



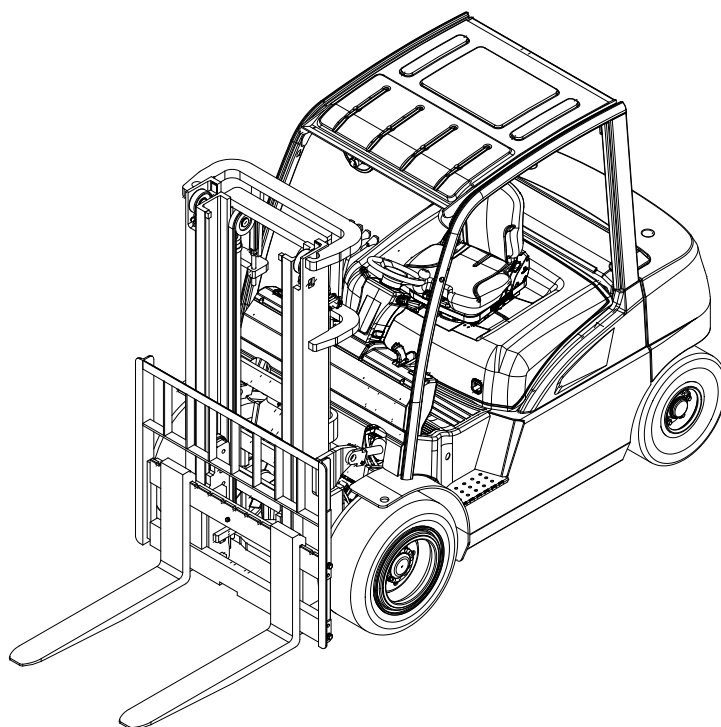
XC Series

Lithium Battery Counterbalanced Forklift Truck

CPD40/45/50-XCY2-SI

CPD50-XCXY2-SI

Operation and Maintenance Manual



Original Instruction

HANGCHA GROUP CO., LTD.

Apr. 2025

Foreword

Thank you very much for purchasing lithium battery counterbalanced forklift truck of Hangcha Group.

Before using the truck, relative persons must read and understand the manual, get to know how to safely operate and maintain the truck.

XC series four-wheel lithium battery counterbalanced forklift truck is a new product with small turning radius, attractive design, compact structure, small size, low centre of gravity, good stability and superior performance. Using the permanent magnet motor, simple structure, high reliability, high efficiency.

This manual is about the brief introduction and correct operation of the XC series four-wheel lithium battery counterbalanced forklift truck, which will tell you how to operate safely and maintain preventively. Relevant operator and maintainer must read this manual before operation.

Because of the update and improvements of our products, there may be some differences between this operation manual contents and your forklift truck.

Please contact the sales company or agent of Hangcha Group in case of anything unclear.

This series of forklifts have passed CE certification.

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1 Summary

The forklift truck described in this operation instruction is suitable for lifting and transportation of goods.

The forklift must be used, operated and maintained following the instructions contained in this operating instruction. The use of equipment for any other use is a non-conforming operation and may lead in casualties, forklift damage or other property loss.

2 Use occasions and conditions

The forklifts described in this manual are only suitable for loading and unloading and transporting goods over short distances.

It must be used, operated and maintained according to the information in this manual. Any other uses are outside the design envelope and can lead to injury to persons or damage to equipment or property.

Only used in specified place and condition:

- Use in specified rated load.
- Used in specified area as factory, tourist attraction and recreation place.
- Used on the flat ground, that is fixed and owns enough carrying capacity.
- Used on the road with good vision and equipment use license.
- Approved working site temperature is $-20^{\circ}\text{C} \sim 40^{\circ}\text{C}$.
- Altitude should not over 2000m.
- Max. gradability when driving with full load is 16%. It is prohibited to travel crosswise or obliquely when going uphill. When going uphill with loads, keep the loads in front; when going downhill, keep people in front.

Please read other safety rules in this manual, it is important to your personal safety, working staff and goods safety.



Warning

- It is forbidden to drive outside the designated areas such as highways.
- Overloading and illegally carrying people are strictly prohibited.
- Do not push or pull loads.
- Non-explosion-proof forklifts are forbidden to be used in flammable and explosive places.
- If it is not a cold storage type, it is forbidden to use it in a cold storage.

3 Expected use

Scope of forklift truck use:

Lift goods.

Transport of goods over short distances.

No driving when the goods are in the rising state.

No manned.

Prohibit the pushing and pulling of the goods.

The cargo must be secured to the trailer while towing the trailer.

No load exceeding the permitted trailer load.



warning

- The maximum traction load is indicated on the model nameplate, and it shall not be exceeded.
- The goods must be placed on the back of the fork stand and in the middle of the fork.

4 Obligations and responsibilities of the equipment user

In this manual, "Equipment user" means any natural person or legal person who directly uses or appoints others to use the forklift. In the case of lease, lease, etc., the "equipment user" represents the party responsible for the operation under the provisions of the contract between the equipment owner and the user.

The user of the equipment must ensure that the forklift is used only used for the specified purposes and promptly eliminate all hazards that may endanger the life and health of the user or the third party. In addition, the equipment user must also strictly abide by the accident prevention regulations, other safety and technical regulations, and the equipment operation, maintenance and repair guidelines.

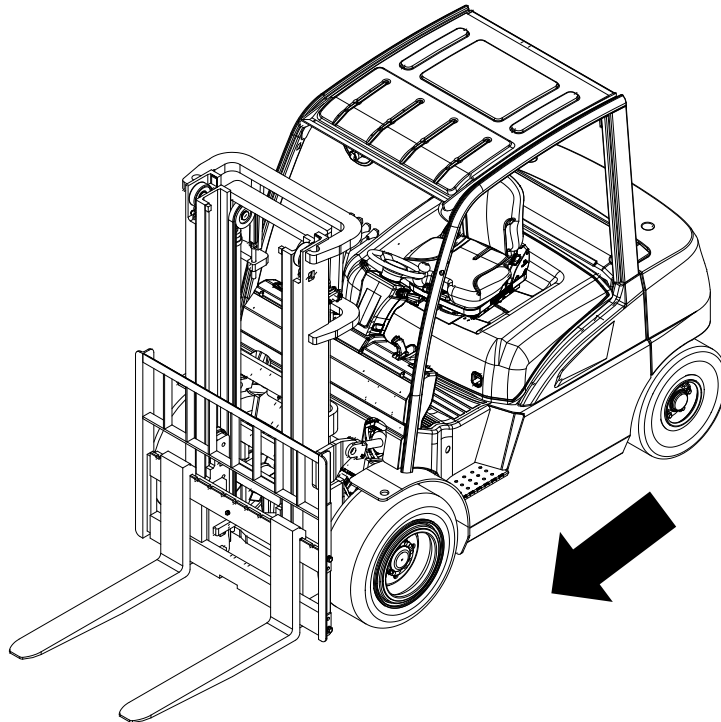
Forklifts can only be operated by specially trained personnel. The equipment user must ensure that all operators carefully read and fully understand the contents of this operation instruction.

5 Install the fittings or accessories

For additional devices to be installed or installed, if the function of the forklift is affected or supplemented, the written consent must be obtained. According to the actual situation, it may have to be approved by the local competent authorities. The audit results of the government departments do not represent the opinions of the company.

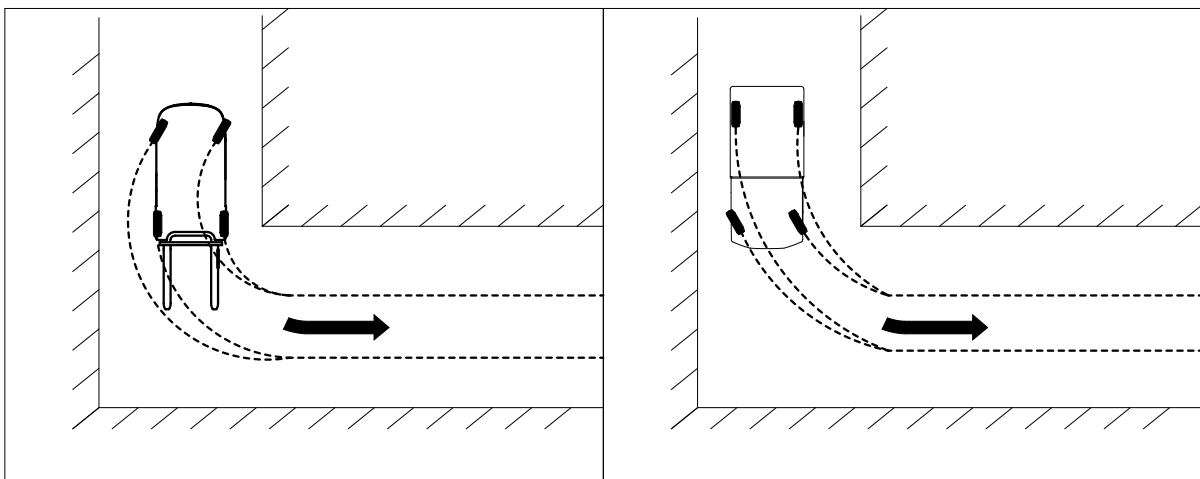
6 Vehicle direction and its wheel track

When the forklift is moving, the cargo fork is taken as the forward direction, as shown in the figure below:



In this manual and maintenance manual, the driver is sitting on the seat in the correct sitting position. At this time, the left side is the left side of the forklift, and the right side is the right side of the forklift.

The forklift is the rear wheel steering, and the rear side is thrown when turning (the track of the rear wheel is off the outside), different from the car (the rear wheel is on the inside of the front wheel).

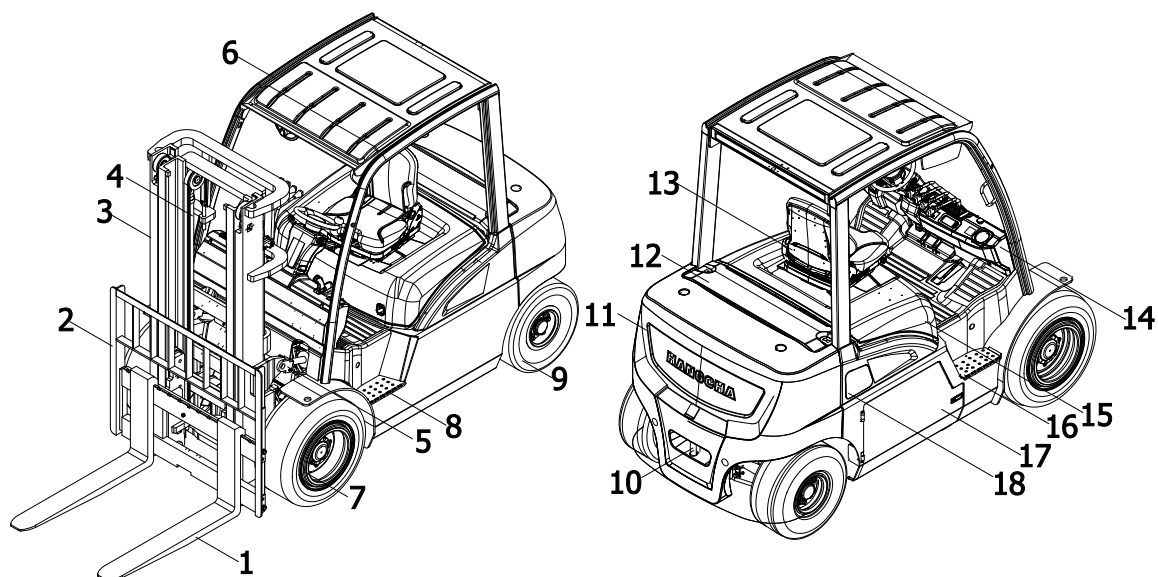


Forklift truck (rear wheel steering rail line)

Motor vehicle (front wheel steering track line)

7 Forklift introduction

7.1 Appearance and main part



N0.	Name	N0.	Name
1	Fork	10	Tow pin
2	Load bracket	11	Counterweight
3	Mast	12	Water tank cover plate
4	Lift cylinder	13	Driver' s seat
5	Tilt cylinder	14	Dashboard assembly
6	Overhead guard	15	Machine hood
7	Front wheel	16	Right pedal
8	Left pedal	17	Car door
9	Rear-wheel	18	Charging door

7.2 Forklift truck each system introduction

XC series battery counterweight forklift truck can be divided into seven systems, respectively transmission system, steering system, body system, control system, hydraulic system, electrical system and lifting system, its main functions are as follows:

(1) Transmission system: transmission system by the motor, gearbox, drive axle, brakes, tires and other parts of the composition, its main role is to achieve the walking function of forklift.

(2) Steering system: The steering system is mainly composed of two parts: the steering device and the steering bridge, and its main role is to control and realize the steering of the forklift.

(3) Body system: The body system is mainly composed of covering parts such as frame, instrument frame, hood, roof protection frame, balance weight, etc. Main function: Provide solid support carrier for forklift truck, protect the driver's personal safety.

(4) Control system: The control system includes hand brake and foot brake. Manual braking is parking braking, which adopts hand-pulled mechanical braking; Foot brake is service brake, which realizes the brake of forklift truck by stepping on the brake pedal, and they work together with the left and right brake of the drive axle.

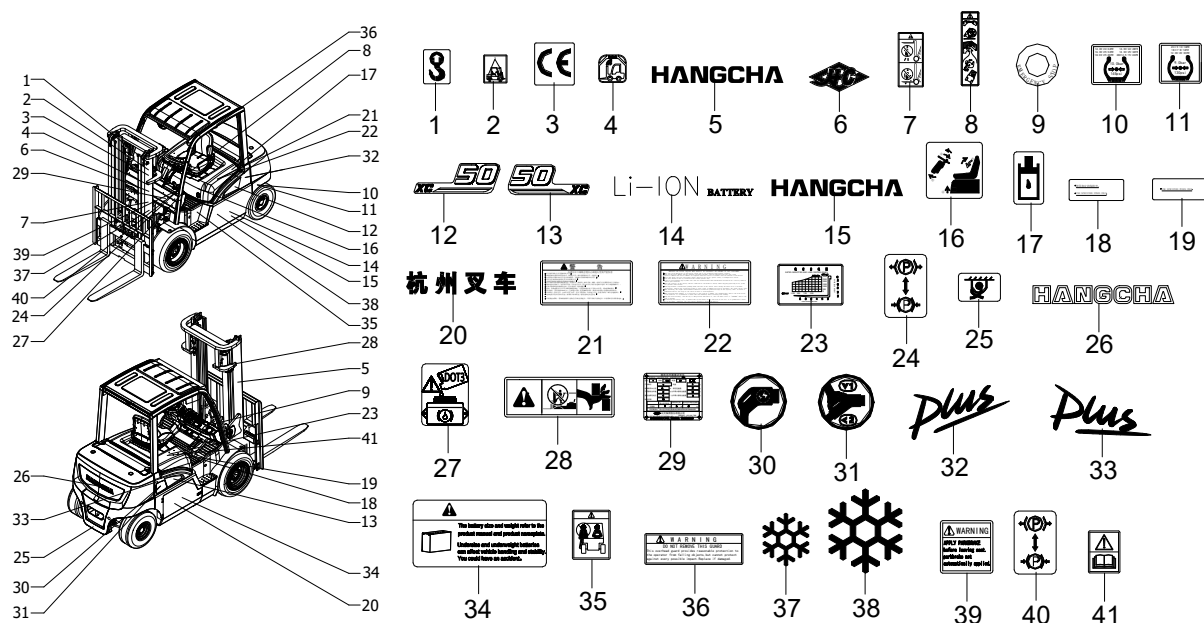
(5) Hydraulic system: The hydraulic system is mainly composed of hydraulic oil tank, oil pump device, multi-way valve control assembly and hydraulic pipeline assembly, and its main role is to control the steering of the forklift truck and the lifting and falling of the door frame through hydraulic oil.

(6) Electrical system: forklift electrical system mainly includes instruments, lighting systems, lithium batteries, key switches and other electrical components.

(7) Lifting system: the lifting system of forklift truck is composed of door frame, fork frame, fork, stop shelf, lifting chain, roller, lifting cylinder and tilt cylinder, etc. It and the oil circuit, hydraulic system constitute the working device of forklift truck, is the executive mechanism of forklift truck loading and unloading operations.

8 Vehicle nameplate

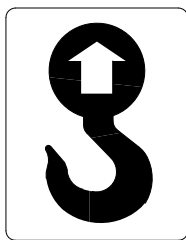
Signage and warning signs, such as product nameplates, load curve signs, warning labels must be clearly and readable and replaced if necessary.



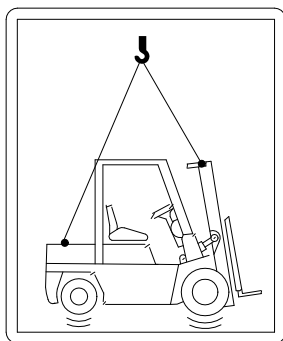
NO.	Name
1	Lifting point label: The fixed point of the equipment when loading and unloading by crane
2	Lifting method label: Lifting method when loading and unloading by crane.
3	CE label (for CE vehicles)
4	Intelligent label
5	Manufacturer's logo
6	Manufacturer's logo
7	Danger label: It is strictly forbidden to stand on the fork, and it is strictly forbidden to stand under the fork
8	Warning labels: Measures to be taken when the forklift rolls over.
9	Emergency stop switch label
10	Tire pressure label (for pneumatic tires)
11	Tire pressure label (for pneumatic tires)
12	Tonnage label
13	Tonnage label
14	Lithium battery label
15	Manufacturer's logo

16	Open cover operation instruction label
17	Hydraulic oil filler port
18	Fuse label: Only use the specified fuse
19	Fuse label: Only use the specified fuse
20	Manufacturer's logo
21	Warning label
22	Warning label
23	Load curve label
24	Handbrake label
25	Tie-down point label: Tie-down point when dragging
26	Manufacturer's logo
27	Brake liquid label
28	Danger label: Pay attention to the risk of pinching when lifting the mast.
29	Product nameplate
30	Charging tag
31	Draw sequence tag
32	Left label
33	Right label
34	Battery Warning Labels
35	Passenger prohibited tag
36	Roof guard remove warning label
37	Snowflake label
38	Big snowflake mark
39	Hand brake lock warning label
40	Handbrake label
41	Safety notice label

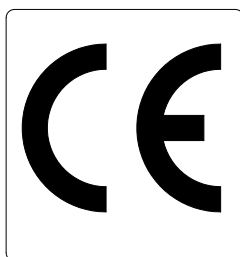
1.Lifting point label



2.Lifting method label



3.CE label



4.Intelligent label



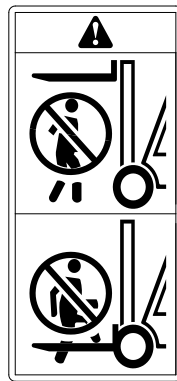
5.Manufacturer's logo

HANGCHA

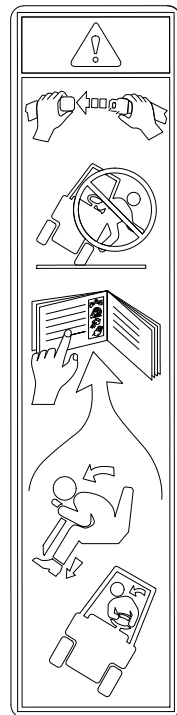
6.Manufacturer's logo



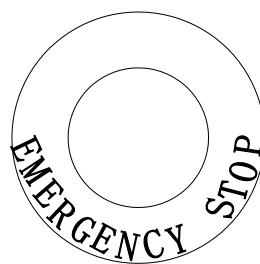
7.Danger label



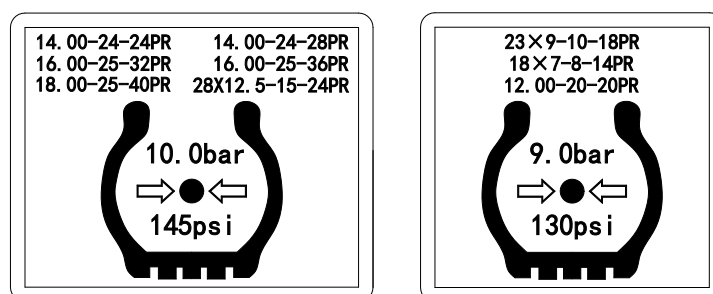
8.Warning labels



9.Emergency stop switch label



10、 11.Tire pressure label



12、 13.Tonnage label

40 45 50

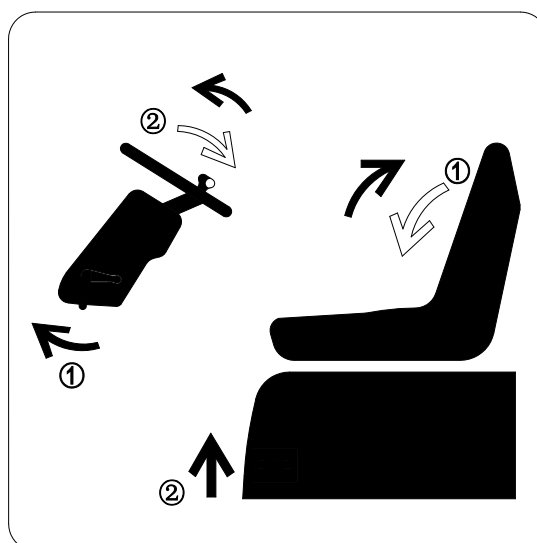
14.Lithium battery label

Li-ION BATTERY

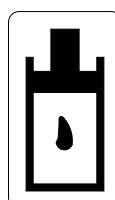
15.Manufacturer's logo

HANGCHA

16.Open cover operation instruction label



17.Hydraulic oil filler port



18、19.Fuse label

- 使用指定的保险丝。
- USE SPECIFIED FUSES ONLY

20.Manufacturer's logo

杭州叉车

21、22.Warning label

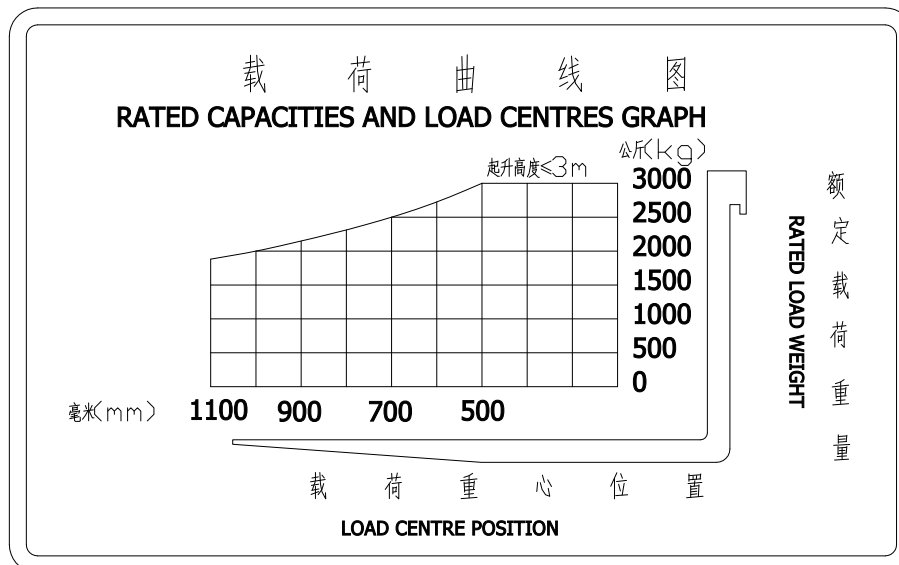


W A R N I N G

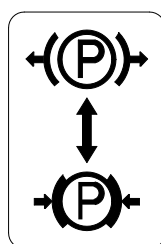
SERIOUS OR FATAL INJURY MAY RESULT TO YOURSELF OR OTHERS IF NOT FOLLOWED

- This lift truck should not be operated by anyone who is not authorized and properly trained.
- Read the Operators Manual and all warnings carefully, and make yourself familiar with your lift truck.
- Operator's Manual and Service Manual are supplied with this truck or available from our forklift truck dealers.
- Inspect and check your lift truck daily before and after use. Do not operate faulty or damaged lift trucks.
- Repair work should be done by authorized and trained persons only.
- To protect from falling objects, make sure that the Overhead Guard and Load Backrest Extension are correctly mounted and in good condition.
- Check the capacity of the battery and the condition of all kinds of switch, connecting plug, operating level, pedal, tyre pressure and fastener.
- Starting forklift truck: Release parking brake and turn on the switch. After moving the shift lever to Forward (or Reverse), depress the accelerator pedal to start truck. If making an error by procedure, the truck can not start.
- When unloading, the weight and dimension should be within the permitted range on the capacity chart. Overload is prohibited and set the cargo at the center of mast to avoid departure.
- When traveling with loading, it is necessary to lift fork up to 300mm, tilt backward most and set the load closed to the backrest. It is prohibited to brake and turn suddenly when travelling with loading.
- Stop the truck steadily, turn the key to OFF position and remove it, move the shift level to "NEUTRAL" and set the fork to ground.
- When hoisting the battery case, it should take by four holes in the each side of the case. It is prohibited to hoist only by two holes, otherwise, the case will be deformed to damage the battery.

23.Load curve label



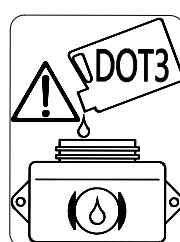
24、39.Handbrake label



25.Tie-down point label



27.Brake liquid label



28.Danger label



29.Product nameplate

ELECTRIC FORKLIFT TRUCK			
MODEL-TYPE	I	-	VII
SERIAL NO.	V	SERVICE WEIGHT	II kg
NOMINAL LOAD CENTER	XI mm	RATED CAPACITY	VI kg
MASS WITHOUT BATTERY	III kg	MAX.BATTERY MASS	VIII kg
SYSTEM VOLTAGE	IV V	MIN.BATTERY MASS	IX kg
YEAR OF MANUFACTURE	X VI		
	MAX .LIFTING HEIGHT	LOAD CENTER	CAPACITY AT MAX.L.H
WITHOUT ATTACHMENT	X mm	XI mm	XII kg
If an attachment is installed, the actual capacity at maximum lifting height refer to the model plate of the attachment or the rated capacities and load centers graph.			
HANGCHA GROUP CO.,LTD.			
Add:666 Xiangfu Road, Hangzhou,Zhejiang,China(311305)			

30.Charging tag



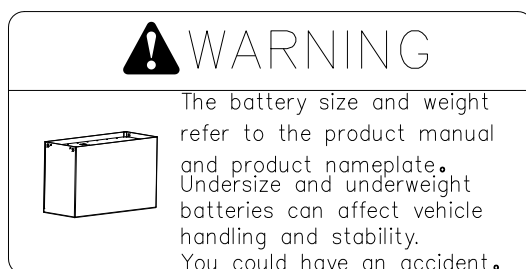
31.Draw sequence tag



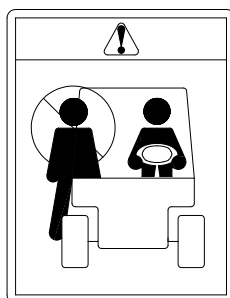
32、33.Left label、 Right label

Pro Plus

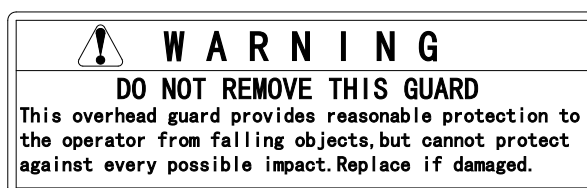
34.Battery Warning Labels



35.Passenger prohibited tag



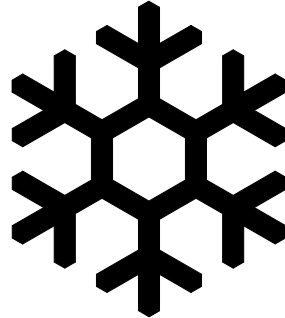
36.Roof guard remove warning label



37.Snowflake label



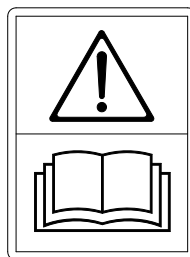
38.Big snowflake mark



40.Handbrake label



41.Safety notice label

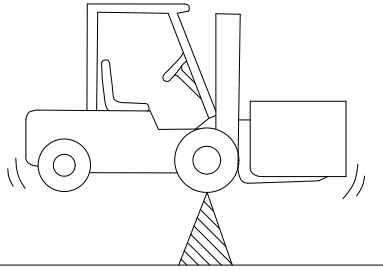


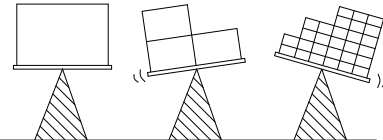
9 Main technical performance parameter table

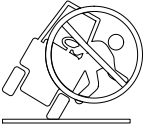
No.	Item		unit	CPD40-XCY2-SI	CPD45-XCY2-SI	CPD50-XCY2-SI	CPD50-XCXY2-SI
1	Rated load capacity		kg	4000	4500	5000	5000
2	Load center distance		mm	500	500	600	500
3	Mast Lifting height	maximum	mm	3000			
4		Free lift height	mm	150			
5	Mast max. tilting angle（F/R）		°	5/10			
6	Max travelling speed（Laded）		km/h	19			
7	Max lifting speed（Laded）		mm/s	350			
8	Min. outside turning radius		mm	2550			
9	Big balance heavy weight		kg	2300 ⁺⁴⁰	2300 ⁺⁴⁰	3040 ⁺⁴⁰	3040 ⁺⁴⁰
10	Small balance heavy weight		kg	/	380 ⁺²⁰	280 ⁺²⁰	/
11	Dimension	Length	mm	2844	2844	2854	2844
		Width	mm	1369	1369	1459	1459
		Height	mm	2270	2270	2250	2270
12	Service weight	Including lithium battery	kg	6040	6400	7150	6870
13	Battery	Brand	/	DQ-EB2080608A0-C223			
		Voltage/Capacity	V/Ah	80/608			
14	Motor	Drive	kW	25			
		Pump	kW	28			
15	Tires	Front tire/number	/	250-15/2		28×12.5-15/2	
		Rear tire/number	/	23×9-10/2			

10 Structure and stability of truck

Prevent the forklift to turn over! It is very important for operator to know the truck's structure and relationship between load and stability.

	<div style="display: flex; justify-content: space-between; align-items: center; border-bottom: 1px solid black; margin-bottom: 10px;"> <div style="text-align: center;"> <p>Caution</p> </div> <div> <p>The structure of the truck</p> </div> </div> <p>The forklift truck essentially consists of the lifting device (forks and mast) and the truck itself (with tires).</p> <p>The front wheels are the fulcrum of the forklift and keep the centre of gravity of the forklift and load balanced.</p> <p>The relationship between the forklift's centre of gravity and the load's centre of gravity is very important to maintaining the operation of the forklift.</p> <div style="text-align: right; margin-top: 20px;">  </div>
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	<div style="display: flex; justify-content: space-between; align-items: center; border-bottom: 1px solid black; margin-bottom: 10px;"> <div style="text-align: center;"> <p>Caution</p> </div> <div> <p>Load center</p> </div> </div> <p>The forklift handles loads of different shapes, from crates to boards and elongated objects. In order to assess the forklift and its stability, it is very important to distinguish between the centres of gravity of different-shaped loads.</p> <div style="text-align: right; margin-top: 20px;">  </div>
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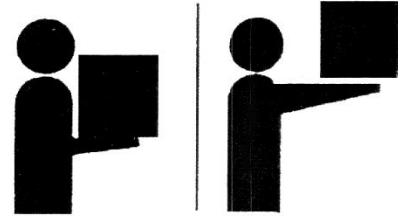
<div style="display: flex; align-items: center;">  <div style="margin-left: 10px;"> <p>Warning</p> <p>If the forklift begins to tip over, do not attempt to jump off. The truck tips over much faster than you can jump. Spread your feet and grip the steering wheel with both hands to keep yourself within the confines of the forklift.</p> </div> </div>					
 <p style="font-weight: bold; margin-top: 10px;">W A R N I N G</p>	 <p style="font-weight: bold; margin-top: 5px;">Fasten Seatbelt</p> <p style="font-weight: bold; margin-top: 5px;">IN CASE OF TIP-OVER</p> <p style="font-weight: bold; margin-top: 10px;">Follow these instructions:</p>	 <p style="font-weight: bold; margin-top: 10px;">Lean Away</p>	 <p style="font-weight: bold; margin-top: 10px;">Hold on Tight</p>	 <p style="font-weight: bold; margin-top: 10px;">Brace Feet</p>	 <p style="font-weight: bold; margin-top: 10px;">Do Not Jump</p>



Caution

the max load and load center distance

The horizontal distance between the centre of gravity of the load on the forks and the backrest or the front face of the forks (whichever is shorter) is called the load centre distance. Maximum load is the maximum load that a forklift truck can carry at a standard load centre distance. The relationship between maximum load and load centre distance is stipulated in the forklift truck's load capacity graph. If the load centre distance moves towards the front of the forks, the overall centre of gravity shifts forward. Therefore, the load capacity decreases.



Caution

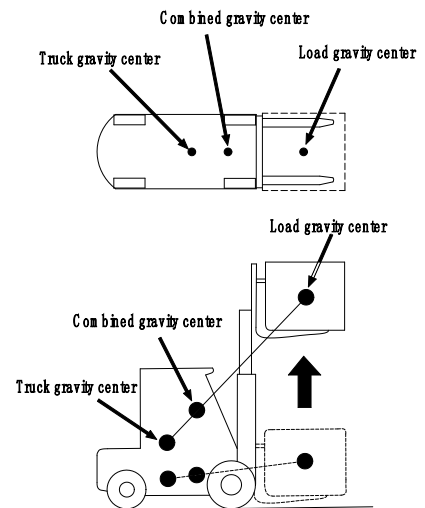
Gravity and stability

Forklift stability depends on the common centre of gravity of the forklift. When the forklift is unloaded, the centre of gravity (CoG) remains unchanged. When the forklift is loaded, the centre of gravity is formed by the combined centre of gravity of the forklift and load.

The load's centre of gravity depends on whether the mast is tilted forward or backward, raised or lowered, which means that the combined centre of gravity also changes accordingly.

The forklift's combined centre of gravity is determined by the following factors:

- Load size, weight and shape;
- Lifting height;
- Mast tilt angle;
- Tire inflation pressure;
- Acceleration, deceleration and turning radius;
- Driving surface conditions and inclination;
- Attachment type



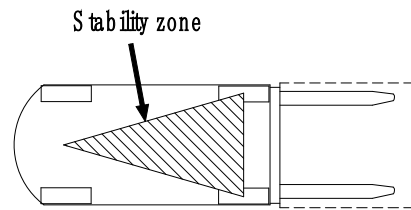


Caution

the stability zone of the center of gravity

In order to stabilize the forklift, the combined centre of gravity must be located inside a triangle formed by the front wheels and the midpoint of the rear axle.

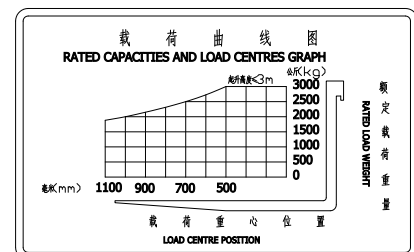
If the combined CoG is located on the front axle, the two front tires will form a fulcrum point on which the forklift will tip forward. If the combined CoG moves out of the stability triangle, the forklift will tip over in the direction that the combined CoG has moved.



Caution

the load capability chart

This graph shows the relationship between the position of the load centre distance and the maximum load. Prior to loading, check whether the load and the load centre distance are within the limits of the load capacity graph. If a load has a complex shape, the heaviest part of the load should be centred over the forks and close to the load bracket.



Caution

Speed and acceleration

A stationary object will remain stationary unless an external force acts on it. Similarly, in the absence of an external force, a moving object will continue moving at the same speed. This is inertia.

Due to inertia, a rearward force is exerted when the forklift starts moving, and a forward force is exerted when the forklift stops moving.

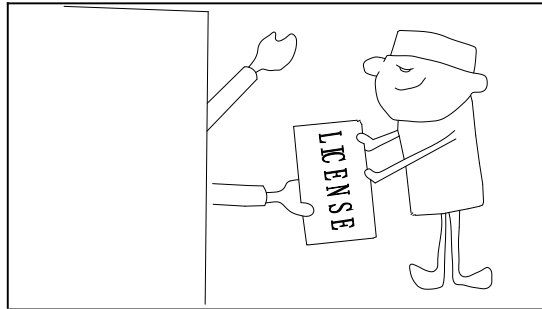
Sudden braking is dangerous because it generates a large forward force that will cause the forklift to tip over, or the load to slide off.

When the forklift turns a corner, a centrifugal force is exerted outward from the centre of the turn. This force pushes the forklift outward and makes it tip sideways.

The truck has narrow lateral stability, so cornering must be performed slowly to prevent the forklift from tipping sideways. If the forklift is handling an elevated load, the overall centre of gravity is higher and therefore the forklift is more prone to forward or lateral tipover.

11 Safety instructions

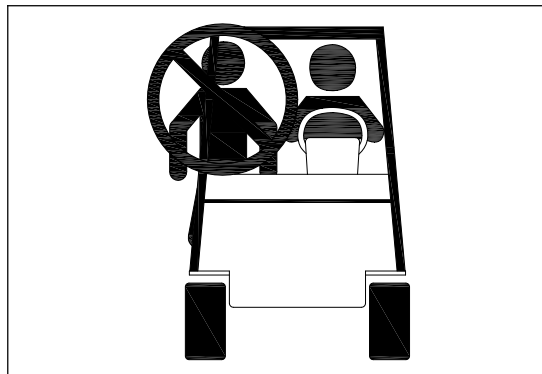
1. Only trained and accredited operators are permitted to operate the forklift truck.



2. Operators must wear a helmet, work shoes and overalls.



3. Never carry people.

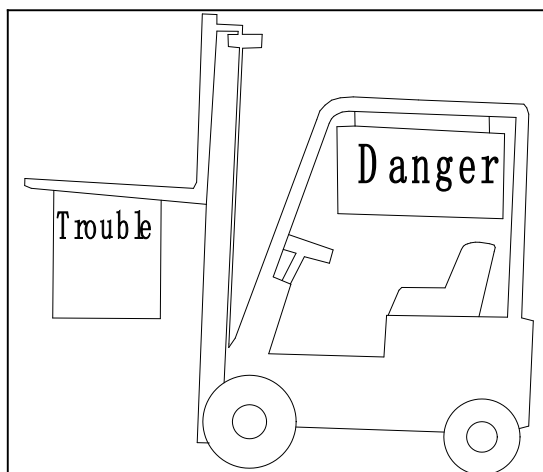


4. Inspect the truck at periodic intervals for leaks, deformation, defects, etc. Neglecting the inspection will shorten the life of the vehicle and lead to accidents in severe cases.

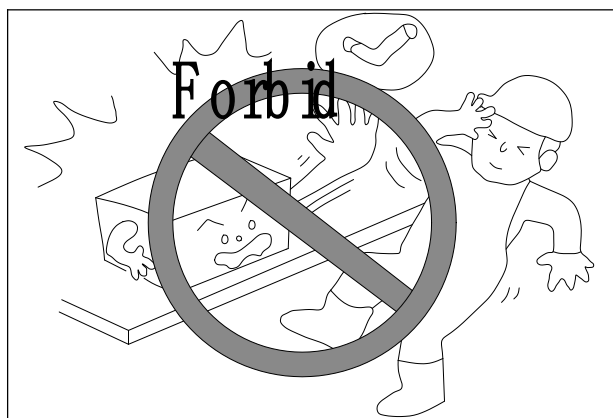
- Make sure to replace the “safety parts” during periodical inspection.
 - Wipe off oil, grease or water from the floor board, pedal and hand controls.
 - Strictly prohibit smoking and spark near the storage battery when checking it.
 - Pay attention to safety in case of high-level maintenance (such as mast, front and rear lights, etc.) to prevent pinching or slipping.
 - Be careful do not be scalded when inspecting the motor, controller and etc.
5. Whenever you discover a fault, stop the forklift, hang a "DANGER" or "OUT OF ORDER" sign on it, remove the ignition key and notify a manager. The truck may only be used after the fault has been eliminated.

- Arrange for immediate repair in the event of a fault when lifting or driving uphill or downhill, or

a leakage of battery electrolyte, hydraulic oil or brake fluid.



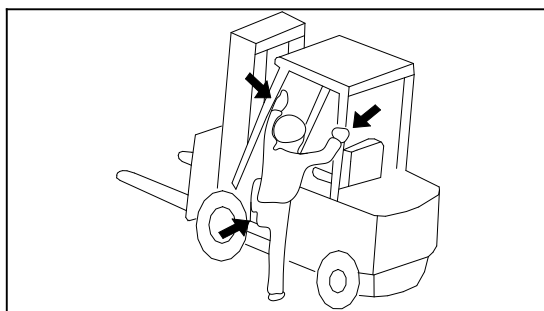
6. Batteries generate explosive gases. Keep sparks and open flames away from the battery. Keep tools away from the battery terminals to prevent sparks or short-circuits.



7. The work ground of forklift shall be solid and smooth concrete surface or similar ones. Pre-check the ground condition of working site.

- The truck is designed to operate in the following climatic conditions: temperature range -20°C to 50°C ; maximum wind speed 5 m/s; maximum relative air humidity 90% (at 20°C).
- The truck is not suitable for use in flammable or explosive working environments.
- Altitude not exceeds 2000m.

8. Do not get on or off the running forklift. Please use the safety pedal and armrest.

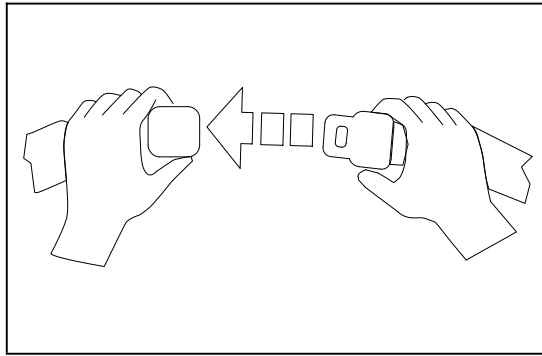


9. Never attempt to work the controls unless properly seated.

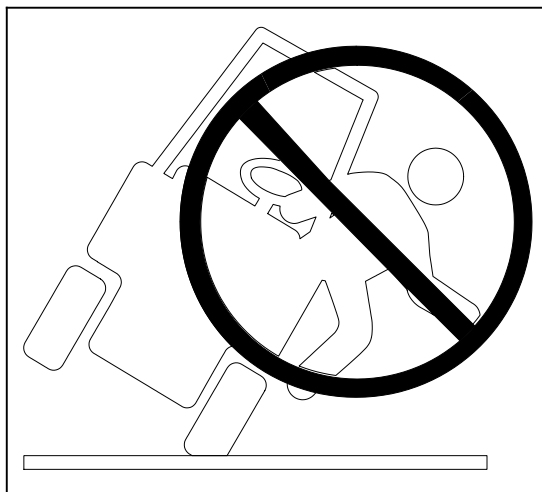
- Before starting the vehicle, adjust the seat position to facilitate hand and foot control.

10. Before starting up, make sure that:

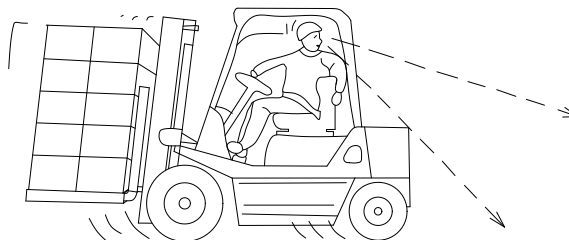
- The seat belt is fastened;



- The hand brake is released;
- The direction lever is in neutral;
- No person near the forklift.
- Before turning on the power, do not depress the accelerator pedal or operate the lift or tilt levers
- Operate the controls smoothly and do not jerk the steering wheel. Avoid sudden stops, starts or turns. Sudden braking may cause the vehicle to tip over. Jumping is prohibited when the vehicle tips over.



11. Always look in the direction of travel and keep a clear view of the travel path.



Warning

When reverse pay attention to driving direction.

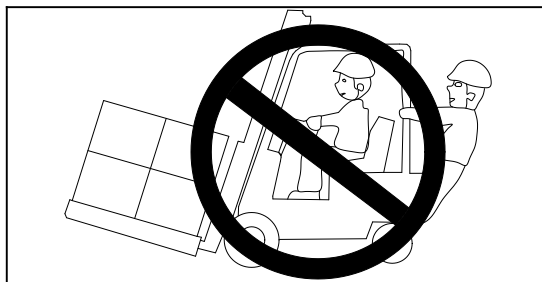
12. Select appropriate attachments and tools according to the shape and material of the loads to be handled.

- Do not lift loads by suspending ropes from the forks or attachment, as the ropes may slip off. If

necessary, arrange for a lifting hook or jib to be attached by someone qualified to perform heavy lifting tasks.

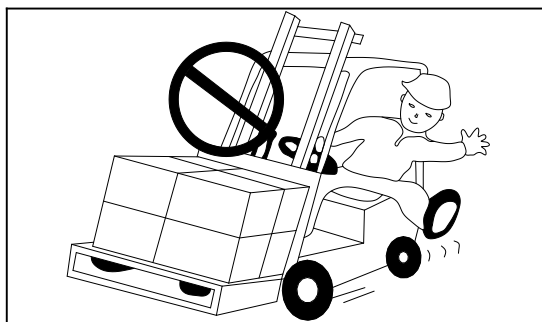
- Be careful not to let the forks touch the floor, so as to avoid damaging the fork tips or driving surface.

13. Know the load capacity of the forklift and attachments, and never exceed it. Do not use people as an additional counterweight.



14. While driving, do not use mobile phones or other electronic products, and concentrate on work.

15. Keep your head, hands, arms, feet and legs in the cab, and do not extend them for any reason.

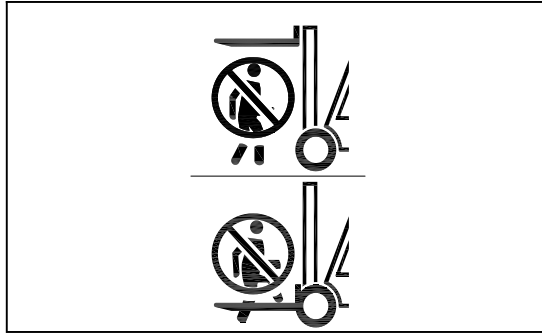


16. Pallets and skids should be strong enough to bear the weight of the load. Never use damaged or deformed pallets.

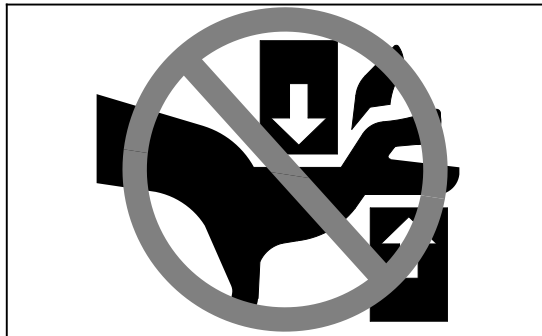
17. Hangcha can provide users with a variety of attachments including rotating clamps, flat clamps, side-shift forks, jibs, etc. Such attachments are for special uses only. Modifications to attachments must be authorized by the manufacturer. Do not attempt to modify attachments yourself.

18. The overhead guard prevents cargo from falling onto the operator. The load bracket ensures the stability of loads. Do not use a forklift without the overhead guard and load bracket.

19. Never permit anyone to walk or stand under upraised forks or attachments. Do not allow anyone to stand on the forks. If it is unavoidable, choose a safe place and use wooden blocks to support the forks or attachments to prevent accidents.



20. Never place your head or body in between the mast and overhead guard. Risk of serious injury or death due to entrapment.



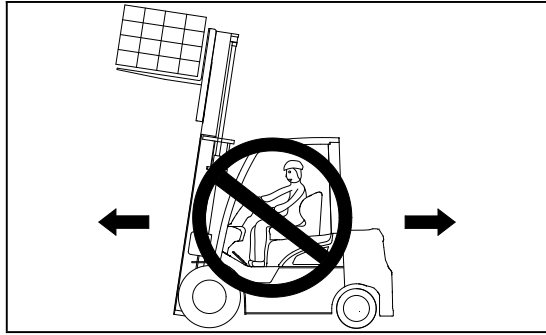
21. Off-center loads may fall easily when turning corners or driving on uneven surfaces and increase the risk of the vehicle tipping over.

22. Do not stack loads on forks in such a way that the top of the load exceeds the load bracket height. If unavoidable, make the load stable and secure. When handling bulky loads which restrict your vision, operate the forklift in reverse or have a guide. When using a guide, make sure you know and understand the meaning of all hand, flag, whistle or other signals being used. When transporting long loads such as lumber, piping and oversized cargo, or operating vehicles with elongated attachments, pay close attention to the front end when driving around corners or along narrow aisles and be aware of other people.

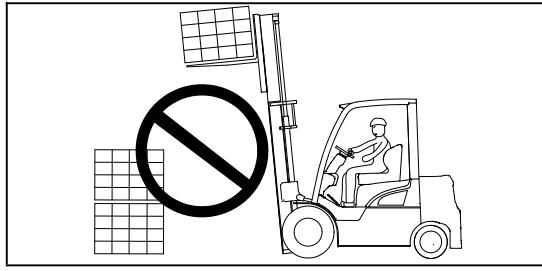
23. Try to reduce the front tilting angle when stacking goods, you can only tilt forward when the goods are higher than the stacking floor or at a low position.

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

24. It is dangerous to travel with the forks elevated, regardless of whether loaded or not. When travelling, the forks should be 15–30 cm from the ground with the mast tilted backward. Do not operate a sideshift mechanism when the forks are raised and loaded. This will cause the forklift to be unbalanced.

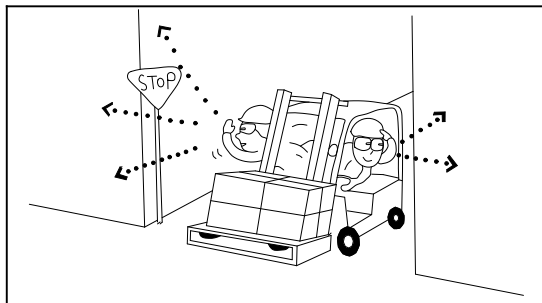


25. Do not tilt the mast forward when the cargo is raised.



26. When operating in congested areas, be aware of intersections, trailing ropes, entrances/exits and hanging objects.

- Slow down and sound the horn at cross aisles and other locations where vision is obstructed.
- Turning speed should be limited to 1/3 of the vehicle's top speed.

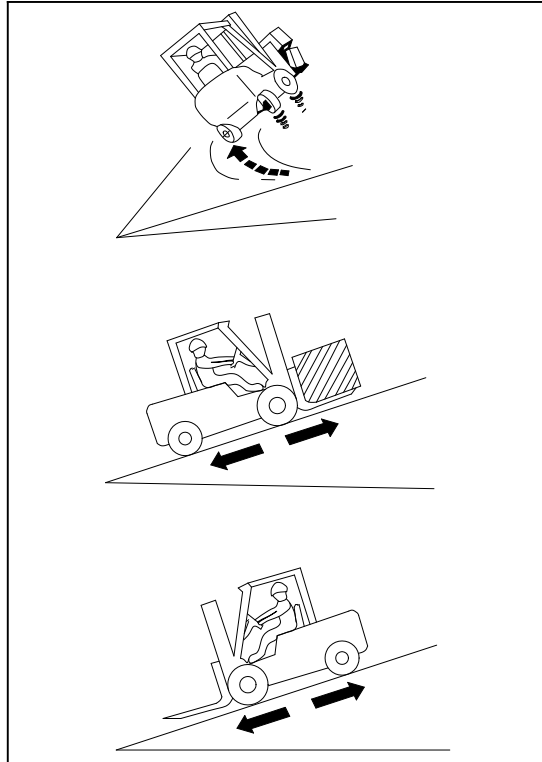


27. Make sure to keep your distance from the roadside or platform edge.

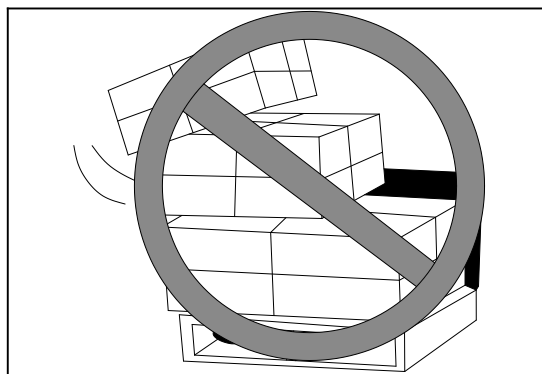
28. When driving over a ship's gangway or a bridge, make sure that it is properly secured and strong enough to withstand the weight of the forklift.

29. When operating a loaded forklift, reverse downhill, and climb forward.

- When operating an unloaded forklift, reverse uphill, and go downhill.
- Do not turn on ramps to avoid tipping over



30. Goods are not allowed to deviate from the fork center, when goods are deviating from the fork center, turn or pass uneven road, they are easily to fall. Meanwhile, possibility of tipping over will increase.



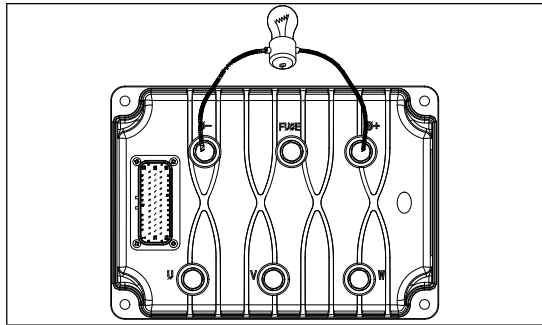
31. It's forbidden to lift goods on tilting roads. Do not load on the ramp.

32. Inspect the surface over which you will run. Look for holes, drop-offs, obstacles, protrusions and anything that might cause loss of control or bumps.

- Clear away rubbish and debris and pick up items that might puncture a tire or unbalance the load.
- Slow down on wet/slippery areas. Do not drive near the edge of the travel path; if unavoidable, be extra cautious.
- Do not use the forklift during sandstorms, snowfall, lightning, torrential rain, typhoons or other harsh weather conditions. Above all, avoid using the forklift where wind speeds are greater than 5 m/s.

33. Controller is equipped with accumulator. It's forbidden to touch within B+ and B- to prevent

from wounding by electricity. To check or clean the controller, please disconnect the power supply of the whole vehicle first, and then connect a load (such as light bulb, resistor, speaker, etc.) between the controller B+ and B- to discharge the capacitor in the controller.

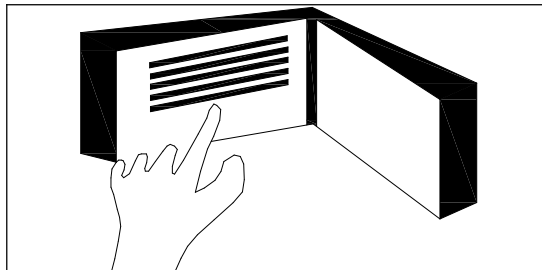


34. Park the forklift on a level surface and apply the handbrake securely. If parking on the ramp is unavoidable, be sure to block the wheels.

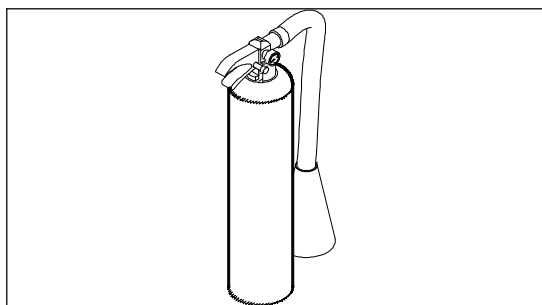
- Lower the forks to the floor and tilt slightly forward. Turn off the key switch and remove the key.
- Disconnect the battery plug.
- Park the forklift away from naked flames and sparks.

35. When the truck is unable to drive, drag the truck to a safe place. Do not tow a truck whose steering system or braking system has been damaged.

36. The labels and signs on the vehicle provide warnings and operating instructions. During operation, adhere to the requirements of the manual as well as the labels and signs on the vehicle. Inspect the labels and signs, and replace damaged or missing ones.



37. The workplace should be equipped with fire extinguishers. Users can also select a vehicle equipped with fire extinguisher. The fire extinguisher is generally installed on the rear leg of the safety frame and is easily accessible. Drivers and managers need to be familiar with the location and use of fire extinguishers.

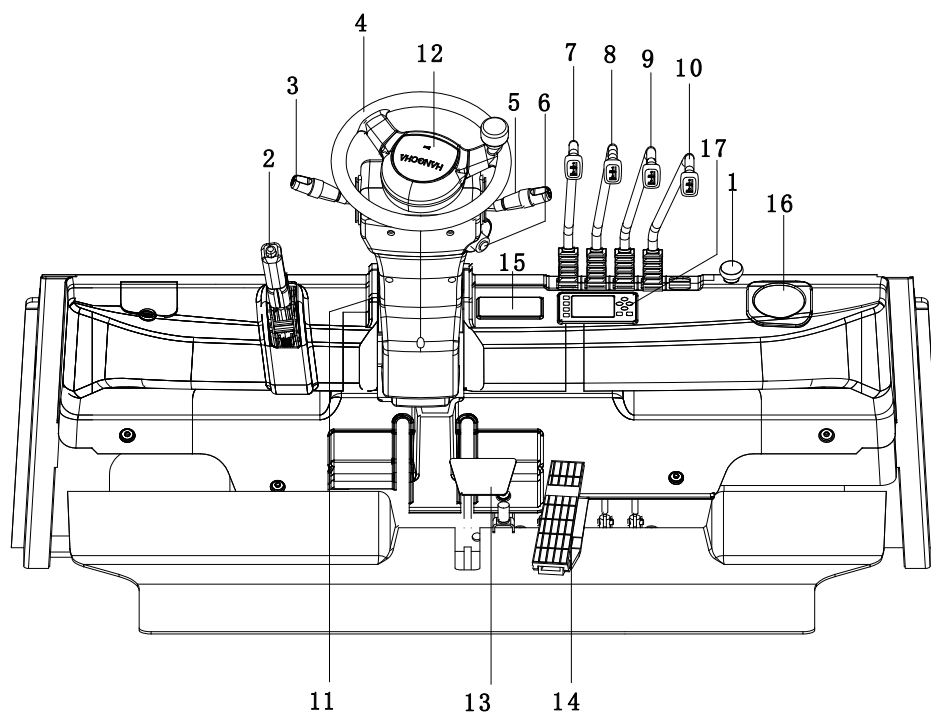


38. Small loads should be carried on a pallet and not placed directly onto the forks.

- 39.** Refrigerator type truck is not allowed to store in the refrigerator when power off.
- 40.** Maintain 3-point contact with the vehicle when getting on and off. When getting on and off the vehicle, always keep one hand and both feet in contact with the vehicle, or both hands and one foot in contact with the vehicle. Hold nothing in your hands (i.e. food, drink, tools).

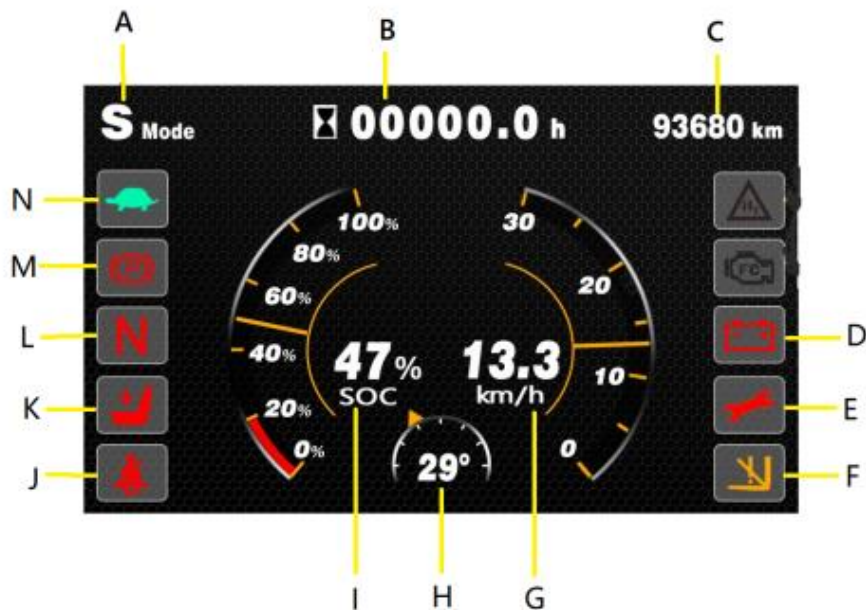
12 Displays and controls

12.1 Each element is in the car position



Code	Name	Code	Name
1	Emergency disconnect switch	10	Accessory lever
2	Hand brake lever	11	Steering wheel tilt lever
3	Reversing lever	12	Horn button
4	Steering wheel	13	Brake pedal
5	Combined light switch	14	Accelerator pedal
6	Switch lock	15	Rocker switch
7	Lifting lever	16	Water cup holder
8	Tilting lever	17	Meter
9	Sideshift lever		

12.2 Display of instrument main interface



A. Operating mode	H. Steering angle	B. Operating hours
I. Power display	C. Odometer	J. Power display
D. Low battery display	K. Seat switch	E. Fault indicator
L. Neutral indicator	F. Working device limit	M. Stop indicator
G. Vehicle speed display	N. Tortoise speed mode	

Operating mode[A]

There are four operation modes: S mode, P mode and E mode (tortoise speed mode)

S mode: fast mode. At this time, the acceleration and maximum gradient of the forklift are high. It is suitable for carrying heavy goods or climbing slopes in a short time. The power consumption is the highest in this mode.

S P E

P mode: normal mode, with various indicators slightly lower than fast mode, which is applicable to the general operating environment. This mode is the default mode.

S P E

E mode: Tortoise speed mode, where the maximum speed is limited, is suitable for working in crowded warehouses and narrow spaces.

S P E

Operating hours[B]

26h

When the forklift key switch is turned on, the operation of the forklift starts timing. When the forklift key switch is turned off, the operation of the forklift stops timing.

Low battery display[D]



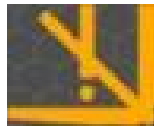
When the battery power is lower than 20%, this indicator is always on; When the battery level is higher than 20%, this indicator will go out.

Fault indicator light[E]



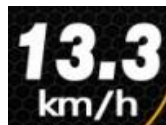
This indicator is always on when the electrical system fails. After troubleshooting, this indicator light goes out.

Working device limit indicator[F]



When the power level is below 10%, the light will be on, limit the lifting of the door frame to remind the user to charge the battery as soon as possible.

Vehicle speed display[G]



The measuring range is 0~30km/h, and it is displayed with a decimal point.

Steering angle[H]



The left and right steering angles of the vehicle are displayed in °

Power display [I]



Display the remaining capacity of the battery, the display range is 0~100%, and the accuracy is 1. It is recommended to charge the battery when the remaining power is 30%, otherwise the service life of the battery will be greatly shortened.



Caution

- It is important to charge the battery in time, otherwise the service life of the battery will be affected!

Safety belt[J]



Fasten the safety belt. This indicator will light up when the safety belt is not fastened.

Seat switch[K]



When people leave the seat, this light will be on, indicating that the seat switch is off, and the vehicle cannot walk and lift at this time. This function requires the installation of seats with seat switches

Neutral indicator light[L]



When the gear is in neutral, this indicator light will be on.

Stop indicator light [M]



When the hand brake is pulled up, this indicator light is on.

Tortoise speed mode[N]

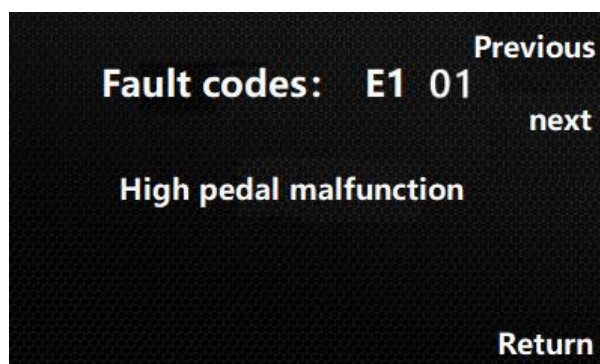


This indicator is on when the vehicle is running in slow mode (E mode).

3.Instrument keys



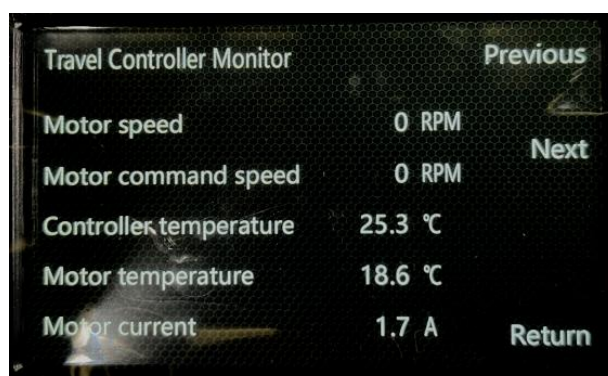
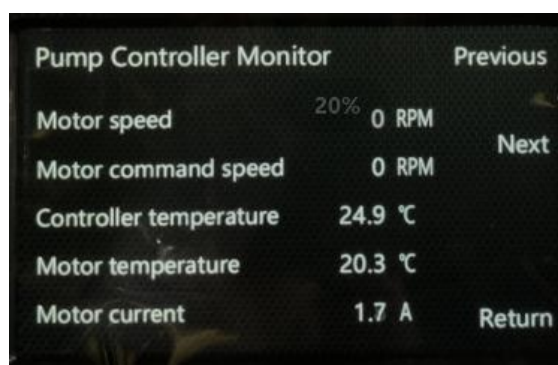
(1) In the main interface, click button 1 to view the fault information, click button 1 and button 2 to page up and down to view multiple fault information, and click button 4 to return to the main interface.



(2) In the main interface, press key 2 to switch between the three operation modes: fast mode S, normal mode P, and tortoise speed mode E. The mode indicator icon will change accordingly.



(3) Under the main interface, click button 3 to view the monitoring information, click button 1 and button 2 to turn pages up and down to view the monitoring information of traction controller, slave traction controller (reserved), oil pump controller, slave oil pump controller (reserved) and lithium battery, and click button 4 to return to the main interface.



Pump Controller Monitor		Previous
Motor speed	0 RPM	Next
Motor command speed	0 RPM	
Controller temperature	24.9 °C	Return
Motor temperature	20.3 °C	
Motor current	1.7 A	

Slave Pump Controller Monitor		Previous
Motor speed	0 RPM	Next
Motor command speed	0 RPM	
Controller temperature	-40.0 °C	Return
Motor temperature	-40.0 °C	
Motor current	0.0 A	

Battery Monitor		Previous
Battery voltage	79.8 V	Next
Battery current	0.5 A	
Max regen current	810 A	Return
Max discharge current	1275 A	
Max cell temperature	23 °C	

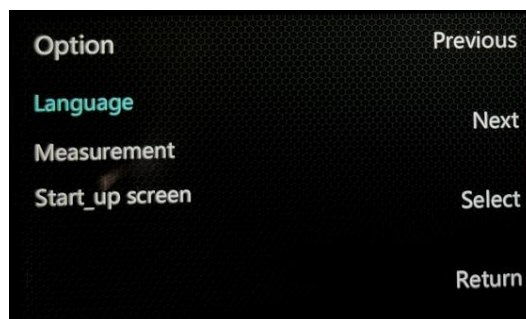
(4) Under the main interface, press key 4 to enter the setting page, press key 1 and key 2 to switch to different sub page options, press key 3 to enter the selected sub page, and press key 4 again to return to the main interface.

Setting		Previous
Advanced Setting		Next
Option		
Version		Select
		Return

4.Options Page

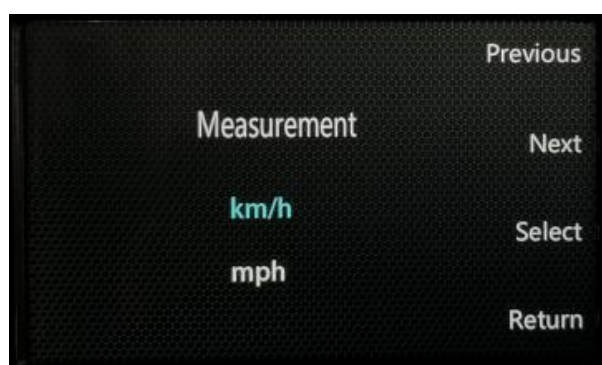
(1) Language Settings

Press key 1 and key 2 to select Chinese and English options; Press key 3 to confirm, the interface will automatically jump to the previous interface and the language will change accordingly; Press key 4 to cancel the setting and return to the previous interface.



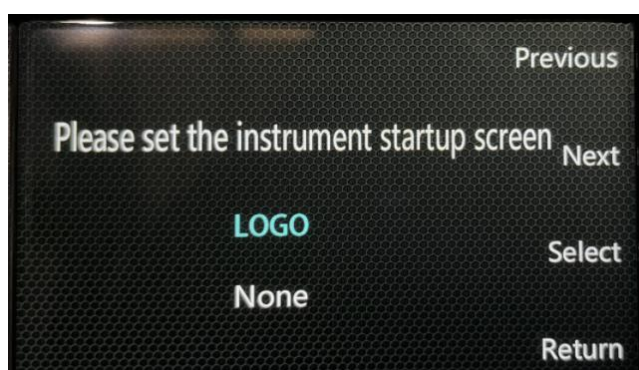
(2) Unit Setting

Press key 1 and key 2 to select English system and metric system options; Press key 3 to confirm, the interface will automatically jump to the previous interface, and the main interface unit will change accordingly; Press key 4 to cancel the setting and return to the previous interface.



(3) Startup interface settings

Press key 1 and key 2 to select Hang Fork Logo and No Boot Screen; Press key 3 to confirm, the interface will automatically jump to the previous interface, and the boot interface will change accordingly; Press key 4 to cancel the settings and return to the previous interface.



12.3 Executive component

Emergency power switch [1]



Power is switched on or off.

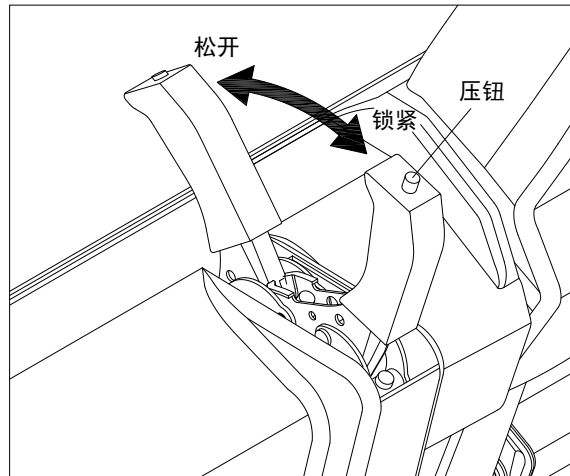
In case of emergency, press the red mushroom head button to cut off the main power supply of the vehicle. No walk, turn, rise



Caution

- Please do not replace the key switch with the stop button switch.

Hand brake lever [2]



Fix a forklift truck in a stationary condition.

During parking braking, the rear handle is applied on the front wheel to make the brake generate braking force. To release the brake, push the front handle just before it.

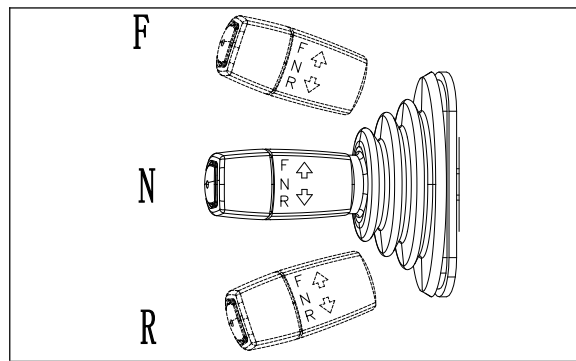
The left side of the hand brake is equipped with a micro switch, tightening the handle to invalid the operation.



Warning

- If you have to park on the ramp, be sure to use a strong wedge to secure the wheels.

Reversing lever [3]



Before changing the driving direction, press the brake pedal to stop the car completely, and then dial the front handle to the forward gear. If you need to step back, press down the brake pedal to slow down the speed, and push the control lever backward to the back gear.

After starting the forklift, switch the switch to the forward position and press the accelerator pedal; switch the switch to the backward position and press the accelerator pedal, the forklift moves backward.



Caution

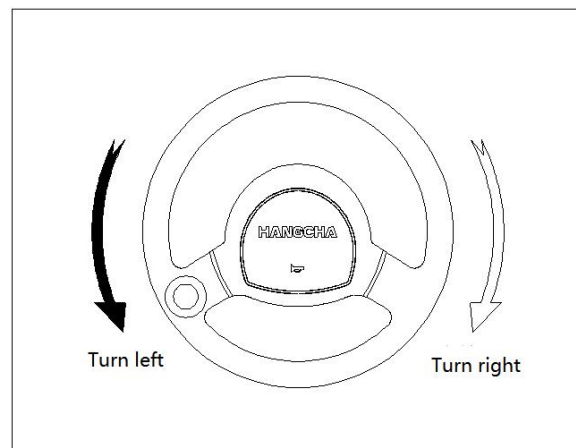
- **When the forklift pushes the driving direction switch to the opposite direction in operation, the electrical brake works to slow down the forklift. Stop and the forklift will slowly run in the other direction.**



Warning

- **If the driving direction switch is not in the middle or the accelerator pedal is pressed, the key switch to the "on" position will not run the forklift. In this case, the driving direction switch should be restored to the middle, and the foot should be removed from the accelerator pedal, so that the forklift can start the operation.**

Steering wheel [4]



Control the truck direction.

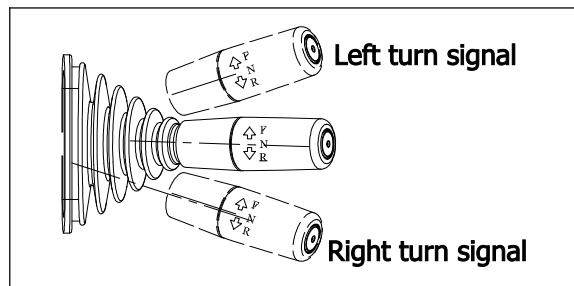
When the steering wheel is turned right, the forklift will turn to the right; when the steering wheel is turned left, the forklift will turn to the left. The rear end of the forklift swings out when turning.



Warning

This forklift truck adopts a fully hydraulic steering system. Therefore, steering will be impaired when the oil pump motor stops running. Immediately restart the oil pump motor before turning again.

Combined light switch [5]



Control the working status of turn signals, headlights and small headlights.

The arrow indicates the turning direction of the forklift truck. Push forward, left turn flashing; push back, right turn flashing.

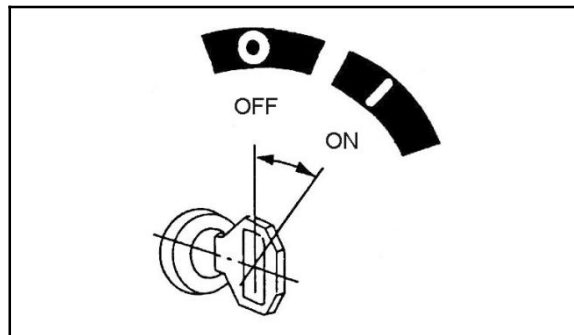
Size light switch, second gear, first gear small light; second gear small lights.



Caution

- **The steering indicator lever cannot automatically return to the median and requires manual reset.**

Switch lock [6]



Switch on and off the control current. Remove the key and make sure that the truck does not move suddenly.

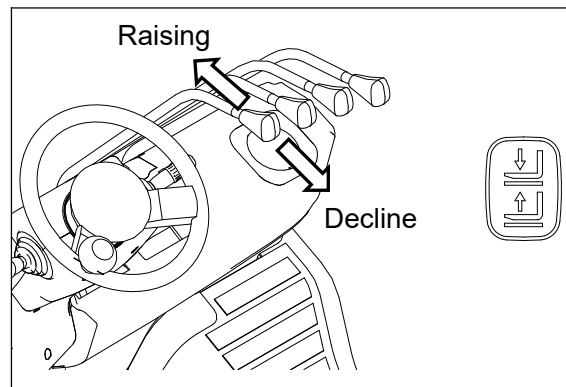
The key switch has two positions: ON and OFF. First set the direction lever to the neutral position, release the accelerator pedal, and then turn the key clockwise to the ON position.



Caution

- If the direction lever is not in neutral or the accelerator pedal is depressed, the forklift will not start when the key switch is turned to ON.
- At this point a fault code will be displayed, which is perfectly normal.
- Return the direction lever to the neutral position and take your foot off the accelerator pedal before attempting to start the forklift.
- The fault code will then disappear.

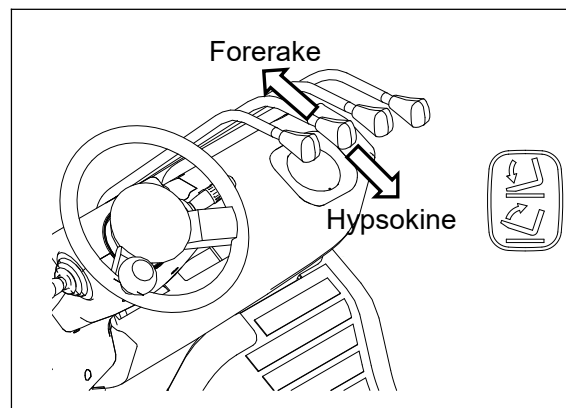
Lifting lever [7]



Control the rise and fall of the forks.

Push and pull this handle, the fork can fall and rise. The lift speed is controlled by the backtilt angle of the handle. The descent speed is controlled by the forward tilt angle of the handle.

Tilting lever [8]



Control the forward tilt and backward tilt of the cargo fork.

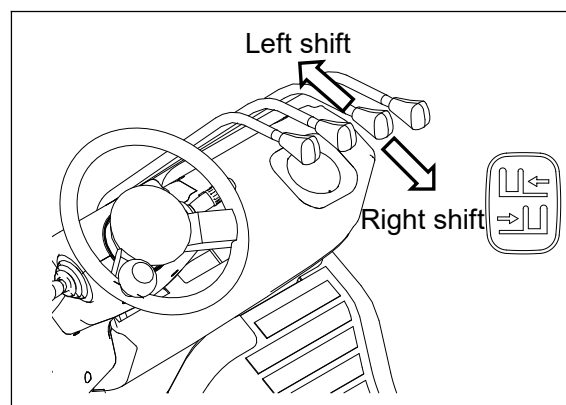
Fork tilt can be achieved by pushing and pulling the tilt handle. Push the handle forward to tilt the fork forward; pull the handle backward to roll the fork backward, and the tilt speed determines the tilt angle of the handle.



Caution

- **Multi-channel valve with a forward tilt self-locking valve, when the circuit is cut off, even if the forward tilt handle, also can not make the gantry forward.**

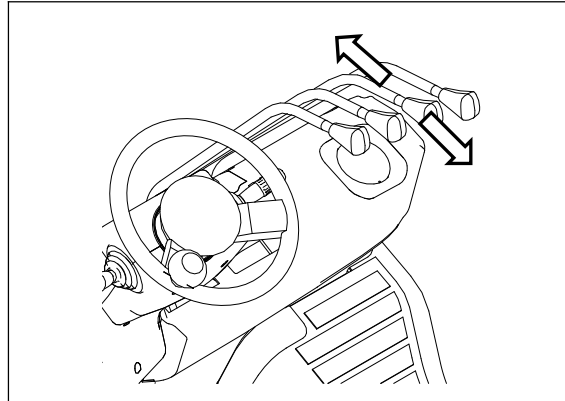
Sideshift lever [9]



Control the movement of the fork relative to the gantry.

Push and pull this handle back and forth to realize the left and right movement of the cargo fork relative to the gantry.

Accessory lever [10]

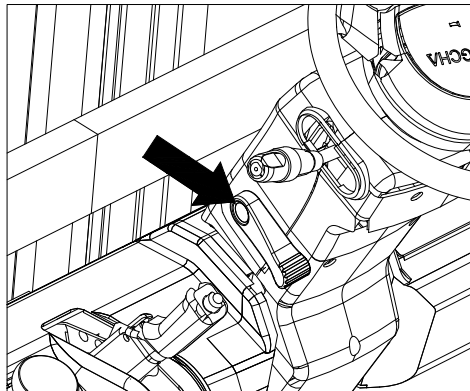


The levers may be moved sideways, or rotating or other hand rods, depending on the circumstances.

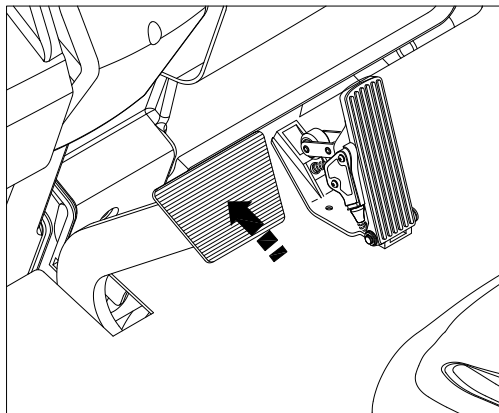
Steering wheel tilt lever [11]

Adjust and fix the Steering wheel tilt lever for the required distance.

To meet the needs of the operator, the steering column inclination of the forklift is adjustable. Up the steering post is released; lock down.

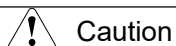


Brake pedal [13]



Perform brake operation.

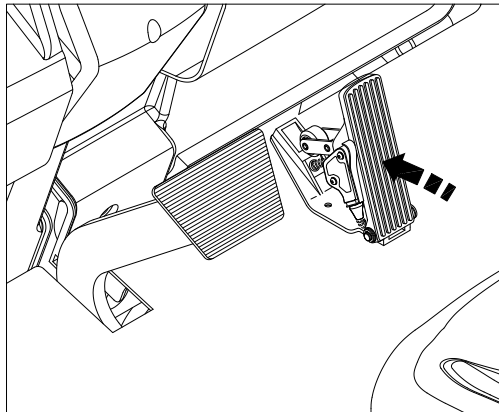
Press the brake pedal, the forklift will be slowed down or stopped, with the brake light on.



Caution

- Do not press the accelerator pedal and the brake pedal at the same time, otherwise it will damage the walking motor.

Accelerator pedal [14]



Stepless regulation for the driving speed of the forklift.

Slowly depress the accelerator pedal, the drive motor will start running and the forklift will move off.

According to the pedaling force on the pedal, the running speed can be adjusted steplessly.



Caution

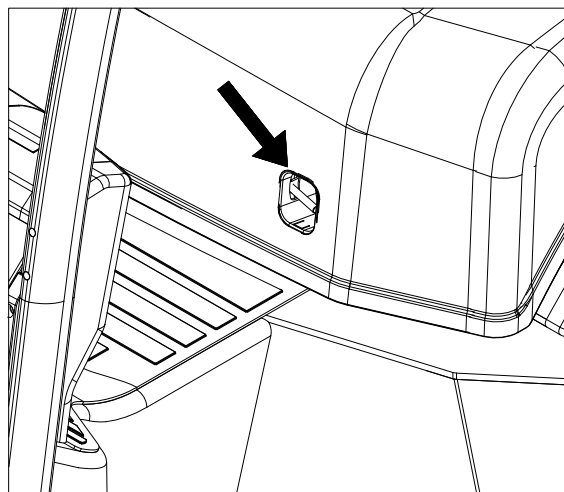
Release the accelerator pedal while driving to perform soft braking.



Warning

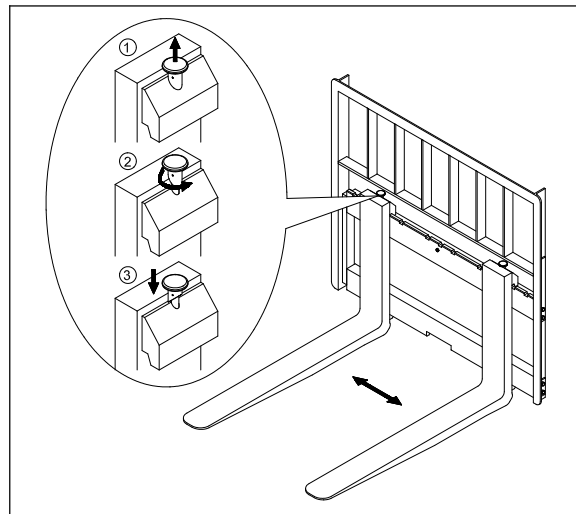
Do not depress the accelerator pedal before turning on the key switch, otherwise the meter will display a fault. Release the accelerator pedal, the fault will disappear.

Front cover lock



Fixed front cover.

Goods fork positioning pin



Use when adjusting the fork spacing. Pull up the fork positioning pin, rotate 90, and adjust the fork to the desired position according to the goods to be loaded and unloaded.



Caution

- The interval adjustment of the fork should be based on the center line of the forklift and symmetrical. After adjustment, the fork positioning must be locked.
- There is an opening on the lower beam of the fork rack for loading and unloading forks.
- Avoid fixing the opening position of the fork rack to prevent the fork from falling off from the opening position.
- A bolt is installed in the middle of the upper beam to prevent the cargo fork from working here. If the bolt is damaged, replace it in time.

Replace the fork

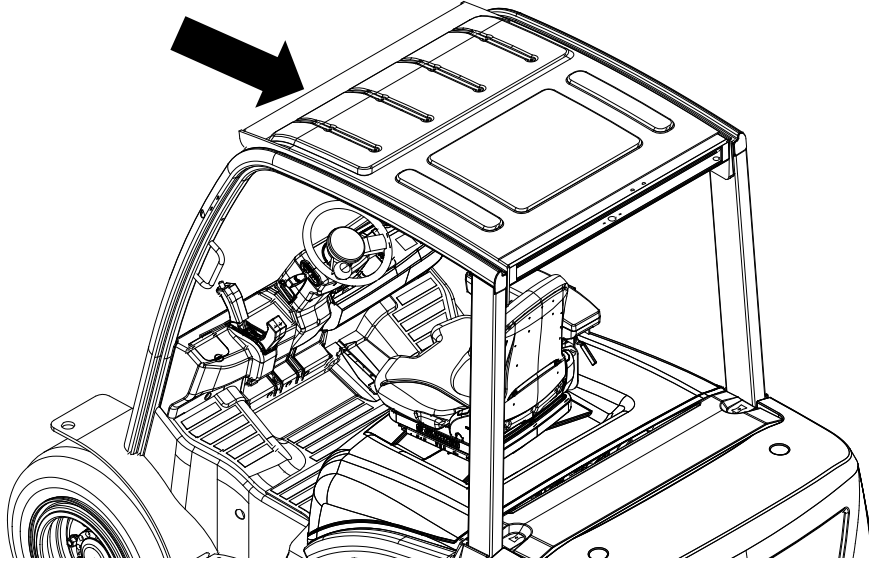
Disassemble the fork: put the fork in the middle, the fork down to the ground, tilt the gantry, make the fork off the fork rack, back the vehicle can be.

Installation of new fork: the fork is facing the vehicle flat on the ground, the fork rack drops the lowest, the vehicle runs slowly forward, aim at the upper and lower groove of the fork and the upper and lower beams and gap of the fork rack, lift the fork rack full, and adjust the left and right position of the fork.

12.4 Body and other

12.4.1 The roof frame

The roof frame is an important part to prevent the upper object from falling and protect the safety of the operator. It must have sufficient impact resistance strength, loose installation, removal or modified after use are very dangerous, may lead to major accidents. The upper gap is used to lift the storage battery.



Warning

- It is forbidden to use forklift without roof frame.

12.4.2 cover

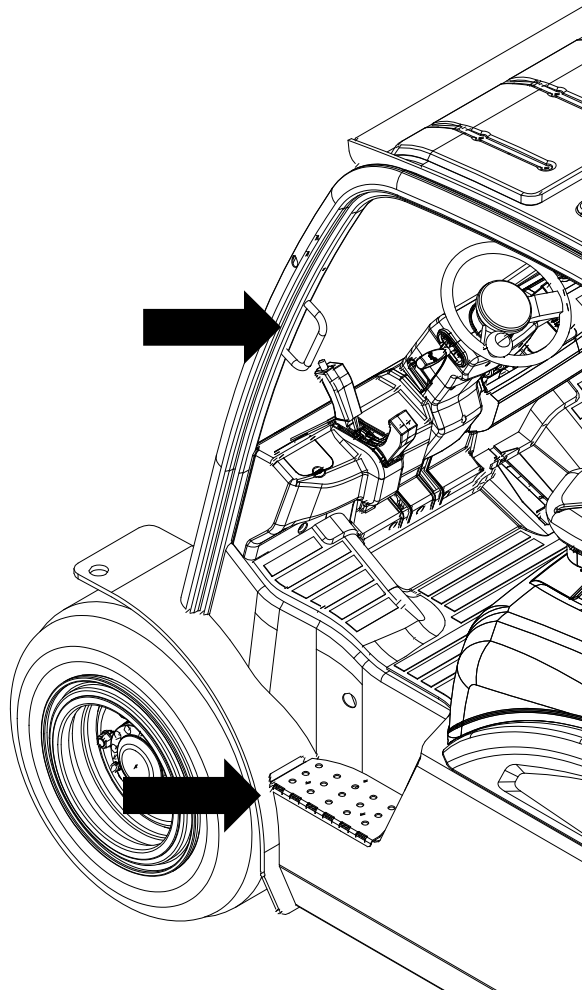
Large opening hood, easy to check and maintain the battery.

With the help of the air spring force inside the hood, the hood can be fully opened up with a very small force. When closing, release the air spring insurance first, and then press the head of the hood below.

Caution

- When turning off the hood, you must first press the air spring insurance down, and then press the head of the hood.
- When turning off the hood, prevent the falling hood card from holding your fingers.

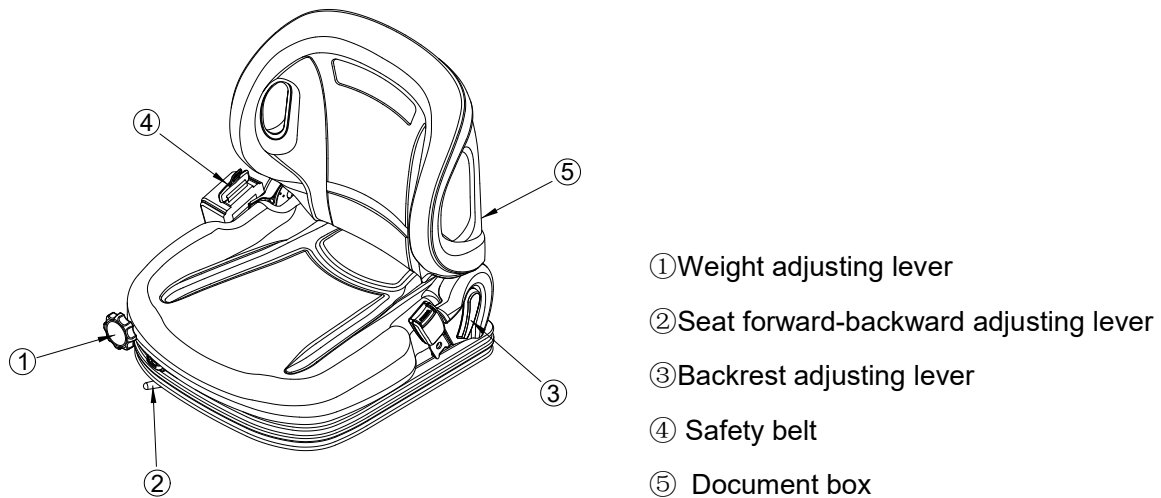
12.4.3 Safety pedals and handrails



There are on and off safety pedals on both sides of the body and safety handrails on the left pillar of the roof frame. Use the safety pedals and safety handrails when going up and down the vehicles.

12.4.4 Seat

The seat design satisfies the maximum comfort, and can adjust as follows:



Adjust driver seat according to weight:

In order to get ideal damping effect, adjust the seat according to driver's weight

- Driver sits on. If it is set correctly, seat adjusting lever① should match with driver weight mark.
If the seat adjusting lever deviates to left or right too much, adjust the seat according to driver's weight.
- If driver is light, pull the seat adjusting lever① to left.
- If driver is heavy, pull the seat adjusting lever① to right.

Adjust seat position:

- Pull the driver seat forward-backward adjusting lever② upward, and move the seat forward or backward to proper position.
- Lock driver seat forward-backward adjusting lever②.



WARNING

- Lock the driver seat forward-backward adjusting lever on the set position. Never adjust seat when driving.

Adjust seat back:

- Driver sits on.
- Press the seat back adjusting button③, and adjust back inclination.
- Release the seat back adjusting button③ and lock the seat back.

Safety belt

Fasten safety belt④ before driving. It protects driver when accidents happen. Regularly clean and check safety belt, avoid dirt.

Correctly use safety belt:

- Sit on the seat correctly.
- Check if the safety belt twisted.
- Place the safety belt on the hip.
- Fasten the safety belt and check safety belt lock.
- Adjust safety belt until it reaches the state that it does not squeeze hip or is unable to fix due to loosen too much.

Regular verification of seat belt related to:

- Cut or frayed straps.
- Worn or damaged hardware, including anchor points.
- Buckle or retractor malfunction.
- Loose stitching.

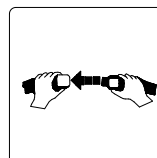
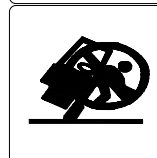


WARNING

- In any case, if there is damage or flaw(insecure lock, damage, wet light) on the safety bet, please repair or replace immediately.
- Never do any change to the safety belt. Replace new one after each accident.

Adopted measure when special condition incurred:

- Fasten the safety belt and sit on.
- Never jump from the truck.
- Lean forward, hold the steering wheel with both hands, and support with feet.
- Lean yourself in the opposite direction to truck tipping over.



WARNING

- **When there is danger of tipping over, do not unfasten the safety belt to escape. It may cause severe bodily injury.**

12.5 OPS system (optional)

OPS (Operator Presence Sensing) system is a safeguard system that installs a sensor in the driver seat to sense if the driver sits on the seat correctly. If the driver does not sit on the seat correctly, driving force is cut off, meanwhile, all loading and unloading operations will be stopped. It helps to reduce accident when the driver leaves. When the driver does not sit correctly, the driver cannot drive the truck or operate the loading and unloading, thus the accidents by maloperation will be reduced.

Driving protection function

When the vehicle is travelling, the driver leaves the seat or the safety belt is released (if equip with safety belt protection switch) over 1 second, truck stops automatically, and the instrument displayed seat indicator light  lights up, meanwhile the buzzer sends out continuous alarm signal. Only when pulling up the hand brake or the driver sits on the seat correctly and the direction switch returns to neutral, the seat indicator light  goes out, travelling OPS status is released.

Working protection function

When the vehicle is under working condition, the driver leaves the seat or the safety belt is released (if equip with safety belt protection switch) over 1 second, working stops automatically, and the instrument displayed seat indicator light  lights up, meanwhile the buzzer sends out continuous alarm signal. OPS light comes on, buzzer sends out alarm signal, transportation operation stops automatically. When the driver sits down again, the seat indicator light  goes out, working OPS status is released.

Warning function

Once the seat sensor detects the seat switch is turned off, within 1 second, the buzzer sends out continuous alarm signal, and the seat indicator light  lights up. If the seat indicator light  keeps on when the seat switch is off, it means the OPS in the startup state.

Resume neutral function

If the direction switch does not return to neutral and the seat switch is turned on. The buzzer will send out continuous alarm signal to remind the driver that the OPS in the startup state.

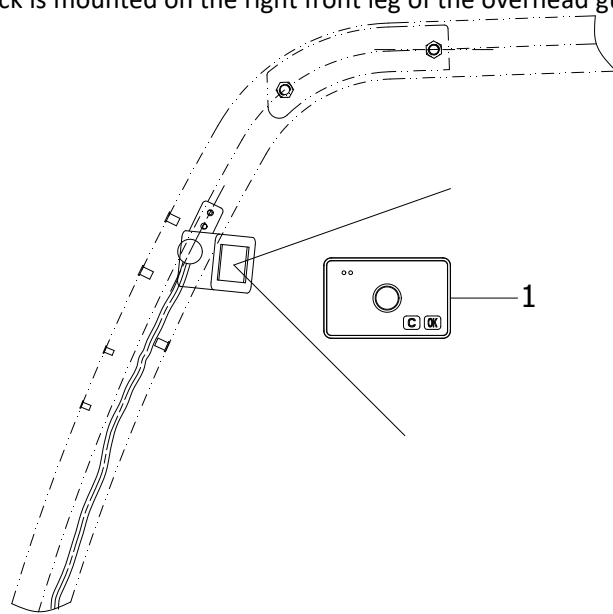
OPS abnormal function handling

Park the truck in safe place and contact Hangcha agency to check if any below condition is occurred. a. after the driver leaves the seat, the seat indicator light  does not light up; b. when the driver sits down, the seat indicator light  does not go out.

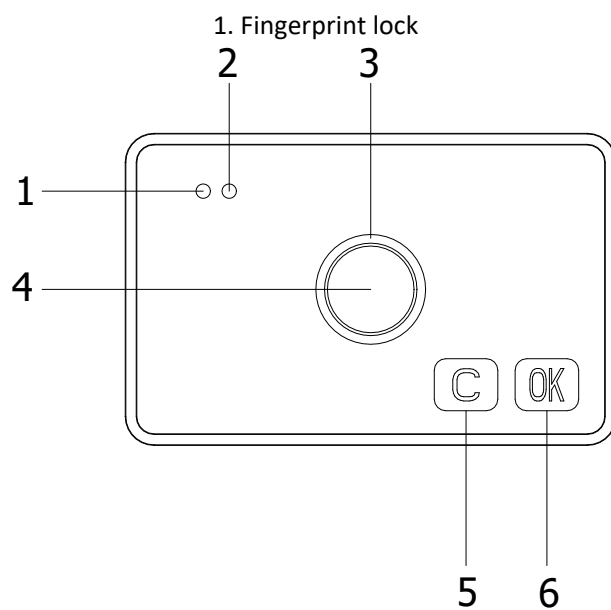
12.6 Fingerprint lock(optional)

12.6.1 EPS310 Fingerprint lock

The EPS310 fingerprint lock is mounted on the right front leg of the overhead guard.



Fingerprint lock installation position



- | | | | |
|--------------------------|------------------------|---------------------------|-----------------------------|
| 1. Green indicator light | 2. Red indicator light | 3. Ring fingerprint light | 4. Fingerprint reading area |
| 5. "C" key | 6. "OK" key | | |

12.6.1.1 Fingerprint lock factory status

When the user receives a new truck, the fingerprint lock is in the factory state, after turning the starter key to the vehicle power state the green indicator light blinks, the red indicator light turns off, the ring fingerprint light blinks blue and green alternately, and the buzzer sounds (1 second).

Indicator light	Status
Green indicator light	Blink
Red indicator light	Turn off
Ring fingerprint light	Blue-green alternating flash



Caution

For forklift trucks equipped with an emergency cut-off switch, please ensure that the emergency cut-off switch is unplugged before powering on the vehicle.

At this time, you can use any fingerprint to unlock, after unlocking, the green indicator light is always on, the red indicator light is always on, the ring fingerprint light flashes blue and green alternately, the buzzer sounds (3 seconds), turn the start key and the forklift truck can start normally.

Indicator light	Status
Green indicator light	Constant
Red indicator light	Constant
Ring fingerprint light	Blue-green alternating flash

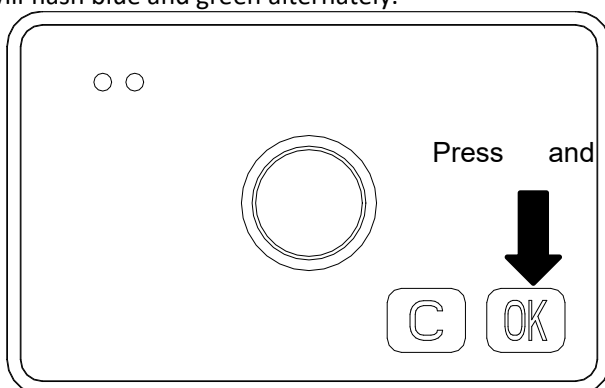


Caution

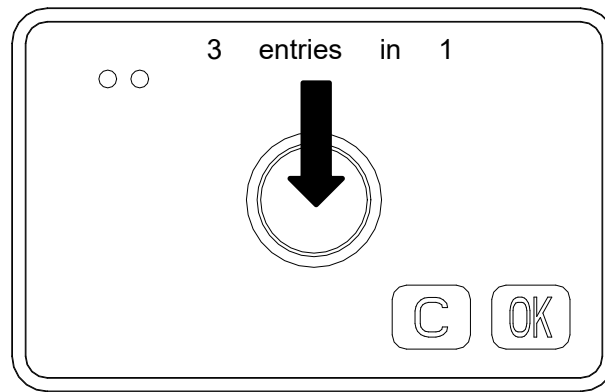
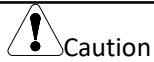
For security purposes, please enter the administrator's fingerprints in a timely manner.

12.6.1.2 Adding administrator fingerprints

1) After unlocking a new vehicle with any fingerprint, long press the OK button for more than 5 seconds, the buzzer will sound 3 times (1 second each time), the red indicator and green indicator will turn off, and the ring fingerprint light will flash blue and green alternately.



2) Use the same fingerprint in the fingerprint module area to make 3 entries (each entry interval of more than 1 second), after the third entry action is completed, the buzzer will sound for 1 second, the green indicator light will be on, the red indicator light will be on, the ring fingerprint light will be on, and the ring fingerprint light will be displayed in blue, which means that the administrator fingerprints have been successfully entered.

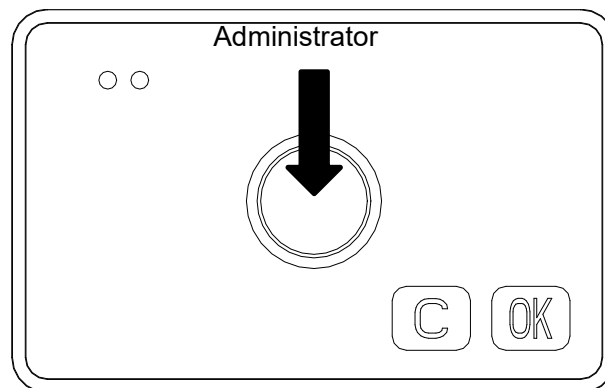


Caution

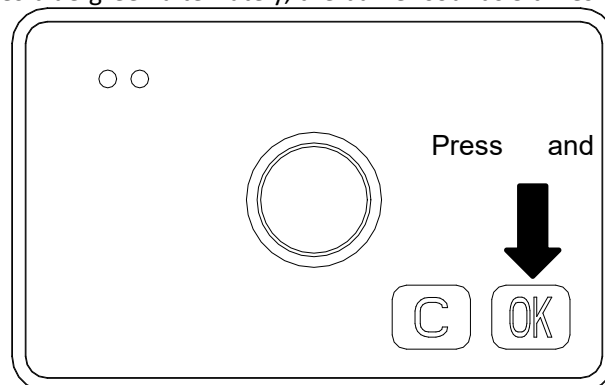
- 1) The EPS fingerprint lock only supports the entry of 1 administrator's fingerprint.
- 2) If the fingerprint is not entered within 5 seconds after long pressing the "OK" button to enter the add fingerprint procedure, the fingerprint lock will enter the add timeout error state, the red indicator light and green indicator light will flash alternately, and the buzzer will sound for 3 seconds, and then the fingerprint lock will be restored to the unlock state, and the administrator fingerprint can be re-entered at this time.

12.6.1.3 Adding ordinary fingerprints

1) The fingerprint lock which has already had the administrator's fingerprint entered is powered on first, then use the administrator's fingerprint to unlock, at this time, the green indicator light is always on, the red indicator light is always on, the ring fingerprint light is displayed in blue, and the buzzer sounds for 3 seconds.

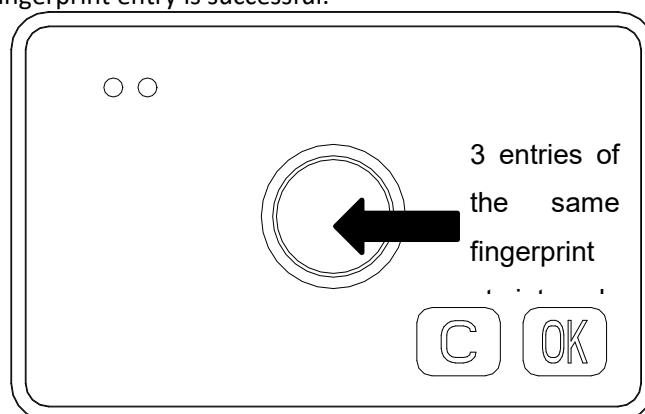


2) In the administrator fingerprint unlock state, long press the "OK" key for more than 5 seconds to enter the ordinary fingerprint entry procedure, at this time, the green indicator and red indicator light is off, the ring fingerprint light flashes blue-green alternately, the buzzer sounds 3 times.



3) Use the same fingerprint to make 3 entries in the fingerprint module area (more than 1 second interval)

between each entry), after the 3rd entry action is completed, the buzzer sounds (1 second), the green indicator light is always on, the red indicator light is always on, and the ring fingerprint light is displayed in blue, and the ordinary fingerprint entry is successful.



Caution

- 1) The fingerprint lock supports the entry of 50 ordinary fingerprints.
- 2) Make sure you have added an administrator fingerprint before adding a regular fingerprint.
- 3) If the fingerprint entry fails, the fingerprint lock will enter the error state, the red indicator light and green indicator light flash alternately, the ring fingerprint light turns red, and the buzzer sounds for 3 seconds; then the fingerprint lock returns to the pending unlock state, and then you can use the administrator's fingerprint to unlock the lock to continue the entry operation.
- 4) If the fingerprint is not entered within 5 seconds after long pressing the "OK" button to enter the add fingerprint procedure, the fingerprint lock will enter the add timeout error state, the red indicator light and green indicator light will flash alternately, and the buzzer will sound for 3 seconds, and then the fingerprint lock will be restored to the unlock state, and the administrator fingerprint can be re-entered at this time.

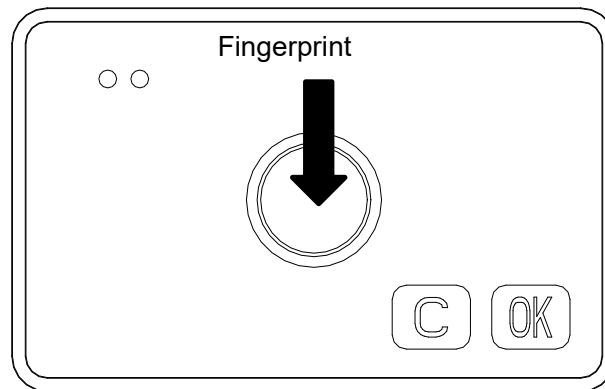
12.6.1.4 Unlocking the fingerprint lock

When the fingerprint lock is powered on, use the administrator's fingerprint or ordinary fingerprint to touch the fingerprint recognition area to unlock, after unlocking, the green indicator light is always on, the red indicator light is always on, the ring fingerprint light blinks blue and green alternately, and the buzzer sounds (3 seconds), the unlocking is successful, and the forklift truck can be started normally by turning the start-up key.

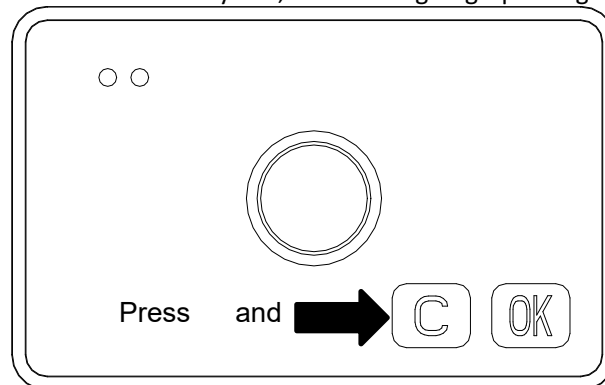
Indicator light	Status
Green indicator light	Constant
Red indicator light	Constant
Ring fingerprint light	Blue-green alternating flash

12.6.1.5 Deleting ordinary fingerprints

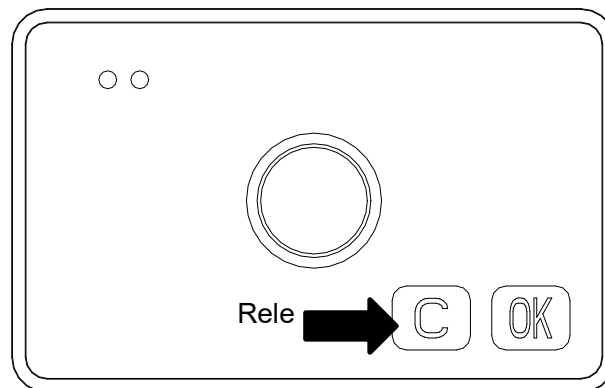
- 1) Power on the fingerprint lock that has already had ordinary fingerprints entered and unlock the fingerprint lock with the fingerprint that needs to be deleted. The green indicator light is always on, the red indicator light is always on, the ring fingerprint light is displayed in blue, and the buzzer sounds for 3 seconds.



2) Long press the "C" key for more than 5 seconds, the green indicator starts to light up for 3 seconds and go out for 1 second, the red indicator is always on, and the ring fingerprint light is blue.



3) Release the "C" button, the green and red indicator lights turn off, and the ring fingerprint light turns green and then turns off. After 2 seconds the fingerprint lock returns to the pending unlock state, i.e. the green indicator light is flashing, the red indicator light is off, the ring fingerprint light shows blue and green alternately, and the buzzer sounds for 1 second, at which time the fingerprint is deleted successfully.

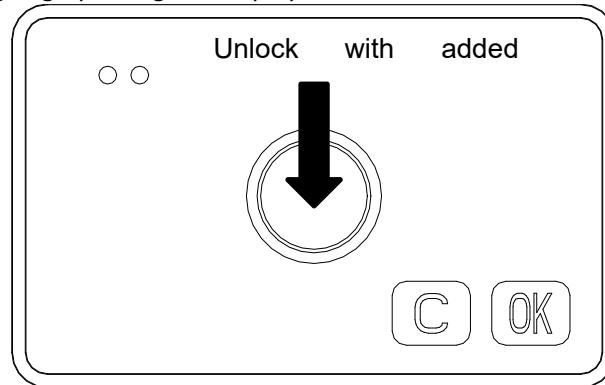


Caution

If the red indicator and green indicator flash alternately after releasing the key, and the ring fingerprint light shows blue and green alternately, this indicates deletion failure status. The fingerprint lock will then return to the pending unlock state, i.e. the green indicator light is flashing, the red indicator light is off, the ring fingerprint light shows blue and green alternately, and the buzzer sounds for 1 second. At this point, you can re-unlock the device with the fingerprint to be deleted to perform the fingerprint deletion operation.

12.6.1.6 Device initialization

1) Power on the fingerprint lock and unlock the fingerprint lock with the added fingerprint (any fingerprint can be unlocked when no fingerprint is added). The green indicator light is always on, the red indicator light is always on, the ring fingerprint light is displayed in blue, and the buzzer sounds for 3 seconds.



2) Press and hold down the "C" key and "OK" key at the same time for more than 5 seconds, the green indicator and red indicator will turn off, and the ring fingerprint light will turn red. When the button is released, the green and red lights go out, and the ring fingerprint light turns green and then goes out.

3) After a short wait the fingerprint lock returns to the pending unlock state, i.e. the green indicator light is flashing, the red indicator light is off, the ring fingerprint light shows blue and green alternately, and the buzzer sounds for 1 second, at this time, it indicates the successful initialization state.



Caution

All fingerprints will be deleted after initialization, so please proceed with caution.

12.6.2. FKS Fingerprint lock

The FKS fingerprint lock is mounted on the right cover of the dashboard.



Fingerprint lock

12.6.2.1 Fingerprint lock factory status

When the user receives a new vehicle, the fingerprint lock is in the factory state, and any fingerprint can unlock the fingerprint lock after turning the starter key to power on the vehicle.



Caution

- 1) For forklift trucks equipped with an emergency cut-off switch, please ensure that the emergency cut-off switch is unplugged before powering on the vehicle.
- 2) For security purposes, please enter the administrator's fingerprints in a timely manner.

12.6.2.2 Adding administrator fingerprints

- 1) Any finger continues to press on the fingerprint identification area (about 5 seconds or so) and does not release, after the ring fingerprint light lights up yellow, remove the finger, at this time the ring fingerprint light lights up yellow and blinks slowly, the fingerprint lock enters the administrator's fingerprint entry procedure.
- 2) Start to press the finger, the ring fingerprint light is light blue after the finger is pressed down, the ring fingerprint light is yellow and flashing after the finger is lifted up, after pressing the finger 4 to 6 times continuously, the ring fingerprint light is green (for about 1 second), which represents successful administrator's fingerprint entry; if it lights up in red, it means that the administrator's fingerprint entry failed.
- 3) After the ring fingerprint light turns green (successful entry) or red (failed entry), the ring fingerprint light will continue to turn yellow and blink slowly, at this time, you can continue to enter other administrator fingerprints, if you need to end the entry, just stop the operation for about 10 seconds, the fingerprint lock will automatically exit.

Fingerprints that have already been recorded are not allowed to be re-recorded, a red light will be displayed and you will be automatically exited from the enrollment. In the process of registering your

fingerprints, press with different edges of your finger.

In the process of registering fingerprints, press with different edges of your finger so that the registered fingerprints are recognized at a higher rate. If the red light blinks during registration, it is a prompt to press with different edges of your finger, not the same edge every time.



Caution

- 1) The FKS fingerprint lock supports the entry of up to 10 administrator fingerprints.
- 2) Users can decide whether to enter multiple administrator fingerprints during the initial administrator fingerprinting according to their own situation.
- 3) When entering the administrator's fingerprints, fingerprints that have already been entered are not allowed to be entered again. If they are entered, the ring fingerprint lamp will light up red and automatically exit the fingerprint entry process.
- 4) In the process of entering fingerprints, you should use different edges of the same finger to press, which can improve the fingerprint recognition rate. If the red light blinks during the process of entering, it is a prompt that you should use different edges of the finger to press, and should not use the same edge every time.

12.6.2.3 Entering ordinary user fingerprints

- 1) Use the administrator's fingerprint to keep pressing on the fingerprint identification area (about 10 seconds or so) without releasing, the ring fingerprint light will light up yellow and then pink, remove your finger when it lights up pink, at this time, the ring fingerprint light will light up pink and flash, and the fingerprint lock will enter into the normal fingerprint entry procedure.
- 2) The ordinary fingerprint entry procedure is the same as the administrator fingerprint entry procedure.

12.6.2.4 Fingerprint unlocking

After entering the administrator's fingerprint and ordinary fingerprint, press the fingerprint identification area with the administrator's or ordinary fingerprint, if the ring fingerprint light turns blue, it means the unlocking is successful and the forklift can be started normally. If the ring fingerprint light is on red, it means the unlocking has failed, please re-press the fingerprint identification area again to unlock the forklift.

12.6.2.5 Deleting all fingerprints

- 1) Keep pressing on the fingerprint identification area with the administrator's fingerprint (about 15 seconds or so) and don't release it, the ring fingerprint light will light up yellow, pink, yellow and blink in sequence, remove your finger when it lights up yellow and blinks for the second time, at this time, the ring fingerprint light will light up yellow (not blinking), and the fingerprint lock will enter into the procedure of deleting all fingerprints.
- 2) Press the fingerprint identification area again with any fingerprint, the ring fingerprint light turns green (about 1 second), all fingerprints are deleted successfully, at this time, the fingerprint lock is restored to the factory setting state, any fingerprint can unlock the fingerprint lock.

12.6.2.6 Deleting all ordinary fingerprints

1) Keep pressing on the fingerprint identification area with the administrator's fingerprint (about 20 seconds or so) and don't release it, the ring fingerprint light will light up yellow, pink, yellow and blinking, pink and blinking in sequence, remove your finger when it lights up pink and blinks for the second time, at this time, the ring fingerprint light will light up pink (not blinking), and the fingerprint lock will enter into the procedure of deleting all normal fingerprints.

2) Press the fingerprint recognition area again with any fingerprint, the ring fingerprint light turns green (about 1 second), all ordinary fingerprints are deleted successfully, the administrator's fingerprint can still be used, and only the administrator's fingerprint can be used to unlock the fingerprint lock before adding a new ordinary fingerprint.

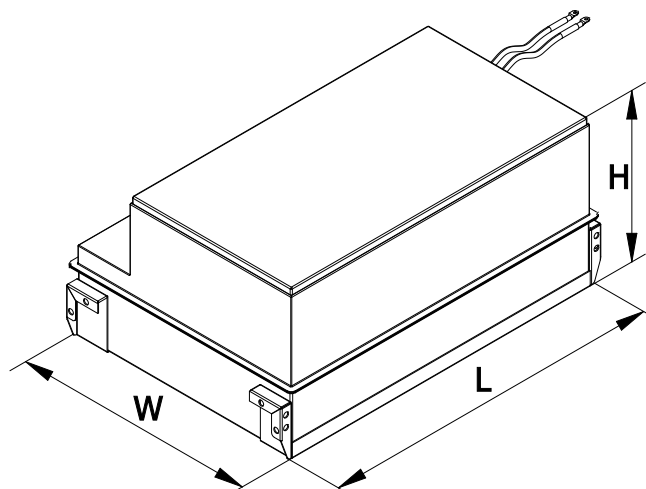
12.6.2.7 Deleting the fingerprint of a specified ordinary user

1) Keep pressing on the fingerprint identification area with the administrator's fingerprint (about 25 seconds or so) and don't release it, the ring fingerprint light will light up yellow, pink, yellow and blinking, pink and blinking, white and blinking in sequence, remove your finger when it lights up white and blinking, at this time, the ring fingerprint light will light up white (not blinking), and the fingerprint lock will enter the procedure of deleting the designated ordinary fingerprint.

Press the ordinary fingerprint to be deleted on the fingerprint recognition area, if the ring fingerprint light is green means the deletion is successful, and red means there is no such fingerprint in the fingerprint library. At this point, you can continue to delete other ordinary fingerprints to be deleted, keeping about 10 seconds without any operation will automatically exit the deletion process.

13 Lithium battery

13.1 Lithium battery parameters



Item		CPD40/45/50-XCY2-SI CPD50-XCXY2-SI
Length (L)	mm	1170
Width (W)	mm	820
Height (H)	mm	533.5
Lightest weight	kg	430
Rated capacity	Ah	608
Rated voltage	V	76.8

13.2 Safety instructions

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



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

3When operating and maintaining the battery system, please wear insulting gloves and take off metal ornaments.



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



13.3 Installation instructions

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 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.

13.4 Basic terms for lithium ion battery

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.

2 SOC

Refers to the percentage of battery remaining electricity.

3 Nominal voltage

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

4 Rated capacity

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

5 Overdischarge

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.

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.

7 Explosion:

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

8 Fire

Open fire appears in the battery case.

9 Leakage

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

10 CAN

Communication: Control Area Network, Controller Area Network.

13.5 Instructions for Use

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℃.

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 can not overdischarge the power battery system. Overdischarge will cause irreversible permanent damage to lithium-ion power battery.

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 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.

13.6 Maintenance

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

13.7 Emergency plan

1Scenarios,extreme anomalies

Users should establish a good sense of security in the use process, strictly prohibit illegal operation, avoid battery system abuse (overcharge, overdischarge, 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.

2Emergency plan

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

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.

3 Contact forklift brand dealers to obtain professional treatment advice.

13.8 Charger

13.8.1 SKC-N 80200 Charger

13.8.1.1 Overviews

Product features:

1. Adopt full digital control technology

Advanced digital circuit control system design replaces the traditional analog circuit. The high-speed microcontroller samples and self-detects all functional circuits, accurately judges the real-time working status of each functional circuit and analyzes faults to ensure the high reliability and stable operation of the system.

2. Intelligent detection and monitoring functions

The microprocessor of the digital circuit control system can detect the state of the output power supply, the working state of the circuit and the running state of the battery in real time without interruption. When failure occurs, the system will automatically alarm and synchronously start the protection function.

3. Electrical isolation design

In order to improve the reliability of the system, the circuit architecture of input and output electrical isolation is designed.

4. Enter the rectifier section

Advanced and mature circuit design is adopted to improve the input power factor and reduce the input harmonic current. The average input current tracks the reference current and is not constrained by the load current. Even if the load current has a large harmonic, the input current will not be seriously distorted.

5. Perfect protection function

It has a variety of perfect protection functions and alarm mechanisms such as input over-voltage protection, input surge protection, output overload and short circuit protection, and over-temperature protection.

6. Forced air cooling cooling mode design

Efficient cooling duct design. Use multiple high-power fans to effectively force heat dissipation.

7. Interface configuration complete

Input and output power interface, CAN communication interface and reserved interface, etc.

8. Intuitive display of working parameters and working status, simple interface operation.

13.8.1.2 Conditions of use

1. The altitude does not exceed 2000m;

2. The operating temperature of the device ranges from -20°C to $+50^{\circ}\text{C}$.

3. The maximum relative humidity of the surrounding air does not exceed 95% (when the ambient air temperature is $25\pm 5^{\circ}\text{C}$);

4. The installation foundation should be stable, there should be no violent vibration or impact, and the vertical inclination should not exceed 5%;

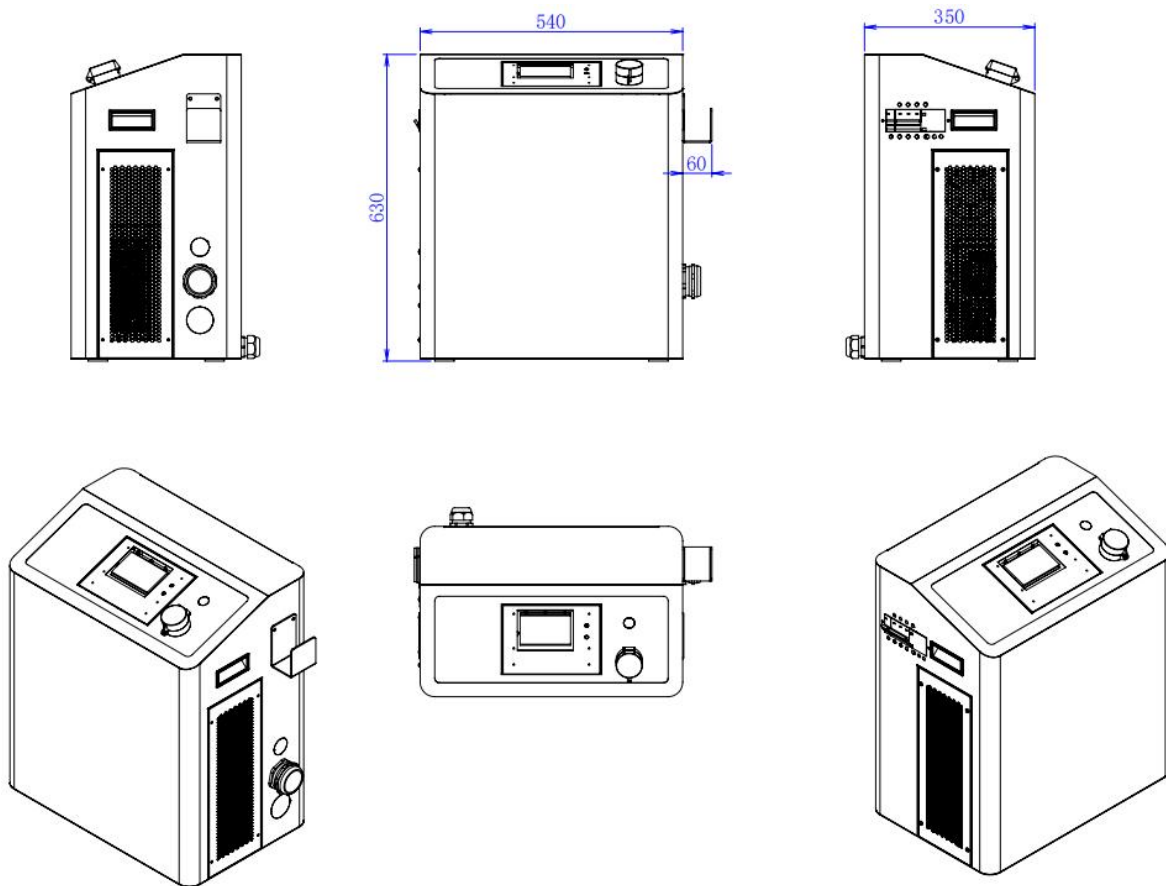
5. No conductive or explosive dust, no gas or vapor that corrodes metal or destroys insulation at the operation site;

6. For outdoor operation, install a ceiling above the equipment to prevent rain.

13.8.1.2 Main technical parameters

item	Parameter index
Input technical parameters	
Input voltage	AC380V $\pm$ 15%
Input current	<39A
frequency	45Hz~65Hz
Power factor	$\geq$ 0.99
Current distortion	$\leq$ 5%
Output technical parameter	
Maximum voltage	DC100V
Maximum current	200A
Maximum power	20KW
Output voltage range	40~100VDC
Adjustable range of current limiting	5A-200A
Efficiency	>90%
Voltage ripple	<3%
Current ripple	<3%
Voltage regulation accuracy	5‰
Accuracy of current regulation	1%
Charging curve	BMS setting
Working environment condition	
Operating temperature ambient	-20~45℃ Normal operation; 45-65℃ Derated output.
Storage temperature	-40~75℃
Relative humidity	5~95%
Altitude	$\leq$ 2000m Full load output
Protection function	

Input protection	Input undervoltage or input overvoltage
Output protection	Output overvoltage, output short circuit, battery reverse connection
Overtemperature protection	If the internal temperature of the module is too high, the system shuts down
Exception protection	If the power component is abnormal, it will shut down
Scram protection	When uncontrollable anomalies occur, the emergency stop button can be used to force shutdown



7.

The structure and size of the charger

The dimensions of the cabinet are: -540mm x 350mm x 630mm.

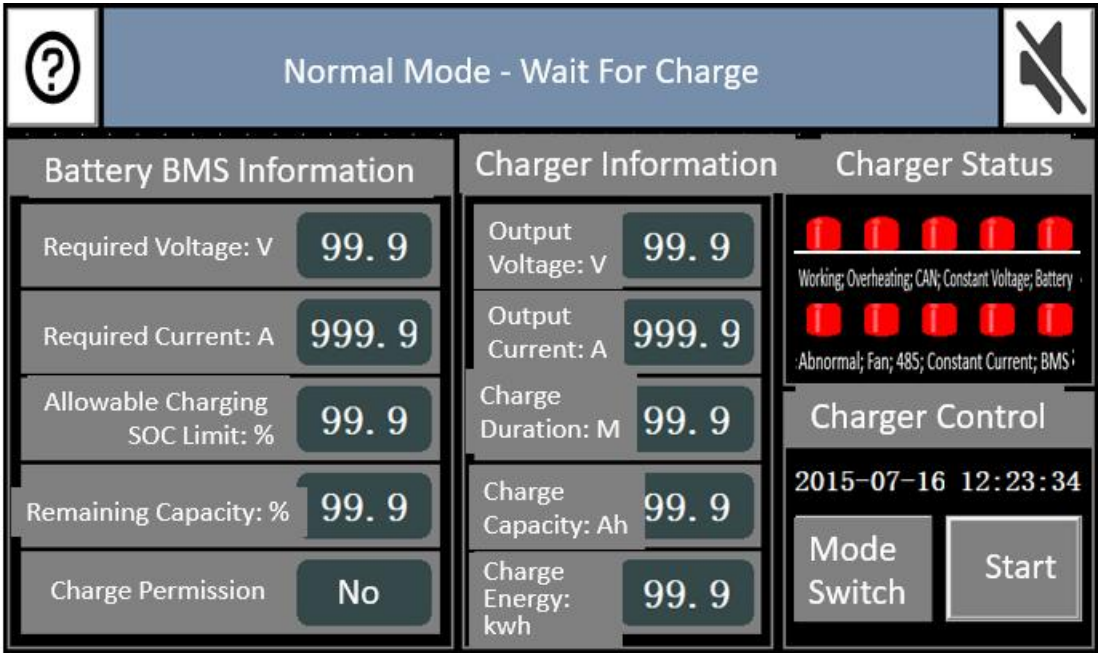
13.8.1.3 Panel, touch screen operation instructions

Operation instructions for SLC-80200 intelligent charger

Touch screen display interface



Power on interface



Homepage interface

Click the icon: to enter the help interface.

Click the icon: or to switch alarm sound on/off, indicates the “ON” state, indicates the “OFF” state.

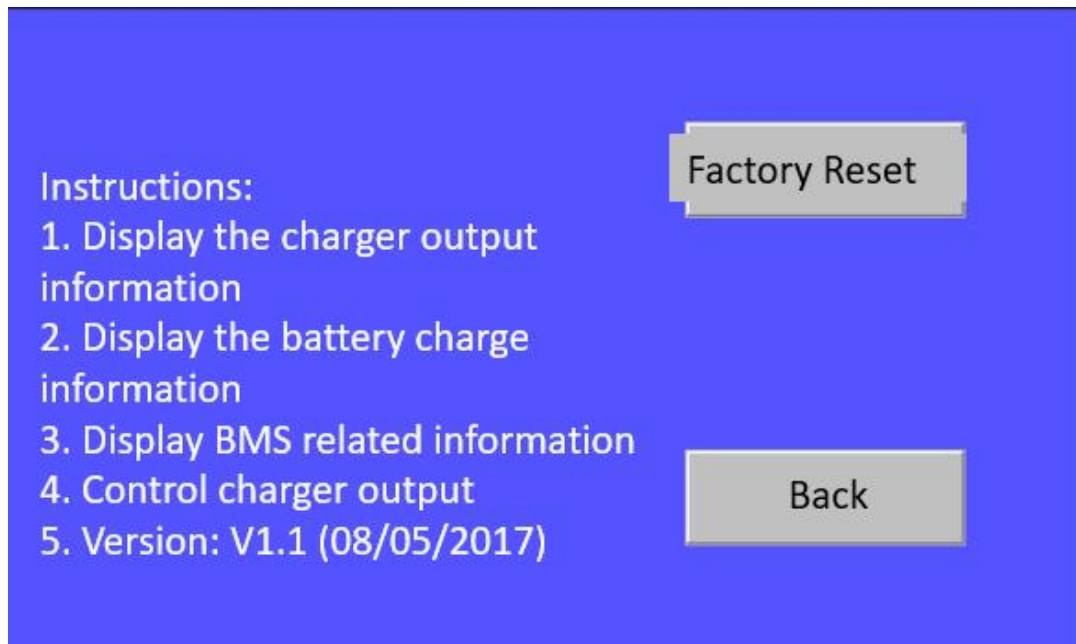
The control operation needs password permission, the default password is 123456.

Click the start icon: to start or stop charging.

Click the charging status bar (in purple) to enter the single charging module information display bar.

Click the battery BMS battery bar to enter the detailed BMS information display bar.

Click the mode switch icon to switch between the common mode and booking mode.

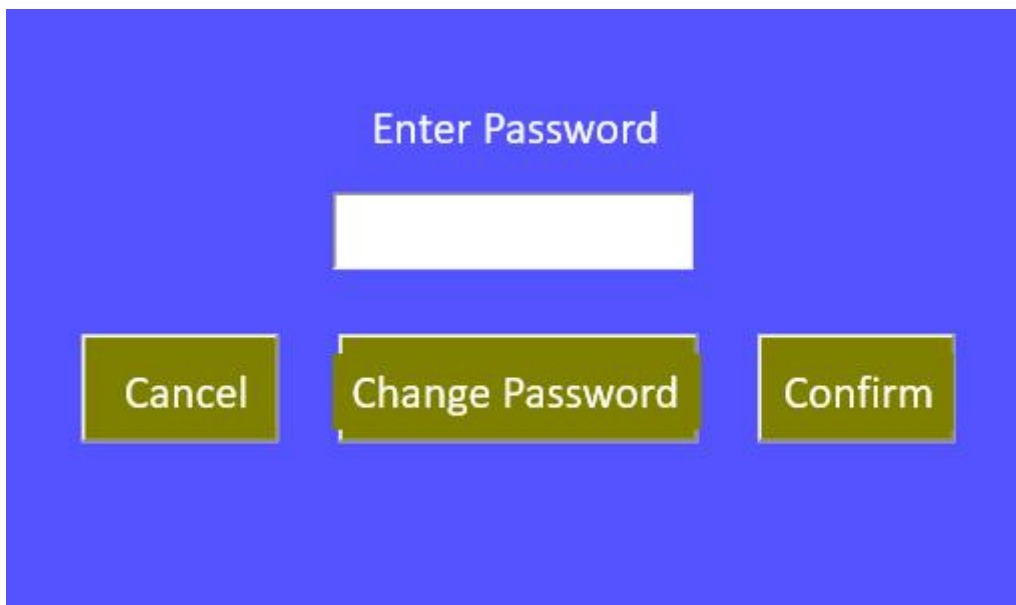


Help interface

Click the icon: Back to return to the homepage interface.

Click the booking icon to set the time for charging in booking mode, password: 123456.

Click the icon: Factory Reset to enter the password input interface, and enter the ex-factory parameter setting interface after the password is input correctly.



Password interface

Enter the correct password in the password input field, the default password is 888888.

Click the icon: Cancel to return to the help interface.

Click the icon: Change Password to enter the password change interface.

Click the icon: Confirm to enter the parameter setting interface if the password is correct, otherwise there will be a prompt, i.e. password input error, please input again.

A screenshot of a password change interface with a blue background. It contains three white input fields stacked vertically. The first field is preceded by the text 'User's old password:'. The second field is preceded by 'Enter new password:'. The third field is preceded by 'Re-enter the new password:' and contains a single asterisk '*' character. Below the input fields are two yellow buttons with black borders. The left button is labeled 'Cancel' and the right button is labeled 'Confirm'.

Password change interface

Follow the prompts to enter in order: enter the user's previous password, enter a new password first and then re-enter the aforementioned new password.

Click on the icon: Confirm, it will prompt that the password change is successful if the previous password was input correctly and the new input passwords for the first time and second time were the same as each other, otherwise it will prompt that the password change failed, please input the password again. Click the icon: Cancel to return to the password input interface.

Parameter Setting

Charger No.	1	Charge Module No.	3
Rated Voltage: V	100	Limiting Voltage: V	100.0
Rated Current: A	200	Limiting Current: A	200.0
Diverter Range: A	500	Rated Current: A	75.0
Start-up Voltage: V	5.0	Allowable Charge SOC Limit: %	100.0

Debugging Interface

Back

Parameter setting interface

Click the icon: Back to return to the help interface.

Parameter setting information: The rated voltage, rated current and shunt range are related to the hardware of the forklift truck and cannot be modified after delivery.

If the above parameters need to be modified, please consult the manufacturer. The charger number is set only for identification by the user, so it can be set as required. The debugging interface is set for the manufacturer's debugging, and the user is not allowed to set the parameters in this interface.

Power Module 1

Com.

Output Voltage: V

0.0

Output Current: A

0.0

Operating State; Hardware Fault; Limiting Current; Input Over-voltage; Output Over-voltage; Over-current Protection

Set Power On/Off; Fan Fault; Constant Voltage; Input Under-voltage; Output Under-voltage; Over-heating Protection

Previous

Back

Next

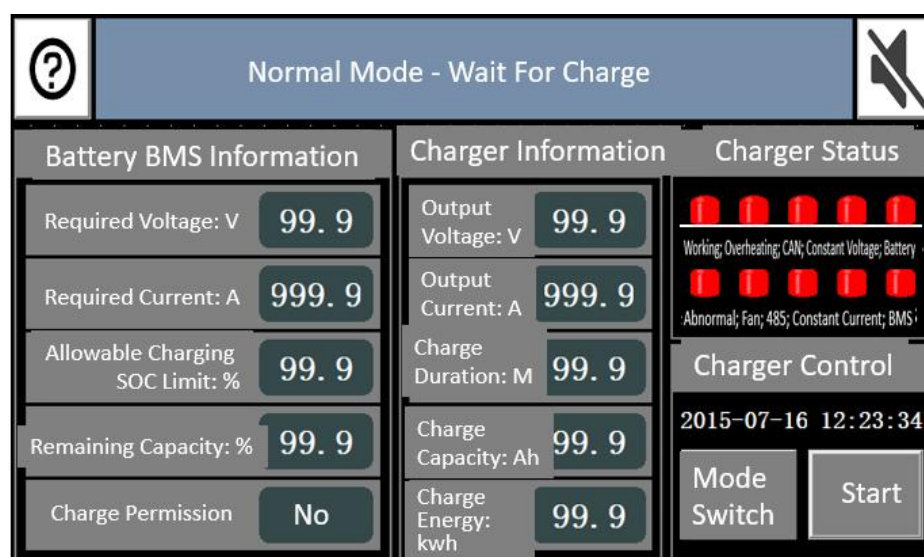
Power module information display interface

Click the icon: Previous to switch module information forward.

Click the icon: Back to return to the homepage interface.

Click the icon: Next to switch module information backward.

This interface displays the output voltage, output current, and various operation parameters of the single power module.



Instructions on the charging process

Charging steps:

1. Select "ON" charging control mode. The "CAN" and "485" indicator lights are green.
2. The DC charger is connected to the battery normally.
3. The charging process can be started only if the "Remaining Capacity" is less than the "Allowable Charging SOC Limit".
4. The "Battery" indicator light turns green (it will light up when the charger detects the battery voltage), and the "BMS" indicator light turns green.
5. "Working" indicator light turns green. When the "Output Voltage" and "Battery Pack Voltage" are similar to each other, the charger output relay is activated, and the charger starts working. At this time, the "Output Current" and "Output Voltage" will be consistent with the "Current Demand", "Voltage Demand".
6. When BMS charging is complete it sends a charging termination command, and the charger ends the charging process.
7. The charging process will be terminated if there are any charger faults (it indicates there is a fault when the "Overheat" and "Abnormal" indicator lights of the charger turn on), or the BMS charging is completed, the "Charging Permission" failed, or the charging process was manually "Stopped".

User wiring instructions



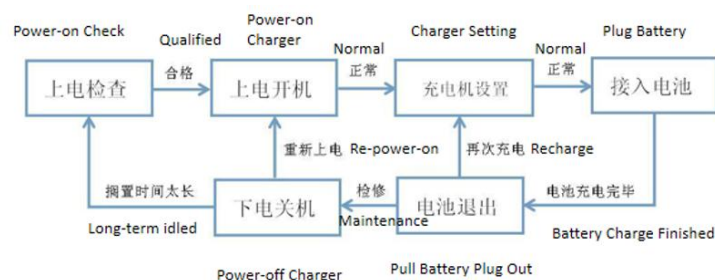
The truck's power supply is controlled by the AC input air switch. The input terminal is a YEEDA plug and the output terminal is the charger.

Warning: PE grounding must be provided to guarantee personnel safety.

Operation instructions

1. Precautions:

- Before the charger is powered on, check whether the battery wiring is correct, and check whether a short circuit will occur or the positive and negative terminals are reversed. Avoid overloading the charger as this may burn the components or wiring.
- The charger should be put into use only after it is powered on without abnormal, overheating and other warning prompts.
- For the safety of the charger and equipment operation, do not disconnect the battery switch directly when there is output current, except in an emergency.



Operation flow chart

Check before power-on: Make sure that the AC input live/neutral wire and DC output positive/negative terminal are connected correctly; there is no short circuit between input/output; the input voltage and frequency are normal in the power-on state at all times. The off-line and on-line charging circuits cannot be connected at the same time.

Power on: Check whether the air flow direction of the AC fan is correct and check whether the touch

screen can be turned on normally, and communication with the charger is normal.

Connect the battery: The battery voltage and current level meets the charger requirements, with no reverse connection. The battery is in good condition with no abnormalities.

Power off: Power the battery off after the charging current and voltage drop to 0 and then turn off the AC input air switch.

13.8.1.5 Common faults and troubleshooting methods

1.Troubleshooting instructions

When the charger works abnormally, find the charging status display area on the right side of the touch screen of the charger, pass the status indicator above to determine the cause of the fault, and then troubleshoot the fault.

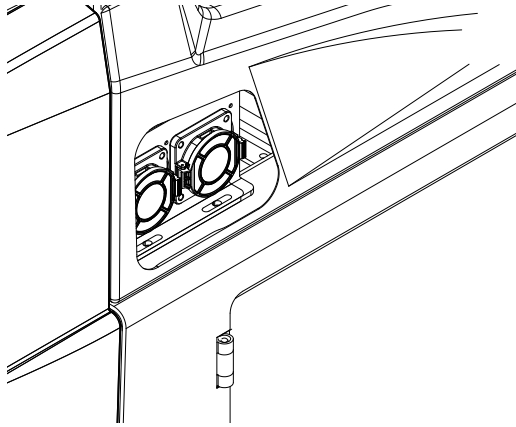
2.Solutions to common faults

NO.	Fault phenomenon	Fault cause	solution
1	BMS status indicator is off	1. The BMS of the car battery is damaged. 2. The charger controller is faulty. 3. The 12V auxiliary power supply inside the charger is damaged. 4, the charging interface is not well inserted.	1, change the car charging, if normal, the battery BMS damage, if the same problem is the charger internal controller or 12V auxiliary power failure. 2. Check whether the charging interface is firmly plugged.
2	CAN indicator is steady red	1. The CAN communication port between the main control board and the module is faulty.	1. Check the connection between the main control board and the module. If the connection is invalid, use step 2 of the solution. 2. Replace the main control board. If invalid, use step 3 of the solution. 3. Replace the charging module.
3	485 status indicator is steady red	1. The communication between the main control board and the touch screen is faulty.	1. Check the connection line between the main control board and the touch screen. If it is invalid, use step 2 of the solution. 2, Replace the main control board, if invalid, use solution step 3. 3. Replace the touch screen.
4	Abnormal status indicator is steady red	1. The internal module of the charger is faulty or protected.	1. When an exception occurs, click the blue background area on the main interface to enter the module information details interface. If it is "Input Undervoltage" or "AC input Fault", measure whether the three-phase power supply voltage of the charger is normal.

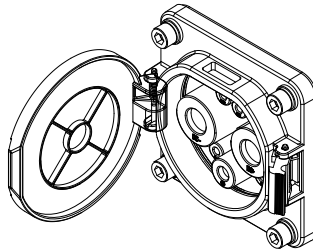
13.9 Lithium battery charging

Park the forklift safely.

Open the charging door cover.



The charging port of the lithium battery is visible, and the charging port is covered with a cover. Open the cover, the charging port is visible.

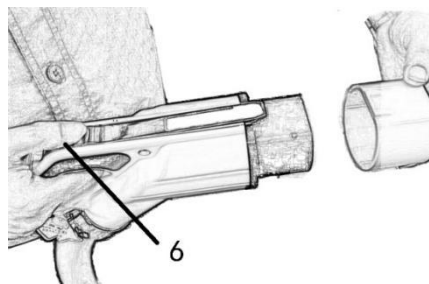


Lithium battery charging port structure

Note: There is a thin slot above the socket, which is used to buckle the lock when the charging gun is inserted into the charging.



Note: The flat side of the plug is equipped with a locking hook, which is used to buckle into the slot when inserted into the battery socket.

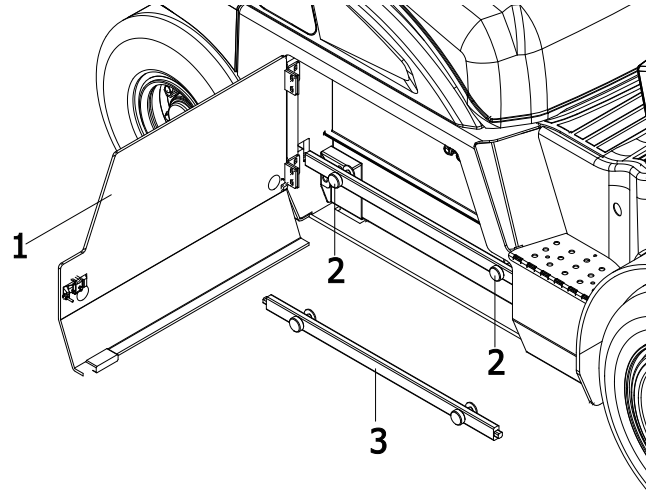


Only press the lock button (6) on the charging gun head to insert or pull out.

13.10 Lithium battery replacement and installation

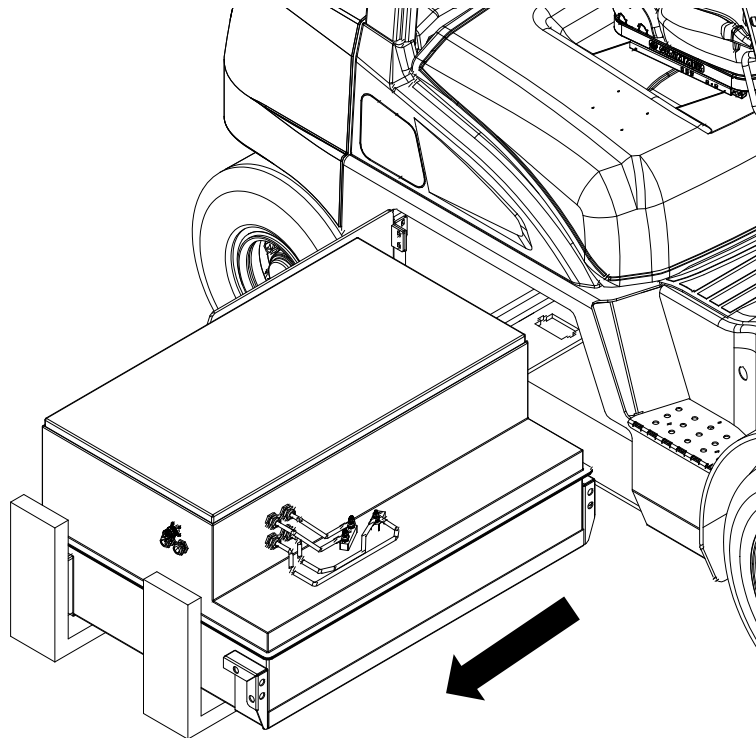
The lithium battery sinks at the bottom of the vehicle body, and the side is fastened by a protective rod. Rely on the weight to sit on the frame. For the removal and installation of lithium batteries.

a. Loosen the plug(1) of the lithium battery and the truck body, open the side door (2), loosen the bolt (3) on the fastening device, and lift it up a short distance (4), and then take it out, the lithium battery can be taken out from the body.



b. Center the fork to the middle of the two rows of rollers, take out the battery, and transfer it to the fork.

c. Lift 1cm with a forklift or pallet truck, pay attention to adjusting the fork spacing, and gently pull out the lithium battery.



Install

Installation is the opposite of removal.



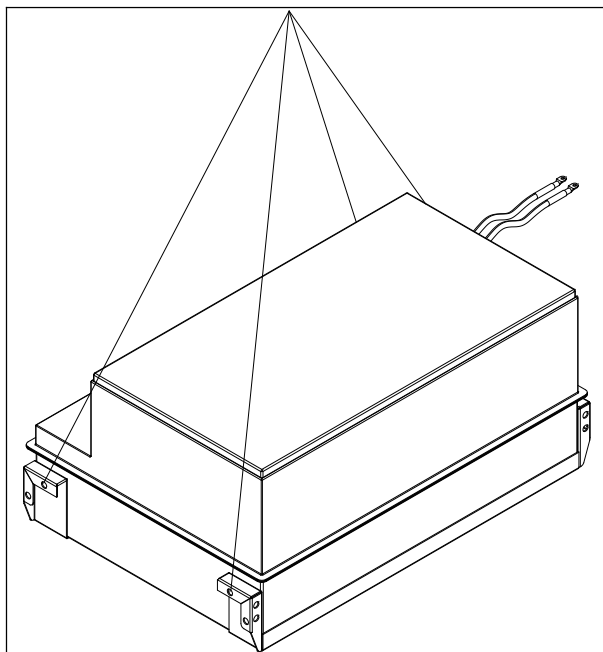
Warning

Carefully hoist, the lithium battery weighs about 320kg, which is very heavy
During installation, prevent crushing feet or clamping hands.



Caution

The service weight of the replacement battery should be within the min/max range specified on the manufacturer's vehicle nameplate.



Lift the lithium battery to the ground with a lifting device, and the fixing points are shown in the figure above.

13.11 Daily battery maintenance and care

(1) Check before use

After the vehicle key switch is closed, confirm that the instrument panel has no battery system alarm information. Please check the remaining power before use. It is recommended to use SOC between 50% and 100%. If the SOC is lower than 30%, it is not recommended to continue to use it.

(2) Charging instructions

The battery system SOC is lower than 20%, please charge in time. Please use the special charging equipment specified by the manufacturer for charging. If a fault alarm occurs during charging, the battery system and the charger will stop charging, and the charger will display the fault information. The charging environment should be dry and ventilated, and there are no flammable and explosive materials around. The battery system should be fully charged once a week.

(3) Long-term storage

Before long-term storage, confirm that the battery system power is not less than 50%. The charging maintenance should be carried out every three months: the power is charged to 100%. Store for more than three months, please confirm whether there is a fault alarm in the power battery system before using it again. Keep the storage environment as dry and ventilated as possible, away from heat sources. Tip: When the ambient temperature is low, the charging time of the battery system will be extended, which is normal. To ensure the best performance of the battery system, the battery management system automatically adjusts the charging time as the temperature changes.

(4) Clean

① Clean the cabinet: Check the battery system for abnormalities such as foreign objects, obvious deformation, and corrosion.

② Charging port cleaning: In the power off state, check the interface for abnormalities such as damage, foreign objects, rust, etc.

③ Plug cleaning: Check if the connector is loose or damaged under power failure.

④ Status detection: Observe the battery system voltage, temperature and other status information on the display screen of the charger during charging to ensure that all status information is within the normal range.

13.12 Common failures of batteries and their Solutions

The battery voltage is too low after filling

1.The batteries have not been used for a long time and have not been maintained in accordance with the regulations. Solution: recharge the battery.

2.The battery has been subjected to severe collisions characterized by damage to the outer surface of the cell case or the smell of electrolyte in the battery pack. Solution: this kind of situation is generally not within the scope of maintenance. If the maintenance needs to be determined, there is a problem in the output line or in the battery itself. First, disconnect the battery case to see

if the battery P+/C+ and P-/C- lines or solder joints are damaged. If there is any damage, they need to be replaced. Then the battery is odored by the method of incitement. If there is an exciting electrolyte odor, the battery has been leaked. It needs to test the battery of each battery. If a series of voltages is too large and very low, it is necessary to contact the manufacturer to change the battery.

3.Shortage of capacity. Solution: charge and discharge cycle for the battery, usually 3-5 cycles.

When the battery is fully charged (the charger shows full charge), the voltage is zero or on the low side.

1.Battery disconnection. Solution: take apart the battery, check whether the circuit is broken, check whether the solder joint has fallen off, repair the damaged place according to the situation.

2.The protective plate is not working. Solution: first of all, make sure whether the shield plate is in good contact with the shield board, and observe whether the solder joint falls off. If the above conditions are the same, test the voltage between B + B- and P + P-, if the difference between the two voltages is large, the protection board is broken and needs to be tested in detail. The test does not pass and needs to be replaced.

Battery voltage instability

1.Virtual welding .Solution: use the internal resistance tester to test the internal resistance of the battery. If the internal resistance exceeds the specified value, there may be false welding inside the battery, which needs to be disassembled and rewelded.

2.Abnormal protective plate. Solution: replace the protective plate

3.Poor contact between terminals or connectors. Solution: replace terminals or connectors

Normal charging, abnormal discharge or normal discharge, abnormal charging.

1.The protective plate is broken.Solution: the protection plate needs to be replaced.

13.13 Emergency Preparedness

Extreme anomalies that may occur during battery operation: In the process of use, users should establish a good sense of safety prevention, prohibit illegal operation strictly, avoid battery system abuse (overcharge, over-discharge, short-circuit, extrusion, puncture, environmental overheating, high-current discharge, etc.).Possible anomalies in the battery system during charging and use are as follows:

- a. The battery system or the local temperature rises sharply.
- b. The battery system has abnormal odor at any part of the system.
- c. The battery system will smoke and fire at any part of the system.

Emergency measures in case of smoke and fire in battery system during

operation In the event of smoke or open fire occurring in the battery system during the use of the battery, it is dealt with promptly in the following order:

- a. Stop the car and turn off the electricity.
- b. Personnel evacuate the vehicle quickly, call the police according to the situation of the scene.
- c. In order to ensure their own safety, depending on the specific circumstances of the site, the following operations may be carried out:

Using carbon dioxide fire extinguishers or dry powder fire extinguishers to extinguish smoke or fire site under the condition of ensuring the safety of personnel.

- d. Notify our company personnel as soon as possible to deal with.

14. Vehicle operation

14.1 Check and adjust before being put into daily use



- Visual check the forklift, pay attention to the wheel, wheel bolt and load part if damage or loose.
- Check whether the tire pressure is normal with a barometer.
- Check the positioning of the fork.
- Visually inspect the visible area of the hydraulic system for damage and leakage.
- Check that the driver's seat is fastened.
- Check the function of the alarm (including the reversing buzzer if necessary).
- Check that the load curve signs and warning signs are clearly visible.
- Check the functionality of the operation and display elements.
- Check the function of the steering system.
- Check whether the gantry lifting chain is evenly tightened.
- Check the function of the harness (it must be locked during a fast pull out).
- Check the seat switch function: do not operate the hydraulic function when not sitting on the seat.
- Check the lifting / down and tilt hydraulic functions and if necessary.
- When the parking brake operation lever is pulled up, check through multiple trampling.
- Check that the lights are normal.
- Whether the accelerator pedal works properly.
- Visual check on the connection of battery and cable.



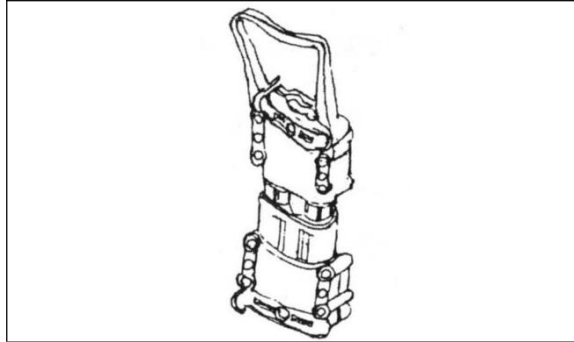
WARNING

If damage or other defects are identified on the forklift or device during subsequent inspection, the forklift shall not be used until repairs are performed as specified. The following operations are required:

1. The forklift defect must be reported to the superior authority immediately.
2. Mark damaged forklifts and stop them.
3. The forklift can be restarted only after the fault is determined and removed.

14.2 Starting

- Open the cover, connect the battery plug, and then close the cover.



- Put the direction lever in the neutral position.
- Turn on key switch.
- Grip the steering wheel knob with your left hand and turn on the key switch with your right hand.
- Tilt mast backwards
- Operate the lifting lever to raise the forks 10 to 20cm off the ground. Operate the tilt lever to tilt the mast all the way back.
- Operate the direction lever
- To drive forward: push the direction lever forward;
- To reverse: pull the direction lever back.
- Release hand brake lever:
- Depress the brake pedal, push the hand brake lever all the way forward.
- Grip the steering wheel knob with your left hand and rest your right hand on the steering wheel.

14.3 Driving

Slowly depress the accelerator pedal until the forklift starts to travel forward or backward.

14.4 Decelerating

Slowly release the accelerator pedal, the forklift will slow down.



CAUTION

Always decelerate in the following situations:

- **When turning;**
- **When approaching cargo or pallets;**
- **When approaching stacked cargo areas;**
- **When entering narrow aisles;**
- **When ground or road is in poor condition.**



WARNING

- **Never depress the accelerator pedal and the brake pedal at the same time.**

14.5 Steering

A forklift is not like an ordinary vehicle in that it has rear-wheel steering, which means that the rear counterweight swings outward when cornering.

Decelerate, then rotate the steering wheel in the direction that you want to turn. The steering wheel needs to be turned slightly earlier than it would in a vehicle with front-wheel steering.



CAUTION

- **Drive slowly and operate the steering wheel carefully. Ensure that there is sufficient room for the rear end to swing out when making the turn.**

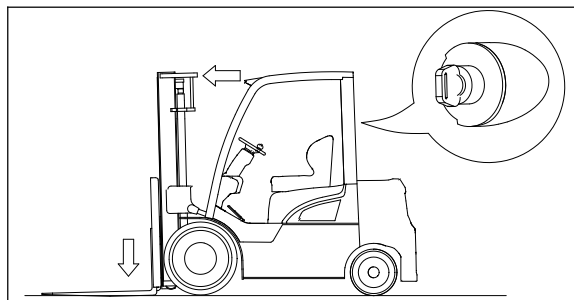
14.6 Parking

- Decelerate, then depress the brake pedal until the vehicle stops.
- Get the shift lever in neutral.
- Apply the hand brake.
- Lower the forks to the floor and tilt the mast all the way forward.
- Turn the key switch to the OFF position, disconnect the battery plug, remove the key and keep it in a secure place.



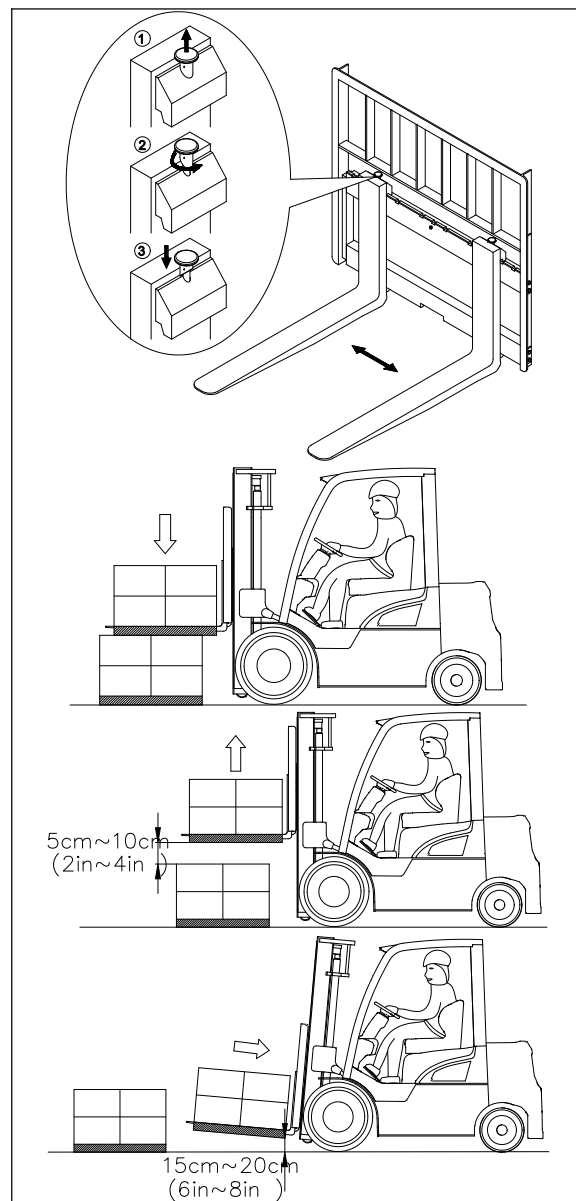
CAUTION

- **Dismount carefully — do not jump off.**
- **The vehicle must not be parked along driving routes.**



14.7 Loading

- Adjust the spacing between the forks to ensure a well-balanced load
- Position the forklift square to the load.
- Pallets should be placed symmetrically with respect to the forks.
- Insert the forks into the pallet as far as possible
- Lifting the load:
 - First raise the forks 5–10cm off the ground and make sure that the load is secure.
 - Tilt the mast all the way back, raise the load 5–10 cm off the ground, then move off.
- When a bulky load restricts vision, the forklift should be driven in reverse, except when driving up a gradient.



14.8 Stacking

- Slow down when approaching the deposit location.
- Stop the vehicle in front of the deposit location.
- Check the condition of the deposit location.
- Tilt the mast forward so the forks are parallel to the floor and raise them until they are slightly above the drop-off position.
- Inch forward until the load is over the drop-off position, then stop.
- After making sure that the load is squarely over the drop-off position, slowly lower the forks and then check that the load is safely deposited.
- To perform necessary lifting and tilting operations, reverse the forklift to remove the forks from the loads.
- Make sure that the fork tips are clear of the load, then lower the forks to 15–20 cm off the ground.
- Tilt the mast all the way back



CAUTION

Slow down to the below condition:

- **When turn;**
- **Approach loads or tray;**
- **Approach stock area;**
- **Enter narrow aisle;**
- **Bad ground or road condition.**



WARNING

- **Do not tilt the mast when the load is raised above 2 m.**
- **Do not dismount or leave a vehicle unattended with a load elevated.**

14.9 Unstacking

- Slow down when approaching the pick-up location.
- Stop when the forklift is 30cm away from the load.
- Check the condition of the load.
- Tilt the mast forward until the forks are parallel to the floor, then raise the forks to the level of the pallet or rack.
- Make sure that the forks are aligned with the pallet, move forward slowly and insert the forks all the way into the pallet, then stop.



CAUTION

- **When it is difficult to insert the forks fully into the pallet, drive forward so that the forks are inserted to 3/4 of their length. Raise the forks by 5–10cm, back up 10–20cm, then lower the pallet or rack. Drive forward again until the forks are fully inserted.**

- Raise the forks 5–10cm off the stack.
- Look around the vehicle to make sure there are no obstacles in your path, then back up slowly.
- Lower the forks 15–20cm off the ground, tilt the mast all the way back, then carry the load to its destination.

14.10 Post-operation checks

After use, clean the forklift and carry out the following checks:

- Check for damage and oil leaks.
- Add lubricant if required.
- Check tires for damage and foreign bodies embedded in the treads.
- Check for loose wheel nuts.
- If the forks have not been elevated to their maximum height during the day, after finishing work, raise them to their maximum height 2 to 3 times.



CAUTION

- **If you discover any defects or faults, have them repaired immediately.**
- **Do not use the forklift until it has been fully repaired.**

14.11 During running-in

New forklifts should run under low load in the initial stage of being put into use. In particular the following requirements should be met within the first 100 hours of operation:

Battery over discharge must be prevented during initial use.

Generally, it should be charged in time when it is 80% discharged.

Required preventive maintenance must be carried out thoroughly.

Avoid sudden braking, acceleration or cornering.

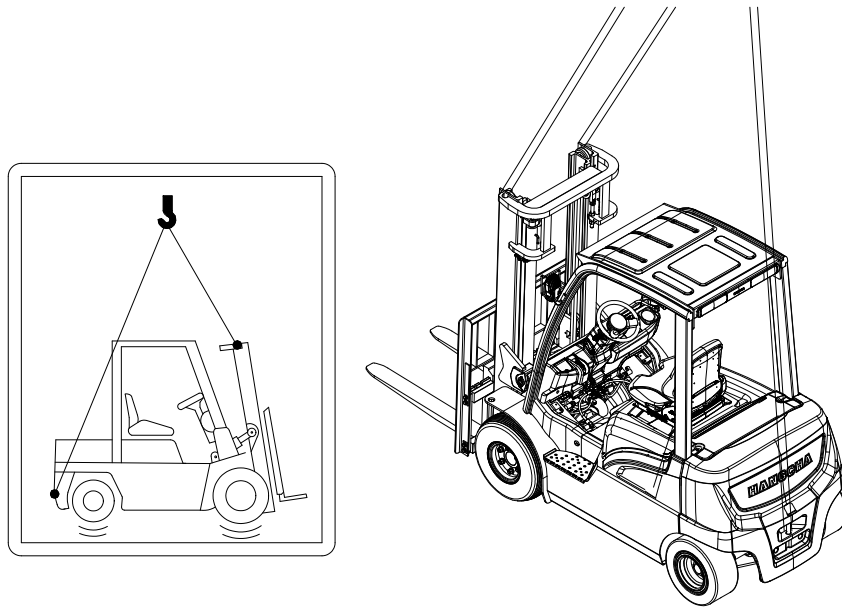
Carry out oil changes or lubrication ahead of schedule in accordance with regulations.

Limit the load weight to 70%–80% of the rated load.

15 Truck lifting, carrying and towing

15.1 Lifting

Securely fasten wire ropes to the lifting holes in both ends of the outer mast crossbar and to the counterweight hook, and then hoist the forklift with a lifting device. The wire rope fastened to the counterweight end must pass through the gap in the overhead guard, without putting stress on the overhead guard.



Securely fasten wire ropes to the lifting holes in both ends of the outer mast crossbar and to the counterweight hook, and then hoist the forklift with a lifting device. The wire rope fastened to the counterweight end must pass through the gap in the overhead guard, without putting stress on the overhead guard.



Warning

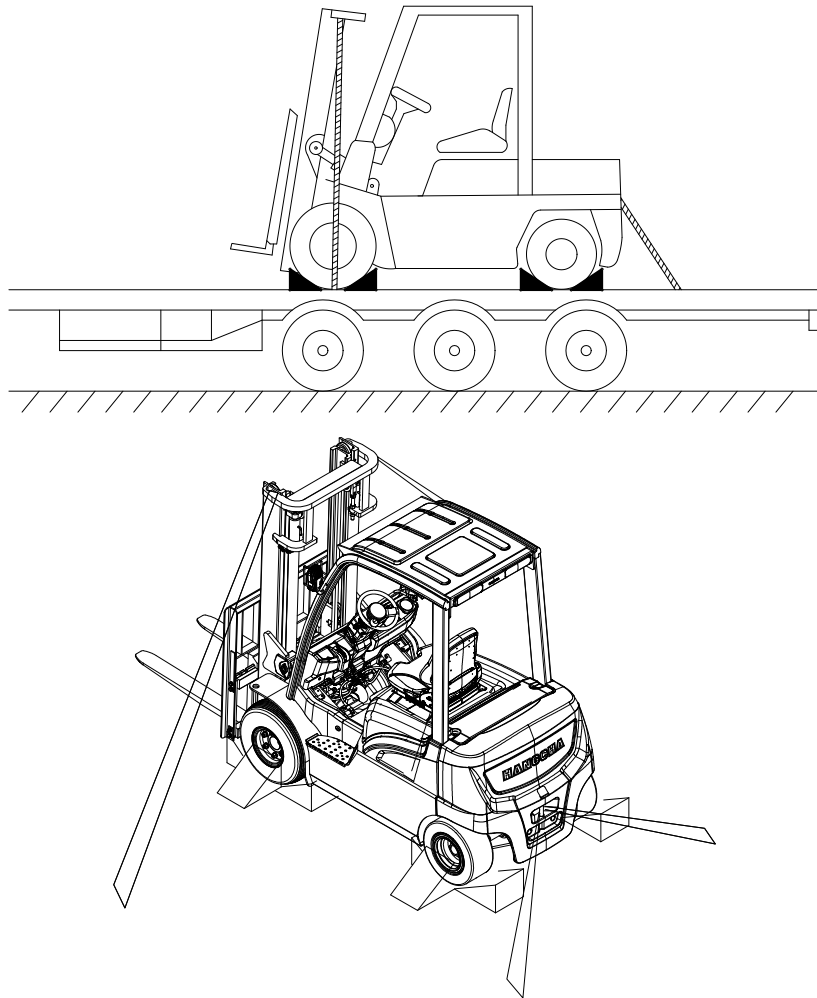
- Only use the lifting tools with enough load.
- Fully tilt the mast backward when lifting.
- When assembling lifting tool, notice that the lifting tool will not touch forklift part or overhead guard when lifting.
- Do not lift a forklift by its cab frame (overhead guard).
- Never walk under a forklift when it is being lifted.

15.2 Carrying

Forklift trucks are generally used for loading, unloading and short-distance transportation. They are not designed to be a long-distance mode of transport. A forklift that needs to be transported over a long distance should be transported in a ship, train or a truck having a load capacity over 5T.

Steps:

- Park the forklift on the lorry or trailer, and apply the parking brake.
- Tie the tension belt to the mast upper beam and counterweight tow pin, and use clamping device to strain the tension belt.
- Block the front and rear wheel of the forklift with wedge wood.



Warning

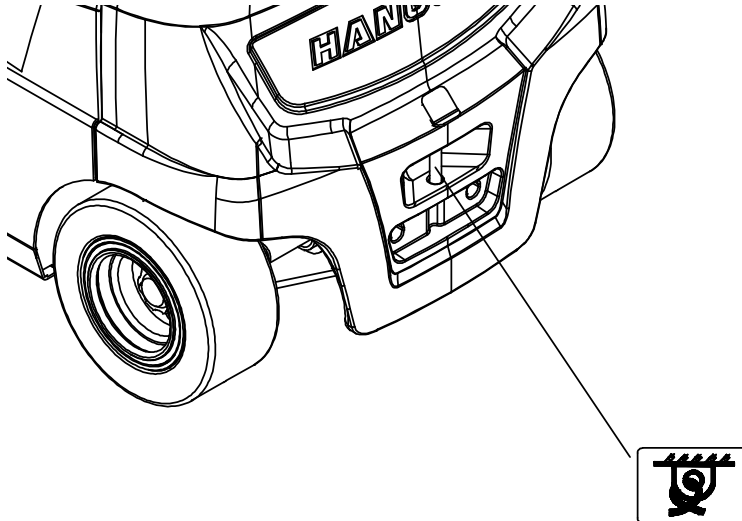
- When fixing forklift, take effective measures according to specific condition to guarantee the safety of transportation.
- Correctly fix the forklift when transporting by lorry or trailer.
- Chock the forklift to avoid accident movement.
- Only use tension belt with big enough nominal strength or fasten the belt to fix the truck.

15.3 Towing

Forklift is not permitted to use for daily traction or traction task

Towing pin in the lower counterweight is only used for the following occasions:

- Forklift malfunctions on the working road and move the truck urgently.
- Use when forklift gets into trouble and cannot drive(wheels get stuck in pits etc.)



Steps:

- Turn off the key switch and disconnect the power plug.
- Release the parking brake.
- Put the direction lever in neutral.
- Fasten the wire rope for traction.

It can drag the forklift.



Warning

- **Do not tow the forklift with abnormal steering system and damaged braking system.**
- **Don't carry a load to steel wire ropes suddenly.**
- **Towing the forklift while the power is on will damage the controller.**

16 Maintenance

16.1 Maintenance summary

- The forklift must be regularly checked and maintained to keep it in good working order.
- Inspection and maintenance is often easily overlooked. Early detection enables problems to be addressed in a timely manner.
- Use original Hangcha Group spare parts.
- Do not use different types of oil when changing or topping up oil.
- Waste oil and battery fluid must not be poured away indiscriminately, but recycled or disposed of in accordance with local environmental laws and regulations.
- Establish and follow a comprehensive maintenance and service schedule.
- Maintain current and complete records of all maintenance and servicing activities.
- Untrained personnel must not attempt to carry out forklift repairs.



CAUTION

- **No Open flames !**
- **Turn off the key switch and disconnect the battery plug before carrying out any servicing or maintenance. (except when carrying out certain obstacle checks).**
- **Clean electrical parts with compressed air. Do not clean with water.**
- **Do not put your hands, feet or any part of your body between the mast and dashboard.**

16.2 Daily maintenance (8 hours)

It also serves as a pre-operation check.

To ensure the safe operation of the forklift truck, the operator must check and adjust the forklift truck before driving it.



Warning

- **If there is damage or a safety hazard on the forklift truck or attachment found in the check, the forklift truck should not be used again until it is repaired in accordance with the regulations.**
- **In addition to testing the lights and checking the operational performance, the key switch must be turned off and the battery must be unplugged before checking the electrical system.**

16.2.1 Leakage inspection of hydraulic oil, electrolyte, brake fluid

Check whether there is any oil/fluid leakage in the hydraulic pipe connectors, battery and brake system by hand and visual inspection. Do not use naked flames.

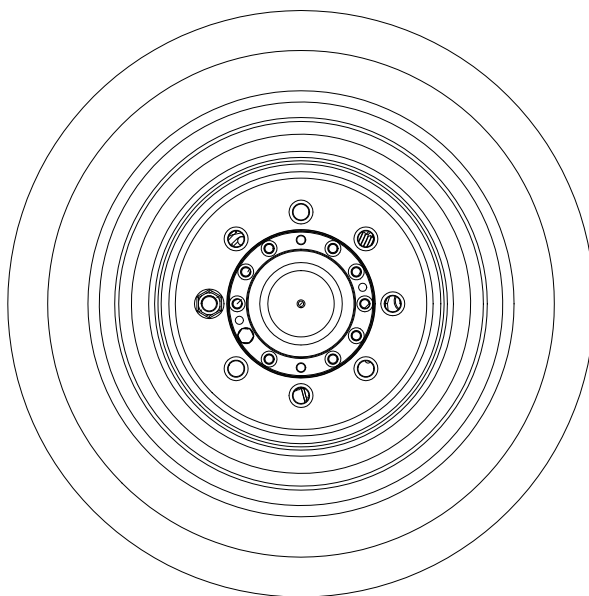
16.2.2 Wheel fastening inspection and tire replacement

- Park the truck according to rules and regulations.
- Tighten the wheel nuts with a torque wrench in a crosswise way.

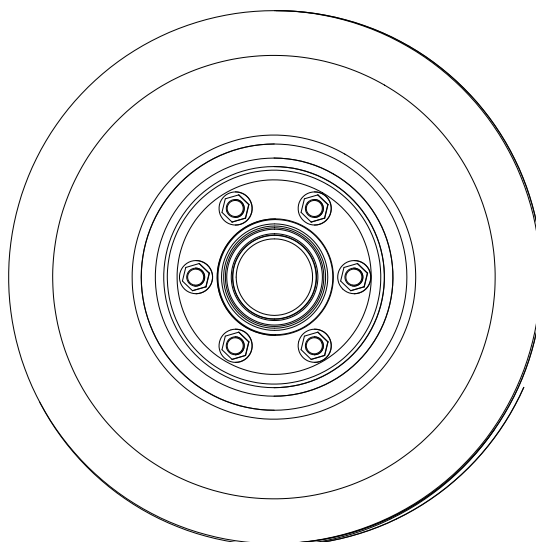
Table of Bolt Tightening Torque:

Front wheel nuts	Rear wheel nuts;
363-490 Nm	363-490 Nm

Front wheel (driving wheel)



Rear wheels (steering wheels)



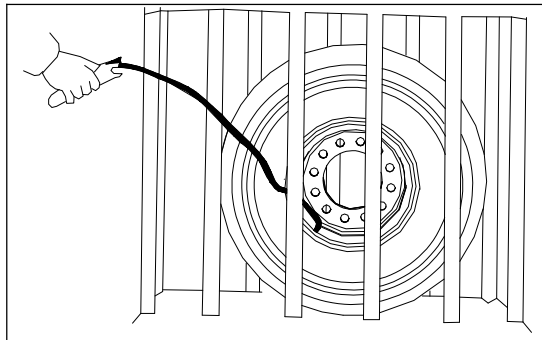
Replacing the tires:



Warning

The forklift truck tires require very high pressure to bear loads; tiny deformation of the rim or surface damage to the tire may cause an accident.

- When using an air compressor, as the maximum output pressure of the air compressor is higher than the specified pressure of the tire, the pressure setting should be adjusted first; otherwise it may cause a serious accident.
- In order to ensure safety, the tire should be placed in a protective frame during inflation.



Front wheel tires

- ① Park the forklift on level and solid ground.
- ② Turn on the switch and raise the mast by approximately 100 mm.
- ③ Place wooden blocks behind the rear wheels to prevent the forklift from moving.
- ④ Loosen each wheel nut 1-2 turns counterclockwise.
- ⑤ Tilt the mast backward and place wooden blocks at the sides of the outer mast.
- ⑥ Tilt the mast forward until the front wheels are lifted off the ground.



Caution

Do not loosen the nuts until the front wheels have been lifted off the ground.

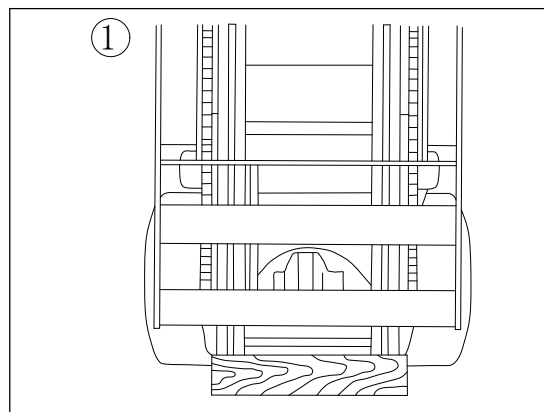
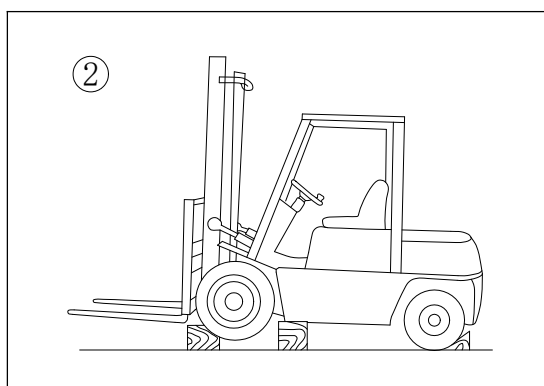
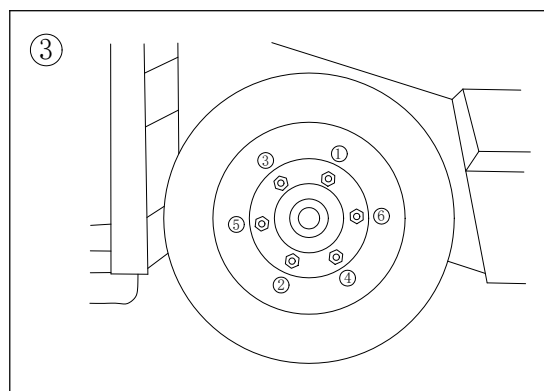
- ⑦ Place wooden blocks on each front side of the forklift frame to support the forklift and then turn off the switch.
- ⑧ Remove the wheel nuts and replace the front wheels.



Caution

- a. When removing the tire from the hub, the rim bolts and nuts should not be removed until deflating.
- b. The wooden blocks should be solid and strong enough.
- c. When the forklift is only supported with wooden blocks do not lay under it.

- ⑨ Put on the nuts in sequence as shown in the diagram and lock them temporarily.
- ⑩ Turn on the switch and remove the wooden blocks from the forklift frame.
- ⑪ Tilt the forklift frame backward so that the forklift is slowly lowered, and then take out the wooden blocks under the forklift frame and at the rear wheels.
- ⑫ Tighten the tire bolts symmetrically and crosswise in sequence.
- ⑬ Adjust the tire pressure to the specified value.



Rear wheel tires

1. Park the forklift on level and solid ground.
2. Engage the handbrake and place wooden blocks behind the front wheels to prevent the forklift from moving.

3. Place the jack at the bottom cut of the counterweight as shown in the diagram.

Note: Make sure the minimum bearing weight of the jack is $\frac{2}{3}$ of the total weight of the forklift truck.

4. Loosen the nuts on the wheel 1-2 turns counterclockwise.



Warning

Do not remove the nuts until the rear wheels are lifted off the ground.

5. Slowly lift the forklift with a jack until the rear wheels are completely off the ground. Place wooden blocks on each rear side of the forklift frame to support the forklift as shown in the diagram.

6. Remove the wheel nuts and replace the rear tires.



Warning

a. When removing the tire from the hub, the rim bolts and nuts should not be removed until deflating.

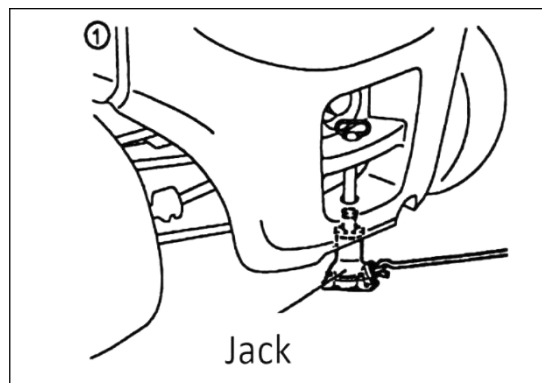
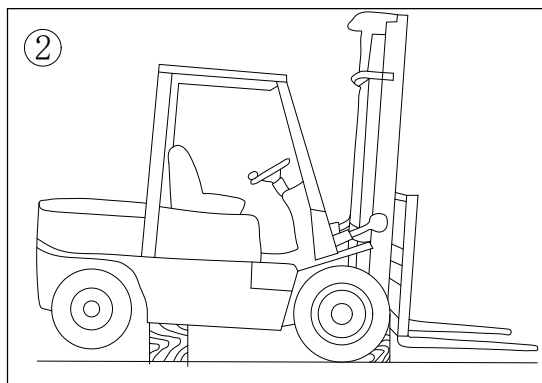
b. Make sure that the wooden blocks used to support the forklift are solid and strong enough.

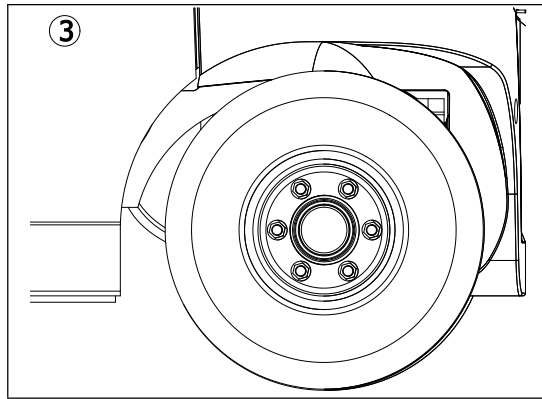
7. Put on the nuts in sequence as shown in the diagram and lock them temporarily.

8. Remove the wooden blocks under the frame, lower the forklift slowly to the ground and remove the wooden blocks and jack behind the front wheels.

9. Tighten the nuts in a crosswise manner to the specified torque, refer to the "Tightening torque" table.

10. Adjust the tire pressure to meet the specified parameters.





16.2.3 Brake pedal inspection

- Depress the brake pedal and check for sluggishness or jamming.
- Adjust the pedal height: Adjust the stop bolts so that the distance between the middle point of the upper surface of the pedal and the front bottom base is 140-150mm.
- Adjust the length of the brake master cylinder push rod so that the idle stroke of the pedal is 1mm-3mm.
- Gradually depress the brake pedal by 10mm-20mm, the brake light switch should be turned on.

16.2.4 Handbrake lever inspection

The operating force is adjusted by the top lever screw. Screw it clockwise to increase the operating force; screw it anticlockwise to decrease the force.

Make sure the hand brake handle acts normally after it is tightened and then loosened to its original position.



Caution

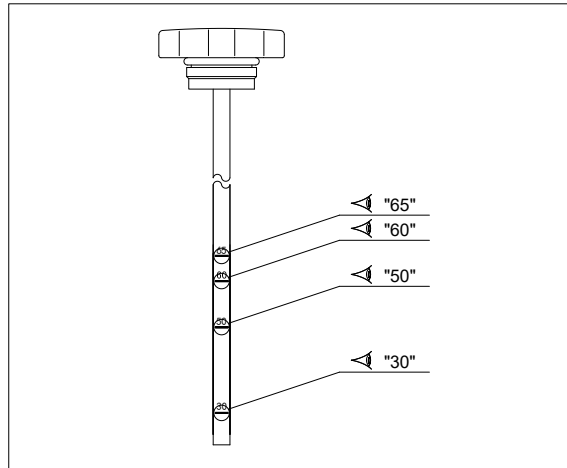
Depressing the brake pedal helps to tighten or loosen the handbrake lever.

16.2.5 Accelerator pedal inspection

When the accelerator pedal is depressed, the acceleration should increase and the pedal should return when released.

16.2.6. Hydraulic oil inspection

Open the front hood, unscrew the hydraulic oil filling cover at the left rear part, pull out the dipstick and check whether the oil level is between the scale lines. If the oil level is insufficient, add more into the tank. Then close the front hood.



After the working device operates to fill the pipeline with oil, the working device is reset, and the liquid level in the hydraulic oil tank needs to reach the indicated scale.

"30" refers to the liquid level when the mast with a lifting height of 3.0m or less is equipped.

"50" refers to the liquid level when the mast with a lifting height of 5.0m or less is equipped.

"60" refers to the liquid level when the mast with a lifting height of 6.0m or less is equipped.

"65" refers to the liquid level when the mast with a lifting height of 6.5m or less is equipped.

Note: When installing attachments, please add hydraulic oil appropriately according to the attachments.

16.2.7 Driver's seat adjustment

Pull the seat adjusting lever to right, adjust the driver's seat to a comfortable position for your hands and feet, and lock it. Adjust the weight.

16.2.8 Battery inspection

Check if the locking pin is firmly mounted. Check whether the battery is fixed firmly and reliably.

Check whether the two terminal wires are loose or damaged, in which case adjustment or replacement is required.

Connect the battery plug, close the hood

Turn the key switch on.

16.2.9 Dashboard monitor inspection (power, faults)

See the Dashboard section.

16.2.10 Lift lever, tilt lever and attachment lever

Check whether the lift lever, tilt lever and attachment lever are secure and return properly.

16.2.11 Mast

Inspect the mast and fork to ensure:

- The fork is not cracked or bent and firmly and correctly mounted on the fork arm.
- Check the oil cylinder and oil pipe for any oil leakage.
- Check the rotation of the rollers.
- Check whether there are cracks or deformation in the mast.
- Operate the lift, tilt, and attachment lever to check whether the mast works normally and whether there is any abnormal noise.

16.2.12 Mast lubrication

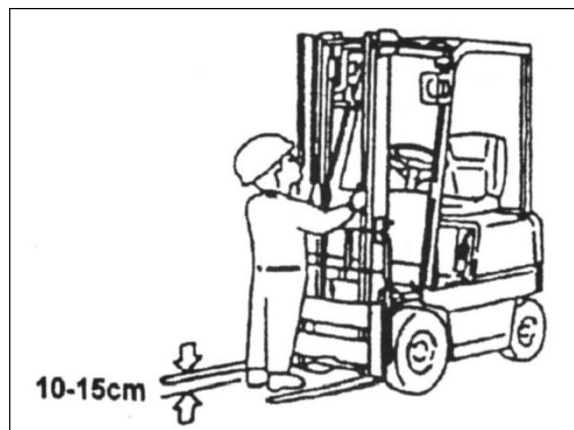
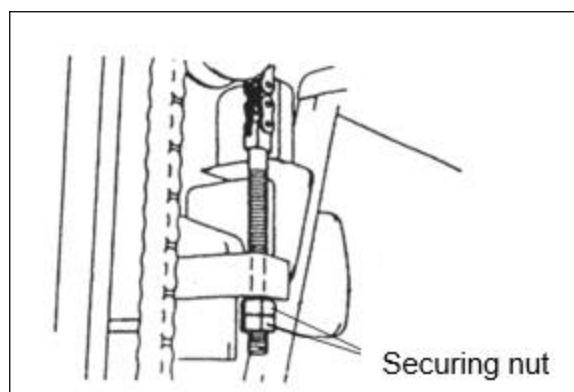
As per the requirements of the regular maintenance and lubrication cycle, the inner and outer mast rails should be lubricated regularly.

The lubrication cycle should be changed according to the operating conditions. In the busy months of operation, the lubrication cycle should be shortened.

In order to ease the truck operation, apply a layer of grease to the contact surface of the lifting guide wheel and the inner & outer mast.

16.2.13 Chain tension inspection

- Raise the fork by 10cm-15cm with the mast vertical.
- Press the middle of the chain with your thumb to check whether the tension of the left and right chains is the same.
- Tension adjustment: loosen the locknut, screw the nut to adjust the chains so that the tension of the two chains is the same, and then tighten the locknut.



16.2.14 Steering system inspection

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

16.2.15 Steering indicator light, horn and other lights inspection

Push and pull the turn indicator light to check whether it works normally.

Press the horn button to check its sound.

Check other lights and the reversing buzzer

16.2.16 Battery maintenance

See the Battery section.

16.2.17 Others

Check for abnormal noises.

16.3 Weekly maintenance (40 hours)

In addition to the daily maintenance, the following maintenance items should be included.

16.3.1 Handbrake lever inspection

The operating force is adjusted by the top lever screw. Screw it clockwise to increase the operating force; screw it anticlockwise to decrease the force.

Make sure the handbrake handle acts normally after it is tightened and then loosened to its original position.



Caution

Depressing the brake pedal helps to tighten or loosen the handbrake lever.

16.3.2 Mast

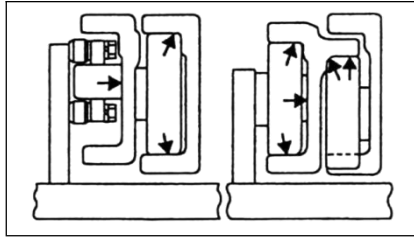
Inspect the mast and forks to ensure:

- The fork is not cracked or bent and firmly and correctly mounted on the fork arm.
- Check the oil cylinder and oil pipe for any oil leakage.
- Check the rotation of the rollers.
- Check whether there are cracks or deformation in the mast.
- Operate the lift, tilt, and attachment lever to check whether the mast works normally and whether there is any abnormal noise.

16.3.3 Lubrication

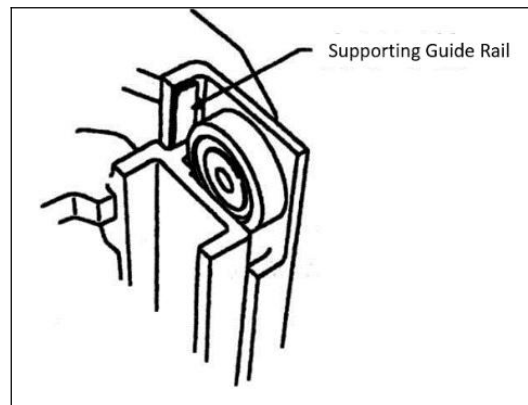
16.3.3.1 Mast lubrication

According to the requirements of the regular maintenance and lubrication cycle, the following parts should be lubricated regularly.



Caution:

a) The lubrication cycle should be adjusted according to the operating conditions. In the busy months of operation, the lubrication cycle should be shortened.



b) In order to ease the forklift truck operation, apply a layer of grease to the contact surface of the lifting guide wheel and the inner & outer mast.

**Warning**

When applying grease, park the forklift on a flat road, turn off the engine and engage the handbrake. Prevent your hands and body from being caught when applying grease, and take care to avoid falling when lubricating at height. Be careful

16.3.3.2 Chain lubrication

Spray the chain spray directly on the chain or take a brush and apply the lubricating oil to both sides of the chain.

16.3.3.3 Apply lubricating grease on the following parts

- (1) Lubrication of mast seat bearing
- (2) Lubrication of brake pedal (clutch)
- (3) Lubrication of steering axle support shaft
- (4) Lubrication of steering knuckle spindle
- (5) Lubrication of steering linkage pin
- (6) Lubrication of steering cylinder pin

16.3.4 The routine inspection and maintenance of the electrical cable and wiring harness connections

Check for the first 40 hours and every 250 hours thereafter.

Regular inspections on the connections of electrical wiring harness such as the motor AC input terminals (U, V, W), controller DC input (B+, B-, fuse), AC output (U, V, W), main contact of DC contactor (positive input, positive output), terminal (charge +, discharge +/-), disconnect switch contact etc. are required during using the forklifts, which needs to be tightened if loose.



Caution

If the fasteners at the connection end of the cable and wiring harness become loose, electric leakage may occur and cause fires with serious consequences!

During the check, the vehicle must be powered off and the battery cables must be disconnected to prevent electric shock!

Operation in humid environments is strictly prohibited!

16.4 Monthly maintenance (200 hours)

Add the following maintenance items in addition to weekly maintenance.

16.4.1 Adding lubricating grease on the front and rear pins of the tilt cylinder.

Wipe the filling point clean and then squeeze out the old oil.

16.4.2 Chain inspection

(1) Use a caliper and measuring tape to measure chain elongation and replace it when the elongation exceeds 3% of the initial length.

(2) Use a caliper to measure the height of the chain plate, replace it when its wear exceeds 3% of the initial height, and replace other chains on the same mast, do not replace them individually.

(3) Clean and lubricate the chain. When the chain is working in severe cold or corrosive substances, the cleaning and lubrication time should be shortened to 100 hours.

16.4.3 Changing the drive axle gear oil

The gear oil should be replaced after 200 hours of use for the first time, and then replaced once every 2000 hours.

Park the forklift on horizontal ground.

- 1) Remove the oil drain plug and drain the oil into a container. Clean the oil drain plug.
- 2) Install the oil drain plug.
- 3) Remove the air vent plug and oil level plug. Add oil into the drive axle housing from the curved plug seat hole until the oil overflows from the horizontal plug hole. See the "Refilling Amount".
- 4) Install the horizontal plug and curved plug holder.
- 5) Start the forklift truck. Put the direction control lever into the neutral position.
- 6) Remove the horizontal plug. Maintain the oil level until the oil overflows.

16.5 Trimonthly maintenance (500 hours)

Add the following maintenance items in addition to those for every one month and a half.

16.5.1 Cleaning the oil absorption filter

Park the forklift truck on a horizontal road, lower the forks to the ground, tilt the mast back, pull up the handbrake handle firmly to stop the forklift truck.

- ① Loosen the bolts on the upper cover assembly of the hydraulic oil reservoir.

- ② Remove the oil absorption filter from the upper cover.
- ③ Clean the oil absorption filter
- ④ Fit the oil absorption filter by hand.
- ⑥ Install the upper cover of the oil reservoir and tighten the bolts.

16.5.2 Check the brake master cylinder and wheel cylinder for any leaks or damage

16.6 Semi-annual maintenance (1000 hours)

Add the following maintenance items in addition to every three-month maintenance.

16.6.1 Lubrication of the steering wheel locking device

Apply lubricating grease to the steering wheel locking device.

16.6.2 Replacement of brake fluid

- (1) Park the forklift truck on a horizontal road in the designated maintenance area, lower the forks to the ground, engage the hand brake handle securely to stop the forklift truck.
- (2) Take off the rubber dust cap on the drain port, put the two ends of the prepared transparent hose in the drain port and the waste oil collection bottle respectively, and then use a wrench to loosen the drain port screw counterclockwise while another person on the vehicle repeatedly presses the brake pedal. The brake fluid will be sprayed from the drain port, pay attention to the level of the brake fluid reservoir, and add new brake fluid as the fluid level drops. Tighten the drain port screws after clear brake fluid flows out.
- (3) Repeatedly press the brake pedal to the bottom and hold it, while the person under the forklift loosens the screws of drain port, tightens the screws after clear brake fluid comes out and then asks the person on the forklift to release the brake pedal. Repeat the above operation several times until there are no air bubbles in the released brake fluid. Pay attention to the fluid level in the brake fluid reservoir and add new brake fluid as the level drops.



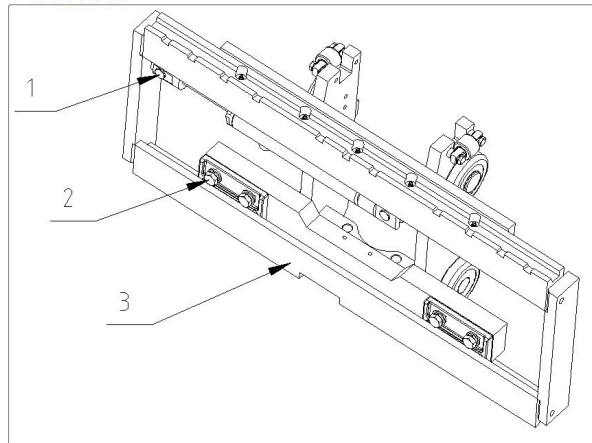
Caution

Prevent dust and water from mixing when adding brake fluid.

Brake fluid is toxic and corrosive and should be rinsed off if you are exposed to it.

16.6.3 Check the built-in friction block in the side shifter

- (1) Remove the pin at the piston rod end of the side-shifting cylinder.
- (2) Remove the four bolts of the left, right and down friction blocks, and remove the down friction block (pay attention to the adjustment pad inside).
- (3) Push the beam under the side-shifting frame forward slightly and lift the side-shifting frame upwards.
- (4) Check the thickness of the friction block and replace the friction block with a new one when the wear relative to the initial size is greater than 2 mm.



16.7 Annual maintenance (2,000 hours)

16.7.1 Hydraulic oil replacement

- Stop the truck in a flat road.
- Turn the steering wheel right to its limit to leave enough room for the drain plug;
- Tilt the mast to its limit and lower the forks to the ground.
- Pull up the handbrake handle;
- Open the hood, unscrew the hydraulic oil filling cover and pull out the dipstick;
- Place an oil container under the frame, remove the drain plug, and drain out the old oil;
- Take away the oil container, handle the waste oil according to local environmental regulations, do not dump it arbitrarily;
- Screw in the drain screw plug, add new hydraulic fluid and check for leaks;
- Start the truck, lift the forks 3-5 times, and tilt the mast forward/backward 3-5 times.
- Refill it with hydraulic oil to the specified line.

16.7.2 Vehicle lubricating grease replacement

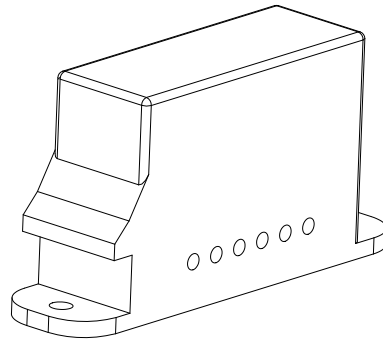
16.8 Fuses

- (1) Before replacing any defective fuse or relay, please investigate the cause of failure.
- (2) Replace the fuse with a new one of the correct specification.

Check and replace the fuse

Operating steps:

- Park the forklift according to rules and regulations.
- Open the right door and unplug the battery.
- Open the fuse box cover.
- Check the fuses for any damage, and replace the damaged fuse promptly.
- Close the fuse box cover.



Caution

- Unplug the battery before any operations on the electrical system of the forklift truck.
- Take off the metal trim before any operations on the electrical system of the forklift truck.
- When replacing a fuse, please select a new fuse of the same rating as the original.

16.9 Others

16.9.1 Oil tank inspection



Warning

- All work must be done by an authorized professional during the inspection. Ensure adequate ventilation if cleaning the oil tank indoors.
- Do not use tools that may cause sparks, heat or static electricity.

1. Visually inspect all sides of the hydraulic tank to ensure that there is no deformation or scratching.
2. Remove the retaining bolts and rubber gaskets on the tank cover, check the tank flange surface, and use a file or other tools to polish the surface if there are any bumps.
3. Remove the retaining bolts and rubber gaskets on the tank cover, check the inner cavity with a flashlight to ensure that there are no iron chips, dust or other solid impurities in the oil tank.
4. Check the oil drain screw plug and replace it promptly if there is any damage.
5. Repair or replace the hydraulic oil tank if it is broken or leaking.

Checks, cleaning and replacement of the return oil filter and oil suction filter

Park the forklift truck on a flat surface, lower the forks to the ground, tilt the mast back and power off.

1. Loosen the bolts on the upper cover assembly of the hydraulic oil tank.
2. Remove the return oil filter from the upper cover.
3. Mount the new return oil filter by hand.
4. Remove the filter screen from the oil tank.
5. Mount a new filter screen by hand.
6. Mount the upper cover of the oil tank and tighten the bolts.
7. Power on and operate the hydraulic system so that the entire system is primed with hydraulic oil. Check for any leakage.
8. Power off and check the oil level. Retract all cylinder rods so that the oil level remains between the scales of the dipstick.

16.9.2 Forklift cleaning



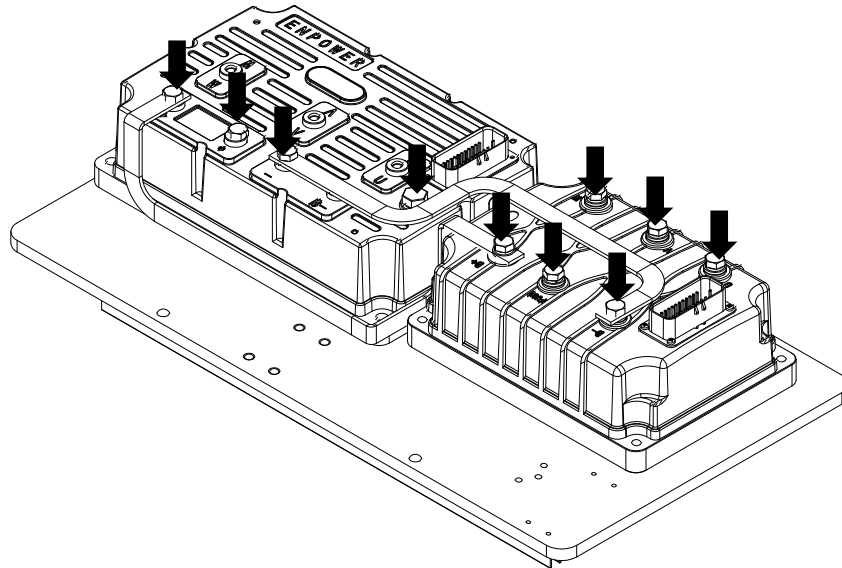
Warning

- Do not clean the truck with flammable liquids!
- Before the cleaning process, the vehicle must be disconnected and the power cable must be unplugged.
- Before cleaning operations, all necessary safety measures must be taken.
- Do not directly wash electrical components with water!
- It is forbidden to directly flush the pedal pad, hood assembly, dashboard assembly and other places with a large number of electrical components with a high-pressure water gun!
- If using a high-pressure water gun to clean the forklift, the electrical components must be carefully covered beforehand, otherwise it may affect the normal function of the forklift's electrical system.

16.9.3 The routine inspection and maintenance of the electrical cable and wiring harness connections

16.9.3.1 Controller contact

Cables, fuses, contactors, copper busbars, terminals and other electrical components are all connected by threads to realize a closed loop of the circuit. If the connection loosens, it is prone to leakage and cause serious accidents like fire etc., so it is necessary to check the fasteners of these parts. The following are some models' controller for reference, the arrow indicates the controller terminals, and the controller appearance is subject to the actual object.

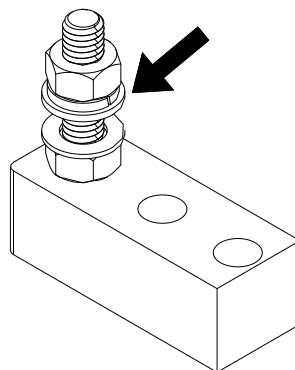


Check the controller for loose threaded part

Power off the forklift and unplug the battery discharge cable for check. Check the connection for looseness by a visual check or wearing gloves (wear insulating gloves for high voltage), and tighten it if loose. The tightening torque is shown in Table 1 Tightening Torque Table for Threaded Connections at Electrical Component End.

16.9.3.2 Terminal

Forklifts are sometimes installed with a separate terminal for wiring and the threads must be checked regularly for looseness.



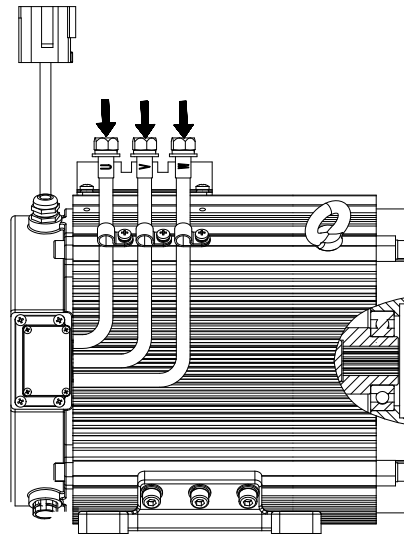
Check the terminal for loose threaded part

The inspection process is performed as follows:

Power off the forklift and unplug the battery discharge cable for check. Check the connection for looseness by a visual check or wearing gloves (wear insulating gloves for high voltage), and tighten it if loose. The tightening torque is shown in Table 1 Tightening Torque Table for Threaded Connections at Electrical Component End.

16.9.3.3 Motor U, V, W terminals

Usually there are U, V, W terminals on the motor to connect the cables, which should be regularly checked for loose threads. The following are some models' motor for reference, the arrows indicate the motor U, V, W terminals, and it is subject to the actual object.

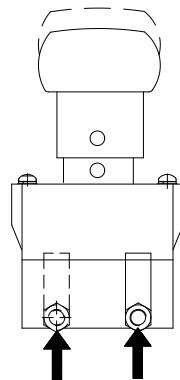


Check the motor terminals for loose threaded part

Power off the forklift and unplug the battery discharge cable for check. Check the connection for loose by a visual check or wearing gloves (wear insulating gloves for high voltage), and tighten it if loose. The tightening torque is shown in Table 1 Tightening Torque Table for Threaded Connections at Electrical Component End.

16.9.3.4 Disconnect switch

Forklifts installed with disconnect switches are sometimes connected with thread, which should be checked regularly for loose threads.



Check the disconnect switch for loose threaded part

16.9.3.5 Electrical wiring harness connector

Wiring harness connectors, cable connections, and battery connectors of the forklift must be checked regularly for looseness. If it is loose, adjust it to ensure a reliable connection.

16.9.3.6 Socket, cable connector, charging socket

Some of the charging socket, socket and cable connector are mounted on the body or lithium-ion battery by bolts or screws, which should be checked regularly and tightened if loose. See Table 3 for Bolt Tightening Torque Table.

16.9.3.7 Tightening Torque Table for Threaded Connections at Electrical Component End

Name of check part	Bolt diameter	Recommended tightening torque (Nm)	Bolt grade	Base
Controller bolt Torque	M6	10 (9–11)	8.8	Aluminum alloy
	M8	15 (13–17)	8.8	Aluminum alloy
Terminal	M8	11 (10–12)	/	Composite insulating material
Fuse assembly	M8	11 (10–12)	/	Composite insulating material
Contactor	M8	11 (10–12)	/	Composite insulating material
Contactor	M10	14 (13–15)	/	Composite insulating material
Fuse	M6	10 (9–11)	/	/
Fuse	M8	15 (13–17)	/	/
Motor terminal block bolts (U, V, W)	M6	6 (5–6)	/	Composite insulating material
	M8	11 (10–12)	/	Ceramics
	M10	23 (21–25)	/	Ceramics
	M12	26 (22–30)	/	/
	M16	55 (50–60)	/	/
Unite motor (U, V, W)	M8	20 (18–22)	/	Ceramics
ZAPI (U, V, W)	M10	11 (10–12)	/	
Liaoyuan motor (U, V, W)	M4	11 (10–12)	/	

16.10 Regular maintenance schedule

○ — Check, correction, adjustment ×— Replacement

16.10.1 Lithium-ion battery

Maintenance Item	Maintenance content	Tools	Daily (8h)	Weekly (40h)	Monthly (200h)	3 months (500h)	6 months (1000h)	12 months (2000h)
Lithium-ion battery	Installation and fastening of lithium-ion batteries		○	○	○	○	○	○
	Cleaning of lithium-ion battery charging sockets				○	○	○	○
	Check whether the contacts of the lithium-ion battery charging socket are damaged or corroded		○	○	○	○	○	○
	Check if there is water on the contacts of the lithium-ion battery charging socket, and dry it off if there is any		○	○	○	○	○	○
	Check whether the dust cover of the lithium-ion battery charging socket is in good condition				○	○	○	○
	Check whether the lithium-ion battery casing is damaged		○	○	○	○	○	○
	Check the battery level		○	○	○	○	○	○
	Check whether it is kept safe from smoke and flames		○	○	○	○	○	○
	Loose connection between battery charge/discharge cable and socket			○ (for the first time)	○	○	○	○

16.10.2 Controller

Maintenance Item	Maintenance content	Tools	Daily (8h)	Weekly (40h)	Monthly (200h)	3 months (500h)	6 months (1000h)	12 months (2000h)
Controller	Check the contacts for any wear					○	○	○
	Check whether the mechanical motion of the contactor is abnormal					○	○	○
	Check whether the micro switch works normally					○	○	○
	Check whether the connections between the motor, battery and power unit are in good condition					○	○	○
	Check whether the fault diagnosis system of the controller is normal							After 2 years for the first maintenance
Controller contact	Tightness of thread installation	Torque wrench		○ (for the first time)	○	○	○	○
	There is no risk of touch short circuit between the copper plate and each pole column.			○ (for the first time)	○	○	○	○
	Whether the cable sheath of each pole column and terminal column is complete and suitable.			○ (for the first time)	○	○	○	○

16.10.3 Motor

Maintenance Item	Maintenance content	Tools	Daily (8h)	Weekly (40h)	Monthly (200h)	3 months (500h)	6 months (1000h)	12 months (2000h)
Motor	Clean the motor enclosure				○	○	○	○
	Clean and replace the bearings						○	○
	Check the carbon brushes and rectifiers for any wear; check whether the spring force is normal				○	○	○	○
	Check whether the wiring is correct and secure				○	○	○	○
	Clear away the carbon powder in the commutator slot and on its surface					○	○	○
Motor U, V, W terminals	Tightness of thread installation			○ (for the first time)	○	○	○	○

16.10.4 Transmission system

Maintenance Item	Maintenance content	Tools	Daily (8h)	Weekly (40h)	Monthly (200h)	3 months (500h)	6 months (1000h)	12 months (2000h)
Drive axle	Check for any noises		○	○	○	○	○	○
	Check for any leakage		○	○	○	○	○	○
	Oil change						×	×
	Check the hub bearing for looseness and noise.			○	○	○	○	○
	Clean and refill lubricating oil					×	×	×
	Check for any leakage		○	○	○	○	○	○
	Check the axle for any deformation, cracks or damage				○	○	○	○

16.10.5 Wheels (front/rear)

Maintenance Item	Maintenance content	Tools	Daily (8h)	Weekly (40h)	Monthly (200h)	3 months (500h)	6 months (1000h)	12 months (2000h)
Tire	Inflation pressure	Air pressure gauge	○	○	○	○	○	○
	Wear, cracks or damage		○	○	○	○	○	○
	Check the tires for any nails, gravel or other foreign objects.				○	○	○	○
	Check the rim for any damage		○	○	○	○	○	○
	Check the split rim bolts are tight	Inspection hammer	○	○	○	○	○	○

16.10.6 Steering system

Maintenance Item	Maintenance content	Tools	Daily (8h)	Weekly (40h)	Monthly (200h)	3 months (500h)	6 months (1000h)	12 months (2000h)
Steering wheel	Check the clearance		○	○	○	○	○	○
	Check the slack in the axial direction		○	○	○	○	○	○
	Check the slack in the radial direction		○	○	○	○	○	○
	Check the operating condition		○	○	○	○	○	○
Steering gear	Check the mounting bolts for looseness				○	○	○	○
Steering knuckle	Check the pin for looseness				○	○	○	○
	Check for bends, deformations, cracks or damage				○	○	○	○
	Check the installation condition	Inspection hammer			○	○	○	○
Steering cylinder	Check the operating condition		○	○	○	○	○	○
	Check for any leakage		○	○	○	○	○	○
	Check for any looseness in the assembly and joints				○	○	○	○

16.10.7 Braking system

Maintenance Item	Maintenance content	Tools	Daily (8h)	Weekly (40h)	Monthly (200h)	3 months (500h)	6 months (1000h)	12 months (2000h)
Brake pedal	Idle running	Calibrated scale	○	○	○	○	○	○
	Pedal travel		○	○	○	○	○	○
	Check the operating condition		○	○	○	○	○	○
	Check the brake line for air		○	○	○	○	○	○
Parking brake control	Check whether the brake is safe and reliable, and has enough travel		○	○	○	○	○	○
	Check the operating performance		○	○	○	○	○	○
Tie rod or cable, etc.	Check the operating performance				○	○	○	○
	Check the joints for looseness				○	○	○	○
	Check for any wear in the transmission joints					○	○	○
Pipeline	Check for damage, leaks, cracks				○	○	○	○
	Check the joints and clamping parts for any looseness				○	○	○	○
Brake master cylinder and wheel cylinder	Check the leakage		○	○	○	○	○	○
	Check the oil level, change it if necessary		○	○	○		×	×
	Operating condition of the brake master cylinder and wheel cylinder					○	○	○
	Check the brake master cylinder and wheel cylinder for any leaks or damage					○	○	○

	Check the brake master cylinder and wheel cylinder piston cup and non-return valve for any wear or damage and replace if necessary.						x	x
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16.10.8 Hydraulic system

Maintenance Item	Maintenance content	Tools	Daily (8h)	Weekly (40h)	Monthly (200h)	3 months (500h)	6 months (1000h)	12 months (2000h)
Hydraulic oil tank	Check the oil level or change it		○	○	○	○	x	x
	Clean the oil absorption filter						○	○
	Clear away any foreign objects						○	○
Control valve stem	Check the joints for looseness		○	○	○	○	○	○
	Check the operating condition		○	○	○	○	○	○
Multi-way valve	Check for oil leakage		○	○	○	○	○	○
	Check the operating condition of the safety valve and tilt self-locking valve				○	○	○	○
	Measure the safety valve pressure	Oil pressure gauge					○	○
Pipe joint	Check pipeline joints for any leakage, looseness, fracture, deformation or damage				○	○	○	○
	Replace the pipe							x 1-2 years
Hydraulic pump	Check the hydraulic pump for any leakage or noise		○	○	○	○	○	○
	Check the driving gear of the hydraulic pump for any wear and tear				○	○	○	○

16.10.9 Lifting system

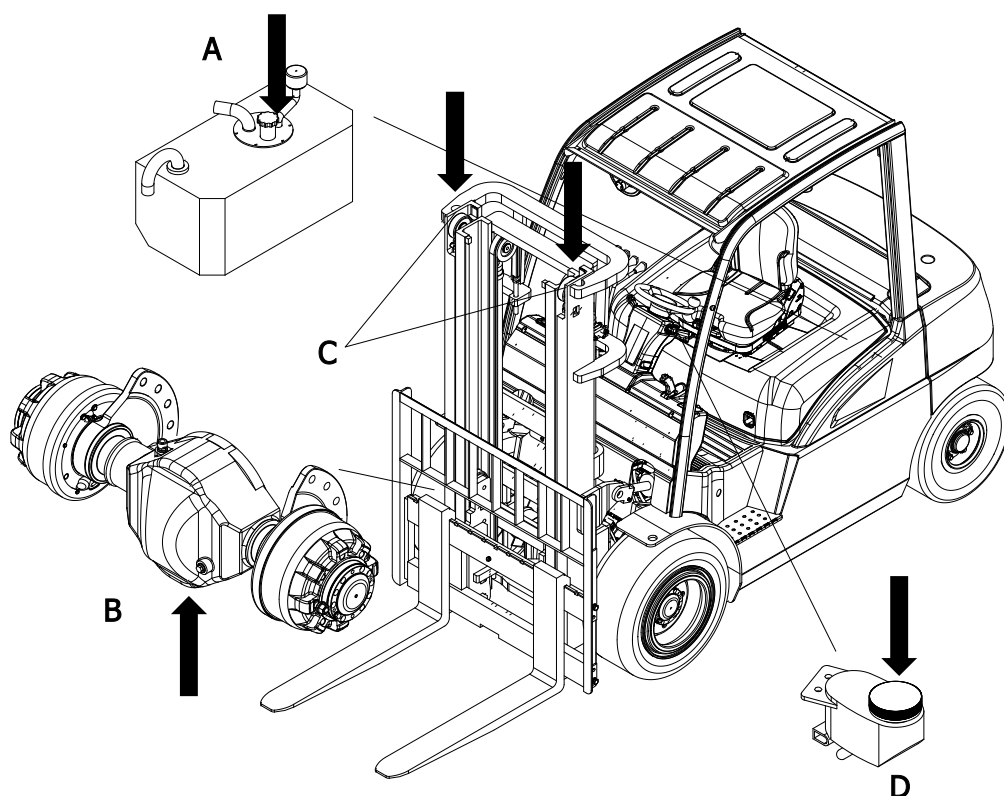
Maintenance Item	Maintenance content	Tools	Daily (8h)	Weekly (40h)	Monthly (200h)	3 months (500h)	6 months (1000h)	12 months (2000h)
Chain and chain wheel	Check the chain tension and check for any deformation, damage or rust		○	○	○	○	○	○
	Lubricate the chain				○	○	○	○
	Check the riveted pin for any looseness				○	○	○	○
	Check the chain wheel for any deformation or damage				○	○	○	○
	Check the chain sprocket for any looseness				○	○	○	○
Attachments	Check the operating status				○	○	○	○
Lifting cylinder and tilting cylinder	Check the piston rod, the thread and joint for any looseness, deformation or damage	Inspection hammer	○	○	○	○	○	○
	Check the operating condition		○	○	○	○	○	○
	Check the leakage		○	○	○	○	○	○
	Check the pin and steel-backed bearing of the cylinder for any wear or damage				○	○	○	○
Fork	Check the forks for any damage, deformation or wear				○	○	○	○
	Check the stop dowel for any damage or wear					○	○	○
	Check the welded part of the hook at the root of forks for any cracks or wear				○	○	○	○
Mast and fork arm carrier	Check the welding between the inner/outer mast and beam for any cracks or damage				○	○	○	○
	Check the welded part between the tilt cylinder frame and mast for any poor welding, cracks or damage				○	○	○	○
	Check the inner/outer mast for any poor welding, cracks or damage				○	○	○	○

	Check the fork arm carrier for any poor welding, cracks or damage				○	○	○	○
	Check the roller for any looseness				○	○	○	○
	Check the bearing shaft bush of the mast for any wear or damage						○	○
	Check the bearing cap bolts of the mast for any looseness	Inspection hammer			○ (Only for the first time)		○	○
	Check the bolts at the top of the lifting cylinder piston rod for any looseness	Inspection hammer			○ (Only for the first time)		○	○
	Check the roller, roller shaft and welded part for any cracks or damage				○	○	○	○

16.10.10 Others

Maintenance Item	Maintenance content	Tools	Daily (8h)	Weekly (40h)	Monthly (200h)	3 months (500h)	6 months (1000h)	12 months (2000h)
Check the overhead guard and load backrest	Check whether they are secured	Inspection hammer	○	○	○	○	○	○
	Check for any deformation, cracks or damage		○	○	○	○	○	○
Steering indicator light	Check the operating and installation condition		○	○	○	○	○	○
Horn	Check the operating and installation condition		○	○	○	○	○	○
Lights and light bulbs	Check the operating and installation condition		○	○	○	○	○	○
Reverse buzzer	Check the operating and installation condition		○	○	○	○	○	○
Instruments	Check the operating condition of all instruments		○	○	○	○	○	○
Controller contact	Tightness of thread installation	Torque wrench		○ (for the first time)	○	○	○	○
	There is no risk of touch short circuit between the copper plate and			○ (for the first time)	○	○	○	○
	Whether the cable sheath of each pole column and terminal column is			○ (for the first time)	○	○	○	○
Disconnect switch	Tightness of thread installation	Torque wrench		○ (for the first time)	○	○	○	○
Vehicle wiring harness	Damaged wiring harness, loose connection			○ (for the first time)	○	○	○	○
	Loose circuit connection			○ (for the first time)	○	○	○	○
Socket, cable connector, charging socket	Loose fasteners				○	○	○	○

16.11 Oil and lubrication of the forklift



代码	名称	规格	加油量	备注
A	Hydraulic oil	Normal environments: L-HM32 Severely cold environments:L-HV32	45L	Hydraulic oil tank
B	Gear oil	Heavy-load vehicle gear oil GL-5	8L	Driving axle
C	Grease	General purpose automotive lithium grease		Lubrication Part
D	Brake fluid	DOT3	1L	Brake liquid oil pot
	Industrial Vaseline	2#		Battery electrode pole
	Anti-rust oil	Chain spray or engine oil		Chain

Note: Replace the hydraulic oil as shown in fig. 16.7.1

16.12 Regular replacement of key safety parts

- It is difficult to find damage to certain parts through regular maintenance, thus in order to improve safety, the user should regularly replace the parts listed in the table below.
- If the replacement time is not reached and any abnormality is found in these parts, the defective parts should be replaced immediately.

Key safety part name	Service life(years)
Brake hose or rigid pipe	1~2
Hydraulic rubber hose for the lifting system	1~2
Lifting chain	2~4
High-pressure rubber hose and flexible tube for the hydraulic system	2
Brake master cylinder cover and dust cap	1
Sealing parts and rubber parts in the hydraulic system	2
Steering axle rubber pad	4

17 Storage

17.1 Daily storage

- Park the forklift at the designated place and use wedge blocks to support the wheels.
- Pull the shift lever into the neutral position.
- Pull up the handbrake handle.
- Turn off the key switch and operate the multi-valve handle several times to release the remaining pressure in the oil cylinder and pipeline.
- Unplug the power supply.
- Remove the key and keep it in a safe place.
- Forklift trucks specially designed for cold storage warehouse should not be turned off and parked inside the warehouse.

17.2 Long-term storage

Make the following maintenance and checks in addition to maintenance as required in Daily Storage.

- Unplug the battery to prevent discharge and store it in a dark place.
- Apply anti-rust oil to exposed parts such as the piston rod and shafts that may rust.
- Cover the ventilation holes and other places where water can enter.
- Cover the vehicle forklift with a cover.
- Fill all lubrication points with oil (grease).
- Use wooden blocks for support under the vehicle body and counterweight to reduce the loading on the rear wheels.
- Run the forklift truck once a week. Lift the forks to maximum height several times.



Warning

- The wooden block must be solid and should be strong enough to support the weight of the forklift truck.
- Do not use blocks higher than 300 mm
- Raise the forklift just enough to place it on the supports
- Place blocks of the same size under the left and right sides of the forklift
- After supporting the forklift with the blocks, push the forklift back and forth & left and right to check whether it is stable.

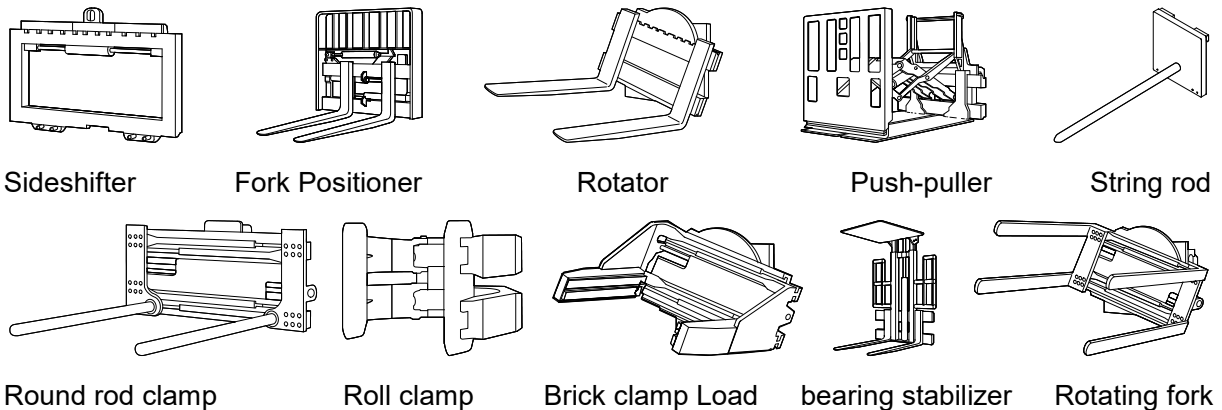
17.3 Operations after long-term storage

- Remove the anti-rust oil on exposed parts.
- Drain the gear oil from the drive axle and transmission, clean the inside and add new oil.

- Charge the battery, mount it on the truck and connect the battery leads.
- Carefully carry out pre-start inspection to check the starting, forward, reverse, steering, lifting, lowering, front and rear tilting functions of the forklift truck.

18 Use, installation and safety rules for attachments

We select the attachments, such as the side shifter, fork positioner, rotator, push-puller and string rod, etc., in accordance with international standard ISO2328: Forklift trucks - Hook-on type fork arms and fork arm carriages - Mounting dimensions.



18.1 Installation of attachments

- Without the technical permission of the company, it is strictly prohibited to modify the safety and performance of the forklift truck attachments.
- The actual load-carrying capacity shall be subject to the rated load-carrying capacity of the forklift truck, the load-carrying capacity of attachments, or the overall load-carrying capacity of the whole truck, whichever is the smaller. Generally speaking, the overall bearing capacity of the complete truck is the lowest of the three. “Bearing capacity of attachments” is a calculated value for the force applied on attachments.
- The installation and positioning should be reasonable, reliable and safe, to avoid attachments sliding from side to side along the fork arm carrier of the forklift truck during use.
- After the attachments are mounted, if there is a upper hook block, it should be embedded in the notch of the upper beam, so that the offset between the center line of attachments.
- The offset from the center line of the fork arm carrier should be less than 50mm, otherwise it will affect the lateral stability of the forklift.
- For attachments with a rotation function, (roll clamp, soft clamp, multi-purpose rigid arm clamp, bucket clamp) after hanging and installation, stop blocks should be welded on both sides of the joint between the upper beam of the fork arm carrier and the attachments to prevent sliding when operating them.
- When attachments with lower hook positioning are installed, the joint spacing between the lower hook and the lower beam of the fork arm carrier should be adjusted appropriately.

18.2 Use of attachments

- Become familiar with the relevant content on the nameplate of the forklift truck, read the relevant operation manual carefully before use (especially the user manual and installation manual of the professional attachment company), and be trained and qualified to operate the forklift truck attachments.
- Fully understand the basic performance and operation methods of forklift attachments, especially the allowable load, lift height, cargo size and the fitting range of attachments;
- When operating forklift truck attachments with multiple functions, such as side shift, clamping or rotation, do not perform multiple operations at the same time. One action can be carried out only after the other one is completed.
- Forklift trucks provided with attachments must not be driven when the cargo is at a high level; when the cargo volume is too large do not drive the forklift truck forwards; when transporting cargo, ensure that cargo is 300 mm above the ground, and the mast is tilted backward;
- The weight of the cargo should not exceed the limit of the combined bearing capacity of the forklift truck and attachments. Try not to load eccentrically at high cargo positions. Attachments with side shift function can only be operated for a short time. Eccentric load is strictly limited to 100 mm on the left and right (the side shift amount of the side shifter above 5 tons (including 5 tons)) is within the range of ± 150 mm).
- Except for the driver's position which is protected by the overhead guard, it is strictly prohibited to stand within 2 meters of the projection area under attachments and cargo to avoid injury.
- It is strictly prohibited to engage the emergency brake when the forklift truck with attachments is running and it is required to drive slowly with a load.
- Do not allow external forces to act on the truck when the attachment is working; do not use the attachment for unsuitable purposes, the normal working range of the attachment must not be exceeded.
- Do not use attachments for unsuitable purposes, do not exceed the normal scope of work of attachments.
- When attachments are faulty, they should not be used until the fault has been eliminated.

18.3 Checks and maintenance of the attachments

- Check whether the spacing between the lower beams of the forks of the forklift truck and the lower hooks of attachments conform to the requirements of the attachment manual.
- Check whether the upper hook is properly embedded in the groove of the fork arm carrier of the forklift truck.
- The upper and lower sliding support surfaces should be lubricated with general automotive lithium based grease every 500 hours.
- Check fasteners for tightness.
- Regularly check whether hydraulic circuit connections are loose and whether the hose is damaged. If it is damaged, it must not be used before repair.
- Regularly check whether the transmission or rotating elements of attachments are worn or stuck, and replace them promptly if any damage or defect is found.
- In the case of dynamic loads, check whether the working elements of the attachments are normal, whether the working pressure of the attachments is normal, and whether the attachments work normally. If not, it is necessary to check the hydraulic circuit, find any leaking elements, and replace the seals or the whole circuit.

19 Main stressed structural components (Compliance with the relevant provisions of TSG 3.4.1)

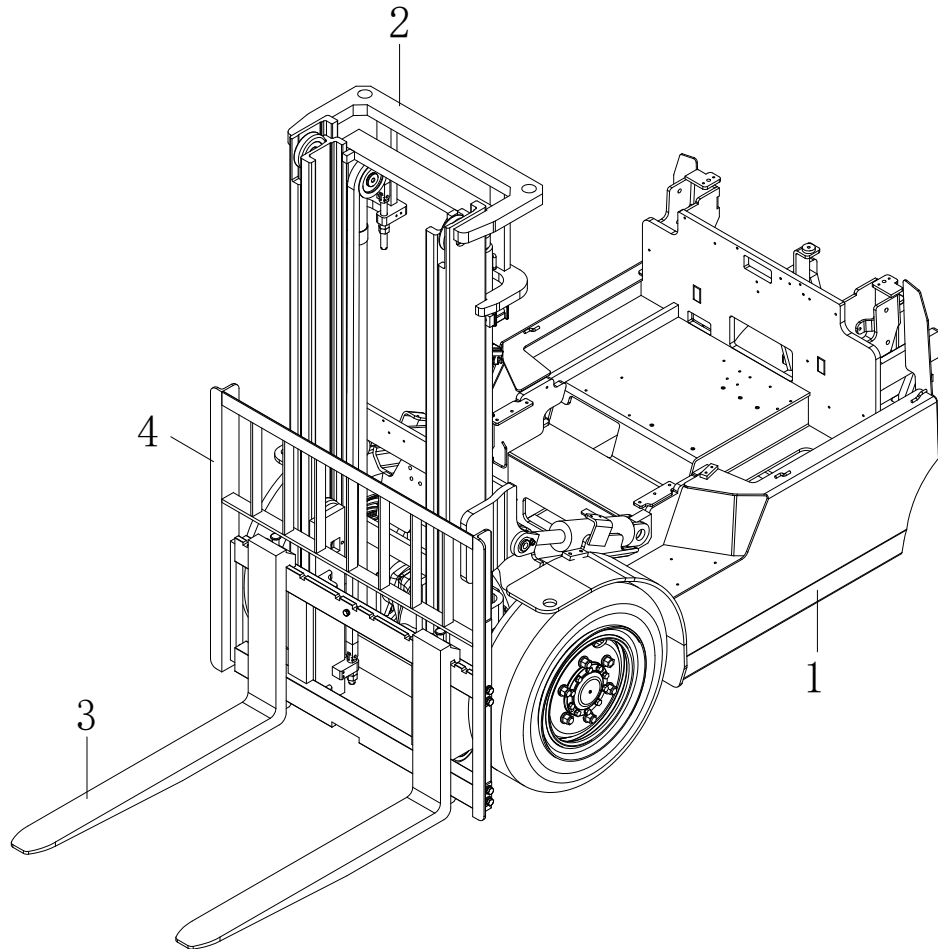


Figure 19-1 Main stressed structural components

1.Frame	2.Gantry	3.Fork	4.Block shelves
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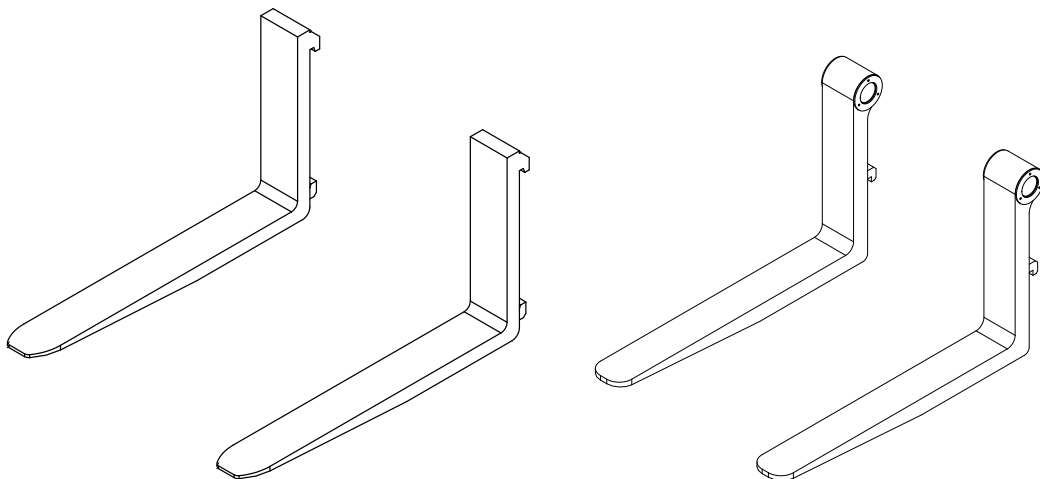


Figure 19-2 Fork

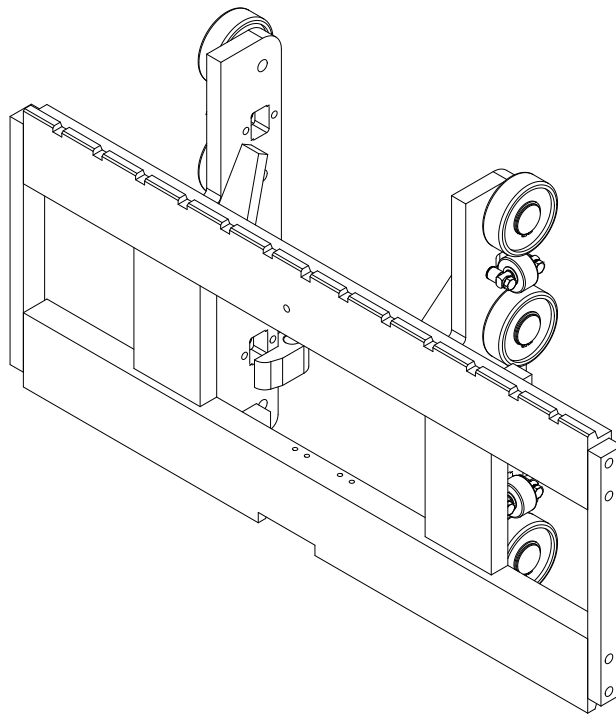


Figure 19-3 Block shelves

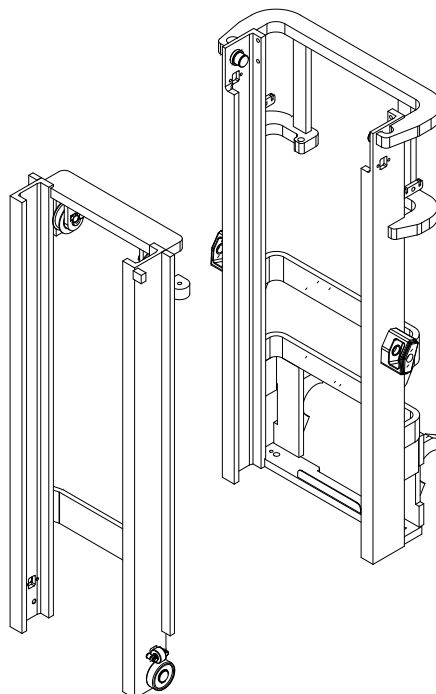


Figure 19-4 Inner gantry and outer gantry

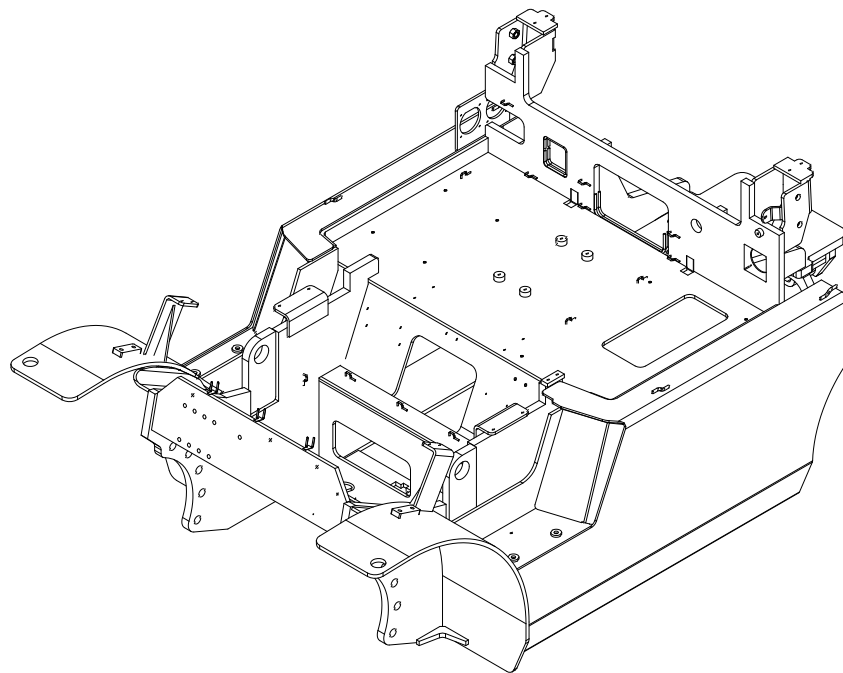
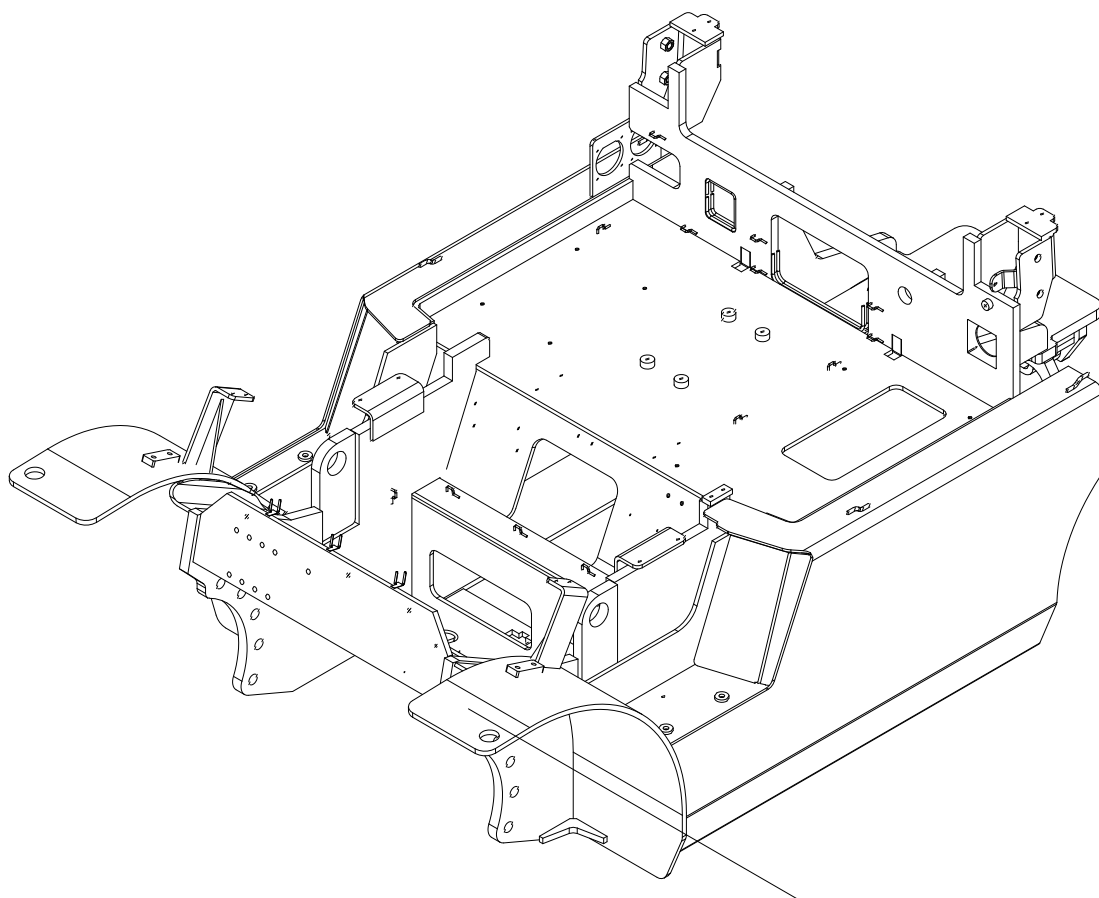


Figure 19-5 Frame

Frame, door frame, cargo fork and cargo fork frame are the main stressed structural parts of the forklift truck, with sufficient strength and stiffness. If the user matching equipment, the device is equivalent to a fork, as the main stress structure.

20 Marking positions for frame S/N



Marking positions for frame S/N

21 Bolts tightening torque table

Unit: N·m

Nominal Diameter	Class			
	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:

- Grade 8.8 bolts are used for all key joints.
- The bolt grade can be found in the head, if not, it is Grade 8.8.

Maintenance record

[illegible]



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