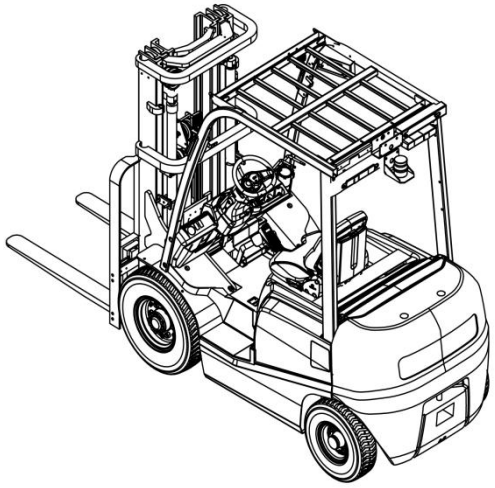
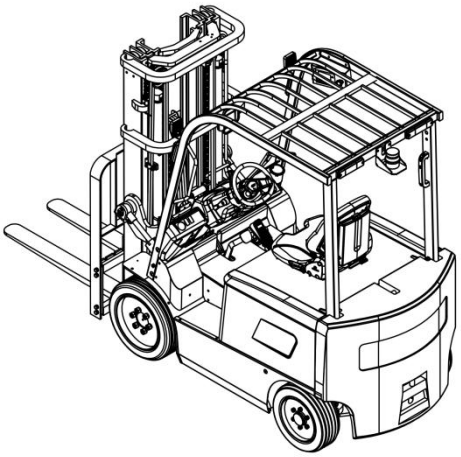
Lithium Battery Electric Series

FCB25M-3 / FCB25M-5 / FCB25M-7 / FCB25M-9 / FCB25M-11 / FCB25M-13 / FCB25M-15 / FCB25M-17

FPB25M-3 / FPB25M-5 / FPB25M-7 / FPB25M-9 / FPB25M-11 / FPB25M-13 / FPB25M-15 / FPB25M-17

Operation and Maintenance Manual





Original Instruction

2023/10

Thanks for choosing our FB SERIES Lithium Battery Counterbalanced forklift truck.

This manual will instruct you how to operate safely and do necessary precautionary maintenance. To ensure safety and maximize the forklift's performance, all the personnel that in charge of operation, maintenance and management must read this manual thoroughly before starting the forklift.

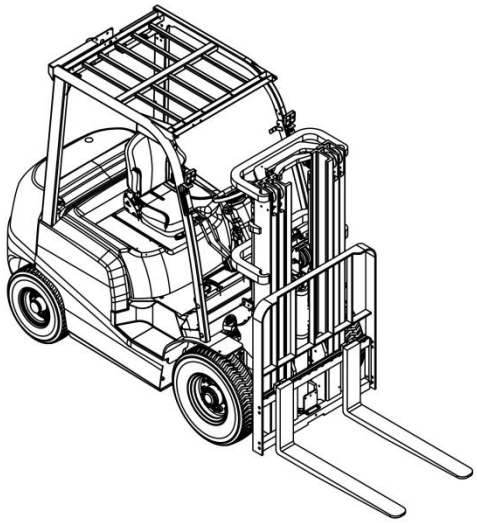
With the improvements of products of our company, there might be some differences between this operation manual with your forklift truck.

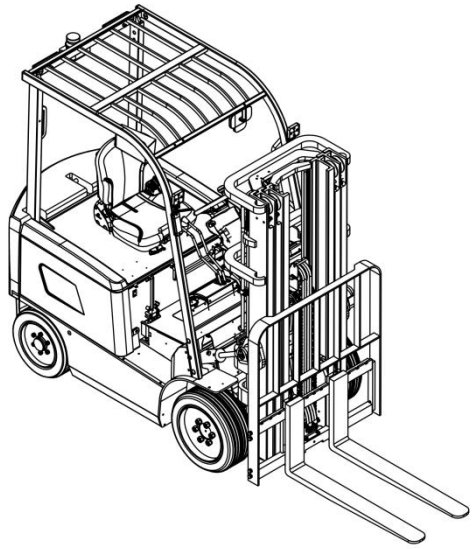
If you have any questions, please keep in touch with us or our forklift dealer.

CONTENT

1 Truck introduction

1.1 General information





Drive and brake system

– Integral drive axle.

– High-efficiency, high-power AC drive motor that provides superior driving force and travel speeds up to 14km/h.

Control system

– Ergonomic, large operating space.

Hydraulic system

– High-power oil pump motor and working oil pump greatly improve the lifting speed.

Electric system

– The 80V battery pack provides super power and performance.

– Large-size digital display instrument with intelligent management module.

– Latest AC control system.

Steering system

– Hydraulic steering system supplies super and stable power.

–The driving speed is about 14km/h, the lifting speed is about 450mm/s.

1.2 Use occasion and condition

Truck in this manual is only for handling and transporting loads in short distance.

It must be used, operated and maintained according to the instruction in this manual. Any other use beyond the design scope may result in personal injury or damage to equipment and property.

For use only in designed locations and conditions.

– Use under specified rated load.

– Used off-road condition such as factories, tourist attractions, etc.

– Used on the flat ground which has enough carrying capacity.

– Used on the road with good vision and equipment use license.

– Approved working site temperature -5°C~+40° C.

– Altitude should not exceed 2000m.

– Max. Gradeability is 15% (3.5), 18% (3.0T) and 20% (2.0T-2.5T) with full load.

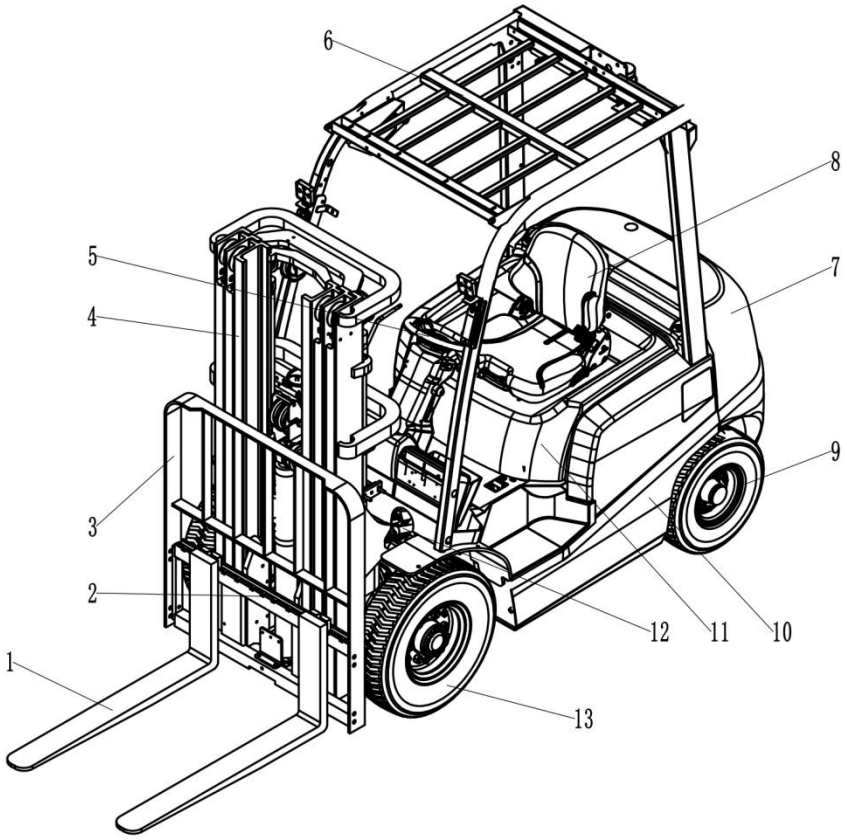
– Driving in crosswise or obliquely is prohibited. When carrying loads in uphill, keep the load in front; when going downhill, keep the person in front.

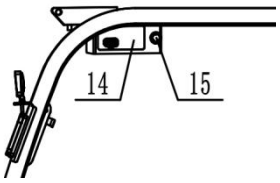
Please read other safety regulation in this manual related to personal safety and cargo safety.

WARNING

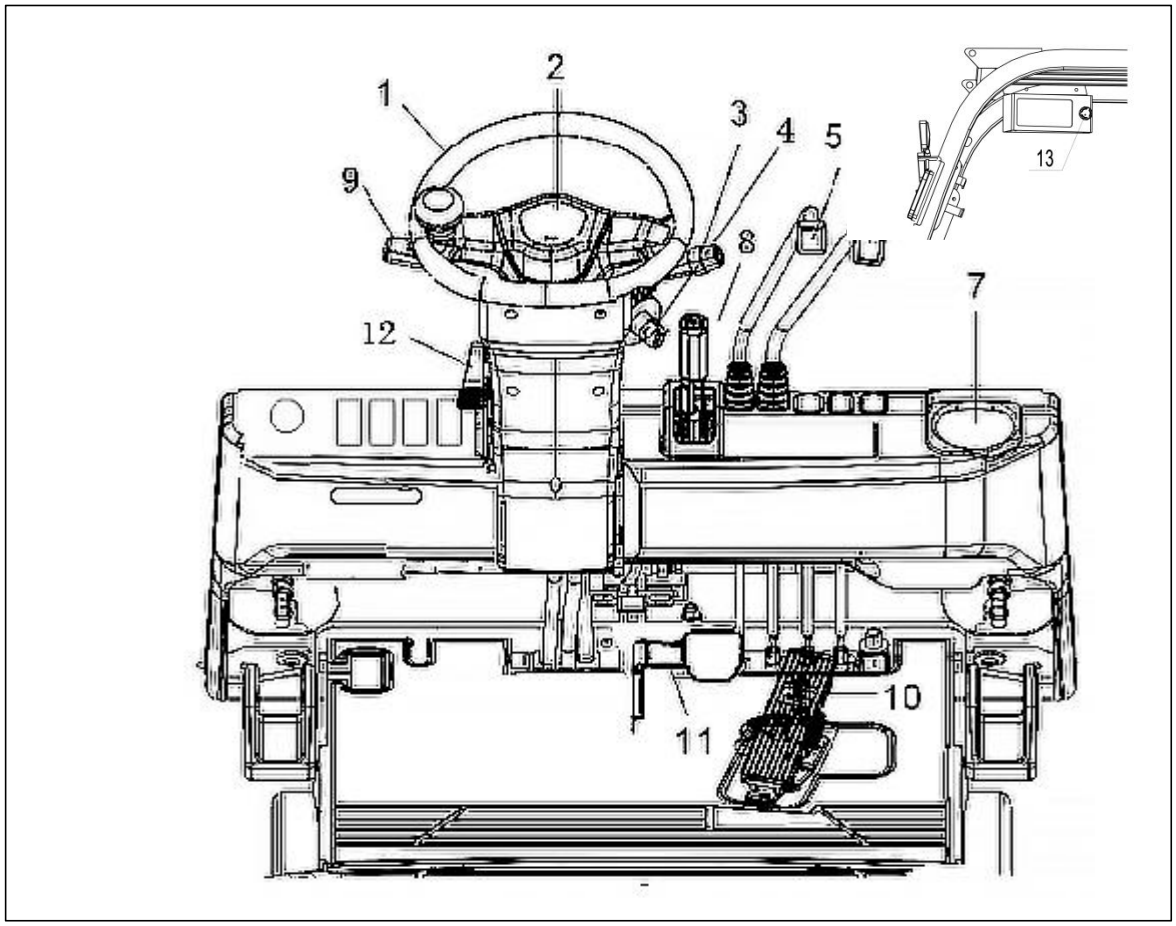
- Never drive outside the designated area.
- Never overload or carry passengers.
- Never push or pull cargo.
- Non explosive-proof forklift is prohibited to use in the flammable and explosive place.
- Non refrigerator type forklift is prohibited to use in cold storage.

1.3 Appearance and Main Components



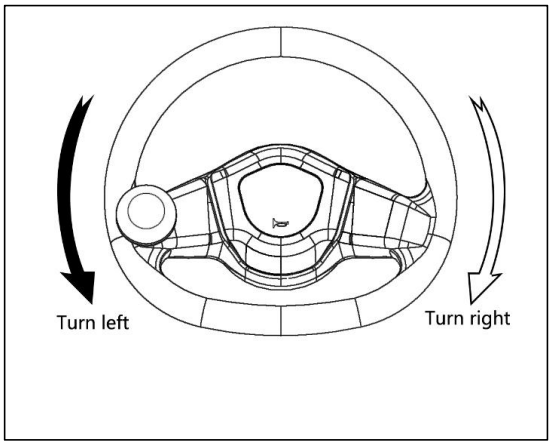
1. Fork	2. Fork Carriage	
3. Load Backrest	4. Mast Frame	
5. Steering wheel	6. Overhead guard	
7. Counterweight	8. Driver’s seat	
9. Rear wheel	10. Chassis	
11. Hood	12. Tilt cylinder	
13. Front wheel	14. Display Instrument	
15. Emergency Button		

1.4 Description of display and operating elements



1. Steering wheel
2. Horn
3. Combination light switch
4. Key switch
5. Lifting lever
6. Tilting lever
7. Cup holder
8. Parking brake lever
9. Direction lever
10. Accelerator pedal
11. Brake pedal
12. Steering column
13. Emergency button

1.Steering wheel



Control truck direction.

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

WARNING

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

2. Horn

Press the horn button on the center of the steering wheel and horn will sound.

3. Combination light switch

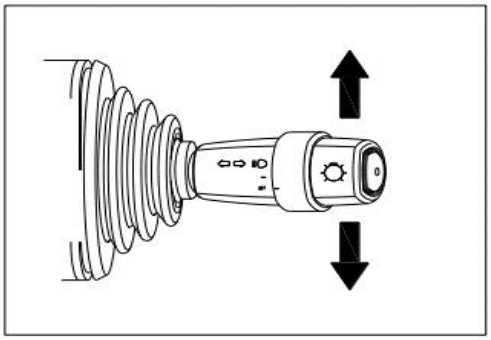
The combination light switch includes turn Signal indicator and light switches.

Turn signal lever: Push or pull this lever,the corresponding left and right turn signal light flashes.

Push Forward	⇦	Left turn light flashes
Neutral		Lamp goes off
Pull back	⇨	Right turn light flashes

CAUTION

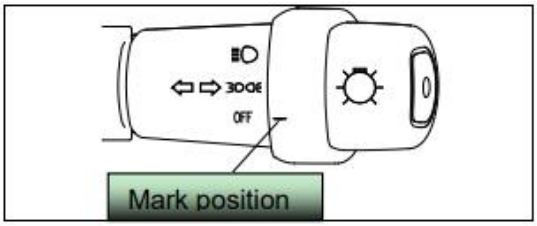
- The turn signal lever does not automatically return to the neutral position, reset it by hand.



Light switch: Rotation type switch. Control the light through the knob on the head of combination switch.

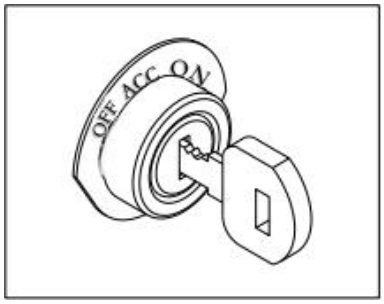
×: means being connected

Contact Symbol	Light symbol	Front signal light	Headlight	Width lamp
—	≡D		×	×
	—	×		×
	OFF			



To turn on the headlights, front lights, and width lights, turn this switch to align the position line on the switch handle with the corresponding mark on the switch body.

4. Key switch

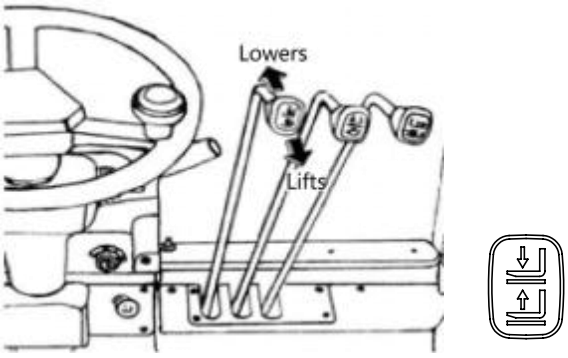


Connect and interrupt the control current. Remove the key and make sure the truck does not move suddenly.The key switch has three positions: ON, ACC and OFF. First set the direction lever to the neutral position, take your foot off the accelerator pedal, then turn the key clockwise to the "**ACC**" position. Wait until you hear a sound and then turn to the "ON" position.

CAUTION

Before starting the forklift, please confirm that the direction switch is at N position (if the forklift is started in the D or R position– the system will show error code). When power on, turn the key clockwise from “OFF” to “ACC” position, stop at “ACC” position for 2 seconds, and then turn the key clockwise to “ON” position after the self-inspection is completed.

5. Lifting lever

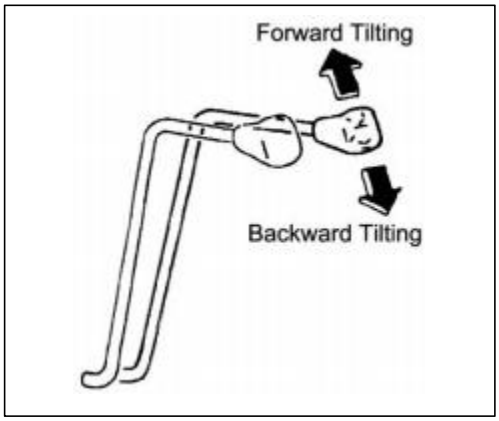


Lifts/ lowers the forks.

Push forward--- Lower; Pull--- Lift.

Lifting speed can be controlled by tilt backwards angle of lever and the lowering speed can be controlled by tilt forwards angle of the lever.

Tilting lever



Tilts the forks forward/ backward.

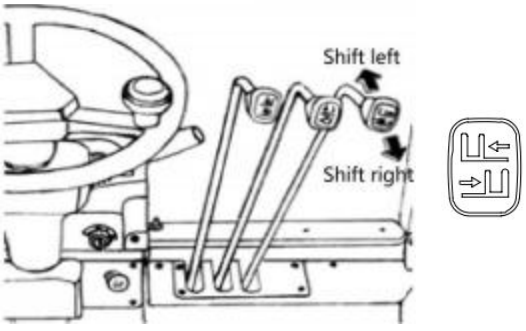
Push forward--- forward; Pull--- backward

The tilt speed can be controlled by tilt angle of the lever.

CAUTION

- The tilt lock mechanism built in the hydraulic control valve does not allow the mast to tilt forwards while the electricity is being shut down even if the tilt lever is pushed forwards.

Sideshifter lever



Shift left/ shift right the forks.

Push forward——shift left, Pull——shift right.

The side shift speed is determined by the tilt angle of the l e v e r and the throttle control.

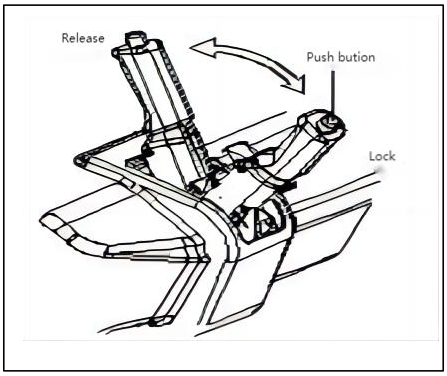
4th lever (option)

It can be a fork positioner lever, or a rotator lever or other attachment lever, depending on the working requirement.

7. Cup holder

On the right side of the instrument rack, there is a cup holder for the driver to place the cup.

8. Park brake lever



Pull the park brake lever backwards, that is braking; push the lever forward is to release. The lever must be tightened before the operator leaves the truck.

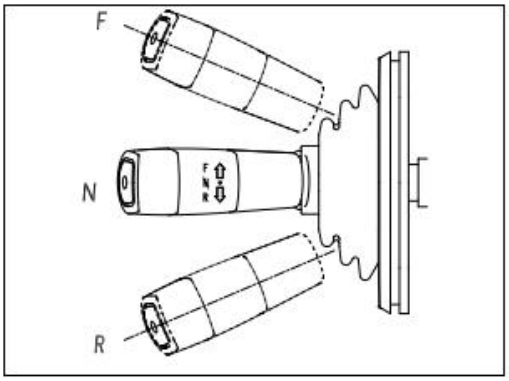
CAUTION

When the vehicle's brake system fails or an emergency occurs, the vehicle can be braked by tightening the handle. It is strictly forbidden to use a hand brake to achieve the service brake.

9. Directional lever

The directional lever is mounted on the left side of the steering column.

F	Forward
N	Neutral
R	Reverse



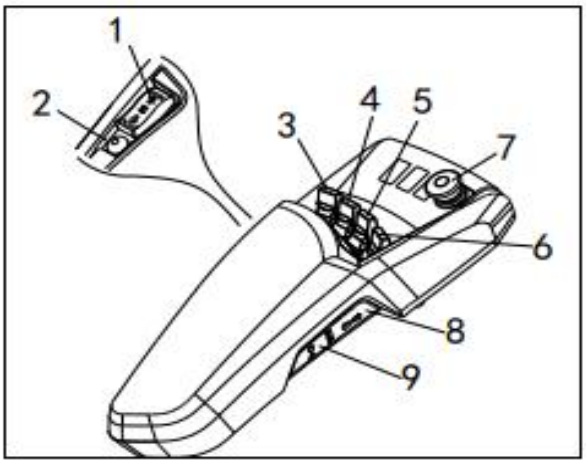
Before changing the direction of travel, press the brake pedal to stop the forklift completely, then push the handle forward to drive forward. To reverse, press the brake pedal and slow down the speed, push the lever backward.

CAUTION

The truck can only be started if the joystick is in the neutral position.

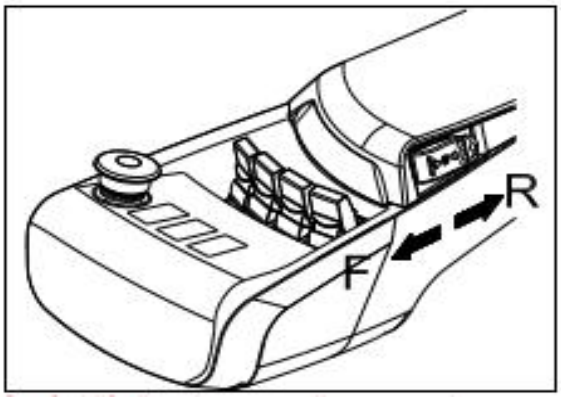
Fingertip operation (option)

Armrest system is composed of armrest bracket, fingertip, emergency stop button,horn button and wire etc.



1.Direction switch	2. Horn button	3. Lift finger tip
4. Tilt fingertip	5. Side shifter fingertip	6. Attachment fingertip
7. Emergency stop button	8. Level shit handle	9. Vertical shift handle

Direction switch



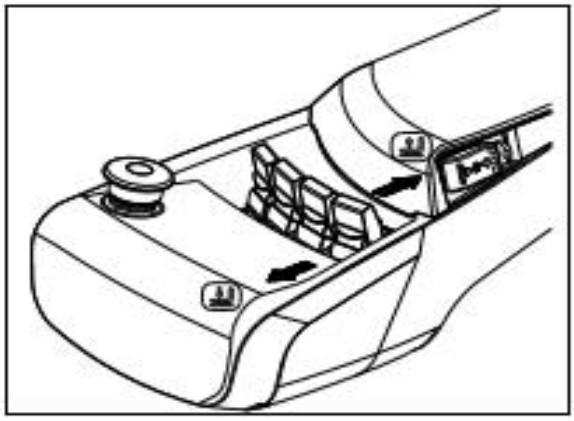
Set forklift direction according to need.Direction switch is used to switch the forklift going forward or backward. Press the switch forward and step on the accelerator pedal, press the switch backward, forklift travels back.

CAUTION

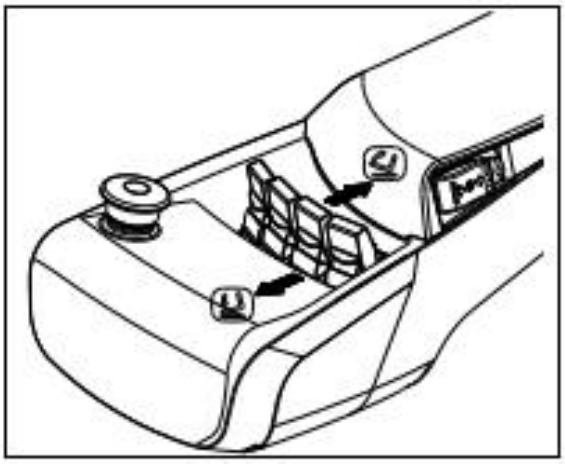
- If press the direction switch to opposite direction during truck running, the electric braking works to decelerate the forklift. After stop, the truck moves to another direction.

- If the direction lever is not in neutral when the key switch is turned to ON, a fault code will be displayed. Return the direction lever to the neutral position the fault code will then disappear.

Lift fingertip



Push the fingertip forward to lower the forks Pull the fingertip back to raise the forks. The lifting lowering speed is controlled by the tilting angle that the lever is moved, the larger angle, the faster speed.

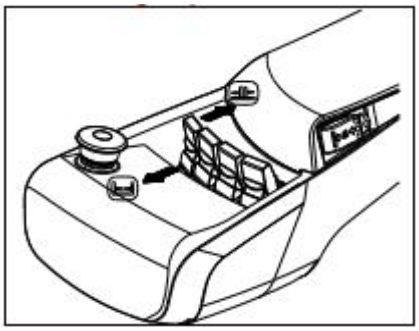


Push forward the fingertip to tilt the forks forward; pull backward to tilt the forks back The tilting speed is determined by the distance that the fingertip is moved.

CAUTION

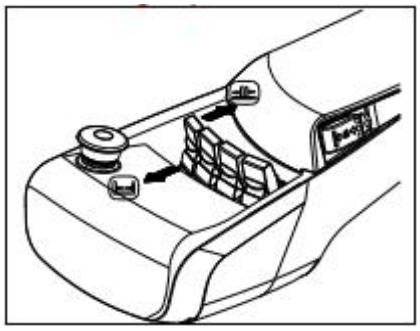
- The multi-way valve is equipped with a front tilt self-locking valve. When the circuit is cut off, the mast cannot tilt forward even if the lever is pushed forward.

Sideshift fingertip



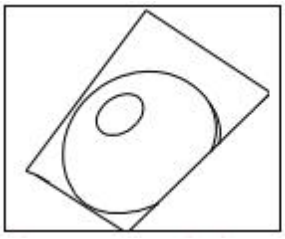
Pull and push the fingertip can realize the left/right movement of the mast.

Attachment fingertip

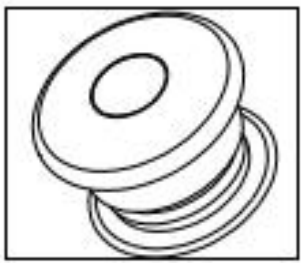


Apply when installing the attachment with 4th valve. Push and pull the fingertip can realize the attachment function.

Horn button



Press this button to send alert or warning signal.

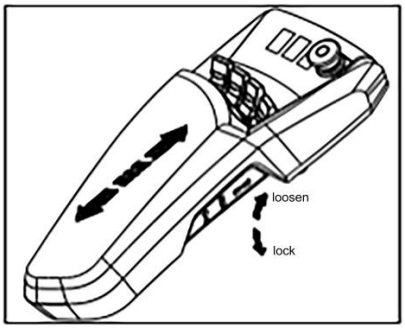


In an emergency. press the red mushroom head button to cut off the vehicle's main power supply.

CAUTION

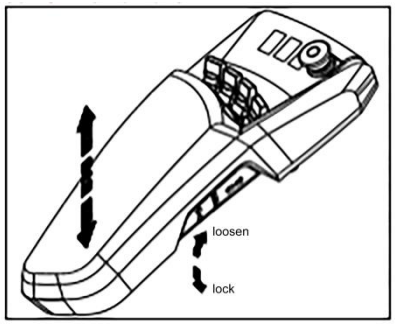
- Do not use the emergency stop switch to stop the truck under normal circumstances as the key switch.

Level shift handle



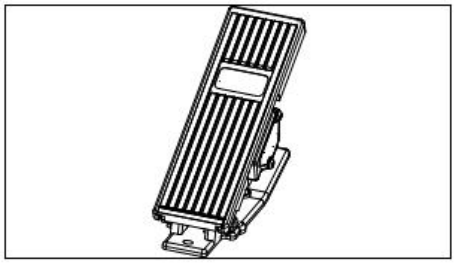
Adjust the horizontal position of the armrest:Flip the pick up, loosen the armrest, and move the armrest to a suitable position horizontally: turn the pick downward to lock the armrest.

Vertical shift handle



Adjust the height of the armrest: flip the pick up, loosen the armrest, and move the armrest to a suitable height vertically, turn the pick downward to lock the armrest.

10. Acceleration pedal



Provides infinitely variable control travel speed. As the accelerator pedal is slowly pressed, the drive motor start turning and the forklift truck will start to move. The harder the force applied to the pedal, the faster the forklift is driving.

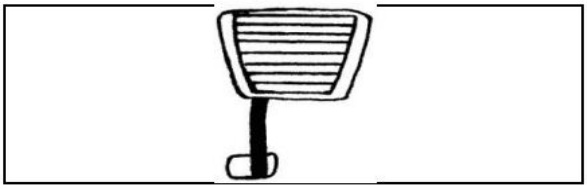
CAUTION

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

WARNING

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

11. Brake pedal

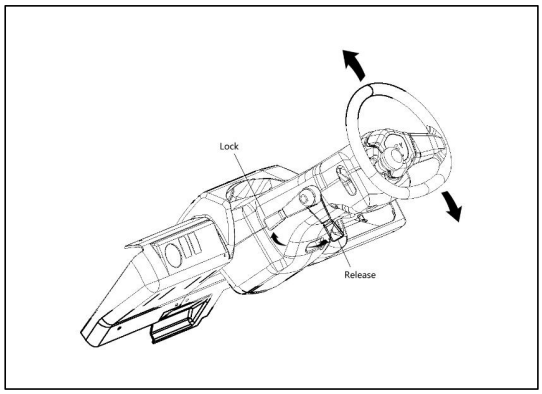


When the brake pedal is depressed, the vehicle decelerates and stops. Release the pedal and the vehicle runs.

CAUTION

- Prevent sudden braking. Rapid braking can easily lead to vehicle tipping or cargo damage.

12. Steering column



The position of the steering wheel is adjustable. The method is to pull the adjustment rod mounted on the left side of the directional column, then move the steering wheel to the desired position, and then push the adjustment lever down to lock.

CAUTION

a. Adjust the steering wheel tilt angle after the forklift stops and pulls the hand brake handle.

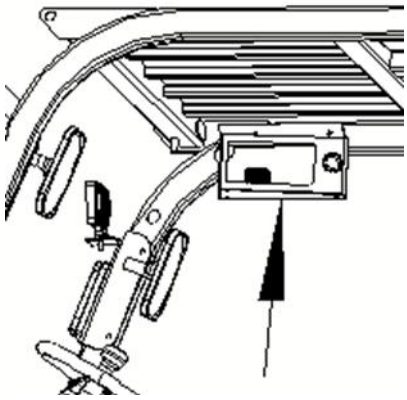
b. After adjustment, force the steering wheel up and down to ensure that it is locked.

13. Emergency button

1. Turn the power on or off.

2. In case of emergency, press the red button to cut off the main power of the vehicle to stop walking, steering or lifting.

1.5 Display instrument



1.5.1 Multi-function display

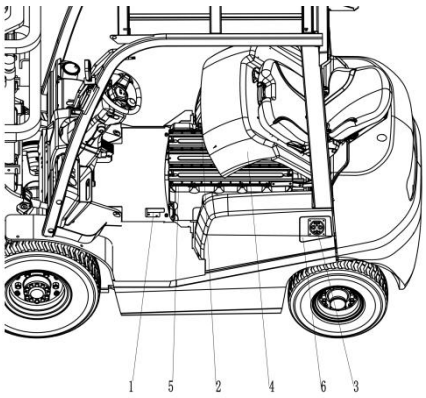
Located in the upper right corner of the overhead guard.

Number	Display	Number	Display
A	Current remaining battery	F	Seat belt not fastened warning
B	Time	G	Accumulative working hours
C	Date	H	Menu
D	Running speed (km/h or MPH)	I	The brake lights up when braking
E	SET	J	Adjust Speed

1.6 Lithium battery charging port

structure and side charging door

The charging port of the lithium battery and the side charging door are independently introduced. As the side door and charging port are often used for charging. Detailed lithium battery and charger are described in the following section.

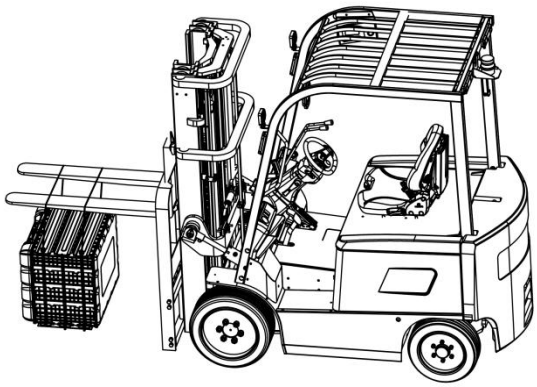


1. Hood lock	2. Plug
3. Charging port	4. Hood Battery box
5. Battery box	6. Charging port door

FB20(P)/25(P)/30(P)/35(P) charging port structure and side door

Lithium battery fastening:

There are 6 bolts on the clamping device. The heads of the bolts are welded with gaskets. When the bolts are tightened clockwise, the lithium batteries are installed horizontally.



Open yhe side charging door. Plug in the charger.

1.7 Lithium battery removal and installation

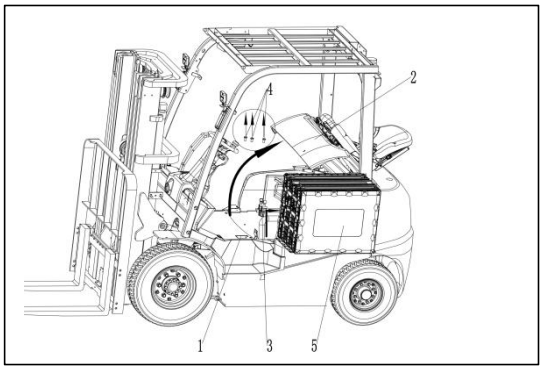
Lithium battery is located under the seat. It is mounted on the chassis with six bolts. For the removal of lithium battery：

(1) Open the hood cover lock

(2) Open the hood cover

(3) Pull the plug out

(4) Remove the six bolts

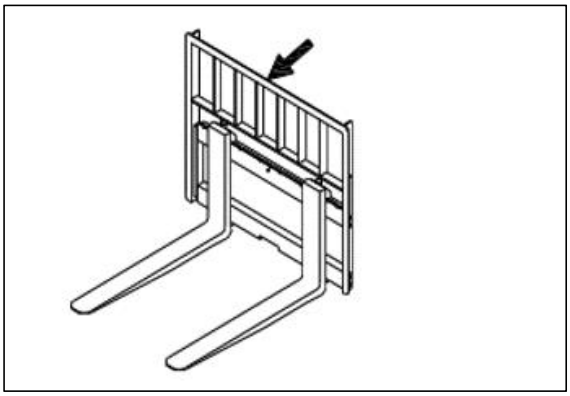


Installation is opposite to removal.

WARNING

Lift carefully.The lithium battery weighs about 320 kg. It's very heavy. Prevent crushing or pinching your hands during installation.

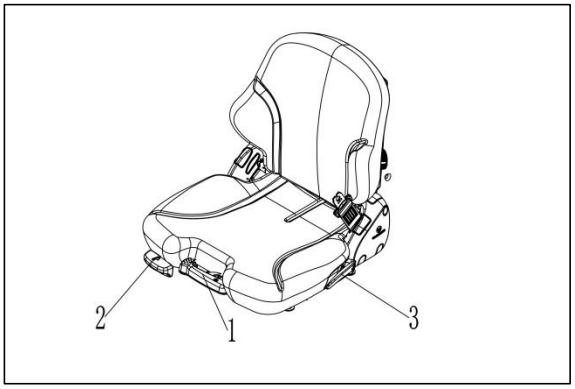
1.8 Truck body and others



Load backrest

Load backrest can guarantee stable goods loading. It’s forbidden to use the forklift without the load backrest. It is forbidden to disassemble and modify the load backrest.

Seat



1. Forward and backward adjustment lever
2. Backrest angle adjustment lever

Forward and backward adjustment

Manually move the lever inward and forward the brake assembly to adjust the device to the proper position. The seat will be automatically locked when the handle is lifted.

Backrest angle adjustment

When sitting on the seat, lay the back on the backrest and pull the backrest angle adjustment lever upward with left hand. Do not release the lever until adjusted to a proper position by moving the body forward or backward.

⚠ WARNING

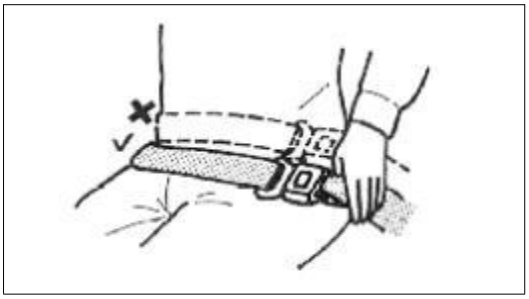
- Turn off the key before adjusting the seat.
- Stop the truck to adjust the seat.
- It is not allowed to adjust the seat during driving to avoid accidents
- Make sure the lever is moved completely to separate the seat structure before the forward and
- rearward adjustment of the seat and angle adjustment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

Seat belt

Fasten the belt

Belt was huddled up in a box. Pull the safety belt out from the box and insert into the socket on the other side. The belt is fastened.

Please fasten the belt when getting onto the truck. Meanwhile, keep your back and waist close to the seat. Do not strap the belt to your abdomen.

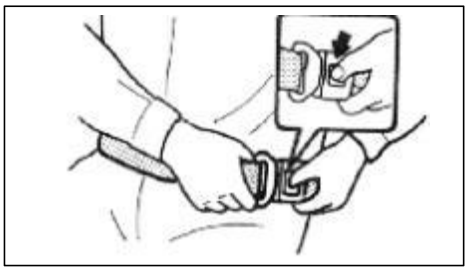


Please don't tilt the seat backrest excessively. Otherwise, the belt can not be stretched properly.

It is prohibit to knot or twist the belt.

Fastening the belt during daily operation can protect you when the truck turn over and reduce the harm.

Unfasten the belt.



Press the red button (with the word PRESS) in the socket, it's untied.

Check the belt

Check if the bolt that fixed belt is loosened

Don't press the belt against hard or frangible objects.

It is prohibited to remove any parts of the belt.

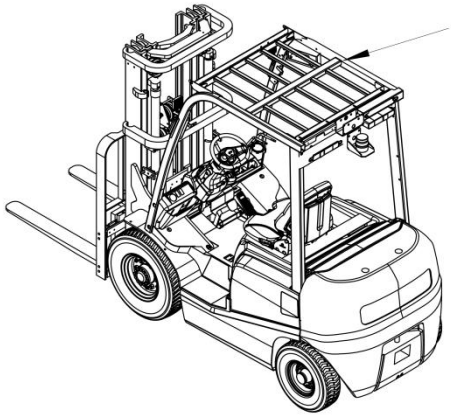
The belt used frequently needs to be checked periodically.

- Cutting or fracturing
- Worn or damaged metal parts, including positioning points
- Buckle or traction device fault
- Off-line

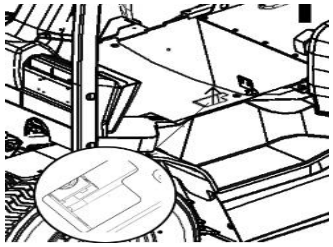
If abnormal condition occurs, please replace with new belt immediately. The service life of the belt is three years, so do not use it if it's abnormal.

Overhead guard

The overhead guard protects the operator from being hurt by falling materials.
It must have enough shock resistance strength.
It's not allowed to use forklift without overhead guard. Always tighten the overhead guard.

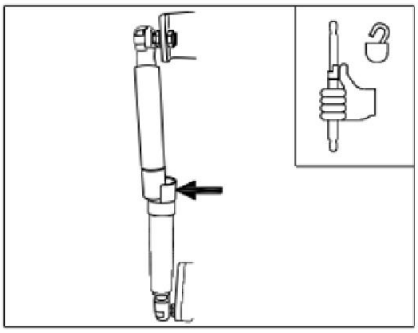


Lock device

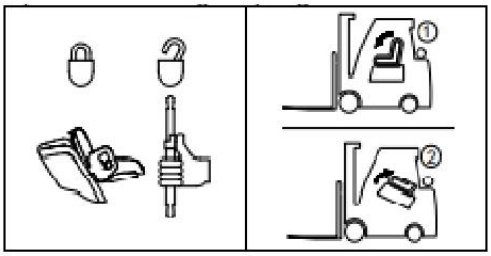


In order to open the hood, you need to lift up the lock under the floor mat first.

Air spring



The air spring is to support the hood when it is open. Do not close the hood directly, press the cover of air spring first (at "arrow" position as the illustration) before closing the hood.



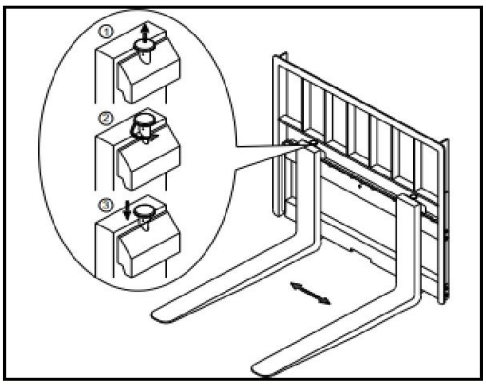
⚠ CAUTION

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 power off. However, in case that any part of the body can not reach the components, in order to diagnose the fault by hearing, the key switch is allowed to be turned on when the hood is open.

Fork lock knob/lever



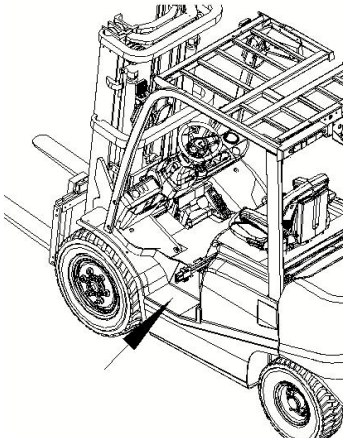
To adjust fork spacing, pull up fork lock knob/lever turn 180° and move the forks to the desired position. The fork spacing should be adjusted according to loads to be handled.

⚠ WARNING

- The forks should be located symmetrically to the truck's center line and fork lock knob/lever should always be locked again.
- There is a gap on the bottom bar. It is used to slip in the forks into the carriage.
- To prevent the fork fall off from the gap, it is forbidden to lock the fork on the gap position. Always check the bolts in the middle of the bar gap, which prevents the fork from slipping out.

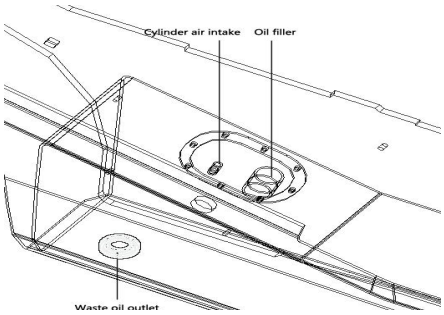
Pedal and handrail for getting on and off

The truck is equipped with pedal for getting on and off at both side of the truck. The handrails are on left and right side of the overhead guard bracket. Please use handrails for safety when getting on and off the truck.

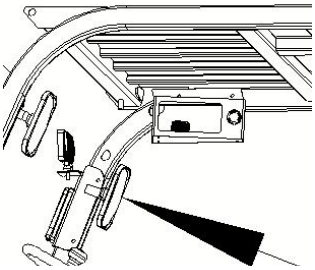


Hydraulic fluid reservoir cap

The hydraulic fluid reservoir cap is located on the right of the hood. Open the cover when adding oil. Fill clean hydraulic oil through this oil filler. After filling, lock the cap.



Rear-view mirror

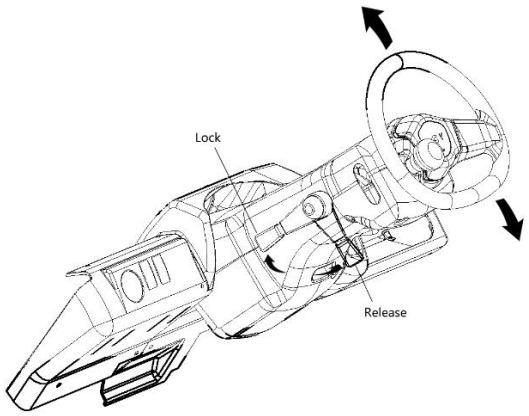


Circular rear-view mirror is installed on the upper right of overhead safeguard, and is for observing rear condition or safe driving during reversing.

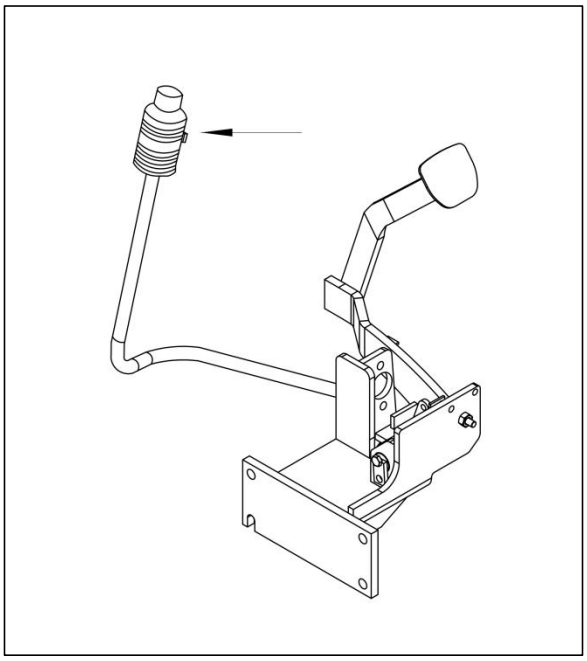
Steering column positioning device

Adjust and fix steering column according to needed distance.

In order to meet operator's need, the tilting angle of steering column is adjustable. Pull the lever upward, the steering column is released; push downward and locked.



Brake fluid reservoir



Brake fluid reservoir installs in the instrument stand right below the steering wheel. Translucent reservoir enable us to check the brake fluid level from outside

CAUTION

- When adding brake fluid, prevent dust and debris from entering the cup. Brake fluid is corrosive and toxic.

1.9 Adjust and replace forks

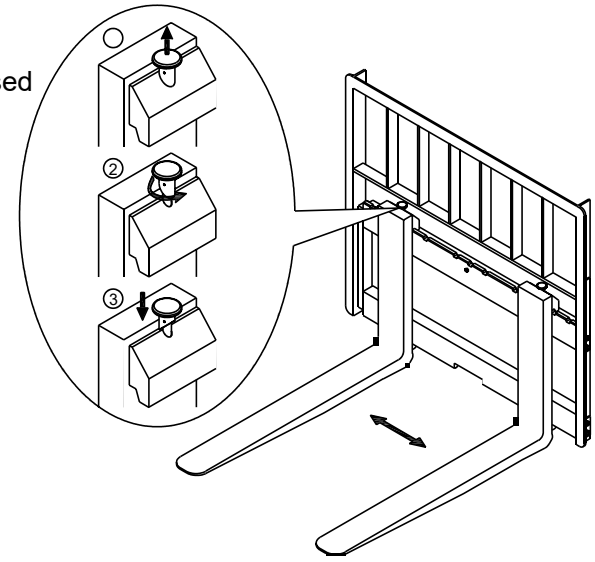
Adjust fork distance

In order to guarantee safe operation, adjust the fork distance to a proper distance:

– Lift up the fork lock knob or lever, and rotate 180 degree in either direction, the fork is unlocked.

– Adjust the fork positions to both ends symmetrically based on the fork carriage center line.

– After adjusting the fork distance, lift up the fork lock knob or lever, rotate it to the original position. And make sure the lock pin of the fork is put inside of the upper bar notches.



Fork distance is adjusted.

CAUTION

Fork lock pin must be put inside of the upper bar notch. Otherwise forks are easy to move during driving and loads may fall down.

Be careful when adjusting forks.

CAUTION

There is a gap on the lower bar of the fork carriage to install and remove forks.

It's prohibited to fix forks on the fork carriage opening, prevent forks dropping from the opening.

There is a bolt in the middle of the lower bar gap to prevent forks from falling down. Replace in time if the bolt is damaged.

Fork removal：

When replacing forks, screw off the bolt in the middle of the carriage lower bar, move the fork to the gap, and then tilt forward and lower the forks until forks are off the fork carriage, then tilt backward the truck.

Fork installation：

Place forks on the ground against the truck, lower the fork carriage to the lowest point, drive the truck forward slowly, fit the forks upper and lower hook to the top and lower carriage bar gap, lift the fork carriage, adjust the left and right position of forks and lock the forks onto the upper bar notch.

Then lock the screw the bolt in the middle of the lower bar to prevent forks from falling off.

1.10 OPS system (optional)

OPS (Operator Presence Sensing) system is a safety system that installs a sensor in the driver seat to sense if the driver sits on the seat correctly. If the driver does not sit on the seat correctly, the driving power will be cut off., the driver cannot drive the truck or operate the loading and unloading, thereby reducing accidents by caused by wrong operation.

Driving protection function

When the forklift is running, if the driver the safety belt is released over 1 second, the forklift stops automatically, and the instrument displayed seat indicator light  lights up. Only when the hand brake is pulled up and the driver is seated correctly, the directional lever is returned to neutral, the seat indicator light will goes out, and the driving OPS will be released.

Working protection function

When the forklift is working and the driver leaves the seat or the safety belt is released over 1 second, the operation will stop automatically, and the instrument displayed seat indicator light  lights up, meanwhile the OPS light turns on, and the buzzer sends out continuous alarm signal. When the driver sits down again, the seat indicator light  goes out and the OPS is released.

Warning function

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

Resume neutral function

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

OPS abnormal function handling

Park the truck in safe place and contact forklift manufacturer to check if any below condition is occurred.

a. After the driver leaves the seat, the seat indicator light  does not light up;

b. When the driver sits down, the seat indicator light  does not go out.

> **CAUTION**
> As to forklift equipped with safety belt protection switch, after sitting on the seat correctly, it also needs fasten the safety belt, then the truck can be operated normally. When driving on the uphill, starting the OPS will cut off the drive power and make the truck slip. In order to avoid this accident, the driver must sit correctly when operating on the uphill.

Fork locking function after power off

This function means: forks are locked when starting switch is closed or power failure, forks will not lower down even operate the control lever.

1.11 Technical Specifications

FB20P/25P/30P/35P

No.	Item			FB20P	FB25P	FB30P	FB35P
1	Rated lifting capacity		kg	2000	2500	3000	3500
2	Load center distance		mm	500	500	500	500
3	Standard mast lift height		mm	3000	3000	3000	3000
4	Free lift height		mm	105	110	165	170
5	Mast Tilt angle (front/back)		(°)	6/10	6/10	6/10	6/10
6	Maximum lifting speed (no load/full load)		mm/s	500/450	500/450	400/350	400/300
7	Maximum travel speed (no load/full load)		km/h	15/14	15/14	15/13	15/12
8	Maximum grade ability (no load/full load)		%	20/20	20/20	20/18	20/15
9	Minimum outside turning radius		mm	2170	2240	2400	2470
10	Minimum ground clearance		mm	110	110	140	140
11	Dimensions	Length (to fork face)	mm	2485	2555	2705	2760
		Width	mm	1150	1150	1225	1225
12	Service weight	Include battery box	kg	3340	3700	4400	4950
13	Battery	Standard	V/Ah	80/205	80/205	80/205	80/205
14	Motor	Driven Motor	kW	15	15	15	15
		model		XYQ-15			
		Pump Motor	kW	13.5	13.5	13.5	13.5
		model		TSW132/4-195LP72-6			
15	Tire	Front×2		7.00-12-12PR	7.00-12-12PR	28X9-15-12PR	28X9-15-12PR
		Rear×2		6.00-9-10PR	6.00-9-10PR	6.50-10-10PR	6.50-10-10PR

The manufacturer reserves the rights to make any changes without notice concerning specifications in this chart.

Battery options: big battery capacity for different working condition is available. (80V230Ah, 80V410Ah, 80V460Ah)

FB20/25/30/35

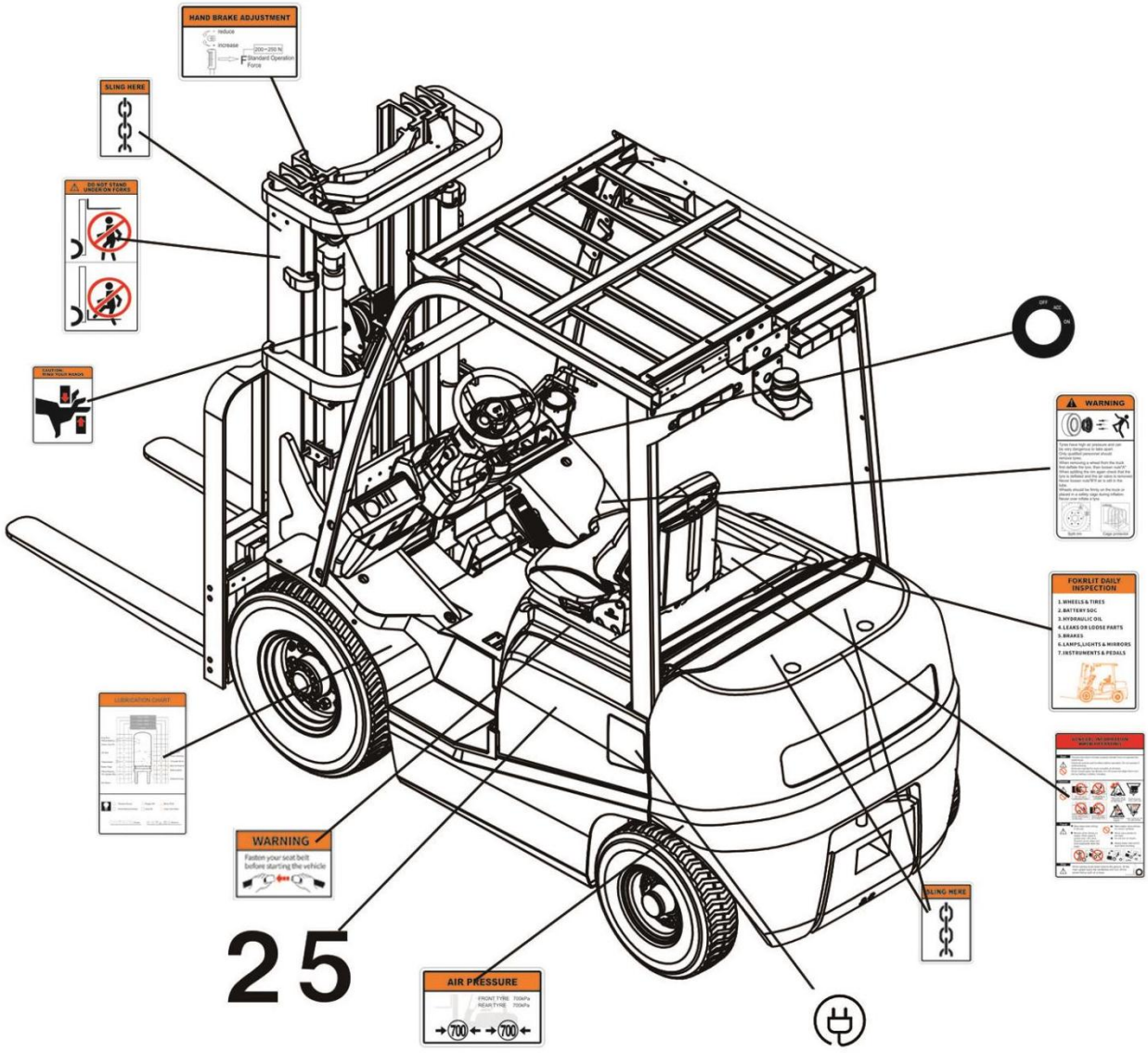
No.	Item			FB20	FB25	FB30	FB35
1	Rated lifting capacity		kg	2000	2500	3000	3500
2	Load center distance		mm	500	500	500	500
3	Standard mast lift height		mm	3000	3000	3000	3000
4	Free lift height		mm	105	110	165	170
5	Mast Tilt angle (front/back)		(°)	6/12	6/12	6/12	6/12
6	Maximum lifting speed (no load/full load)		mm/s	330/450	330/450	330/450	330/450
7	Maximum travel speed (no load/full load)		km/h	15/14	15/14	15/13	15/12
8	Maximum grade ability (no load/full load)		%	20/20	20/20	20/18	20/15
9	Minimum outside turning radius		mm	2170	2240	2400	2470
10	Minimum ground clearance		mm	110	110	140	140
11	Dimensions	Length (to fork face)	mm	2245	2285	2510	2550
		Width	mm	1150	1150	1225	1225
12	Service weight	Include battery box	kg	3554	3854	4774	5304
13	Battery	Standard	V/Ah	80/205	80/205	80/205	80/205
14	Motor	Driven Motor	kW	11	11	11	11
		model		XYQ-11-80			
		Pump Motor	kW	13.5	13.5	13.5	13.5
		model		TSW132/4-195LP72-6			
15	Tire	Front×2		21×8-9-16PR	21×8-9-16PR	28X9-15-12PR	28X9-15-12PR
		Rear×2		18×7-8-14PR	18×7-8-14PR	18×7-8-14PR	18×7-8-14PR

The manufacturer reserves the rights to make any changes without notice concerning specifications in this chart.

Battery options: big battery capacity for different working condition is available. (80V230Ah, 80V410Ah, 80V460Ah)

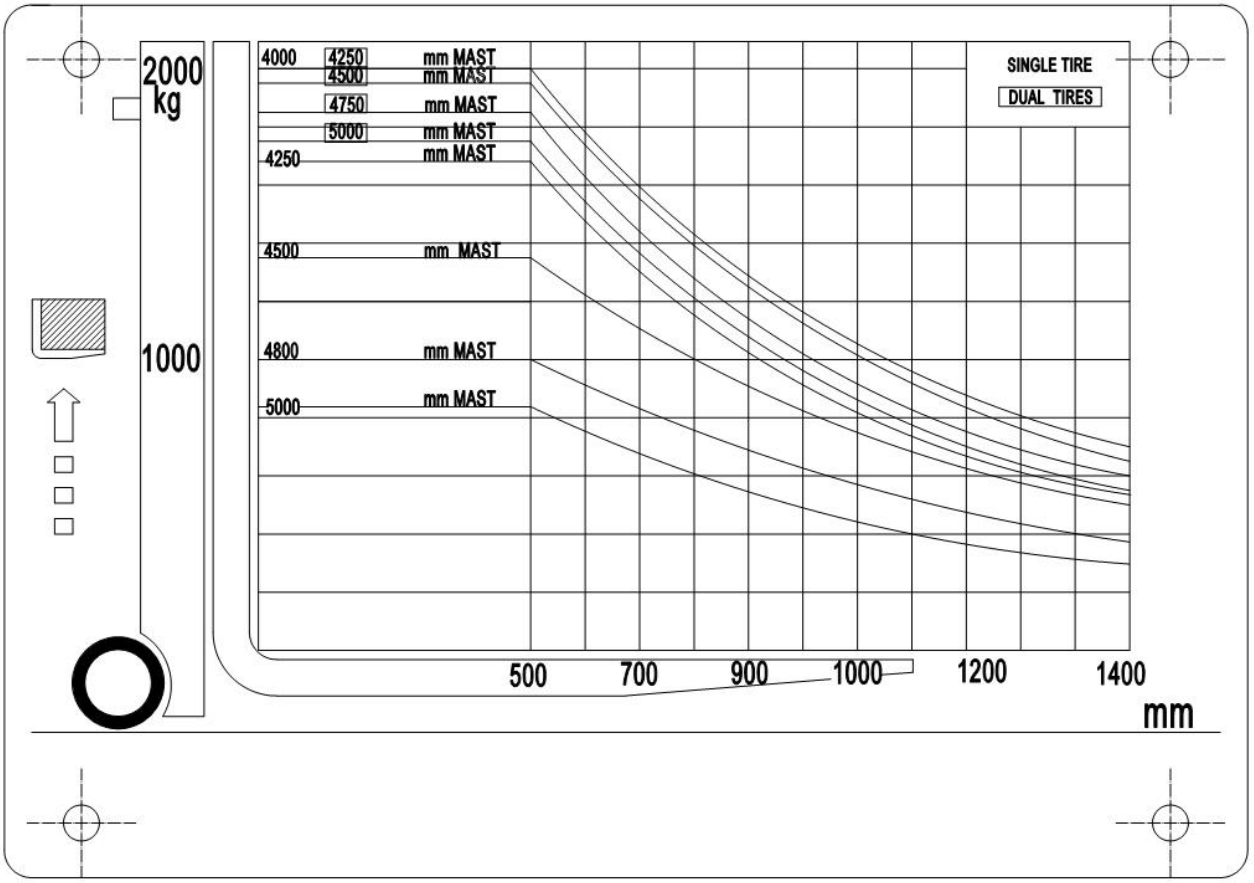
1.12 Nameplate and Safety Labels

Warnings and notices such as Rated capacities and load curve chart, Warning label and name plate must be clearly visible at all times. Replace if necessary. The figure below shows the approximate location of the each marker. Before operating the truck, please understand the meaning of the various symbols.

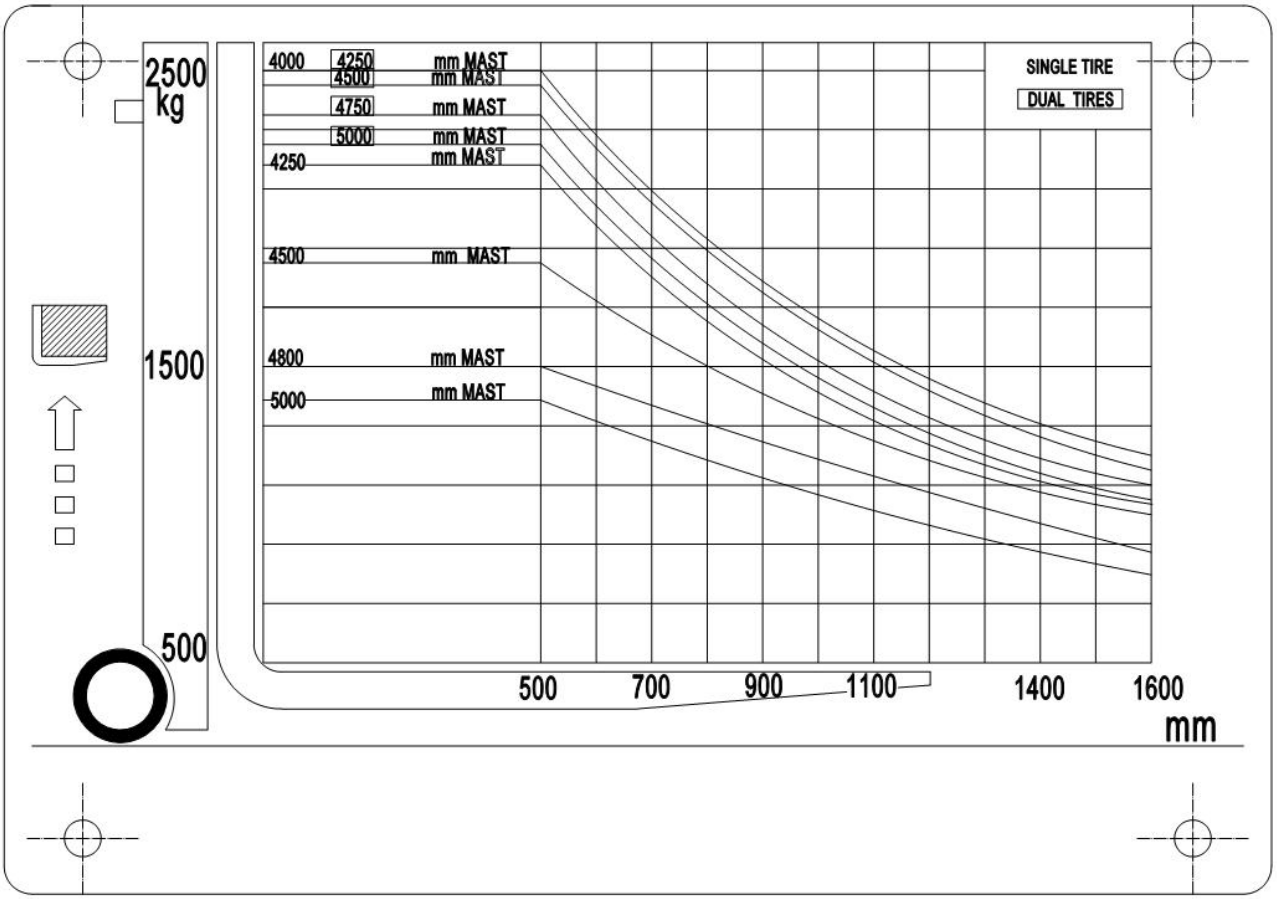


1.12.1 Load curve chart

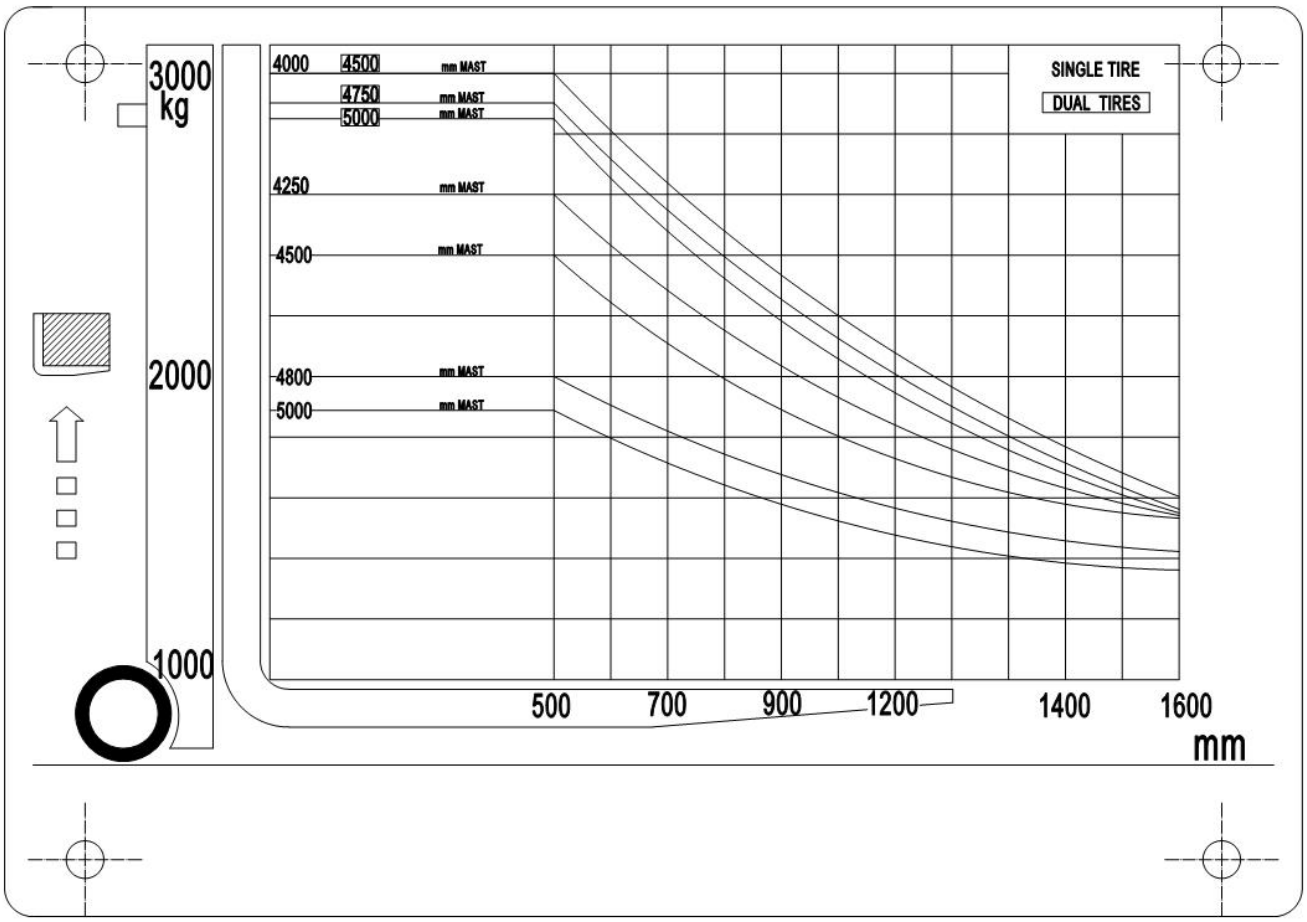
FB20P/FB20



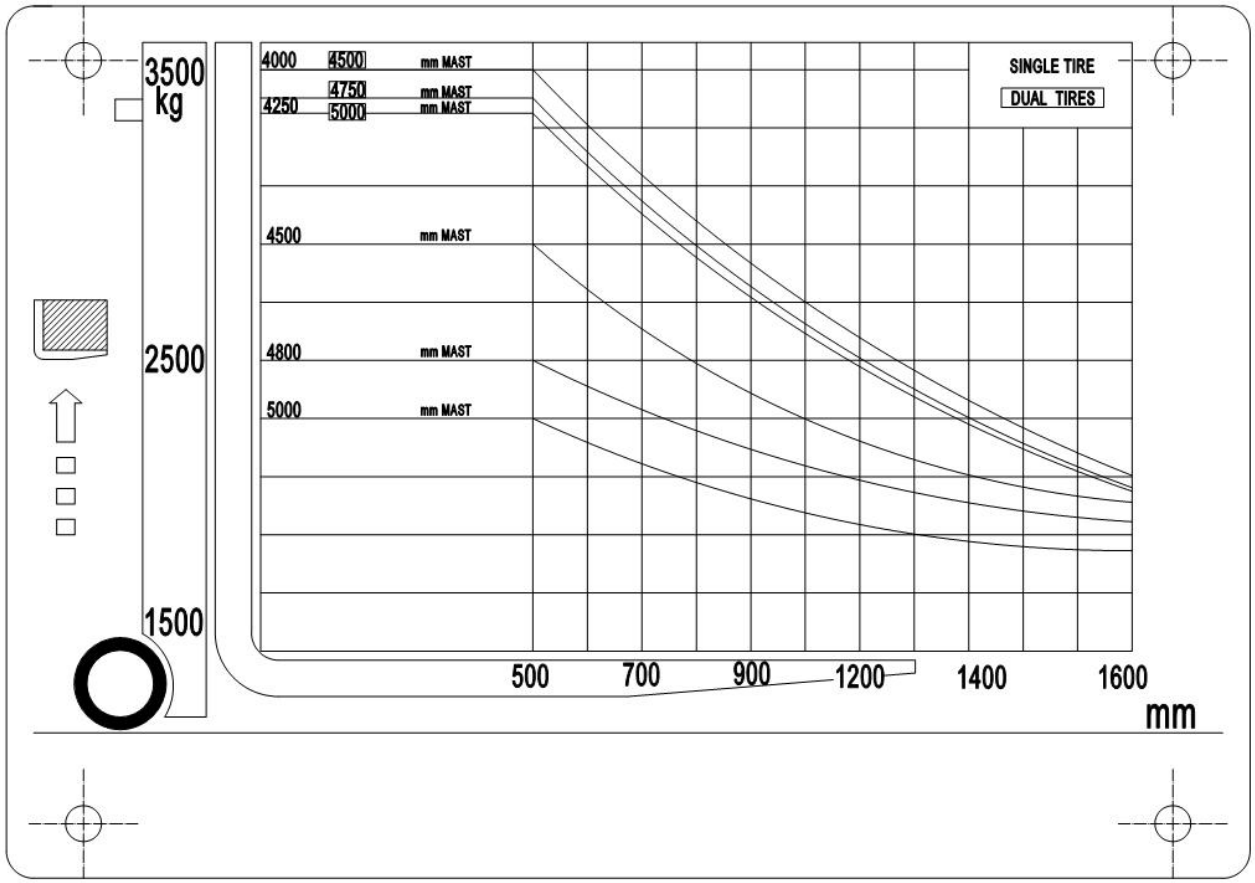
FB25P/FB25



FB30P/FB30

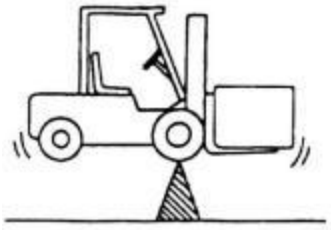


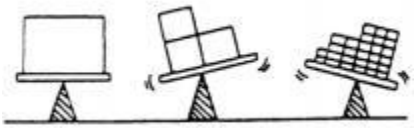
FB35P/FB35



1.13 The Structure and Stability of Truck

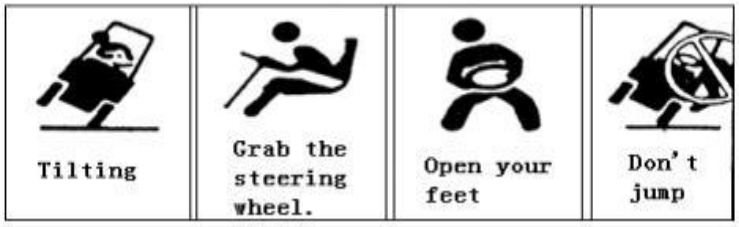
Prevent the forklift to turn over! It is very important for operator to know the truck's structure and relationship between load and stability.

⚠ CAUTION	Structure	
The basic structure of the truck is mast (include mast and forks) and body (include tire). The lift truck keeps the balance of weight between the truck body and the load on the forks with the center of the front wheels as a fulcrum when the rated capacity load is placed in position. Due care should be paid to the gravity center of loads and forklift to maintain the stability of the truck.		

⚠ CAUTION	Load center	
There is difference in gravity because of the loads' shape, such as box, board and large roller. It is very important to distinguish the difference of the gravity center of loads for evaluating the truck's stability.		

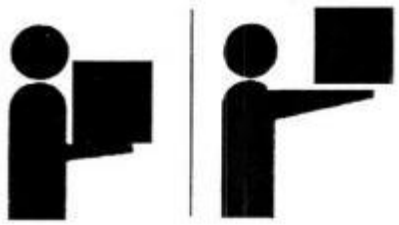
⚠ **WARNING**

If the truck roll over, do not attempt to get out of the truck because the speed of overturn is much faster than your speed. You should hold the steering wheel handle, spread your feet, and keep the seat belt fastened all the time.



⚠ CAUTION	The max. load and load center

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



⚠ CAUTION	Gravity center and stability

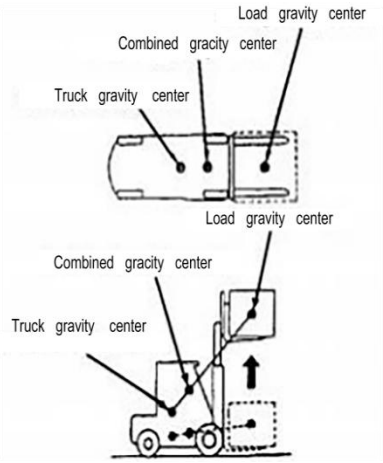
The combined gravity center that is composed of the forklift center and the load gravity center, it determines the stability of lift trucks.

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

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

The combined center is determined by these factors:

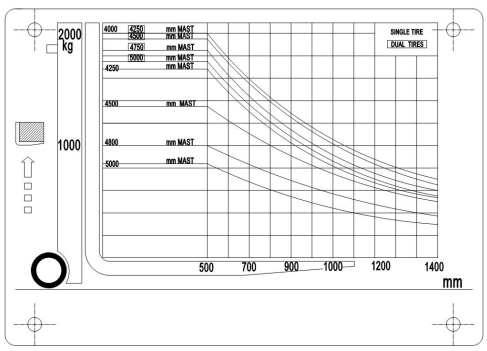
- Load's size, weight and shape
- The lifting height
- The tilting angle
- The acceleration
- The radius of turning
- The road and grade's angle
- The attachments



⚠ CAUTION	Capacity chart

The chart given shows the relation between the load center and the weight of loads.

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



⚠ CAUTION	Speed and acceleration	

Inertia is the tendency of objects in motion to stay in motion, and objects at rest to stay at rest, unless a force causes its speed or direction to change.

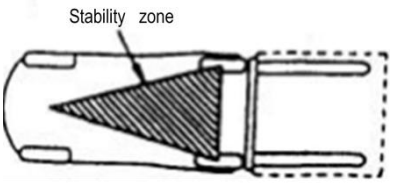
According to inertia, when truck starts moving, it gives a backward force, and when truck stops moving, it gives a forward force. So, it's dangerous to brake suddenly, because it causes a large force forwards, and it might cause truck to tip over or load slide off.

When the forklift makes a turn, it will exert a centrifugal force outward from the curve center. This strength pushes forklift outwards and causes it to roll over. The stability region is very small, so it is necessary to decelerate when turning. If the load is lifted up a high position, it also may cause roll over if turns too fast.

⚠ CAUTION	The stable region of the load center	

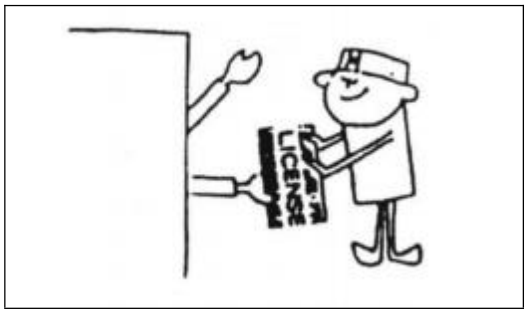
In order to make the truck stable, the combined center must be in the triangle formed by two points that the two front wheels touch the ground and the midpoint of the rear axle.

If the combined center is in the front driving axle, the two front wheels become two fulcrums, the truck will roll over. And if the combined center is out of the triangle, the trucks shall roll over in the corresponding direction.



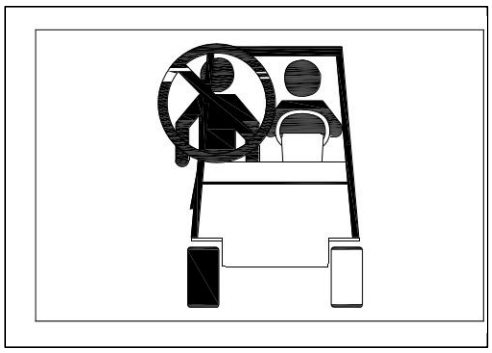
2 Safety instructions

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



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

3. Never carry passenger.



4. Inspect the truck periodically for leakage, deformation, defects, etc.

– Make sure to replace the key safety parts during periodical inspection.

– Wipe off oil, grease or water from the floor board, foot pedal and hand controls.

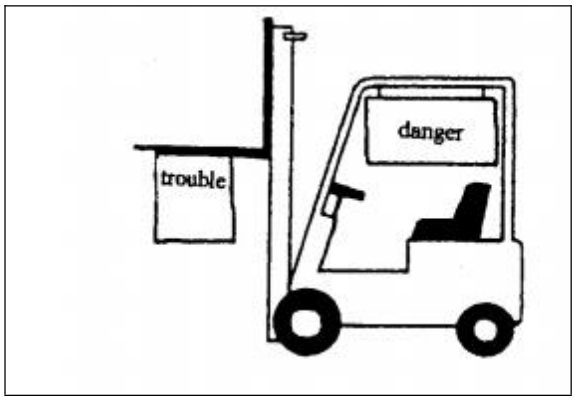
– Strictly prohibit smoking and spark when inspecting the battery.

– When performing maintenance on the mast, front and rear lights, or other high places, be safely secured and take care not to slip.

– Be careful do not be scalded when inspecting the motor, controller and etc.

5. Whenever you discover a fault, stop the forklift, hang a "DANGER" or "OUT OF ORDER" sign on it, remove the key switch and notify a manager. The truck may only be used after the fault has been eliminated.

– Arrange for immediate repair in the event of a fault when lifting or driving uphill or downhill, or a leakage of battery electrolyte, hydraulic oil or brake fluid.



6. Make sure to wear insulating gloves and keep tools ware from battery terminals to avoid short circuit.

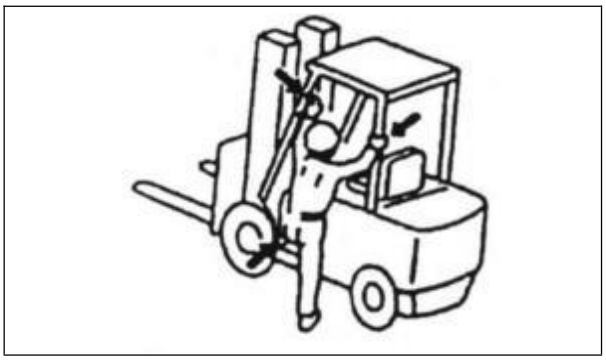
7. The truck is designed to operate on solid and flat cement, asphalt or concrete surfaces. Check road conditions in advance.

– The truck is designed to operate in the following climatic conditions: temperature range -20°C to 50°C; maximum wind speed 5 m/s; maximum air humidity 90% (at 20°C).

– The truck is not allowed to use in flammable or explosive working environments.

– Altitude not exceeds 2000m.

8. Never mount or dismount the forklift while it is in motion. Always use the safety step and safety handgrip when mounting and dismounting.

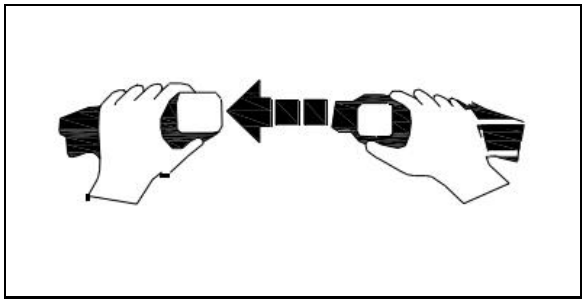


9. Never attempt to operate the control levers unless property seated.

– Before starting the forklift, adjust the seat position to make hand and foot at a comfortable reach.

10. Before starting up, make sure that:

– The seat belt is fastened



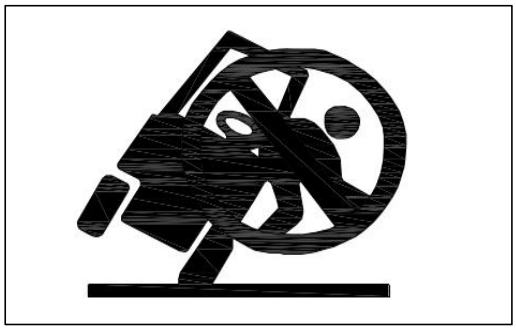
– The hand brake is released

– The direction lever is in neutral

– No person near the forklift.

– Before turning on the power, do not press the accelerator pedal or operate the lift or tilt levers

– Operate the controls smoothly and do not jerk the steering wheel. Avoid sudden stops, starts or turns. Sudden braking may cause the vehicle to tip over and rollover.



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

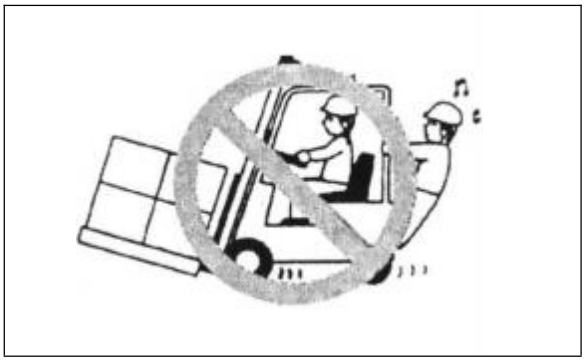
– It is especially important to look in the direction of travel when reversing.

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

– Do not lift loads by suspending ropes from the forks or attachment as the ropes may slip off. Attach a lifting hook or jib if necessary.

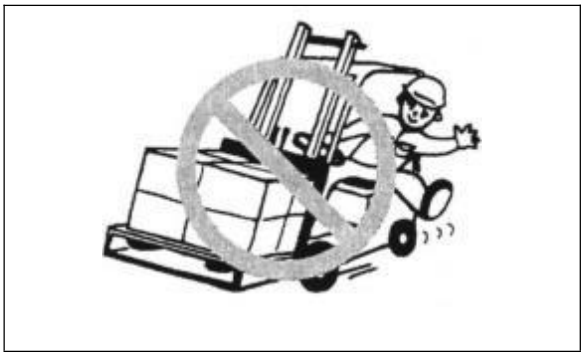
– Be careful not to let the forks touch the floor, so as to avoid damaging the fork tips or driving surface.

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



14. Do not use mobile phones or other electronic devices while driving. Be sure to focus on operation.

15. Keep your head, hands, arms, feet and legs inside of the forklift at all times.

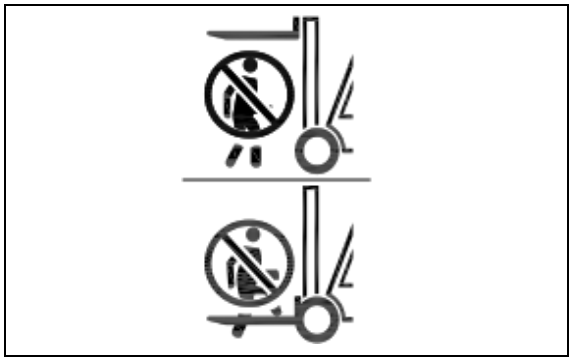


16. Pallets and skids should be strong enough to bear the weight of the load. Never use damaged or deformed pallets.

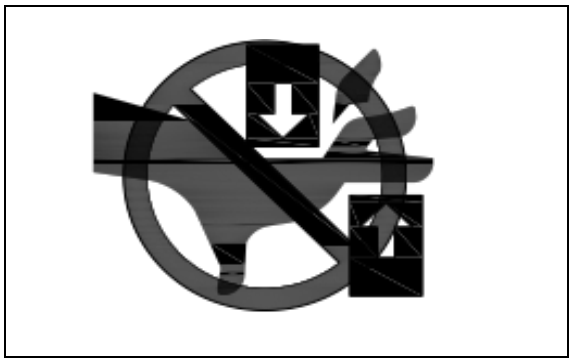
17. The forklift manufacturer can provide users with a variety of attachments including rotating clamps, bale clamps, fork positioners, etc. Such attachments are for special uses only. Modifications to attachments must be authorized by the manufacturer. Do not attempt to modify attachments yourself.

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

19. Never permit anyone to walk or stand under raised forks or attachments. Do not allow anyone to stand on the forks.



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



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

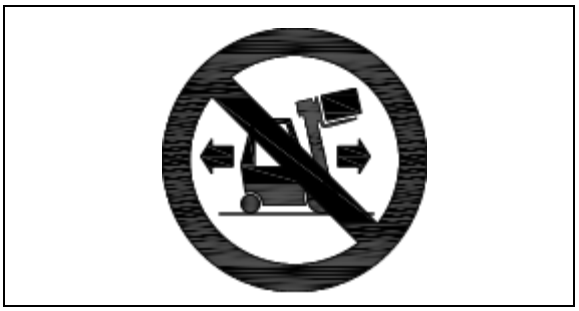
22. Do not stack loads on forks in such a way that the top of the load exceeds the backrest height. If unavoidable, make the load stable and secured. When handling bulky loads which restrict your vision, operate the forklift in reverse or have a guide. Make sure you understand the all the hand, flag,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

23. Use minimum forward and reverse tilt when stacking and unstacking loads. Never tilt forward unless the load is slightly above the stack or at low lift height.

– When stacking loads on a high place, make the mast vertical at a height of 15–20 cm above the ground and then lift the load. Never attempt to tilt the mast beyond vertical when the load is raised high.

– To remove loads from high places, insert forks into the pallet, lift slightly and drive backwards, then lower the load. Tilt the mast backwards after lowering. Never attempt to tilt the mast with the load elevated.

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

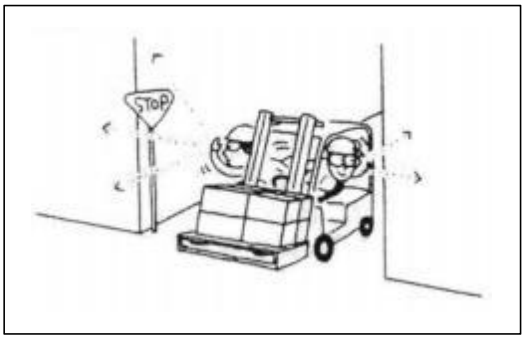


25. Never tilt the mast forward when lifting the loads.

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

– Slow down and press the horn at crossings and other spots where vision is obstructed.

– Turning speed should be limited to 1/3 of the vehicle's maximum speed.



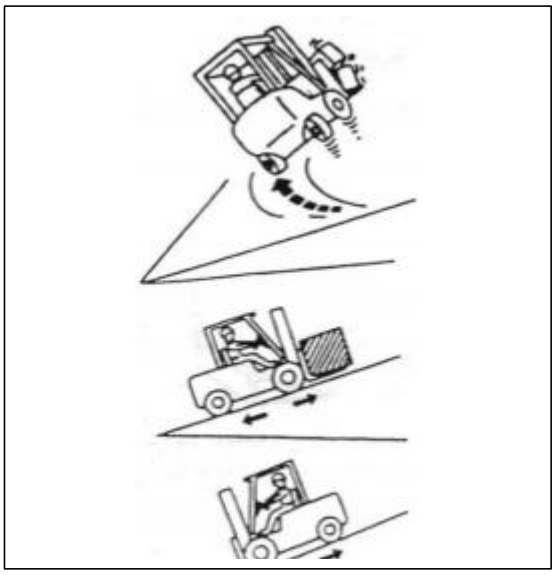
27. Be sure to keep your distance from the roadside or platform edge.

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

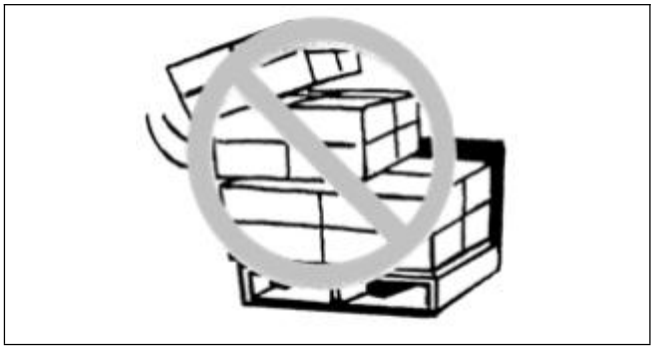
29. When operating a loaded forklift, climb inclines with the front end of the machine pointing uphill.

– When operating an unloaded forklift, descend inclines with the front end of the machine pointing downhill.

– Never turn sideways on an incline to avoid rollover.



30. Do not allow load to move away from the center of the forks. Off-center loads may fall down when turning or driving on uneven surfaces and increase the risk of the tipping over.



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

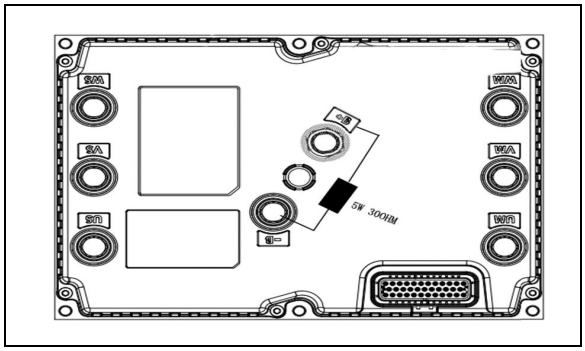
32. Inspect the ground condition which you will drive the forklift. Look for holes, drop-offs, obstacles, protrusions and anything that might cause loss of control or bumps.

– Clear away trash and debris and sharp items that might puncture a tire or unbalance the load.

– Slow down on wet/slippery areas. Do not drive near the edge of the travel path; if unavoidable, be extra cautious.

– Do not use the forklift during sandstorms, snowfall, lightning, heavy rain, typhoons or other harsh weather conditions. Above all, avoid using the forklift where wind speeds are greater than 5 m/s.

33. Controller is equipped with accumulator. Forbid to touch within B+ and B- to prevent from electric shock and injury. Before inspection or cleaning, please connect a load (such as a contactor circuit or horn) between B+ and B- first to discharge the controller's capacitor.



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

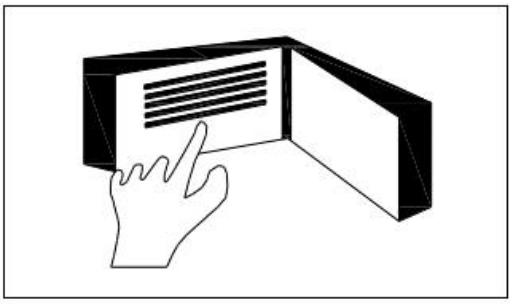
– Lower the forks to the floor and tilt slightly forward. Turn off the key switch and remove the key.

– Disconnect the battery plug.

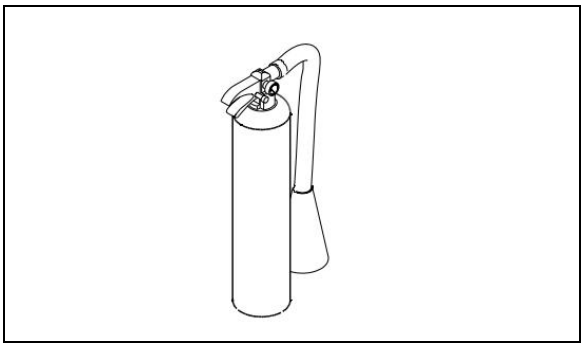
– Park the forklift away from flames and sparks.

35. When the truck is unable to drive, tow the truck to safe location. Do not tow a truck with damaged steering and braking system.

36. Labels and signs on the forklift provide warnings and operating instructions. During operation, the requirements of the manual as well as the labels and signs on the forklift should be followed. Inspect the labels and signs, and replace any that are damaged or missing.



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



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

39. Non-Refrigerator type truck is not allowed to store in the cold storage when power off.

3 Operation and safety regulations to lithium battery forklift truck

1. Contact the manufacturer immediately in case of battery malfunction. Do not open the battery cover for maintenance.
2. Do not reverse charge.
3.Whether charging or discharging, it should be ensured that the battery management system is properly connected and working properly to ensure normal communication of the battery management system.
4. Do not operate the equipment in a location where static electricity and magnetic field is strong. Or it may damage safety protection device, and lead to potential safety hazard.
5. Keep the battery system or battery box away from heat and fire and avoid direct sunlight for a long time. The lithium battery can not be directly baked and heated by hot water, otherwise it will cause explosion. Work in high temperature environment is not allowed.
6. Do not place the battery pack in water or in a high humidity environment to avoid leakage or insulation failure.
7. When working in a low temperature environment, the battery system capacity is slightly reduced, which is a normal phenomenon, and the performance will be recovered after the environmental temperature rises.
8. It is forbidden to modify or disassemble the battery system and battery box without authorization. Non-professionals are not allowed to disassemble to prevent foreign matter from entering the battery pack, and causing burning and explosion.
9. To charge the battery, use the battery charger designed for the lithium battery, do not use other chargers to prevent battery damage.
10. Do not connect the battery with other batteries in series or in parallels.
11. Prevent water and corrosion of diagnostic ports and connectors, etc.
12. Do not mix battery cases with batteries of other types or other manufacturers.
13. It is forbidden to connect the battery box or the positive and negative poles of the battery system directly with metal or other conductors to avoid ignition or short circuit. It is also prohibited to contact and mix the battery pack with items that can cause short circuit.
14. Avoid mechanical damage to the battery box, such as squeezing, puncture, shock, impact, etc.
15. If there is dust, metal particles or other debris on the top cover and pole of the battery pack, use compressed air or dry cloth for cleaning. Do not use water or water-soaked objects for cleaning.
16. Water-based fire extinguishers are installed in the working environment.
17. If the temperature of the battery system rises sharply and the smell is abnormal, stop it immediately and turn off the power. If smoke or fire occurs, stop and turn off the power supply. Use Water-based fire extinguishers to extinguish fire under the condition of ensuring personnel safety.
18. Charge in a well ventilated, dry environment.

19. Charging working temperature: 0°C-45°C; Discharge working temperature: -20°C-55°C; Short-term storage temperature range: -20°C-40°C Long-term storage temperature range: 0°C-25°C Operating humidity range: 5%-80% Storage humidity: <=70%

Daily charging of lithium battery forklift

1. Charge in time when the forklift meter power shows 1-2 bar (that is, 20%-30% remaining).
2. Turn off the forklift switch power supply and press the emergency stop switch.
3. Close the charger input electric master valve to ensure that the emergency stop switch pops up, the charging device automatically turns on, the power indicator light is on, and the display interface starts automatically.
4. When the charging gun is removed, the button must be pressed to remove the charging gun. Check the charging gun to ensure that there is no water or foreign objects in each port, and that the metal terminals are not damaged or affected by rust or corrosion.
5.Open the lithium battery charging cover. Check the lithium battery charging socket to ensure that there is no water or foreign matter in each port, and that the metal terminals are not damaged or affected by rust or corrosion.
6. Insert the charging gun/charging plug into the lithium battery charging socket, the charger will self-test and communicate with the lithium battery. When the entire system is fault free, a few seconds later, the relay inside the charger gathers and start charging, and the charging indicator will light up. At the same time, the meter will display information such as charging voltage, charging current value, charging time and charging fault.
7.When the lithium battery is fully charged, the charging device will automatically stop charging. At this time, the output voltage and output current of the meter are 0A. At this time, press the pause button, then press the charging gun lock/connector and pull out the charging gun/connector at the same time. If the lithium battery needs to stop charging when it is not fully charged, the pause button on the screen should be pressed first. After the charging current drops to 0 A, the charging gun lock/connector can be pressed and pull out the charging gun or plug.
8.Insert the charging gun/connector into the charger's resting position and pull the charger input main valve down and close.
9. Close the lithium battery charging door. Note: Do not plug the discharge plug of the battery into the charging socket, otherwise the forklift has no power.

Daily maintenance of lithium Batteries

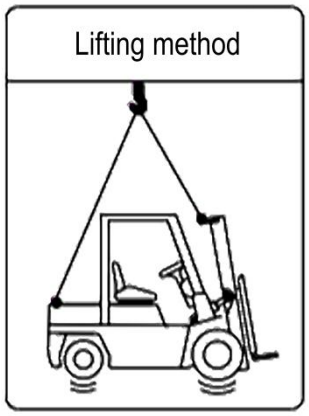
Everyday	1. Check whether the appearance is deformed, whether the surface is oxidized, paint removing, the mounting position is offset, and the cabinet is damaged.
Weekly	1. Clean the lithium battery and charger with a dry cloth or compressed air.
Monthly	1. Check if there is water or foreign matter in the plug and socket and check for rust or charring.
	2. Check the cable for damage and loose joints.
	3. Check the battery case for abnormalities such as cracks, deformation, and bulging.

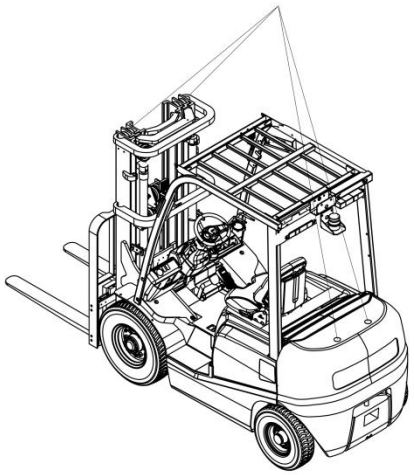
Lithium battery storage	1. The battery is stored in a clean, dry and ventilated indoor environment with an ambient temperature of 20°C ± 5°C and a relative humidity of no more than 75%. It must not be inverted to avoid mechanical shock and heavy pressure.
	2. Charge once a month.
	3. The positive and negative terminals of the battery box are wrapped with high-voltage insulation sleeve or other insulating material to ensure that no metal parts are exposed outside to avoid short circuit. The diagnostic port is free of dust and is covered.

4 Truck Lifting, Carrying and Towing

4.1 Lifting

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





WARNING

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

4.2 Carrying

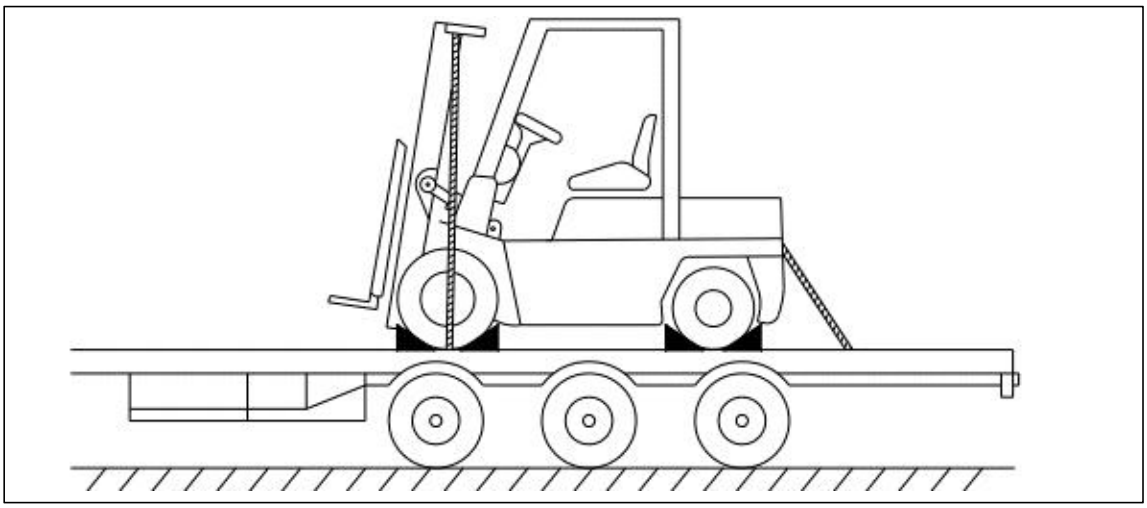
Forklift trucks are generally used for loading, unloading and short-distance transportation. They are not designed to be a long-distance mode of transport. A forklift that needs to be transported over a long distance should be transported in a ship, train or a truck having a load capacity over 5T.

Procedures：

– Park the forklift on the lorry or trailer, and pull up the parking brake.

– Tie the tension belt on the mast upper beam and counterweight, and use clamping device to strain the tension belt.

– Block the front and rear wheel of the forklift with wedge wood.



WARNING

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

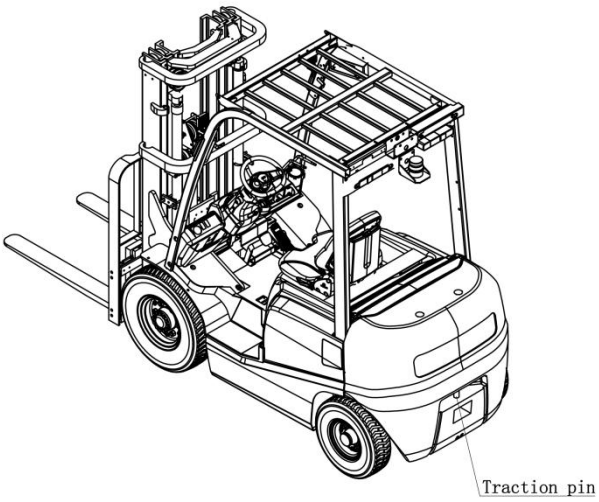
4.3 Towing

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

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

– Forklift malfunctions on the working road and move the truck urgently.

– Use when forklift gets into trouble and cannot drive (wheels get stuck in pits etc.)



Procedures：

– Turn off the key switch and disconnect the power plug.

– Release the hand brake.

– Put the direction lever in neutral.

– Fasten the wire rope for traction.

> ⚠ **WARNING**
>
> - Don’t tie the steel wire ropes on the unfixed position.
> - Don’t carry a load to steel wire ropes suddenly.
> - The truck would be damaged if you tow it with the electric lock working.

5 Lithium battery

5.1 Safety instructions

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

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

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

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

5.2 Installation instructions

5.2.1 Installation requirements

Installation personnel should be on duty with a certificate, wear labor insurance supplies, and pay attention to safety protection. Low voltage must be cut off before system installation. The high-voltage output interface should be protected to prevent the installation personnel from contacting during the installation process. Mechanical hoisting should be used when installing the battery. When moving to the battery into the forklift chassis, the speed should be slow and the position should be correct to prevent the extrusion deformation of the battery box. To avoid reverse connection of negative and positive pole when the battery is connected. In rainy and snowy weather, pay attention to the protection of connectors to prevent rainwater from entering.

5.2.2 Post-installation Inspection

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

5.3 Basic terms for lithium-ion battery

5.3.1. Battery system

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

5.3.2 SOC

Refers to the percentage of the battery.

5.3.3 Nominal voltage

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

5.3.4 Rated capacity

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

5.3.5 Over discharge

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

5.3.6 Overcharging

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

5.3.7 Explosion

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

5.3.8 Fire

Open fire appears in the battery case.

5.3.9 Leakage

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

5.3.10 CAN

CAN BUS communication system

5.3.11 Charge-discharge cycle

A complete process of a lithium battery from charged to discharged and full again

5.3.12 Battery life

The total length of time that a lithium battery can maintain a certain capacity and performance under normal use conditions.

5.4 Instructions for use

5.4.1 Temperature characteristics of batteries

Working Environment Temperature: -25 ° C~55 ° C. Permissible Charging Temperature: 0 ° C ~55 ° C. Permissible Discharge Temperature: -28 ° C ~55 ° C. Storage Environment Temperature: -28°C~55°C.

5.4.2 Pre-delivery inspection

After the truck is power off, confirm that the instrument panel has no alarm information. Check the remaining power before leaving the forklift. It is recommended to charge up to 50%~100% before leaving the forklift. It cannot over discharge the power battery system. Over discharge will cause irreversible permanent damage to lithium-ion power battery.

5.4.3 Charging instructions

When forklift battery SOC less than 20%, please charge in time. Use the specific charger authorized by the manufacturer to charge. If there is a fault alarm during charging, the power battery system and charger will stop charging, and the charger will show the fault. Charging environment should be dry and ventilated without flammable and explosive materials. Forklift should be fully charged once a week.

5.4.4 Long-term parking storage

Before parking, it is necessary to confirm the battery power of the forklift: 50%-70%. Maintenance is recommended to be done in every three months. The battery is fully charged, and then discharged to 50%~70% before parking. If The forklift has been parked for more than three months, and if there is any error code alarms before reusing, please contact the vehicle manufacturer for maintenance. Forklift parking environment should be kept as dry and ventilated as possible, away from heat sources.

5.5 Maintenance

5.5.1 Outside appearance of inspection box

Check whether there are any debris, obvious deformation, rust and other abnormal conditions in the battery system outer box.

5.5.2 National Standard Charging Port

When the power is off, check whether there are any abnormal conditions such as debris and rust in the plug in surface.

5.5.3 Plug-in

When the power is off, check whether the connector is loose or damaged.

5.5.4 Parameter Detection

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

5.6 Emergency plan

5.6.1 Scenarios, extreme anomalies

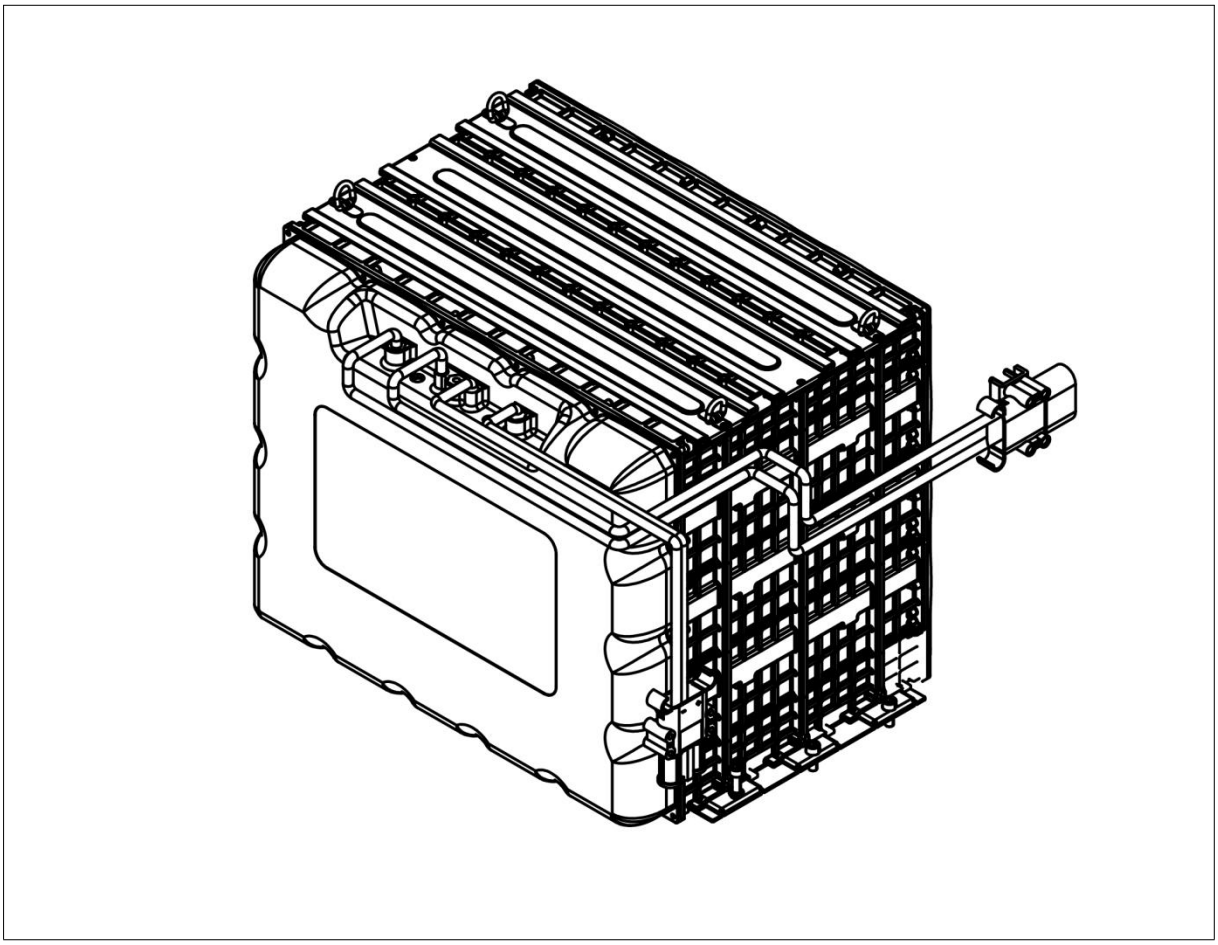
Users should establish a good sense of security in the use process, strictly prohibit illegal operation, avoid battery system abuse (overcharge, over discharge, short circuit, extrusion, puncture, environmental overheating, high current discharge, etc.). In the process of charging and using, the abnormalities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

5.6.2 Emergency plan

- Personnel leave the forklift quickly and dial the alarm phone according to the situation on the spot.
- To ensure personal safety, the following operations are carried out conditionally:
- a. Use carbon dioxide or dry powder fire extinguishers if the battery harness smokes and ignites.
- b. If the battery is on fire, use a high-pressure water gun to extinguish the fire at a long distance.
- c. If smoke is inhaled carelessly, please transfer it to the doctor as soon as possible.
- Contact forklift dealers or manufacturers to obtain professional treatment advice.

5.7 Size and Weight

Item		80V205Ah/ 80V230Ah	80V410Ah/ 80V460Ah
Length (L)	mm	657.5kg	847.5kg
Width (W)	mm	496.6kg	510kg
High (H)	mm	281kg	408kg



5.8 Lithium battery instructions

5.8.1 Safety Instructions

In order to protect your personal safety, please be sure to read and comply with the following safety instructions:

Do not touch the live device

Do not touch the positive and negative terminals of the battery with both hands at anytime.

No flushing

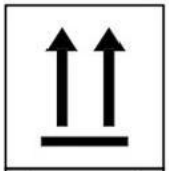
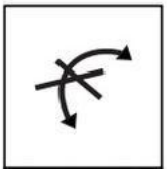
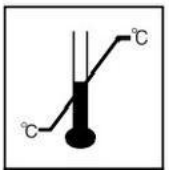
While cleaning the vehicle, prevent high-voltage components from contact with water to avoid adverse consequences.

No metal or watch

Always wear insulated gloves when operating and maintaining the battery system, and do not wear metal jewelry such as watches.

Inflammable and explosive

Keep the battery system away from highly corrosive and flammable environments and away from sources of ignition when in operation.

					
Handle with care	Up	Keep away form radioactive and heat sources	Keep dry	No rolling	Humidity limit

5.8.2 Emergency Response Plan

Scenarios and extreme abnormalities

Please pay attention to the safety precautions and use it strictly according to the instructions in the instruction manual to avoid the occurrence of the abuse of the battery packsystem (overcharging, over-discharging, short-circuiting, extrusion, puncture, overheating of the environment,high-current discharging and so on)during the process of your use. In the process of charging and using, the power battery system may have the following abnormal conditions:

- Sharp temperature rise of the battery system or part of the batter system.
- Abnormal odor from any part of the battery system.
- Smoke or fire of any part of the battery system.

If any of the above abnormal conditions occurs,dispose of it as follows：

Step 1

Quickly leave the vehicle and call the emergency line as appropriate to the scene.

Step 2

Under the condition of ensuring the safety of the personnel,if the condition permits, please perform the following operations:

- If only the external wiring harness of the battery is smoldering and there is no other abnormality, you can use carbon dioxide or dry powder fire extinguisher to spray the battery.
- If the battery catches fire, use a high-pressure water hose to extinguish the fire from a distance.
- If anyone has been exposed to smoke inhalation, please seek medical attention as soon as possible.

Step 3

Contact the vehicle distributor for professional advice.

Tips:

If the fire is caused by charging abnormality, please make sure to cut off the power at the first time and call the emergency line in time, and then carry out the next fire extinguishing action.

5.8.3 Installation Instructions

Installation requirement

■

Installers need to be licensed to work,wear labor protection equipment, and pay attention to safety protection.

■

Low voltage must be disconnected(control system disconnected)prior to battery system installation.

■

To prevent accidental contact with personnel during installation, please protect the output connector of the battery system before proceeding with the work.

■

The battery system should be installed by mechanical lifting, and should be moved to the battery system compartment at a slow speed to avoid extrusion and rupture of the electrical box and external cables.

■

Avoid reversed positive and negative terminals, short circuits, etc.when connecting the battery system.

■

In rainy or snowy weather, take care to protect the connector from rain water.

Check after installation

■

After the system is installed,check the battery system's locating pins,fixing bolts, etc.to confirm compliance with the installation requirements.

■

Check the connections at low voltage connectors,meter box inserts,etc.to ensure that the connections are correct,secure and in place.

■

Check the connection of the high voltage positive and negative cables to ensure that they are correctly and securely connected and in place.

■

Turn the key switch to ON or press the power switch of the instrument box,the relay should be able to absorb normally and there is no battery alarm.If there is a fault alarm,you need to cut off the power immediately and notify our after-sales service department to solve the problem.

5.8.4 Operating Instructions

Battery temperature characteristics

■

Permissible discharge ambient temperature: -20°C to 45°C.

■

Permissible recharge ambient temperature: 0°C to 45°C.

■

Storage ambient temperature: -20°C to 45°C.

Inspection before use

■

First time use of the vehicle, need to charge to 100% before use.

■

After turning on the power, make sure that there is no battery system alarm message on the instrument panel or no abnormal buzzer warning.

■

Before using the vehicle again, check the remaining battery power, and it is recommended to use it when the SOC is between 50% and 100%

■

When SOC is below 20%, it is not recommended for further use, please recharge as soon as possible.

Long-term storage

■

Before long-term storage, make sure that the battery system is not less than 50% and not more than 80% charged.

■

Conduct charge maintenance every three months.

■

If stored for more than three months, please check whether there is any fault alarm in the power battery system before using it again, if so, please contact our after-sales service department for maintenance.

■

Keep the storage environment as dry and ventilated as possible and keep it away from heat sources, please protect it from rainy weather and avoid open air storage.

5.8.5 Charging Instructions

Step 1: Charge

- Park the forklift in a regular manner in the charging area and turn off the vehicle key switch
- Check battery charging plug-in and charger plug-in for foreign objects.
- Check whether the charger works properly.

Step 2: Start to charge

- Correctly connect the charger plug-in to the battery system charging plug-in in place.
- Observe charging connection and display status on the charger display.
- Wait for about 15 seconds to confirm that the charging current is normal and charging starts.

Step 3: End of charging

- Press the stop button of the charger.
- After confirming that the charging current of the charger is displayed as "0"A, correctly unplug the charging plug of the charger.
- Close the protective cover of the battery charging port and standardize the placement of the charger charging plug-in.

Tips:
Please use our recommended charger brands.

5.8.6 Charging Precautions

■

Turn off the key switch of the vehicle before charging.

■

Choose a safe environment for charging (avoid environments with liquids, sources of ignition, etc.)

■

Charging equipment should be surrounded by the necessary safety fire extinguishers to allow for emergency fire extinguishing in the event of an extreme situation.

■

Before charging, make sure the charging plug-in is free of dust,water and other foreign matter, if there is any foreign matter, please clean it up before charging, otherwise it will cause heat or even fire due to poor contact of the charging plug-in.

■

Do not modify or disassemble the charging plug-in and charging equipment, as this will cause charging malfunctions and may lead to fire!

■

After charging, do not disconnect the charging device with wet hands or by standing in the water, as this may cause electric shock and personal injuries.

■

If you need to end the charging in advance during the charging process, please press the stop button first, and disconnect the charging plug-in only when the current drops to "0"A. Otherwise, cutting off with load will cause damage to the relay and burns on the plug-in terminals.

■

Check the exterior: look for debris, obvious deformation, rust, corrosion and other abnormalities in the battery system.

■

When the battery power is lower than 15%, it should be charged in time, and over-discharge of the battery is strictly prohibited(it is recommended to charge the battery when the power is as low as 20%.

■

Batteries should be recharged in time after use, and a full charge should be done at least once every half a month.

■

For use at low temperatures, fully recharge the battery immediately after use.

5.8.7 Charging Precautions II

To avoid damage to the charging equipment, please note the following.

■

Do not pull or twist the charging cable.

■

Do not subject charging equipment to impact.

■

Do not use the charging device at temperatures above 45 degrees Celsius.

■

Prohibit direct plugging and unplugging the charging plug-in when the charging equipment has current output to avoid arcing.

■

Do not keep the charger near heaters or other heat sources.

■

Observe other safety precautions that are not mentioned in this manual.

5.8.8 Periodic Maintenance

Maintenance contents

■

Check the exterior: look for debris, obvious deformation, rust, corrosion and other abnormalities in the battery system.

■

Charging port: Under the power-off state, check the port for debris, rust and other abnormalities.

■

Connector: Under the power-off state, check the connector for looseness, breakage and other abnormalitie.

■

Parameter check: Before charging and discharging, check the battery voltage, temperature, etc. on the display to ensure that all values are in the normal range 6months/1000 working hours.

■

Unpacking Inspection: Check the fixed status of each module and the connection status of each cable to ensure that the bolt tightening torque is normal, and that the connecting parts are not loosened or shaken.

Tips:

If you find abnormalities in daily maintenance, please contact our after- sales service department to deal with, strictly prohibit private operation with unauthorized disassembly or repair.

Maintenance after every 6 months/1000 working hours shall be carried out by qualified personnel or authorized personnel of the battery manufacturer.

5.8.9 General Fault Diagnosis

Fault	Possible Cause	Solution
The vehicle is not powered up	The emergency stop button is pressed	Recoverable by rotating the emergency stop
	The discharge connector is loose or not inserted correctly	Install the connector in place
	The key switch is damaged	Replace the key switch
Can not charge	Physical connection is not completed or the charger is not connected to the power supply	Check physical connections and power up the charger
	The power battery is fully charged	When the power battery is fully charged, charging will be automatically stopped.
	The power battery temperature is below 0°C or above 55°C.	Allow the battery to heat up or cool down before charging, place the battery in a suitable temperature environment, and charge it when the temperature is normalized.
	Charger or vehicle display malfunction	Make sure that the power battery system fault light on the instrument of the vehicle is on, or there is a charging system fault message, or the charger shows that there is a fault, then stop charging, and it is recommended that you contact an authorized professional for repairs.

Tips:

If you find unmanageable problems on site, please contact our after- sales service department in time, it is strictly prohibited to operate privately.

6 Instructions

6.1 Running-in of the new truck

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

– Must prevent the new battery from over discharging when early used. Usually should recharge when discharging down to 20%.

– Perform specified preventive maintenance services carefully and completely.

– Avoid sudden stop, starts or turns.

– Oil changes and lubrication are recommended to do earlier than specified.

– Limited load is 70%~80% of the rated load.

6.2 Check and adjust before operation

For the safe operation of forklift, do relevant check and adjustment to the forklift before operation.

> ⚠**WARNING**
> If there is damage or potential risk on forklift or attachment after check, then do not operate the forklift before repairing.
>
> Except checking lamps and operating performance, before checking electrical system, turn off the key switch and take out the battery plug.

– Visual check the forklift, pay attention to the wheel, wheel bolt and load part, if damage or looseness.

– Visual check and touch the drive axle, hydraulic system, brake system and battery, if leak or damage.

– Check tire pressure: check if the tire pressure in the specified value (front tire 0.9 MPa/rear tire 0.8 MPa) with barometer.

– Check if battery box locked.

– Check if the function of driver seat is normal, and adjust the seat position according to driver's need.

– Adjust the position of handrail control device according to driver's need.

– Check if the safety belt functions normally: safety belt must be locked when pulling out rapidly.

– Adjust the inclination of steering column.

– Adjust the rear-view mirror vision.

– Check if the lifting chain's tension is even.

– Check the function of operation and display element.

– Check if instrument displays normally.

– Check seat switch function: when driver does not sit correctly, instrument displayed seat switch indicator light lights up, meanwhile hydraulic function cannot be operated.

– Check steering system function.

– Check if braking pedal functions normally.

– Check accelerator pedal: step the accelerator pedal, as the change of stroke, accelerated speed strength is distinct, and return well.

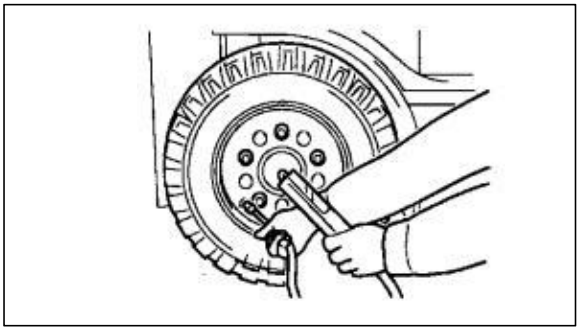
– Check steering angle display: rotate the steering wheel to two directions in place, and check if the instrument displays the wheel position.

– Check if the hydraulic function of lifting, tilting and attachment is normal.

– Check if the function of lamp, horn, back-up buzzer is normal.

Check tire pressure (Pneumatic tire only)

Turn tire valve cap counter clock-wise and remove it. Using a tire pressure gauge, measure the inflation pressure, and adjust it to the specified pressure, if needed.After confirming leakage free, screw the nut cap, check if the ground surface or side of the tire damaged, and rim transformed.



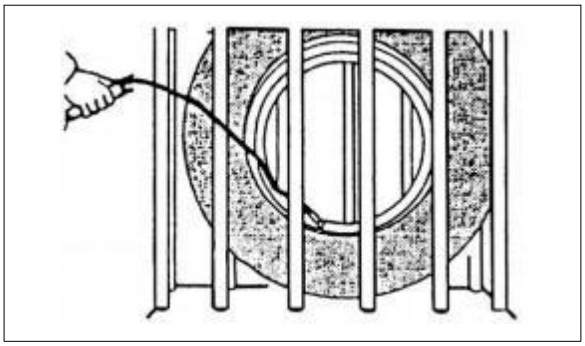
WARNING

- Since the forklift truck needs tires that have a high inflation pressure to carry heavy loads, even a small bending of rims or damage a the tread surface could cause an accident.
- When using an air compressor, first adjust the air pressure of the compressor. Failure to do so will cause a serious accident, since the compressor delivers the maximum pressure.

Tire regulated pressure (Adopt new standard GB/T2982-2001)

Model	Front tire	Rear tire
2.0t~3.5t	0.9 MPa	0.8 MPa

Note: the above is pneumatic tire pressure, not used to solid tire.

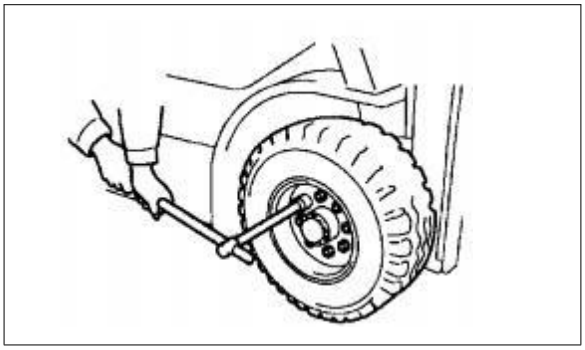


WARNING

- After assembling tires and rims, all the bolts and nuts should be fastened to specified torque valve, then inflate the tires. Tires have expanding power after inflation, and the tire pressure should not exceed specified value.
- To ensure safety, you should place the Tires in a protective frame or tie the tires with chain when inflation.

Check wheel fixation

Check if the tightening torque of front/rear wheel nut meets requirement.



Procedures：

– Park the truck.

– Screw down wheel retaining nut with spanner crosswise, tightening torque refers to the following table.

Model	Front-wheel nut (Nm)	Rear-wheel nut (Nm)
1.5t~1.8t	157-176	76-107
2.0t~5.0t	441-588	157-176

Brake pedal check

Procedures：

– Depress the brake pedal and check that it moves freely without jamming.

– The correct braking distance without a load is 2.5 meters.

– Adjust pedal height: regulate the limit bolt so that the midpoint of the upper face of the pedal pad is 115mm -125mm from the front base plate.

– Adjust the length of the push rod of the brake master cylinder so that the pedal free play is 1mm–3mm.

– The brake light switch should turn on fully when the brake pedal is gradually depressed 10mm–20mm.

Hand brake lever check

The operating force is regulated by means of an adjusting screw on the rod tip. Turn clockwise to increase the operating force; turn anti-clockwise to reduce it.

Make sure that after pulled tight and released, the hand brake lever returns to its original position effectively.

CAUTION

- Depressing the brake pedal helps to
- tighten or loosen the hand brake..

Brake fluid check

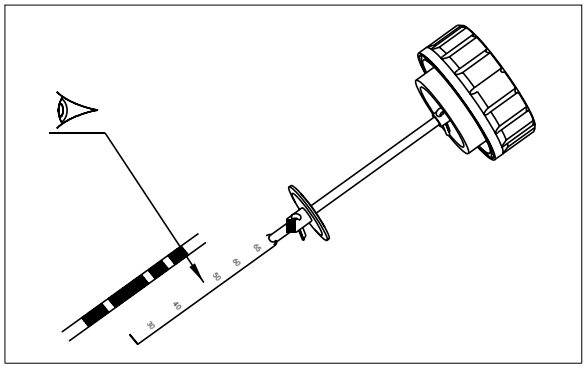
Open the cap of the brake fluid cup and check whether the brake fluid level is between the scale marks. Top up if necessary. Also check for air trapped in the brake line.

CAUTION

- Use pure-grade brake fluid. Do not mix different grades of brake fluid.
- Do not spill brake fluid on painted surfaces, otherwise it will damage the paint.
- When adding brake fluid, avoid getting dust and water in the reservoir.

Hydraulic oil check

Open the rear baseboard, unscrew the hydraulic oil filler cap on the rear rightside, pull out the dipstick and check whether the oil is between the marks. Add if necessary.



Different mast lifting height corresponded dipstick level：

—30 means liquid level for mast with 3M lifting height or below;

—40 means liquid level for mast with 4M lifting height or below;

—50 means liquid level for mast with 5M lifting height or below;

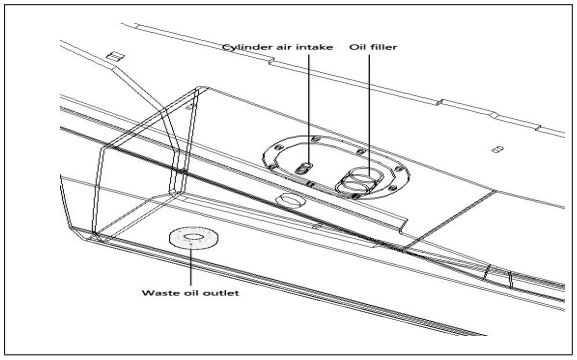
—60 means liquid level for mast with 6M lifting height or below;

—65 means liquid level for mast with 6.5M lifting height or below.

Battery check

Check that the lock pin is securely inserted and the battery is firmly fixed.

Check where the wiring of both terminals is loose or damaged. Adjust or replace the wiring if necessary.



Mast and fork check

– Forks are not cracked or bent, and that they are firmly and correctly installed in the fork carriage;

– Check the oil cylinder and pipeline for leakage;

– Check that the rollers turn condition;

– Check the mast for cracks and deformation;

– Operate the lifting, tilting and attachment levers, check if the mast operates normally and no noise.

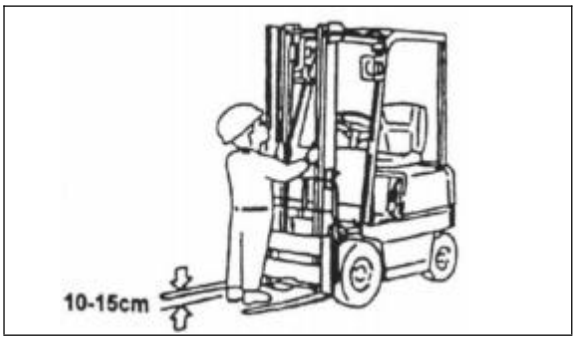
Chain tension check

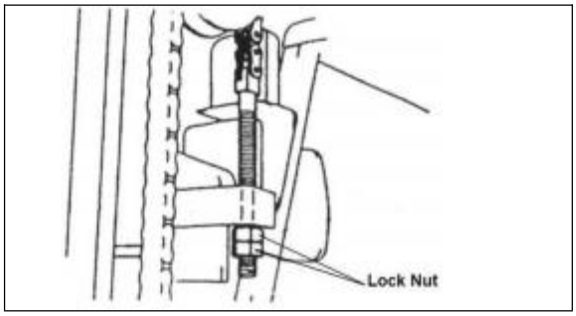
– Raise the forks to a height of

10 cm– 15cm with the mast vertical.

– Press the middle section of the chain with your thumb to check whether the tension between the left and right chains is identical.

– Tension adjustment: loose the lock nut and turn the adjuster nut to adjust the chains so that they both have the same tension, then tighten the lock nut.





6.3 Driving truck

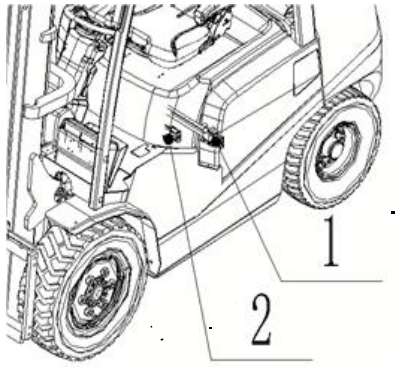
Driving and Operation

WARNING

- Before operating the truck, check all controls and warning devices for proper operation. If any damage or fault is found, don't operate truck until corrected.

Driving

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



- Release the emergency stop switch. Rotate a certain angle clockwise and the emergency stop switch button automatically pops up.
- Set the direction switch to neutral position .
- Turn on key switch .
- The truck enters the self-test procedure for 3 to 4 seconds, and the available battery level is displayed in the display after the self-test is completed.

CAUTION

The forklift will automatically enter the self -test program (about 3 to 4 seconds). The display shows the welcome screen, and all indicators are lit. During this time the forklift could not drive and lift. If the direction switch or accelerator pedal or hoist switch is operated during this time, a fault message will appear in the display and the fault indicator will illuminate.

- Hold the steering wheel with left hand and turn on the key switch with right hand.
- Tilt back the mast.
- Control the lifting lever to set the bottom of the fork 150mm-200mmabove the ground. Control the tilting lever to fully tilt back the mast.
- Control direction lever.
- Forward: Push the direction lever backward.
- Backward: Pull the direction lever backward.
- Loosen the hand brake lever.
- Step the brake pedal and push the hand brake lever to the front position.
- Hold the steering wheel with your left hand and attach your right hand.

Traveling

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

Decrease speed

Loosen the accelerate pedal slowly,the truck will decelerate.

CAUTION

Decelerate the truck in the situations following:

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

WARNING

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

Turning

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

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

CAUTION

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

Stopping or parking

– Slow down and press the brake pedal to stop the truck.

– Place the shift lever in neutral.

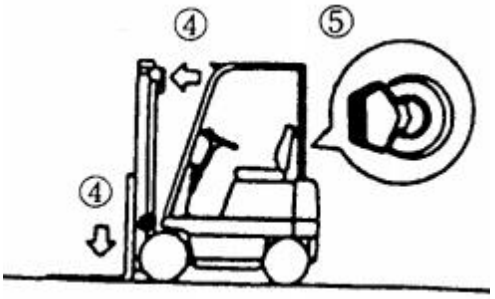
– Pull up the parking brake lever.

– Down the forks on the ground, tilt mast forwards fully.

– Place the key switch in —OFF to shut off the battery. Remove the key and keep it.

CAUTION

- Don't dismount from the moving truck. Never jump from the truck.
- Don't parking the truck on the working road.



Loading

– The forks should be adjusted properly to maintain the balance of load.

– Place the truck right in front of the load to be handled.

– The pallet should be evenly positioned across both forks.

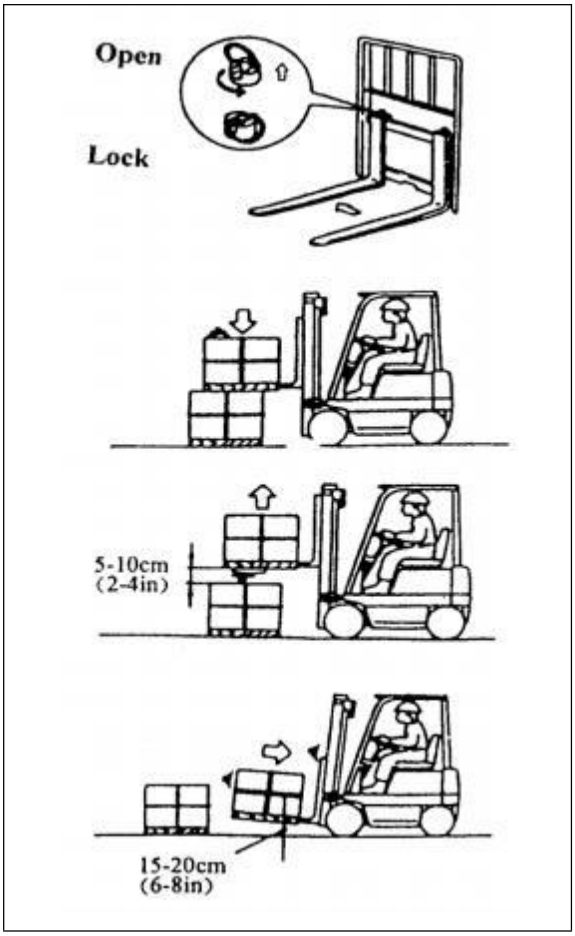
– Insert forks into the pallet as far as possible.

– To raise loads from the ground：

– Firstly, lift the forks 5cm to 10cm off the ground or floor and make sure loads lay stably.

– Then tilt the mast backwards fully and lift forks up to 15cm to 20 cm off ground then start running.

– When handling bulky loads which restrict your vision, operate the truck in reverse except when climbing grades.



Stacking load

– When approaching the designated area, slow down your truck.

– Stop the truck right 30cm far away from the position where your load is to be deposited.

– Check the condition of the deposit area.

– Tilt the mast forward until forks become to horizontal. Raise forks until they are a little higher than the deposit position.

– Move forward to place the load directly over the desired area and stop the truck.

– Make sure your load is just over the desired area. Slowly lower the load into position. Make sure the load is securely stacked.

– Do necessary lift-tilt operations and then back away to make the forks leave loads.

– After making sure the forks leave the load, lower the forks to the basic position (15cm to 20cm off the ground).

– Tilt the mast backwards.

CAUTION

Decelerate the truck in the situations following:

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

WARNING

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

Un-stacking load

– When approaching the area where the load is to be retrieved, slow down your truck.

– Stop the truck 30 cm far from the load.

– Check the condition of the load.

– Tilt the mast forward until forks become horizontal. Elevate forks up to the position of the pallet.

– Make sure forks are positioned properly to the pallet. Move forward slowly to insert forks into the pallet as far as possible.

CAUTION

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

– Raise the forks 5cm to 10cm off the stack

– Check all around the truck to insure that the path of travel is unobstructed and back away slowly.

– Lower forks to a height of 15cm to 20cm above the ground. Tilt the mast backward fully and move to the desired area.

Check after operation

Clean and check the truck after operation:

– Damage or leakage.

– Add grease if necessarily.

– Check the tire if it is damaged or inset with foreign body.

– Check the wheel hub nut if it is loose.

– Check the height of electrolyte surface.

– If you haven't lift the fork to the max. height in the day, you should lift it to the max. height 2~3 times.

CAUTION

- If you find any trouble, must repair it in time.
- Prohibit operate the forklift before repairing it completely.

7 Maintenance

Serious and complete maintenance can keep the forklift in good work condition, not only guarantee the forklift safety, but also your work and life safety.

7.1 Maintenance summary

– The forklift must be regularly checked and maintained to keep it in good working order.

– Inspection and maintenance are often easily overlooked. Early detection enables problems to be settled in a timely manner.

– Use original manufacturer spare parts.

– Do not use different types of oil when changing or topping up oil.

– Waste oil and battery fluid must not be poured away indiscriminately, but recycled or disposed of in accordance with local environmental laws and regulations.

– Establish and follow a comprehensive maintenance and service schedule.

– Maintain current and complete records of all maintenance and servicing activities.

– Untrained personnel must not attempt to carry out forklift repairs.

– Truck modification by user, which can introduce hazards or risk not considered by manufacturers, will invalidate the existing truck risk assessments.

Truck modification outside Europe is subject to regional requirements (see ISO/TS 3691-8)

CAUTION

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

Approximate Weight of counterweight

Tonnage	2.0t	2.5 t	3.0 t	3.5 t
FB Series	1.03t	1.445t	1.821t	2.196t
FBP Series	1.73t	2.03t	2.53t	3.01t

7.2 Periodic maintenance schedule

○ —check, correct, adjust ×— replace D—Daily; W—Weekly; M—Monthly; T—Trimonthly; S—Semiannually; Y—Yearly

Lithium battery

Item	Service required	Tool	D (8 h)	W (40 h)	M (166 h)	T (500 h)	S (1000h)
Battery	Lithium battery installation and fastening		○	○	○	○	○
	Lithium battery charging socket cleaning				○	○	○
	Lithium battery charging socket contacts are damaged or rusted		○	○	○	○	○
	Lithium battery charging socket contacts have water, clear		○	○	○	○	○
	Lithium battery charging socket dust cover is intact				○	○	○
	Is the lithium battery case damaged		○	○	○	○	○
	Battery power		○	○	○	○	○
	Keep away from flames		○	○	○	○	○

Controller

Item	Service required	Tool	D (8 h)	W (40 h)	M (166 h)	T (500 h)	S (1000h)
Controller	Check condition of contacts					○	○
	Check mechanical movement of contactors					○	○
	Check pedal micro switches are functioning properly					○	○
	Check condition of connections between motor, battery and power unit					○	○
	Check controller faults to determine whether system is functioning properly						2 years for first time

Motor

Item	Service required	Tool	D (8 h)	W (40 h)	M (166 h)	T (500 h)	S (1000h)
Motor	Clear foreign bodies on motor housing				○	○	○
	Clean or replace bearings						○
	Wiring correct and secure				○	○	○

electrical system

Item	Service required	Tool	D (8 h)	W (40 h)	M (166 h)	T (500 h)	S (1000h)
Emergency power off button	Work and installation			○	○	○	○
Seat sensing system	Work and installation			○	○	○	○
Rocker switch	Rear headlights						
Reversing switch	Work and installation			○	○	○	○
Combination Switch (steering, lighting)	Left and steering operation right switch			○	○	○	○
	Light stalls and work conditions			○	○	○	○
horn	Work and installation		○	○	○	○	○
Lights and light bulb	Work and installation		○	○	○	○	○
Reversing buzzer	Work and installation		○	○	○	○	○
Meter	Instrument working situation		○	○	○	○	○
Wire	Harness damage, fixed looseness			○	○	○	○
	Loose circuit connection				○	○	○

Body system

Item	Service required	Tool	D (8 h)	W (40 h)	M (166 h)	T (500 h)	S (1000h)
Frame and side door	Is the frame cracked				○	○	○
	Is the right door lock assembly working well		○	○	○	○	○
	Is the right door open				○	○	○
	Protective rod fastening		○	○	○	○	○
	Is the roller under the lithium battery		○	○	○	○	○
Safeguard And Shelf	Is the installation firm	Testing hammer	○	○	○	○	○
	Check for deformation, cracking, damage		○	○	○	○	○

Transmission system

Item	Service required	Tool	D (8 h)	W (40 h)	M (166 h)	T (500 h)	S (1000h)
Drive axle assembly	For abnormal noise		○	○	○	○	○
	Check Leakage for		○	○	○	○	○
	Change oil					For the first 3 months, every 6 months thereafter	
	Check for hub bearing looseness and noise			○	○	○	○
	Check axle deformation, crack or damage				○	○	○

Wheels (Front, Rear Wheels)

Item	Service required	Tool	D (8 h)	W (40 h)	M (166 h)	T (500 h)	S (1000h)
Tires	Inflation pressure	Barometer	○	○	○	○	○
	Wear, cracks or damage		○	○	○	○	○
	Check for nails, stones or other foreign objects in the tread				○	○	○
	Check for damaged rims		○	○	○	○	○
	Split type rim bolt looseness	Test hammer	○	○	○	○	○

Steering System

Item	Service required	Tool	D (8 h)	W (40 h)	M (166 h)	T (500 h)	S (1000h)
Steering wheel	Check play		○	○	○	○	○
	Check axial looseness		○	○	○	○	○
	Check radial looseness		○	○	○	○	○
	Check operation		○	○	○	○	○
Steering gear	Check for loose mounting bolts				○	○	○
Rear wheel knuckle	Check king pin for looseness or damage				○	○	○
	Check for deflection, deformation ,cracks or damage				○	○	○
	Check for installation	Test hammer			○	○	○
Steering cylinder	Check for operation		○	○	○	○	○
	Check for leakage		○	○	○	○	○
	Check for looseness when mounting and hinging.				○	○	○

Braking system

Item	Service required	Tool	D (8 h)	W (40 h)	M (166 h)	T (500 h)	S (1000h)
Brake pedal	Free play	Ruler	○	○	○	○	○
	Pedal stroke		○	○	○	○	○
	Operation		○	○	○	○	○
	Check for air in brake lines		○	○	○	○	○
Hand brake operation	Check braking is safe and reliable, stroke is sufficient		○	○	○	○	○
	Operating performance		○	○	○	○	○
Rods, cables, etc.	Operating performance				○	○	○
	Loose connections				○	○	○
	Gear box connector wear					○	○
Pipelines	Damage, leakage, rupture				○	○	○
	Connection, clamping parts, looseness				○	○	○
Master brake cylinder	Leakage		○	○	○	○	○
	Check oil level, change oil		○	○	○		×
	Master cylinder, wheel cylinder action					○	○
	Master cylinder, wheel cylinder leakage and damage					○	○
	Inspect master and wheel cylinder piston cups and check-valves for wear and damage, replace						×

Hydraulic system

Item	Service required	Tool	D (8 h)	W (40 h)	M (166 h)	T (500 h)	S (1000h)
Hydraulic oil reservoir	Check oil level,change oil		○	○	○	○	×
	Clean oil filter						○
	Clear foreign bodies						○
Control valve linkage	Loose connections		○	○	○	○	○
	Operation		○	○	○	○	○
Multi-way valve	Leakage		○	○	○	○	○
	Operation of safety valve and self-locking tilt valve				○	○	○
	Measure safety valve pressure	Oil pressure gauge					○
Line connectors	Leaks, looseness, rupture, deformation, damage				○	○	○
	Replace pipes						× 1-2 years
Hydraulic pump	Check pump for leaks and noise		○	○	○	○	○
	Check wear of drive gear pump				○	○	○

Lifting system

Item	Service required	Tool	D (8 h)	W (40 h)	M (166 h)	T (500 h)	S (1000h)
Chain sprocket	Check chain tension, check for deformation, damage and corrosion		○	○	○	○	○
	Lubricate chain				○	○	○
	Riveting pins and looseness				○	○	○
	Sprocket deformation and damage				○	○	○
	Looseness of sprocket bearings				○	○	○
Attachments	Check chain tension, check for deformation, damage and corrosion				○	○	○
Lift and tilt cylinders	Piston rod and piston rod threading, loose connections, deformation, damage	Testing hammer	○	○	○	○	○
	Operation		○	○	○	○	○
	Leakage		○	○	○	○	○
	Wear pins and damage of and cylinder				○	○	○
Forks	Fork damage, deformation, wear				○	○	○
	Damage and wear of fork stoppers					○	○
	Cracking and wear of welded part of fork heel coupling				○	○	○
Roof guard and shelf	Is the installation firm	Testing hammer	○	○	○	○	○
	Check for deformation, cracking, damage		○	○	○	○	○
Mast and fork carriage	Cracking and damage of welding on inner mast, outer mast and crossbars				○	○	○
	Wear, cracking and damage of welding on tilt cylinder brackets and mast				○	○	○

	Wear, cracking or dam- age of welding on inner and outer masts				○	○	○
	Wear, cracking and damage of welding on fork carriage				○	○	○
	Loose roller bearings				○	○	○
	Wear and damage of mast support bearing bushes						○
	Looseness of mast support cover bolts	Testing hammer			○ (first time only)		○
	Looseness of lift Cylinder piston bolts and Plate rod head bolts	Testing hammer			○ (first time only)		○
	Cracking and damage of welding on inner mast, outer mast and crossbars				○	○	○

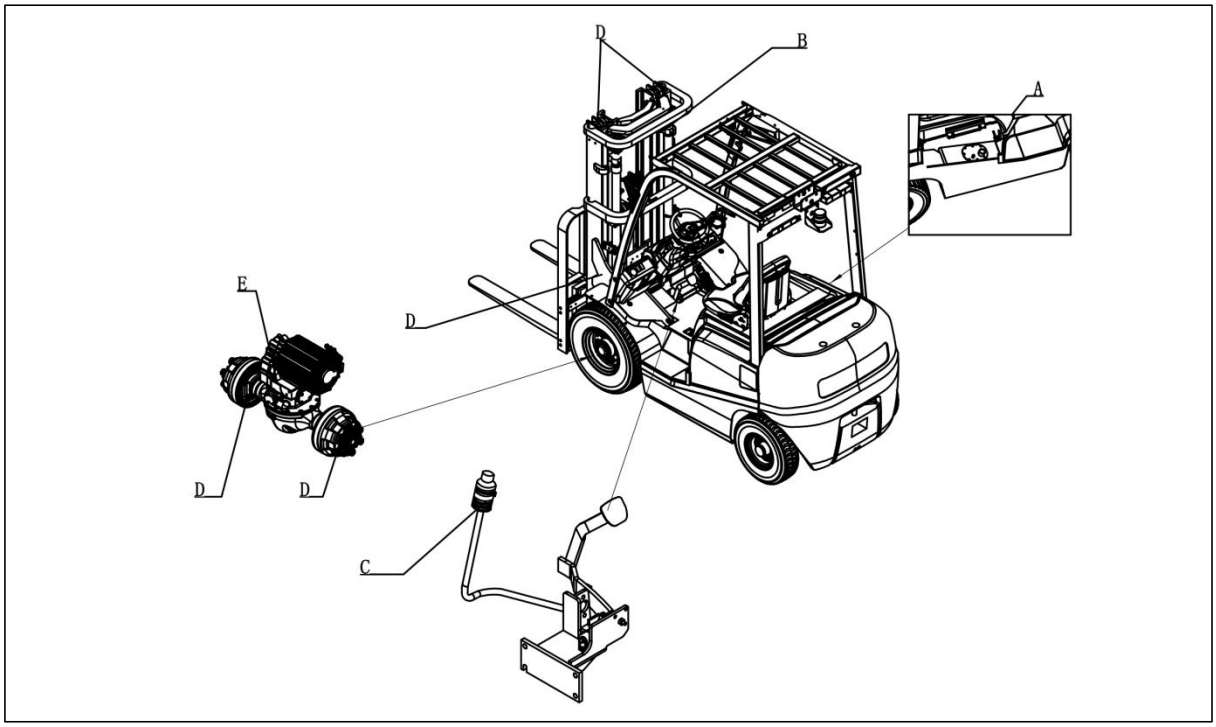
7.3 Periodic replacement of safety-critical parts

– Some parts are difficult to inspect during periodic maintenance. Therefore, in order to further improve safety, users should carry out periodic replacement of the parts listed in the following table.

– If any of these parts are found to be damaged or faulty before they are due for replacement, they should be replaced immediately.

Name of safety-critical part	**Useful life (years)**
Brake hose or rigid pipe	1～2
Lifting system hydraulic hoses	1～2
Lifting chain	2～4
Hydraulic system high-pressure hoses	2
Brake fluid cup	2～4
Brake master cylinder cover and dust boot	1
Hydraulic system inner seals and rubber parts	2
Rubber pad for steering axle	4

7.4 Forklift used oil and lubrication



Code	Description	Specification	Fuel charge (L)	Remark
A	Hydraulic oil	Common environment：L-HM32 Refrigerator/cold environment：L-HV32	35~65	Hydraulic oil tank
B	Anti-rust grease	Chain spray		Chain
C	Brake fluid	Choice HZY3 brake fluid (Add before delivery) or DOT3 brake fluid	≈1.0	Braking oiler
D	Lubricating grease	General purpose lithium lubricating grease for automobile		Lubricating surface or lubricating nozzle
E	Gear oil	85W/90 (GL-5)	≈4-8	Drive axle and Gearbox
	Industrial Vaseline	2#		Battery terminal

Replace hydraulic oil

Hydraulic oil should be changed every half year

Procedures：

– Park the truck on level ground

– Tilt the mast backward to the end and drop the forks on the ground;

– Remove the rubber pad from baseboard.

– Remove rear baseboard.

– Screw off the oil filler cap of the fuel tank, and take out the dipstick.

– Put one container under the truck frame, remove oil plug and sealing gasket, and drain oil;

– Take away the container, dispose waste oil according to local environmental law, and do not dump at will;

– Screw back the drain plug and sealing gasket, add new hydraulic oil and check for leakage;

– Start forklift, raise forks for 3-5 times, and tilt the mast forward or backward for 3-5 times;

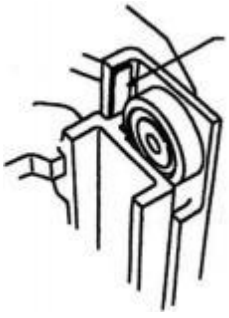
Add oil to specified scale.

Mast lubrication

Apply grease to the inside and outside of the mast track regularly according to the periodic maintenance and lubrication table.

In heavy or severe operating conditions, adjust lubrication intervals accordingly. During busy months, increase the number of lubricated parts.

Depending on the operation of the forklift, coat the lift guide wheel and the contact surfaces on the inner and outer sides of the mast with a layer of grease.

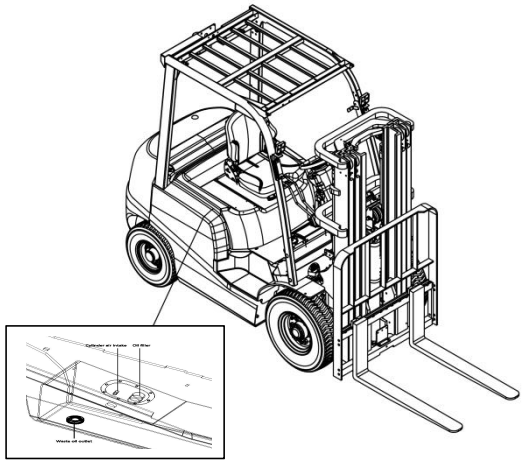


⚠ WARNING

- When adding grease, park the forklift on flat ground, turn off the switch and pull up the hand brake. Be careful when adding and avoid dropping when lubricating on high position.

Chain lubrication

Use chain spray to spray against the chain or brush engine oil to both sides of chain.



Different mast lifting height corresponded dipstick level：

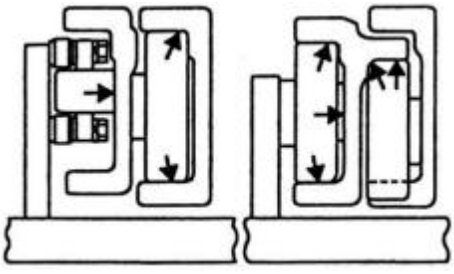
—30 means liquid level for mast with 3M lifting height or below;

—40 means liquid level for mast with 4M lifting height or below;

—50 means liquid level for mast with 5M lifting height or below;

—60 means liquid level for mast with 6M lifting height or below;

—65 means liquid level for mast with 6.5M lifting height or below.



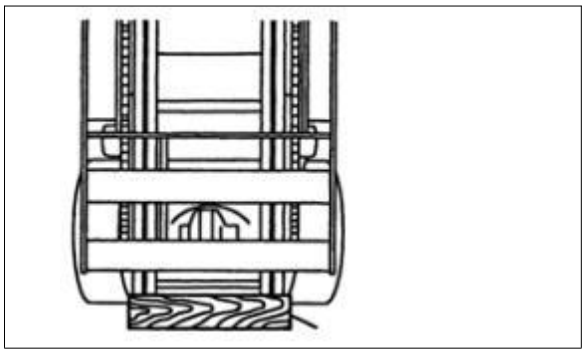
7.5 Replace wheel

Replace in pairs in time when tires wear to limit or is damaged. After running for 10hours with replaced tires, check if the wheel nuts tighten or not.

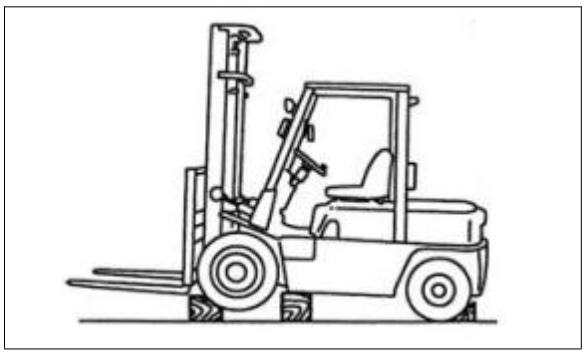
Replace front wheel

– Park forklift truck on level concrete. Place chocks behind rear wheels to prevent movement of forklift;

– Start the forklift, and lift the mast about 100mm. Tilt mast fully backward, and place a wooden block under each side of outer mast;Tilt mast forward until front wheels are raised from surface.



– Support truck by putting wooden blocks under both sides of the front truck frame,
then turn off the key switch.



Replace rear wheel

WARNING

- Only use the jack with 3000kg minimum rated load.
- Use proper tools like wedge or hardwood base to fix to prevent sudden rolling or tipping.

WARNING

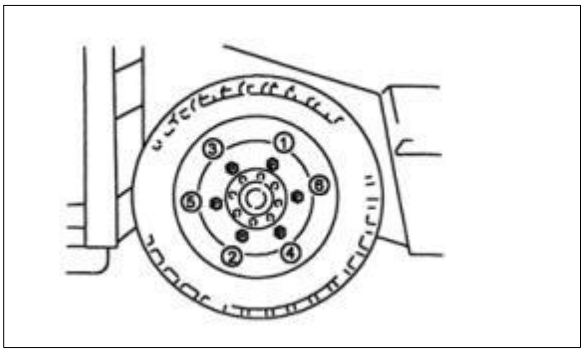
- Use proper tools like wedge or hardwood base to fix to prevent sudden rolling or tipping.
- Make sure that wooden blocks used to support forklift truck are solid, one-piece units;
- Never get under forklift while it is supported only by wooden blocks.

– Take out the wheel nuts and replace the new tires.

WARNING

- Do not take out wheel nuts before the rear wheels leave the ground.

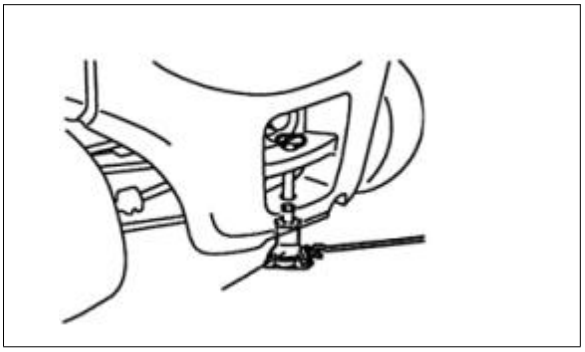
Install the new tire on the hub, and screw down the hub nut symmetrically and crosswise (T=588Nm~736Nm).



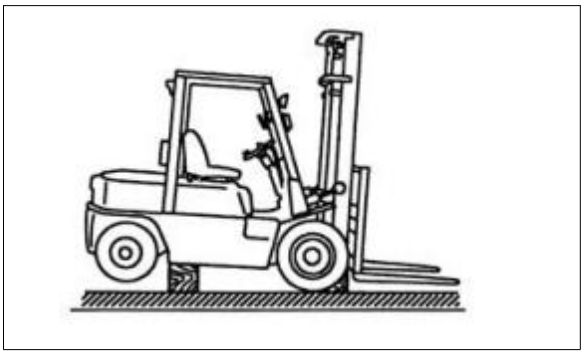
– Start the forklift, and take out wood block from the truck frame. Tilt the mast backward, slowly lower the truck, take out the wood blocks from the mast and rear wheel.

– Park forklift truck on level concrete, pull up the hand brake, place chocks behind front wheels to prevent movement of forklift.

– Put the jack at the section of the bottom counterweight, and raise the forklift with jack slowly until rear wheels off the ground.



– Place a solid wood block under the truck frame.



WARNING

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

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

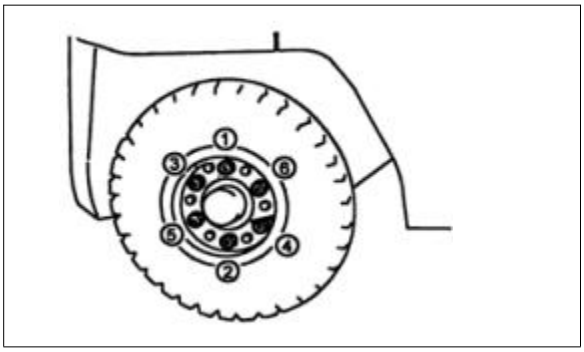
c. Never get under forklift while it is supported only by wooden blocks.

– Release hub nut, remove the wheel and replace new tire.

WARNING

- **Do not take out wheel nuts before the rear wheels leave the ground.**

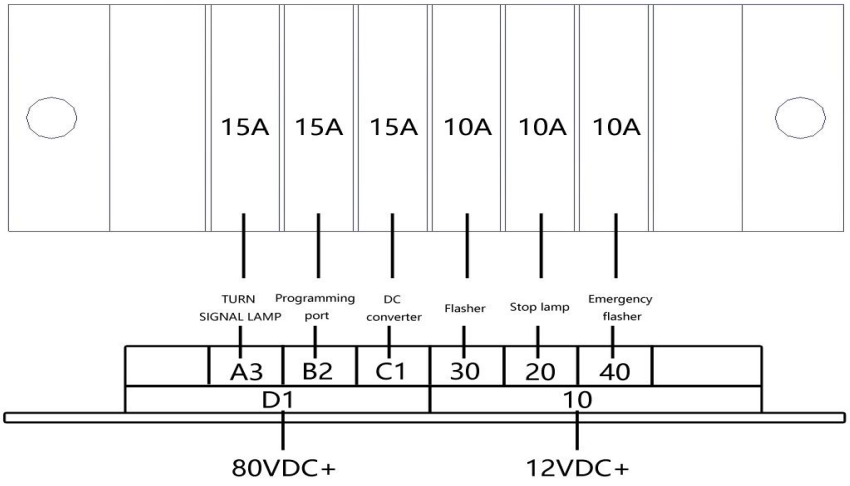
– Install the new tire on the hub, and screw down the hub nut symmetrically and crosswise (T=411~588N.m).



– Remove the wood block from the truck frame, lower the forklift on ground slowly, and then take away wood block and jack from the front wheel.

7.6 Check and replace fuse

Fuse parameter list



Fuse position

Fuse list

Position	Capacity	Application component
A3	15A	TURN SIGNAL LAMP
B2	15A	Programming port
C1	15A	DC converter
30	10A	Flasher, 12V power output end
20	10A	Stop lamp,12V power output end
40	10A	Emergency flasher,12V power output end
D1	/	80V power output end
10	/	12V power output end

Fusible links

A melting fusible link can be watched or touched easily, if it is uncertain of melting, use multi meter or lamp to test.

CAUTION

1. If fusible links is melted, maybe because of short circuit(power or current is too high). No matter which reason, please check and eliminate fault.
2. Fusible links can cause heat, do not enlace with adhesive tape. Do not put fusible links near other rubber or wiring assembly.

CAUTION

- Remove battery plug before checking the forklift electrical system.
- Take off the metal accessories from the hand before checking the forklift electrical system.
- Replace fuse with the same specification.

7.7 Check and maintenance of control system assembly

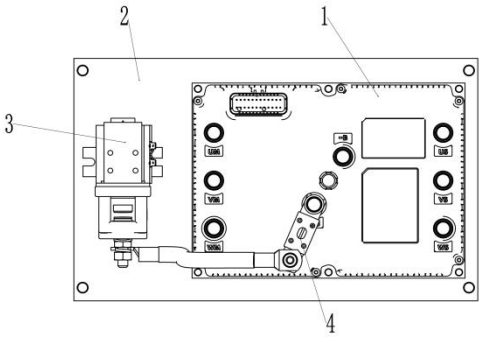
Procedures：

– Park the forklift.

– Open the hood and the side door, remove the controller protective cover.

– Remove the battery plug.

– Check, replace and adjust the control system assembly elements

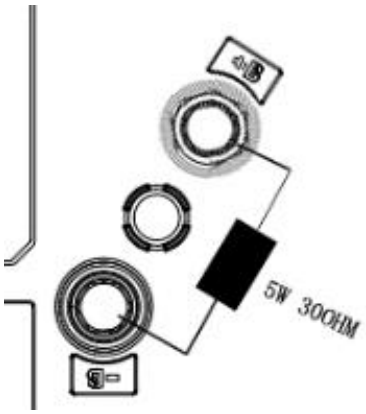


1	Controller	INV.DACE2 NEW GEN 72-80L PRM C/FUSE
2	Aluminum plate	Aluminum plateL450*W230*H10mm
3	Contactor	S W120-55
4	Fuse wire	CNL-500A

CAUTION

- Remove battery plug before checking the forklift electrical system.
- Controller is equipped with accumulator. Forbid to touch within B+ and B- to prevent from wounding by electricity. Before checking or cleaning, first disconnect truck power, and then connect loads (resistance or bulb for example) between B+ and B- first to discharge for capacitor of controller.
- Take off the metal accessories from hand before checking the forklift electrical system.
- Replace fuse cutout with the same specification.

– When repairing the controller's electronic control, the power must be cut off, and then connect 10-100 ohm resistor to the positive and negative terminals of the controller to short-circuit the residual voltage on the capacitor, otherwise there is a danger of electric shock.



The magnetic field and magnetic radiation of the environment have a certain influence on the normal operation of the inverter, and the long-term influence may damage the controller. Therefore, keep away from magnetic fields and magnetic radiation.

7.8 Bolt tightening torque table

Unit：N·m

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

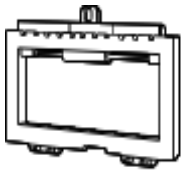
Note：

– Use entirely 8.8 grade bolt in the important joint position.

– Bolt’s grade can be found in the head of the bolt, if it can’t be found, the grade is 8.8.

8 The use, install and safety rules of attachment

The forklift manufacturer will choose attachment that in accordance with International standard ISO2328 *Forklift hook fork and installation size of carriage*, such as side shifters, fork positioner, rotator, push/pull and clamp etc.

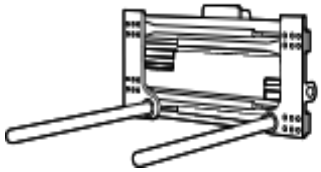

Sideshifter

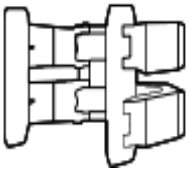

fork positioner

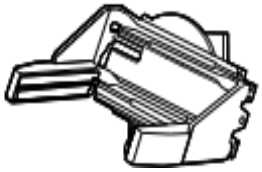

rotator


push/pull

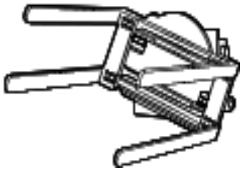

coil boom


bararm clamp


paper roll clamp


block clamps


load Stabilizer


turnaload

8.1 Attachment install

–Any modification of the attachments is strictly prohibited without the manufacturer's technical permission.

– Actual rating load capacity should be the least of rating load capacity, the load capacity of attachment, combined load capacity of truck. Generally speaking, the combined load capacity of truck is the least. Attachment load capacity just a count value of attachment pressure.

– Installation goes to in reason, credibility, safety to avoid the attachment glide around carriage in using.

– After hang attachment, embed the rise catch block to the gap of top beam, let the offset of centre line of attachment and carriage is less than 50mm.Otherwise, it will affect the landscape orientation stability of forklift.

– To these attachment with rotating function, such as paper roll clamp, bale clamp, muti-purpose clamp, drum clamp, it needs to weld chock block in the joint of carriage beam and attachment to prevent move from side to side in the operation.

– Install the attachment of below catch orientation, it need to adjust the clearance between below catch and beam of carriage

8.2 Attachment use

– Be familiar with relevant content on the forklift attachment nameplate, read the service manual (especially user manual and installation manual by professional attachment company) before use. Operating the attachment needs training and the quality.

– Fully understand basic performance and operation method of the attachment, especially to its rated capacity, lift height, goods dimension and subject range.

– When operating attachment with multi-functions, like sideshifter with clamping or rotation function, it is prohibited to carry out two actions, and only allowed to carry out another action after finishing one action.

– Truck equipped with attachment is not allowed to travel with high goods; when the goods are too large, it is prohibited to travel; when carrying goods, it should guarantee the goods bottom is 300mm off the ground, and tilt the mast backward.

– Goods weight should not exceed the limit of forklift and attachment combination load capacity. Do not carry out unbalance loading on high good level, the attachment with sideshifter only work in short period, unbalance loading quantity should be controlled within 100mm both right and left (Side shifting stroke for sideshifter on truck over 5T<including 5T> is+150mm)

– Except driver's position protected by overhead guard, it is prohibited to stand under the attachment or 2 meters out of goods projection zone to avoid accidents;

– Avoid hard brake to truck with attachment during traveling, it is required to slow down when with load.

– It is prohibited external force impact during attachment working; attachment is prohibited to work in improper area, it should not go beyond normal working scope.

– The attachment is prohibited to work in improper area, it should not go beyond normal working scope.

When the attachment occurs to fault, it is prohibited to use without eliminating the fault.

8.3 Check and maintenance

– Check the clearance of carriage beam and below catch of attachment if meet the attachment manual.

– Check the rise catch is right on the flute of fork carriage.

– Use the auto general lithium-grease per 500 hours to bearing surface.

– If the tighten firmware become flexible.

– Check the tie-in of hydraulic pressure loop, if tube attaint. Prohibit use after repair.

– Check the drive of attachment or if the rotating elements fray or block, change in time.

– Check if each element and attachment working pressure is normal as well as attachment works normally under load. If not, check the hydraulic pressure loop, find out the broken part, change sealing element or whole loop element.

Maintenance record

Date	Service content	Serviceman