



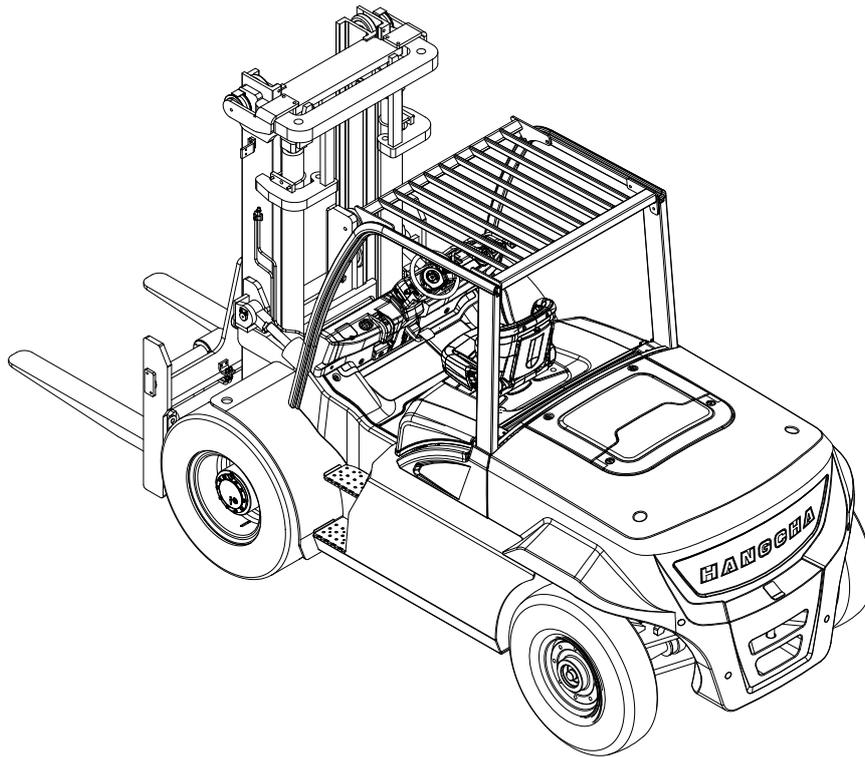
***XE Series***

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**Electric Counterbalance Forklift Truck**

**CPD60/70/80/90/100-XEY2-SI**

# **OPERATION AND MAINTENANCE MANUAL**



Original Instruction

**HANGCHA GROUP CO., LTD.**

**03/2025**

## **Preface**

Thank you for purchasing this XE series 4-wheel electric counterbalanced heavy-duty forklift truck manufactured by HANGCHA GROUP CO., LTD.

The XE series 4-wheel electric counterbalanced heavy-duty forklift truck is a new product developed by our company, which incorporates the special lithium-ion battery platform that improves the performance of the vehicle, and incorporates the large tire design, low pressure platform.

This manual provides instructions on how to use and maintain the XE series 4-wheel electric counterbalanced heavy-duty forklift truck, operators and maintenance personnel must read it before use.

Due to the constant updating and improvement of our products, the functions of your forklift may be slightly different from the instructions in this manual.

For any queries, please contact the sales company or agent of HANGCHA GROUP CO., LTD.

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# 1 Overview

The forklift introduced in this operation manual is suitable for lifting and transporting goods.

Users must operate and maintain the forklift according to this operation manual. Do not use the forklift truck for purposes not mentioned in this manual as it may cause personal injury or even death or cause damage to the forklift truck and other property.

## 2 Environmental Conditions for Vehicle Use

### Environmental conditions for vehicle use

- The permissible temperature range is between -20°C and 40°C.
- The air humidity should not exceed 90% at 20°C.
- The wind speed should not be greater than 12m/s.
- The forklift can only be used on solid and flat ground with sufficient load-bearing capacity.
- The forklift can only be used on driving roads with good visibility and the permission of the operator.
- When carrying a load uphill, it is necessary to keep the forks facing forward, do not travel sideways or diagonally. When going downhill, it is recommended to drive in reverse.



### Warning

- When this forklift is used in extreme environments, especially in places with a large amount of dust or where corrosion and rust are easily caused, additional special equipment must be installed with the permission of the manufacturer.
- Do not use this truck in explosion-proof places.
- Do not operate the forklift outdoors or in hazardous areas during severe weather conditions such as storms or lightning.

## 3 Expected Use

### Scope of forklift use:

- Lift and lower cargo.
- Transport the cargo over short distances.
- Do not drive the forklift when cargo is raised.
- Do not carry people.
- Do not push or pull the goods.
- When towing a trailer, the cargo must be secured on the trailer.
- Do not carry cargo exceeding the load capacity.



### Warning

- The maximum towing load is indicated on the product nameplate and the load should not exceed this value.
- The cargo must be positioned against the back of the fork backrest and centered on the forks.

## 4 Obligations and responsibilities of the truck user

In this manual, the User refers to any natural or legal person who directly uses or appoints another person to use the forklift. In special cases such as leasing or renting, the User refers to the party who assumes the specified operational obligations according to the terms of the contract between the forklift owner and the user.

The User must ensure that the forklift is used only for the specified purpose and that any danger that may risk the life and health of the user or a third party is eliminated in a timely manner. In addition, the User must strictly observe accident prevention regulations, other technical safety regulations, and guidelines for the operation, maintenance and repair of the forklift.

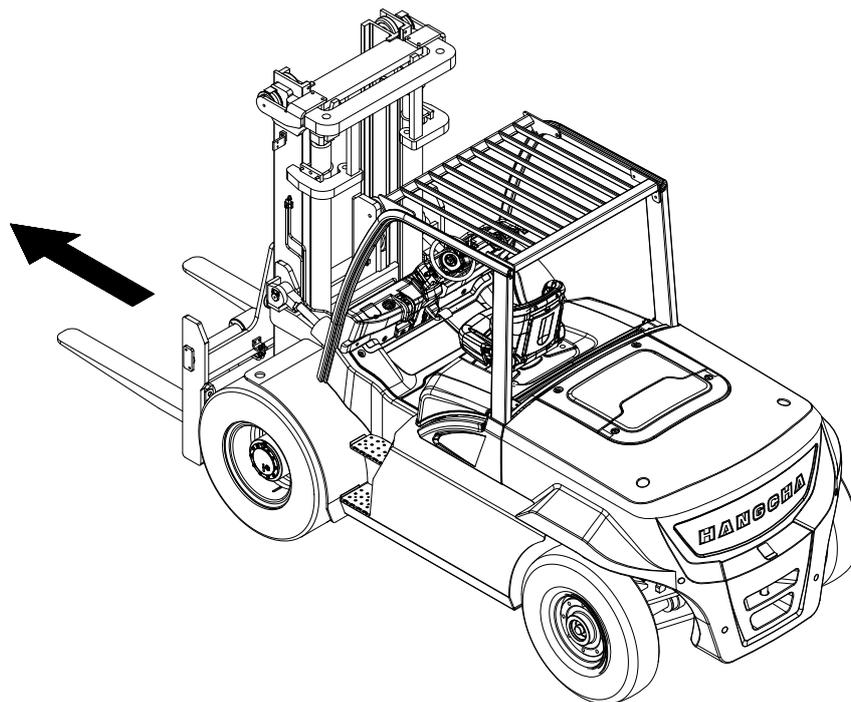
The truck can only be operated by specially trained personnel. The forklift user must ensure that all operators read and fully understand the content in this manual.

## 5 Installation of attachments or accessories

If it is required to install or add additional devices that may affect or supplement the functions of the forklift, you must obtain prior written consent from our company. Depending on the actual situation, the approval and consent of the local authorities may also be required. The results of the review by the governmental authorities do not represent the opinion of the Company.

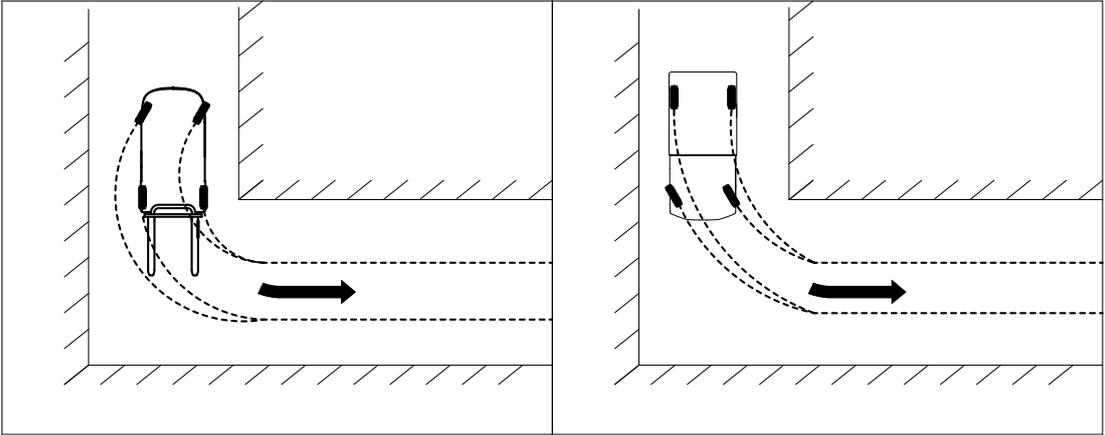
## 6 Vehicle direction and wheel tracks

The forklift is traveling in the forward direction with the forks facing forward, as shown in the diagram below:



In this instruction and repair manual, the driver is seated in the seat in the correct sitting position, at which time the driver's left hand side is the left side of the forklift and the right hand side is the right side of the forklift.

Forklifts are rear-wheel steered, which means that during steering, the rear side swings outwards (the rear wheel tracks veer outwards), differing from cars where the rear wheels' trajectory is biased inward compared to the front wheels.

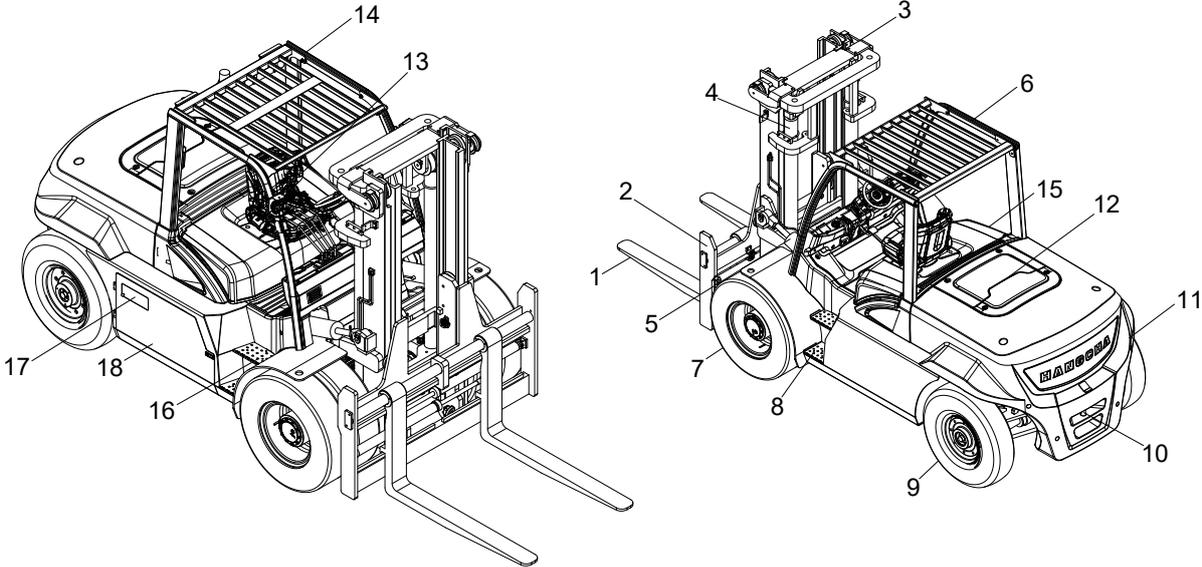


Forklift trucks (rear wheel steering track lines)

Motor vehicles (front wheel steering track lines)

# 7. Forklift truck introduction

## 7.1 Appearance and main parts



Code	Name	Code	Name
1	Fork	11	Counterweight
2	Load backrest	12	Water tank cover
3	Mast	13	Driver's seat
4	Lift cylinder	14	Dashboard
5	Tilt cylinder	15	Hood
6	Overhead guard	16	Right pedal
7	Front wheel	17	Charging port
8	Left pedal	18	Door
9	Rear wheel		
10	Tow pin		

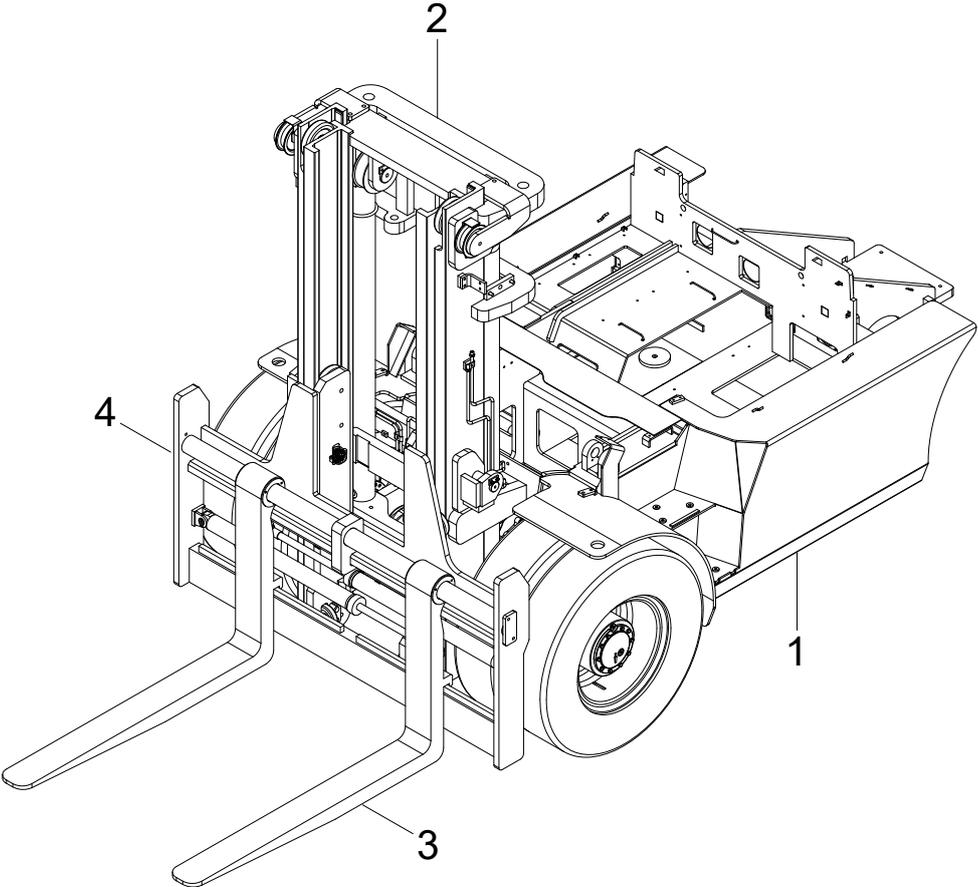
## 7.2 Introduction to forklift systems

The XE series electric counterbalanced forklift truck can be divided into seven systems, including the transmission system, steering system, body system, operation system, hydraulic system, electrical system and lifting system, and their main functions are as follows:

- (1) Transmission system: the transmission system consists of the motor, gearbox, drive axle, brakes, tires and other parts, and its main role is to move the forklift truck.
- (2) Steering system: The steering system consists of two parts: the steering device and the steering axle, and its main role is to control and steer the forklift.
- (3) Body system: The truck body consists of the mast, dashboard, machine hood and other covers, overhead guard, and counterweight Main functions: To provide a solid support platform for the forklift and protect the personal safety of the driver.
- (4) Operation system: The operation system includes the handbrake and foot brake. The handbrake is the parking brake and uses a cable operated mechanical brake; the foot brake is the traveling brake and is applied by stepping on the brake pedal, they work together with the drive axle left and right brakes.
- (5) Hydraulic system: The hydraulic system consists of the hydraulic tank, oil pump device, multi-way valve manipulation assembly and hydraulic pipeline assembly, its main role is to control the steering of the forklift truck as well as the lifting and lowering of the mast.
- (6) Electrical system: The forklift electrical system includes instruments, lighting systems, lithium-ion batteries, key switches and other electrical components.

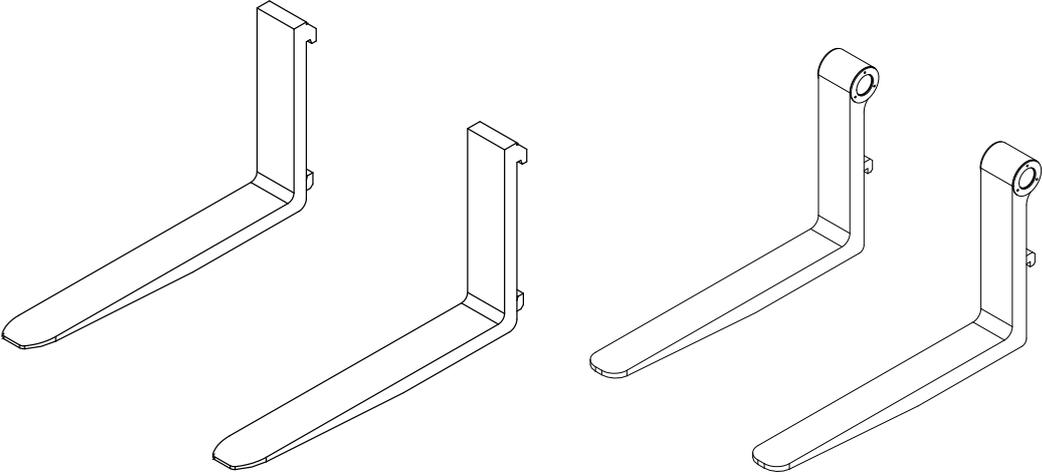
Lifting system: The lifting system is composed of the masts, fork arm carrier, forks, load backrest, lifting chain, rollers, lift cylinder and tilt cylinder, etc., which constitutes the working device of the forklift truck together with the oil circuit and hydraulic system.

**7.3 Main load-carrying structural parts of the forklift (meet TSG 3.4.1)**

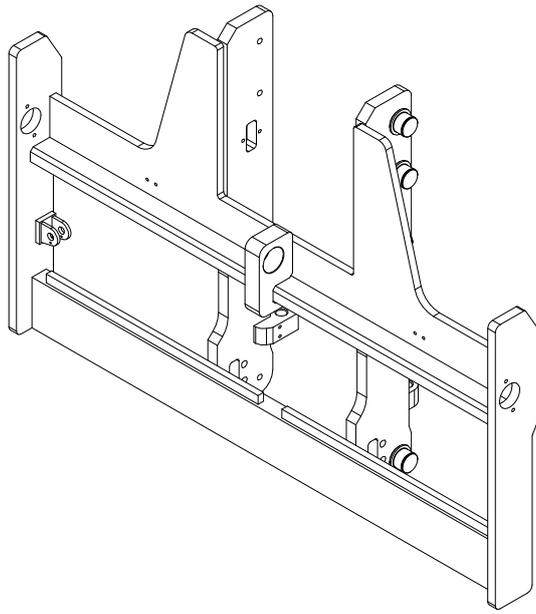


Main Load-bearing Structural Parts

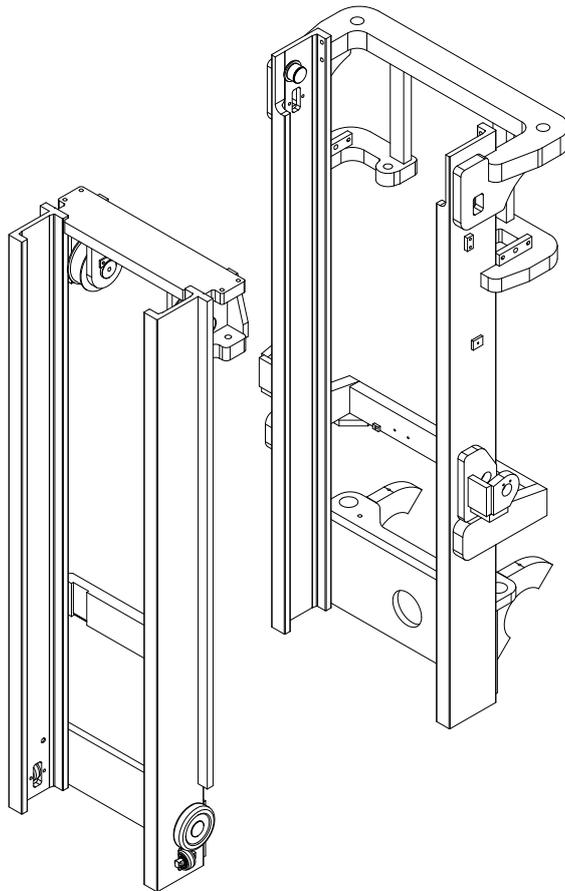
1. Frame	2. Mast	3. Fork	4. Fork arm carrier
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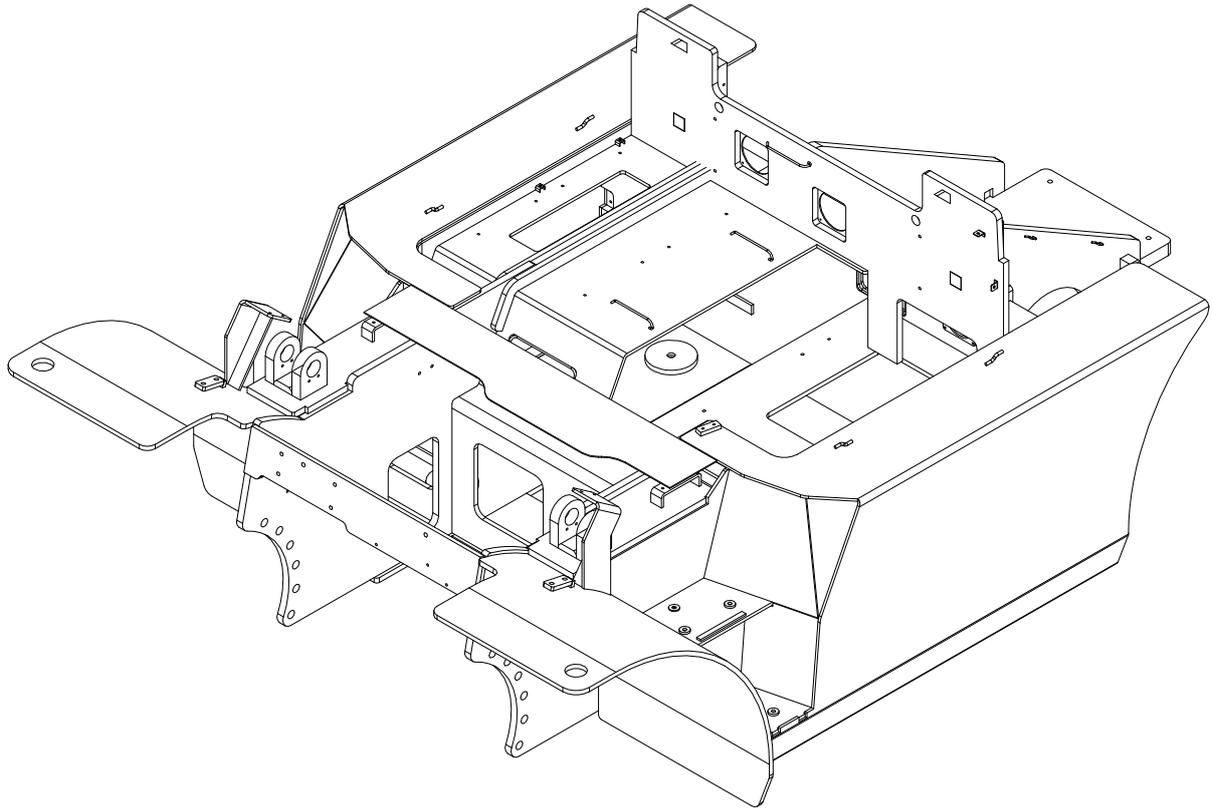
Fork



Fork arm carrier



Inner/outer mast

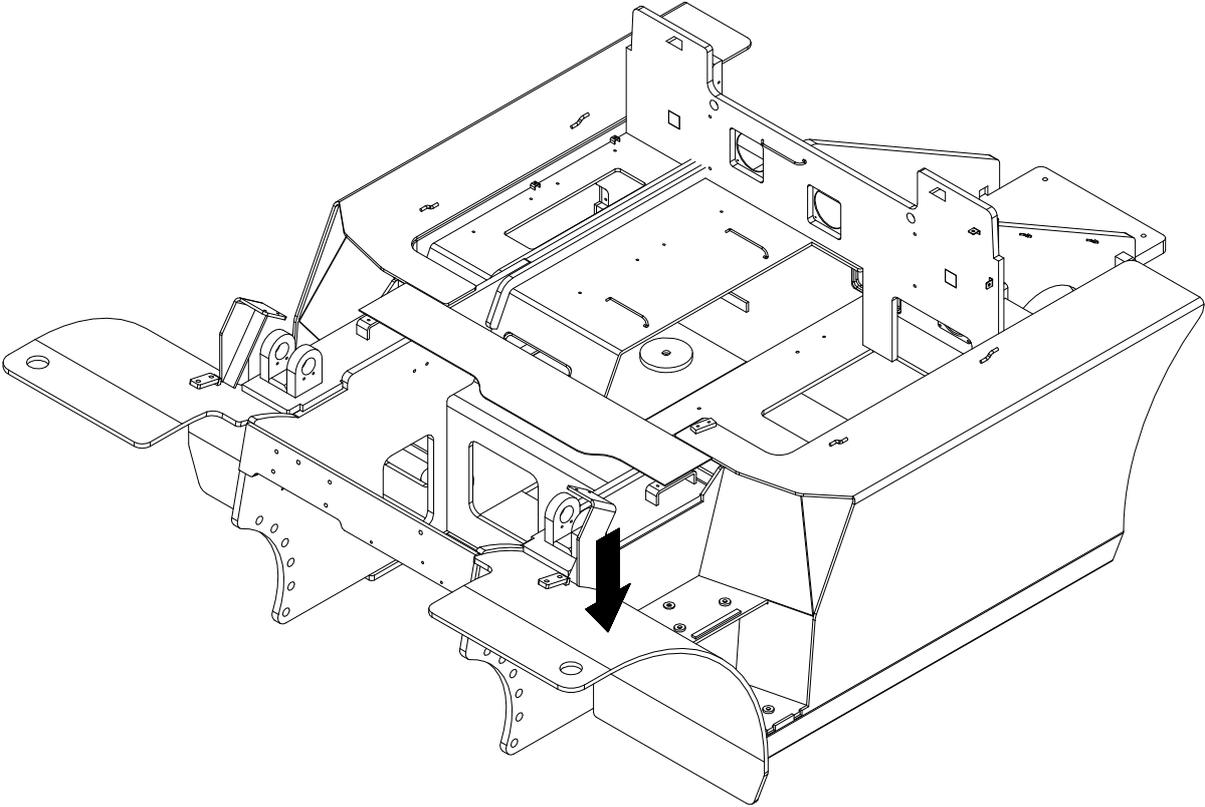


Frame

The frame, masts, forks and fork arm carrier are the main load-bearing structural parts of the forklift truck and have sufficient strength and rigidity. The optional attachments are equivalent to the forks and are also treated as main load-bearing structural parts.

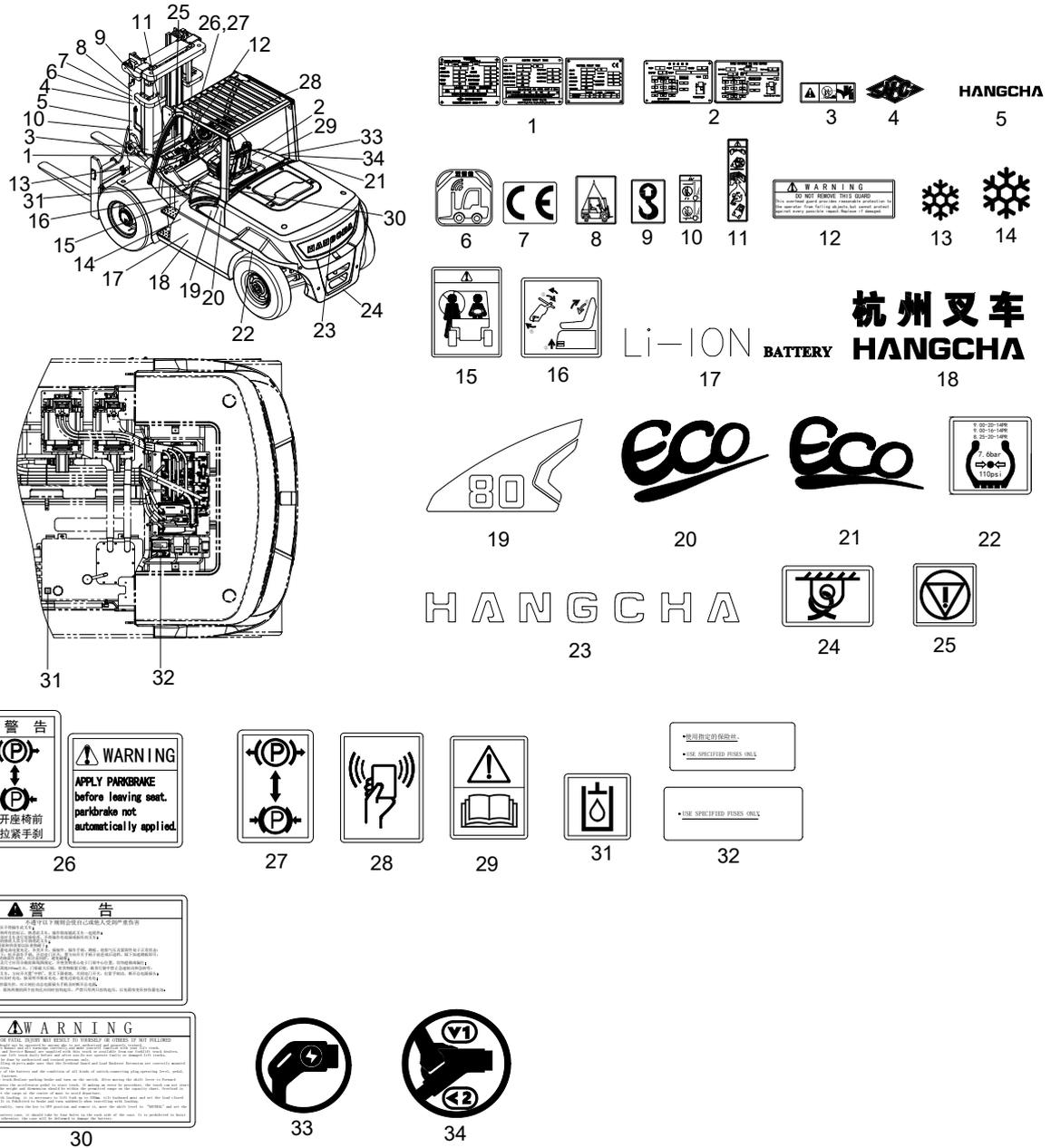
### 7.4 Chassis Steel Stamp Number Position

Each vehicle has a unique steel-stamped chassis number at the time of factory production, and the specific location is shown in the figure below:



# 8 Vehicle marking

The labels and warning signs, such as the product nameplate, load curve sign and warning labels, must be clear and visible. If necessary, they should be replaced.



Code	Name	Code	Name	Code	Name	Code	Name
1	Product nameplate	10	Hazard label	19	Tonnage label	28	Swipe Tag
2	Load curve label	11	Safety belt label	20	Left label	29	Safety instruction label
3	Hazard label	12	Overhead guard removal warning label	21	Right label	30	Warning label
4	HC logo	13	Snowflake label	22	Tire pressure label	31	Hydraulic oil label
5	Logo label	14	Large snowflake label	23	HANGCHA characters	32	Fuse label
6	Cloud intelligence	15	Passengers prohibited label	24	Tie-down point label	33	Charging Label

<b>Code</b>	<b>Name</b>	<b>Code</b>	<b>Name</b>	<b>Code</b>	<b>Name</b>	<b>Code</b>	<b>Name</b>
	label						
7	CE label	16	Hood opening label	25	Emergency power-off switch label	34	Pulling sequence label
8	Lifting label	17	Lithium-ion battery label	26	Handbrake lockout warning label		
9	Lifting label	18	Logo label	27	Handbrake label		

### 1.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: **VII** kg

SYSTEM VOLTAGE: **IV** V MIN.BATTERY MASS: **IX** kg

YEAR OF MANUFACTURE: **X VI**

	MAX .LIFTING HEIGHT	LOAD CENTER	CAPACITY AT MAX.LH
WITHOUT ATTACHMENT	<b>X</b> mm	<b>XI</b> mm	<b>XII</b> 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)

ELECTRICAL FORKLIFT TRUCK

**CE**

MODEL TYPE: **I** - **VII**

SERIES NO.: **V** SERVICE WEIGHT: **II** kg

NOMINAL LOAD CENTER: **XI** mm RATED CAPACITY: **VI** kg

WEIGHT WITHOUT BATTERY: **III** kg MAX.ALLOWABLE BATTERY WEIGHT: **VII** kg

NOMINAL VOLTAGE: **IV** V MIN.ALLOWABLE BATTERY WEIGHT: **IX** kg

YEAR OF MANUFACTURE: **X VI**

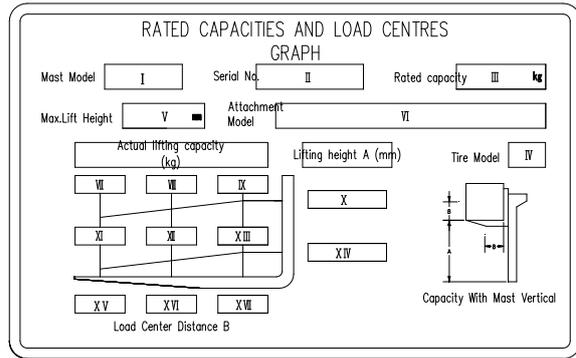
	MAX.LIFT HEIGHT	LOAD CENTER	CAPACITY AT MAX.LH
WITHOUT ATTACHMENT	<b>X</b> mm	<b>XI</b> mm	<b>XII</b> kg
WITH ATTACHMENT	<b>XIII</b> mm	<b>XIV</b> mm	<b>XV</b> kg

### 2.Load curve label

It shows the relationship between the location of the load center distance and the maximum load or maximum lift height.

The load capacity of trucks with a sideshifter and attachments is reduced. When the lift height is increased, the load capacity will decrease.

Check whether the load and the load center distance are within the allowable range of the Loading Capacity Chart before loading. If the load shape is complicated, the heaviest part should be placed in the center of the fork and close to the load backrest.



### 3.Hazard label

Beware of hand trapping when the lifting mast is moving. Do not climb the mast when it is raised.



### 4.HC logo



### 5.Logo label

**HANGCHA**

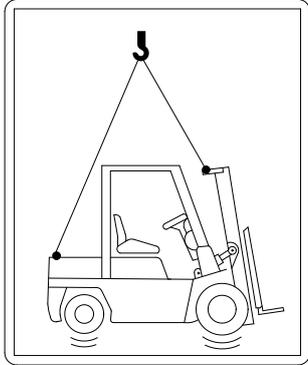
### 6.Cloud intelligence label



### 7.CE label

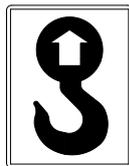


**8.Lifting label**



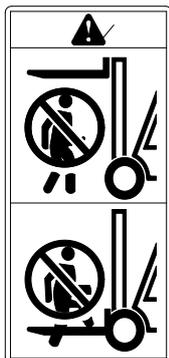
**9.Lifting label**

Indicate that this location is one of the lifting points.



**10.Hazard label**

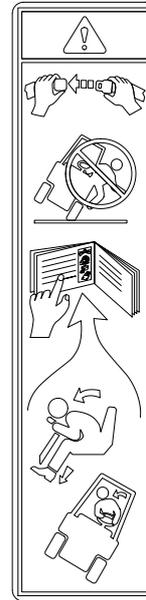
Do not stand on the forks or stay under overhanging forks.



**11.Safety belt label**

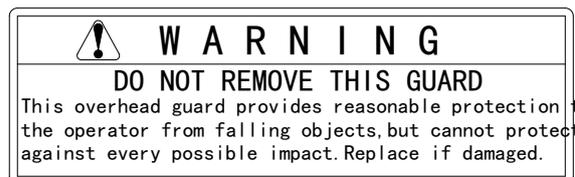
When operating a forklift, the driver must fasten the seat belt to prevent inertial injuries caused by sudden braking or sharp turns. If the forklift accidentally tips over, the driver should immediately lean down and hug the steering wheel, tilting their body in the opposite direction

of the rollover to maintain balance as much as possible. Under no circumstances should the driver attempt to jump off the vehicle to escape, as this action could likely result in more serious injuries or even death.



**12.Overhead guard removal warning label**

This overhead guard provides reasonable protection to the operator from falling objects, but cannot protect against every possible impact. Replace if damaged.

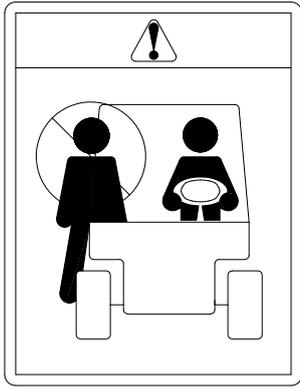


**13、 14.Snowflake label**

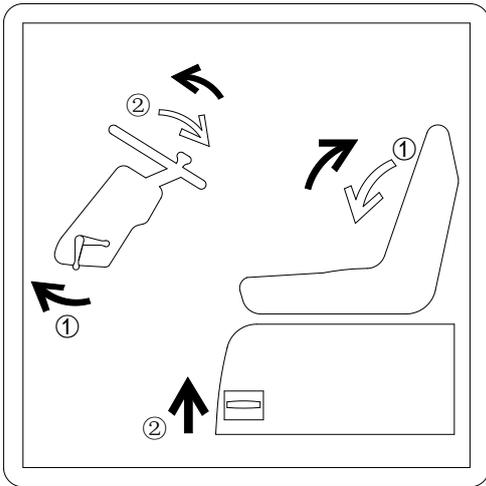


**15.Passengers prohibited label**

Forklifts are not allowed to carry passengers, and the driver must not extend their body outside of the cab while operating the forklift.



16.Hood opening label



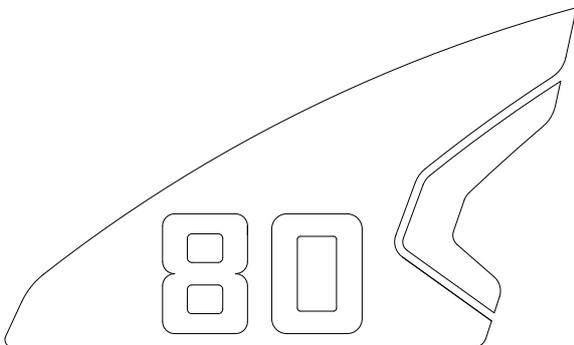
17.Lithium-ion battery label

Li-ION BATTERY

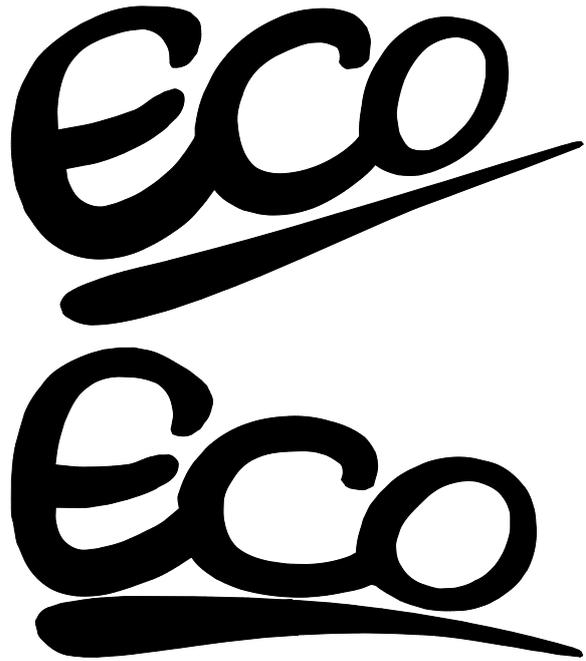
18.Logo label

**HANGCHA**

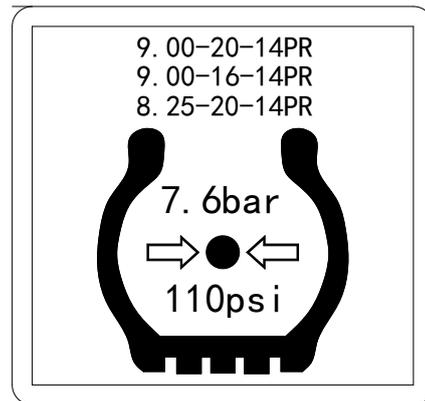
19.Tonnage label



20、 21.Left and right label



22.Tire pressure label

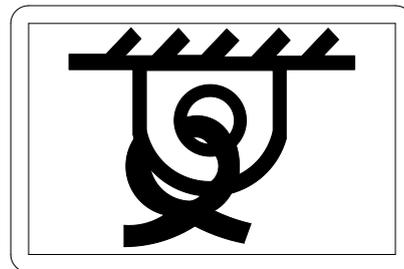


23.HANGCHA characters

H A N G C H A

24.Tie-down point label

Indicate the towing point when towing a forklift.



25.Emergency power-off switch label

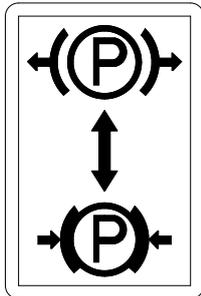


**26. Handbrake lockout warning label**

Apply parkbrakake before leaving seat. Parkbrake not automatically applied.



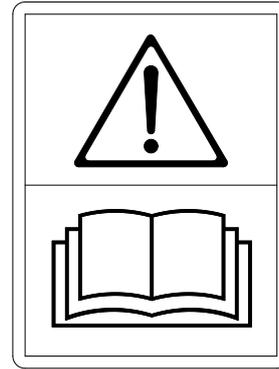
**27. Handbrake label**



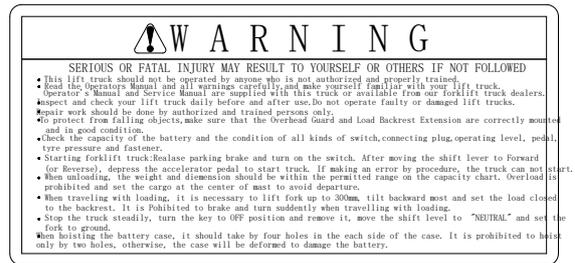
**28. Swipe Tag**



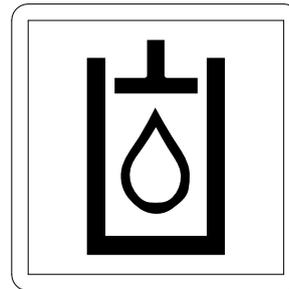
**29. Safety instruction label**



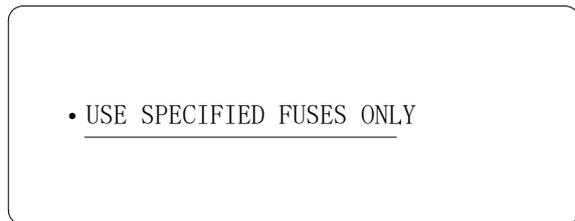
**30. Warning label**



**31. Hydraulic oil label**



**32. Fuse label**



**33. Charging Label**



**34. Pulling sequence label**



## 9 Table of main technical performance parameters

S/N	Item		CPD60-XEY2-SI	CPD70-XEY2-SI	CPD80-XEY2-SI	CPD90-XEY2-SI	CPD100-XEY2-SI	
1	Rated load lifting capacity	kg	6000	7000	8000	9000	10000	
2	Rated load center distance	mm	600	600	600	600	600	
3	Standard mast lifting height	mm	3000	3000	3000	3000	3000	
4	Free lift height	mm	170	175	200	200	200	
5	Max. mast tilt angle (forward/backward)	(°)	6/12	6/12	6/12	6/12	6/12	
6	Max. running speed (full load)	km/h	19/20	19/20	16/16	16/16	16/16	
7	Max. lift speed (full load)	mm/s	410/500	360/440	340/430	280/350	280/350	
8	Min. outside steering radius	mm	3360	3360	3740	3740	3740	
9	Maximum Traction Force	Kg	35	35	35	35	35	
10	Braking distance	Kg	Execute according to the standard					
11	Overall dimensions	Length	mm	3604	3609	4023	4035	4035
		Width	mm	1994	1994	2197	2197	2197
		Height (up to the overhead guard)	mm	2470	2470	2580	2580	2580
12	Truck weight	Including the battery weight	kg	9600	10200	11900	13200	13800
13	Battery	Model		DQ-EB709 6560A0-Z1 60	DQ-EB709 6560A0-Z1 60	DQ-EB009 6690A0-Z 159	DQ-EB009 6690A0-Z1 59	DQ-EB009 6690A0-Z1 59
		Voltage / Capacitance	V/Ah	96/560	96/560	96/690	96/690	96/690
14	Motor	Driving motor	kW	40	40	40	40	40
		Oil pump motor	kW	30×2	30×2	30×2	30×2	30×2
15	Tire	Front wheel× number		8.25-15-14 PR/4	8.25-15-14 PR/4	9.00-20-1 4PR/4	9.00-20-14 PR/4	9.00-20-14 PR/4
		Rear wheel× number		8.25-15-14 PR/2	8.25-15-14 PR/2	9.00-20-1 4PR/2	9.00-20-14 PR/2	9.00-20-14 PR/2

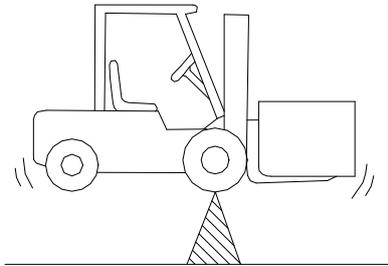
## 10 Forklift truck structure and stability

Prevent the truck from rolling over! Be aware that the structure and stability of the forklift truck are very important to safe operation.

 <b>Caution</b>	<b>Forklift truck structure</b>
--	---------------------------------

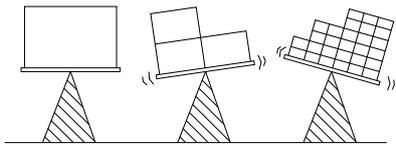
The basic components of the forklift truck are the lifting device (forks and mast) and the forklift truck itself at the rear (with tires). The front wheels of the forklift truck can be used as fulcrums to keep balance between the center of gravity of the forklift truck and that of the load.

The relationship between the center of gravity of the forklift and that of the load is critical to the operation of the forklift.



 <b>Caution</b>	<b>Center of gravity of load</b>
--	----------------------------------

The load profiles handled by the truck vary; in order to evaluate the truck stability, it is very important to identify the load center in different shapes from boxes to boards and rectangular objects.



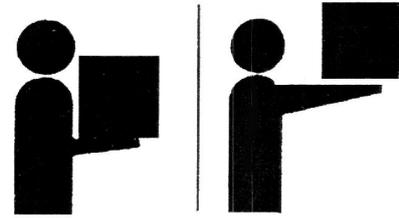
### Warning

Do not jump out of the truck if it starts to roll over. The forklift truck will roll over much faster than you can jump out of the truck. You should extend your feet and keep your hands on the steering wheel firmly to hold you in the cab.



 <b>Caution</b>	<b>Maximum load and load center distance</b>
--	--

The horizontal distance between the center of gravity of the load on a fork and the load backrest of the fork or the front surface of the fork (whichever is smaller) is called the load center distance. The maximum load refers to the maximum load that the fork can bear at the standard load center distance. The relationship between the maximum load and the load center distance is shown on the Loading Capacity Chart of the forklift truck. If the load center distance moves towards the front fork, the overall center of gravity will move forward, thus the load has to be reduced.

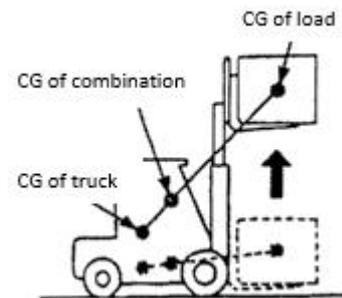
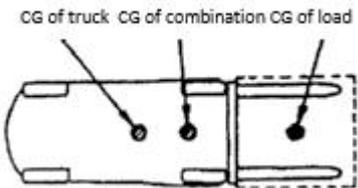


**Caution**

**Center of gravity and stability**

The center of gravity of the forklift depends on the combined center of gravity of the forklift and the load. When the forklift truck is unloaded, the center of gravity remains unchanged; when it is loaded, the center of gravity is formed by the combined center of gravity of the forklift truck and the load. The center of gravity of the load is determined by whether the mast is tilted forward or backward or whether it is lifted or lowered, thus the combined center of gravity can change. The combined center of gravity of the truck is determined by the following factors:

- Load magnitude, weight and shape;
- Lift height;
- Tilt angle of the mast;
- Tire inflation pressure;
- Acceleration, deceleration and turning radius;
- Road conditions and road tilt angle;
- Attachment type.

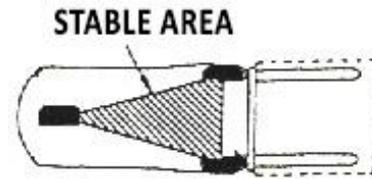


**Caution**

**Stable center of gravity region**

In order to make the forklift truck stable, the combined center of gravity has to be within the triangle formed by the contact point of the front left and right tires and the midpoint of the rear axle.

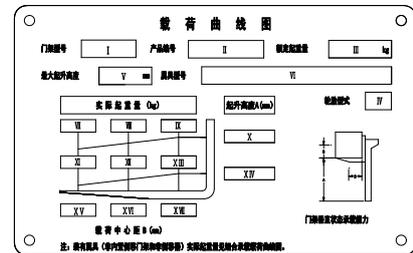
If the combined center of gravity is on the rear axle, the two front tires will form a fulcrum and the forklift truck will tilt forward. If the combined center of gravity moves out of the stable center of gravity triangle, the forklift truck will roll over in the direction towards the combined center of gravity.



**Caution**

**Loading Capacity Chart**

The chart shows the relationship between the location of the load center distance and the maximum load. Check whether the load and the load center distance are within the allowable range of the Bearing Capacity Chart before loading. If the load shape is complicated, the heaviest part should be placed in the center of





**Caution**

**Speed and  
acceleration**

A static object should remain static without an external force. Similarly, a moving object continues to move at the same speed without an external force, which is referred to as inertia.

Due to inertia, when the forklift truck starts to move forward, a force acts backwards; when the truck stops, a force acts forward.

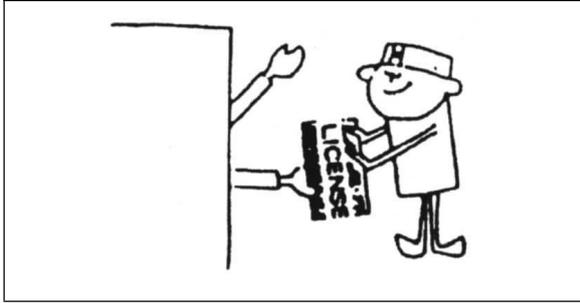
It is dangerous to suddenly apply the brake, because the forklift will roll over or the load will slide when a large force acts forward.

When the truck turns, a centrifugal force will be applied outwards from the turning center. The truck can be pulled out and rolled over by the force.

The left and right stability regions are small, thus the truck should slow down to avoid rolling over when turning. If the truck carries a high load and the overall center of gravity is high, the truck may easily tilt forward, to the left or to the right.

## 11 Safety rules

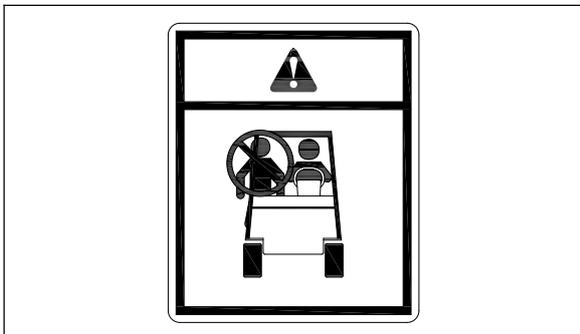
1. Only trained and approved operators can operate the truck.



2. Operators must wear helmets, work shoes and clothes.



3. Do not carry people!



4. Oil/water leakage, deformation and looseness should be regularly checked; otherwise, the service life of forklift truck will be shortened; in severe cases, it may cause an accident.

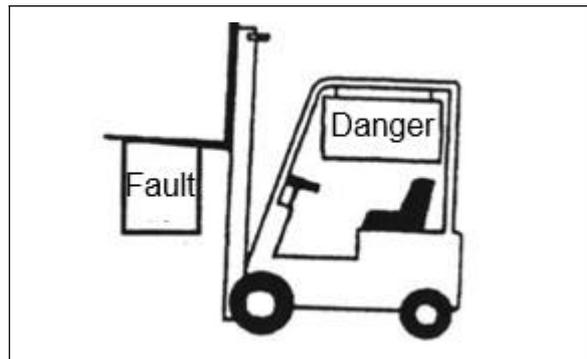
- Ensure that "safety critical parts" are replaced in regular checks.
- Wipe off oil, grease and water on the baseplate, pedal and control lever.
- No smoking, sparks or flames near to the lithium-ion battery during inspection.

- During maintenance at height (such as the mast, front light and back light), take care to avoid getting trapped and slipping.

- Take care to avoid burning yourself when checking the motor or controller.

5. In the event of any faults, the operator should stop the truck immediately, hang the "Danger" or "Fault" sign, pull out the key and report to the management. The forklift should not be used until all faults are eliminated.

- In the event of a sudden fault when lifting cargo or driving on gradients, causing leakage of storage battery electrolyte or hydraulic oil and brake fluid, personnel should be organized for repair immediately.



6. Explosive gas will be generated in the lithium-ion battery, so no flames should be close to the battery.

- Keep tools away from the poles of the lithium-ion battery, to prevent sparks or short circuits.

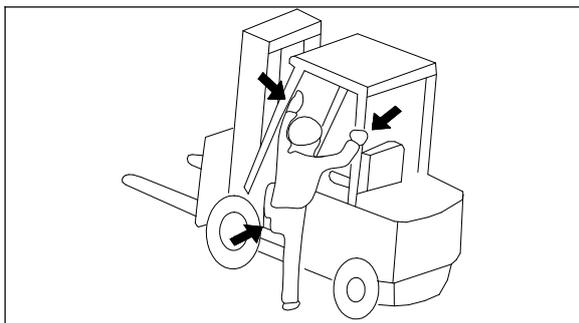
7. The driving route must be a solid and flat concrete road or similar roads suitable for operation. Pre-inspect the ground conditions of the work site.

- The climate conditions the forklift truck is designed for: Temperature: -20°C to -50°C; wind speed: No more than 5 m/s; relative air

humidity: No more than 90% (temperature: 20°C).

- The forklift trucks are not suitable for use in flammable and explosive working environments.
- The altitude for using the forklift truck should not be greater than 2,000 m.

**8.** Do not get on or off the forklift truck when it is in use; please use the safety footboard and safety handrail when getting on or off.



**9.** Operate the forklift truck only when sitting properly.

- Adjust the seat position for good hand and foot control before starting.

**10.** Before starting:

- Please fasten the safety belt tightly.
- Release the hand brake.
- Place the direction lever in the neutral position.
- No people should be around the forklift truck.
- Do not depress the accelerator pedal or operate the lift control lever or tilt control lever before powering on.

**11.** Keep a stable and accurate operation; sudden stops and sharp turns should be avoided.

- Truck rollover may occur during emergency braking.

**12.** Pay attention to the driving direction and keep a good lookout.



**Warning**  
Pay special attention to the driving direction when reversing.

**13.** Other people must not sit on the fork, pallet or forklift truck.

**14.** Select proper attachments and tools according to the shapes and materials of the cargo to be loaded.

- Do not hang ropes on the forks or attachments to lift cargo, because the rope may slip; if necessary, a person with lifting operation qualifications should lift cargo with a lifting hook or a boom.
- Be careful not to let the forks touch the road surface, to avoid damaging the fork tip and road surface.

**15.** Know the load curves of the forklift truck and attachments Do not use people as additional counterweight.



**16.** Do not use a mobile phone or other electronic products while driving. Focus on the work.

**17.** Keep your head, arms, legs and feet in the cab and do not stretch them out of the cab for any reason.

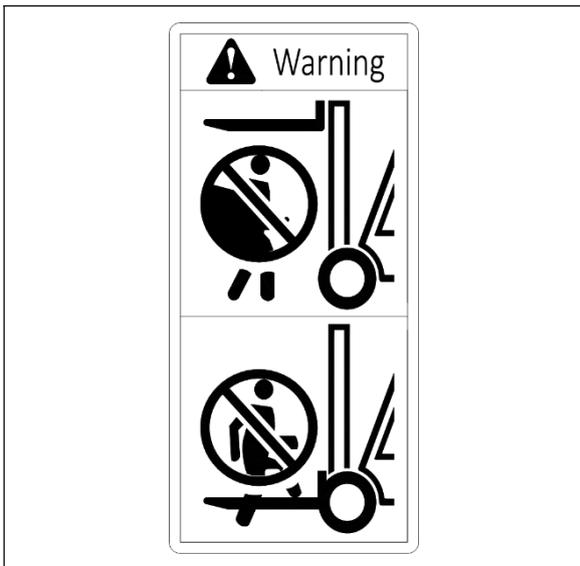


**18.** The pallet or wooden wedges should be strong enough to bear the cargo weight, do not use damaged or deformed pallets.

**19.** Various attachments are provided from HANGCHA for the user, such as rotating clamps, flat holding clamps, side shift forks, and booms, which are to be used exclusively. If attachments are required to be refitted, the permission of the manufacturer must be obtained. Do not refit your attachments without permission.

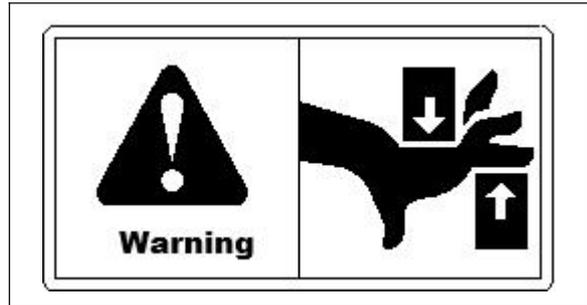
**20.** The overhead guard can protect you from being hit by falling cargo. The load backrest ensures the stable loading of cargo. Forklifts should not be used without overhead guards and load backrests.

**21.** Do not stand or walk under the forks or attachments. Do not stand on the fork.



**22.** Do not stretch your head or body between the mast and the overhead guard. You may be injured if your head or body is trapped.

- Do not stretch your hands between the inner mast and the outer mast.



**23.** When cargo is not aligned, or when the truck turns or crosses uneven surfaces, the cargo may easily fall off. The possibility of rollover is also increased.

**24.** The stacking height of cargo should not exceed that of the load-backrest; if this cannot be avoided, the cargo should be fixed securely. Please drive in reverse or under guidance when handling large cargo obstructing visibility. When there is a guide for forklift operations, the operator must be familiar with the meaning of his hands, flags, whistles or other signals. When the forklift truck is used for carrying cargo in large lengths such as wood, pipes and oversized items, or attachments of the forklift truck can be extended, the operator must pay full attention to the front and keep an eye on other people when turning or driving in narrow passages.

**25.** Reduce the forward tilt angle as much as possible when stacking for unloading; when the height of cargo is slightly higher or lower than that of the stacking layer, cargo can tilt forward.

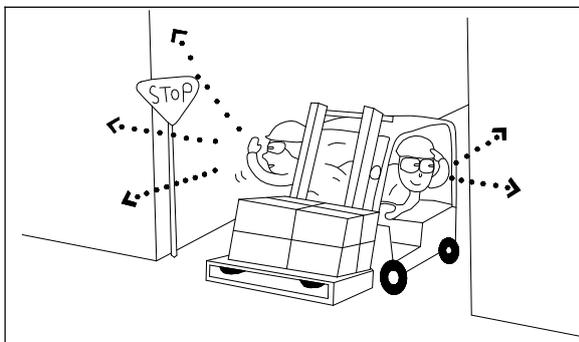
- When stacking at height and the distance to the ground is 15cm-20cm, the mast should be vertical and then lifted; be careful to not tilt the mast when the cargo is lifted.
- When picking up goods at height, insert

the fork into the pallet, slowly lift, back up and then descend, lower the rear mast and tilt it backward. Never tilt the mast when the goods are at height.

**26.** It is dangerous to lift the forks when driving with or without load; the distance between the forks and the ground should be 15 - 30 cm; and truck should be driven with the mast tilting backward. Do not conduct side shift operations when the forks are raised to protect the forklift truck from losing balance.

**27.** Pay attention to intersections, ropes, exits/entrances and hanging objects when operating in a crowded space.

- Slow down and sound the horn when passing through crossroads or other sections with poor visibility.
- Reduce the driving speed to 1/3 of maximum speed when turning.



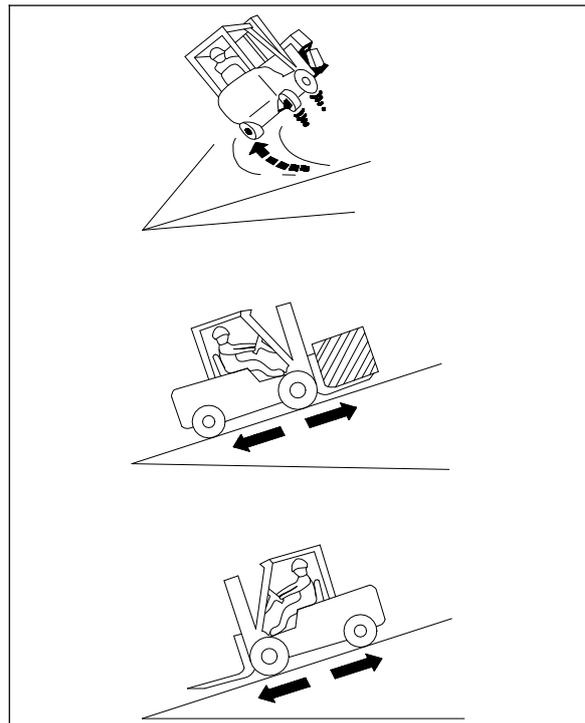
**28.** Keep the truck away from the road edges or platform edges.

**29.** When crossing a ship deck or bridge, confirm that it is fixed correctly and has enough strength to bear the weight of the forklift.

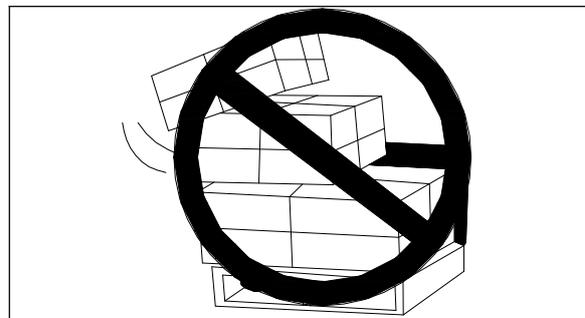
**30.** Reverse downhill and climb facing forward when loaded.

- Reverse uphill and drive downhill when loaded.
- Do not turn on ramps to avoid rolling

over.



**31.** Cargo must be aligned with the center of the forks; when cargo is not aligned, or when the truck turns or crosses uneven surfaces, the cargo may easily fall off. The possibility of rollover is also increased.



**32.** Do not lift cargo when the forklift truck is on a slope and avoid loading and unloading operations on ramps.

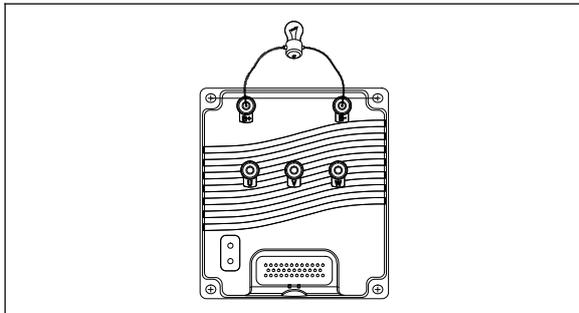
**33.** Do not stand or walk under the lifted forks or attachments. If it is unavoidable, the user should choose a safe place and hold the forks or attachments with wooden blocks to prevent accidents.

**34.** Check the road to be driven for holes, abrupt slopes, barriers, bumps, and road conditions that

may cause loss of control and vibration.

- Remove rubbish, debris and foreign matter that may puncture tires and throw cargo out of balance.
- Slow down on slippery roads, do not drive on the edge of the road, and take extra care when it cannot be avoided.
- Do not use the forklift truck in sandstorms, snow, lightning, rain, wind and other bad weather conditions. In particular, when the wind speed is more than 5m/s, it is better not to use the forklift truck.

**35.** The controller is equipped with an accumulator. Do not touch the position between B+ and B- to prevent an electric shock. In order to check or clean the controller, please power off first, and then a load device (such as contactor coil, horn, bulb or resistor) should be connected between B+ and B- to discharge the capacitor inside the controller.



**36.** Pull up the handbrake when parking on a flat road; if the truck has to be stopped on a ramp, a wedge must be placed under the wheel.

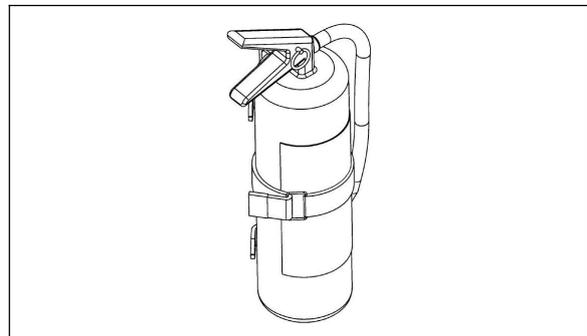
- Turn off the key switch and take out the key when the forks are lowered to the ground and slightly tilted forward.
- Pull the battery plug out.
- Stop the truck away from smoke or flames.

**37.** When the forklift truck cannot be driven, it can be towed to a safe place using the tow pin. Do not tow trucks with defective steering systems or damaged brake systems.

**38.** There are warnings and operation methods on the truck labels or signs. Please operate according to the directions of the manual and truck labels and signs. Check labels, signs and marks, and replace them if they are damaged or missing.

**39.** The workplace should be provided with fire extinguishers. The user can choose to provide a fire extinguisher for the truck, which is generally installed on the rear leg of the safety frame for easy access.

- Drivers and managers should be familiar with the position and usage method of the fire extinguishers.



**40.** Use a pallet when handling small objects and do not place them on the forks directly.

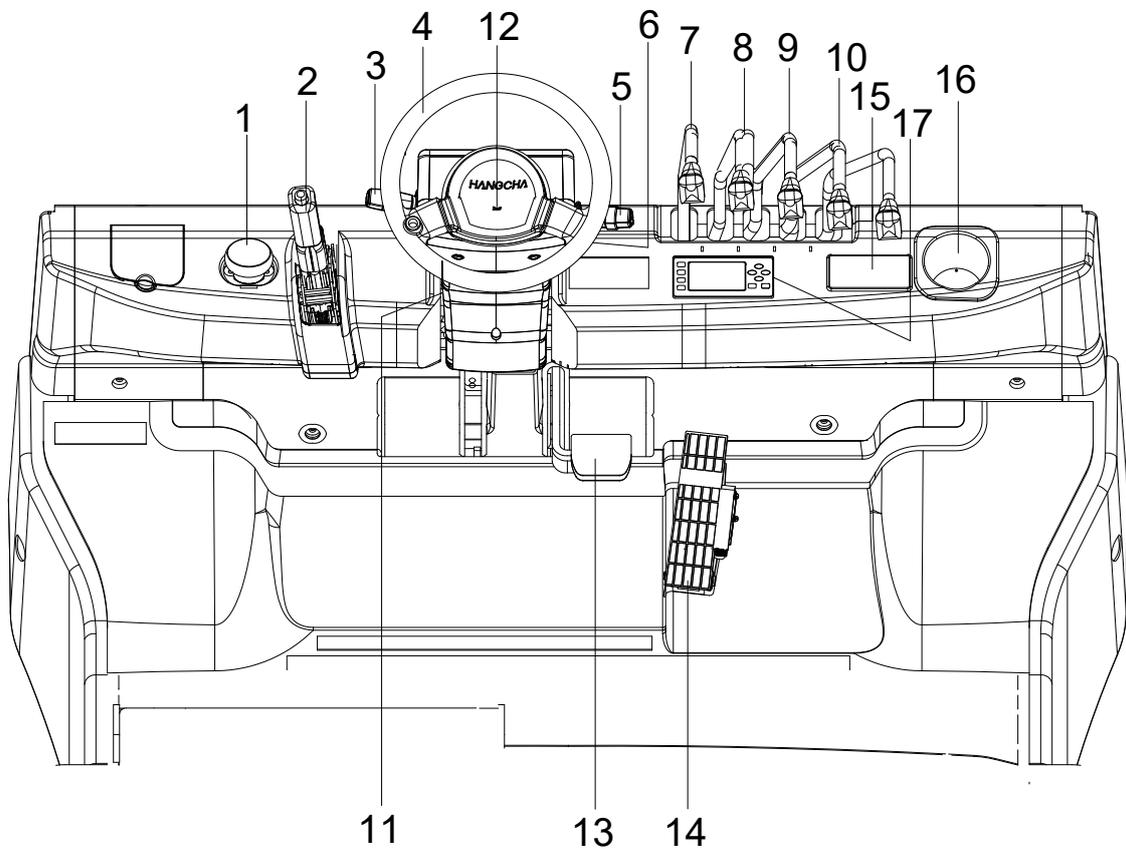
**41.** Forklift trucks specially designed for cold storage warehouses should not be turned off and parked inside the warehouse.

**42.** Do not flush the forklift with water.

**43.** Ensure that the lighting at the forklift operation site meets the requirements, and when operating the forklift at night, the forklift lighting device should be switched on.

## 12 Description of display and control parts

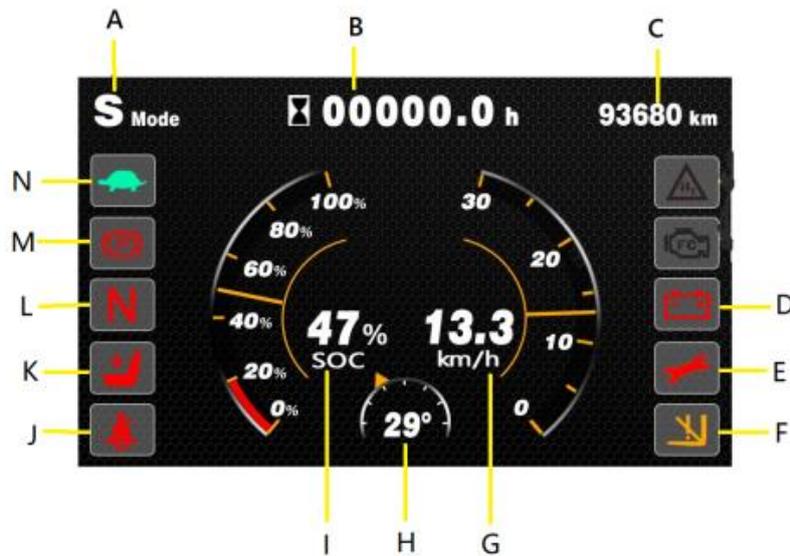
### 12.1 Position of each component in the truck



Code	Name	Code	Name
1	Emergency power-off switch	10	Attachment control lever
2	Parking brake	11	Steering column stop device
3	Forward/backward switch	12	Horn
4	Steering wheel	13	Brake pedal
5	Combination light switch	14	Accelerator pedal
6	Switch lock	15	Cover plate
7	Lift lever	16	Cup holder
8	Tilt control lever	17	Multi-function display
9	Side shift control lever		

## 12.2 Multi-functional display screen

The multi-functional display screen can display vehicle speed, battery level, working hours, total mileage, Chinese/English display, password protection, fault codes, drive and lithium-ion battery monitoring information, etc. At the same time, users can change the driver parameters through the dashboard to meet individual customization needs.



A. Running mode	H. Steering angle	B. Running hours	I. Battery level
C. Odometers	J. Safety belt	D. Low battery display	K. Driver's seat switch
E. Fault indicator light	L. Neutral indicator light	F. Working device restriction	M. Parking indicator light
G. Speed display	N. Slow mode		

### Running mode [A]

There are four running modes, respectively: Mode S, mode P, and mode E (slow mode).

**Mode S** refers to the fast mode. In this mode, the forklift truck's acceleration, maximum gradeability and other values are high, and the forklift truck is suitable for carrying a large amount of cargo in a short time and climbing a slope. The power consumption of the forklift truck is highest in this mode.

**S P E**

**Mode P** refers to the normal mode. In this mode, all indexes are slightly lower than the fast mode, and the forklift truck is suitable for normal operating environments. This is the default mode.

**S P E**

**Mode E** refers to the slow mode. In this mode, the maximum speed is limited, and the forklift truck is suitable for working in crowded warehouses and narrow spaces.

SPE

### Running hours [B]

26h

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

### Low battery display [D]



When the battery level is less than 20% of the battery capacity, this indicator light will light up; When the battery level is higher than 20% of the battery capacity, this indicator light goes off.

### Fault indicator light [E]



When an electrical system fault occurs, this indicator light stays on constantly. After the fault is cleared, this indicator light goes off.

### Working device restriction indicator light [F]



When only 10% battery capacity remains, this icon will light up; at the same time, the lifting speed of the mast will be reduced, prompting the user to charge the battery immediately.

### Vehicle speed [G]

13.3  
km/h

Range is 0-30 km/h, displayed to 1 decimal place.

### Steering angle [H]

86°

Displays the vehicle's left/right steering angle, unit: °

### Battery level [I]

47%  
SOC

Displays remaining battery capacity with a display range of 0-100% and accuracy of 1%.

It is recommended that the battery should be charged when only 30% capacity remains, otherwise its service life will be greatly shortened.



**Caution**

- **It is important to charge the battery on time, otherwise the battery life will be shortened!**

**Safety belt [J]**



Fasten the safety belt. If the safety belt is not fastened properly, the safety belt alarm indicator light will turn on.

**Driver's seat switch [K]**



When the driver leaves the seat, this icon will light up. It indicates that the seat switch is turned off, and the truck cannot move or lift. This function applies to driver's seats fitted with a switch.

**Neutral indicator light [L]**



When the gear position is in neutral, the indicator light will light up.

**Parking indicator light [M]**



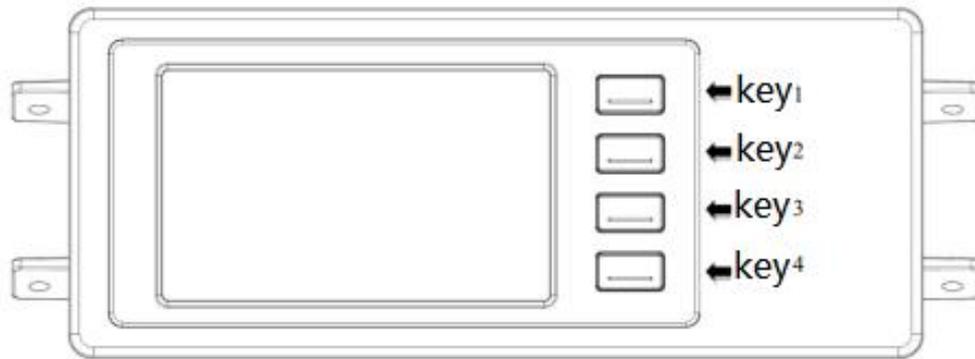
When the handbrake is engaged, this icon will light up.

**Tortoise speed mode [N]**

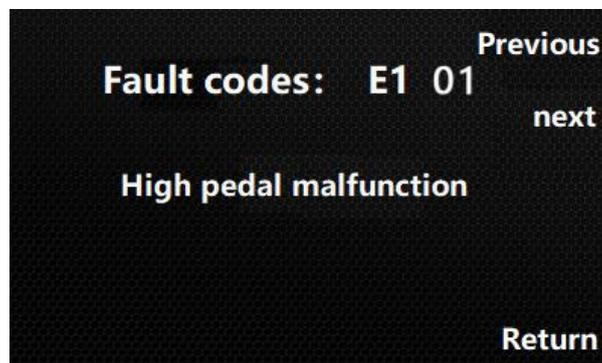


When the forklift truck is running in low-speed mode (Mode SPE), this indicator light will light up.

### 12.2.1 Instrument buttons



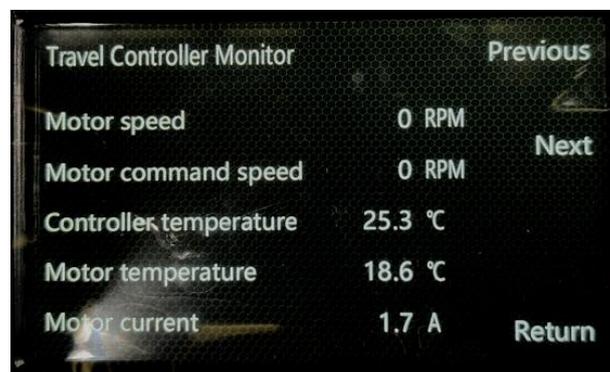
(1) Press button 1 on the main interface to view fault information. Press button 1 and button 2 to page up/down to view multiple fault messages. Press button 4 to return to the main interface.



(2) Press button 2 on the main interface to switch between the three running modes: Speed mode S, Normal mode P, and Slow mode E. The mode indicator icon will change accordingly.



(3) Press button 3 on the main interface to view monitoring information. Press button 1 and button 2 to page up/down to view traction controller, auxiliary traction controller (reserved), oil pump controller, auxiliary oil pump controller (reserved), and lithium-ion battery monitoring information. Press button 4 to return to the main interface.



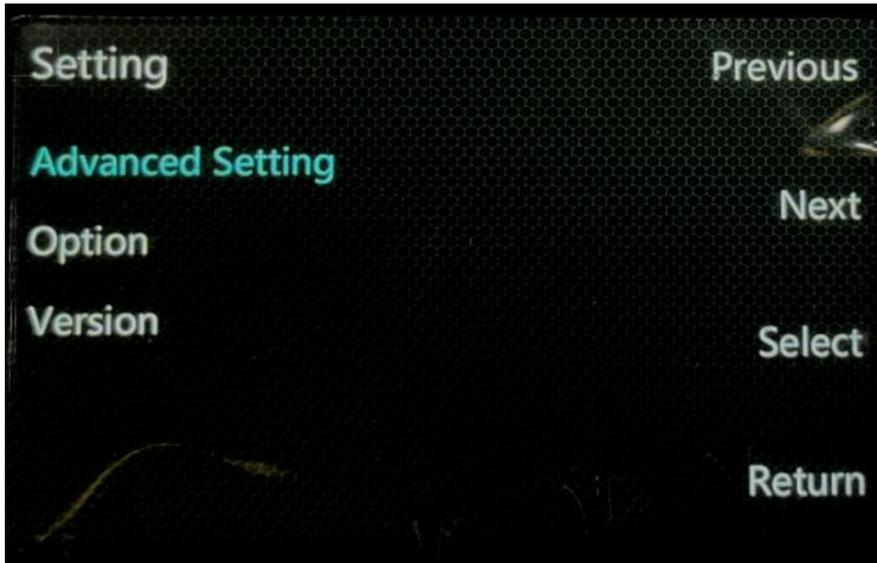
Pump Controller Monitor		Previous
Motor speed	20% 0 RPM	Next
Motor command speed	0 RPM	
Controller temperature	24.9 °C	Return
Motor temperature	20.3 °C	
Motor current	1.7 A	

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	

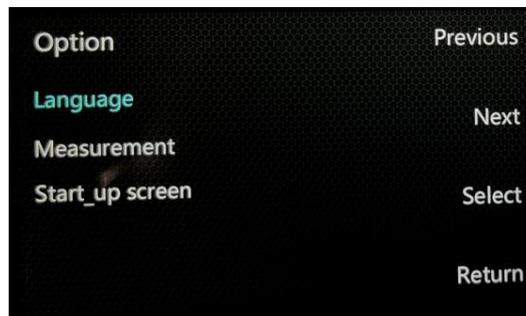
(4) Press button 4 on the main interface to enter the setting page. Press button 1 and button 2 to switch between different sub-page options. Press button 3 to enter the selected sub-page, and press button 4 again to return to the main interface.



### Option screen

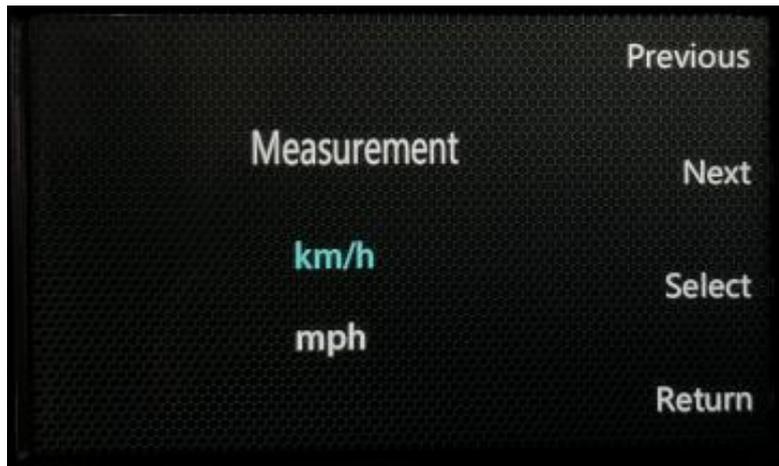
#### (1) Language settings

Press button 1 and button 2 to select between Chinese/English; press button 3 to confirm, and the interface will automatically jump back and the language will change accordingly; press button 4 to cancel and return to the previous interface.



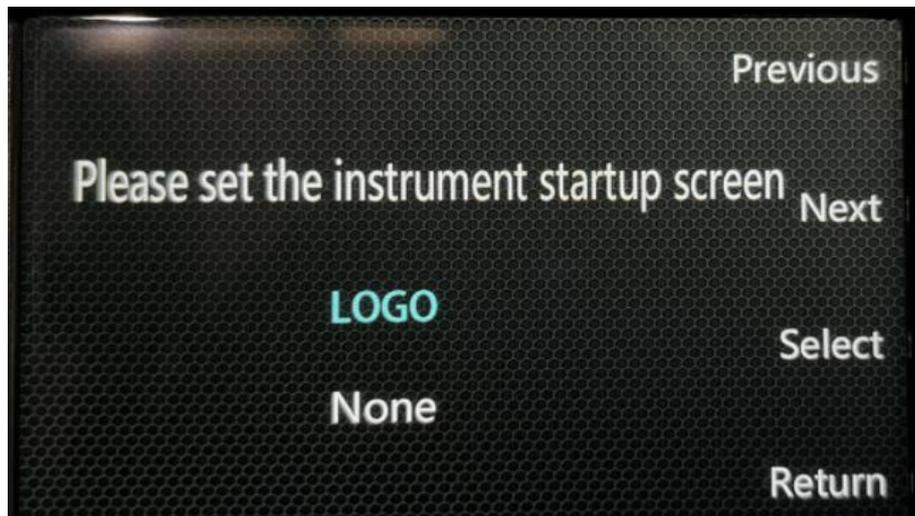
#### (2) Unit settings

Press button 1 and button 2 to select between imperial and metric system; press button 3 to confirm, and the interface will automatically jump back and the unit will change accordingly; press button 4 to cancel and return to the previous interface.



(3) Start-up interface settings

Press button 1 and button 2 to select HANGCHA Logo/No Power On Screen options; press button 3 to confirm, and the interface will automatically jump back and the power on screen will change accordingly; press button 4 to cancel and return to the previous interface.



## 12.3 Control parts

### Emergency power-off switch [1]



Turns the power on or off.

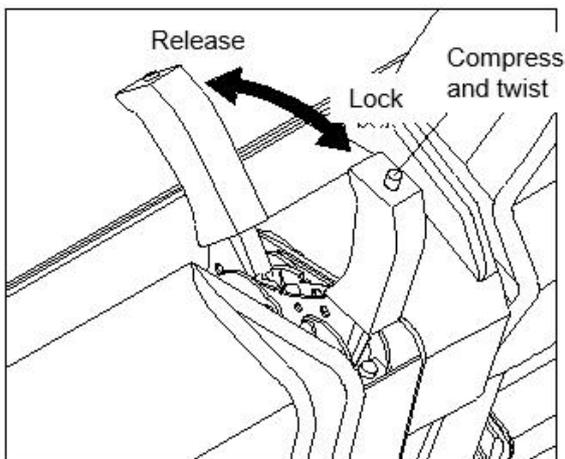
In an emergency, press the red mushroom-shaped button to cut off the main vehicle power. Traveling, steering and lifting actions will be disabled.



#### Caution

- Do not use the emergency stop button instead of the key switch.

### Parking brake [2]



Fixing a forklift in a stationary position.

In order to park, pull the handle backward to apply a braking force to the front wheels. Push the handle forward to release the brake.

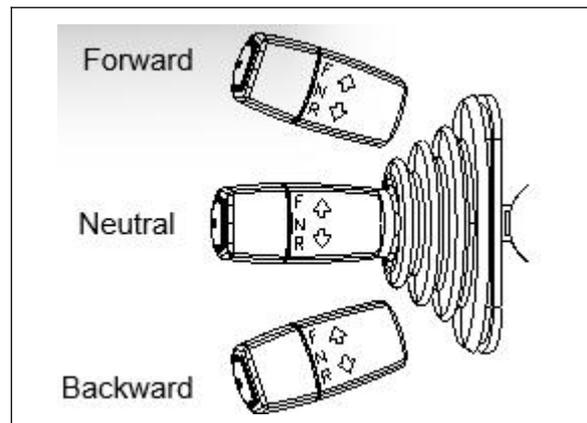
The handbrake is equipped with a micro switch on its left side and operation actions will become invalid when the handle is pulled tightly.



#### Warning

- If the forklift truck has to be parked on a ramp, solid wedge blocks must be used to support the wheels.

### Forward/backward switch [3]



Press the brake pedal to the bottom to fully stop the truck before changing the driving direction; push the lever forward to engage forward gear. Press on the brake pedal to slow down if it is required to reverse; and then pull back the lever to engage reverse gear.

After starting the forklift, when the switch is switched to the forward position and the accelerator pedal is depressed, the forklift runs forward; when the switch is switched to the reverse position and the accelerator pedal is depressed, the forklift travels backwards.



#### Caution

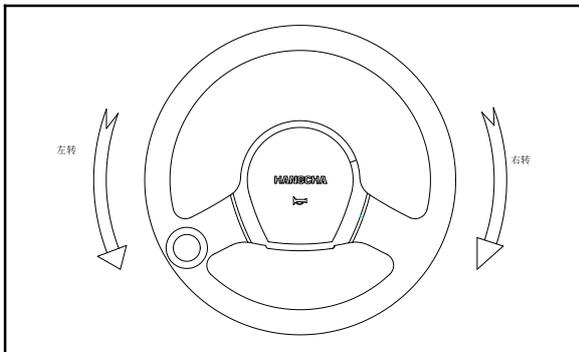
- When the forklift truck is running, the electric brake can slow down the forklift truck if the direction lever is pushed to the opposite direction. After stopping, the forklift truck will slowly run in the other direction.



### Warning

- If the direction of the travel switch is not in the neutral position or the accelerator pedal is pressed, turning the key switch to the "on" position will not start the forklift truck. In this case, the direction of the travel switch should be returned to the neutral position and the accelerator pedal should be released so that the forklift truck can start.

### Steering wheel [4]



To control the driving direction of the forklift.

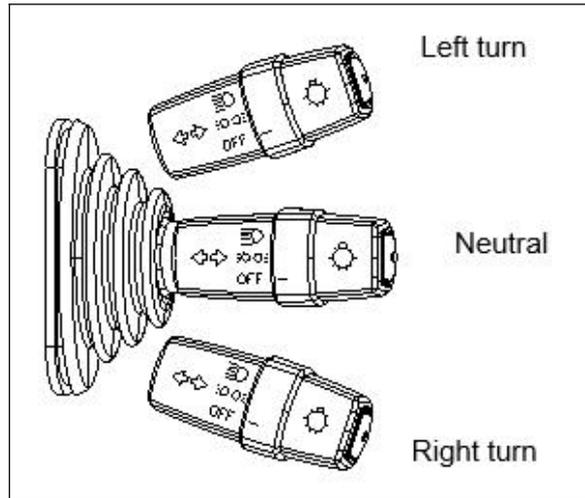
When the steering wheel is rotated to the right, the truck will turn right; when the steering wheel is rotated to the left, the truck will turn left. The rear of the truck can swing outward.



### Warning

- The forklift truck is equipped with a hydraulic steering mechanism. When the oil pump motor shuts down, the steering will become very heavy. Before turning again, the oil pump motor must be restarted immediately.

### Combination light switch [5]



Controls the operating status of steering indicator lights, headlights, and front signal lights.

The arrow indicates the truck turning direction. Push forward and the left steering indicator light flashes; push back and the right steering indicator light flashes.

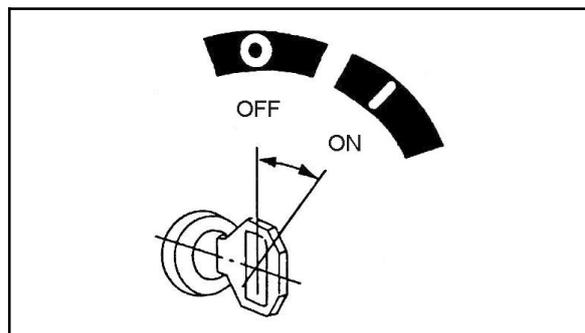
The headlight switch has two positions. In position 1, only the signal lights turn on. In position 2, both the signal lights and the headlights turn on.



### Caution

- The steering indicator rod does not return to neutral automatically, it must be reset manually.

### Key switch [6]



To connect or disconnect the electric circuit. Pull the key out of the lock switch to ensure that the truck cannot be started accidentally.

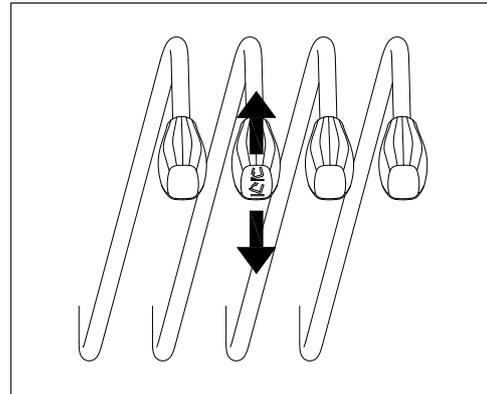
The key switch has two functional positions: on/off; first, set the shift lever to neutral, release

the accelerator pedal, and then turn the key clockwise to the "ON" position.



**Caution**

- The forklift truck will not start if the direction lever is not in neutral or the accelerator pedal is pressed down when the key switch is turned to the "ON" position.
- In this instance, there will be a fault code.
- The user should restore the direction lever to the neutral position and move their foot away from the accelerator pedal to start the truck.
- At this time, the fault code will disappear.



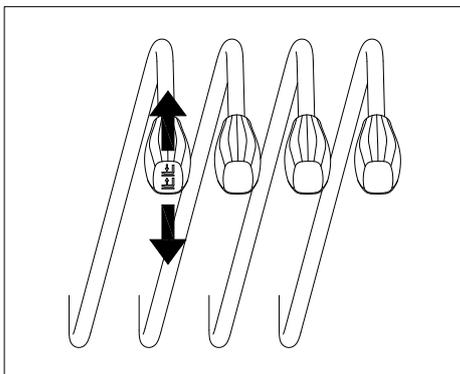
Controls forward and backward tilt of fork  
Push/pull the tilt lever to make the mast tilt forward/backward. Push the tilt lever forward to make the forks tilt forward; and pull it backward to make the forks tilt backward. The tilt speed is determined by the tilt angle of the lever.



**Caution**

- The multi-way valve is equipped with a forward tilt self-locking valve. Therefore when the power is off, the mast cannot tilt forward even if the tilt lever is pushed forward.

**Lift control lever [7]**



To control the fork lifting/lowering action.

Push this lever forward/backward to lower/lift the forks. The lifting speed is controlled by the backward tilt angle of the lever. The lowering speed is controlled by the forward tilt angle of the lever.

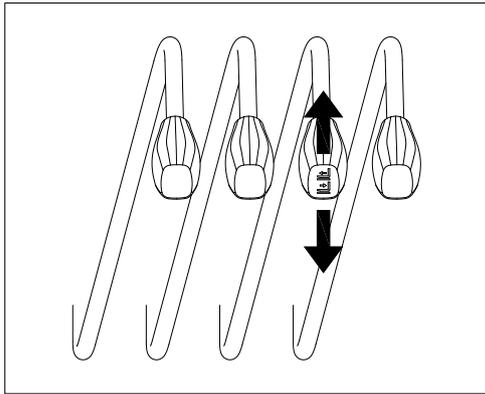
**Tilt lever [8]**



**Danger**

- When the fork or attachment is in a high position, operating the tilt control lever can affect the longitudinal stability of the forklift and may even cause the forklift to tip over.

**Side shift lever [9]**



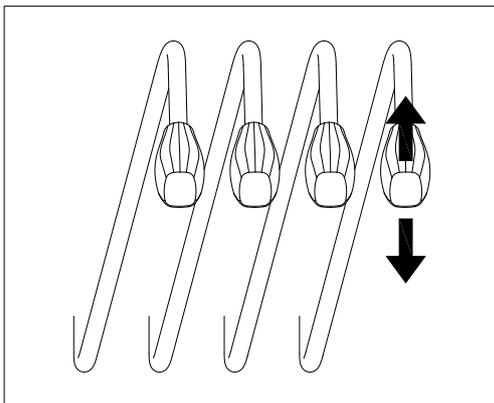
Control the left and right shift of the forks relative to the mast.

Push/pull this lever forward/backward to control the left and right shift of the forks relative to the mast.

**⚠ Danger**

- When the fork or attachment is in a high position, operating the side shift control lever can affect both the lateral and longitudinal stability of the forklift and may even cause the forklift to tip over.

**Attachment lever [10]**



Used for attachments such as paper roll holders and rotators.

**⚠ Danger**

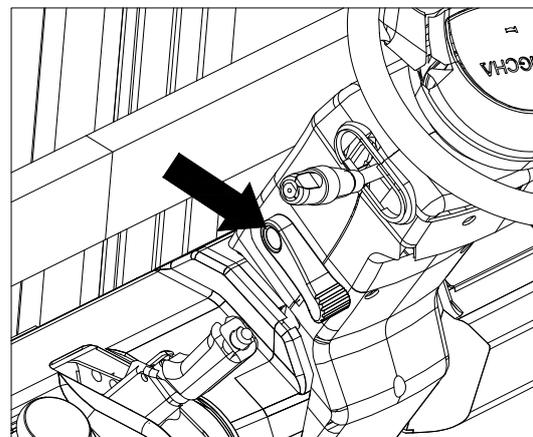
- When the fork or attachment is in a high position, operating the attachment control lever can affect both the lateral and longitudinal stability of the forklift and may even cause the

**forklift to tip over.**

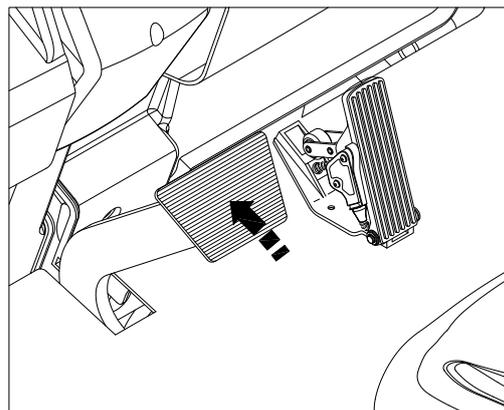
**Steering column stop handle [11]**

Adjust and secure the steering column to the desired distance.

The tilt angle of the steering column is adjustable to suit the operator. Pull the handle upward to release the steering column; and push it downward to lock it.



**Brake pedal [13]**



Perform a brake operation.

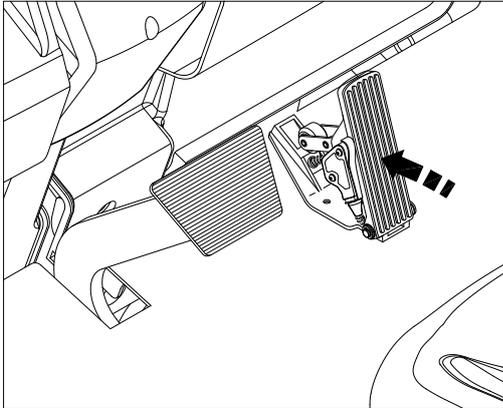
When the brake pedal is depressed, the forklift will slow down or stop and the brake light will come on.

**⚠ Caution**

- Do not depress the accelerator pedal

and brake pedal at the same time, as this may damage the motor.

#### Accelerator pedal [14]



The forklift speed can be adjusted by changing the accelerator pedal angle.

Depress the accelerator pedal slowly, the motor starts to run and the forklift will begin moving. Increase the vehicle speed by depressing the accelerator pedal.



#### Caution

- When the forklift truck is running, soft braking will occur when the accelerator pedal is released.



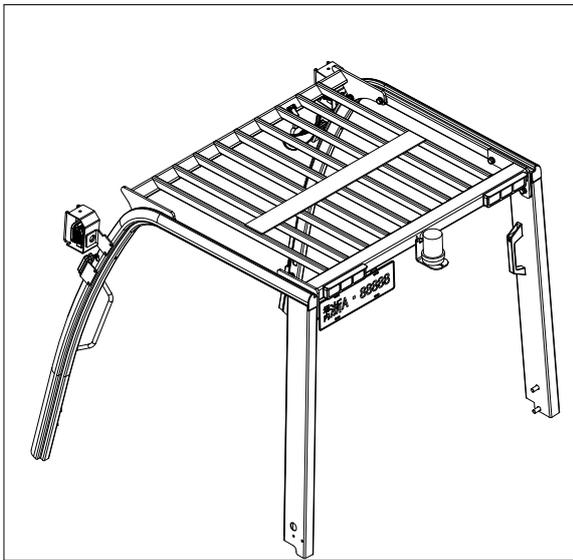
#### Warning

- Do not depress the accelerator pedal until the key is turned on, otherwise the instrument panel will display an error. At this time, the user should release the accelerator pedal.

## 12.4 Body and Others

### Overhead guard

The overhead guard is an important component in preventing falling objects from above and protecting the operator. It must have sufficient impact resistance. It is highly dangerous to use it after loose installation, disassembly, or modification, which may lead to serious accidents. The notch is used to lift the battery.



#### Warning

- The forklift truck must not be used without an overhead guard.

### Hood

Large opening hood for easy inspection and maintenance of the battery.

With the help of the inner gas spring, the user can fully open the hood with very little force. To close the hood, the user should release the gas spring and then push the hood down.

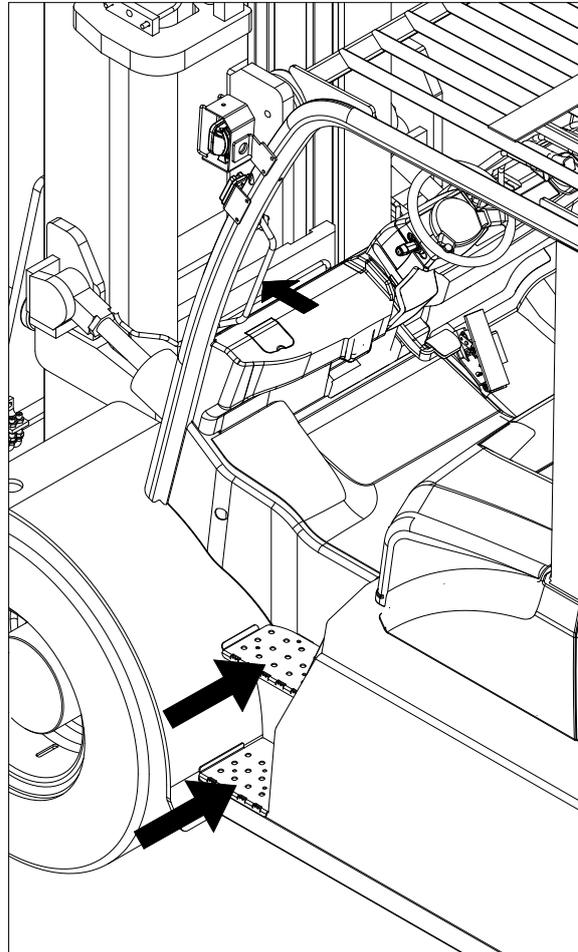


#### Caution

- To close the hood, the user should release the gas spring and then push the hood down.

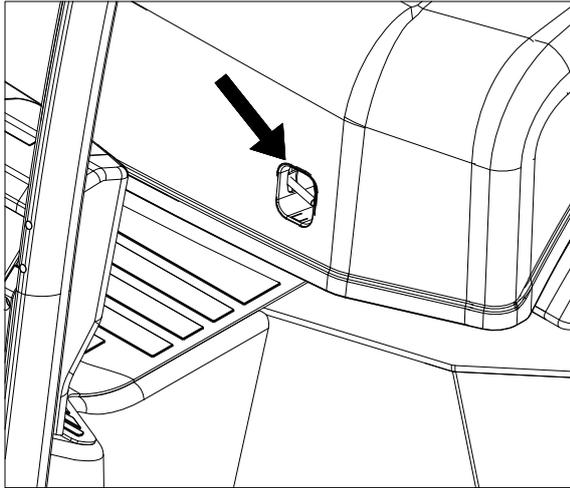
- Take care to prevent your fingers from being trapped by the hood when closing.

### Safety footboard and handrail



The body is provided with a safety footboard for getting on and off the truck on both sides; the safety handrails are installed on the left pillar of the overhead guard. Safety footboards and safety handrails are to be used when getting in and out of the vehicle.

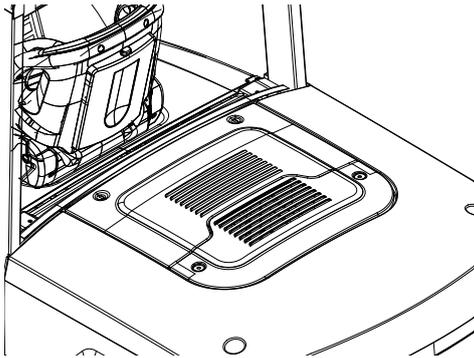
### Front hood lock



Fixing the front hood

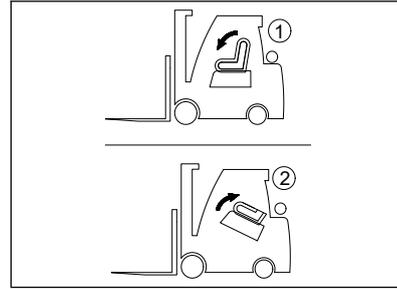
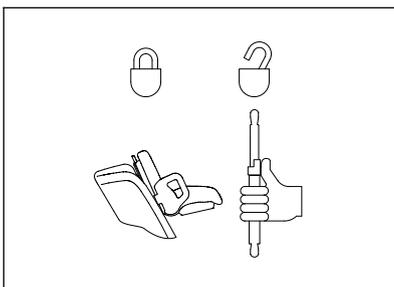
### Tank cover plate

The open hood is easy maintenance service. You can lift up the hood with little effort with help of inner hood gas spring force.



To open, first unscrew and tighten the handle of the rear cover plate, then open the rear cover plate before you can open the front cover plate.

When it is closed, press the red button on the air spring pipe, then the lock will be released. Press the hood head, you can shut it down, and the hood is locked after you hear click sound.



### CAUTION

When closing the hood, prevent the falling hood from clamping your fingers.

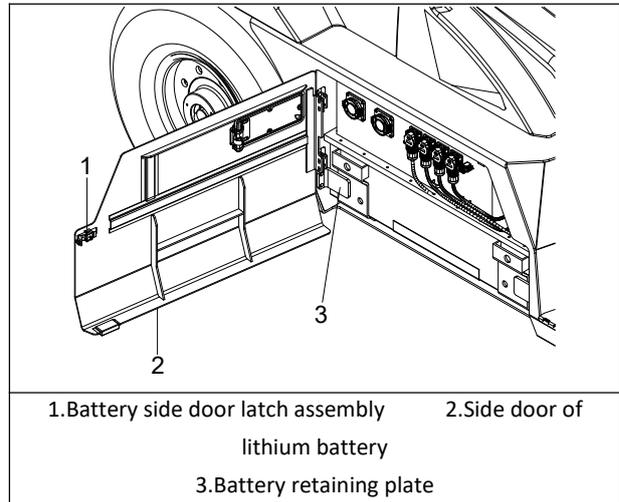


### Warning

When servicing under the hood, be sure to turn off the key switch to prevent electric shock. However, in the case where the hands, feet, head, and body do not touch the components, in order to diagnose the fault by hearing, the key switch and the hood are allowed to open at this time.

### Lithium battery charging port structure and side door

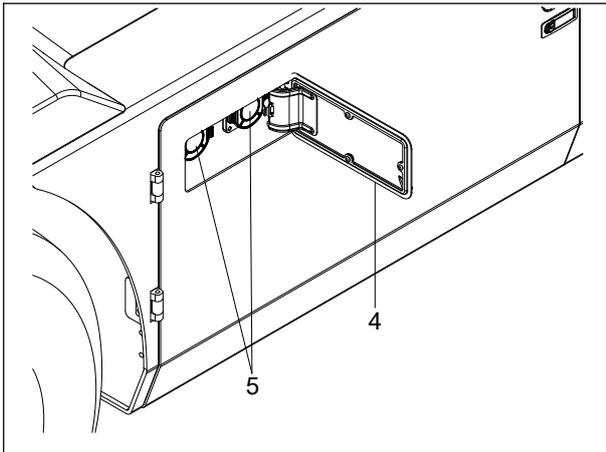
Side door of lithium battery and its fastening device



### Charging port structure and side door

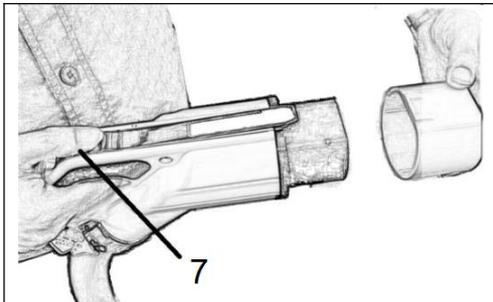
The charging door(4) is attracted by a magnet. When the charging door is opened, the charging port of the lithium battery can be seen, and the charging port is covered with a cover. Open the

cover and you can see the charging port (5).



**Lithium battery charging port structure**

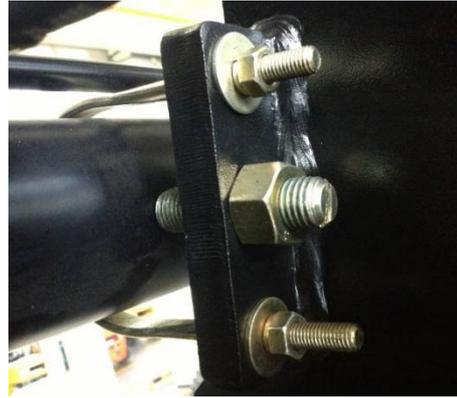
Press the lock button (7) on the charging gun head to insert or remove.



Note: The flat side of the plug is equipped with a locking hook that snaps into the slot when it is inserted into the battery socket.

### **Adjust and replace forks**

1.Remove the hoop on the distance-adjusting cylinder and the fork carriage, and remove the hoop, screws, nuts and washers.



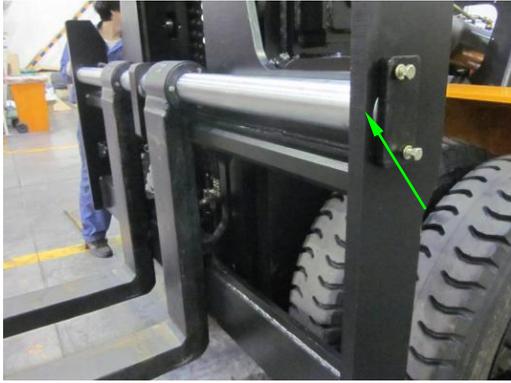
2.Remove the connecting hose that is in contact with the distance-adjusting cylinder, and remove the pin that connects the distance-adjusting cylinder to the fork. Tie the fork with a cloth rope to prevent the fork from accidentally falling off during disassembly.



3.Straighten the distance-adjusting cylinder, and remove the pin shaft connecting the distance-adjusting oil cylinder to the load bracket. Repeat the above steps to remove the two distance-adjusting cylinders. The removed fasteners include: pins, bolts, and washers.



4.Remove the bolts that fasten the pressure plates on both sides of the fork shaft, and take out the pressure plates.



5. Start the forklift and use the joystick to adjust the position of the fork carriage, so that the fork falls on the ground, and there is no large force between the fork shaft and the fork hole. Pull out part of the fork shaft using the tool pusher for dismantling the string rod as shown.



6. Use the tool to slowly knock the fork shaft out of the fork hole.



7. Wind the rope in the middle and front of the fork, and operate the truck to move the fork out of neutral.



### Install

The installation method is the opposite of the removal method. Install the distance control oil cup. The orientation of the oil cup after it is finally screwed in should facilitate butter filling.



### Caution

The installation method is the opposite of the removal method. Install the distance control oil cup. The orientation of the oil cup after it is finally screwed in should facilitate butter filling.

After the installation is complete and the hoop is tightened, adjust the limit screw until the screw just touches the cylinder, and then tighten the nut.



### Caution

- The fork is a heavy component. When disassembling, pay attention to personal safety to avoid physical injuries such as smashing and crushing.
- When using the crane to lift the fork, fix the rope in multiple places to prevent it from falling off during assembly.
- The fork carriage is equipped with

screws, bolts and other tightening parts.  
After assembling the fork, please check  
whether it is tight. If damaged, it should  
be replaced in time.

**Card swiper operation and safety monitoring device**

1. Start the vehicle by card swiping

- ① Engage the gear shift lever in the neutral position;

 **Caution**  
 If the shift handle is not placed in neutral, the forklift cannot be started even if the card is swiped successfully

- ② Turn the key start switch to the vehicle power-on status (the instrument lights up); at this time the card-swiping indicator or icon flashes;

The swiping indicator symbols are as follows.

Attribute Symbol name	Symbol color	Icon*
Card-swiping icon	Green	((  )
Note: Some devices, such as card swipers, do not have an icon display function and only provide indicator lights for status display.		

- ③ The card can be successfully swiped by bringing the provided IC card (see below) close to the swiping area, and the card indicator or icon will always light up when the card is successfully swiped.

 **Caution**

- The swipe location is generally located near the display instrument where there is a swipe label or swipe logo.
- If the card is not swiped successfully within 2 minutes, the system will automatically judge it as operation timeout, and the forklift will revert to the state of swiping unsuccessful, please restart the forklift and then swipe the card again.



IC Card Front View



Card-swiping label

④ If the gear shift handle is in the neutral position, the electric forklift will start after the card is swiped successfully; after the card is swiped successfully for the internal combustion forklift, the forklift can be started by rotating the key start switch to the "start" position.

## 2. Binding a new IC card

- ① Engage the gear shift lever in the neutral position;
- ② Turn the key start switch to the vehicle power-on status (the instrument lights up); at this time the card-swiping indicator or icon flashes;

The swiping indicator lights or symbols are as follows.

Attribute Symbol name	Indicator light color	Icon*
Card-swiping icon	Green	((  )
Note: Some devices, such as card swipers, do not have an icon display function and only provide indicator lights for status display.		

- ③ Bring the new IC card to be bound to the card-swiping area and sense it 3 times within 15 seconds, at which time the card-swiping indicator or icon goes out;
- ④ Then the new IC card to be bound is kept close to the card-swiping area and continues to be sensed for more than 5 seconds, at this time, the card-swiping indicator or icon is always on, the new IC card is bound successfully and the device is in the card-swiping success state.



### Caution

- If the current operation is not completed within 2 minutes before proceeding to the next operation, the system will automatically judge it as operation timeout, and the forklift will revert to the status of unsuccessful card swiping. Please restart the forklift before performing the relevant operation.

### 3. Deleting a binded IC card

- ① Engage the gear shift lever in the neutral position;
- ② Turn the key start switch to the vehicle power-on status (the instrument lights up); at this time the card-swiping indicator or icon flashes;

The swiping indicator lights or symbols are as follows.

Attribute Symbol name	Indicator light color	Icon*
Card-swiping icon	Green	
Note: Some devices, such as card swipers, do not have an icon display function and only provide indicator lights for status display.		

- ③ The IC card to be deleted will be continuously sensed on the card-swiping area for about 15 seconds (during which it cannot be moved away), at which time the card-swiping indicator or icon will start to light up cyclically for 3 seconds and go out for 1 second;
- ④ Take away the IC card and then swipe the IC card to be deleted, if the swipe indicator is off, it means that the IC card is successfully deleted; if the swipe indicator lights up cyclically for 3s and goes off for 1 second, it means that the IC card failed to be deleted.
- ⑤ Restart the forklift power supply before starting the forklift operation again by swiping the card.



#### Caution

- If the current operation is not completed within 2 minutes before proceeding to the next operation, the system will automatically judge it as operation timeout, and the forklift will revert to the status of unsuccessful card swiping. Please restart the forklift before performing the relevant operation.

### 4. Safety monitoring device

The ride-on electric forklift, electro-hydraulic steering ride-on internal combustion forklift and electro-hydraulic steering ride-on internal combustion side forklift are equipped with safety monitoring devices. When the operator is not in the normal operating position, the forklift truck will not be able to move forward or backward, operating the mast control lever will not lift, lower, or tilt the mast and the forklift will not be able to move.



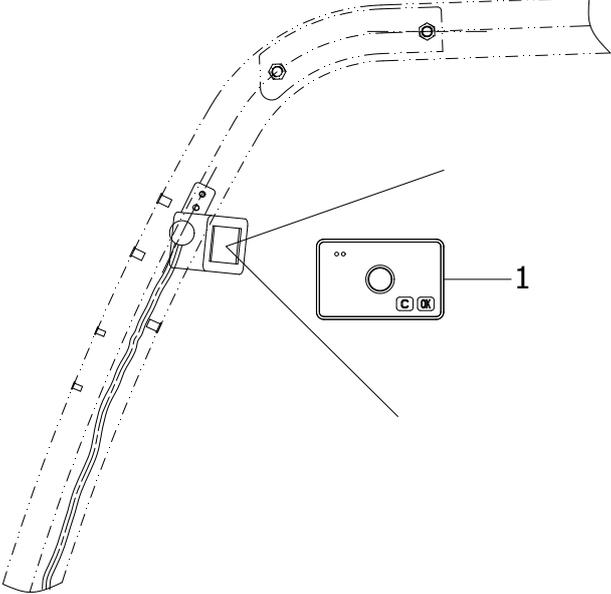
#### Caution

- When the operator is not in the normal operating position and the forklift cannot move forward or backward, and the mast joystick cannot be operated, the mast cannot be raised, lowered, tilted, and the fork frame cannot move, the operator needs to return to the normal operating position and put the shift handle and the mast joystick in the middle position before continuing to control the forklift to move forward or backward, and raise, lower or tilt the mast and move the fork frame.

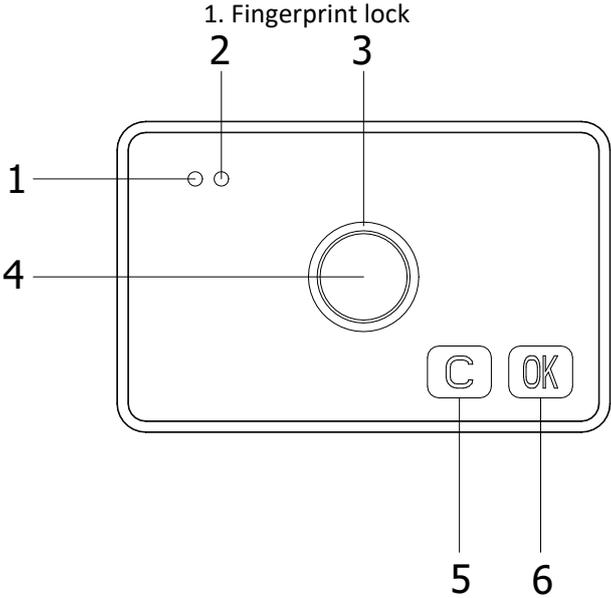
**Fingerprint lock(optional)**

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

### 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.

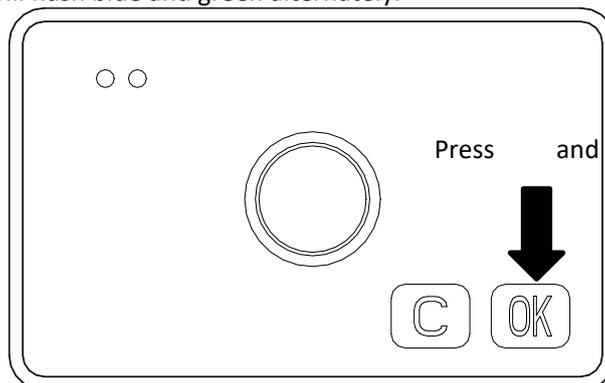
At this time, you can use any fingerprint to unlock, after unlocking, the green indicator light is always on, the red indicator light is always on, the ring fingerprint light flashes blue and green alternately, the buzzer sounds (3 seconds), turn the start key and the forklift truck can start normally.

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

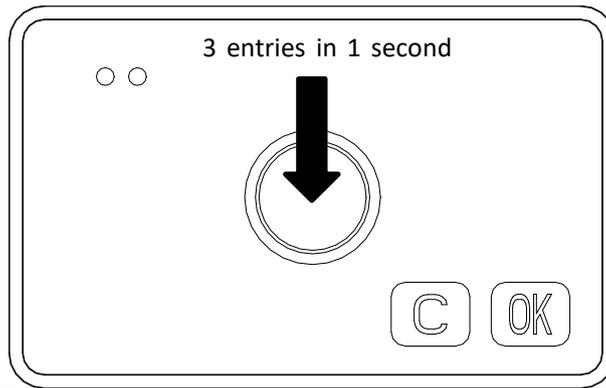
 **Caution**  
 For security purposes, please enter the administrator's fingerprints in a timely manner.

### 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.

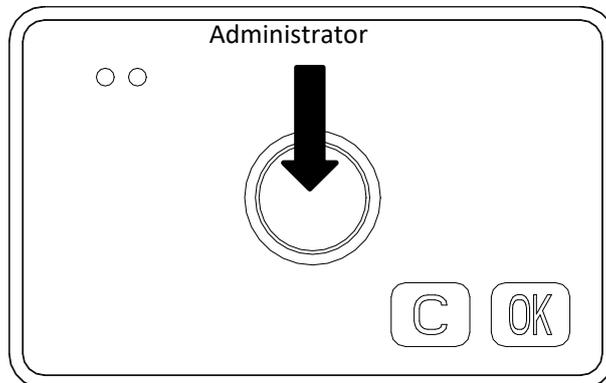


Caution

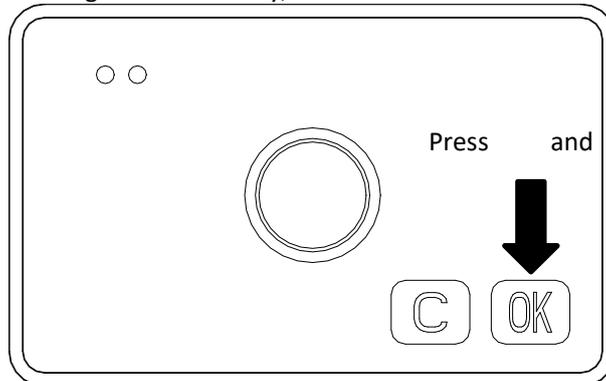
- 1) The EPS fingerprint lock only supports the entry of 1 administrator's fingerprint.
- 2) If the fingerprint is not entered within 5 seconds after long pressing the "OK" button to enter the add fingerprint procedure, the fingerprint lock will enter the add timeout error state, the red indicator light 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.

### 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.

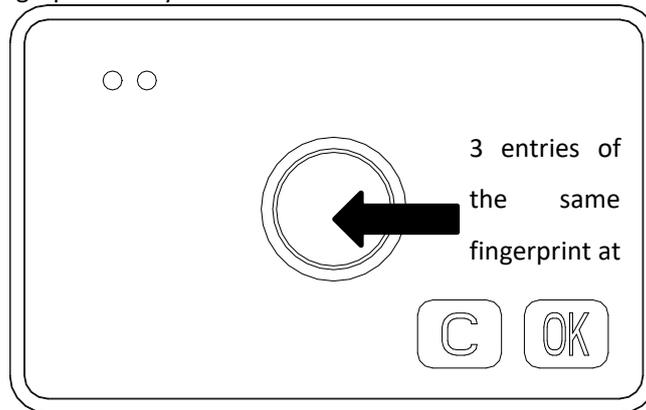


2) In the administrator fingerprint unlock state, long press the "OK" key for more than 5 seconds to enter the ordinary fingerprint entry procedure, at this time, the green indicator and red indicator light is off, the ring fingerprint light flashes blue-green alternately, the buzzer sounds 3 times.



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.

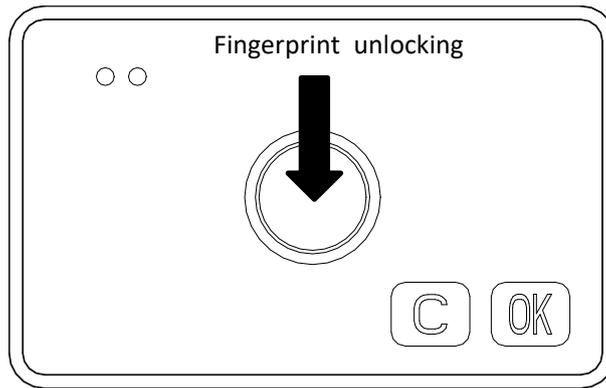
#### 1.4 Unlocking the fingerprint lock

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.

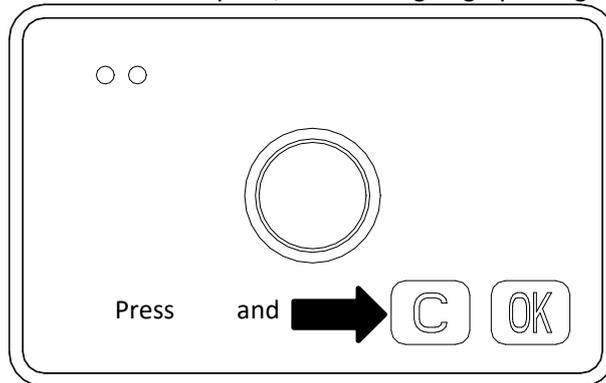
Indicator light	Status
Green indicator light	Constant
Red indicator light	Constant
Ring fingerprint light	Blue-green alternating flash

#### 1.5 Deleting ordinary fingerprints

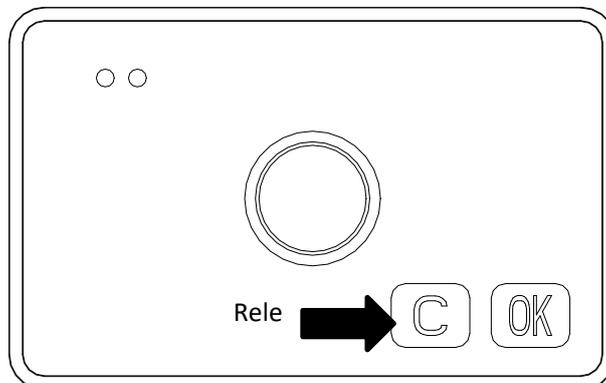
1) Power on the fingerprint lock that has already had ordinary fingerprints entered and unlock the fingerprint lock with the fingerprint that needs to be deleted. The green indicator light is always on, the red indicator light is always on, the ring fingerprint light is displayed in blue, and the buzzer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

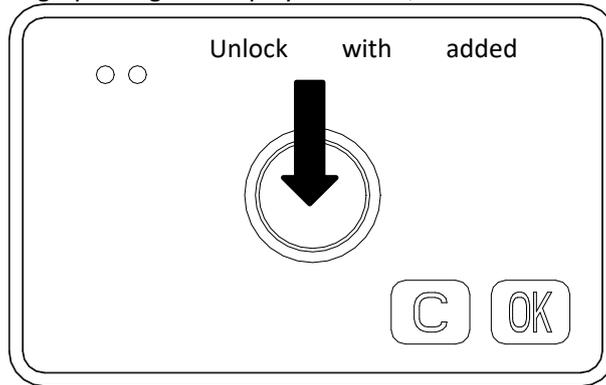


 **Caution**  
 If the red indicator and green indicator flash alternately after releasing the key, and the ring fingerprint light shows blue and green alternately, this indicates deletion failure status. The fingerprint lock will then return to the pending unlock state, i.e. the green indicator light 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.

## 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.

## 2. FKS Fingerprint lock

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



Fingerprint lock

### 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.

### 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.

### 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.

### 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.

### 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.

## 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.

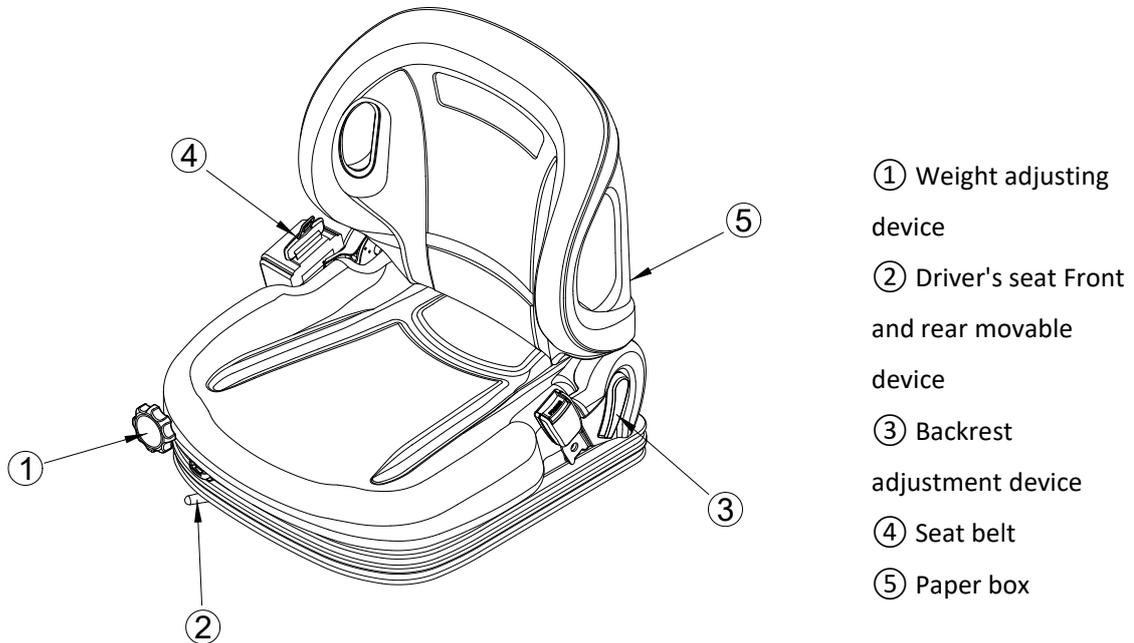
## 2.7 Deleting the fingerprint of a specified ordinary user

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.

2) 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.

## Driver's seat

This seat is designed for maximum comfort and can be adjusted as follows:



### Adjustment based on the driver's weight:

In order to optimize the shock absorption effect, the seat must be adjusted based on the driver's weight.

- The driver sits on the seat. If it is properly set, the seat adjustment lever ① should be matched with the driver's weight. If the seat adjustment lever deviates too much from the center (on the left or right), the seat must be adjusted based on the driver's weight.
- If the driver has a low body weight, the seat adjustment lever ① should be adjusted to the left.
- If the driver has a large body weight, the seat adjustment lever ① should be adjusted to the right.

### Adjust the seat position:

- Pull the horizontal adjustment lever ② upward and move the seat back and forth to a proper position.
- Lock the horizontal adjustment lever ②.



#### Warning

- Ensure the horizontal adjustment lever ② is locked securely. Do not adjust the driver's seat while driving the truck.

### Adjust the seat back

- The driver sits on the seat.
- Press the seat back adjustment button ③ down to adjust the back tilt angle.
- Release the back adjustment button ③ to lock the back.

## Seat belt

Please fasten the safety belt ④ securely before driving the truck. The seat belt can protect the driver in the event of an accident. Clean and inspect the seat belt regularly to avoid build up of dirt.

### Properly use the safety belt:

- The driver sits on the seat properly.
- Check the safety belt for any twisting or knots.
- Pull the safety belt to the hips.
- Fasten the safety belt and check the buckle.
- Adjust the safety belt to avoid extreme tension or looseness (which leads to a failure to hold the driver in place).

### Check the safety belt regularly:

- Check the safety belt for any damage, breakage, or cracks.
- Check the metal attachments of the safety belt (including the tie-down point) for any wear or damage.
- Check the safety belt buckle and tensioning device.

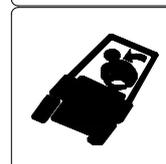
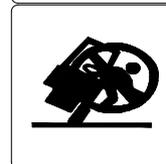
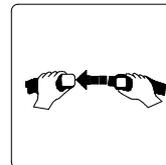


#### Warning

- In any event, if the safety belt has any damage or defects (insecure, broken or slippery safety belt), please repair or replace it immediately.
- Do not modify or refit the seat belt. Replace the seat belt after an accident.

### Measures to be taken in special circumstances:

- Fasten the seat belt and sit in the seat.
- Do not jump out of the forklift.
- Lean your body forward, grip the steering wheel with both hands and support your body with both feet.
- Tilt your body in the opposite direction of rollover.



#### Warning

- When the forklift is in danger of rolling over, do not unbuckle the seat belt and jump out of the forklift to escape. Jumping may lead to more serious injuries!

## 12.5 OPS System (optional)

The OPS (Operator Presence Sensing) system is a safety protection system that senses whether the driver is sitting in the seat correctly with a sensor mounted in the driver's seat. If the driver is not sitting in the driver's seat correctly, the driving force will be cut off and all handling operations will be stopped. It is used to prevent accidents when the driver leaves the seat. If the driver is not sitting in the driver's seat correctly, he/she will not be able to conduct driving or handling operations, to reduce the risk of accidents.

### Driving protection function

While driving the truck, if the driver leaves the seat or releases the seat belt for more than 1s (on the premise that it is mounted with a seat belt protection switch), the truck will automatically stop, the seat switch indicator light “” will turn on and the buzzer will sound a continuous alarm. Only when the handbrake is engaged or the driver is sitting on the seat correctly, and the direction lever returns to the neutral position, will the seat switch indicator light “” turn off and the OPS driving state be released.

### Working protection function

When the truck is working, if the driver leaves the seat or releases the seat belt for more than 1s (on the premise that it is mounted with a seat belt protection switch), the truck will automatically stop working, the seat switch indicator light “” will turn on and the buzzer will sound a continuous alarm. The OPS indicator light will automatically turn on, the buzzer will sound an alarm and the handling operations will automatically stop. Only when the driver is sitting on the seat correctly, and the seat switch indicator light “” turns off, will the OPS working state be released.

### Alarm function

Once the seat sensor detects that the seat switch is off, within about 1s, the buzzer will sound a continuous alarm and the seat switch indicator light “” will turn on. If the seat switch indicator light “” is on when the seat switch is off, it indicates that the OPS is in the “ON” state.

### Neutral reset function

If the direction lever has not been restored to the neutral position and the seat switch is on, the buzzer will sound a continuous alarm to remind the driver that the OPS driving function is activated.

### OPS function exception handling

In the event of the following conditions, the truck should be parked in a safe place and Hangcha agency should be contacted for inspection. a. After the driver leaves the seat, the seat switch indicator light “” does not turn on; b. After the driver sits back in the seat, the seat switch indicator light “” does not turn off.



#### Caution

- For forklift trucks with seats provided with a safety belt protection switch, after the driver

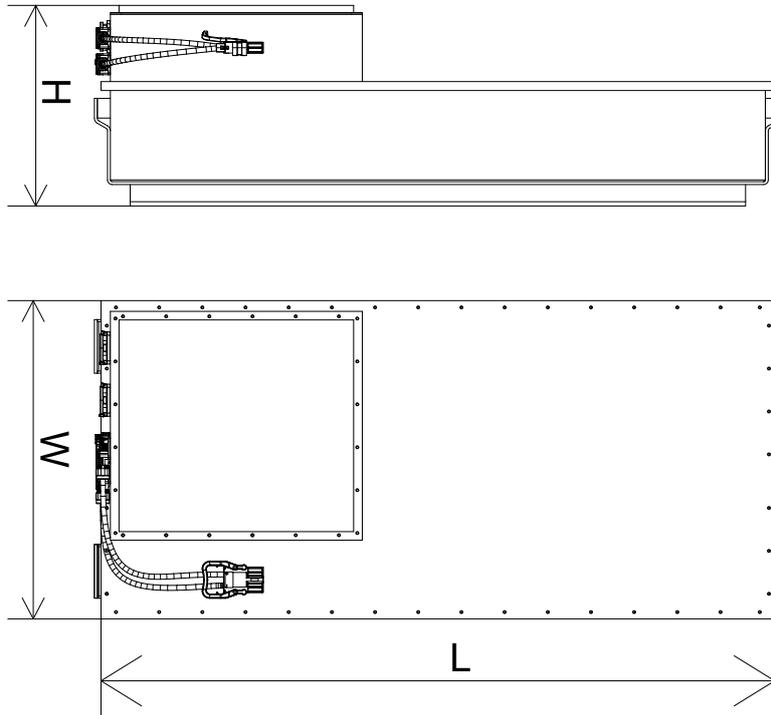
first sits back on the driver's seat properly and fastens his/her safety belt, normal operation can be conducted. If the OPS system is started by accident when driving uphill, it will disconnect the driving power, making the forklift truck roll backwards. In order to avoid accidents, the driver must sit on the driver's seat properly when driving uphill.

**Fork lock function after power failure**

In the event of turning off the start switch or power failure, the forks are locked and cannot be lowered even if the lowering lever is used.

## 13 Lithium-ion battery

### 13.1 Lithium-ion battery parameters (CATL)



Item		CPD60-XEY2-SI CPD70-XEY2-SI	CPD80-XEY2-SI CPD90-XEY2-SI CPD100-XEY2-SI
Length (L)	mm	1908 <sup>0</sup> <sub>-2</sub>	1910
Width(W)	mm	890	1085
Height (H)	mm	561 <sup>0</sup> <sub>-2</sub>	613
Min. weight	kg	660 ± 5%	770 ± 5%
Rated capacity	Ah	560	690
Rated voltage	V	96	96

## 13.2 Instructions for safety

1.1.1 Do not touch the positive and negative terminals of the battery box with your hands at the same time at any time to prevent an electric shock.



1.1.2 Maintenance personnel must have an electrician license issued by the State Administration of Work Safety and should not conduct maintenance without the ENERO maintenance authorization.



1.1.3 Wear insulated gloves when operating and maintaining the battery system, metal jewelry such as watches are strictly prohibited.



1.1.4 When cleaning the truck, do not directly flush the battery system to protect the battery system from malfunctions caused by water ingress.



## 13.3 Instructions for installation

1.2.1 Installation personnel should have a relevant

license for installation, be provided with labor protection, and pay attention to safety protection. Before installing the battery system, make sure that the low-voltage plug-in of the battery system is disconnected from the truck. When connecting the high-voltage system, pay attention to safety protection to prevent an electric shock during installation. During the installation of the battery system, the battery should be mechanically lifted and slowly installed into the battery compartment of the truck, do not crush or damage the battery case and external cables. During the installation of the battery system, avoid high-voltage reverse connection or short circuits, etc. To remove the battery system from the vehicle, make sure that the key for the whole vehicle is turned off and the high-voltage cable and low-voltage plug-in are disconnected from the vehicle.

1.2.2 Post-installation inspection: after the battery system is installed, check the battery system stop pins and fixing bolts to confirm that they meet the battery system installation requirements. Check that the high-voltage cable and low-voltage plug-in are connected correctly and securely. Turn the key switch to the "ON" position, the relay should engage normally with no battery alarm. If there is a battery fault alarm, cut off the power immediately and notify our after-sales service center for a solution.

## 13.4 Common terms for lithium-ion power batteries

### 1.3.1 Battery system

The battery system is an energy storage device that typically includes one or more battery modules, battery management systems, thermal

management systems, high/low voltage wiring harnesses, connectors, and structural components.

### 1.3.2 SOC

The 'State Of Charge' (SOC) of a battery is a measurement of how much energy is remaining (percent).

### 1.3.3 Rated voltage

It is an approximate value used to indicate the battery voltage.

### 1.3.4 Rated capacity

Under the specified conditions, the electric capacity provided by the fully charged battery, which is indicated by the manufacturer.

### 1.3.5 Over-discharge

The state when the battery voltage is below the discharge cutoff voltage, and it usually refers to the discharge state after the battery is fully discharged.

### 1.3.6 Overcharge

The state when the battery voltage is higher than the maximum charging voltage and at this time it can usually be regarded as battery overcharge.

1.3.7 Explosion: The battery housing is broken and solid material is flushed out of the battery with an explosive sound.

1.3.8 Fire: Open fire comes out of the battery shell.

1.3.9 Leakage: The internal composition of the battery (electrolyte or other substances) leak out of the battery.

1.3.10 CAN communication: communication via controller area network.

## 13.5 Instructions for use

1.4.1 Battery working temperature:  $-28^{\circ}\text{C}$  to  $55^{\circ}\text{C}$ ; allowable charging temperature:  $0^{\circ}\text{C}$  to  $55^{\circ}\text{C}$ ;

allowable discharging temperature:  $-28^{\circ}\text{C}$  to  $55^{\circ}\text{C}$ ; storage temperature:  $-28^{\circ}\text{C}$  to  $55^{\circ}\text{C}$ .

1.4.2 Check before use and make sure there is no battery system alarm message on the dashboard after the key switch is turned off. Please check the remaining battery capacity before use. It is recommended to use the truck when the battery SOC is within the range of 50% - 100%. It is recommended not to use the truck when the battery SOC is below 30%. Please charge the battery as soon as possible.

1.4.3 Charge the battery promptly when the battery SOC is below 20%. Please use the special charging device designated by the manufacturer. In the event of a fault alarm during charging, both the battery system and charger will stop charging and the fault information will be displayed on the charger. The charging place should be dry and ventilated, with no flammable and explosive materials. The battery system should be fully charged once a week.

1.4.4 Before long-term storage, make sure that the battery level is not less than 50% of the rated capacity. Charge the battery every three months for maintenance, i.e. fully charge the battery. When the battery has been stored for more than three months, before using, please confirm whether there is a fault alarm in the power battery system. If so, please contact our after-sales service center for maintenance. Keep the storage place dry and well-ventilated and away from heat sources.



### Caution

- When the ambient temperature is low, the charging time of the battery system will be extended, which is a normal phenomenon. The battery

management system will automatically adjust the charging time with the temperature change to ensure the best performance.

## 13.6 Daily maintenance

1.5.1 Battery box maintenance: Check the outer box of the battery system for foreign objects, obvious deformation, rust and corrosion and other abnormalities.

1.5.2 Charging port maintenance: In the power-off state, check whether there are any foreign objects, damage, rust and corrosion and other abnormalities in the charging port.

1.5.3 Connector maintenance: In the power-off state, check for looseness, damage and other abnormalities in the connector components.

1.5.4 State detection: Observe the battery system voltage, temperature and other state information on the charger display while charging to ensure that all state information is in the normal range.

## 13.7 Emergency plan

1.6.1 Severe abnormalities: During use, users should be familiar with safety precautions and should not carry out inappropriate operations to

avoid improper use of the battery (e.g. overcharge, over-discharge, short circuit, extrusion, puncture, overheating and high current discharge, etc.). In the charging and use process, the power battery system may develop abnormalities: the temperature of battery system or parts rises sharply; or abnormal smell or smoke from the battery system.

1.6.2 Emergency plan:

6.2.1 Users should quickly leave the truck and call the emergency services.

6.2.2 Carry out the following operations if possible provided that personal safety can be guaranteed:

a. If there is any smoke or burning in the external wiring harness, use a carbon dioxide or dry powder fire extinguisher for fire-fighting.

b. If there is any smoke from the battery, use a high-pressure water gun for fire-fighting at a distance.

c. If the user inadvertently inhales smoke, please leave the area and seek medical attention as soon as possible.

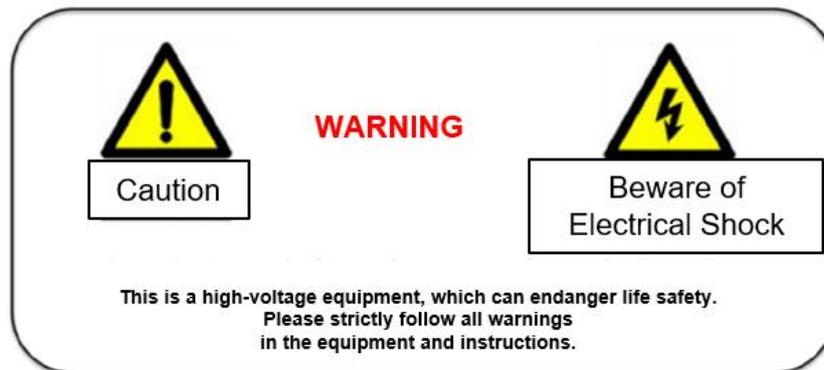
6.2.3 Contact the truck dealer for professional advice.

## 13.8 Charger

### 13.8.1 Titans charger(SLC-96400)

#### 13.8.1.1 Overview

##### (1) Safety warning



##### (2) Regulations for use

- ★ When using and connecting the lithium-ion charger, the relevant regulations on the charging of electric vehicles should be strictly observed.
- ★ Lithium-ion chargers have been developed, manufactured, tested and filed in accordance with the relevant safety standards. If all prescribed rules and technical safety instructions are observed, no property damage or personal injury will be caused under normal circumstances.
- ★ Relevant safety instructions must be strictly observed, otherwise safety hazards may be introduced or failure of safety devices may occur. Although we have provided the relevant safety instructions, the user must also comply with the local regulations on safety and accident prevention where the truck is to be used.

##### (3) Applicable population

These instructions apply to the following people:

- ★ Charging equipment trainers;
- ★ Charging equipment operators;
- ★ Technical services

##### 13.8.1.2 Precautions for safety

(1) Use of this equipment without observing the safety precautions in this section may result in danger to life, injury, and damage to the equipment! We will not be liable for any resulting claims.

##### (2) Instructions for safety

To ensure personal and truck safety, the operator must comply with the following rules and regulations:

- ★ Before powering on the truck, ensure that the truck is properly grounded.
- ★ Before powering on the truck, ensure that the input voltage, frequency, the circuit breaker or fuse and

other device parameters are in accordance with the specifications.

★ Ensure that all tools are properly insulated as necessary to prevent exposed metal parts from touching the metal frame, which may cause a short circuit.

★ To ensure the reliable operation of this truck, it should be operated in a clean and well-ventilated environment as far as possible, and the operating environment must not contain volatile or flammable gases.

### 13.8.1.3 Safety rules

Tips and warnings can be viewed at various places in this manual to indicate possible dangers, the symbols used have the following meanings:

S/N	Safety labels	Meaning
1		Danger Failure to take appropriate precautions may result in death or serious injury
2		Warning Failure to take appropriate precautions may result in property damage or minor injuries
3		Caution Failure to take appropriate precautions may result in property damage

#### (1) Danger

- ★ Electrical hazard! Fire hazard! Do not use a damaged, worn or dirty charging gun.
- ★ Flammable, explosive or combustible materials, chemicals, combustible vapors and other dangerous objects should be kept away from the charger.
- ★ Power off during installation and replacement of the charger to prevent an electric shock.
- ★ Do not use an extension cable to connect the charger to the electric truck. The charger must only be connected to the electric truck, rather than other loads (such as electric tools).
- ★ Keep the charging cable protected from any mechanical damage (caused by bending, extruding or crushing), the cable surface must not come into contact with heat, dirt or water sources.
- ★ All charger cables must be firmly wired, well insulated and of the proper size. Loose, damaged or undersized cables can cause circuit failure and, in severe cases, cause irreversible damage to the charger, even personal injury or fire.
- ★ If the device has been dropped, even if there is no visible damage on its exterior, it must not be installed directly because internal damage may cause a system malfunction or a short-circuit and other faults, it must be tested by professionals to ensure that it is free of any damage before installing.
- ★ Do not flush the charger with water as it will cause a short circuit.

#### (2) Warning

- ★ Faults that may affect its safety performance must be cleared immediately by a professional before restarting.
- ★ Hold the charging gun handle firmly when unplugging/plugging it and never pull the cable.
- ★ Do not allow heavy objects or people to stand on the charging cable.

★ Keep the charging gun clean and dry. If it is dirty, wipe it with a clean and dry cloth. Do not touch the charging gun core directly with your hands.

★ This product has been installed by the company's professional technicians (or authorized professional institutions), any unauthorized installation or modification may lead to accidents or damage. In the event of any damage arising therefrom, the company shall not take any responsibility.

**(3) Precautions**

★ In the event of any abnormalities during the application, press the emergency stop button immediately to cut off the input and output power supply.

★ In rain or thunder, use the truck with caution.

★ The normal operation of the truck depends on reasonable parameter settings which are generally carried out after installation and debugging on site, it is not recommended that users reset the parameters by themselves unless necessary.

★ Do not charge until the truck is powered off. Do not start the truck until the charging process is finished. Do not drive the truck when it is charging.

★ Check the charging gun, cable and the truck body for any damage or breakage.

★ Read relevant recommendations and instructions for the truck carefully before using charger.

★ The warnings and operation signs inside the truck body and cabinet play an important role in the safe operation of the truck and must not be torn or damaged. Replace damaged or illegible labels or signs promptly.

**13.8.1.4 Technical parameters**

Input section	
Input voltage	TN-C/TN-S (A, B, C, N, PE) AC380V±15%
Input Current	< 90A
Power factor	≥ 0.9
Output section	
Max. voltage	DC110V
Max. current	Single charging gun: 200A
Max. power	Double charging guns working at the same time: 44KW
Voltage ripple	<3%
Current ripple	<3%
Voltage regulation accuracy	5‰
Current	1%

regulation accuracy	
Charging curve	BMS given
Protection functions	
Input over-voltage protection	>440V shutdown protection
Input under-voltage protection	<320V shutdown protection
Battery reverse connection protection	Output side voltage <5V Output relay cut-off within 100ms
Output short circuit protection	Output current >210A Shutdown in 100ms
Output overvoltage protection	Battery voltage > 110V Shutdown in 100ms
Overtemperature protection	Internal temperature >75°C Output suspend
Abnormality protection	Power-off in the event of abnormal power devices
Emergency stop function	In the event of any uncontrollable abnormalities, the charger can be forced to shutdown by pressing the emergency stop button.
Interface	
RS485 interface	1 channel, baud rate 9600bps, address settable
CAN interface	1 channel, baud rate 250kbps
Human-machine interface	
Display	7-inch touch screen (screen size: 153.8*86.84)
Operator password	A password is required for setup and can be set

### 13.8.1.5 Operation instructions

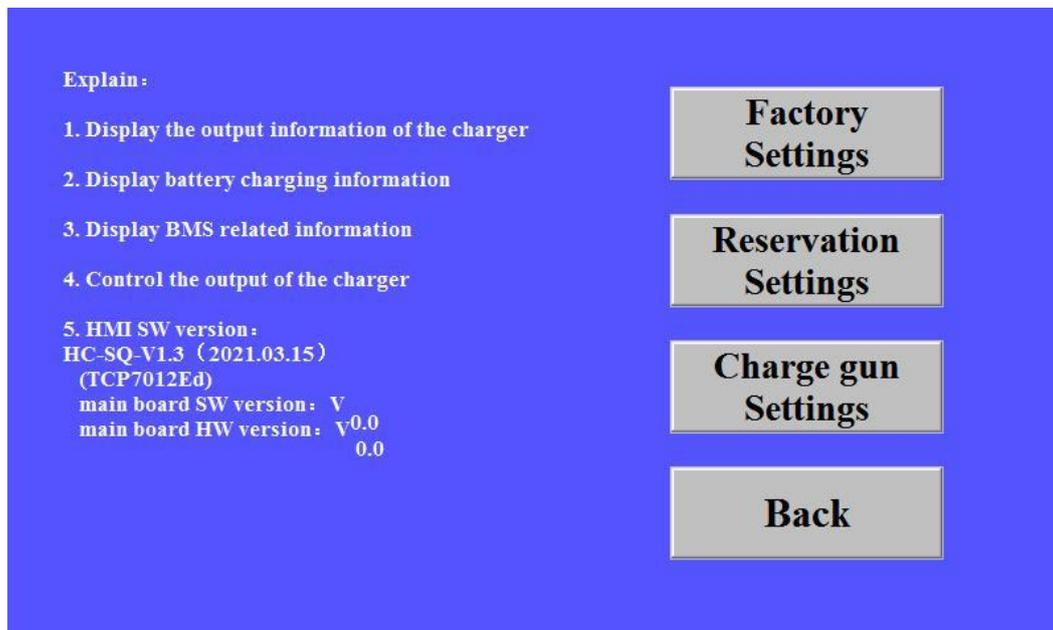
#### (1) Touch screen display interface

##### a. Main interface

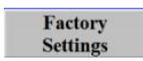
##### Regular mode



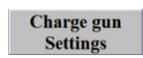
**b. Help interface**



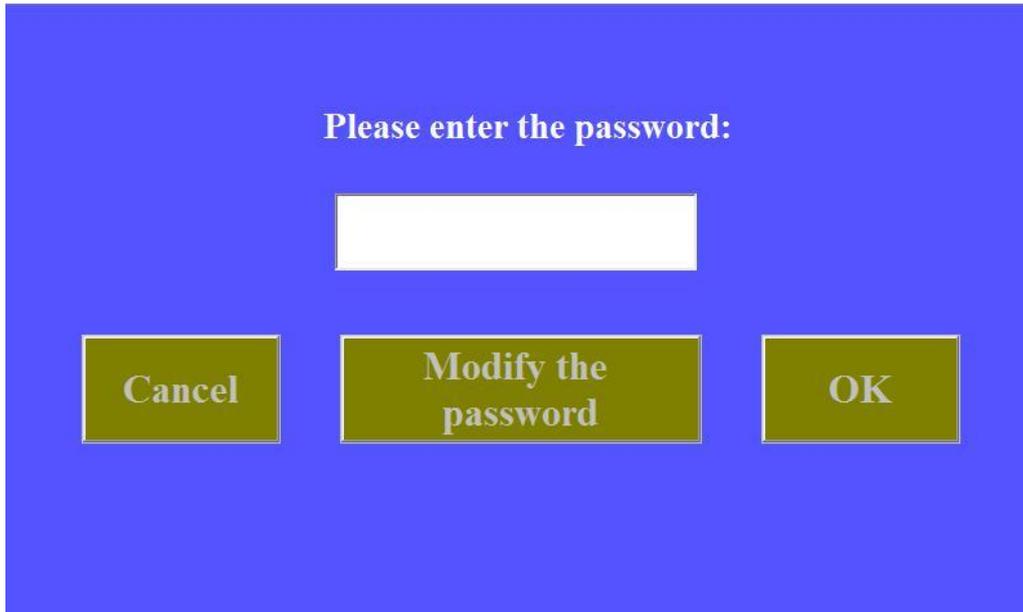
Click the icon:  to return to the main interface.

Click the icon:  to enter the password input interface, and enter the ex-factory parameter setting interface after the password is input correctly: 888888.

Click on the icon:  to enter the appointment mode time setting, password: 123456.

Click on the icon:  to enter the DC gun control settings, password: 123456.

**c. Factory-set password entry interface (operational password entry interface is similar)**



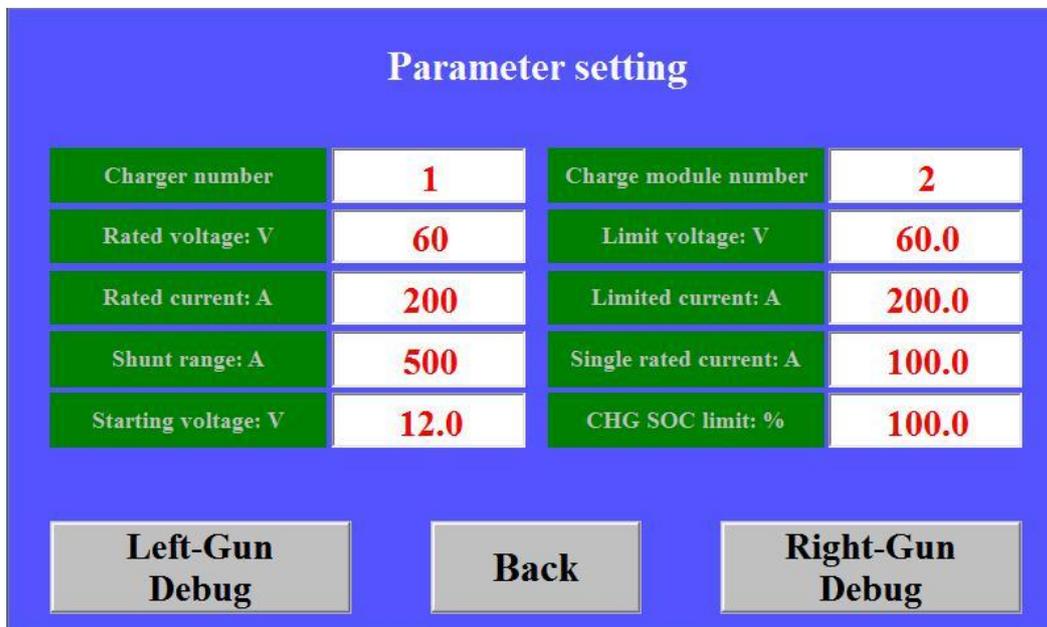
Enter the correct password in the password input field, the default password is 888888.

Click the icon:  to return to the help interface.

Click the icon:  to enter the password change interface.

Click the icon:  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.

#### d. Parameter setting interface



Click the icon:  to return to the help interface.

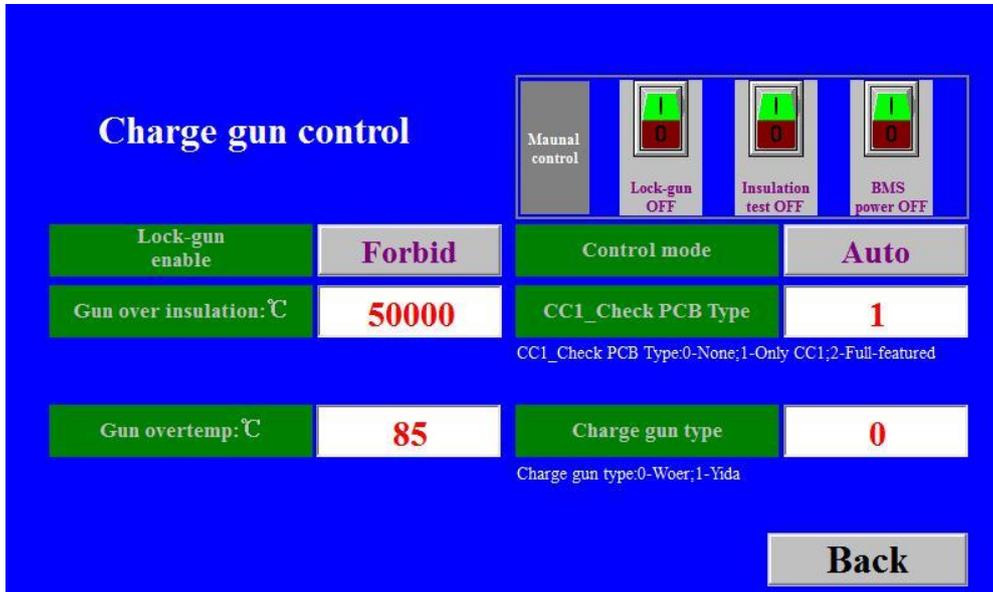
Parameter setting information: The rated voltage, rated current and shunt range are related to the hardware of the tractor and cannot be modified after delivery.

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.

**e. DC gun parameter setting**



**f. Password change interface (similar to operation password change interface)**

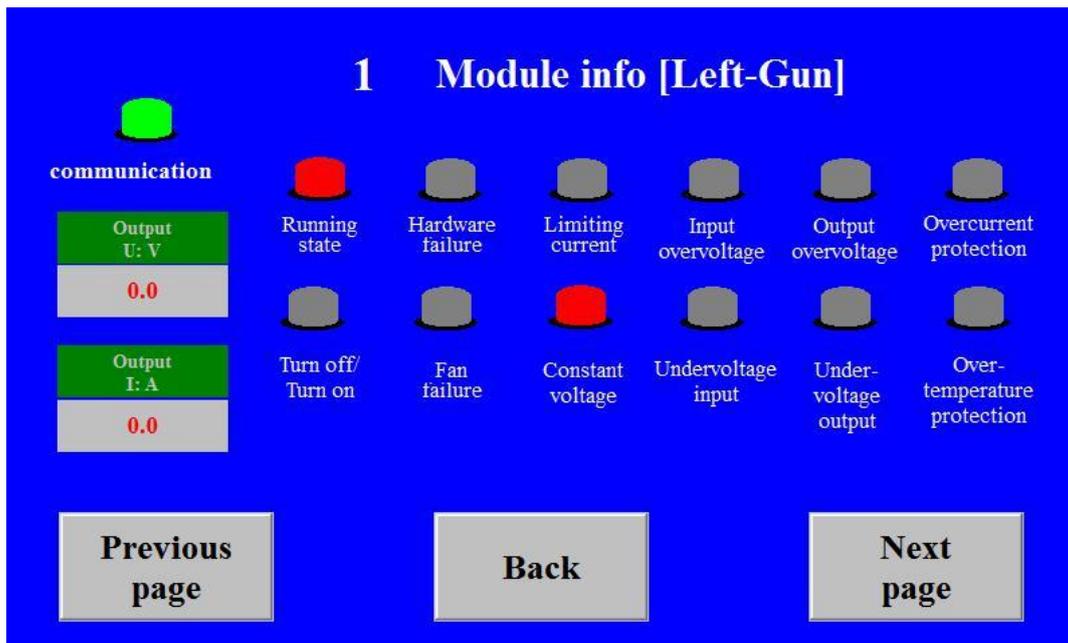


Follow the prompts to enter in order: enter the user's previous password, enter a new password first and then re-enter the aforementioned new password.

Click on the icon: , it will prompt 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:  to return to the password input interface.

**g. Power module information display interface**



Click the icon: to switch module information forward.



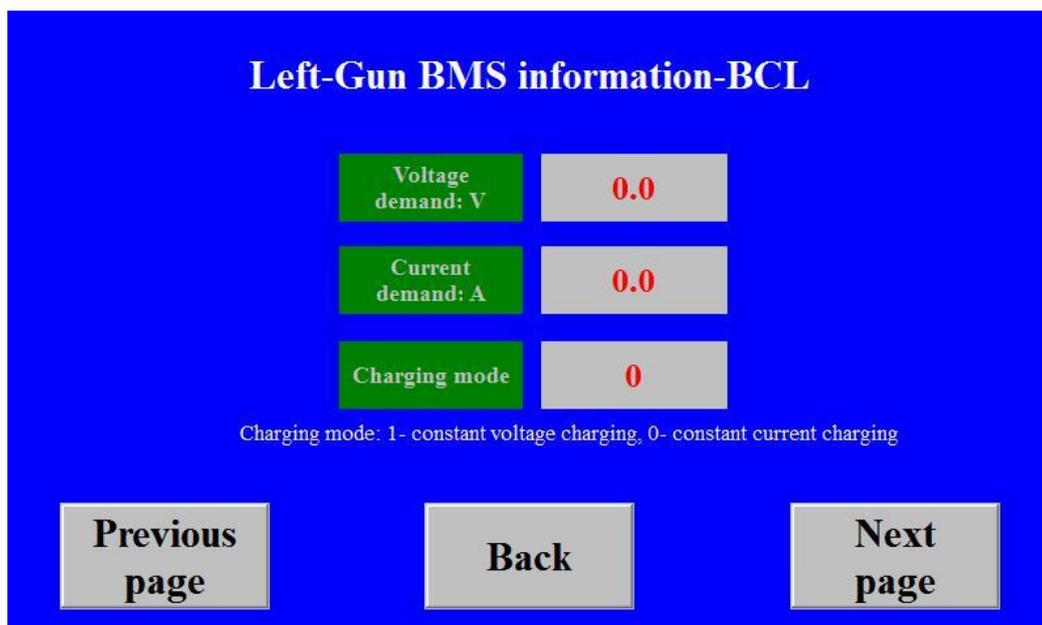
Click the icon: to return to the main interface.



Click the icon: to switch module information backward.

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

**h. BMS information display interface**



Click the icon: to switch module information forward.

Click the icon:  to return to the main interface.

Click the icon:  to switch module information backward.

Follow the national standard GB/T 27930-2015 standard protocol or customized according to customer requirements, parsing and displaying all kinds of information transmitted from the BMS.

**i. Instructions for the charging process**



**Charging steps:**

1. Select the "power on" charge 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".

Single and dual charging mode: each gun can provide 200A DC output

**j. User wiring instructions**



The user AC wiring part is at the rear lower cabinet door.

The truck power supply is controlled by the AC input air switch. PE is the earth, A is the A-phase power supply, B is the B-phase power supply, and C is the C-phase power supply.

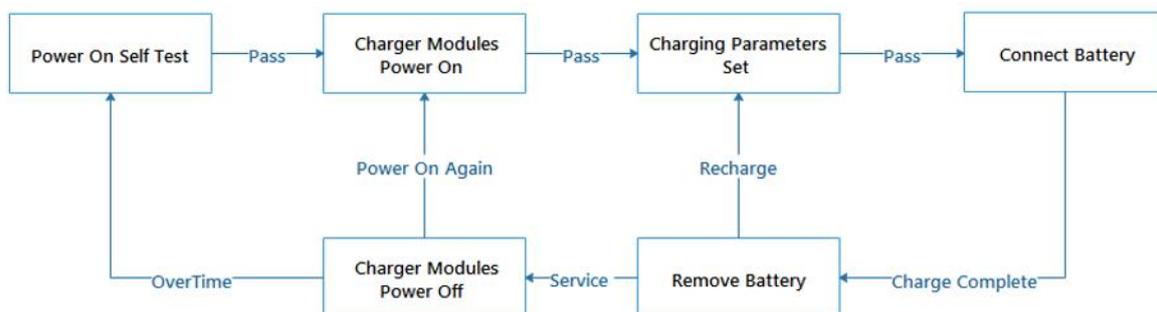
**Warning: PE grounding must be provided to guarantee personnel safety.**

## (2) Operation instructions

### a. 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.

### b. Operation flow chart



### c. Specific operations

#### Checks 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 offline and online charging circuits cannot be connected at the same time.

**Power on:**

Check whether the AC fan airflow direction is correct after power on.

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 meet the charger requirements. Battery polarity is not reversed. The battery is in good condition with no abnormality.

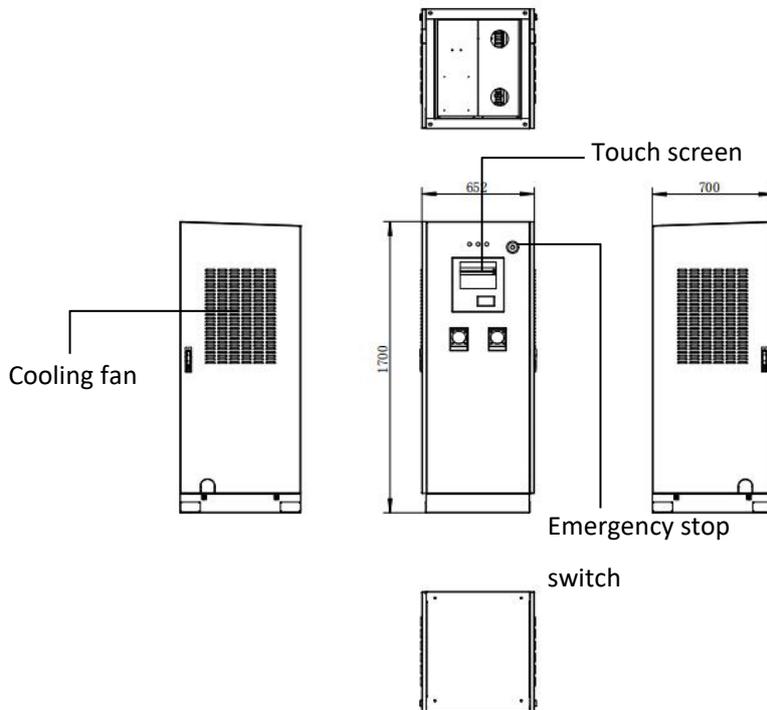
**Power off:**

Power the battery off after the charging current and voltage drop to 0.

Turn off the AC input air switch.

### 13.8.1.6 Appearance and dimensions

Cabinet dimensions are: length, width and height- 652mm\*700mm\*1700mm.



### 13.8.1.7 Packaging, transport, maintenance

#### (1) Packaging

Do not open the charger housing without permission. Otherwise, we are not responsible for any damage to the equipment or personal injury. At the same time, for the resulting technology leakage, our company reserves the right to pursue the relevant legal responsibility.

#### (2) Transport

The charger must be shipped in a separate wooden box.

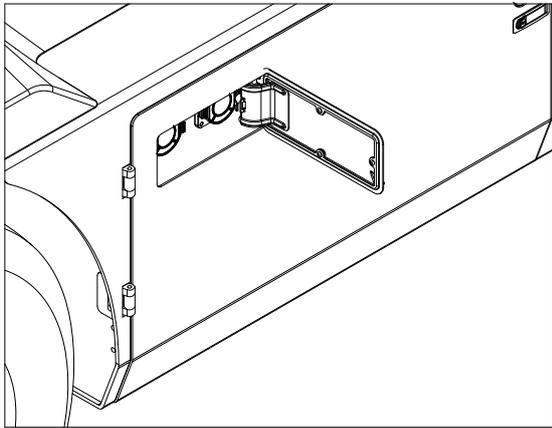
#### (3) Maintenance

1. Keep the charger clean at all times, and regularly perform dust removal on the vents.
2. Regularly check whether the charger terminal interface is firm, there should be no loose and poor contact.
3. Do not move the charger in normal working conditions.
4. Do not place the charger on uneven ground.
5. Do not place the charger in corrosive and humid air.
6. The left and right sides of the charger must reserve enough space for heat dissipation and ventilation.
7. Keep the charger away from open fire or baked goods to avoid high temperature.

### 13.9 Charging the lithium-ion battery

Park the forklift according to rules and regulations.

Open the charging port cover



The lithium-ion battery charging port is visible, and it is covered with a lid. Open the lid to see the charging port.



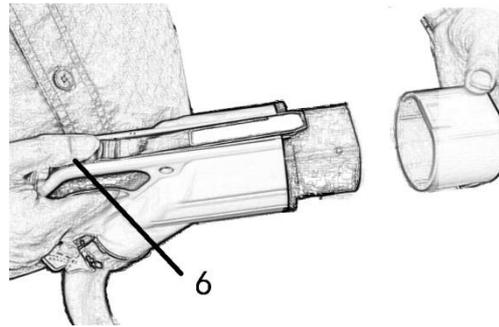
#### Structure of the lithium-ion battery charging port

Note: There is a slot above the socket, which is used for fastening the lock catch when the charger is plugged in.



Note: A lock hook on the flat side of the plug is used for buckling the charger into the slot as the

charger is plugged in the battery socket.



Only when the lock catch button (6) in the charging gun head is pressed can the charging gun be inserted or unplugged.

#### Precautions for Charging

(1) Inspect the appearance of the charger and charging cable. Check if there is any severe damage or deformation on the charger housing, and if there are any signs of wear, cracking, or exposed wires on the charging cable. If any abnormalities are found, do not use them and contact the relevant staff for repair or replacement in a timely manner.

(2) Safe Disconnection: After charging is completed, first end the charging operation on the charger. Wait until the charger displays "charging complete" and the current returns to zero before unplugging the charging gun. After unplugging the charging gun, cover the forklift's charging protection cover and compartment door. Place the charging gun properly in the designated position on the charger to avoid damage from dropping or external impacts. Turn off the charger's power supply.

(3) Vehicle Inspection: Do not start the vehicle immediately after charging. First, check if the vehicle's charging interface is normal and look for any signs of overheating or unusual odors.

(4) Prohibition of Use under Equipment Failure:

Never use the charger if there is a device malfunction. In case of charging abnormalities, in addition to pressing the emergency stop button, do not operate it arbitrarily. Please contact the staff or call the customer service hotline in a timely manner.

(5) Before connecting to the vehicle, ensure that the vehicle's charging port is compatible with the charging plug on the charger. Check if the charger has been soaked in rainwater and if there is any water or debris inside the charging gun. If water or debris is found inside the charging gun, clean it before use.

(6) In case of rainy weather, avoid charging outdoors to prevent the risk of electric leakage. If charging is necessary, when unplugging the charging gun from the charger, be cautious to prevent rainwater from splashing into the gun head. When moving the gun, ensure that the nozzle is pointing downward.

(7) After use, return the charging gun to its place to prevent it from falling to the ground and getting contaminated with water or sand. This helps to avoid water or sand entering the vehicle's charging socket during the next charging session.

(8) When pulling out the charging gun, hold the handle part and do not pull the cable!

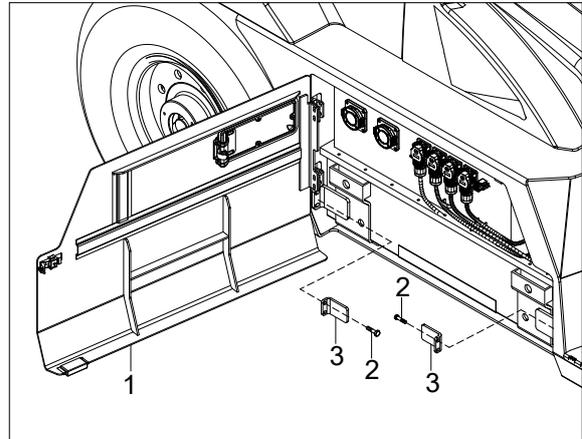
### 13.10 Lithium-ion battery replacement

The lithium-ion battery sits at the bottom of the forklift, and the sides are fastened by protection rods. It is held on the frame by its weight. For lithium-ion battery replacement and assembly.

CPD80/90/100-XEY2-SI

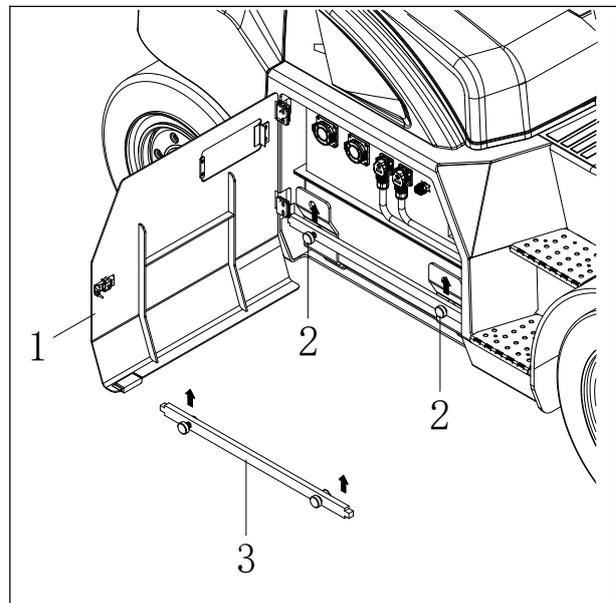
a. Disconnect the lithium battery from the vehicle's plug, open the side door (1), loosen the

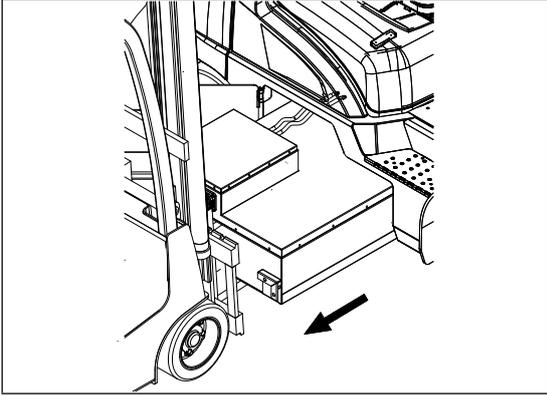
bolts securing the retaining plate (2), remove the retaining plate (3), and then the lithium battery can be taken out from the vehicle.



CPD60/70-XEY2-SI

a. Loosen the plug between the lithium-ion battery and the forklift, open the side cover (1), loosen the bolt (2) on the fastening device and lift it up a little (3), then remove it, the lithium-ion battery can be removed from the truck.



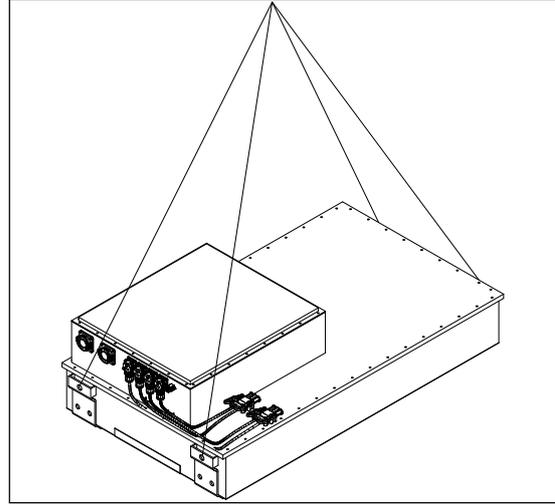


b. Center the forks in the middle of the two rows of rollers, remove the battery and transfer it to the forks.

c. Lift the battery by 1cm with a forklift truck or pallet jack, pay attention to adjust the fork spacing correctly, and pull it out gently.

#### Assembly

The mounting process is a reverse of the dismounting process.



Lower the lithium-ion battery to the ground using a lifting device, the tie-down points are shown in figure above.



#### Warning

Lift carefully, the lithium-ion battery weighs about 800kg, it is very heavy.

Take care during mounting to prevent feet or hands from being crushed by the battery.



#### Caution

The weight of the replacement battery should be within the range stated on the truck nameplate of the manufacturer (it must not exceed the max./min. value).

## 13.11 Daily maintenance and care of the battery

### (1) Checks before use

Make sure there is no battery system alarm message on the dashboard after the ignition key switch is turned off. Please check the remaining battery capacity before use. It is recommended to use the truck when the battery SOC is within the range of 50% - 100%. It is recommended not to use the truck when the battery SOC is below 30%. Please charge the battery as soon as possible.

### (2) Instructions for charging

Charge the battery promptly when the battery system's SOC is below 20%. Please use the special charging device designated by the manufacturer. In the event of a fault alarm during charging, both the battery system and charger will stop charging and the fault information will be displayed on the charger. The charging place should be dry and ventilated, with no flammable and explosive materials. The battery system should be fully charged once a week.

### (3) Long-term storage

Before long-term storage, confirm that the battery level is not less than 50% of the rated capacity. Charge the battery every three months for maintenance, i.e. fully charge the battery.

When the battery has been stored for more than three months, before using, please confirm whether there is a fault alarm in the power battery system. If so, please contact our after-sales service center for maintenance. Keep the storage place dry and well-ventilated and away from heat sources. Tip: When the ambient temperature is low, the charging time of the battery system will be extended, which is a normal phenomenon. The battery management system will automatically adjust the charging time with the temperature change to ensure the best performance.

### (4) Cleaning

① Housing cleaning: Check the outer case of the battery system for foreign objects, obvious deformation, rust and corrosion and other abnormalities.

② Charging port cleaning: In the power-off state, check whether there are any foreign objects, damage, rust and corrosion and other abnormalities in the charging port.

③ Plug cleaning In the power-off state, check for looseness, damage and other abnormalities in the plug-in components.

④ Status detection Observe the battery system voltage, temperature and other status information on the charger display while charging to ensure that all parameters are in the normal range.

## 13.12 Common faults and troubleshooting

### Undervoltage after fully charged

1. The battery has been idle for a long time and has not been maintained in accordance with the provisions. Troubleshooting: Charge the battery.

2. The battery has suffered a severe impact, which caused damage to the battery case or a smell of electrolyte in the battery pack. Troubleshooting: Generally, this fault is not covered by the maintenance scope. It is necessary to figure out whether the fault is in the output circuit or the battery prior to any maintenance. First of all, disassemble the battery case, check the P+/C+ and P-/C- wires or solder joints of the battery pack for any damage, and if so, please replace them. Check the battery smell. If there is an irritating electrolyte smell, it indicates that there is a leakage in the battery and a voltage test for each battery pack should be performed. If the voltage of one battery pack is very low and very different to that of the other battery packs, please contact the battery manufacturer for replacement.

3. Insufficient battery capacity. Troubleshooting: Carry out 3-5 charge-discharge cycles for the battery.

### **The battery is fully charged (as shown on the charger), but the voltage is zero or low.**

1. The battery is disconnected. Troubleshooting: Disassemble the battery and check for wire disconnection or missing solder joints. Clear the fault if necessary.

2. The protection board does not work. Troubleshooting: Check the wiring of the protection board for any missing solder joints; otherwise, check the voltage between B+ and B- and the voltage between P+ and P-, if there is a great difference between them, it means that the protection board is damaged. It is necessary to thoroughly test the protection board, and if it fails to pass the test, please replace it.

#### **Battery voltage instability**

1. Defective soldering. Troubleshooting: Test the internal resistance of the battery with an internal resistance tester. If the value exceeds the specified value, there may be incorrectly soldered joints in the battery, please carry out correct soldering after disassembling the battery.

2. The protection board is abnormal. Troubleshooting: Replace the protection board.

3. Poor contact with terminals or connectors. Troubleshooting: Replace the terminals or connectors.

**The battery can be charged normally but cannot be discharged normally, or can be discharged normally but not be charged normally.**

1. The protection board is damaged. Troubleshooting: It is required to replace the protection board.

### **13.13 Emergency response**

1. Severe abnormalities: During use, users should be familiar with safety precautions and should not carry out improper operations to avoid improper use of the battery (e.g. overcharge, over-discharge, short circuit, extrusion, puncture, overheating and high current discharge, etc.). During charging and use, the following abnormalities may occur in the battery system:

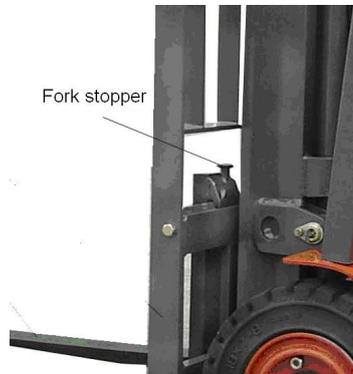
- a. The battery system or parts temperature rises sharply.
- b. Abnormal smell from any part of the battery system.
- c. Smoke and fire in any part of the battery system.

2. Emergency measures in the event of smoke and fire in the battery system: In the process of use, in the event of any smoke or fire in the battery system, the following emergency measures should be taken immediately:

- a. Stop the truck and power off.
- b. All personnel at site should quickly leave the truck and call the fire station.
- c. Use carbon dioxide fire extinguishers or dry powder fire extinguishers to put out the smoke or fire provided that personal safety is not put at risk.
- d. Notify our company as soon as possible to get further support.

## 14. Vehicle operations

### 14.1 Checks and adjustment before daily operation



- When carrying out a visual check of the forklift truck, the operator should pay special attention to whether the wheels, wheel bolts and load parts are damaged.
- Check whether the tire pressure is normal with an air pressure gauge.
- Check the fork positioner.
- Visually inspect the visible areas of the hydraulic system for any damage or leaks.
- Check whether the driver's seat is securely fastened.
- Check that the alarms (including the reverse buzzer if necessary) function properly.
- Check that load curve labels and warning labels are clearly visible.
- Check the function of the operating and display parts.
- Check the operation of the steering system.
- Check whether the mast lifting chains are evenly tensioned.
- Check that the safety belt is functioning properly: The safety belt must lock when pulled out quickly.
- Check the seat switch function: the hydraulic

functions must be disabled when the operator is not seated.

- Check lifting/lowering, tilting and hydraulic functions, and attachments if necessary.
- When the parking brake operating lever is pulled up, check by pressing the pedal several times.

Check whether the lights are working properly.

- Check whether the accelerator pedal is working normally.
- Visually inspect the fixing of the battery and the connection of the cables.

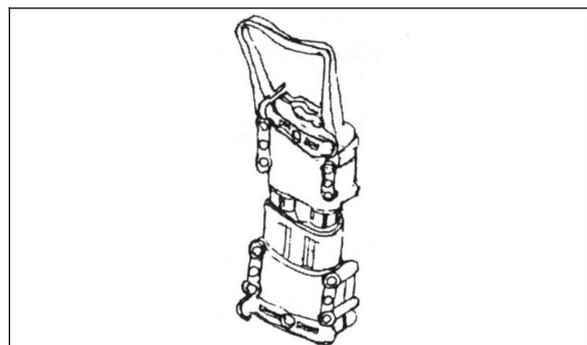
#### Warning

If damage or other defects on the forklift or attachments are identified during subsequent inspections, the forklift must not be used again until repairs have been made in accordance with the regulations. And the following operations must be performed:

1. Defects in forklift trucks must be reported immediately to a higher authority.
2. Mark and stop damaged trucks.
3. Restart the truck only after the fault has been identified and cleared.

### 14.2 Driving

- Open the machine hood, connect the battery plug, close the machine hood.



- Place the direction lever in the neutral position.
- Turn the key switch on.
- Hold the steering wheel with the left

hand and turn the key switch on with the right hand.

- Press down the brake pedal and appropriately increase the throttle for about 10 seconds.
- Tilt the mast backward.
- Operate the lift control lever to lift the forks by 10cm-20cm from the ground. Operate the tilt control lever to make the mast tilt backward to its limit.
- Operating the direction control lever
  - When the forklift is required to move forward: push the direction control lever forward.
  - When the forklift is required to move backward: push the direction control lever backward.
- Release the handbrake lever.
- Press the brake pedal and push the handbrake lever to the forward position.
- Hold the steering wheel handle with your left hand and gently put your right hand on the steering wheel.

### 14.3 Operation

Slowly depress the accelerator pedal to make the truck move forward/backward.

### 14.4 Deceleration

Slowly release the accelerator pedal and the truck will slow down.

 **Caution**  
**Drive the truck slowly in the following cases:**

- When the forklift truck is turning;
- When the forklift truck is

**approaching cargo or pallets;**

- When the forklift truck is approaching the loading area;
- When the forklift truck is entering narrow aisles;
- Poor ground or road conditions.

 **Warning**

- Do not depress the accelerator pedal and brake pedal at the same time.

### 14.5 Steering

The forklift truck is different from general vehicles, because its rear wheels are used for steering; the rear counterweight is rotated outwards at the time of steering.

Slow down and rotate the steering wheel towards the side to turn; the steering wheel needs to be rotated a little bit earlier than front steered vehicles.

 **Caution**

- Drive slowly, turn the steering wheel carefully, and confirm whether there is enough space behind the forklift truck.

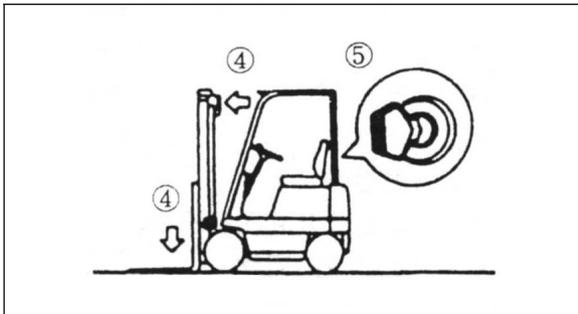
### 14.6 Parking

- Decelerate and depress the brake pedal to stop the forklift truck.
- Place the shift lever in the neutral position.
- Pull up the handbrake lever.
- Lower the forks to the ground and tilt the mast forward to the maximum extent.
- Rotate the key switch to the "OFF" position, unplug the battery plug, pull the key out and keep it safe.



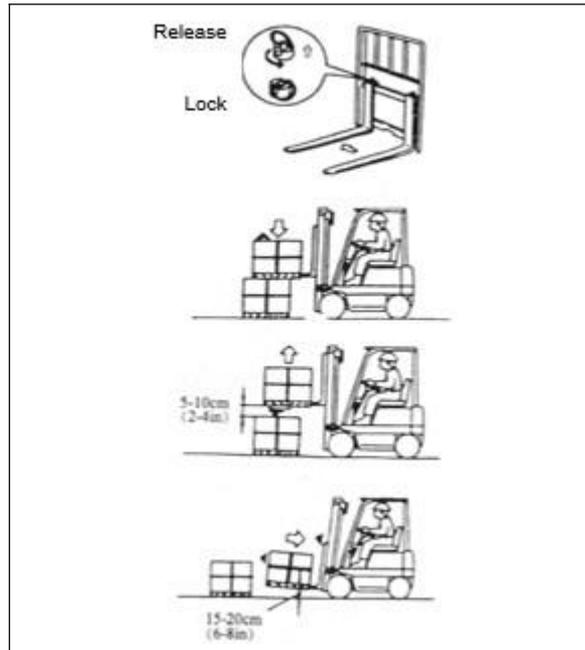
### Caution

- Be careful when getting off the truck and do not jump out.
- The truck should not stop on the driving route.



## 14.7 Loading

- Adjust the fork spacing to keep cargo balanced.
- The truck should be facing the cargo when loading.
- The pallets should be symmetrically placed on the two forks.
- The forks should be inserted into the pallets as much as possible.
- Lifting cargo:
  - First lift the forks 5cm-10cm above the ground to confirm whether the cargo is secure.
  - Then, tilt the mast backward, lift the cargo 5cm-10cm above the ground, and start to drive.
- Please drive in reverse when handling large cargo that obstructs visibility, except when climbing ramps.



## 14.8 Stacking

- Slow down when approaching the place to store the cargo.
- Park the truck in front of the place to store the cargo.
- Check the place to store the cargo.
- Tilt the mast forward to the fork level and lift the forks to a position slightly higher than the unloading site.
- Move forward, put the cargo on the unloading site and stop.
- Slowly lower the forks after confirming that the cargo is above the unloading site and confirm that the cargo is safe and in place.
- Conduct the necessary lifting and tilting operations, move the forklift truck back and take the forks out from the cargo.
- Lower forks to 15cm-20cm above the ground after the fork tips are clear from the cargo.
- Tilt the mast backward in position.



#### Caution

Drive the truck slowly in the following cases:

- When the forklift truck is turning;
- When the forklift truck is approaching cargo or pallets;
- When the forklift truck is approaching the loading area;
- When the forklift truck is entering narrow aisles;
- Poor ground or road conditions.



#### Warning

- Do not tilt the mast when the load is lifted above 2m.
- Do not get off or leave the forklift truck when the load is at a high level.

### 14.9 Unstacking

- Slow down when the forklift truck approaches the place to pick up the cargo.
- Park when the forklift truck is 30cm away from the cargo.
- Check the cargo condition.
- Tilt the mast forward to the fork level and lift the forks to the position of the pallet or crosstie.
- Confirm whether the forks are aligned with the pallets, move forward slowly, try to insert forks into the pallets and stop.



#### Caution

- If it is difficult to insert forks fully into the pallets, the truck can move forward to insert the forks 3/4 of the way into the pallets. Lift the forks 5cm-10cm,

move the truck backwards 10cm-20cm, lower the pallets or crossties, and move the truck forward to fully insert the forks into the pallets or crossties.

- Lift the forks 5cm-10cm above the stacking place.
- Look around the truck, confirm whether there are any obstacles, and move backward slowly.
- Lower the forks to 15cm-20cm above the ground, tilt the mast backward, and transport the cargo to the destination.

### 14.10 Checks after operation

Clean the truck after operation and conduct the following checks:

- Check for any damage or leakage.
- Refill with lubricating oil as appropriate.
- Check the tires for any damage or foreign objects.
- Check the wheel nuts for any looseness.
- If the truck did not lift to the maximum height during the operation on that day, the forks should be raised to the maximum height 2 or 3 times after the operation is completed.



#### Caution

- In the event of any faults, prompt maintenance should be made.
- Do not use the truck before it is repaired.

### 14.11 Breaking-in of new forklift trucks

The forklift truck should be operated under low load in the initial stages after it is put into use,

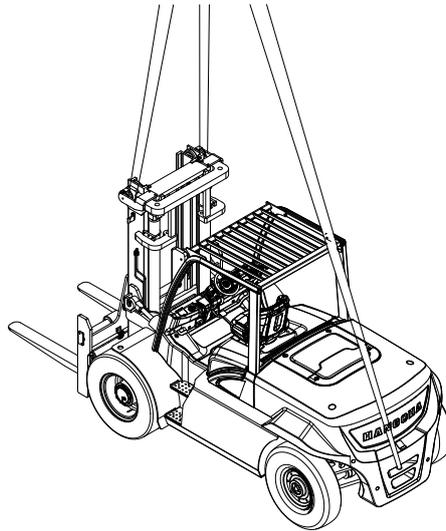
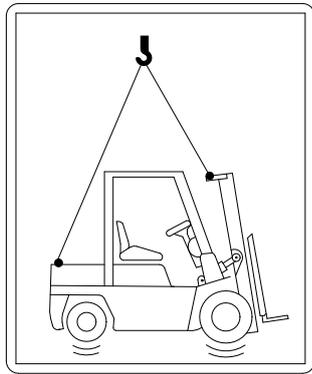
especially within the first 100h, and the following requirements should be met.

- Over-discharge of the new battery in the initial application stage must be prevented.
- Promptly charge the battery when the battery level drops to 20% of its capacity.
- The prescribed preventive maintenance should be made.
- Fast running, sudden stops and sharp turns should be avoided.
- Oil change or lubrication should be done in advance according to the requirements.
- The actual load capacity should be 70% to 80% of the rated load capacity.

## 15 Lifting, transportation and towing the forklift

### 15.1 Lifting

Tie the steel rope on the lifting hole and counterweight lifting hole at both ends of the beam of outer mast firmly and lift the forklift truck with the lifting device. The wire rope connected with one end of counterweight should be passed through the gap in the overhead guard, to avoid placing any strain on it.



#### Warning

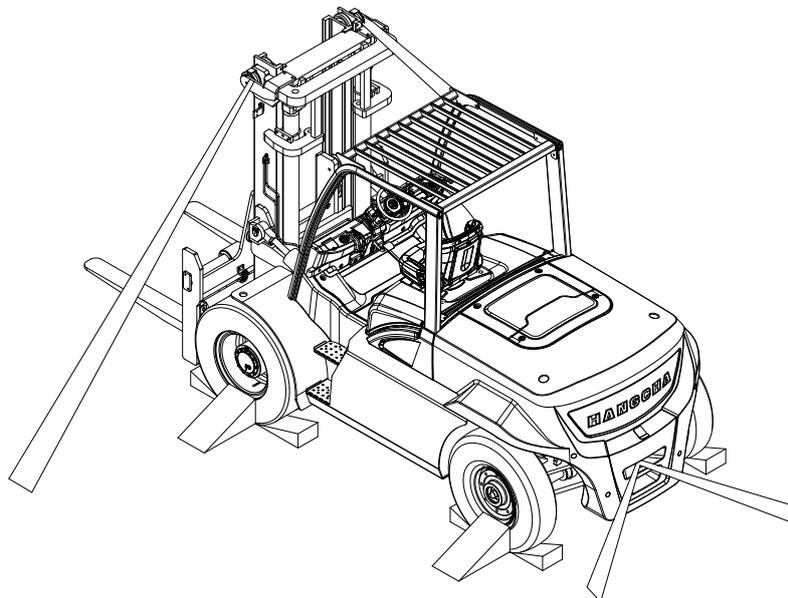
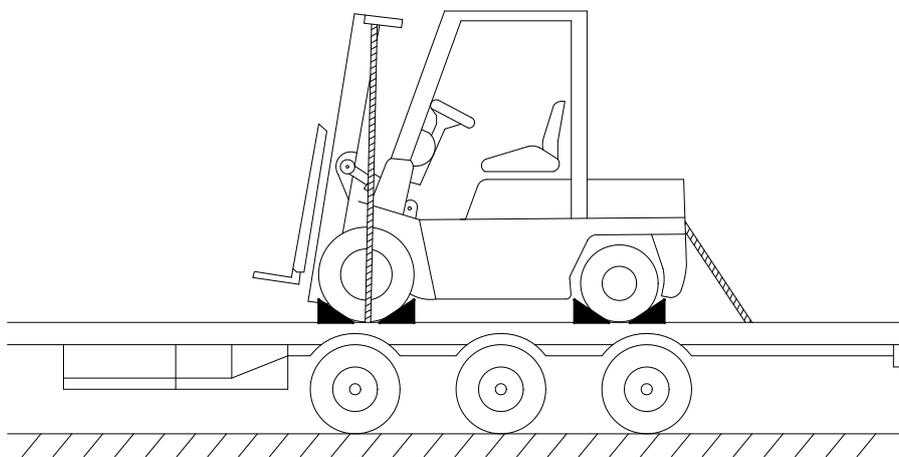
- Only lifting tools with sufficient loading capacity can be used.
- Tilt the mast backwards completely when lifting.
- When installing the lifting tools, you must be careful to ensure that the tools will not touch the components or overhead guard of the forklift truck during the lifting process.
- Do not lift the forklift truck from the cab frame (overhead guard).
- Do not stand under the forklift truck when lifting it.

## 15.2 Transportation

The forklift truck can be used for loading and unloading and short distance transport, but should not be used for long distance transport. If the forklift truck is transported over a long distance, it should be carried with a ship, train or vehicle with load capacity of more than 13 tons such as a truck and trailer.

Operating steps:

- Park the forklift safely on the truck or trailer and apply the parking brake.
- Bolt the tension belt to the upper crossbeam of the mast and the counterweight towing pin and pull the tension belt with the tightening device.
- Pad the front and rear wheels of the forklift firmly with wedge-shaped wooden blocks.



### Warning

- When the truck is being fastened, effective measures must be taken for the specific situation to ensure transportation safety.

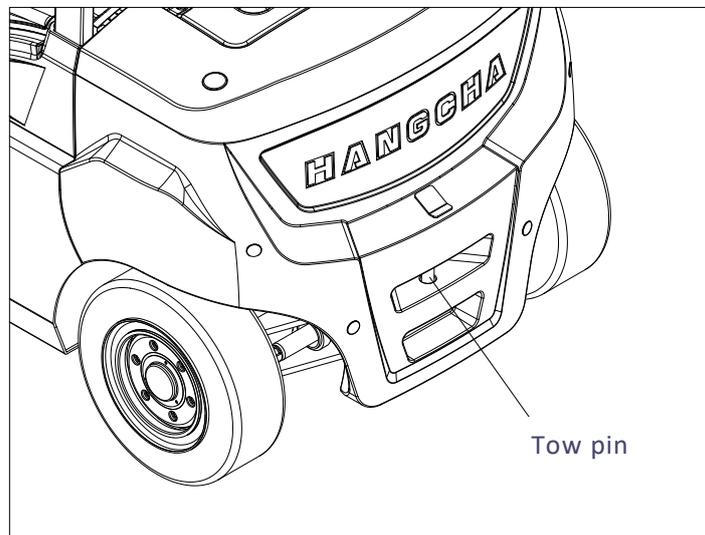
- The forklift must be securely fixed when it is transported with a crane or trailer.
- Use wedges to secure the truck to prevent accidental movement.
- Only tensioned or tethered belts of sufficient nominal strength should be used to secure the forklift.

### 15.3 Towing

Do not routinely use the forklift truck for towing or being towed.

The tow pin under the counterweight is only to be used in the following situations:

- To urgently move the forklift truck if it suddenly breaks down on the working road.
- To be used for getting out of trouble if the forklift truck gets stuck (e.g. its wheels are trapped in a hole) and cannot be driven.



Operating steps:

- Turn off the key switch and unplug the battery power supply.
- Release the parking brake.
- Put the direction lever in the neutral position.
- Firmly tie the steel tow rope on the tow pin.

The forklift truck can then be towed.



#### Warning

- Do not tow forklift trucks with defective steering systems or damaged brake systems.
- Do not suddenly apply load to the steel wire rope.
- The controller will be damaged if the forklift truck is towed when it is powered on.

## 16 Repair and maintenance

### 16.1 Maintenance overview

- It is necessary to perform regular checks and maintenance to keep the truck performance at optimum.
- Checks and maintenance are often neglected, so it is better to find the problems early and solve them in time.
- Use the spare parts from HANGCHA GROUP CO., LTD.
- When changing or adding oil, do not use oil which is not the same as the original.
- The waste oil and waste fluid from the lithium-ion battery should be disposed of in accordance with the local environmental protection laws and regulations, rather than dumped at will.
- Develop a comprehensive maintenance and repair plan.
- Complete records should be made after each maintenance and repair.
- Do not repair trucks without training.



#### **Caution**

- **Smoke and fire are strictly prohibited!**
- **Turn off the emergency stop switch and unplug the battery before maintenance. (Except for fault diagnosis).**
- **Use compressed air to clean the electrical parts, rather than water.**
- **Do not put your hands, feet or any part of your body under the mast and display frame.**

### 16.2 Daily maintenance (8 hours)

Careful and thorough maintenance keeps the truck in good working condition. Ensure the truck safety, that is, ensure your work and personal safety.



#### **Warning**

- **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.**
- **Do not use a forklift with any faults.**
- **Small faults can cause big accidents.**

#### 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

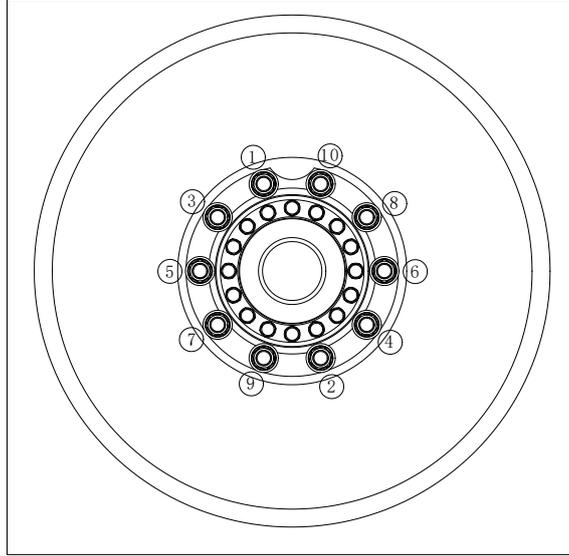
- Park the truck according to rules and regulations.

- Tighten the wheel nuts with a torque wrench in a crosswise way.

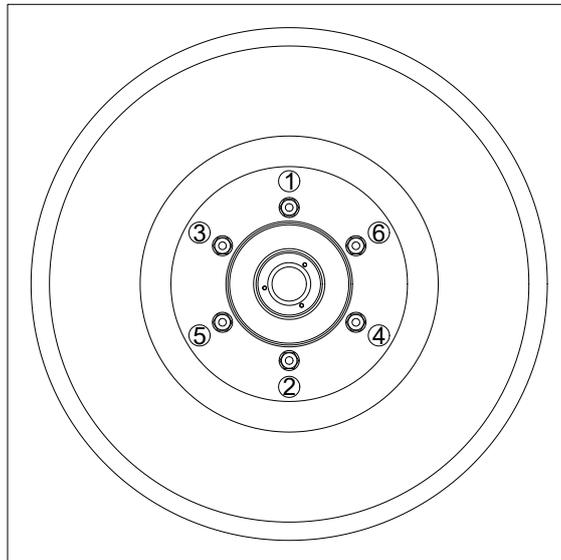
Table of Bolt Tightening Torque

Front wheel nuts	Rear wheel nuts;
500~585 Nm	441~558 Nm

Front wheel (driving wheel)



Rear wheels (steering wheels)



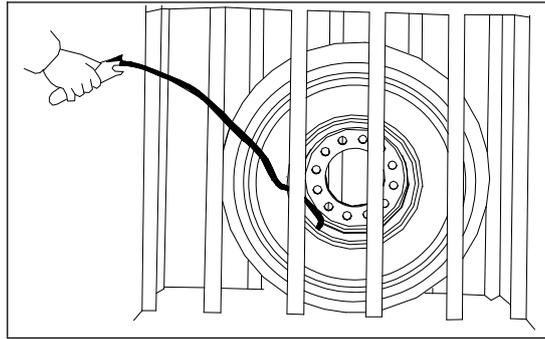
Replacing the tires:



**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.



Tire pressure (standard configuration)

	Front wheel	Rear wheel
CPD60/70-XEY2-SI	8.3 bar	8.3 bar
CPD80/90/100-XEY2-SI	7.6 bar	7.6 bar

#### 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.

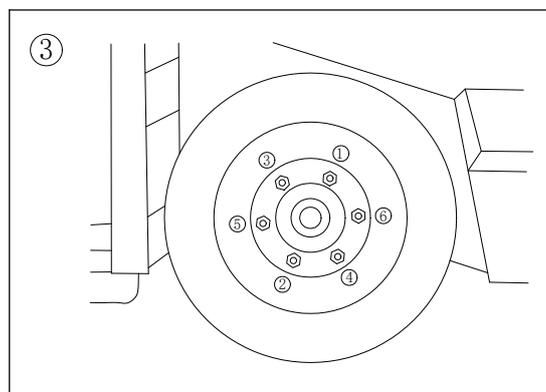
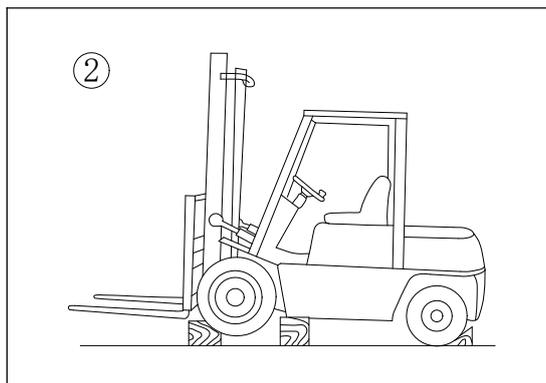
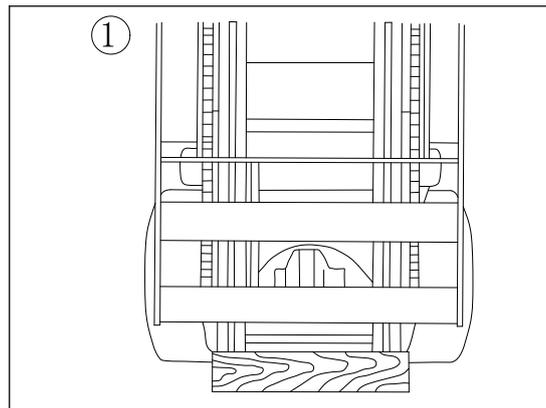


**Caution**

- 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 2/3 of the total weight of the forklift truck.

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

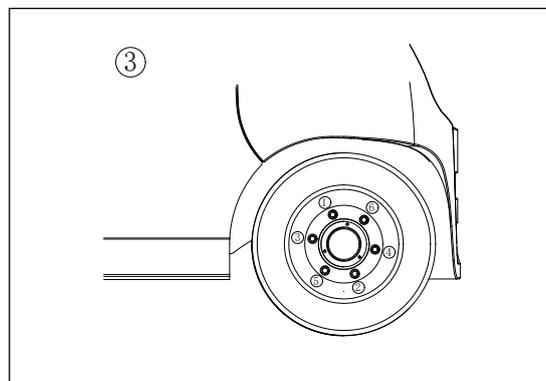
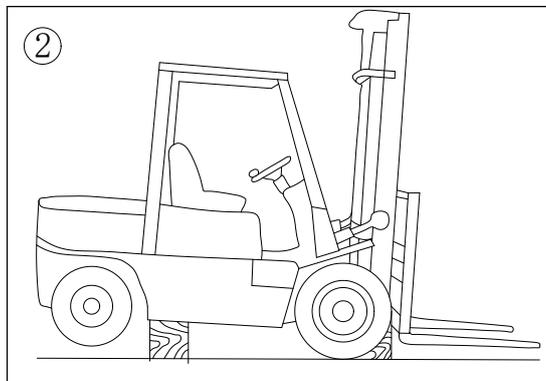
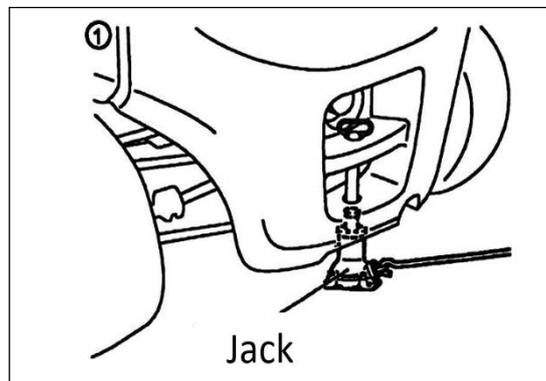
 **Warning**  
Do not remove the nuts until the rear wheels are lifted off the ground.

- 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

- 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**

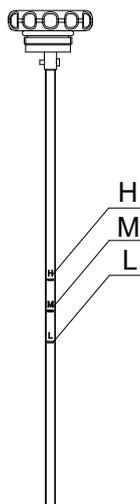
- Depressing the brake pedal helps to tighten or loosen the handbrake lever.

### 16.2.5 Accelerator pedal inspection

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

### 12.2.6. 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.

"L" refers to the liquid level height of a gantry equipped with a 5-meter or shorter structure, including

second and third-level fully freestanding gantry systems.

"M" refers to the liquid level height of a gantry equipped with a 6-meter or shorter structure, including second and third-level fully freestanding gantry systems.

"H" refers to the liquid level height of a gantry equipped with a 7-meter or shorter structure, including second and third-level fully freestanding gantry systems.

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

### **12.2.7 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.

### **12.2.8 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.**

### **12.2.9 Dashboard monitor inspection (power, faults)**

See the Dashboard section.

### **12.2.10 Lift lever, tilt lever and attachment lever**

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

### **12.2.11 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.

### **12.2.12 Mast lubrication**

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

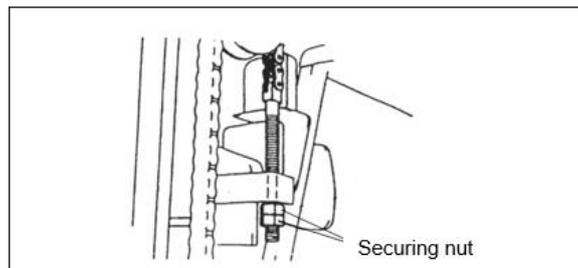
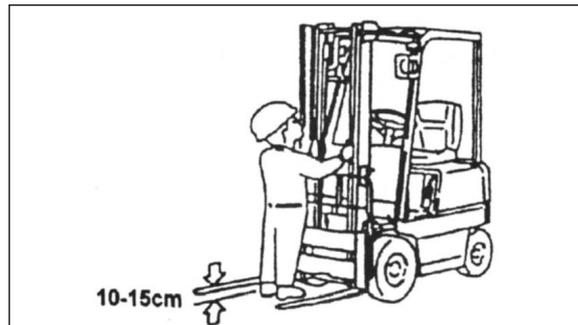
The lubrication cycle should be changed according to the operating conditions. In the busy months of operation, the lubrication cycle should be shortened.

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.

### 12.2.13 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.



### 12.2.14 Steering system inspection

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

### 12.2.15 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

### 12.2.16 Battery maintenance

See the Battery section.

### 12.2.17 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.

 <b>Caution</b> <ul style="list-style-type: none"><li>● <b>Depressing the brake pedal helps to tighten or loosen the handbrake lever.</b></li></ul>
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### 16.3.2 Mast

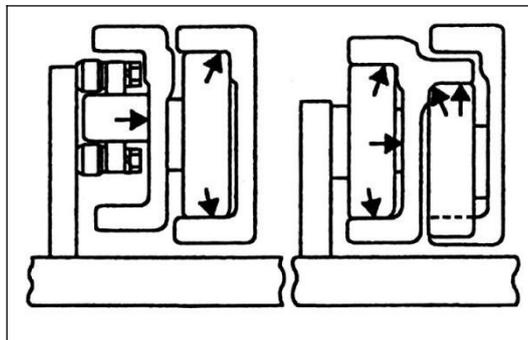
**Inspect the mast and forks to ensure:**

- 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

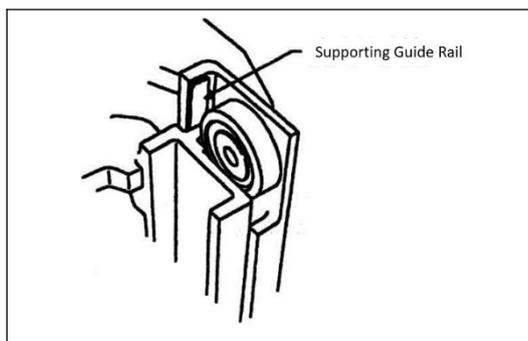
#### 16.3.3.1 Mast lubrication

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**

#### 16.3.4.2 Chain lubrication

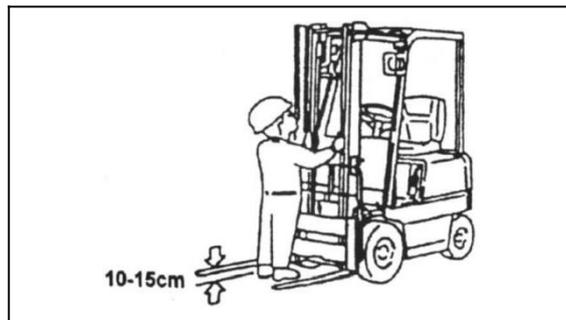
Spray the chain spray directly on the chain or take a brush and apply the lubricating oil to both sides of the chain.

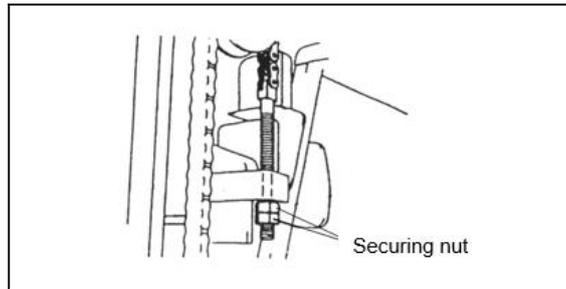
#### 16.3.4.3 Apply lubricating grease on the following parts

- 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

#### 16.3.5 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.





## 16.4 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**

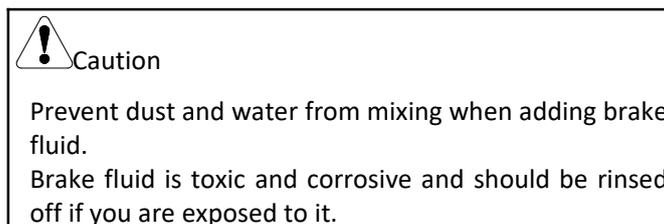
Apply lubricating grease to the steering wheel locking device.

### **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.

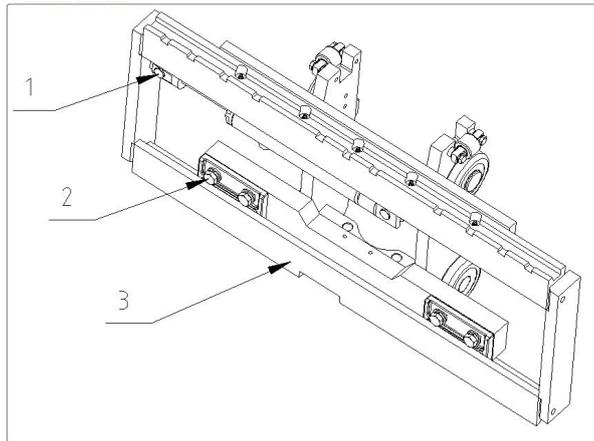
(2) Take off the rubber dust cap on the drain port, put the two ends of the prepared transparent hose in the drain port and the waste oil collection bottle respectively, and then use a wrench to loosen the drain port screw counterclockwise while another person on the vehicle repeatedly presses the brake 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.



### **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

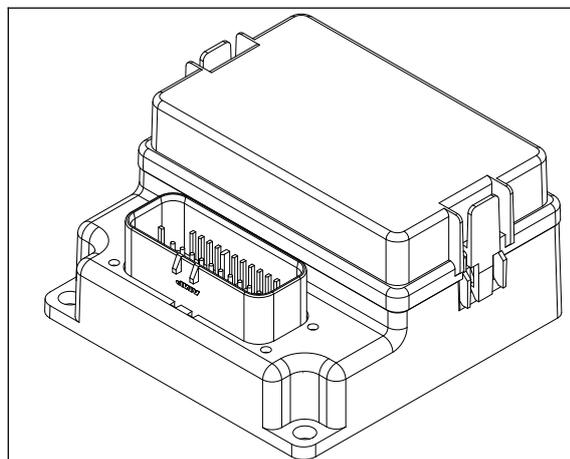
(1) Before replacing any defective fuse or relay, please investigate the cause of failure.

(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



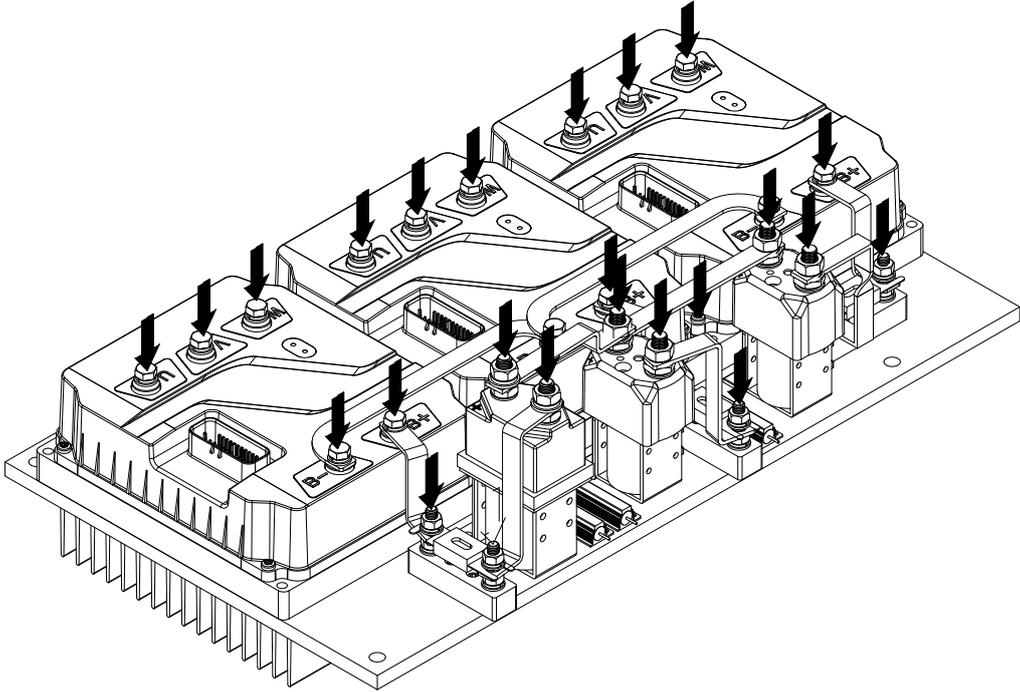
### Warning

- 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.

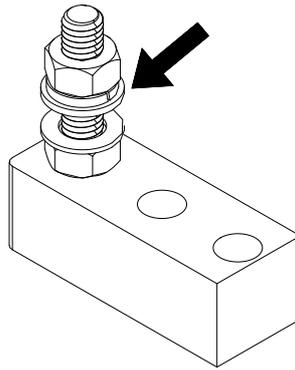


Check the controller for loose threaded part

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.



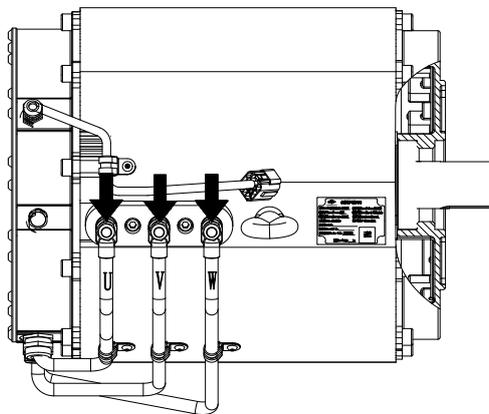
Check the terminal for loose threaded part

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.

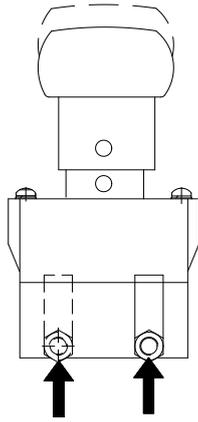


Check the motor terminals for loose threaded part

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
Contactora	M8	11 (10-12)	/	Composite insulating material
Contactora	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	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		○	○	○	○	○	○
	Cleaning of lithium-ion battery charging				○	○	○	○
	Check whether the contacts of the lithium-ion		○	○	○	○	○	○
	Check if there is water on the contacts of the		○	○	○	○	○	○
	Check whether the dust cover of the lithium-ion				○	○	○	○
	Check whether the lithium-ion battery casing is		○	○	○	○	○	○
	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)	Trimonthly (500h)	Semi-annually (1000h)	Annually (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)	Trimonthly (500h)	Semi-annually (1000h)	Annually (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 terminal	Tightness of thread installation			○ (for the first time)	○	○	○	○

### 16.10.4 Transmission system

Maintenance Item	Maintenance content	Tools	Daily (8h)	Weekly (40h)	Monthly (200h)	Trimonthly (500h)	Semi-annually (1000h)	Annually (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)	Trimonthly (500h)	Semi-annually (1000h)	Annually (2000h)
Tire	Inflation pressure	Air pressure gauge	<input type="radio"/>					
	Wear, cracks or damage		<input type="radio"/>					
	Check the tires for any nails, gravel or other foreign objects.				<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Check the rim for any damage		<input type="radio"/>					
	Check the split rim bolts are tight	Inspection hammer	<input type="radio"/>					

### 16.10.6 Steering system

Maintenance Item	Maintenance content	Tools	Daily (8h)	Weekly (40h)	Monthly (200h)	Trimonthly (500h)	Semi-annually (1000h)	Annually (2000h)
Steering wheel	Check the clearance		<input type="radio"/>					
	Check the slack in the axial direction		<input type="radio"/>					
	Check the slack in the radial direction		<input type="radio"/>					
	Check the operating condition		<input type="radio"/>					
Steering gear	Check the mounting bolts for looseness				<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Steering knuckle	Check the pin for looseness				<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Check for bends, deformations, cracks or damage				<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Check the installation condition	Inspection hammer			<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Steering cylinder	Check the operating condition		<input type="radio"/>					
	Check for any leakage		<input type="radio"/>					

	Check for any looseness in the assembly and joints				<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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### 16.10.7 Braking system

Maintenance Item	Maintenance content	Tools	Daily (8h)	Weekly (40h)	Monthly (200h)	Trimonthly (500h)	Semi-annually (1000h)	Annually (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)	Trimonthly (500h)	Semi-annually (1000h)	Annually (2000h)
Hydraulic oil tank	Check the oil level or change it		○	○	○	○	×	×
	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							× 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

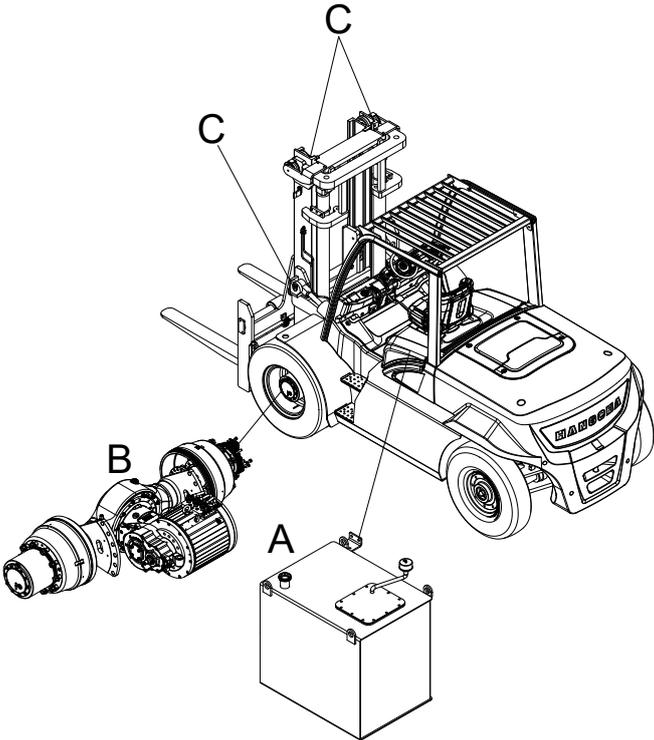
Maintenance Item	Maintenance content	Tools	Daily (8h)	Weekly (40h)	Monthly (200h)	Trimonthly (500h)	Semi-annually (1000h)	Annually (2000h)
Chain and chain wheel	Check the chain tension and check for any deformation, damage or rust		○	○	○	○	○	○
	Lubricate the chain				○	○	○	○
	Check the riveted pin for 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				<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Check the roller for any looseness				<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Check the bearing shaft bush of the mast for any wear or damage						<input type="radio"/>	<input type="radio"/>
Check the bearing cap bolts of the mast for any looseness	Inspection hammer			<input type="radio"/> (Only for the first time)		<input type="radio"/>	<input type="radio"/>
Check the bolts at the top of the lifting cylinder piston rod for any looseness	Inspection hammer			<input type="radio"/> (Only for the first time)		<input type="radio"/>	<input type="radio"/>
Check the roller, roller shaft and welded part for any cracks or damage				<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### 16.10.10 Others

Maintenance Item	Maintenance content	Tools	Daily (8h)	Weekly (40h)	Monthly (200h)	Trimonthly (500h)	Semi-annually (1000h)	Annually (2000h)
Check the overhead guard and load backrest	Check whether they are secured	Inspection hammer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Check for any deformation, cracks or damage		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Steering indicator light	Check the operating and installation condition		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Horn	Check the operating and installation		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lights and light bulbs	Check the operating and installation		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reverse buzzer	Check the operating and installation condition		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instruments	Check the operating condition of all		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Controller contact	Tightness of thread installation	Torque wrench		<input type="radio"/> (for the first time)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	There is no risk of touch short circuit between the			<input type="radio"/> (for the first time)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Whether the cable sheath of each pole column and			<input type="radio"/> (for the first time)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Disconnect switch	Tightness of thread installation	Torque wrench		<input type="radio"/> (for the first time)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vehicle wiring harness	Damaged wiring harness, loose connection			<input type="radio"/> (for the first time)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Loose circuit connection			<input type="radio"/> (for the first time)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Socket, cable connector, charging	Loose fasteners				<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**16.11 Oil and lubrication of the forklift**



Code	Name	Spec.	Filling amount	Remarks
A	Hydraulic oil	Normal environments: L-HM46	90L(Fill according to the dipstick scale)	Hydraulic oil tank
B	Gear oil	Heavy load gear oil	15L	Drive axle
C	Grease	General purpose automotive lithium grease		Lubrication Part
	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**

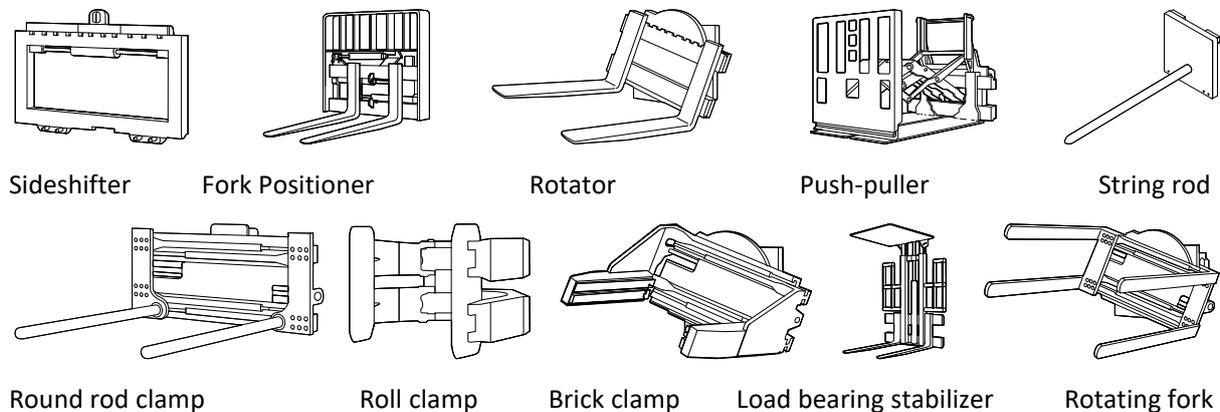
- **The wooden block must be solid and should be strong enough to support the weight of the forklift truck.**
- **Do not use blocks higher than 300 mm**
- **Raise the forklift just enough to place it on the supports**
- **Place blocks of the same size under the left and right sides of the forklift**
- **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  $\pm 150$  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 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.

## 20 Relevant safety command and standard (CE models)

The model with CE certification which accords to the following directive and standard: Machinery Directive 2006/42/EC (*The European Council of the Laws of the Member States concerning Machinery*), Noise Directive 2000/14/EC (*Directive of the Laws of the Member States concerning Outdoor Equipment Noise Radiation*), EN ISO 12100:2010 (*Safety of machinery — General principles for design — Risk assessment and risk reduction*), , EN ISO 3691-1:2015+A1:2020, EN 16307-1:2020, EN 1175:2020, EN 12053:2001+A1:2008, EN 13059:2002+A1:2008, etc. coordinative standards.

- Main safety factors accord with Machinery Directive 2006/42/EC, EN ISO 12100:2010, EN ISO 3691-1:2015+A1:2020, EN1175:2020, EN 16307-1:2020.
- Noise is measured according to EN 12053:2001+A1:2008.
- Vibration parameter is measured according to EN 13059:2002+A1:2008.
- Electromagnetism compatibility is measured according to EN 12895:2015+A1:2019, and meet with 2014/30/EU Directive.
- Static test coefficient for lifting attachment is 1.33.

Model	Whole-body Vibration m/s <sup>2</sup>	Sound pressure level at the operator's position dB(A)	Sound power level dB(A)
CPD60-XEY2-SI	/	/	/
CPD70-XEY2-SI	/	/	/
CPD80-XEY2-SI	/	/	/
CPD90-XEY2-SI	/	/	/
CPD100-XEY2-SI	1.3	69	89

# EC DECLARATION OF CONFORMITY



Original Declaration

**MANUFACTURER:**

Name           HANGCHA GROUP CO., LTD.

Address       666 Xiangfu Road, Lin'an District, Hangzhou City, Zhejiang Province 311305, P.R. China

**TECHNICAL DOCUMENT WAS COMPILED BY:**

Name                       Andy Yang

Address                   Die das technische Datenblatt erstellt hat Mariechen-Graulich-Straße 12a,  
65439 Flörsheim am main Germany Tel: 0049-61453769188

**HEREBY DECLARES THAT THE PRODUCT DESCRIBED BELLOW:**

Name                       Electric Forklift Truck

Model                      CPD60/70/80/90/100-XEY2-SI

Serial No.

**COMPLIES WITH THE PROVISIONS OF THE FOLLOWING EUROPEAN DIRECTIVES**

2006/42/EC               Machinery Directive

2014/30/EU               EMC Directive

2014/35/EU               LVD Directive

**COMPLIES WITH THE PROVISIONS OF THE FOLLOWING STANDARDS**

EN ISO 12100:2010

EN ISO 3691-1:2015+A1:2020

EN 1175:2020

EN 16307-1:2020

EN 12053:2001+A1:2008

EN 13059:2002+A1:2008

EN 12895:2015+A1:2019

Place: Hangzhou, Zhejiang, P.R. China

Date:

Signature and stamp:

Name:

Position:

According to Annex II 1.A of the Directive 2006/42/EC





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