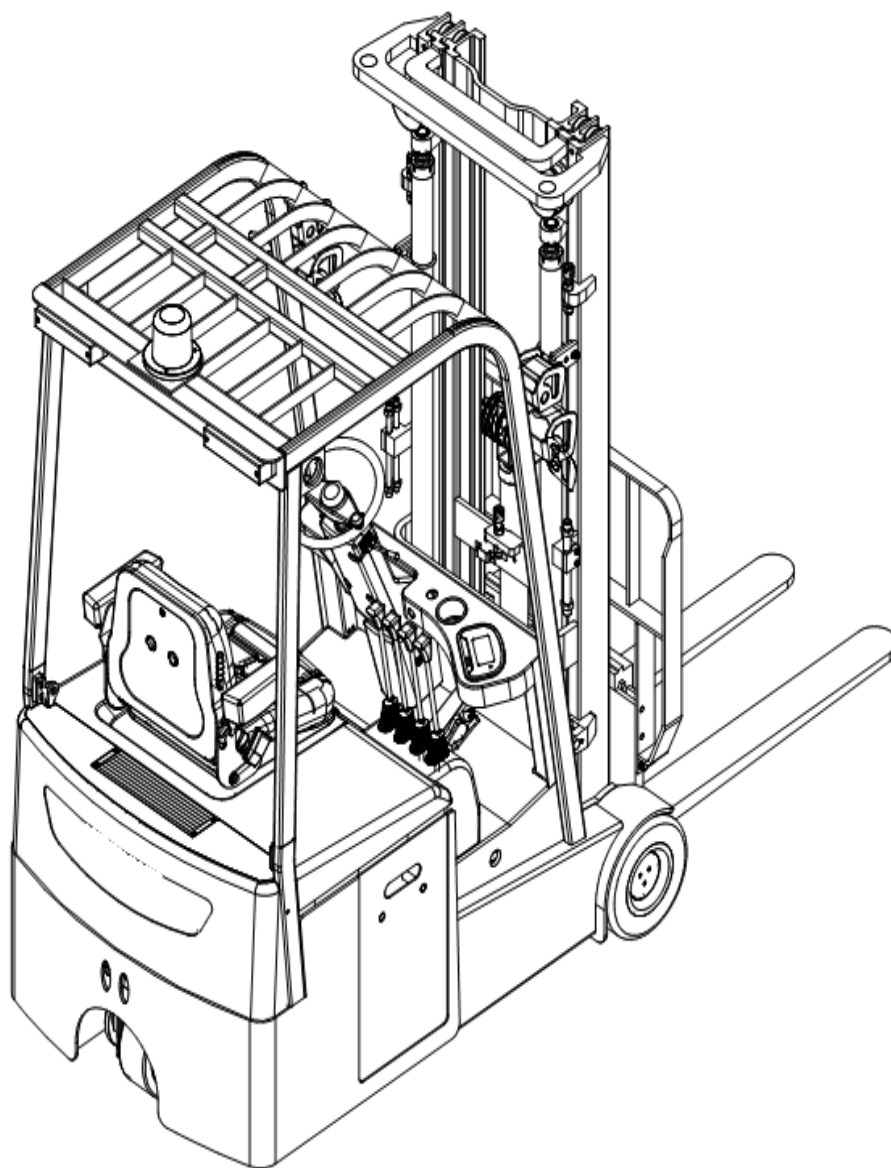


CPD15S-ELi Li-ion Powered 3-Wheel Electric Forklift

- Operation Manual
- Parts Catalogue



Thanks for choosing CPD15S-ELi electric forklift!

Hope our electric trucks would bring great convenience to the work!

- Please read the manual carefully before operation.
- This manual is a common manual. We reserve the right to modify technology of the electric pallet truck. If there is anything in the manual that is not consistent with the actual truck, the actual truck should be considered correct and the manual is only for reference.

Warning

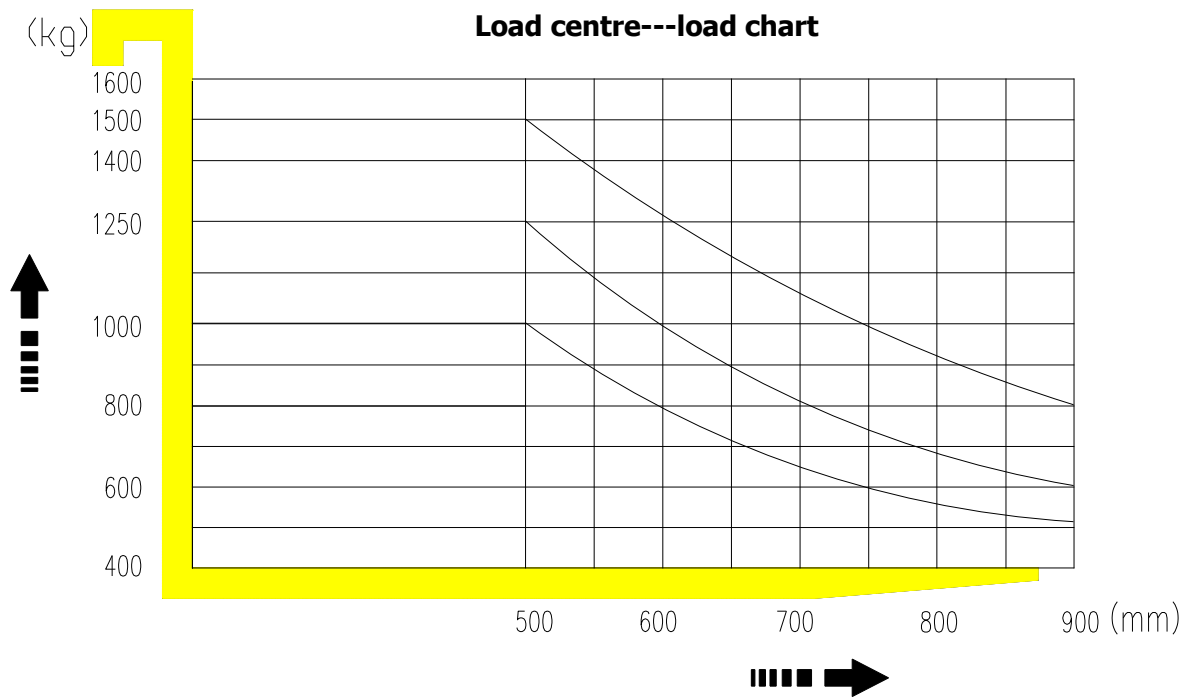
Operators must strictly conform to ISO3691: 1980 Safety Specifications of Motor Industrial Trucks". Untrained personnel are not allowed to operate the truck.

According to ISO3691 :1980 《Safety regulation for industrial trucks》 the load capacity and lifting height of our CPD15S-ELI Li-ion powered 3-wheel electric forklift is regulated as follows:

I. Rated capacity:

—When the lifting height of CPD15S-ELI Li-ion powered 3-wheel electric forklift is below 3000mm(including 3000mm),the max. capacity of the truck is the rated capacity, overloading is strictly forbidden.

1. Capacity plate information: the capacity plate is under the overhead guard,it contains: Serial number, capacity information (load, load center and lift height), truck type (fire safety level), truck weight with battery (load not included), attachment information.
2. Reading capacity plate: capacity may be reduced as lift height increases. For example (CPD15S-ELI): on the sample plate, load weighting 1500kg can be lifted to 3000mm. But above 3000mm to 4800mm,load is reduced from 1500kg to 800kg.
3. Capacity is reduced as load center increase. For example (CPD15S-ELI): on the sample plate,1500kg can be lifted if the load center is 500mm.The load center is increased from 500mm to 600mm,capacity is reduced from 1500kg to 1300kg.
4. Do not increase capacity ifload center data is less than that shown on the capacity plate. Contact our company for load center distance, lifting height and max. capacity.
5. Truck weight: Dock boards、elevators and some floors have limited capacity. Check the capacity plate for the weight of the truck. Make sure you use the correct units of measure.
6. Some truck types are not permitted in areas where there are fire hazards. Watch for marked areas. For example: must not drive a type E or ES truck into an area restricted EE or EX trucks.
7. Attachment data: If an attachment on the truck does not match the information given here on the capacity plate, do not operate the truck. The capacity plate maybe wrong. Report the problem to the supervisor.
8. Braking reduced: For added stability and comfort, braking may be reduced at some lift heights. Check the capacity plate and allow a longer stopping distance above that lift height.



Note:

Vertical coordinate stands for load capacity, cross coordinate stands for the load center. The load center is calculated from the front forks, the base point of standard load capacity refers to 1000mm center of the cube. When the mast has tilting forward, using nonstandard fork or load exceeding that in the normal width, which will reduce the load capacity, understand the load capacity in all load centers in time by the load chart. Reduce 200kg when adding side-shifter.



Note:

Vertical coordinate stands for the load capacity, cross coordinate stands for lift height. understand the load capacity in all load centers in time by the load chart. Reduce 200kg when adding side-shifter.

II. Nameplate

Basic information and extreme information, including capacity, height, of every nameplate should be carefully read before operation.

1. Model and serial no.
2. Li-ion battery voltage
3. Rated lifting capacity
4. Accessories
5. Load center
6. Lifting height
7. Truck weight
8. Battery weight

III. Capacity & Load Center

1. What is truck capacity?

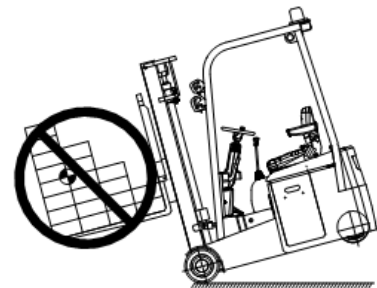
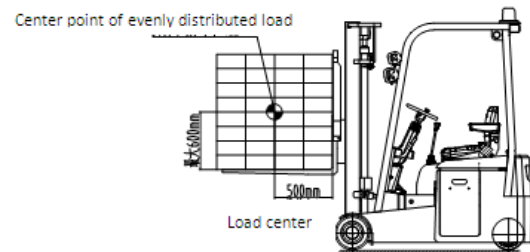
Capacity is the load that can be lifted to a given height at a given load center. See the capacity plate on the truck. Make certain you use the correct units of measure.

2. What is load center?

Load center is the distance from the end of the operator platform to the center of an evenly distributed load.

3. Loads must be evenly distributed

The truck could tip over, in any direction, if a load is placed or shifted to the front, back or side of a pallet, cart, platform or container. Make sure you spread the load evenly as you load a pallet.



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Brief introduction :

CPD15S-ELi series electric forklift is powered by Li-ion battery, and driven by AC motor. This kind of truck travels by means of gear transmission. The fork is lifted by means of DC motor and hydraulic actuation, which motivate hydraulic cylinder up and down to lift fork and goods together. As this truck is electrically driven for traveling and lifting, driving is stand, power steering in wheel it possesses many characteristics as labor-saving, high efficiency, stability in operation, simple and easy operation, safety and reliability, little noise and environmental friendly, etc. This truck adopts 24V large capacity battery cell, which greatly extends service time within one charge.

The kind of truck is applicable for goods transportation on hard and flat ground.

Allowed environment for using:

- a. Height above sea level shall not be over 1000m;
- b. Ambient temperature shall not be higher than +40°C and no lower than -25°C.
- c. When the ambient temperature reaches +40°C, the relative humidity should not exceed 50%; at a lower temperature, higher relative humidity is allowed.
- d. Hard and flat ground.
- e. It is prohibited to use the truck in a flammable, explosive or corrosive environment with acid and alkali.

Description:

The instruction manual shall be kept by the operator, and shall be read by the operator until he gets a full understanding.

The instruction manual is composed of correct operation, convenient and simple maintenance, and routine inspection.



The instruction manual shall be carefully read before operation, for purpose of correct drive and suitable maintenance to ensure safe and effective material transportation.

The instruction may be in disagreement with practical product due to product innovation.

The instruction manual shall be accompanied with in case of truck leasing or transfer.

Please come into contact with our sales department in case of any problem.

Description of symbol: Regulations of the following symbols are of great importance to the safety and others as well. Please obey these rules.

	Danger	Indicates an impending danger. Deaths or severe injuries would be resulted without any precaution or avoidance. You must observe those requirements.
	Warning	Indicates a potential danger. Deaths or severe injuries would be resulted without any precaution or avoidance. You must observe those requirements.
	Caution	Indicates a potential danger. Moderate injuries would be resulted without any precaution or avoidance. You must observe those requirements.
	Notice	You shall pay attention to statements that are in direct or indirect relation with personal security and truck maintenance.

Three-wheel electric forklift

3-wheel electric forklift can lift side-shift and stack goods; it is designed specially to operate in the warehouse with narrow aisle.

Fork function, standard function and optional function

Standard fork or hydraulic function: lift and lower fork and tilting mast.

Also include other parts, such as side-shifter, carton clip or push-puller. The company can determine the relative function according to the working area and conduct relevant training.

How to drive the forklift

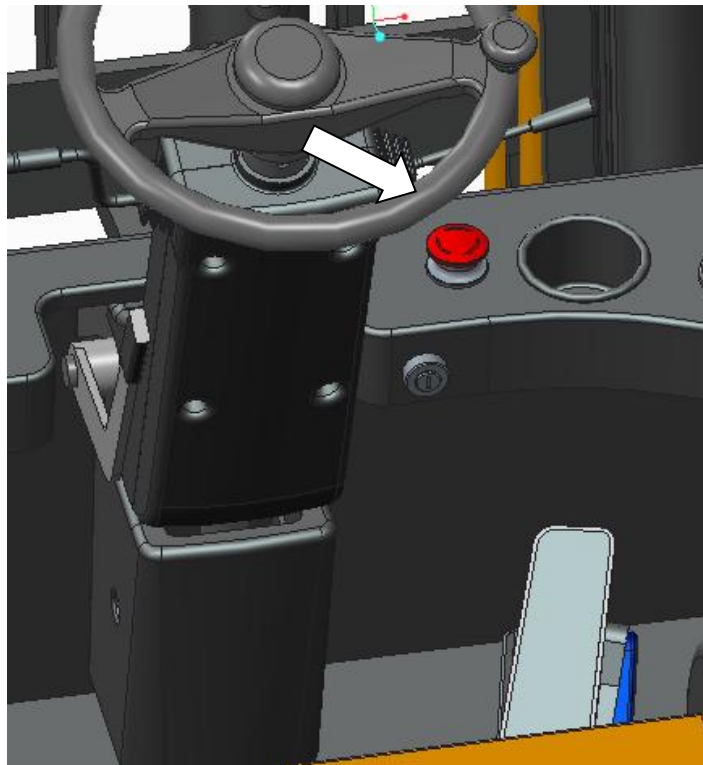
Forklift can be equipped with the soft cushion, adjustable handrail and moveable pedal in the operation area. The operator stands on the side and back on the soft cushion when driving. What's more, the hand and the foot are on the control handle and the pedal respectively, which can be comfortable and stable. In addition, observe the other direction when turning the head and drive in this direction.

Key switch

The key switch is on the right side of the operating table:

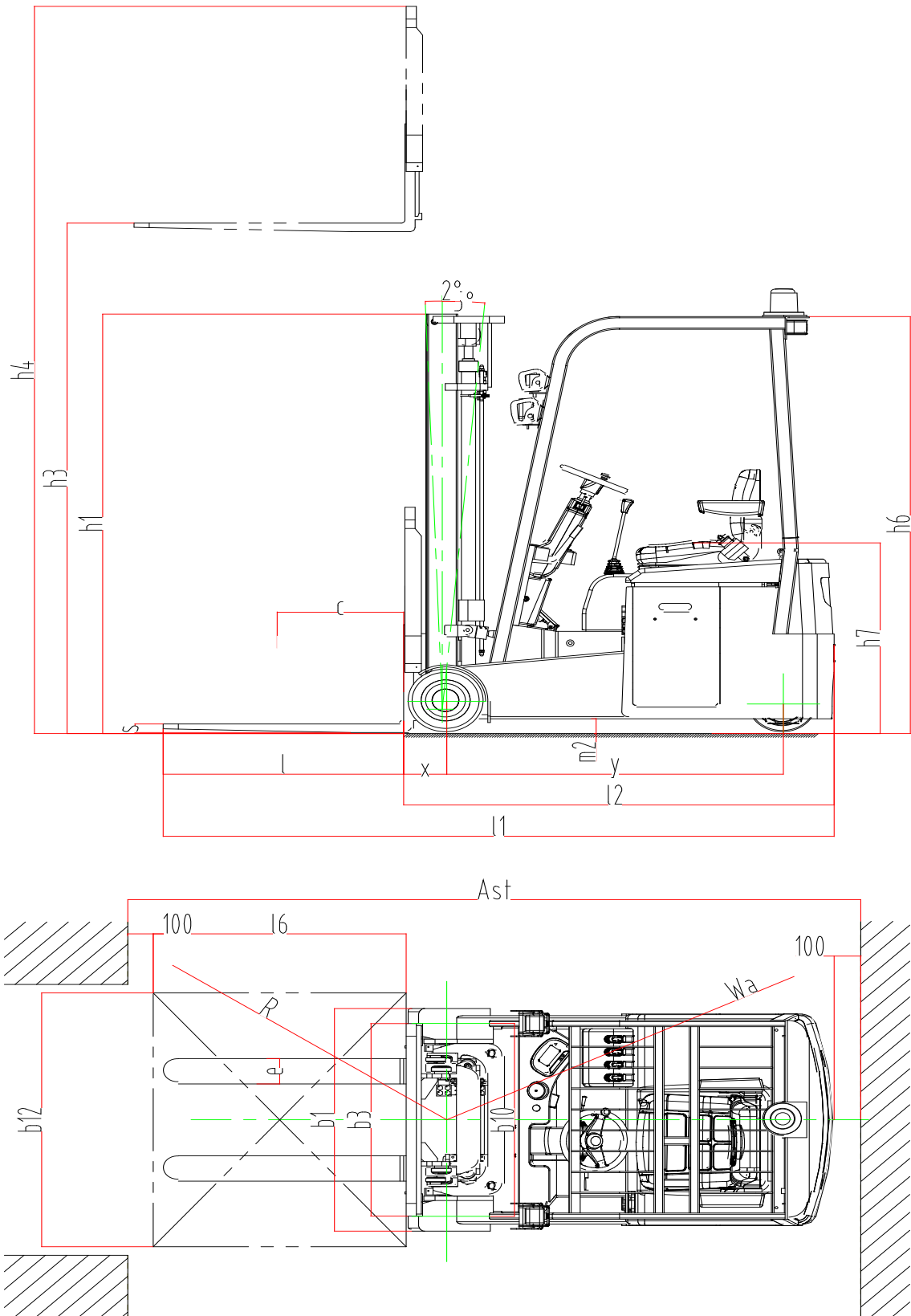
OFF –turn the key switch to OFF,disconnect the circuit.

ON-- turn the key switch to ON,connect the circuit.



1. Outline drawing

1.1 CPD15S-ELi Outline drawing

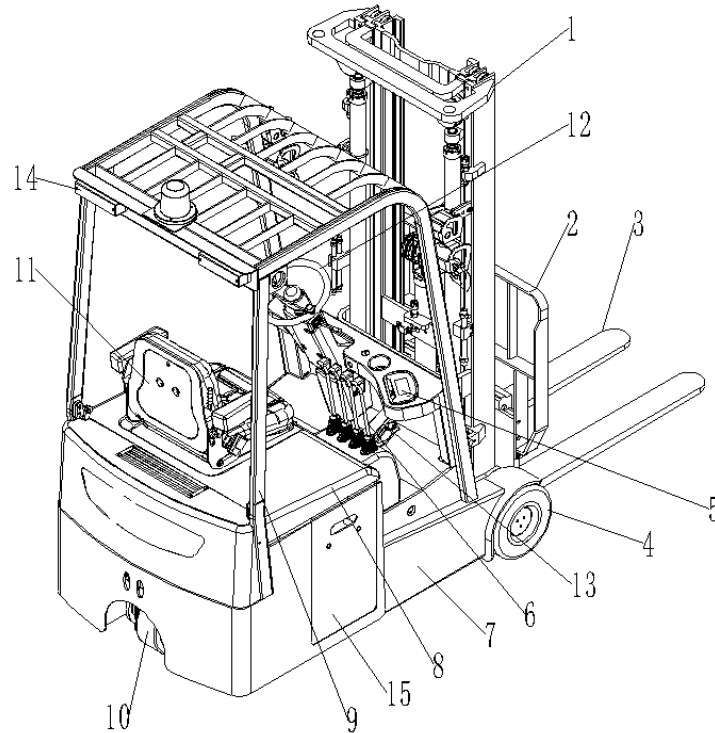


1.2 Main technical parameters

Characteristics	1.1	Model		CPD15S-ELi
	1.2	Drive type		
	1.3	Operation type		Seated
	1.4	Rated capacity	Q(kg)	1500
	1.5	Load center	c(mm)	500
	1.6	Distance from front axle to support	x(mm)	170
	1.7	Wheel base	y(mm)	1348
Weight	2.1	Weight(no battery)	kg	2600
	2.2	Axle load, laden front/rear	kg	3280/810
	2.3	Axle load, unladen front/rear(with Max. battery)	kg	975/1625
Wheels	3.1	Wheel size front	spring solid wheel	305X140
	3.2	Wheel size rear	solid wheel	280X100
	3.3	Wheel number-front		2
	3.4	Wheel number-rear		1
	3.5	Thread-front	b10(mm)	912
	3.6	Thread-rear	b11(mm)	0
Dimensions	4.1	Mast/fork frame tilting angle,front		2
	4.2	Mast/fork frame tilting angle,rear		5
	4.3	Mast height,lowered	h1(mm)	1980
	4.4	Free lift height	h2(mm)	Optional
	4.5	Lift height	h3(mm)	2500-5600
	4.6	Max. height, mast extended	h4(mm)	3500-6600
	4.12	Overall width	b1(mm)	1055
	4.13	Thickness	s(mm)	35
	4.14	Width	e(mm)	100
	4.15	Length	l(mm)	950 (1070)
	4.16	Fork frame type		A type
	4.17	Fork frame width	b3(mm)	680
	4.18	Bottom of mast ground clearance,laden	m1(mm)	68
	4.19	Truck body ground clearance	m2(mm)	68
	4.2	Aisle width for pallets 1000x1200 crossways	Ast(mm)	3050
4.21	Aisle width for pallets 800x1200 lengthways	Ast(mm)	3150	
4.22	Turning radius	Wa(mm)	1550	
Performance	5.1	Travel speed,laden	km/h	7
	5.2	Travel speed, unladen	km/h	7
	5.3	Lift speed,laden	mm/s	100
	5.4	Lift speed, unladen	mm/s	150
	5.7	Gradeability,laden	%	10
	5.8	Gradeability, unladen	%	15
	5.11	Brake		Electric braking
Motor	6.1	Drive motor power	KW	2.2 (AC)
	6.2	Pump motor power	KW	4.5
	6.3	System pressure	bar	140
Li-ion Battery	7.1	Voltage	V	24
	7.2	Capacity	Ah	250 (300)
	7.3	Battery weight	kg	95(115)
Others	8.1	Travel control		AC frequency conversion
	8.2	Average noise	Db(A)	68

2. Structure introduction (refers to the structure diagrams, schematics of main components)

The truck mainly consists of mast 1.load backrest 2.fork 3.Load wheel 4.multifunction liquid crystal combined instrument 5.multi-valve operating mechanism 6.truck frame 7.hood 8.overhead guard 9.drive wheel 10.seat (with switch) 11.steering operation system 12.electrical control system 13.lamp system 14.side-way Li-ion battery 15 and other components.



No.	CPD15S-ELi	Name
1	●	Mast
2	●	load backrest
3	●	fork
4	●	Load wheel
5	●	multifunction liquid crystal combined instrument
6	●	multi-valve operating mechanism
7	●	Truck frame
8	●	Hood
9	●	overhead guard
10	●	Drive wheel
11	●	seat (with switch)
12	●	steering operation system
13	●	electrical control system
14	●	lamp system
15	●	Li-ion battery
●=Standard		○=Option

3. Safety Norms:



Warning

Please pay attention to the following items first before operation of the truck:

- 1) This electric truck is only limited to utilization indoor with a hard flat floor. Operation in inflammable, explosive environment or corrosive environment such as acid or alkaline condition shall be strictly forbidden.
- 2) Only drivers who have received formal training or are authorized can be allowed to drive the truck.
- 3) Read this instruction carefully before operation so as to master the performance of the truck; check the truck whether it is in its normal condition before each operation. It is forbidden to use faulty truck; repair by untrained persons is forbidden as well.
- 4) Overloading operation is forbidden.
- 5) As for goods carrying and operation, center of gravity of the goods must be within range of the two forks. It is forbidden to transport loose goods
- 6) The truck shall travels slowly when forks pass in or out of pallet.
- 7) It is strictly forbidden to press the lifting or lowering button during the traveling of the truck. Meanwhile, don't switch lifting and lowering buttons rapidly or frequently, because rapid and frequent lifting or lowering will cause damage to the truck and goods.
- 8) Don't load heavy goods on the forks rapidly.
- 9) Don't lay the goods on the truck for a long time!
- 10) It is strictly forbidden to make sharp turn on narrow aisle. When it is turning, slow down the truck so as to ensure the safety of personnel and goods.
- 11) Descend the forks to the lowest position when the truck is not used.
- 12) It is strictly forbidden to put any part of the body under heavy goods and forks.
- 13) This truck is suitable to be used on flat ground or flat platform. Don't put the truck on the slope for a long time.
- 14) Overloading operation is forbidden. Otherwise the wheel will skid, resulting in the damage of wheel and motor as well as danger of the human body and goods.
- 15) It is strictly to use the truck under stipulated voltage of 20.4V.
- 16) It is strictly forbidden to conduct charge by connecting the plug to AC power directly.
- 17) It is strictly forbidden to put the operator's head, hand and foot out of the cabin.
- 18) It is strictly forbidden to drive when the forks are in lifting position.

3.1 Safety operation norms:

- 1) Training of driver:



Notice

Even though each truck may have the same technical parameters, there may be differences on features of braking and acceleration as well. Never drive the truck until you get familiar with all those operations.

- 2) Wear of the driver during truck driving:



Notice

Please put on safety shoes and protective clothes. Do not wear clothes that are too loose for sake of being caught, which would result in danger.

- 3) Rules that must be observed:



Notice

Never drive the truck when you are tired or un-concentrated, with an injection of drug, or after a liquor drinking.

- A. Safety rules and regulations shall be observed during operation or maintenance of the truck.
 - B. Avoid sudden start or stop. Operate all parts smoothly.
 - C. It is forbidden to turn around on slopes. Drive smoothly.
 - D. It is forbidden to load on slopes or travel while the forks are lifting
 - E. Lowering the speed before turn around particularly in unladen cases.
- 4) Self protection



Notice

Before operating the truck make sure to fasten the safety belt and traction rope. Fix the chain and guardrail in appropriate position.

5) Safety of working place:



Notice

This kind of electric truck is only limited to utilization indoor with a hard flat floor. Operation in inflammable, explosive environment or corrosive environment such as acid or alkaline condition shall be strictly forbidden.

- A. Good roadway condition shall be kept and the traffic should be smooth.
- B. Sufficient light ray shall be ensured on working place.
- C. Fire extinguishing appliances shall be equipped in the places where truck and charging is operated. The extinguishing appliances shall comply with the requirements of extinguishing fire of solid combustible matter and electric apparatus.
- D. The value of truck noise mentioned in instruction is measured under the condition of new truck running on flat, smooth and hard ground. If the traffic surface is bad or the tyre of truck is damaged, the noise may be amplified.

6) Integrity of the truck shall be realized:



Warning

Do not make modifications on the truck.

- A. Please observe safety rules and regulations of the working place during operation, inspection, and maintenance of the truck.
- B. No modification or addition shall be made to the truck without written permission by our company. A modification of the truck may have a negative effect on its safe operation. No modifications or alterations to a powered industrial truck, which may affect, for example, capacity, stability or safety requirements of the truck, shall be made without the prior written approval of the original truck manufacturer, its authorized representative, or a successor thereof. This includes changes affecting, for example braking, steering, visibility and the addition of removable attachments. When the manufacturer or its successor approve a modification or alteration, they shall also make and approve appropriate changes to capacity plate, decals, tags and operation and maintenance handbooks. Only in the event that the truck manufacturer is no longer in business and there is no successor in the interest to the business, the user may arrange for a modification or alteration to a powered industrial truck, provided, however, that the user shall:
 - a) arrange for the modification or alteration to be designed, tested and implemented by an engineer(s) expert in industrial trucks and their safety;
 - b) maintain a permanent record of the design, test(s) and implementation of the modification or alteration;
 - c) approve and make appropriate changes to the capacity plate(s), decals, tags and instruction handbook;
 - d) affix a permanent and readily visible label to the truck stating the manner in which the truck has been modified or altered together with the date of the modification or alteration, and the name and address of the organization that accomplished the tasks.

7) Prepare safety operation procedure:

Safety operation procedure shall be formulated with consideration of practical situations before operation of the truck. Safety shall be taken into full consideration in preparation of the safety operation procedure.

When lifting the truck please be careful of the space, particularly the space overhead.

8) Operation of truck under unsafe condition is strictly forbidden:

- A. Operation under unsafe condition is forbidden, such as under conditions with uneven floor, or impeded road. Goods lifting on slope is strictly forbidden.
- B. Faulty truck is forbidden to use.
- C. Make sure a daily inspection of the truck would be taken. Please immediately repair or replace in case of any abnormal conditions.

9) Overloading operation of truck is forbidden:



Warning

Overloading operation of truck is forbidden. Overloading operation would cause damage to the truck or bring harm to operator.

10) Use suitable pallet:

- A. The pallet shall be of suitable dimensions, neither too wide nor too large.
- B. Fix the pallet or lifting table. If pallet is installed on the truck make sure the clip to the pallet is fastened. If there no pallet or pallet clip make sure lifting is safely fixed.
- C. Make sure the pallet or lifting table is well fixed or the stability on the forks. If there is pallet on the truck make sure the forks are in the outside edge to decrease the possibility of tilt of the truck .
- D. Put the goods evenly within the pallet limited size.
- E. Only allow to load stipulated weight and within the load center. Refer to plate.
- F. Keep well the focus of the goods and make sure the forks are under the goods.

11) Pay attention to load area:



Notice

Check the width of the board, loaded goods and safety. Pay attention to the strength of the ground.

12) Electrical System Inspection:



Notice

Before checking the electrical system, turn off the key switches and the emergency isolation switches.

3.2 Safety Operation Specification:

1) Check the safety condition around the truck:



Notice

Before starting up the truck, please ensure that there is no person around it.



Notice

If the driver's view is shielded by the bulky goods carried, please drive backwards or drive under the guidance of other working personnel.



Notice

No travelling while lifting or descending which is not safe.



Notice

Ensure no people around the truck when driving backwards.



Notice

Driving through the narrow access shall be guided by working personnel.



Notice

At crossroad or other places impeditive for view, the driver shall not drive until there is no person at both sides.



Notice

Keep concentration when operating truck.



Caution

The driving mechanism of truck is installed on the front. Due to this difference from common trucks, the front of truck swings comparatively fast when turning around. For this reason, to prevent collision with other objects nearby the front of truck, do drive or turn slowly.

2) Strictly forbid harsh driving:



Notice

Never start up, brake or turn abruptly.

Abrupt start-up or braking may cause the falling of goods.

Abrupt turning during traveling may cause the tilting of truck and result in serious accident. Do decelerate and take care to turn.



Notice

Observe all items of safety rules on working place. Decelerate and sound horn when travel by other truck or trucks. Avoid driving in places with bad view.



Notice

Ensure to provide certain clearance between truck and entrance.

3) Never drive too close to roadside:



Notice

Ensure to provide enough distance between the truck and roadside or platform edge.

When running on narrow road or platform, keep a certain safety distance with the edge against falling of the truck.



Warning

Avoid turning or loading and unloading operation on slope; otherwise the truck can go tilting.

3.3 Operation norms:



Notice

The truck can only carry goods under rated capacity.

- 1) Forbid overloading operation.
- 2) Forbid deflective transportation.
- 3) Passengers on truck must be forbidden.
- 4) Never push or pull the handle abruptly
- 5) Never use the truck as towing truck.
- 6) When transporting over-wide goods, the driver shall be extremely careful to turn slowly to keep balance of the goods. Decelerate when ascent and descent, meanwhile, watch around for sake of safety.
- 7) The faulty truck for future repair must not be parked at places impeditive for traffic. Lower down the fork arms to the lowest position and put on the warning board. Pull off the key.
- 8) The truck cannot be operated when the protective cover for the mast and other protective facility are not installed.
- 9) Avoid wind risk while loading.



Notice

Avoid wind risk while loading.

- 10) The driver must control the speed according to the on spot situation. The driver must drive slowly when turn around, passing narrow aisle, passing rotating door, and view impeding places. Appropriate braking distance must be kept with the other truck in front and control the electric well at all time. It is prohibited to stop abruptly (except there is an accident), turn around quickly or surpass the other truck in dangerous or view impeded position. It is prohibited to put the body or the hand out of the cabin.
- 11) Driver's view during driving: The driver must keep his view in the driving direction and mind the situation on the road. If the transported goods impede the driver's view the goods must be moved to the back of the driver. If the goods cannot be adjusted an additional personnel is needed at the side front to guide the driver.
- 12) Up and down slopes: Up and down slopes must be on the stipulated driving road. The road surface should be clean and not slippery. The road must be suitable for stackers and safe and reliable. Up slopes laden the forks must be forward and down slopes backward. No turn around side drive or loading and unloading during up or down slopes. Deceleration is necessary down slopes and is ready to brake at any time.
- 13) Drive the stack to elevator or loading table: If it is necessary to drive the stacker to elevator or loading table make sure that the elevator or loading table is able to stand the weight and the structure is capable of bearing the stacker and at the same time to get permission from the equipment user. All needs to be done before hand. When driving the stack into elevator the goods must comes in first. Choose a suitable place to stand to avoid collision with the tunnel wall during lifting or descending. If there is working staff going together with the stacker make sure to wait until the stacker is positioned well to come in. After reaching the destination level the working staff will leave the elevator first.
- 14) Necessary conditions for the transported goods: The stack driver must check the goods carefully to make sure no danger will happen. Before transporting the goods make sure the goods is well placed and fixed. If there is the possibility that the goods may be upside down or fall off protective facility (such as guardrail) must be installed.

3.4 Protective facility for the operator



Warning

The overhead guard is a protective facility for the operator to avoid possible falling objects. But it will not guard from all possible hit. It is forbidden to dismantle the overhead guard.

3.5 Important notice after operation:

- 1) Parking: Park the truck at appointed place. Never park the truck on slope. Ensure the following points to be achieved before leaving away the truck:
 - a) Lay down the fork to the lowest position naturally.
 - b) Turn the steering wheel to the middle position.
 - c) Turn off the key switch.
- 2) Clean up the truck:



Notice

When cleaning up the electrical system, use compressed air but not water.

- 3) Charge:



Warning

Open flame is forbidden to appear at the charge places, otherwise, explosion or fire disaster can be caused.

Make a record of charge. As for the charge method, refer to the part about Li-ion battery operation.

4. Initial operation

4.1 Initial operation:

4.1.1 In order to stop power supply in dangerous situation the battery plug(not included in shipment) must be connected with the emergence stop plug of the electric truck.



Warning

No operation of the truck without the emergency stop plug.

4.1.2 The stack can only be driven by the power from the battery. Rectified alternating current can damage the electric components of the stacker. The cable of the battery (towing cable) is no longer than 6 m.

4.1.3 If the stack is driven by an external battery via a towing cable it is forbidden to increase the load.

4.1.4 Inspection before use:

a) If the equipment is complete and in normal condition.

b) If the battery is not installed, install the battery. Pay attention not to damage the battery cable.

4.1.5 Adjust the characteristic curve of the charger (charging curve)

4.1.6 After the stacker being idle for a long time the side touching the ground of the wheel is a lot bit flat.

After it travel for a while the flat part will recover.

4.2 The stacker is not driven by the steering device of itself:



Warning

It is strictly forbidden to pull or to drag the stacker on slopes.

4.2.1 If pull or drag the stacker in emergence cases the EM brake must be loosened.

4.2.2 After park the electric truck in stipulated area the EM brake must be fixed well again so that the stacker can resume back to the EM brake condition.

5. Operation instruction

Electric stacker travel and lift by battery for short distance transportation and stacking; Proper use of the truck will bring you great convenience in work and improper use will damage the truck and bring danger to the personal safety and the goods as well.

5.1 Prepare before operation:

For the own safety and maximum service life of the lift truck, make a thorough walk-round inspection before mounting the lift truck or starting to move it. Look for such items as loose bolts, trash build-up, oil leakage, condition of tires, mast, carriage, forks, or attachments.

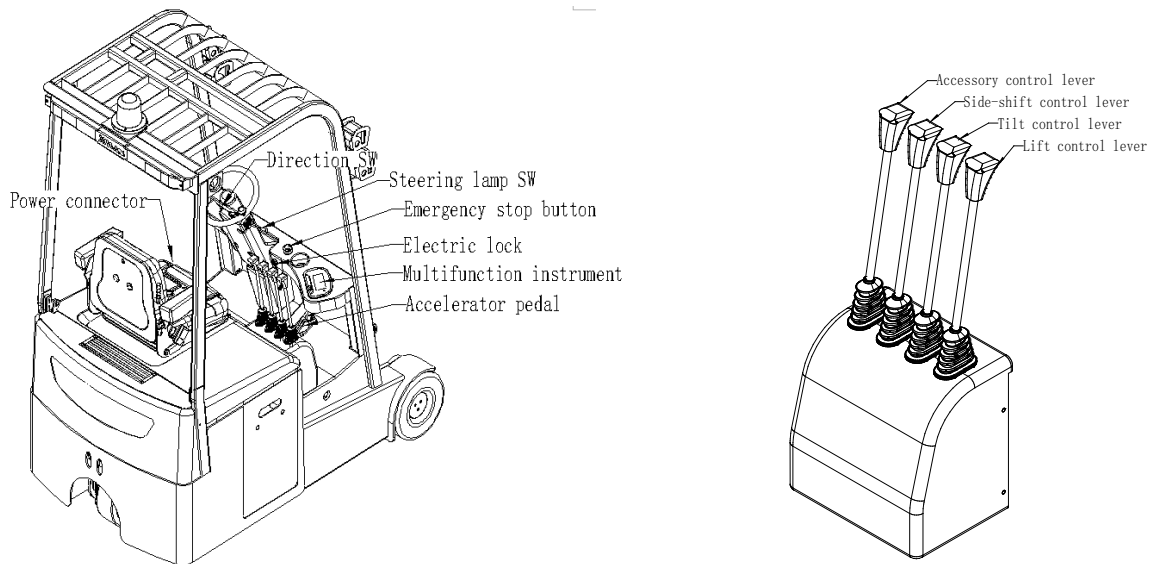


Warning

Never use the faulty truck.

5.1.1 Inspect the truck before operation: 1.Check whether there is loosening the screws. 2.clean any mud or debris from the floor plates for safe footing. 3.check the instrument panel for damage to the indicator display. 4.Check Mast, chains, horns and other devices.5.Check the frame, mast, forks and accessories for wear and damage, if there is no fixed installation screws.6.check the tires and wheels for proper inflation. cuts, gouges, foreign objects and loose or missing nuts. 7.check the overhead guard for damage. loose or missing mounting bolts. 8.check the hydraulic system for leaks, worn hoses or damaged lines. 9.check the drive axle housing for oil leaks. 10.check the battery compartment for loose connection, frayed cables and properly secured battery restraint.11.observe the electrolyte level for proper level. 12.check the light for proper operation. 13. Check the support wheel whether it works or not, there is unimpeded phenomenon of death or not, prohibited the use of faulty trucks.

5.1.2 Check whether the Li-ion battery has power, the method shown in Figure 1, pull out the power switch to open the main power, turn on the electric locks, check the truck's power meter on the dashboard, if left last grid is on, at this time the Li-ion battery has no electricity, charging the Li-ion battery, prohibited the use of the truck in case of the absence of electricity, which will greatly reduce Li-ion battery life, or even damage the Li-ion battery.



Pic.1 Pic.2

5.1.3 Check the braking of truck and the ascent, descent, running forward and backward.

The check method is shown in picture 2:

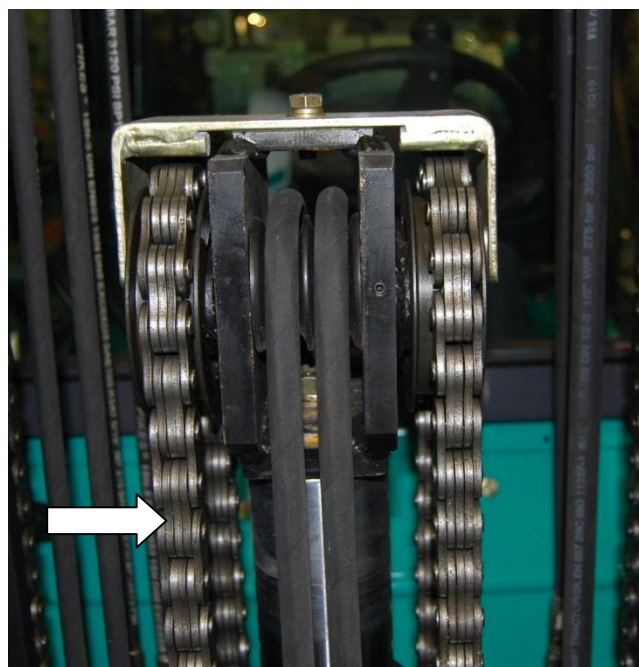
- 1) Press down the ascent, descent button on the tiller to check the ascent, descent, of the forks.
- 2) Turn the speed control button on picture 2 right the truck moves forward and to turn it left the truck moves backward and it control the speed of moving forward or backward as well.
- 3) As shown in picture 2 the speed control button returns back to middle position from forward and backward driving position the truck should be braked immediately.
- 4) As shown in picture 2 the direction control handle turns clockwise is turn right and turns anti-clockwise is turn left.

Through the above check if the truck is trouble free it can be used and if it has trouble it is prohibited to use a faulty truck.

 **Warning**

When forking goods or moving goods, never rotate the accelerator knob rapidly to speed up the truck abruptly.

5.1.4 Lifting chain



- 1) Check the whole chain whether it is in good condition, if a certain chain bent, then moving on sprockets

will cause wearing by friction with each other.

- 2) Check to ensure that every section of the chain pin is not exposed out.
- 3) If a section of the chain pin head has exposed out, indicating that the interior of the chain pin of this section has been broken.
- 4) Check chain joints and fixing holes for wearing.

5.2 During operation:

5.2.1 Note: The truck is equipped with a magnetic brake near the drive wheel motor shaft, the stacker can operate only when energized, power braking.

5.2.2 operator seated

5.2.2.1 operator gets into the operating table, put down the barricade switch, switch off the left foot, left hand steering wheel, right hand operating grip handle.

5.2.2.2 The operating handle controls the lift and lower, tilt-forward/backward, side-shift of the mast.

5.2.2.3 open the electric lock and emergency stop switches, meters lights, warning lights flashing, the truck enters the standby state.

5.2.3 Driving

5.2.3.1 There is a speed button at left of the instrument. The LED screen would show P, E, S indicates different speed of 7km/h、 5km/h and 3km/h respectively. Choose proper speed according to the working environments and operators.

5.2.3.2 Check before traveling, no matter the truck is under load or overload conditions, do not let the forks touch the ground directly.

5.2.3.3 Rotate the accelerating knob clockwise, the truck moves forward. rotate the accelerating knob counter-clockwise, the truck moves backwards.

5.2.3.4 Counter-clockwise rotation of the steering wheel with the left hand, the truck turned left. Clockwise rotation of the steering wheel with the left hand, the truck turned right.

5.2.3.5 The truck has a regenerative brake and electrical brake. When accelerating the knob back to the middle position, the truck brakes themselves.

5.2.4 Lifting of the fork

5.2.4.1 rotate the lift handle counter-clockwise, the forklifts. Vice versa, the fork lowers.

5.2.4.2 Lowering of the fork is buffered. When the fork drops to about 600 mm from the ground will slow down in order to avoid heavy impact on the ground when lowered.

5.2.5 Tilting forwards and backwards

5.2.5.1 Press the control button up, the mast tilts forward. Vice versa, the mast tilts backward.

5.2.6 Side shift of the fork

5.2.6.1 Press the control button forward, the fork shifts left. Vice versa, the fork shifts right.

5.2.7 Operating order and security settings

5.2.7.1 When the driver leaves the driving station , the truck can not lift and lower.

5.2.7.2 BDI of the instrument is designed to monitor the power amount of the Li-ion battery. When the Li-ion battery is discharged to 15%(last electricity segment is left), the forklift is able to travel and lower, but lifting is confined.

5.2.6 Transport and stack operation:



Notice

The following items should be checked before operating the truck:
Make sure in the loading area no goods will fall off or be damaged.
Make sure no goods or objects will impede safety.

As shown in Figure 1, Pull out the main power switch to turn on the main power and the electric lock, drive the truck near heap (the fork head is in 300mm distance from the stockpiles), according to the operating handle shown in Figure 2 lowers the forks, adjust the fork height into place, insert the fork slowly as deep as possible into the cargo pallets, operate the handle lifting fork to 200-300mm height from the ground, driving the truck to stop the arrival of shelf space and slow prong at a distance of 300mm shelf unit, then operate the handle lifting fork up to proper height of the shelf (bottom of the pallet is over the shelf 100mm or so), slowly move the cargo to the exact position of shelf. At last, operating the handle lowering fork, carefully placing goods on the shelves, and made the forks leaving the cargo, slowly drive the truck, so that make the fork out of the shelf (the fork head is in 300mm distance from the shelf), lower the fork down to about 300mm from the ground, the truck leave the shelves . It should be noted the obstacles around in the process of moving, slow down when turning.



Notice

Unlike the common truck the driving steering device of this truck is installed in the front of the truck. When turning around the front of the truck swing fast. When the front of the truck reaches near other objects be sure to drive or turn around slowly to avoid collision.

5.2.7 The operation of taking down the goods from the shelf:

As shown in Figure 1, pull out the emergency stop switch, turn on the main power and the electric lock, drive the truck near the goods shelf (the fork head is in 300mm distance from the good shelf), according to the operating handle shown in Figure 2 lowers the forks, adjust the fork height into place, insert the fork slowly as deep as possible into the goods pallets, operate the handle lifting the goodsto the height that the bottom of the pallet is 100mm over the shelf, slowly drive the truck, so that make the goods out of the shelf (the fork head is in 300mm distance from the shelf), lower the fork down to about 200-300mm off the ground, the truck leave the shelves. Then park the truck after travel to the needed position, at last, lower the fork and the goods, make the fork leave the goods completely, shift the fork out of the pallet slowly.

5.3 Treatment of abnormal circumstance in operation:

5.3.1 Pull back the tiller the forks are lifted, but when the tiller released back to the middle position the forks are still ascending. Lifting is out of control. In case of that, switch off the power immediately. Move the truck to safe place and lower down the goods manually. Inspect the circuit.

5.3.2 If brake is found not working immediately stop operation and inspect and repair the truck.

5.4 After use:

Park the truck to fixed area after use and make daily maintenance in line with clause 6. Charge the truck.

6. Usage, maintenance and charge of Li-ion battery

1 Requirements on operators

- 1.1 Relevant people who are able to use, maintain and take any actions to Li-ion batteries on all electric storage and logistic trucks(hereinafter referred to as operators).
- 1.2 Any operators are only allowed to operate the Li-ion batteries under the backgrounds of professional training, acquiring certain knowledge of Li-ion batteries, and obtaining certifications from relevant departments.

2 Safety Regulation

- 2.1 These signs shown below might be found either on the Li-ion battery cases or on the trucks, which are set on considerations of the safeties of the batteries as well as the operators. All the operations must be under the guidance of them.



High Voltage Warning:

It indicates a possible danger of lightning shock. All the electric work of the equipment must be finished only by qualified professional workers. Unauthorized disassembly is prohibited



Corrosive Risk Sign:

It indicates to pay attention to protect the products when unsafe factors exist over the production.



Waterproof & Humidity proof Sign:

It indicates to protect the products from rain, water and humidity.



No Fire Sign:

It indicates that fire is prohibited in this area when the product is on.



Do Not Step-on Sign:

It indicates the products must not be stepped on.

- 6.2.2 The use of Li-ion battery trucks shall be in accordance with the requirements of temperature, humidity and environment specified in the truck instructions, and the maintenance and disassembly of lithium battery shall be carried out when the battery case is clear without any foreign bodies, especially metal tools, and there are no impurities or blockages in the air duct.
- 6.2.3 Operators are forbidden to short-circuit connect lithium batteries, otherwise the system will be seriously damaged and people will be injured.
- 6.2.4 Li-ion batteries should be kept away from heat, fire and avoid long time direct sunlight. Li-ion batteries must not be placed in liquid (such as water, solvent) or high humid environment to avoid damages caused by leakage or short circuit.
- 6.2.5 Installation, commissioning and maintenance of lithium batteries in rain and snow weather should be carried out indoors to prevent short circuit caused by rainwater entering Li-ion battery system..
- 6.2.6 Because of the communication protocol between the management of lithium batteries and trucks, it is prohibited to interchange lithium batteries with the same voltage and capacity on different trucks without the permission of the host plant.
- 6.2.6 It is forbidden to mix Li-ion batteries with other batteries in one truck. For the truck that is about to replace batteries, it is necessary to check up whether the new batteries are with the same model and with the same group or not before restart it.
- 6.2.7 The Li-ion battery cases shall be transported and moved strictly in accordance with the regulations without any improper operations like towing, prying and kicking, which will cause mechanical impact on the batteries, such as dropping, impacting and pressing. It's highly prohibited to overlap, upside down and side-up lithium battery cases.
- 6.2.8 It is necessary to ensure the correct connection and normal operation of the lithium battery management system whether charging or discharging, and to ensure the normal communication between the lithium battery management system and the truck system.
- 6.2.9 Li-ion batteries are prohibited to contact and to be placed together with objects that will possibly cause a short circuit. Sharp stuff and workers in clothes and accessories with metal are not permitted to get close to Li-ion batteries.
- 6.2.10 Periodically check the lithium battery information displayed by truck meters. If there is any problem, do not open and operate the battery case by yourself. Contact relevant technical personnel immediately for further guidance.
- 6.2.11 Unauthorized disassembly, damage and installation of lithium battery components are strictly prohibited. It is forbidden to dissect lithium batteries or lithium battery groups without authorization in order to avoid danger. Non-professional workers are forbidden to replace the data transmission interface and voltage acquisition interface of lithium battery management system to prevent short-circuit damages to system components and even cause fire. Safety warning signs must be obeyed for safety's sake.
- 6.2.12 If operators find any of the following situations or have any concerns about the safety of the product, shut down the truck first, and take measures like disconnecting the power connection to ensure the safety of both the operators and the truck, then immediately contact the relevant personnel for further guidance. Solutions provided as follow:
Contact relevant technicians for emergency repair when see the signs of overheating, smoking, sparking; battery pack damage (such as rupture), battery leakage; battery system case and power cord take in water.
Contact relevant technicians for an overhaul when see ruptures or damages of the power cord, plug, extension cord, protective device; or when confronted with the problems that don't threat personal or trucks' safety , like the truck fails to work normally.
- 6.3 Requirements on Charging the Li-ion batteries
- 6.3.1 The charging temperature range is 0-50°C. Li-ion batteries are not allowed to charge in the environment below 0°C except those with heating system. Low-temperature charging will cause lithium evolution and affect the service life of Li-ion batteries.
- 6.3.2 The charging place should keep clean and well ventilated, and always keep away from inflammable and explosive articles. Fireworks are strictly prohibited in the charging area.
- 6.3.3 Operators are suggested to help themselves to charge only with the certain charging equipment coming with the truck from the manufacture to maximize the safety performance of Li-ion batteries. Make sure to connect the positive and negative poles correctly and never do reverse charging.
- 6.3.4 After the battery is fully charged, unplug the charging line in time to avoid other safety problems.

6.3.5 Abnormal termination of charging may occur during the charging process of lithium batteries. For example, if the charging voltage is too high or the charging current is too large. The phenomenon is defined as "Abnormal Termination of Charging". When it occurs, it may indicate the leakage of lithium batteries or failure of some parts. It is necessary to notify relevant technicians for a complete inspection, finding out the causes and solving them before resuming the charge.

6.4 Requirements on discharging the Li-ion batteries

6.4.1 Discharge temperature range is -20-60°C.

6.4.2 When a lithium battery fault is found in display during the start-up or operation of a truck, the cause of the fault should be inquired according to the display code and the schedule of the truck instruction, and the technical personnel should be notified to deal with it in time.

6.4.3 It is necessary to ensure that lithium batteries are not less than 50% charged before maintenance or repair.

6.4.4 To prevent damages of lithium batteries caused by over discharge, it is necessary to charge lithium batteries in time when the instrument displays low charge alarm.

6.5 Requirement on transportation and unloading

6.5.1 Firm outer packages are highly required when Li-ion batteries are about to transport.

6.5.2 Sign of water proof, sign of humidity, and sign of upward, sign of careful and light handling shall be attached to the out packages. In case of being damaged, the battery cases must be placed upward according to the sign.

6.5.3 When the lithium batteries are dislocated or extruded during transportation, the exposed wiring harness and connectors should be checked to see if the lithium batteries are damaged or deformed. In case of smoke, sparking, stay away from the scene immediately, and professional technicians should be notified.

6.6 Requirements on the storage

6.6.1 The storage of lithium batteries should be in clean and ventilated rooms with ambient temperature ranging from -10 ~35 °C (recommended storage temperature ranging from 0 ~25°C). Long-term storage batteries (more than 3 months) should be placed in an environment with temperature of 25 ±3 °C and relative humidity of 65 (±20%).

6.6.2 The contact between lithium battery and corrosive chemicals or gases shall be avoided, so as to prevent the corrosion of lithium battery or its connecting parts, affecting the appearance and service life of the battery.

6.6.3 Keep Lithium batteries away from fire and heat, meanwhile, keep the batteries dry.

6.6.4 Insulation, waterproof and dustproof are required over the storage. Make sure that the protective cover plate above the lithium battery case is fixed tightly without defects and damages. The battery case should be covered with insulation materials and sealed if there is no sealing cover plate.

6.6.5 When lithium batteries are to be stored, the charge should be above 30%. In order to prevent over discharge during long-term storage (more than 3 months), batteries should be charged regularly, keeping the charge at 50%-80%.

6.6.6 It is required to conduct a charge check once a month for those long-term parking trucks. After check, make sure the charge is between 50% and 80%. Charge it till the required amount if the charge is insufficient.

6.6.7 Long-term idle lithium batteries need periodic charge-discharge activation and a standard charge-discharge cycle once a month

6.7Charger

6.7.1 This charger is specially designed for lithium battery charging. Please do not use it for other purposes.

6.7.2 Electrical safety

- 1) The charger must be connected with the power supply system specified in the product specification.
- 2) The accessories attached must be used. To ensure the safety of use, do not replace the accessories without permission.
- 3) If the cable, connector or other accessories are damaged, the charger must be stopped immediately, Contact the technical service center for repair or replacement.

6.7.3 Charging environment

- 1) Smoke, water, flame and corrosive gas shall be prevented from entering the charger.
- 2) If a small amount of liquid intrudes, please turn off the charger immediately and send it to the designated professional technician for maintenance.
- 3) The protection grade of the charger is IP20, which means that it has only basic dust-proof and completely waterproof functions.
- 4) Working environment of the charger is: -20°C~40°C。
- 5) Storage temperature of the charger is: -40°C~70°C。
- 6) Working and storage relative humidity: generally 0%~95 %(non-condensing)

6.7.4 Battery installment

1) AC input wiring mode

The charger is equipped with industrial plug and socket accessories. The plug has been pre installed by our company. You need to install the socket accessories yourself. Please install the socket connection by professional electrician

with electrician certificate.

2) DC output wiring mode

The charger you purchased may be the following DC output connectors: (DIN) no matter what kind of DC output connector you choose, be sure to connect the charger correctly according to the identification on the connector.

3) Precaution

Before use, please carefully check whether the AC input terminal and DC output terminal are respectively connected in place without looseness.

4) Charger display and simple troubleshooting

According to the different models you buy, the charger is equipped with a LCD or LED digital tube display, which can display the charging state. If you are unable to solve the charger failure by yourself, please contact the technical service center for assistance.

● Error code display Table

Error display	Description
Self checking (LCD)	In the process of checking whether the battery is faulty, whether charging is allowed, and whether the charger itself is faulty, etc
Ready (LCD)	External environment is normal and can be charged
Battery charging (LCD)	Battery is in charging
Full battery (LCD)	Charging completed
Shut down... (LCD)	Power off, the main switch can be turned off at this time
Grid abnormal (LCD)	Charger input voltage above or below input voltage range
Please connect the output line (LCD)	Output line is not connected with the battery or hardware is not well connected.
Battery disconnection / mode error	(LCD) charger charging mode selection error
Fault E01	Charger output voltage above predetermined value
Fault E02	Charger output current above predetermined value
Fault E03	Charger communication fault
Fault E04	Charger temperature above set value
Fault E09	Charger temperature acquisition signal abnormal
Fault EB1	Battery voltage too high
Fault EB2	Battery current too high
Fault EB3	Communication failure between charger and power management, charger cannot detect BMS message
Fault EB4	Battery temperature too high
Do not charge (LCD)	Charging is not allowed

Note: some of the above fault codes need to be sent out with BMS for display. If the battery has no BMS, some of the fault codes will not be displayed.

7. Inspection before operation:

For the sake of safety operation and good situation of the electric truck, it is compulsory to check the truck completely before operation. Contact the sales department of our company when founding problems. Unless authorized or trained, the manufacturer cannot modify any adjustment values (including motor speed, etc.). In particular, the safety equipment and switches are not allowed to dismantle and adjust, incorrect repair and adjustment, will cause the

occurrence of dangerous situations when operation.

Any inspection, maintenance, investigation and other work related to forklift truck, please contact our dealer. Worthy of note is that our company does not take any responsibility of the secondary damage caused by improper operation and maintenance or incorrect repair and the usage of the unoriginal parts of our company.

7.1 Check point and check content:

	No.	Check point	Check content
Braking system	1	Operation handle	When we rotary concentrated control handle to see whether there is a noise from the brake.
	2	Brake clearance	The clearance between brakes should be kept between 0.2mm and 0.5mm.
Steering system	3	Operation handle	Degree of tightness and rotary flexibility.
Hydraulic system	4	Oil pipe	Leakage or not.
	5	Hydraulic oil	Appropriate oil quantity.
	6	Lifting oil cylinder	Whether there is any oil leakage.
Wheels	7	Pins, screws and all the fasteners	Check all the fasteners of the truck's wheels, i.e. pins or screws, loose or not.
	8	Wearing status	Compare the parameter list, replace the wheel when its diameter reduces by 5%.
Battery	9	Charge	Confirm the display state of the Li-ion battery capacity.
	10	Connecting wire	The connecting line and socket shall be firm.
Horn	11	Horn	Press down the horn button to check whether the horn sounds.
Instrument	12	Function	Turn on the switch of electric lock to check whether the instrument displays normally.
Others	13	Truck frame, etc	No damage, crank.
	14	Function	Check that whether lifting, lowering, forward & backward movement and support legs of the truck is normal, and if there is any abnormal noise.

8. Inspection after operation:

After operation, the smudge on truck shall be wiped out. Besides, the following check shall be carried out:

Keep visibility of all graphics context marks such as warning signs, nameplate and notice board. These marks are able to instruct, caution and warn the operator to some degree.

The situation about deformation, distortion, damage or breakage

Add lubricating oil and grease if necessary.

Replace faulty components.

9. Periodic maintenance and repair:

Comprehensive check for truck can avoid malfunction and ensure the service life. The hours listed in maintenance procedures is based on the cases that the truck works for 8 hours per day and 200 hours per month. For the sake of safety, maintenance shall be carried out according to maintenance procedure.



Notice

All the repair work shall be carried out by professional personnel.

Please contact the sales department of our company if you need to adjust or replace the components.

9.1 Precautions during maintenance:



Notice

The components for replacement shall be produced completely by our company. When replacing components of the truck, the components with the same safety requirement with the original design shall be used.

The lubricating oil and hydraulic oil in use shall be recommended by our company.

1) Places for maintenance:



Notice

The places for maintenance shall be appointed and can provide other services such as hoisting and safety protection facility etc.

The places shall have level ground and good ventilation.

The places shall be equipped with fire-extinguishing devices.

2) The matters needing attention before maintenance:



Notice

No smoking.

Arrange the self-protection work.

Wipeout the effusive oil in time.

Before adding lubricating oil, clean up the dirty oil or dust on the joint with brush or cloth.

Except certain situation, turn off the key switch and pull off the power socket.

Lower down the fork arms to the lowest point when carrying out maintenance.

Ensure no goods on the truck when demounting the high pressure oil pipe. Besides, the fork arms shall be descended to the lowest position, by this way, the pressure of hydraulic system can be released.

For the reason that there are capacitors storing a little amount of electric energy in circuit, so before contacting the binding post of the main circuit, discharge at first.

Clean the electric section with compressed air, never flush with water.

When the truck requires high-position maintenance, the altitude safety protection must be carried out for the repairing and maintenance personnel.

9.2 Inspection and maintenance before the new truck is put into operation

Check whether the packaging of each part, lithium battery and charger of the forklift is in good condition, and whether the information such as power and working time in the instrument is normal after opening the electric lock.

9.3 Daily inspection

Check hydraulic oil level

Lower the fork to the lowest position, refilling amount is 24V. Strongly suggest to apply recommended hydraulic oil.

Check the capacity of the Li-ion battery;

refer to the use and maintenance of Li-ion battery.

9.4 The inspection according to the need

Clean the truck

Inspect and screw down each fastener

Inspect the damage state of wheels

9.5 The inspection and maintenance after 50 hours (Weekly)

Braking system	1	When we rotary concentrated control handle to see whether there is a noise from the brake.
	2	The oil dirt and dust on the turning gearwheel should be cleaned.
	3	The clearance between brakes should be kept between 0.2mm-0.25mm
Inspect the contactor	4	Burnish the coarse surface of contacts using sand paper.
Inspect the Li-ion battery	5	Temperature over discharge is lower than 60°C

9.6 The inspection and maintenance after 200 hours (Monthly)

Besides the weekly maintenance, the following maintenance should be carried out, and when the parts must be adjusted and replaced, please contact with maintenance personnel of our company. (keep monthly maintenance record)

	No.	Check point	Check content
Whole truck	1	Whole status	Abnormal or not.
	2	Horn	Sound
Steering system, braking system, hydraulic system and lifting system	3	Safety seat switch	Seat safety switch closes when seated, there is a noise from the brake.
	4	Brake clearance	The clearance between brakes should be kept between 0.2mm and 0.8mm.
	5	Operation handle	Degree of tightness and rotary flexibility.
	6	Truck frame and fastener	Function, and check cracks, lubrication and tightness of fasteners.
	7	Fork clip mechanism	Function and check the cracks, bending, deformation.
	8	Oil pipe	Whether oil pipes leak or not.
	9	Hydraulic oil	Proper quantity of oil.
	10	Lifting oil cylinder	Whether there is any oil leakage or not.
	11	Plug	Liquid level, specific gravity and cleanness
	12	Key switch	Function, whether it is damaged or not
	13	Contacto	Function
	14	Microswitch	Contact performance and function
	15	Controller	Function
	16	Driving motor	Function
	17	Lifting motor	Wearing status of carbon brush and selenium rectifier.
	18	Fuse	Wearing status of carbon brush and selenium rectifier.
	19	Wiring harness and connection terminals	Whether it is loose or damaged.

9.7 Maintenance for 600 hours (every three months)

During the maintenance every three months, the monthly maintenance process shall be repeated. When the parts must be adjusted and replaced, please contact with maintenance personnel of our company.

Contacto	Burnish the coarse surface of contacts using sand paper.
	Replace according to the status when the function is not well.
Motor	Wearing status of carbon brush and commutator.
Brake	Clean the dirt and dust on friction plates of the brake, meanwhile check the wearing status of the friction plates.

9.8 Maintenance for 1200 hours (every six months)

During the maintenance for a half year, the maintenance process for three months shall be repeated. When the parts must be adjusted and replaced, please contact with maintenance personnel of our company.

Contactor	Burnish the coarse surface of contacts using sand paper.
	Replace according to the status when the function is not well.
Motor	Wearing status of carbon brush and selenium rectifier.
Reduction box	Replace the gear oil
Oil filter	clean
Brake	Clean the dirt and dust on friction plates of the brake, meanwhile check the wearing status of the friction plates.
Hydraulic system	Replace hydraulic oil. Check that whether there is any leakage in the lifting cylinder or not and replace the seals when necessary.
Fork wheel and bearings	Check the wearing condition, and replace them if necessary

9.9 Recommended working medium:

- 1) Hydraulic oil:
 - A. When it is normally loaded, we advise:
Hydraulic oil: LHPISOVG46, in accordance with standard DIN51524T.2, the average sustained temperature should between 40 degrees to 60 degrees.
 - B. Heavy loaded,we advise:
Hydraulic oil: LHPISOVG68,conform to the standard of DIN51524T.2, the average continuous temperature isover 60 degree.
 - C. Low temperature light load, we advise:
Hydraulic oil:HLPISOVG32, conform to the standard of DIN51524T.2, the average continuous temperature is below 60 degree.
 - D. Various load,we advise:
Use the hydraulic oil:LHPISOVG46 that conforms to the standard of DIN51524T.2 in the above working condition.
The viscosity of the lubrication oil is high.(most use the hydraulic oil) .
Use the SAE20W/20 engine oil instead of the HLP68 hydraulic oil when it is difficult to buy the hydraulic oil .
- 2) Gear oil:
Heavy load gear oil 85W-90(GL-5)。
- 3) Lubricating grease:
Lithium grease of type 3

All kinds of depleted hydraulic oil, gear oil and grease will pollute the environment. For this reason, recycle the replaced working medium or treat according to local pertinent regulations.

9.10 Maintenance period of consumables and partial parts:

Items	Maintenance content	Maintenance period	Remarks
Bearings of fork wheel	Replacement	1200 hours	
Wheel	Replacement	1200 hours	
Seals	Replacement	1200 hours	Replace when finding out damage
Gear box	Replacing lubricant grease	1000 hours	
Hydraulic oil	Replacement	1000 hours	
High pressure oil pipe	Replacement	2000 hours	Replace when finding out damage
Filter screen of hydraulic oil tank	Cleaning	1000 hours	
Driving motor	Check for carbon brushes and bearings	1000 hours	
Steering motor	Check for carbon brushes and bearings	1000 hours	
Oil pump motor	Check for carbon brushes and bearings	1000 urs	

10. The storage, transportation and loading of truck:

10.1 The store of truck:

If the electric pallet truck is not used for over 2 months, it should be placed in the room which is in good ventilation, no frost, clean and dry; also the following measures should be taken:

Clean the truck thoroughly.

Lift the forks completely for several times, check it is normal or not.

Lower the forks to the lowest position.

Support the side near to driver of truck with square timber to lift the driving wheels of truck from the ground.

Apply a layer of flimsy oil or grease on all the bared surface of mechanical parts.

Check the condition of the Li-ion battery, and make sure that the power of the lithium battery is less than 20%.

All the electrical contacts should be sprayed using appropriate contacts spray.

10.2 transportation of truck:

If the truck needs to be transported for a long distance, support the side near to driver of truck with square timber to lift the driving wheels of truck from the ground. The two front wheels of truck shall be fixed stably by sphenoid wood block. Fasten the truck to transport truck with ropes.

10.3 Loading and unloading of truck:

Before loading the truck, check out the nameplate for the total weight of truck to choose appropriate hoisting handling equipment. The hoisting of truck shall be kept level, and landing shall be kept slow and stable. The personnel around shall watch for safety. One of the personnel is responsible for conducting. If the other truck is used for loading and unloading, please watch the bottom situation of the truck. Take care to insert the fork arms to the bottom, in avoidance of damaging the driving wheel, balance wheel and forward wheel.

11. Replacement of Li-ion battery

The replacement procedure of Li-ion battery is as follows:

- 1) Open the side door of Li-ion battery and take it down.
- 2) Pull down the socket connector of Li-ion battery from the truck.
- 3) Pull out the Li-ion battery from the side way and take the Li-ion battery away with special car or using hoisting method.
- 4) The mounting method of putting the Li-ion battery back into the battery pack is opposite to the above procedures.



Notice

Handle the Li-ion battery gently during hoisting and transportation of the battery. Otherwise it will cause damage to the battery or bring danger to human body.

12. Common faults and troubleshooting:

No.	Faults	Possible cause	Trouble shooting
1	The forklift cannot start (shout down of main contactor)	①blown fuse of controller circuit	change
		②power switch is not well connected or damaged	repair or change
		③blown fuse of main circuit	change
		④electric lock is not well connected or damaged	repair or change
		⑤connection of battery is loose or fall off	fasten
	The order picker cannot start (shout down of main contactor)	① steering wheel EM brake does not suck, the truck is in brake condition	repair or change
②Potentiometer loose or the screw loosened		repair or change	
③walking motor magnetic coil is broken or terminal is not well		repair or change	

		connected	
		④ tip of contactor is not well connected	repair or change
		⑤ MOSFET tube type circuit board in trouble	repair or change
		6) guardrail is not put down or guard rail switch damaged	put down or repair or change
2	Forklift can only move forward (or backward)	① contactor is not well connected or burned	repair or change
		② circuit board in trouble	repair or change
3	Forklift cannot stop in travelling	tip of contactor damaged, tip does not release when touching it	power off in emergence, change the contactor tip
4	shutdown of brake	① EM brake loose or damaged	fasten the screw or repair EM brake
		② EM brake plate worn out	change the brake plate
5	steering failure	① Steering gear damaged.	repair or change
		② steering motor damaged	repair or change
		② Oil pump motor damaged	repair or change
		③ Steering pipeline leaks.	repair or change
6	steering wheel is heavy to steer, with noise, motor is overloaded	① gear and bearing is blocked	clean or replace the bearing
		② there is clearance in bearing installation	adjust the clearance
		③ front wheel bearing damaged	replace the bearing
7	Forks cannot lift	① overloaded	reduce the load
		② pressure of overflow valve is too low	adjust higher
		③ abnormal inside leakage in lifting cylinder	replace the seal
		④ hydraulic oil is not enough	add appropriate amount of filtered hydraulic oil
		⑤ voltage of the battery is not enough	charging
		⑥ manual multivalve damaged	repair or change
		⑦ Oil pump motor damaged	repair or change
		⑧ Oil pump damaged	repair or change
		⑨ voltage of the battery is severely not enough	Charging
		⑩ electric lock not open or damaged	repair or change
8	The fork cannot lower after lifted.	① inner mast overloaded or deform	repair or change
		② outside mast overloaded or deform	repair or change
		③ mast rolling wheel blocked	repair or adjust
		④ mast guiding rod bended	repair or adjust
		⑤ speed adjust valve blocked	adjust
		⑥ Solenoid valve is out of control	eliminate faults
		⑦ chain loose	repair or tighten chain
9	voltage decreased (after charging)	① individual battery damaged	repair or change
		② battery liquid level low	add electrolyte
		③ there is impurity in electrolyte	replace electrolyte

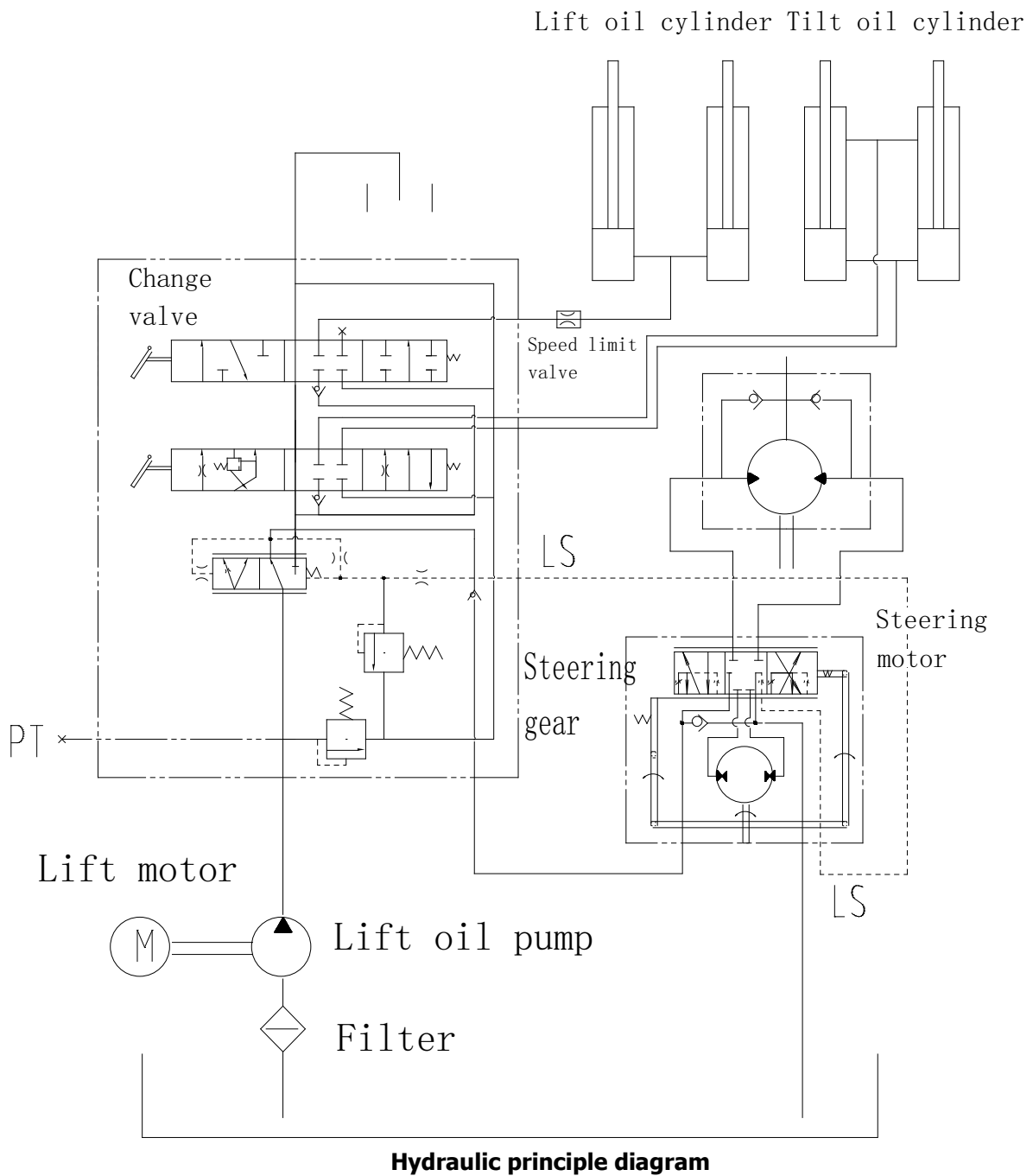
13. List of accessories, spare parts and wearing parts

No.	Name	Position for use	Specification	Quantity	Remark
1	Electric key	switch on electric lock	SZDQ	2	
2	Plug, socket	match the charger	REMA EP160	1set	
3	Fuse	Electrical parts	10A	2	
5	Fuse	Electrical parts	250A	1	

7	Seal ring	Side cylinder	UHS40	1	
8	Dust ring	Side cylinder	DHS40	2	
10	O- seal ring	Side cylinder	47.5X2.65	2	
11	Combined ring	Oil tube	D22	2	
12	Combined ring	Oil tube	D20	2	
13	Combined ring	Oil tube	D14	2	
14	Combined ring	Oil tube	D12	2	

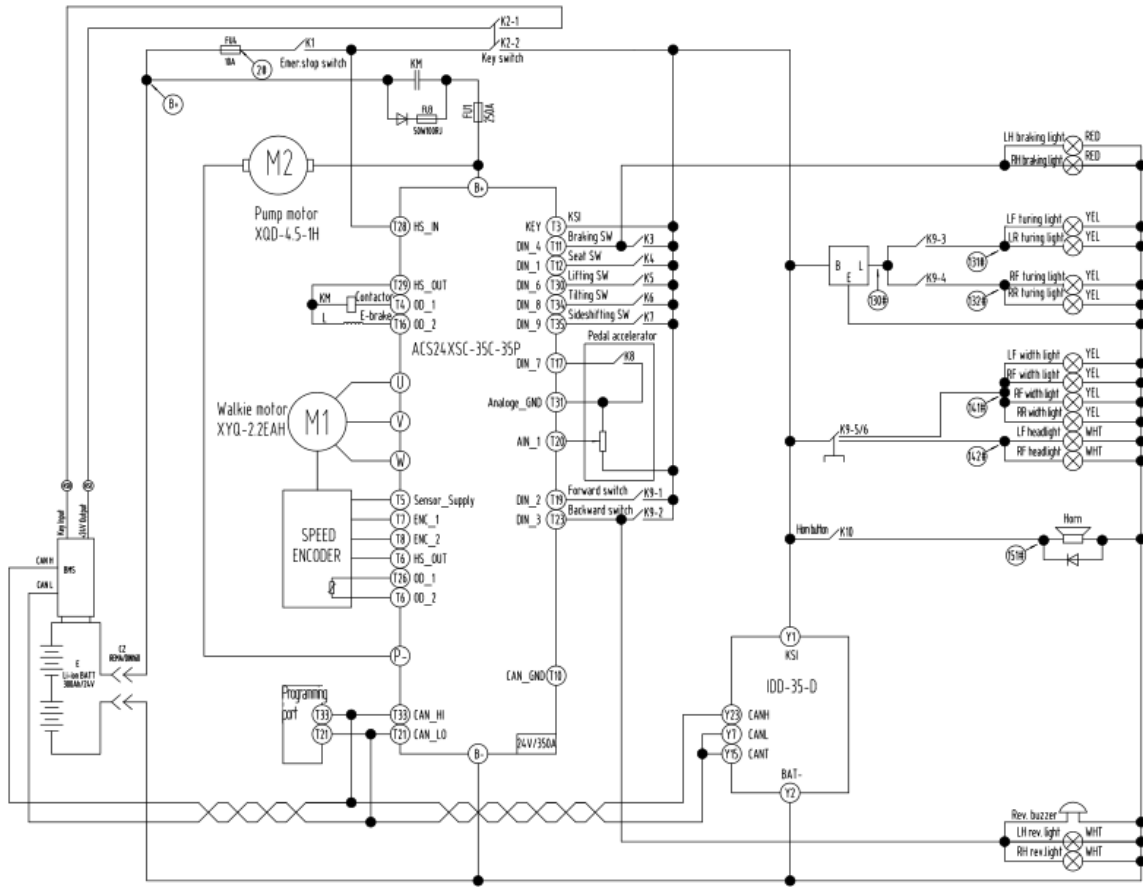
Delivery company:

14. Structure diagrams, schematics of main components



15. Electric system

15.1 Electric system diagram



Electric diagram

15.2 Inmotion controller



- Brand
- ACS: controller series
- 48: Rated voltage is 48V
- 450: Max. current 450A
- Software serial number

Unique serial number of this controller

15.3 Error code table

No.	Error code	Hexadecimal	Description	Trouble shooting
1	13	0x0D	HPG CONTROLLER EEPROM KO	Reset key
2	20	0x14	Incorrect start Accelerator pedal switch active before key on	Release pedal switch
3	21	0x15	Incorrect start Forward switch or reverse switch active before key on	Turn off the direction switch

4	22	0x16	Forward switch and reverse switch active at the same time	Direction switch fault
5	23	0x17	Throttle analog value out of range	Throttle fault or analog need to be calibrated
6	24	0x18	Throttle analog fault	
7	30	0x1E	HPG controller battery voltage low	HPG controller battery voltage low need charge
8	31	0x1F	Traction controller CAN communication fault	Check CAN wire of controller and display
9	32	0x20	Battery voltage low	Need charge
10	33	0x21	DC motor voltage high	Reset key
11	34	0x22	CPU fault	Reset key
12	36	0x24	Incorrect start Tilt switch active before key on	Reset tilt switch
13	37	0x25	Incorrect start Side switch active before key on	Reset side switch
14	38	0x26	Incorrect start Attachment switch active before key on	Reset attachment switch
15	39	0x27	Incorrect start Lift switch active before key on	Reset lift switch
16	40	0x28	Lift analog value out of range	Lift analog fault or need to be calibrated
17	43	0x2B	Steer analog value out of range	Steer analog fault or need to be calibrated
18	44	0x2C	WARNING: Traction controller speed protection	Truck speed is too high alarm
19	45	0x2D	WARNING: Traction controller encoder fault	1.Traction controller encoder fault 2.Traction motor speed sensor connection wire is open
20	49	0x31	DC motor operating current is zero	HPG controller sensor fault
21	53	0x35	HPG controller over current	HPG controller over current
22	62	0x3E	HPG controller temperature high	HPG controller temperature high need cool
23	66	0x42	HPG Controller battery low	HPG controller battery low need charge
24	74	0x4A	HPG controller driver shorted	HPG controller driver shorted
25	76	0x4C	HPG controller coil shorted	HPG controller coil shorted
26	78	0x4E	HPG controller VACC not ok	HPG controller VACC not ok
27	79	0x4F	Incorrect start HPG controller incorrect start	HPG controller incorrect start
28	81	0x51	WARNING: Traction controller temperature is low	Traction controller temperature is low alarm
29	82	0x52	WARNING: Traction controller temperature is high	Traction controller temperature is high alarm
30	83	0x53	Traction controller temperature sensor fault	Traction controller temperature sensor fault
31	84	0x54	WARNING: Traction motor temperature is low	1.Traction motor temperature is low 2.raction motor temperature sensor is fault
32	85	0x55	WARNING: Traction motor temperature is high	1.Traction motor temperature is high 2.Traction motor temperature sensor is fault
33	86	0x56	Traction motor temperature sensor fault	1.Traction motor temperature sensor is fault 2.Traction motor temperature sensor connection wire is open
34	87	0x57	Traction motor encoder fault	1.Traction motor encoder fault 2.Traction motor speed sensor connection wire is open

35	88	0x58	WARNING: DC bus voltage of traction controller is high	1.DC bus voltage high 2.The ramp is too steep
36	89	0x59	WARNING: DC bus voltage of traction controller is low	Need to charge or check power wiring
37	90	0x5A	WARNING: The default value of the traction controller is updated	Reset key
38	91	0x5B	WARNING: Traction drive limit	Battery low truck speed limit
39	97	0x61	Open drain of traction output open or short	Check the wire of open drain of traction output open or short
40	98	0x62	WARNING: Traction controller over current or short	Check power wiring
41	101	0x65	Traction controller short	Check power wiring 2.Controller enable before contactor pull
42	102	0x66	Traction controller temperature is high cut back	Traction controller temperature is high need cool
43	103	0x67	Traction motor temperature is high cut back	1.Traction motor temperature is high need cool 2.Traction motor temperature sensor fault
44	104	0x68	Traction controller over current	1.Truck overload or Mechanical clamping 2.Traction motor speed sensor fault
45	105	0x69	Traction controller precharge failed	Replace the pre charge resistance
46	110	0x6E	DC bus voltage of traction controller is low cut back	Battery need charge
47	111	0x6F	DC bus voltage of traction controller is high cut back	DC bus voltage of traction controller is high cut back
48	112	0x70	DC bus voltage of traction controller is high cut back(Hardware monitoring)	DC bus voltage of traction controller is high cut back(Hardware monitoring)
49	114	0x72	Internal power supply error	Traction motor temperature sensor or speed sensor connection
50	121	0x79	WARNING: Pump controller temperature is low	Pump controller temperature is low alarm
51	122	0x7A	WARNING: Pump controller temperature is high	Pump controller temperature is high alarm
52	123	0x7B	Pump controller temperature sensor fault	Pump controller temperature sensor fault
53	124	0x7C	Pump motor temperature is low	1.Pump motor temperature is low 2.Pump motor temperature sensor fault
54	125	0x7D	WARNING: Pump motor temperature is high	1.Pump motor temperature is high 2.Pump motor temperature sensor fault
55	126	0x7E	Pump motor temperature sensor fault	1.Pump motor temperature sensor fault 2.Pump motor temperature sensor connection wire is open
56	127	0x7F	Pump controller encoder fault	1.Pump motor speed sensor fault 2.Pump motor speed sensor connection wire is open
57	128	0x80	WARNING: DC bus voltage of pump controller is high	DC bus voltage of pump controller is high
58	129	0x81	WARNING: DC bus voltage of pump controller is low	Check power wiring
59	130	0x82	WARNING:	Reset key

			The default value of the pump controller is updated	
60	132	0x84	WARNING: Pump drive limit	Battery voltage low need charge
61	137	0x89	Open drain of pump output open or short	Check the wire of open drain of pump output open or short
62	138	0x8A	WARNING: Pump controller over current or short	Check power wiring
63	141	0x8D	Pump controller short	
64	142	0x8E	Pump controller temperature is high cut back	
65	143	0x8F	Pump motor temperature is high cut back	Pump motor temperature is high alarm
66	144	0x90	Pump controller current calibration error	Reset key
67	145	0x91	Pump controller precharge failed	Replace the pre charge resistance
68	150	0x96	DC bus voltage of pump controller is low cut back	DC bus voltage of pump controller is low cut back
69	151	0x97	DC bus voltage of pump controller is high cut back	DC bus voltage of pump controller is high cut back
70	152	0x98	DC bus voltage of pump controller is high cut back(Hardware monitoring)	DC bus voltage of pump controller is high cut back(Hardware monitoring)
71	153	0x99	Pump controller CPU fault	Reset key
72	154	0x9A	Pump controller speed control fault	Pump controller speed control fault
73	147	0x93	BMS cell voltage too high	
74	148	0x94	BMS firstly fault	
75	149	0x95	BMS secondary fault	
76	155	0x9B	BMS CAN bus off	BMS CAN bus off
77	156	0x9C	Temperature protection	Temperature protection
78	157	0x9D	BMS over temperature protection	BMS over temperature protection need cool
79	158	0x9E	BMS single body over discharge	BMS single body over discharge need charge
80	159	0x9F	BMS over voltage protection	BMS over voltage protection
81	161	0xA1	Display can fault	Check display and controller can connection
82	163	0xA3	BMS over current	BMS over current
83	164	0xA4	Charge protection	Charge protection
84	165	0xA5	Seat switch off after a period of time, the direction of the request to reset	Reset direction switch
85	168	0xA8	BMS indicates Limit Current alarm	BMS indicates Limit Current alarm
86	169	0xA9	BMS indicates cutoff Current alarm	BMS indicates cutoff Current alarm
87	170	0xAA	BMS indicates brake Current alarm	BMS indicates brake Current alarm
88	171	0xAB	BMS CAN error	BMS CAN Error
89	200	0xC8	Proportional valve error	Proportional valve error
90	241	0xF1	HPG controller can bus ko	Check can wire open and can speed rate
91	242	0xF2	HPG controller battery over voltage	HPG controller battery over voltage
92	243	0xF3	HPG controller key shorted	HPG controller key shorted
93	244	0xF4	HPG controller watchdog error	Reset key switch
94	246	0xF6	HPG controller waiting for main contactor	Turn off the pump contactor parameter

15.4 Intelligent instrument

IDD-35C-D is a truck mounted color screen instrument based on CAN and wireless communication, which can display information such as truck speed, working time, battery power, Chinese and English display, password protection, fault code, etc. Meanwhile, it can realize industrial interconnection functions such as truck positioning, remote locking, remote help, etc. It can also modify and configure truck parameters

according to users, provide online real-time communication, cloud data storage and background monitoring services. IDD-35C-D has the advantages of instant communication, precise positioning and high degree of visualization. It is the best terminal for the future Internet of things and cloud services of electric forklift. It is widely used in all kinds of industrial electric trucks, such as forklift, balance truck, tractor, sightseeing truck, AGV, etc.

- Appearance and display instructions



1) Instrument main interface display






NO.	Parameter name	Description	Remarks
1	Hour meter	Digital display of the current cumulative working time of the truck, with a maximum of 5 digits;	
2	Wheel angle indication	The arrow represents the direction of the steering wheel;	
3	Working mode indication	Display the current working mode, including "s" (turtle speed), "P" and "e"	
4	Driving speed display	Displays the current truck speed in km / h or mph	
5	Battery power display	Displays the current battery level	
6	Forward and backward indication	The "↑" arrow appears in forward gear; the "↓" arrow appears in reverse gear; it is not displayed in neutral gear	
Show item subtotal			6

2) Alarm light description



Serial number	Parameter name	Description	Remarks
1	Turtle low speed light	Lights up when the truck is running in tortoise speed mode	
2	Fault light	Lights up when the truck fails	
3	Battery light	Lights up when the battery charge is less than or equal to 20%	
4	Lift lock light	When the power level is less than or equal to 10%, the lift lock lamp is on	
5	Seat light	Lights up when the driver leaves the seat	0: on; 1: off
6	Handbrake light	Lights up when the driver operates the handbrake	

3) Key function

Icon	name	function
	Up	Move the cursor up or add 1 to the selected number; switch S mode (turtle speed mode) in the main interface;

	Left shift	Move the cursor to the left and switch to p mode in the main interface;
	Right shift	Move the cursor to the right, switch e mode in the main interface;
	Down	Move the cursor down or decrease the selected number by 1; switch S mode (turtle speed mode) in the main interface;
	Delete	Cancel the current content or return to the previous menu;
	Confirm	Confirm the current operation and enter the menu mode in the main interface;

4) Key combination

Icon	name	function
	Up	In the main interface, press "up" and "down" simultaneously to view instrument information, including instrument number, SIM card number and software version number.
	Down	

16. Packing list

Item	Name	Q'ty	Remarks
1	Complete truck	1 unit	
2	Fork	1 pair	
3	Technical document	1 pc	Table 1
4	Random tooling	1 pc	Table 2

Table 1. Technical document

Item	Name		Q'ty	Remarks	
1	Content	1.1	Certificate of qualification	1	
		1.2	Random list	1	
		1.4	Use instructions	1	
		1.5	Parts catalogue	1	
2	Key		1		

Table 2. Tool kit attached to the truck

Item	Name	Q'ty(pc)	Remarks
1	Sleeve extension bar	1	
2	Wheel hub nut sleeve 22	1	
3	Wheel rim nut sleeve 17	1	
4	Hook spanner for lifting and tilting of the cylinder	1	
5	Double-ended spanner 8~10	1	
	Double-ended spanner 14~17	1	
	Double-ended spanner 17~19	1	
	Double-ended spanner 22~24	1	

	Solid spanner 13	1	
	Solid spanner 16	1	
	Solid spanner 18	1	

Consignor:

Appendix I

ISO3691-1980

Motor industrial truck—Safety Norms

The Second Part Safety Norms of motor industrial trucks in service, operation and maintenance

- 14 Safety rules for the user and driver
In order to use the motor industrial truck well, this part set up some rules. The 14.1 is applied to the user, the 14.2 is for the driver.
- 14.1 Applied to the user
The users are the owner or the leaser individual or corporation of the truck.
- 14.1.1 The qualification of the driver
The driver of the motor industrial truck should be trained, pass examination and get the operation qualification.
- 14.1.2 The truck working in flammable and explosive circumstance
Only the industrial motor truck getting the qualification of the national authoritative department and getting the license of working in the flammable and explosive circumstance, should work in the circumstance.
This kind of truck should be marked with proper stamp sign, and the relevant building or the plant should be marked too.
The classification of the building or the field condition should agreed on by the user and the national relevant authoritative department.
- 14.1.3 Passenger
Except for special seats, the truck can not carry passengers. The passengers are forbidden to step on the ascent machine or the attachment.
- 14.1.4 The use of the forklift
- 14.1.4.1 The change of the capacity and nameplate of the truck
The truck in use shall not exceed the rated capacity stipulated by the factory.
Without the permit of the factory, any amendment of the design is forbidden, and should not add any attachment on the truck, in order to prevent the influence of the capacity and operation safety of the truck.
Any changing because of adding attachment should not reduce the security and accord to the requirement of this rule. After adopting the attachment, the capacity of the truck, the operation and the repair direction board, label or pattern should be altered correspondently.
The user should ensure all the nameplate and label in proper position, and maintain handwriting clear.
- 14.1.4.2 Stability
The user should pay attention to section 6 of the code, which is about the stability of the truck in the working conditions.
When operating correctly, the high lift truck accord with the section 6 is steady, but the incorrect operating or the wrong maintenance could let the truck working unsteadily.
The factors that may influence the stability are: the condition of the ground and the floor, grade ability, speed, load, the weight of the Li-ion battery, the dynamic force and the static force as well as the judgment train conditions of the drivers.
When the truck is working in the condition differ to the regular working condition should reduce the load.
When the truck mounted attachment working without load, it should be viewed as partial load.
- 14.1.4.3 The protection requirement and protection equipment
The truck should be painted with the color differing from the surrounding circumstance.
When it is necessary to denote the working condition, the truck should add caution device, such as

- light or flash lamp.
- 14.1.4.4 The charging and changing of the battery
 The battery charging station should set in the appointed area. The charging station should prepare the equipment using for flushing and neutralizing the overflow electrolyte, the fire control device, the measure avoiding the truck damage the charging device and the adequacy ventilation facility blow away the fume off from the battery.
 In the area of charging, it is forbidden to smoke and alarm with placard.
 Only the personnel trained and permitted can change or charge the battery. The battery repairing people should wear protective clothes.
 All the work of changing the battery should carried out according to the description of user's manual from the factory. When reinstall the battery, should adopt measures to make the battery connecting, orientation and fixation correctly. Do not put tools and other metal substance on the lidless battery.
 Without the special approval (for example the truck factory), the electrical motor truck should not change the battery with different voltage, weight or size.
 It is obliged to use the battery stated by the factory. It is obliged to prepare the facility for changing battery safely. When hanging up the battery using hoisting equipment, it is necessary to use insulated sleeve.
 If adopting chain hoist, it is necessary to equip chain box. If adopting chain block, the lidless battery should be covered by a piece of rubber blanket or other insulated materials, to prevent the short circuit of chain and the connecting wire or connecting terminal between the battery lattices.
- 14.1.4.5 Charge and replacement of the Lithium battery
 Charging station must be set in the designated area.
 Do not smoke in the charging area and use signs to warn.
 Only trained and approved personnel are allowed to replace or charge lithium batteries. Lithium battery maintenance personnel must wear protective clothing.
 All lithium battery replacement work must be carried out according to the manufacturer's instructions. When re installing the lithium battery, measures must be taken to correctly connect, position and fix the lithium battery. Do not place tools and other metal items on top of lithium batteries without covers.
 Electric trucks shall not be replaced with lithium batteries of different voltage, weight or size without special approval (e.g. truck manufacturer).
 Lithium batteries specified by the manufacturer must be used. Devices for safe replacement of lithium batteries must be available. Insulated suspenders must be used when lifting lithium batteries with lifting equipment.
 If chain block is used, chain box must be equipped. If the chain block is used, the lithium battery without cover must be covered with a layer of rubber plate or other non-conductive materials to prevent short circuit of the connecting wire or terminal between the chain and the single cell of lithium battery.
- 14.1.4.6 The invalid or damaged truck
 If finding the motor industrial truck existing insecurity factors, it should stop using and give away on the spot. After repairing and recovery to the safety conditions, it can be reused.
- 14.1.4.7 Accident
 Once the accident happens, for example the staff injures, the truck damages the building or the equipment, firstly should organize salvage, do best to protect the accident field and report to the governor.
- 14.1.5 Operating conditions
- 14.1.5.1 Channel and stacking field
 The ground of the operating field should have enough carrying capacity, and it is necessary to maintain it well not to influence the truck operating safely.
 The transporting channel of the truck should have well visual field, and it is easy to turn, and no grade, steep slope, narrows channel and low roof board. The outline or the borderline must be clear.
 In the road where it is easy to meet the stepping truck, the width of the channel should be adjusted.
 Advising the grade of the channel should not over 10%, the top and the bottom of the slope should transit smoothly, to prevent the load vibration or the bottom of the truck colliding the ground.
 When the grade is over 10%, installing a sign is advised.

If the truck is in operation (transport) and the load block off the sight, when the truck is operating, the load should be located on the backward of the truck operation direction.

For example: in some conditions (for example stacking and climbing), when the truck is operating, the load is required on the forward of the truck operation direction. Then, the driver should drive the truck carefully. It is necessary to attend: if the operation condition require, should equip accessory (assistant) equipment or assistant.

The passage, road, runway, floor or slope should maintain good operating conditions, to prevent the truck or the load from being damaged, and to prevent reducing the stability of the truck.

In dangerous state, including the barrier danger on the top should mark on the clear location.

The fire fighting passage, the upstairs passage and the fire fighting equipment should maintain expedite.

14.1.5.2 Gangplank or transition board

All the gangplank or transition board should has enough safety coefficients to bear the truck with load. On the gangplank or transition board should marked the max passing load perpetually.

The gangplank or transition board should fix firmly, to prevent the accidental move, vibration or slide.

On the gangplank or transition board should equipped handing or other available equipment to the effect of safety transport. On the conditions of possible, should set the fork hole or suspending ear for moving goods.

The gangplank or transition board should have non-slip finishing.

On the both sides of the gangplank or transition board, should mount the facility to prevent the truck from going over its edge.

When the gangplank or transition board is fixed its location, should adopt measures to prevent the reverse joint truck from moving suddenly.

14.1.5.3 Lighting

When the photometric brightness on the operating field is less than 32LX, the truck should equipped auxiliary light.

14.1.5.4 The suspending of the truck

The sling should be tied to the lifting spot which the factory appointed.

14.1.5.5 The synchronizing operation of the truck

Conveying bulky or heavy load using two trucks simultaneously is a dangerous operating which requires special care. And this kind of conditions should be taken as special conditions and carried out under the supervision of the operator responsible for operation.

14.2 Applied to the driver

The safety operating of the industrial truck lies on the control manner of the driver to a considerable degree. The safety rules applied to the drives are as follows:

- A) general rule;
- B) transporting rule;
- C) operating (driving) rule;
- D) the rule for the driver maintaining the truck.

Without regard to the rules maybe conduce:

- A) the serious danger of damaging the driver or other personnel;
- B) Damage the materials.

14.2.1 General rule

Only the personnel who have been trained and get the qualification of operation are permitted to drive the industrial truck.

The motor industrial truck could not carry passengers, except for equipped with the facility for the passengers sitting.

The driver should pay special attention to the operating circumstance, including the person nearby other staves and fixed or moving substances, and it is necessary to watch out for the passerby at any moment.

No matter whether there is load on the lifting part of the truck, it is forbidden anyone passing or standing under the lifting part of the truck.

If the people, building, organization or equipment accident happens, it is necessary to report to the relevant officer at once.

The driver should not change, add or demolish the truck components without the permission to influence the performance of the truck. It is not allowed to install accessorial frame or handle on the steering wheel, except the factory has installed it.

The driver should use the truck in the using range.

14.2.2 Load carriage (lifting and stacking) rule

14.2.2.1 Load

The truck can only convey the load not over its rated load weight.

Any measure of enhancing the capacity of the truck is forbidden.

Only the rank stabilized or safety load can be conveyed, especially when convey the super long or high load, should pay special care.

When convey the load which center of gravity is uncertain, operating the truck should special carefully.

14.2.2.2 The loading and unloading of goods.

When loading the goods with forks:

A) The space between the forks should fit the width of the conveying load.

B) The fork should insert into the inner of the load as deep as possible. But pay attention to not make the fork tip touch the substance except the load. Then the fork should lift to the enough height to move the goods.

14.2.3 Running (driving) rule

14.2.3.1 General rule

The driver should drive the truck along the right side of the road, and the driver should see the road clearly and attend other truck, passengers and safety space.

The drivers should abide by all the traffic rules, including the speed limit specified in the factory.

It is necessary to hold a certain space with the front operating truck.

The driver should drive the truck with earnest and responsible attitude at any time. The sudden starting, stopping and turn over at high speed are forbidden. Except for the requirement of the operation conditions, advising the steering wheel should not put on the limiting position when the truck is starting. If starting on the limiting position, it is necessary to operate carefully.

In operation (or called transport) state, if the load obstruct the driver's sight, then when the truck running, the load should be located in the back of the truck's moving direction.

In crossroads and the occasion that would obstruct the driver's sight, the driver must reduce the speed of the truck, and issue sound signal.

In crossroads and the occasion that would obstruct the driver's sight or some dangerous occasion, the truck must not exceed other truck moving at the same direction.

The driver must avoid the truck rolling over some fluffy object in order to avoid article damages or personnel hurts.

When turning, if there are some other trucks or pedestrians, the driver must issue warning signal.

The driver must comply with all labels about ground load carrying capacity and requirements of other instructive labels.

The driver must pay special attention to the load carrying capability of slopes and channels leading to electric elevator.

14.2.3.2 Truck speed

The truck speed should coordinate with the status of person's activity, visibility, road or the ground conditions and load conditions of the running area. When the truck is moving on wet and smooth road surface the driver must be very carefully.

Under any situation, the truck speed must be controlled within the range that the truck can be stopped safely.

14.2.3.3 Running on the slope

When operating on the slope, the following regulations must be obeyed:

A) Moving up and down a slope slowly.

B) Except for the side loading and no lifted load truck, it may as well make the bearing load device's surface towards the downgrade direction.

C) Turning on the slope and bestride the slope are all forbidden.

D) When the truck is near the slope, high platform or platform edge, the driver must drive carefully. The distance between the truck and the platform or platform edge must keep at least a truck tyre width.

E) When the gradient is more than 10% during the truck's running up and down the slope, the load surface must be in a downgrade direction.

14.2.3.4 Get across a gap

It must be ensured that under hanging devices (such as: lamps, pipeline and fire extinguishing system) there is an enough clearance height.

Before getting across the passage and door, it must be ensured that there is an enough gap among the truck, the driver and the load.

- 14.2.3.6 The truck operating on the gangplank or transition board
 Before the motor industrial truck pass the gangplank or transition board, it is necessary to make sure the firm of the board.
 The overall weight of the truck should not excess the rated capacity of the gangplank or the transition board.
 When passing the gangplank or the transition board, the driver should drive the truck carefully and slowly.
- 14.2.3.7 The use of the truck in elevator (lifter)
 Before the motor industrial truck driving into the elevator (lifter), it is necessary to make sure the elevator (lifter) can endure the over all weight of the truck, load and drivers.
 Before allow the truck driving in or out of the elevator (lifter), all other personnel should leave away from the elevator (lifter).
 After the bridge box floor of the elevator (lifter) is even to the ground, the truck should slowly drive in as the positive direction.
 It should be the load go into the elevator (lifter) first not the driver, this is specially adapted to the walking type truck.
 After the truck driving into the elevator (lifter), switch off the power.
- 14.2.3.8 Parking
 After the driver leaving, the carrying device must lower to the lowest position, switch off the power, stay steady the truck to prevent accidental move or make bold by others without approval.
 When parking the truck, the fire fighting passage, access stairs and fire fighting passages should keep fluently.
 The parking location of the truck should keep a safety distance to the railway.
- 14.2.4 The truck maintaining rule for the drivers
- 14.2.4.1 General rule
 Before starting the truck, it is necessary to inspect the technical condition of the truck. According to the different type of the truck, should pay more attention to some special location: [for example: alarm system, power system, brake, steering equipment, wheel and lifting system.
 If the truck is found to be repaired, or during the operation the defect develops, it is necessary to report it to the superior in concern. It is forbidden to repair or adjust the truck by the truck by the driver without permission.
- 14.2.4.2 Refilling
 Before refueling, the engine must be turned off, the truck must be braked, and the driver must leave the truck.
 It is impossible to stop open fire and smoke when fueling.
- 14.2.4.2.1 liquid fuels (e.g. gasoline and diesel)
 Trucks using liquid fuels must be refueled at designated locations.
 The engine must not be started until the refueling equipment is removed, the filler cap is covered, and the spilled fuel is removed.
- 14.2.4.2.2 LPG fuel (LPG)
 Only trained and designated personnel can fill or replace LPG containers.
 Personnel responsible for filling LPG must wear protective clothing (i.e. long sleeve clothing and gloves).
 The filling of fixed LPG container and the filling or replacement of detachable LPG container must be carried out at the designated place.
 Care must be taken when transporting or handling LPG containers. Containers must not be dropped, thrown, rolled or dragged. If several containers need to be transported at a time, proper handling devices must be used.
 The LPG container shall not be overfilled.
 The engine must be turned off, the truck must be braked and the driver must leave the truck before fueling.
 Soap solution must be used when checking for leaks.
 Trucks driven by LPG shall not be parked near heat sources, open flames or similar ignition sources, nor shall they be close to open pits, underpass entrances, elevator shafts or other similar areas, and removable LPG containers shall not be replaced in such areas.
 All LPG containers must be inspected for the following defects or damages before refuelling and all detachable LPG containers are reused:
 A) Dent, scratch and groove of pressure vessel;
 B) Damage of various valves and level gauges;

- C) Debris in the relief valve;
- D) Damage or loss of safety valve cap;
- E) Leakage at valve or threaded connection;
- F) The flexible seal at the filling or gas supply connection is deteriorated, damaged or lost.

If the above defects and / or damages are found, the container shall not be used without repair.

When the LPG driven truck needs to park overnight or stay indoors for a long time and the LPG container is still on the truck, the air supply valve of the container must be closed.

14.2.4.3 lithium battery charging and replacement

All lithium battery charging and replacement must be carried out by trained and designated personnel according to the instructions of lithium battery or truck manufacturer. Usually, the driver can be designated.

Before charging or replacing a lithium battery, the truck must be correctly positioned and braked.

Measures must be taken to prevent open fire, spark or arc in the charging area of lithium battery. No Smoking.

Tools and other metal items must be kept away from the top of the uncovered lithium battery.

The upper part of the lithium battery should be kept dry.

Lithium batteries of different voltage, weight or size shall not be used to replace lithium batteries on original electric trucks without approval.

When re installing the lithium battery, the lithium battery must be placed in the correct position of the truck.

14.2.4.3 The charging and changing of the battery

The charging and changing of all the battery should be carried out by the personnel who has been trained and appointed staves and proceed as the description of the user's manual of the battery or truck factory. As usual the driver can be appointed.

Before charging or changing battery, the truck should be located correctly and brake.

When charging, the exhaust cap should be in the correct position to prevent the electrolyte spilling out, and make sure that the wind hole is in effect. Open the cover of the battery (or separate room) to exhaust the gas and thermal.

In the battery charging area, should adopt measures to prevent open flame, spark or electric arc. Smoking is forbidden.

The tools and other metal substance should put far away from the top of the battery without cover. The top of the battery should keep dry; the connection terminal should keep clean, wipe a little Vaseline and screw down correctly.

Without approval, the battery of different voltage, weight or size could not replace the former one in the truck.

When reinstalling the battery, the battery should be put on the correct place.

Inspecting the liquid surface in the battery using open fire is forbidden.

When getting the solvent in the acid carboy, the acid carboy tilting device or siphon pipe could be used. When diluting oil of vitriol confect the electrolyte, only adding the oil of vitriol into water is permitted, not add water into oil of vitriol.

15 Maintenance

15.1 General description

Good performance of the motor industrial truck depends upon maintenance. Truck may damage personal health and properties in case of maintenance neglect.

15.2 Maintenance items

The items of check, lubrication, maintenance shall be carried out according to maintenance instructions supplied by the manufacture.

Only professional and qualified maintenance personnel are allowed to go along with the inspection, maintenance, modification and repair.

15.2.11 Neither modification in design nor addition to the truck shall be taken without permission of the manufacture for sake of weakening performance or operation security of the truck. Nameplate and instruction manual shall be revised accordingly in that condition.

15.2.13 All the components that are used for replacement must be of the same model, or at least of the same quality with the original part.

15.2.14 Industrial truck must be kept clean for sake of fire. Find loose or defective part in time. Keep clean for lifting device, carrying device, wheel tread, foot pedal, and floor of the truck. No grease, oil stain, or other dirty substances shall be kept.

15.3 Inspection

