminals to each other, as this may cause a spark, fire or explosion. Fireworks, mobile phones and electronic products are strictly prohibited.

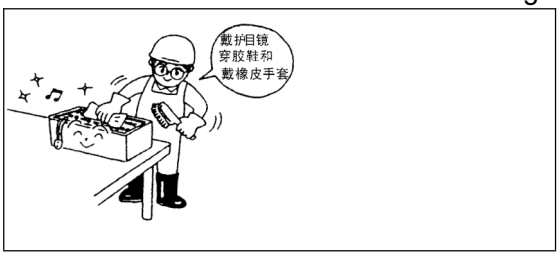


（3）Maintain and replace batteries and charge in designated well-ventilated areas, and place fire and power warning signs in conspicuous places.

（4）Check the electrolyte level daily. Do not use the truck when the electrolyte volume is low. Fill the distilled water (after charging) and always keep the electrolyte level at the specified height.

（5）The specific gravity of electrolyte was measured weekly.

（ 6 ） Make sure the battery surface is clean and dry. The connection terminals should be kept clean and dry. Surface area water and dirt can cause automatic discharge.



（7） Tighten the vent cap and clear the small holes to prevent dust from entering the electrolyte.

（8）Measures in winter: Maintain a good charging environment. Do not park the truck out in the cold or in the freezer for long time especially after the battery is used, it is forbidden to put it in a low temperature environment below 0 °C.

Warning

1. It is forbidden to place metal components and any other objects on it, and it is forbidden to connect the two poles of the battery to avoid short circuit, spark, or even explosion.
2. The electrolyte contains sulfuric acid, which is highly corrosive. If it comes into contact with the body, it may cause burns. Wear goggles, rubber shoes and rubber gloves when handling. Contact with clothing: take off immediately. Contact with skin or eyes: flush with running water for 15 to 20 minutes. Accidental ingestion: drink plenty of water and see a doctor immediately.
3. Explosive gases are generated inside the battery, smoking, flames and sparks are prohibited. Mobile phones and other electronic products are prohibited. Otherwise, the battery will explode.
4. Use a damp cloth when cleaning (no dry cloth or fabric) to prevent static electricity.

1.2 Daily, weekly, monthly, long-term storage maintenance

Time	Content
Daily	1. After the battery is discharged, it needs to be charged in time. 2. Check the electrolyte level. When the electrolyte level is low, add distilled water to the specified liquid level (after charging). If it is too high, it should be sucked out 3. Check if the vent cap is damaged. 4. Keep the battery surface clean and tidy. 5. Check whether the appearance is deformed, whether the surface is oxidized, stripped, whether the installation position is offset, whether the box is damaged or not.
Weekly	1. The specific gravity of the electrolyte is tested and recorded. 2. Check if the small hole of the vent cover is blocked and dredged to prevent dust from falling into the battery. 3. Check if the battery stud bolt connection is loose (use torque wrench, torque is 25Nm). 4. Check if there is any fluid in the box and handle it.
Monthly	1. Check whether the battery stud bolt is oxidized, whether the battery socket is damaged or deformed, or there is foreign matter. 2. Equalizing charge is performed once a month.
Long-term storage	The battery should be stored in a dry, ventilated place. Before storing the battery, fully charge it, and then charge it once every 30 days.

Specific gravity detection and conversion

The specific gravity of the electrolyte is tested at least once a week.

2.1 Specific gravity detection

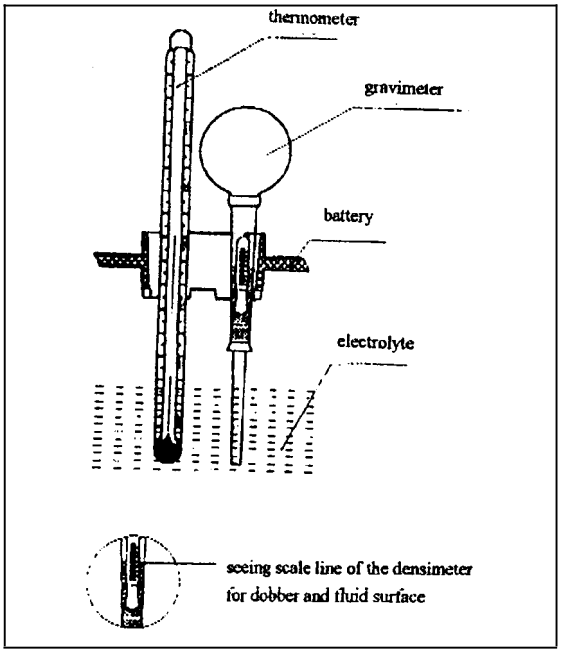
（1）Use a thermometer to measure the temperature of the electrolyte.

（2）Vertically insert the flexible tube of a pipette-type density meter into the electrolyte and squeeze the bulb. Electrolyte will enter the glass tube and the float will rise up.

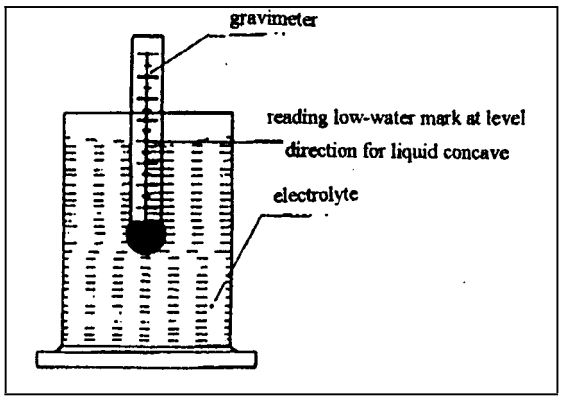
（3）Take the density reading.

Caution

Hold the density meter vertically so that the float does not touch the sides of the glass tube.



Use a hydrometer to measure the specific gravity of electrolyte.



2.2 Specific gravity conversion

Convert electrolyte density at the standard temperature of 30°C based on the following formula:

$D_{30}=D_t+0.0007(t-30)$

Wherein：D_{30}——electrolyte density at 30℃

D_t——measured electrolyte density at t℃.

t——electrolyte temperature during density measurement.

The specific gravity of the electrolyte mentioned in the manual refers to the specific gravity at 30 °C.

Specific gravity of the electrolyte varies with temperature.

Electrolyte after full charge: specific gravity 1.28 g/cm3

Electrolyte after 80% discharge: specific gravity 1.14g/cm3

Check the electrolyte level and add distilled water

Do not use the truck when the electrolyte is low.

Check the electrolyte level once a day. When the electrolyte level is low, add distilled water to the specified surface height (should be replenished after charging).

Warning

1. Using a battery when the electrolyte level is low may lead to overheating and shorten the life span of the battery.
2. When the amount of electrolyte is not correct, it will cause the battery to overheat and even burn the battery and electrical system components.

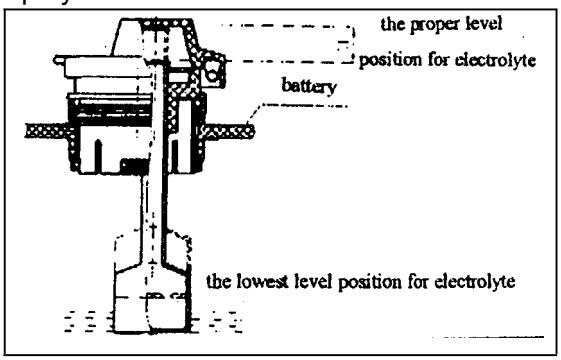
3.1 Check electrolyte level

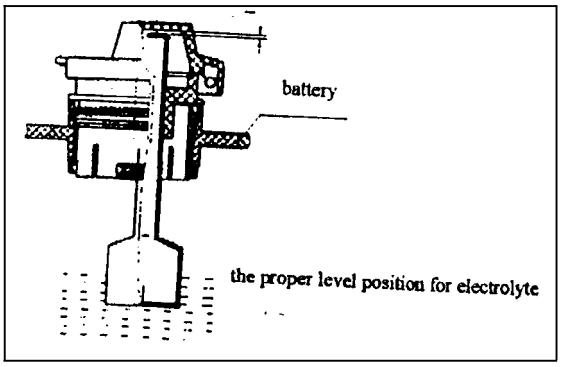
Battery without hydrometer

Electrolyte is 15 ～ 20mm higher than splashguard level.

Battery with hydrometer

Measure electrolyte level by reading the vent cap hydrometer.





3.2 Topping up distilled water

After the charging is completed, distilled water should be added, and the liquid level is 15-20mm higher than protective screening (that is, in the middle position of the screen). But don't overdo it.



Procedures：

（1）Wear protective eyewear, rubber boots and rubber gloves.

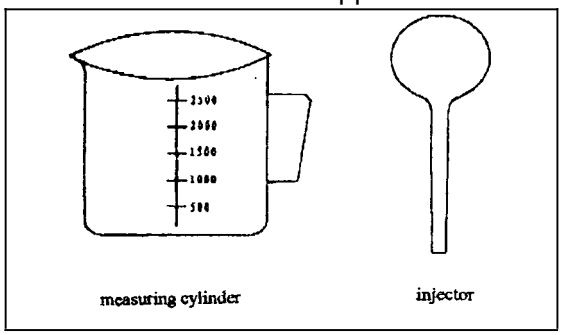
（2）Fill a squeeze bulb pipette with a certain amount of distilled water.

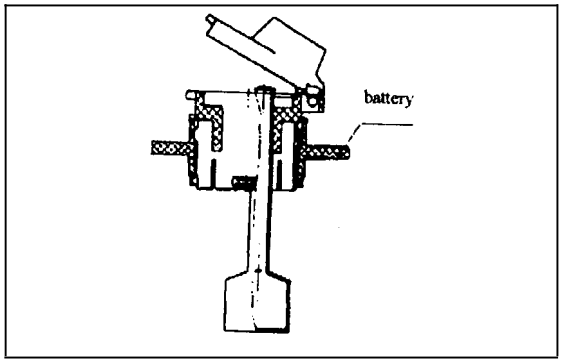
（3）Open all the vent or filler caps on the battery unit.

（4）Inject distilled water into battery cells using squeeze bulb pipette.

Battery with hydrometer

Stop adding water when the red hydrometer float rises and a white line appears.





Battery without hydrometer

Stop adding water when electrolyte is 15-20mm higher than splashguard level.

（5）After topping up, tightly fasten the vent or battery caps.

（6）Use a damp cloth to wipe clean the surface of each battery cell.

（7）Use a squeeze ball pipette to draw off any excess water.

Warning

1. When adding distilled water, do not exceed the specified maximum level. Adding too much water may cause electrolyte leakage and damage the forklift when charging or discharging the battery.
2. Do not use a dry cloth or fabric to wipe the surface of the battery to prevent static electricity from causing an explosion.

Battery charging

Warning

1. The forklift should be charged as soon as possible after use. It must be charged in time before the battery is 20% left. Excessive discharge will shorten battery life.

2. Charge in a designated well-ventilated place, away from inflammable and explosive materials, and place a fire and electric warning sign in conspicuous places.

3. Open the forklift hood and battery vent cover while charging to completely release hydrogen. When charging the battery, it is forbidden to use an open flame, mobile phone or other electronic products to prevent explosion. Do not charge when thunder.

4. During the charging process, it is forbidden to suddenly turn off the power switch or unplug the battery, otherwise it will cause sparks and damage the plug and electrical components. Usually it is continuously and automatically filled.

5. After the charging is completed, distilled water should be added, and the liquid level is 15-20mm higher than protective screening (that is, in the middle position of the screen). But don't overdo it.

4.1 Charger requirement and selection

4.1.1 Charger

（1）When the charger is in use, its casing needs to be reliably grounded.

（2）Disconnect power when replacing fuse.

（3）Only qualified professionals are permitted to disassemble the charger casing for testing or maintenance.

（4）Do not rebuild or disassemble charger.

（5）Take measures to prevent damage caused by charger overheating in high temperature season. If necessary, suspend work temporarily.

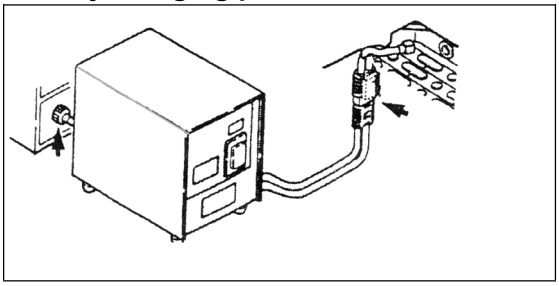
（6）Never continuously charge multiple batteries, which will overheat the charger and may even damage it. After charging, let the charger rest for an hour before re-using it.

4.1.2 Charger selection

Choose charger according to battery voltage and capacity (see parameter list). Generally, the charger current is selected according to the middle value of the battery capacity (1/10 to 1/7), that is, the current = (1/10 to 1/7) battery capacity. For example, the battery capacity is 630Ah, the charger current = (1/10 ~ 1 / 7) 630 = 63A ~ 90A, the choice of 70A-80A charger is most suitable.

Please use the Hangcha pure charger.

4.2 Daily charging procedures



（1）When the forklift meter shows 20% of the remaining power, it should be charged in time.

（2）Turn off the forklift key switch and press the red emergency stop button.

（3）Open the forklift cover and unplug the forklift cable from the battery socket.

（4）Open the battery venting cover to release the explosive gas, and measure the temperature of the electrolyte. If it exceeds 45 °C, it needs to be naturally cooled to below 45 °C, and then charged. The electrolyte temperature during charging should not exceed 55 °C.

（5）Check if the charger plug and the battery socket are damaged. After checking the error, plug the battery into the charger plug. It is strictly forbidden to misconnect positive and negative poles.

（6）Plug in the charger and press the charger's charging switch to charge.

（7）After the charging is completed, the charging device is automatically powered off. Now disconnect the power of the charger and then unplug the charger.

（8）Check the electrolyte level as required in the manual. If it is not enough, add distilled water (filled with Hangcha pure distilled water).

（9）For those equipped with automatic water filling system, distilled water should be added according to the relevant parts of Operation and Maintenance Manual (Automatic Water Filling System of Battery (optional)).

（10）Close the vent cover, clean the battery surface, and close the battery cover. Plug the forklift cable plug into the battery socket and the charging is completed.

4.3 Equalizing charge

4.3.1 Reason of equalizing charge

With time, the voltage, density and capacity of a battery tend to become unbalanced. The voltage and specific gravity of some cells increase more slowly compared with other cells when charging, and decrease at a faster rate when discharging.

Equalizing charge should be applied when any of the following situations occur：

（1）The discharge voltage frequently falls below the cut-off voltage;

（2）The discharge current is frequently too high;

（3）The battery is not charged in a timely manner after discharge is complete;

（4）The battery frequently gets insufficient charge, or hasn't been used for a long time;

4.3.2 Equalizing charge method

Please follow the instructions of the charger. Set to equalizing charge mode and charge. Equalizing charge is performed once a month.

Battery replacement

⚠Caution

1. Before replacing a battery, make sure that the voltage, capacity, weight and dimensions of the new battery match the forklift specifications.
2. Do not use replacement batteries with a different voltage, weight or dimensions without the manufacturer's permission.
3. Lift the battery by attaching hooks to all 4 lifting holes. Do not lift with only 2 of the holes as this may subject the casing to uneven stress, causing the cells to rupture.
4. When lifting the battery box, do not touch the steering wheel or other equipment to avoid damage.
5. When lifting the battery box from the side, keep it steady and slowly pull it out, do not touch or damage the forklift components.

5.1 Replacement procedures

5.1.1Storage battery

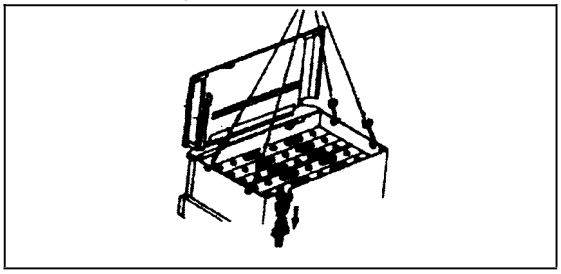
（1）Park the truck on the flat ground, and apply hand brake handle.

（2）Open the forklift cover

（3）Unplug the battery.

（4）Remove the lock pin.

（5）Lift the battery with a suitable lifting tool. See 5.2 for weight.



5.2 Battery weight and dimension

The battery replacement has the lightest and heaviest weight requirements, which is related to the stability of the forklift.

Model / Battery	0.5t
Lightest allowed	71.25kg
Heaviest allowed	78.75kg
Length×width×h	328mm×243mm×424mm（Single group）

Model / Battery	0.6t
Lightest allowed	71.25kg
Heaviest allowed	78.75kg
Length×width×h	328mm×243mm×424mm（Single group）

Model / Battery	0.7t
Lightest allowed	128.25kg
Heaviest allowed	141.75kg
Length×width×he	494mm×302mm×425mm（Single group）

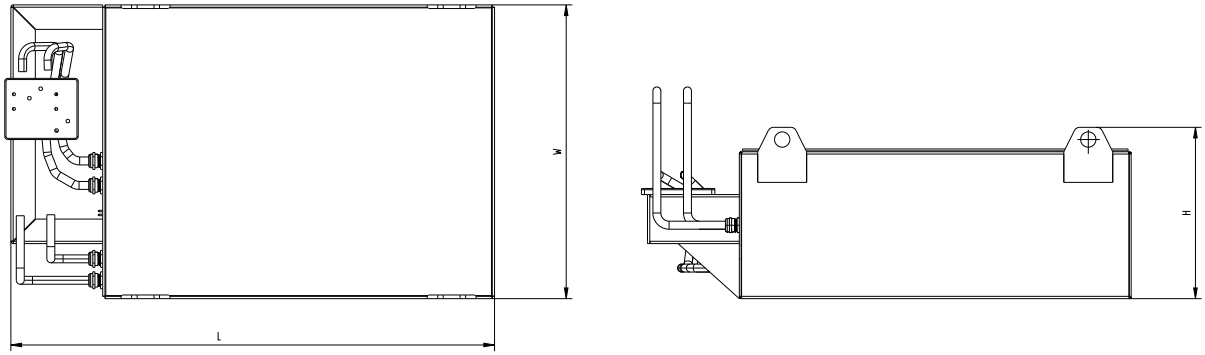
Model / Battery	0.8t
Lightest allowed	128.25kg
Heaviest allowed	141.75kg
Length×width×he	494mm×302mm×425mm（Single group）

Model / Battery	0.9t
Lightest allowed	159.6kg
Heaviest allowed	176.4kg
Length×width×he	494mm×302mm×425mm（Single group）

Model / Battery	1.0t
Lightest allowed	159.6kg
Heaviest allowed	176.4kg
Length×width×he	494mm×302mm×425mm（Single group）

13. Lithium battery

Lithium battery parameter (CATL as standard)



Item		0.5t~0.6t	0.7t~1.0t	1.3t~1.5t
Length（L）	mm	760	790	916
Width（W）	mm	232	480	550
Height（H）	mm	280	280	276
The lightest weight	kg	45	95	120
Rated capacity	Ah	125	250	125
Rated voltage	V	25.76	24	77.28

Safety instructions

1.1 It is strictly forbidden to touch the positive and negative poles of the battery box with both hands at any time.



1.2 Maintenance personnel are required to hold the qualified electrician certificate and ENEROC maintenance authorization issued by the Safety Supervision Bureau in order to carry out maintenance operations



1.3When operating and maintaining the battery system, please wear insulting gloves and take off metal orraments.



1.4When cleaning forklifts, high-voltage components should be avoided to avoid adverse consequences after contact with water.



Installation instructions

2.1 Installation requirements : Installation personnel should be on duty with a certificate, wear labor insurance supplies, and pay attention to safety protection. Low voltage must be cut off before system installation. The high-voltage output interface should be protected to prevent the installation personnel from contacting during the installation process. When installing the system, mechanical hoisting should be adopted. When moving to the battery system warehouse, the speed should be slow and the position should be correct to prevent the extrusion deformation of the battery box. When the system is connected, the phenomena of negative and positive pole reverse connection and short circuit are avoided. In rainy and snowy weather, pay attention to the protection of connectors to prevent rainwater from entering.

2.2 Inspection after installation: After installation of the system, check the positioning pin/fixing bolt of the battery system to confirm that it meets the installation requirements. Check the connection of the low voltage connector is correct/reliable. Check the high voltage positive and negative cable connection is correct/reliable. Turn the key switch to ON gear and the relay should be able to suck in normally without battery alarm. If battery failure alarm occurs, the power supply should be cut off immediately and the after-sales service department of our company should be notified to solve the problem.

Basic terms for lithium ion battery

3.1. Battery system

Electric energy storage system, usually including one or more battery modules, battery management system, thermal management, high and low voltage lines, connectors and structural components.

3.2 SOC

Refers to the percentage of battery remaining electricity.

3.3 Nominal voltage

An appropriate approximate value used to represent the voltage of a battery.

3.4 Rated capacity

The capacity value specified by the manufacturer when the battery is fully charged under specified conditions.

3.5Overdischarge

When the battery voltage is lower than the discharge cut-off voltage, the state can usually be seen as that the battery enters the overdischarge state, generally referring to the state when the battery voltage reaches 0 V or even the voltage is negative.

3.6 Overcharging

When the battery voltage is higher than the maximum charging voltage, the state of the battery can usually be regarded as the state of overcharging.

3. 7 Explosion:

The battery shell is broken and solid material rushes out of the battery and makes sound.

3.8 Fire

Open fire appears in the battery case.

3.9 Leakage

The internal components of the battery (electrolyte or other substances) leak from the battery.

3.10 CAN

Communication: Control Area Network, Controller Area Network.

Instructions for Use

4.1 Temperature Characteristics of Batteries：

Working Environment Temperature：-25℃~55℃，Permissible Charging Temperature:0℃~55℃，Permissible Discharge Temperature：-28℃~55℃，Storage Environment Temperature: -28℃~55℃.

4.2 Pre-departure inspection： After the key switch is closed, confirm that the instrument panel has no battery system alarm information. Check the remaining power before leaving the car. It is recommended to charge up to 50%~100% before leaving the car. It cannot over discharge the power battery system. over discharge will cause irreversible permanent damage to lithium-ion power battery.

4.3 Charging instructions: Forklift truck in operation after stopping or battery system SOC less than 20%, please charge in time. Use the special charging equipment authorized by the manufacturer to charge. If there is a fault alarm during charging, the power battery system and charger will stop charging, and the charger will show the fault. Charging environment should be dry and ventilated without flammable and explosive materials. Cars should be fully charged once a week.

4.4 Long-term parking storage: Before parking, it is necessary to confirm the battery power of the vehicle: 50%-70%. Maintenance is carried out every three months. The electricity is filled by full charging, and then discharged to

50%~70% before parking. The vehicle has been parked for more than three months. Please make sure that the dashboard alarms before reusing. If so, please contact the vehicle manufacturer for maintenance. Forklift parking environment should be kept as dry and ventilated as possible, away from heat sources.

Maintenance

5.1 Outside appearance of inspection box: Check whether there are any debris, obvious deformation, rust and other abnormal conditions in the battery system outer box.

5.2 National Standard Charging Port: When the power is off, check whether there are any abnormal conditions such as debris and rust in the intPlug-in rface.

5.3 Plug-in: When the power is off, check whether the connector is loose or damaged.

5.4 Parameter Detection: Check the battery voltage and temperature on the display before charging and discharging to ensure that all values are in the normal range.

Emergency plan

6.1Scenarios,extreme anomalies

Users should establish a good sense of security in the use process, strictly prohibit illegal operation, avoid battery system abuse (overcharge, over discharge, short circuit, extrusion, puncture, environmental overheating, high current discharge, etc.). In the process of charging and using, the abnormalities that may occur in the power battery system are as follows: Battery systems or local temperatures rise sharply. There is abnormal odor in any part of the battery system. Smoke and fire occur at any part of the battery system.

6.2Emergency plan

6.2.1Personnel leave the vehicle quickly and dial the alarm phone according to the situation on the spot.

6.2.2To ensure personal safety, the following operations are carried out conditionally:

a. Use carbon dioxide or dry powder fire extinguishers if the battery harness smokes and ignites.

b. If the battery is on fire, use a high-pressure water gun to extinguish the fire at a long distance.

c. If smoke is inhaled carelessly, please transfer it to the doctor as soon as possible.

6.2.3 Contact forklift brand dealers to obtain professional treatment advice.

Shineng Charger

a. Summarize

CZC7SI series intelligent charger uses high-performance embedded charging control unit to control the charging current. The main circuit module with optimized parameter design provides continuously adjustable charging current for various batteries and lithium batteries to meet various charging process requirements.

The charging controller has a built-in default charging curve. It can also set and store customized charging curves at the factory according to user needs to meet customized charging process requirements.

The charging controller monitors various parameters during charging in real time, so that the charger has a perfect protection function, and the charging process is smoothly performed in real time. At the same time, it also provides a communication interface and a protection output interface to provide interlocking control with other devices.

Function features：

1) Reservation time charging function: It can set the start time of charging at a fixed time, and use the electricity at off-peak price to charge, so as to save electricity costs.
2) Set parameters for power failure protection: Parameters set by the user can be remembered by the system for a long time and will not be lost even power failure.
3) The digital tube displays parameters such as battery voltage, charging current, capacity, time, and charger working status.
4) Special charging function: The connection cable is disconnected during charging, and the charger is automatically turned off (battery detached detection).
5) Protection function: fault protection and alarm function as open circuit, reverse connection, over current, over voltage, over temperature and power phase shortage.

b. Normal working conditions

(1) The altitude does not exceed 1000 meters;

(2) The temperature of the surrounding medium is not higher than +45 ° C and not lower than -10 ° C;

(3) The relative humidity of the air is not more than 95% (when the medium temperature is 20±5°C);

(4) No rain or snow, no conductive dust, no explosion hazard;

(5) No gas or steam which can corrode metals and destroy insulation;

(6) The charger should be placed in a ventilated and dry place, away from high temperature, dust and corrosive gases;

(7) The vertical plane is inclined no more than 5 degrees and there is no strong vibration and impact.

(8) To ensure the normal operation of the charger, keep the air around the charger unobstructed and keep a certain gap between other objects, and check whether the vent is blocked.

c. Main technical parameters

Item / Spec. / Parameter	Rated input power supply 50Hz/60Hz	Rated input power KVA	Input current A	Max. output current A	Max. output voltage V	Weight Kg	Communication mode	Protection level	Dimension
E30V/100A	Single phase 220	3.3	15.2	100	30	17	CAN	IP21	485×271×274
D60V/100A	Three phase 380	6.9	10.5	100	60	36			625×371×355
D60V/200A	Three phase 380	13.8	21.0	200	60	48			625×371×355
D100V/100A	Three phase 380	10.8	16.3	100	100	37			625×371×355
D100V/200A	Three phase 380	21.5	32.7	200	100	50			625×371×355
D120V/250A	Three phase 380	32.3	49.0	250	120	125			770×500×1030

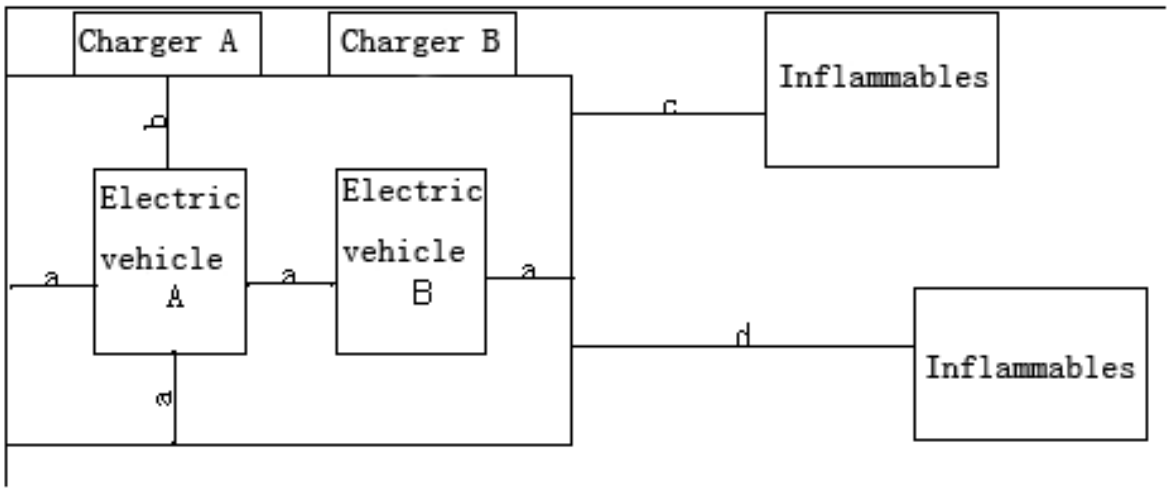
d. Installation

1. Requirements for the layout of the charging station

1) In order to ensure the normal operation of the machine, the charging place should keep the air unobstructed.

2) Keep a space of at least 0.3 meters around the charger, and always check whether the vent of the charger is blocked to ensure that the charger is well ventilated.

3) The placement position of the charger and battery is as shown in the figure below:



The above picture：

a——The space around electric vehicle A and B must be at least 0.6m;

b——The minimum distance between the charged battery and the charger is 1 m;

c——The distance between charger and inflammables should not be less than 2.5 meters;

d——The distance between charger and explosives should not be less than 5 meters;

e——The indoor height of the charging room should not be less than 2 meters.

2. Connection requirements for charger input and output cables

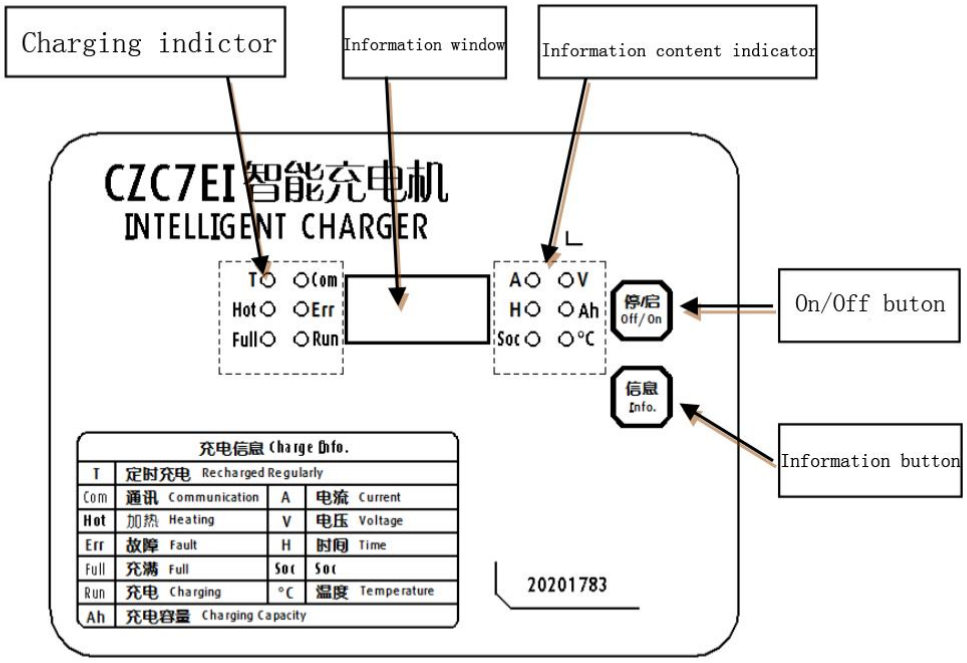
(1) Before wiring, confirm whether the grid voltage used is consistent with the rated input voltage of the charger.

(2) Before use, confirm that the specifications of the battery to be charged should match the specifications of the charger.

(3) When the charging cable is connected, the polarity of the battery must be consistent with the charger output "+" and "-" polarity. And the connection is firm and reliable.

e. Instructions

1. Panel diagram



a. On/Off button-- start or suspend the charger and activate reservation charging.

b. Information window - display various charging parameters, fault code information, etc;

After the charger is powered on, the information window will display Boot --- version information --- customer code (C001) -- charger parameter specification (voltage) -- charger parameter specification (current) -- charging curve; after the charging curve is displayed, if the charger initialization is correct, it will enter the waiting stage and display "----"; if the charger initialization is wrong, it will enter the fault interface.

Under normal circumstances, the charger switches between the waiting and charging interface. If there is a failure, it will enter the failure interface. At the same time, for the convenience of

parameter query, the battery information interface, the DC module information interface and the charger parameter interface are added.

c. Information button——click the "information button" to poll the current display items of the charger; long press for 3s to enter the charger query interface.

d. Information content indicator - each light is on, and the corresponding information window will display the corresponding content information.

l Indicator light A: the light is on, indicating that the current digital tube displays the current value, unit: A.

l Indicator light V: the light is on, indicating that the current digital tube display value is the voltage value, unit: V

l Indicator light H: the light is on, indicating that the current digital tube display value is the charging time, unit: H.

l Indicator light Ah: the light is on, indicating that the current digital tube display value is the charging capacity value, unit: Ah.

l Indicator Soc: the light is on, indicating the percentage of battery capacity.

l Indicator ℃: the light is on, indicating the maximum / minimum temperature of battery, unit: ℃.

2. Normal charging procedures

1) Connect charger and battery charging plug;

2) Turn on the charger input power.

3) At this time, if the battery is connected correctly, after a few seconds delay, the charger will automatically charge according to the preset parameters and charging mode, and display the charging data; if the battery is not connected, the charger will always be in the standby state;

4) When the fully charged light is on, the charger automatically stops. At this point, the battery is full.

3. Operation steps of reservation charging

1) Connect the charger input power; the charger enters the charging waiting interface, and the digital tube displays "----"

2) Double click the on / off button; the digital tube displays "S.xx" (xx is the reserved charging time, unit: h), at this time, click the on / off button to increase the charging reservation time; click the information button to reduce the reservation time; after the charging reservation time flashes for 30 seconds, it will automatically enter the state of subtracting seconds, the battery will start charging automatically after subtracting seconds are completed, and the charger will stop automatically when the battery is sufficient.

3) After the reservation time is set, connect the battery to the charger.

4. Charger information query

After the charger is turned on, press the "information button" for more than 3s (press the information button, and the digital tube displays countdown). After releasing, enter the charging display interface to view the charging information. At this time, the digital tube displays the number of the interface signs. Click the "on / off" button to poll each display interface of the charger, and then press the "information button" to enter.

Charging interface, normal charging display interface display the following data respectively:

Current voltage-- current --charging time(0.1h) --charging capacity(AH) --soc-- charging stage-- charging curve.

Fault interface, it will enter automatically when there is a fault, and the following information will be displayed respectively: interface mark [10] -- fault code-- current voltage-- current -- charging time-- charging capacity, where fault code "F-xx" is bms fault; "c-00" is low battery voltage; and "E-xx" is charger fault.

DC module interface, which is used to display DC module parameters, displays the following data respectively: interface mark [20] - sub module mark -- module voltage --- module current --- module working code, and its sub module mark is each individual module, specifically displayed as "Xx" (X -- sub module address). X -- 0: not online; 1: online and working normally; 2: online but not working properly).

Charger parameter interface is used to view the parameters set by the charger, and display as follows: Interface mark [30] - number of modules -- module voltage specification "Nxxx" -- module current specification "Nxxx" -- input voltage specification "Axxx" -- starting voltage "Sxxx" -- constant voltage specification of charger -- constant current specification of charger – power off current "Sxxx" -- total charging time -- charging protocol -- overvoltage protection value -- overcurrent protection value.

Battery information interface is displayed as follows: interface mark [40] –given voltage -- given current -- maximum single voltage-- minimum single voltage -- battery temperature 1 -- battery temperature 2-- soc-- grid voltage. Each interface display item will automatically display the next item after several seconds, and automatically display in cycle. If you need to speed up the view, just press the "information button"

f. Fault description and corrections

It must be repaired by professional electrical technicians			
Fault type	Fault code	Fault reason	Correction
Charger code	E-03	Open phase protection	Check the input voltage for phase loss
	E-05	Over voltage protection	Check whether the charger main circuit module is normal
	E-06	Over current protection	Check the power supply module
	E-08	Communication timeout	Check whether the communication connector and communication circuit are connected
	E-09	Bms fault	Contact battery supplier
	E-12	Input overvoltage protection	Check the grid voltage
	E-13	Input undervoltage protection	Check the grid voltage
	E-14	No controllable module	The charging module protection or damage
BMS Fault	F-01	Insulation fault	Contact battery supplier
	F-02	Over temperature fault of output connector	
	F-03	BMS element, output connector over temperature	
	F-04	Charging connector failure	
	F-05	Battery pack over temperature fault	
	F-06	High voltage relay failure	
	F-07	Voltage fault at check point 2 （CC2）	
	F-08	Other fault	
	F-09	Excessive charging current	
	F-10	Abnormal voltage	
	F-11	Unit voltage too high	
	F-12	SOC too high	
Note: when the "Err" indicator on the panel is on, the fault code will be displayed in the information window!			

On-board charger

WTL2450ZLCHCJT01 on-board charger is suitable for X-series three-wheel lithium battery forklifts (CPDS08/10-XD2-I). It features a wide voltage input range: 150VAC-264VAC, meeting the needs of domestic and foreign power grids; easy installation: air-cooled sealed waterproof structure, temperature rise is lower than natural cooling, and the whole machine has high reliability; intelligent charging of lithium battery: built-in microprocessor can judge the relative capacity of battery and identify the ambient temperature during the charging process. Different charging curves are adopted according to the relative capacity and ambient temperature of the battery. The whole process is controlled by constant current. The battery has good balance and can effectively prolong the service life of the battery, but the charging time is long.

Protection functions of WTL2450ZLCHCJT01 on-board charger to lithium battery charging

(1) Overheating protection: When the internal temperature of the charger exceeds 87℃, the charger will be shut down for protection. When the temperature drops, it will automatically resume charging.

(2 Battery reverse connection protection: When the battery is connected reversely, the internal circuit of the charger is disconnected from the battery, which will not damage the charger.

(3) No-load protection: no output when the battery is not connected.

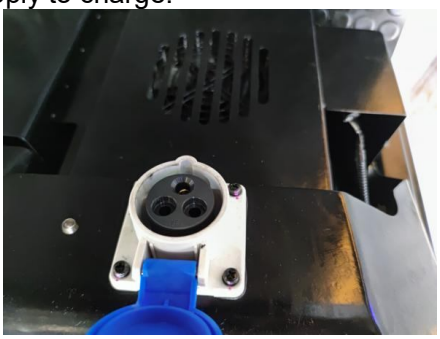
(4) Short-circuit protection: When the output is short-circuited, the internal circuit of the charger is disconnected from the battery, and charging can be resumed only when the battery is reconnected after the fault is removed.

(5) Automatic shutdown when fully charged: The charger will automatically shutdown after judging that the battery is fully charged.

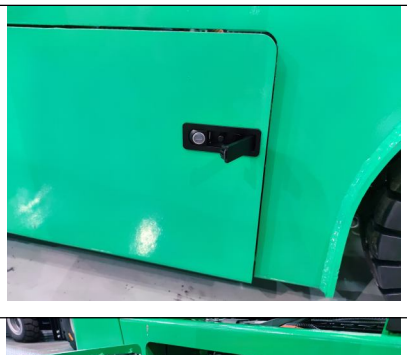
Charging procedures：

Charging method 1

1. Stop the forklift to the charging pile and turn off the key switch of the vehicle, that is, the vehicle is not charged.
2. Check the on-board charger to ensure that there is no water or foreign matter in the port, and the metal terminals are not damaged or affected by rust or corrosion. Use a 10A national standard plug cable to connect the on-board charger, and plug the other end directly into the 220V power supply to charge.







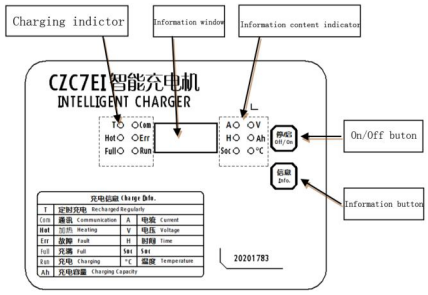




3. Close the charger input main valve, the charging device is turned on, the power indicator light is on, press the on/off button and the charger starts charging.



Input electric main valve



Operation interface

Charging method 2

1. Stop the forklift to the charging pile and turn off the key switch of the vehicle, that is, the vehicle is not charged.

2. Open the side door, disconnect the plug connector between the battery and the on-board charger, check that there is no water or foreign matter in the connector of the CZC7EI series charger, and the metal terminal is not damaged or affected by rust or corrosion, and connect the charger connector to the battery charging connector.

14. Maintenance summarization

- The forklift truck needs inspection and maintenance periodically, to make it in good working condition.
- Inspection and maintenance are usually ignored, you'd better find the problems early and solve it in time.
- Use the pure service parts of HANGCHA GROUP CO., LTD.
- Don't use different oil when changing or adding oil.
- Don't rave about oil and electrolyte used at will, and carry on handling according to the local environmental protection laws and regulations.
- Draw up complete maintenance plan.
- After you make maintenance, you'd better make a record.
- Forbid to repair the forklift truck if you haven't been trained.

Caution

- **No smoking.**
- **You should shut off key switch and pull off the plug before service.（except some Fault shooting）.**
- **Clean the electric part with compress air, and do not with water.**
- **Do not place your hands, feet or any part of body into the gap between the mast and instrument.**

Preventive maintenance schedule

○ —Check, revise, adjust ×—Replace

D—Daily; W—Weekly; M—Monthly; T—Trimonthly; S—Semiannually; Y—Yearly

Battery

Checking item	Service required	Tools	D (8 h)	W (40 h)	M (166h)	T (500 h)	S (1000 h)	Y (2000 h)
Battery	Electrolyte level	Eyeballing		○	○	○	○	○
	Electrolyte proportion	Densimeter		○	○	○	○	○
	Battery quantity		○	○	○	○	○	○
	Terminal looseness		○	○	○	○	○	○
	Looseness of connecting wire		○	○	○	○	○	○
	Cleanness of the battery surface		○	○	○	○	○	○
	If there are tools on the battery.		○	○	○	○	○	○
	The tightness and smoothness of air			○	○	○	○	○
	Far away from firing		○	○	○	○	○	○

Controller

Checking item	Service required	Tools	D (8 h)	W (40 h)	M (166h)	T (500 h)	S (1000 h)	Y (2000 h)
Controller	Check wear condition of connector					○	○	○
	Check the running condition of contactor					○	○	○
	Check micromove switch for running					○	○	○

Checking item	Service required	Tools	D (8 h)	W (40 h)	M (166h)	T (500 h)	S (1000 h)	Y (2000 h)
	Check the connection among motor, battery and power unit.					○	○	○
	Check the controller error diagnose system							First time 2 years

Motor

Checking Item	Service Required	Tools	D (8 h)	W (40 h)	M (166h)	T (500 h)	S (1000 h)	Y (2000 h)
Motor	Clean the foreign body on the motor				○	○	○	○
	Clean or replace the bearing						○	○
	Check the carbon brush and commutater for worn, whether spring is normal				○	○	○	○
	Whether the connection is correct and firm.				○	○	○	○
	Brush carbon powder on shift plate and shift device.					○	○	○

Driving system

Checking Item	Service Required	Tools	D (8 h)	W (40 h)	M (166h)	T (500 h)	S (1000 h)	Y (2000 h)
Transmission box and wheel reducing mechanism(front axle)	Check for noise		○	○	○	○	○	○
	Check for oil leakage		○	○	○	○	○	○
	Change oil						×	×
	Check wheel hub bearing for looseness, noise			○	○	○	○	○

	Clean and replace grease					×	×	×
	Leakage check		○	○	○	○	○	○
	Check axle deformation, crack or damage.				○	○	○	○

Wheels (Front, rear Wheels)

Checking Item	Service required	Tools	D (8 h)	W (40 h)	M (166h)	T (500 h)	S (1000 h)	Y (2000 h)
Tyre	Check for charge pressure	Barometer	○	○	○	○	○	○
	Check for abrasion, cracks or damage		○	○	○	○	○	○
	Check for spikes, stones or foreign matter				○	○	○	○
	Check the wheel hub for damage		○	○	○	○	○	○
	Check the split body wheel hub-bolts for looseness	Test hammer	○	○	○	○	○	○

Steering System

Item	Service required	Tool	Daily (8h)	Weekly (40h)	Monthly (166h)	Every 3 months (500h)	Every 6 months (1000h)	Annually (2000h)
Steering wheel	Check play		○	○	○	○	○	○
	Check axial looseness		○	○	○	○	○	○
	Check radial looseness		○	○	○	○	○	○
	Check operation		○	○	○	○	○	○
Boost mechanism assembly	Check the chain lubrication				○	○	○	○
	Check and clean gear shafts and gears				○	○	○	○

	Check the power steering motor and the locking sleeve for looseness				○	○	○	○
Rear axle knuckle	Check whether the rear axle mounting bolts are loose				○	○	○	○
	Check for deflection, deformation ,cracks or damage				○	○	○	○
	Check or replace the lubrication of axle support bearing					○	○	○
	Check or replace the lubrication of axle support bearing					○	○	○

Brake system

Checking Item	Service required	Tools	D (8 h)	W (40 h)	M (166h)	T (500 h)	S (1000 h)	Y (2000 h)
Brake pedal	Check for free travel	Scale	○	○	○	○	○	○
	Check for pedal travel		○	○	○	○	○	○
	Check for operation		○	○	○	○	○	○
	Check for air mixed in brake piping		○	○	○	○	○	○
Parking brake	Check for lever is securely locked and has sufficient lever stroke		○	○	○	○	○	○
	Operation performance		○	○	○	○	○	○
Rod, Cable, etc	Operation performance				○	○	○	○
	Check connections for looseness				○	○	○	○

Checking Item	Service required	Tools	D (8 h)	W (40 h)	M (166h)	T (500 h)	S (1000 h)	Y (2000 h)
	Check reduction gear box connector lug for abrasion					○	○	○
Hoses and Pipes	Check for damage, leakage or collapse				○	○	○	○
	Check connection or clamping parts for looseness				○	○	○	○
Brake master cylinder and wheel cylinder	Check for leakage		○	○	○	○	○	○
	Check for fluid level, Change brake fluid		○	○	○		×	×
	Check master cylinder and wheel cylinder for operation					○	○	○
	Check master cylinder and wheel cylinders for fluid leaks or damage					○	○	○
	Check master cylinder piston cup, and check valve for wear or damage change						×	×

Hydraulic system

Checking item	Service required	Tools	D (8 h)	W (40 h)	M (166h)	T (500 h)	S (1000 h)	Y (2000 h)
Hydraulic reservoir	Check for oil level, change oil		○	○	○	○	×	×
	Clean suction strainer						○	○
	Clean foreign matter						○	○

Checking item	Service required	Tools	D (8 h)	W (40 h)	M (166h)	T (500 h)	S (1000 h)	Y (2000 h)
Control lever	Check levers for looseness		○	○	○	○	○	○
	Check for operation		○	○	○	○	○	○
Control valve	Check for oil leak		○	○	○	○	○	○
	Check relief valve and tilt lock valve for operation				○	○	○	○
	Measure relief pressure	Oil press gauge					○	○
Hose, Piping Hose Reel & Swivel Joint	Check for oil leak, looseness, collapse, deformation and damage				○	○	○	○
	Replace hoses.							× 1-2 years
Hydraulic Pump	Check hydraulic pump for oil leak or noise		○	○	○	○	○	○
	Check pump drive gear for wear				○	○	○	○

Lifting system

Checking item	Service required	Tools	D (8 h)	W (40 h)	M (166h)	T (500 h)	S (1000 h)	Y (2000 h)
Chains & Sheave	Check chain for tension, damage or rust		○	○	○	○	○	○
	Add lubrication for chains				○	○	○	○
	Check connection of chain anchor pin and chain for looseness				○	○	○	○
	Check sheaves for deformation or damage				○	○	○	○
	Check sheave bearings for looseness				○	○	○	○
Attachment	Check whether the condition is normal				○	○	○	○
Lifting cylinder and tilting cylinder	Check piston rod, rod screw and connection for looseness deformation or damage	Test hammer	○	○	○	○	○	○
	Check cylinders for operation		○	○	○	○	○	○
	Check for oil leak		○	○	○	○	○	○
	Check pins and cylinder bushings for wear or damage				○	○	○	○
Fork	Check forks for damage, deformation or wear				○	○	○	○
	Check for stopper pins for damage or wear					○	○	○
	Check fork base and hook welding for defective cracks or wear				○	○	○	○

Checking item	Service required	Tools	D (8 h)	W (40 h)	M (166h)	T (500 h)	S (1000 h)	Y (2000 h)
Mast & Fork carriage	Check weld between cross members with outer and inner masts for defective, cracks or damage				○	○	○	○
	Check tilt cylinder bracket and mast for defective weld ,cracks or damage				○	○	○	○
	Check outer and inner masts for defective weld, cracks or damage				○	○	○	○
	Check for defective weld, cracks or damage of fork carriage				○	○	○	○
	Check roller bearings for looseness				○	○	○	○
	Check mast support bushings for wear or damage						○	○
	Check mast support cap bolts for looseness	Test hammer			○ (for 1st time)		○	○
	Check lift cylinder piston rod head bolts, U-bolts for looseness	Test hammer			○ (for 1st time)		○	○
	Check rollers, roller pins and welded parts for cracks or damage				○	○	○	○

Others

Checking item	Service required	Tools	D (8 h)	W (40 h)	M (166h)	T (500 h)	S (1000 h)	Y (2000 h)
Overhead Guard & Load Backrest	Check for tight installation	Test hammer	○	○	○	○	○	○
	Check for deformation		○	○	○	○	○	○
Turn signal	Check for proper operation and tight installation		○	○	○	○	○	○
Horn	Check for proper operation and tight		○	○	○	○	○	○
Light & Lamps	Check for proper operation and tight		○	○	○	○	○	○
Buck-up Buzzer	Check for proper operation and tight installation		○	○	○	○	○	○
Meters	Check meters for proper operation		○	○	○	○	○	○
Wire	Wire damage or looseness			○	○	○	○	○
	LOOSENESS OF ELECTRIC				○	○	○	○

Replace the key safe parts periodically

– Some parts was unable to detect the damage through periodical maintenance, for further improving the safety, users should replace the parts periodically according to the following table.

– If the part is abnormal before the replacing time, it should be replaced immediately.

Key safe part's description	**Term of using (year)**
Brake hose or tube	1～2
Hydraulic hose for lifting system	1～2
Lifting chain	2～4
High-pressure hose, hose for hydraulic system	2
Brake oil cup	2～4
Cylinder cover and dust sleeve of brake master cylinder	1
Inner hermetic, rubber matter	2

Table for oil used in the truck

Name	**Trademark, code name**	**Capability**	**Remark**
Hydraulic oil	L-HM32（extreme cold environment L-HV32）	9	Hydraulic oil tank
Gear oil	automatic transmission oil Dexron-III-G00	There is a small amount of overflow at the oil level	Reduction box
Brake Fluid	Caltex （DOT3-G00）	1.2	
Lubrication grease	Automobile general lithium base lubricant		
Industrial Vaseline	2#		Electrode of storage battery

Table for bolts tight torque

Unit：N·m

Bolt's diameter	Grade			
	4.6	5.6	6.6	8.8
6	4～5	5～7	6～8	9～12
8	10～12	12～15	14～18	22～29
10	20～25	25～31	29～39	44～58
12	35～44	44～54	49～64	76～107
14	54～69	69～88	83～98	121～162
16	88～108	108～137	127～157	189～252
18	118～147	147～186	176～216	260～347
20	167～206	206～265	245～314	369～492
22	225～284	284～343	343～431	502～669
24	294～370	370～441	441～539	638～850
27	441～519	539～686	637～784	933～1244

Note：

- Use entirely 8.8 grade bolt in the important joint position.
- Bolt's grade can be found in the head of the bolt, if it can't be found, the grade is 8.8.

15. The use, Install and Safety Rules of attachment

HANGCHA will choose attachment that according with International standard ISO2328 *Forklift pothook fork and install size of carriage*, such as clamp, rotator, paper roll clamp, carrying ram, side-shifter ect.

Attachment install

- Untempered technology license of our company, any refit at safety and capability to attachment is strict prohibited.
- Fact rating load capacity should be the least of rating load capacity, the load capacity of attachment, colligate load capacity of truck. Generally speaking, the colligate load capacity of truck is the least. Attachment load capacity just a count value of attachment pressure.
- Installation goes to in reason, credibility, safety to avoid the attachment glide around carriage in using.
- After hang attachment, embed the rise catch block to the gap of top beam, let the offset of centre line of attachment and carriage is less than 50mm.Otherwise, it will affect the landscape orientation stability of forklift.
- To these attachment with rotating function, such as paper roll clamp, bale clamp, muti-purpose clamp, drum clamp, it needs to weld chock block in the joint of carriage beam and attachment to prevent move from side to side in the operation.
- Install the attachment of below catch orientation, it need to adjust the clearance between below catch and beam of carriage.

Attachment use

- Know well the content of nameplate on attachment, read the instruction manual before usage. (Especially the manual from attachment company) Before operate the attachment, thepeople should be trained and obtain the qualification.
- It should be understand the basic capability and operate methods of attachment. Especially the admit load, lift height, size of cargo and adapt range of attachment.
- Operate the multi-functional attachment, such as with side-shifter, clamp or rotator, it is not allowed that two action at one time. Operate one functional then do another one.
- Prohibit the cargo at a high position when truck move with attachment. If the size of cargo is too big, prohibit the truck move on. Transport the cargo, make sure that the distance of bottom of cargo and ground is less than 300mm and mast incline back.
- The weight of cargo couldn’t exceed the limited value of combination carrying capacity of forklift and attachment. It is not allowed that partial load at high position. It is a short time work for attachment with side-shifter. Partial load is around 100mm (Above 5 ton (including 5 ton), the side-shifter movable within 300mm.
- In the range of the projection forth 2m of the lower of attachment and cargo, prohibit stand to avoid the suddenness except the driver position under overhead.
- It is not allowed that an emergency brake in moving. Run slowly with load.
- Prohibit outside force when attachment working.

– It couldn’t be use at malfeasance situation and overstep normal work range.
– When the attachment has trouble, prohibit use without check.

Check and maintenance

– Check the clearance of carriage beam and below catch of attachment if accord the attachment manual.
– Check the rise catch is right on the flute of fork carriage.
– Use the auto general lithium-grease per 500 hours to bearing surface.
– If the tighten firmware become flexible.
– Check the tie-in of hydraulic pressure loop, if tube attaint. Prohibit use after repair.
– Check the drive of attachment timing or turn the component if fray or block, change in time.
– Check each element if in normal under load attachment is work in gear. If not, check the hydraulic pressure loop, find out the broken part, change air poof or whole loop part.

16. Battery automatic filling water system(Optional)

Makeup of the automatic filling watering system：

- Automatic Watering Plug
- End Plug
- Floater
- T-piece & L-piece
- Flow Indicator（with filter）
- 6mm, 8mm ,10mmwatering pipe
- Male & Female couplings (Kv10 and KV6, etc.)
- Water Tank





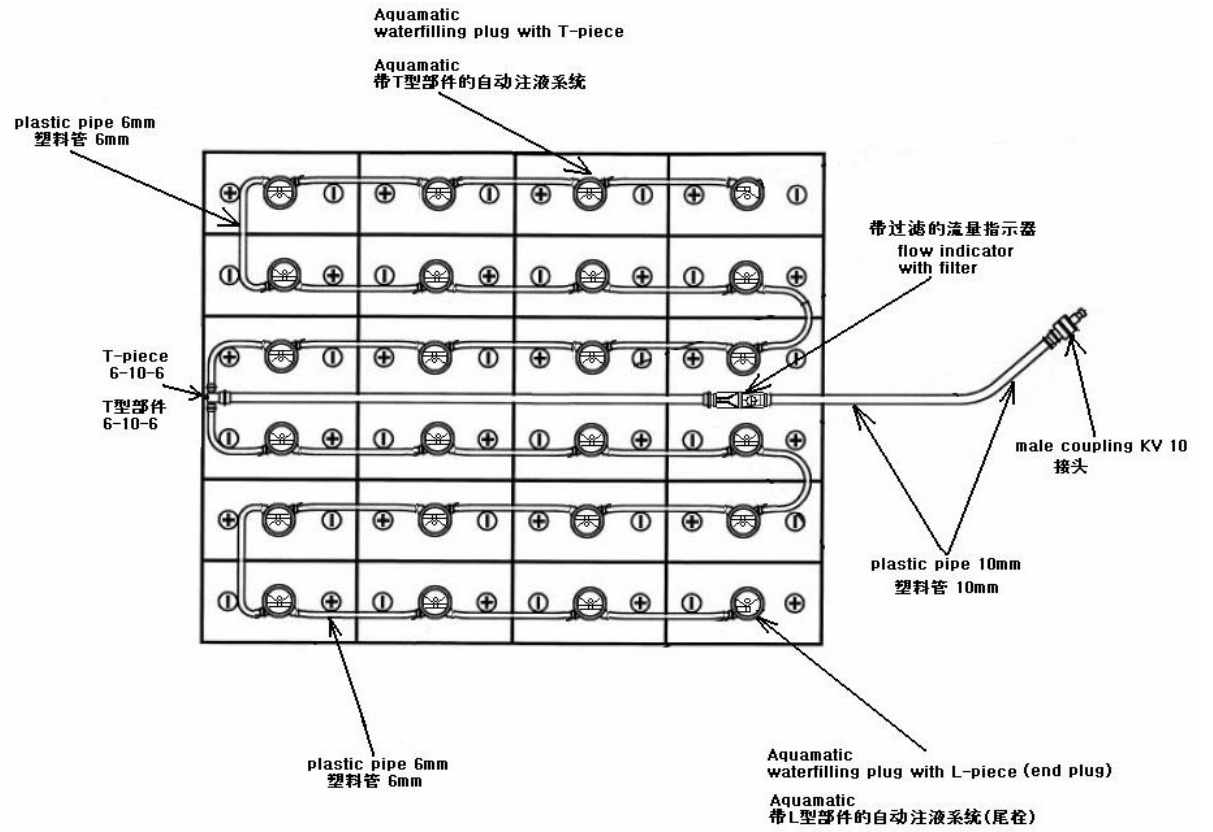
Application specification and installation

During the period of development and long-term practical usage, the leak tightness of FRÖTEK automatic watering system has received complete recognition. But when you use it, you need to keep the automatic watering system clean and there can't be any filth on the surface.

How to properly install the automatic watering system：Our automatic watering system is easy to operate, no need to finish watering the electrolyte in the storage battery by hand, time saving and labor saving, besides, it can extend the service life.

How to correctly install the water tank, choose proper floaters, how to confirm the specification & quantity of the installed accessories according to different types of battery, including correct application rules for automatic watering plug, watering pipe, T/L-pieces and male/female couplings as well as the cleaning of the flow indicator. We will give you a brief introduction for the above items as follows:

Battery spec.	Watering head / T-piece	T-piece （6-10-6）	Flow indicator （filter）	6mm Watering pipe	10mm Watering pipe	End plug	Male/female K10	Water tank Spec.
24V	12 pcs	1 pcs	1 pcs	3m	5m	2 pcs	1 pcs	30L 1 pcs
48V	24 pcs	1 pcs	1 pcs	5m	5m	2 pcs	1 pcs	30L 1 pcs
80V	40 pcs	1 pcs	1 pcs	10m	5m	2 pcs	1 pcs	60L 1 pcs

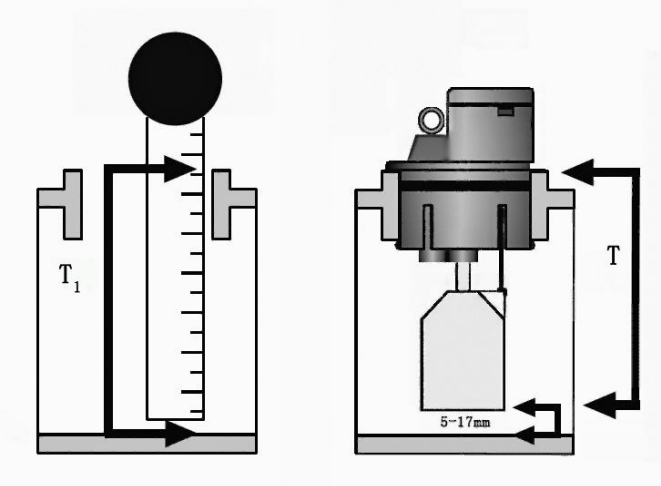


Automatic Watering System of Forklift Storage Battery-48V battery group

Floater

How to choose proper floaters correctly：

- According to different storage battery, we have five kinds of floaters for you to choose. In order to achieve our expected standard and completely reflect the effectiveness of the automatic watering system, the most important thing is to choose proper floaters. At present our company can offer a rule for the client to make judgment and choose the type of floater. (see diagram)
- The diagram the installation way of the floaters:



$T=T_1$-(5～17mm)

T Length	47	50.5	58	61	72
Float	13	16.5	24	27	38

Watering pipe

Our company offers watering pipes of different types and the clients can choose what they need according to the specification of the battery. The watering pipe must be perfectly sealed with T-piece and L-piece.

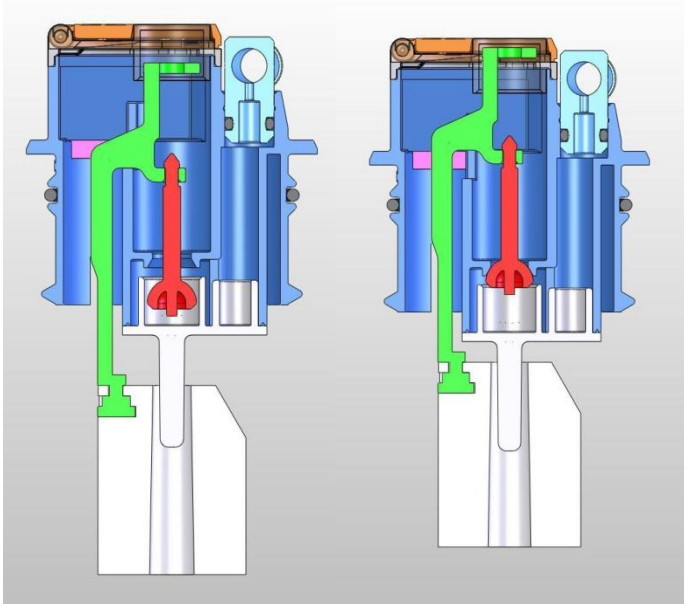
Notes during the filling process：

- In order to ensure a safe watering process, we hereby recommend you to use flow indicator (with filter), the flow indicator with filter can not only timely indicate whether it finishes watering, but also avoid unclean impurities entering the battery to result interruption.
- The watering pressure should be within the range of 0.02-0.06, no less than 20mMPa water tank is 2-5M higher than the battery surface.
- You'd better conduct watering within the specified periods, because frequent filling will lead to overflowing for too much water, which will do great damage to the storage battery.

Note： Filling after finishing charging is the best ideal state, besides, do not filling before charging.

Maintenance（Cleaning）

When you use it, you must pay much attention to keep the automatic watering system clean. No filth remaining on the surface. The users should regularly clean the watering plug for the plug is a kind of plastic good. Clean the surface directly with tap water and no need to use other detergent.



open close

Structure Diagram of the Watering Plug

Characteristics of the automatic filling watering system:

- No need to water by hand, labor saving.
- No malfunction factor leading to damage the battery.
- No malfunction factor leading to damage the battery.
- Ensure a precise electrolyte level in every battery cell.
- Prevent leakage when watering.
- Effectively avoid the acid liquid to erode the storage battery and the electrolytic bath.
- Extend the service life of the battery.
- Environment protection.

Save energy.

Function Introduction：

Function of the automatic watering system: the floater of the automatic watering plug can reach correct water level, when the level rises in the cell, the pressure closes the valves and prevents further water entering the cell.

When the system finishes watering, the flow indicator will stop running and you can see the water-level indicator clearly through the top of the watering system.

Besides, the material of FRÖTEK floater can avoid damage and ineffectiveness.

As for the structure of automatic watering system, there is a terraced step, when the electrolyte gas rises to the watering plug, the terraced part can prevent the leakage of the electrolyte gas as well as quickly cool the electrolyte gas to make them go back to the storage electrolyte gas as well as quickly cool the electrolyte gas to make them go back to the storage.

17. Related Safety Instruction and Standard(For CE)

For trucks exporting to Europe or option.

The model by CE certification which according to the following instruction and standard:

- DIRECTIVE 2006/42/EC OF THE EUROPEAN PAMENT AND OF THE COUNCIL, DIRECTIVE 2000/14/EC OF THE EUROPEAN PAMENT AND OF THE COUNCIL, EN ISO 3691-1:2015, ISO/TS 3691-7:2011, EN 16307-1:2013+A1:2015, EN12053:2001+A1:2008, EN1175-1:1998+A1:2010, EN13059:2002+A1:2008 coordinate standard.
- Main safety factor will be according with DIRECTIVE 2006/42/EC OF THE EUROPEAN PAMENT AND OF THE COUNCIL and EN ISO 3691-1:2015, ISO/TS 3691-7:2011, EN 16307-1:2013+A1:2015，EN1175-1:1998+A1:2010 standard.
- The design and manufacture of electrical element comply with the low voltage standard 2006/95/EC.
- Noise will be according with EN12053:2001+A1:2008 and with 2000/14/EC amended by 2005/88/EC.

  Sound pressure level on the operator's position is lower than 75dB(A), measurement uncertainty is 1.5dB(A).

  Vibration parameters are measured according to standards of ISO5349-2:2001, EN13059:2002+A1:2008, ISO2631-1:1997, and the result meets the requirement of 2002/44/EC.

  Whole body vibration is lower than 1.1m/s^2.
- Electromagnetism compatibility is measured according to standard of EN12895:2015， and meets 2014/30/EU.

Maintenance record

Date	Service content	Serviceman

Introduction to customer service hotline

Hangcha group has a nationwide customer service hotline: 400-884-7888, which contains information about after-sales service, 3---- after-sales service and 4---- spare parts consultation. When you dial and follow the voice prompt operation, the operator will inform you of the specific contact way of the local Hangcha service branch or the online store, and you can get the service in the near place. If you need to purchase spare parts, press 4, the operator will inform you about the nearest supply point. Please buy original spare parts of Hangcha.

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