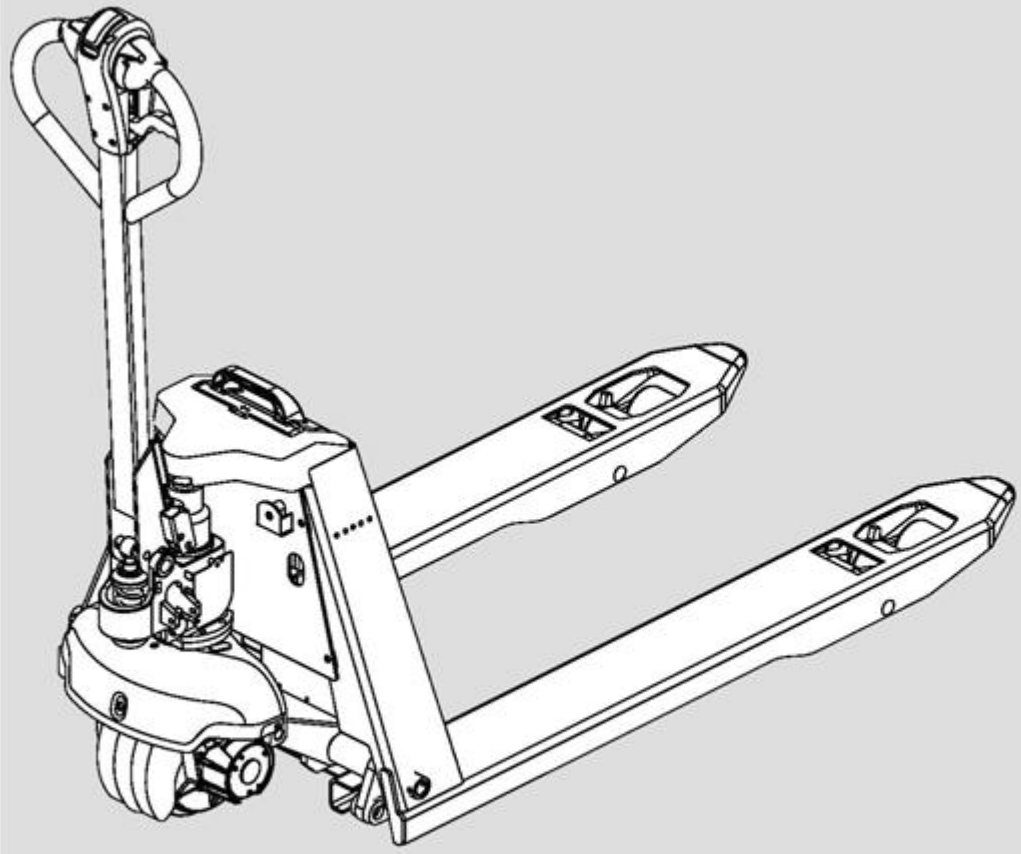
HPL152
Electric Pallet Truck

Operation Manual



CE CERTIFICATE

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EP's mission&vision is " Let more people apply the electrical material handling equipment to relieve the intensity of labour" and "Let's grow together".

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Foreword

Thanks for your purchasing our Pallet truck.

This manual is about how to use, operation and maintenance. Please operator and whom in charge of the truck must read the manual carefully before operate the truck.

We have the right to improve the truck, maybe there are some difference between your product and the description in this manual.

If you have any questions please keep in touch with the sales department or let the dealer know.

Notes:

1. This manual is used for operation and maintenance , the detail parameters, size and specifications in context is only for reference , the real parameters will depend on sale files.
2. Manual pictures for reference only, the real car shall prevail, and shall not affect the manual use.

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WARNING!

TO PREVENT SETIOUS RISK OF INJURY TO YOUORSELF AND OTHERS OBSERVE THE FOLLOWING SAFETY INSTRUCTIONS.

These truck may become hazardous if adequate maintenance is neglected. Therefore, adequate maintenance facilities, trained personnel and procedures should be provided.

Maintenance and inspection shall be performed in conformance with the following practices:

1. A scheduled planned maintenance,lubrication and inspection system should be followed.

2. Only qualified and authorized personnel shall be permitted to maintain, repair, adjust, and inspect truck.

3. Before leaving the truck:
– Do not park the truck on an incline.
– Fully lower the load forks.
– Set the key switch to the "OFF" position and remove the key.

4. Before starting to operate truck:
– Be in operating position
– Place directional control in neutral
– Before operating truck, check functions of lift systems, directional control,speed control,steering, warning devices and brakes.

5. Avoid fire hazards and have fire protection equipment present. Do not use open flame to check lever, or for leakage of electrolyte and fluids or oil. Do not use open pans of fuel or flammable cleaning fluids for cleaning parts.

6. Brakes,steering mechanisms, control mechanisms,guards and safety devices shall be inspected regularly and maintained in legible condition.

7. Capacity, operation and maintenance instruction plates or decals shall be maintained in legible condition.

8. All parts of lift mechanisms shall be inspected to maintain them in safe operating condition.

9. All hydraulic systems shall be regularly inspected and maintained in conformance with good practice. Cylinders, valves and other similar parts shall be checked to assure that "drift" has not developed to the extent that it would create a hazard.

10. Truck shall be kept in a clean condition to minimize fire hazards facilitate detection of loose or detective parts.

11. Modifications and additions which affect capacity and safe truck operation shall not be performed by the customer or user without manufacturers prior written approval. Capacity, operation and maintenance plates or decals shall be changed accordingly.

Catalog

Correct use and application

The guidelines form part of these operating instructions and must be observed. National regulations apply in full.
The truck described in the present operator manual is an industrial truck designed for lifting and transporting load units.
It must be used, operated and serviced in accordance with the present instructions. Any other type of use is beyond the scope of application and can result in damage to personnel, the truck or property. In particular, avoid overloading the truck with loads which are too heavy or placed on one side. The data plate attached to the truck or the load diagram are binding for the maximum load capacity. The industrial truck must not be used in fire or explosion endangered areas, or areas threatened by corrosion or excessive dust.

Proprietor responsibilities

For the purposes of the present operator manual the “proprietor” is defined as any natural or legal person who either uses the industrial truck himself, or on whose behalf it is used. In special cases (e.g. leasing or renting) the proprietor is considered the person who, in accordance with existing contractual agreements between the owner and user of the industrial truck, is charged with operational duties.
The proprietor must ensure that the truck is used only for the purpose it is intended for and that danger to life and limb of the user and third parties are excluded.
Furthermore, accident prevention regulations, safety regulations and operating, servicing and repair guidelines must be followed. The proprietor must ensure that all truck users have read and understood this operator manual.
Failure to comply with the operator manual shall invalidate the warranty. The same applies if improper work is carried out on the truck by the customer or third parties without the permission of the manufacturer’s customer service department.

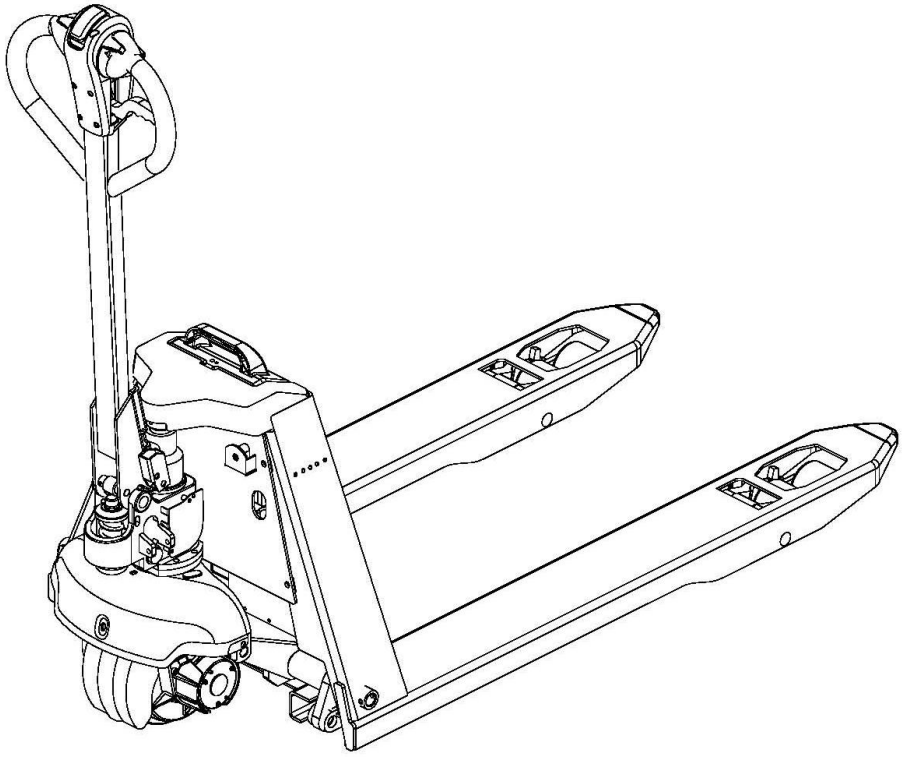
Attaching accessories

The mounting or installation of additional equipment which affects or supplements the performance of the industrial truck requires the written permission of the manufacturer. In some cases, local authority approval shall be required.
Approval of the local authorities however does not constitute the manufacturer’s Approval.

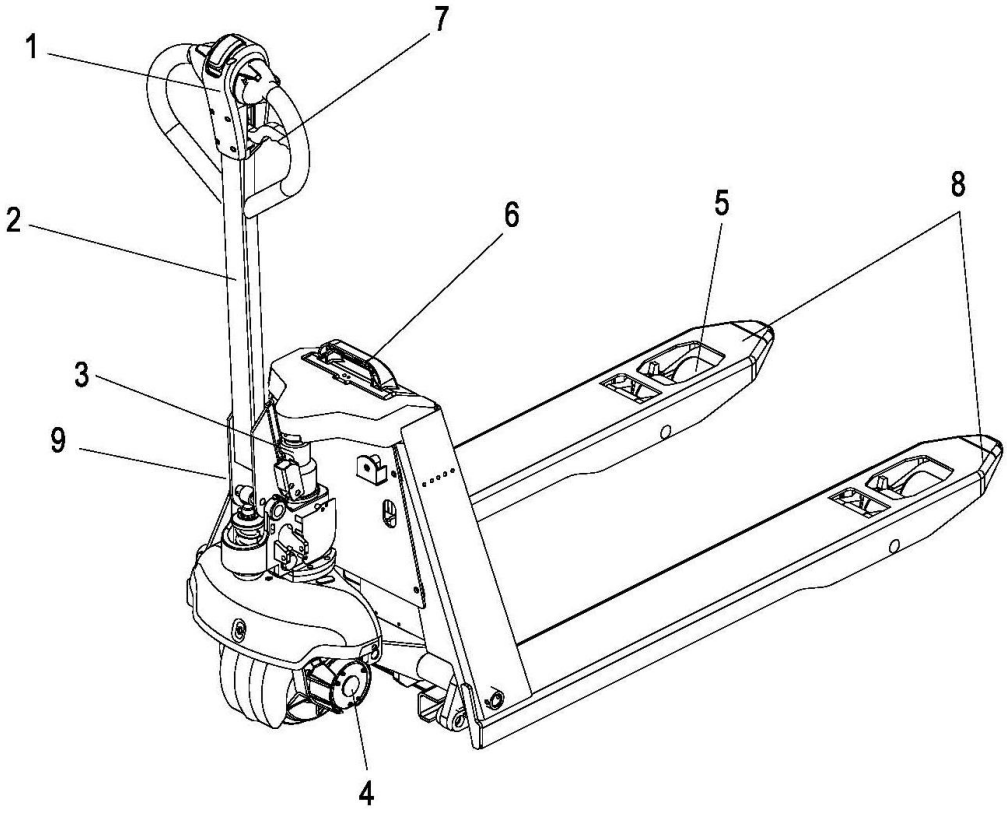
1. Truck Description

1.1 Application

The truck is designed to transport goods on level surfaces. It can lift open bottom or diagonal board pallets as well as roll cages beyond the area of the load wheels.
Suitable environment temperature is 5°C to 40 °C.
If a long time in less than 5 ° C environment, cold storage or in the extreme conditions of temperature and humidity changes in the use of Pallet, you must install additional special equipment, and obtain permission from the manufacturer.



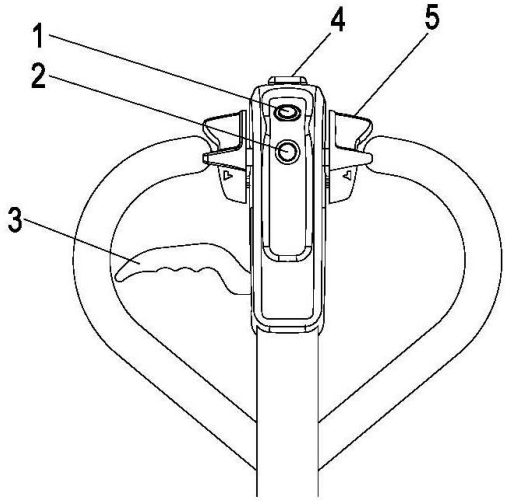
1.2 Assemblies



Item	Component	Item	Component
1	Control handle	6	Battery
2	Control shaft	7	Lowering lever
3	Pump	8	Fork
4	Driving wheel	9	Emergency stop switch
5	Load wheels		

1.2.1 Control Handle

Item	Control / Display	Function
1	"Horn" button	Activates the horn.
2	Power switch button	Starting truck
3	Lowering lever	Pull the lowering lever and hold. The forks will be lowered to its minimum height and stop on its own.
4	Emergency stop switch	By pressing this switch, the vehicle starts to travel in the opposite direction
5	Drive switch	Select the required driving direction and speed.



1.2.3 Discharge indicator

The LCD display (1) show battery residual capacity.
The color of the LCD (1) represent the following conditions:

Component	LCD color	Residual capacity
Standard battery residual capacity	Green	30-100%
	Yellow	15-30%
	Flashing red light	0-15%

If the controller detects a battery failure, flashes of LCD（1） represent battery failure information until the failure is remedied. Details of failure information are shown as below:

Under-voltage of single cell battery: The green light repeats in a cycle of flashing once in 1 second, pausing for 2 seconds and then flashing twice, pausing for 3 seconds.

Over-voltage of single cell battery: The green light repeats in a cycle of flashing once

in 1 second, pausing for 2 seconds and then flashing three times, pausing for 3 seconds.

Short circuit protection: The green light repeats in a cycle of flashing once in 1 second, pausing for 2 seconds and then flashing four times, pausing for 3 seconds.

Over-current protection: The green light repeats in a cycle of flashing once in 1 second,pausing for 2 seconds and then flashing five times, pausing for 3 seconds.

Battery temperature is too high: The green light repeats in a cycle of flashing twice in 1 second, pausing for 2 seconds and then flashing three times, pausing for 3 seconds.

Battery temperature is too low: The green light repeats in a cycle of flashing twice in 1 second, pausing for 2 seconds and then flashing four times, pausing for 3 seconds.

Contactor-related failures: The green light repeats in a cycle of flashing three times in 1 second, pausing for 2 seconds and then flashing four times, pausing for 3 seconds.

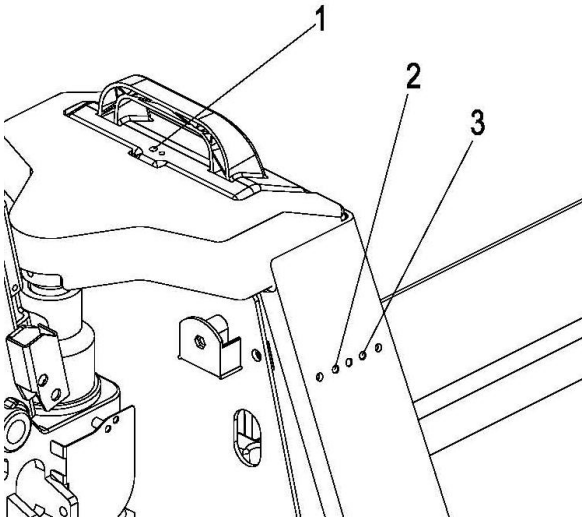
The yellow light flashes rapidly in 1 second when other failures happen.

When powered off, if the green light of power indicator is always on, it means that the battery is in a balanced state, which is a normal phenomenon.

LCD (2) displays the state of charge;

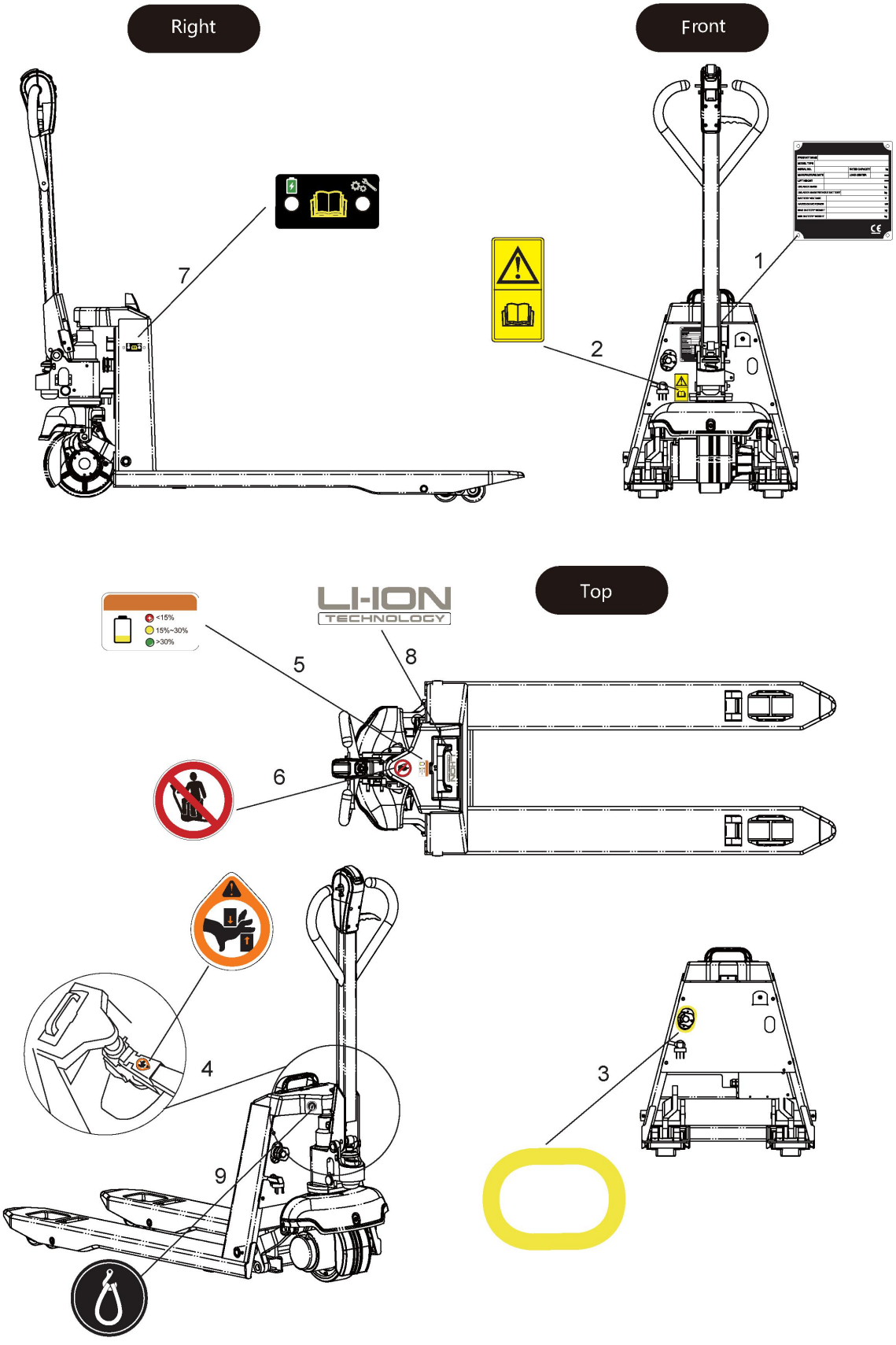
DISPLAY	DESCRIPTION
Continuous red	Charge is charging
Continuous green	Battery charging is complete

The LCD (3) remain green light lit under normal, flashing show the failure state of truck（See section 6 Trouble shooting Error Message）.



1.3 Identification points and data plates

Item	Description
1	Nameplate
2	“Instructions” label
3	Emergency stop switch label
4	Anti pinch hand label
5	Charging indicator label
6	No Riding
7	Fault Indicator Label
8	LIION Logo
9	Sling Label


Right
Front
Top
7
1
2
LI-ION
TECHNOLOGY
<15%
15%~30%
>30%
5
8
6
4
9
3

1.3.1 Truck data plate

Item	Description	Item	Description
1	Product name	8	Battery voltage(v)
2	Model type.	9	Rated drive power(kw)
3	Series no.	10	Max battery weight(kg)
4	Manufacture date	11	Min battery weight(kg)
5	Lift height(mm)	12	Rated capacity(kg)
6	Unladen mass with battery(kg)	13	Load center(mm)
7	Unladen mass without battery(kg)		

For queries regarding the truck or ordering spare parts please quote the truck serial number(3).

1.4 Standard Version Specifications

1.4.1 Performance data for standard trucks

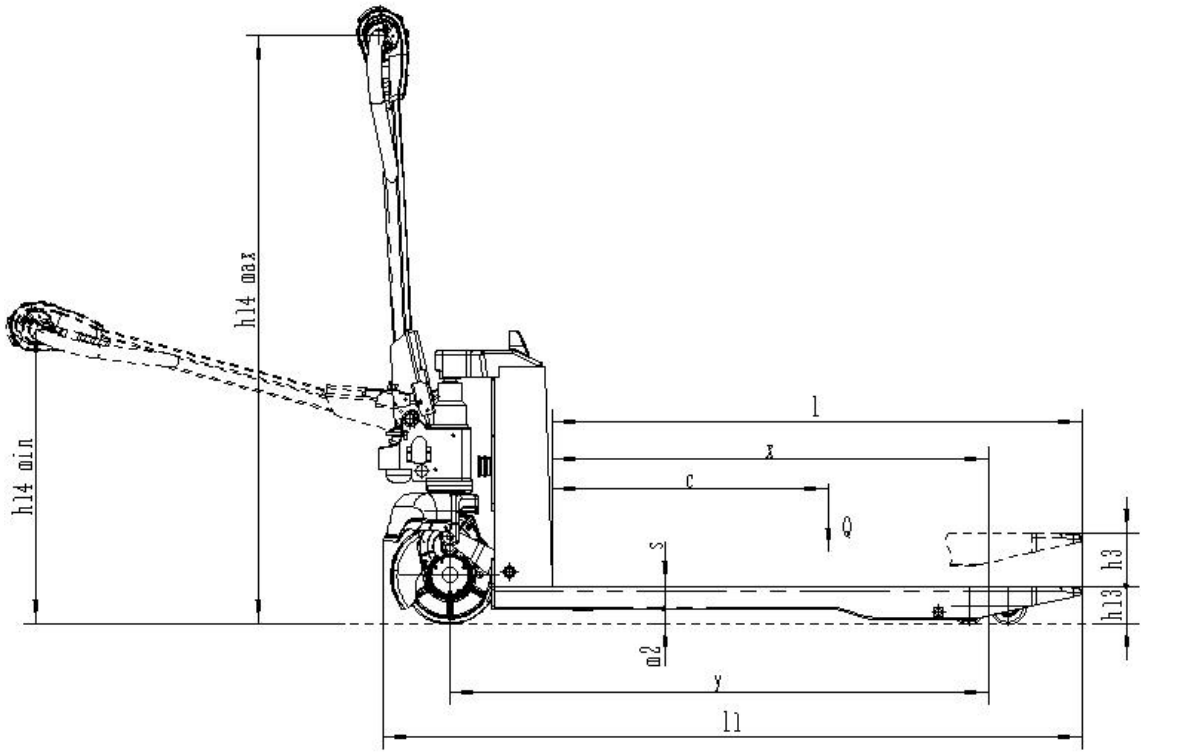
Technical specification details in accordance with VDI2198. Technical modifications and additions reserved.

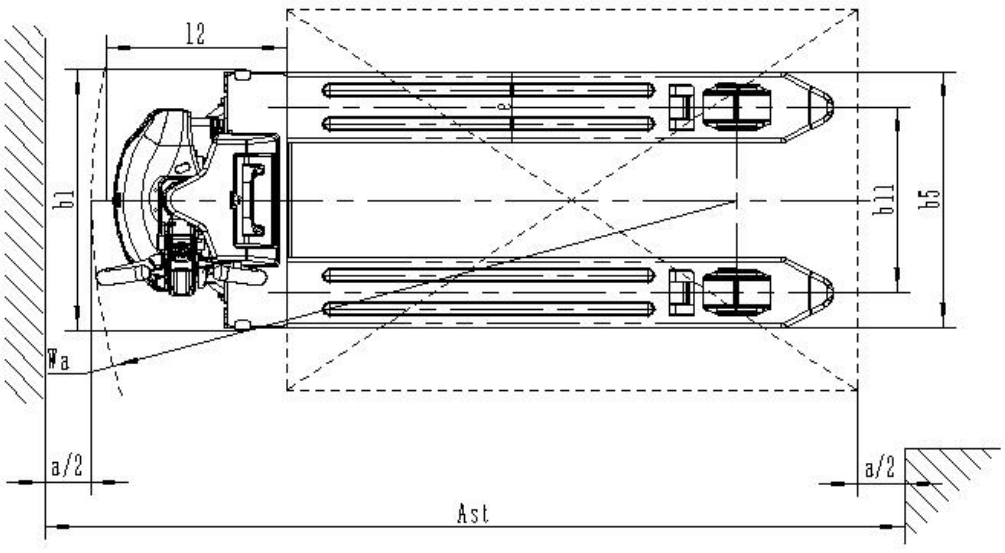
Distinguishing mark					
1.2	Model designation				HPL152
1.3	Drive unit				Battery
1.4	Operator type				Walkie
1.5	rated capacity	Q	lb.	kg	1500
1.6	Load center distance	c	in.	mm	600
1.8	Load distance	x	in.	mm	883/946
1.9	Wheelbase	y	in.	mm	1105/1168
Weight					
2.1	Service weight （include battery）		lb.	kg	130
2.2	Axle loading, laden driving side/loading side		lb.	kg	558/1172
2.3	Axle loading, unladen driving side/loading side		lb.	kg	84/46
Types,Chassis					
3.1	Tyre type driving wheels/loading wheels				PU/ PU
3.2	Tyre size, driving wheels （diameter×width）		in.	mm	Φ210x70
3.3	Tyre size, loading wheels （diameter×width）		in.	mm	2x Φ78x60（Φ78x88）
3.4	Tyre size, caster wheels （diameter×width）		in.	mm	/
3.5	Wheels, number driving，caster/loading (x=drive wheels)		in.	mm	1x /4（1x /2）
3.6	Track width, front,driving side	b_{10}	in.	mm	/
3.7	Track width,rear,loading side	b_{11}	in.	mm	390
Dimensions					
4.4	Lift height	h_3	in.	mm	115
4.9	Height drawbar in driving position min./max.	h_{14}	in.	mm	638/1275
4.15	Lowered height	h_{13}	in.	mm	80
4.19	Overall length	l_1	in.	mm	1518
4.20	Length to face of forks	l_2	in.	mm	381

4.21	Overall width	b_1/ b_2	in.	mm	548
4.22	Fork dimensions	s/ e/ l	in.	mm	50/150/1150
4.25	Distance between fork-arms	b_5	in.	mm	540
4.32	Ground clearance, center of wheelbase	m_2	in.	mm	30
4.34.1	Aisle width for pallets 1000 × 1200 crossways	Ast	in.	mm	1612
4.34.2	Aisle width for pallets 800 × 1200 lengthways	Ast	in.	mm	1812
4.35	Turning radius	Wa	in.	mm	1358
Performance data					
5.1	Travel speed, laden/ unladen	km/ h	mp h	km/ h	3.5/4
5.2	Lifting speed, laden/ unladen		fpm	m/ s	10mm/time
5.3	Lowering speed, laden/ unladen		fpm	m/ s	Manual
5.8	Max. gradeability, laden/unladen		%		5/10
5.10	Service brake type				Electromagnetic
Electric-engine					
6.1	Drive motor rating S2 60 min		hp	kW	0.75
6.2	Lift motor rating at S3 15%		hp	kW	Manual
6.3	The maximum allowed size battery		in.	mm	Lithium-ion Battery193x81x300
6.4	Battery voltage/nominal capacity K5		V/ Ah		24V/20Ah
6.5	Battery weight		lb.	kg	5x1
Addition data					
8.1	Type of drive control				DC
10.5	Steering type				Mechanical
10.7	Sound pressure level at the driver’s ear		dB (A)		74

[1)] Including safety distance a = 200 mm

HPL152





2. Transport and Commissioning

2.1 Lifting the truck by crane

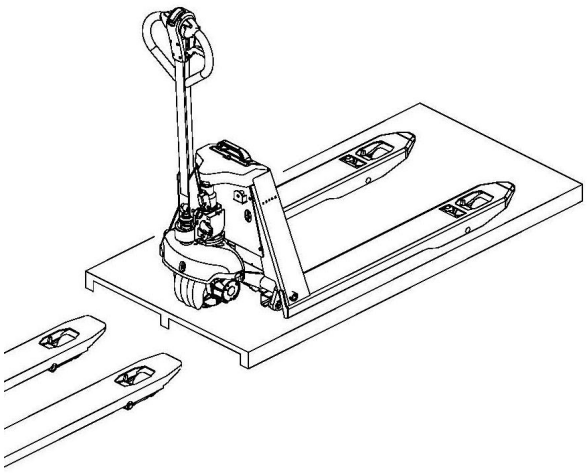
1.Only use crane handling equipment gear with sufficient capacity.

2.Loading weight > net weight of truck (battery weight for electric trucks).Loading weight not only net weight of truck but also the stock or the box.

3.Stock (box) should be big enough and strong enough to bear hole truck.

– Park the truck securely.(see 3.2.4 Parking the truck securely).

– Make sure forks are positioned properly for the pallet. Move forward slowly to insert forks into the pallet as far as possible and then stop the truck.



Warning!

– To avoid break the fork be hurt when you move the truck to stock.

– In order to keep the truck out of be scraped,please move the truck void in void and flat place.

– when you lowering the stock advert status of the place to avoid collapse.

2.2 Using the Truck for the First Time

Only operate the truck with battery current. Rectified AC current will damage the electronic components. Cable connections to the battery (tow leads) must be less than 6 m .

Preparing the truck for operation after delivery or transport

Procedure

• Check the equipment is complete.

• Check the hydraulic oil level.

• Install the battery if necessary (where required), do not damage battery cable.

• Charge the battery, (see "4.3 Charging the battery").

When the truck is parked the surface of the tyres will flatten. The flattening will disappear after a short period of operation.

2.3 During brake-in

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

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

3.Operation

3.1Safety Regulations for the Operation of Pallet Trucks

Driver authorisation: The Pallet truck may only be used by suitably trained personnel, who have demonstrated to the proprietor or his representative that they can drive and handle loads and have been authorised to operate the truck by the proprietor or his representative.

Driver's rights, obligations and responsibilities: The driver must be informed of his duties and responsibilities and be instructed in the operation of the truck and shall be familiar with the operator manual . The driver shall be afforded all due rights . Safety shoes must be worn with pedestrian operated trucks.

Unauthorised Use of Truck: The driver is responsible for the truck during the time it is in use. He shall prevent unauthorised persons from driving or operating the truck. It is forbidden to carry passengers or lift personnel.

Damage and Faults: The supervisor must be immediately informed of any damage or faults to the Pallet truck. Trucks not safe for operation (e.g. wheel or brake problems) must not be used until they have been rectified.

Repairs: The driver must not carry out any repairs or alterations to the Pallet truck without the necessary training and authorisation to do so. The driver must never disable or adjust safety mechanisms or switches.

Hazardous area: A hazardous area is defined as the area in which a person is at risk due to truck movement, lifting operations, the load handler (e.g. forks or attachments) or the load itself. This also includes areas which can be reached by falling loads or lowering operating equipment.

Unauthorised persons must be kept away from the hazardous area.
Where there is anger to personnel, a warning must be sounded with sufficient notice.
If unauthorised personnel are still within the hazardous area the truck shall be brought to a halt immediately.

Safety Devices and Warning Signs: Safety devices, warning signs and warning instructions shall be strictly observed.

3.2 Operate and run the truck

3.2.1 Preparing

Before the truck can be commissioned, operated or a load unit lifted, the driver must ensure that there is nobody within the hazardous area.

Checks and operations to be performed before starting daily work

• Visually inspect the entire truck (in particular wheels and load handler) for obvious damage.

Switching on the truck

• Open the power switch.

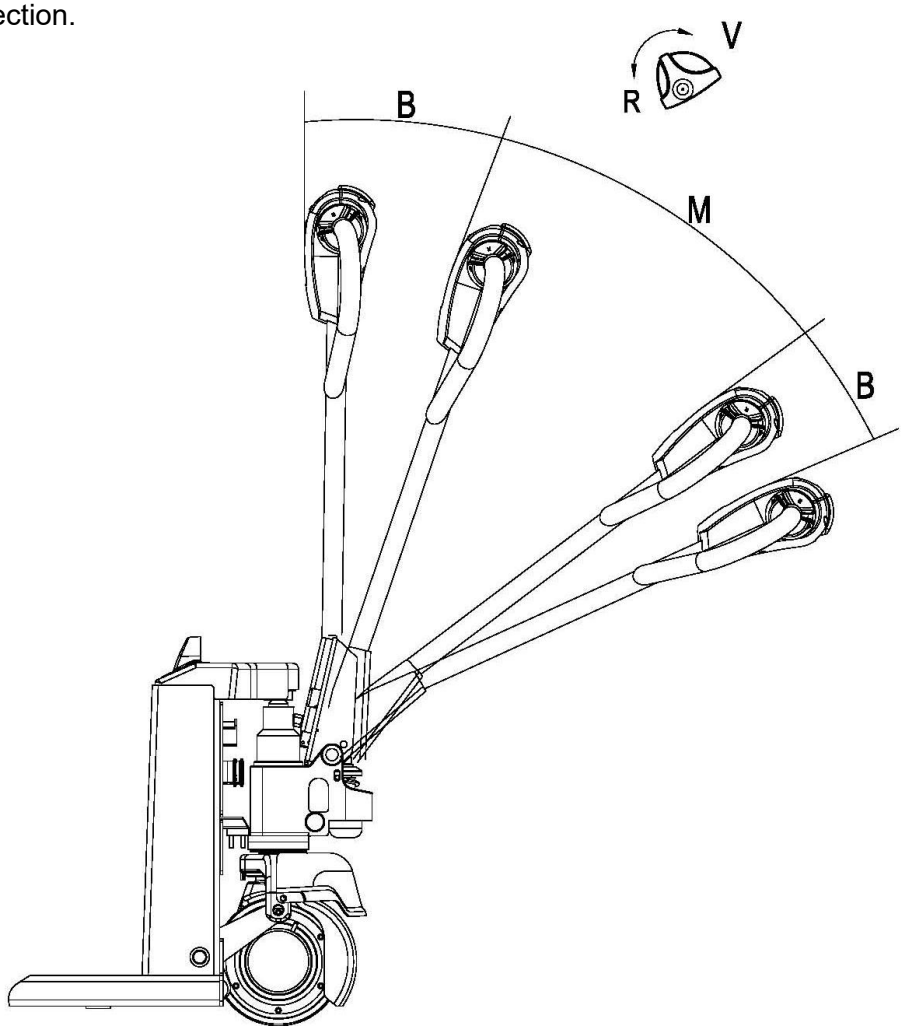
• Pull out emergency stop switch.

3.2.2 Travel ,Steering,.Braking

Do not drive the truck unless the panels are closed and properly locked.

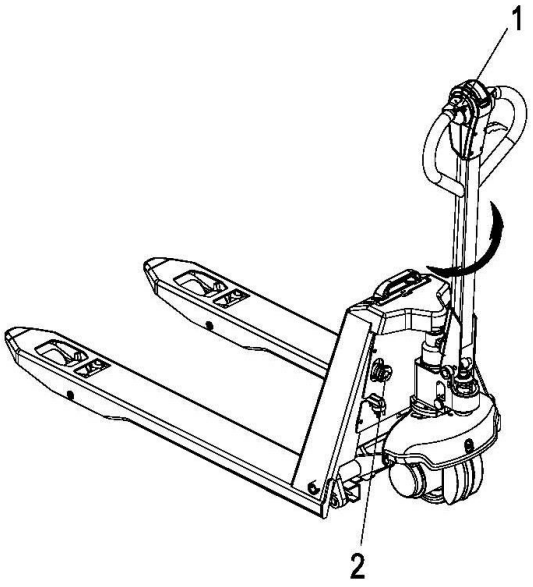
1.Traction

Set the control handle to the travel zone (M).Set the travel switch to control the driving speed and direction.



2.Steering

• Apply the control shaft (1) to the left or right.



3.Braking

Emergency stop

Press the emergency stop switch (2)， all electrical functions are cut out and the truck automatically brakes.

Automatic braking

When the control handle is released it automatically sets itself to the upper brake zone (B) and automatic braking ensues.

Regenerative braking

If the travel switch is released, the truck automatically brakes regeneratively. When the speed below 1Km/h, the brake then applies and motor brake stop.

Inversion braking

You can set the travel switch to the opposite direction when traveling. The truck brakes regeneratively until it starts to move in the opposite direction.

Warning： When driving on a hill or uneven roads, please lift fork leg to stop the bottom of fork leg and the ground being rubbed.

3.2.3Lifting, transporting and depositing loads

Unsecured and incorrectly positioned loads can cause accidents

• Instruct other people to move out of the hazardous area of the truck. Stop working with the truck if people do not leave the hazardous.

• Only carry loads that have been correctly secured and positioned. Use suitable precautions to prevent parts of the load from tipping or falling down.

• Do not transport witch bad handbarrow (as truck and stock) .

• Never stand underneath a raised load handler.

• Do not stand on the load handler.

• Do not lift other people on the load handler.

• Insert the forks as far as possible underneath the load.

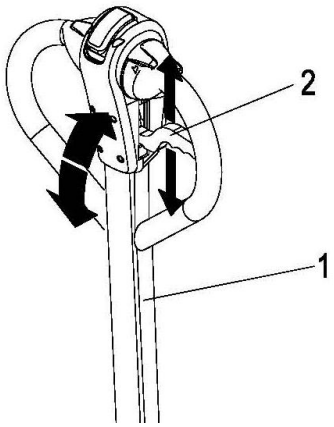
Warning!

Before lifting a load unit the driver must make sure that it has been correctly stowed and does not exceed the truck's capacity.

Do not lift long loads at an angle.

Lift

Press lowering lever(2) to the bottom. Lift the forks by moving the control shaft (1) up and down until the desired lifting height is achieved.Reset the lowering lever(2).



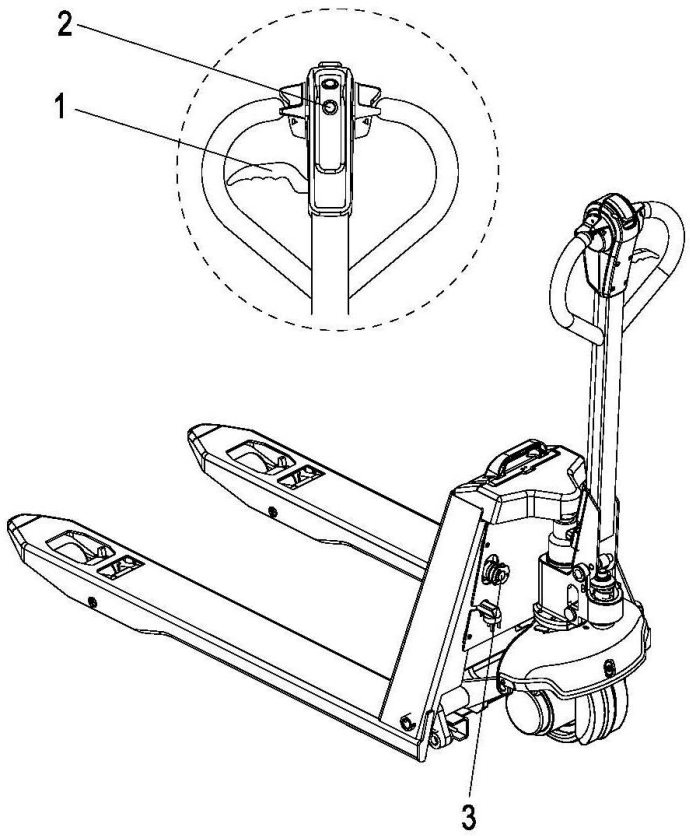
Lower

Set fork to the lowest position by pulling lowering lever (2) upward.

3.2.4Parking the truck securely

• Set fork to the lowest position by pulling lowering lever(1) upward.
• Turn off the power switch (2).
• Press the emergency stop switch.
The truck is parked.

Warning!
Parking the truck securely.
Forbid parking on an incline.
Always fully lower the forks.



4.Battery Maintenance & Charging

4.1 Lithium Battery Precautions

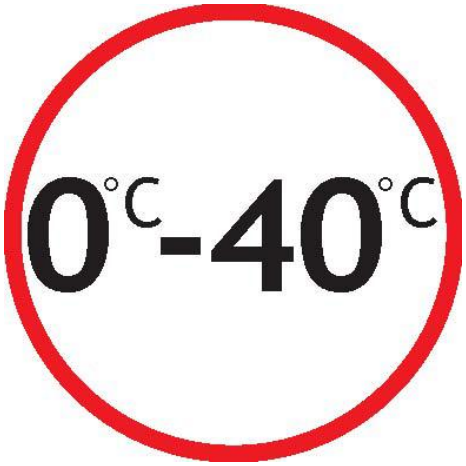
·Please prevent the battery from water or infiltration of any corrosive liquid.

·Do not let the battery close to any open flame, heat, flammable and explosive objects.

·Do not place the battery vertically on a conductive object to prevent the electrode from being touched by protruding objects.

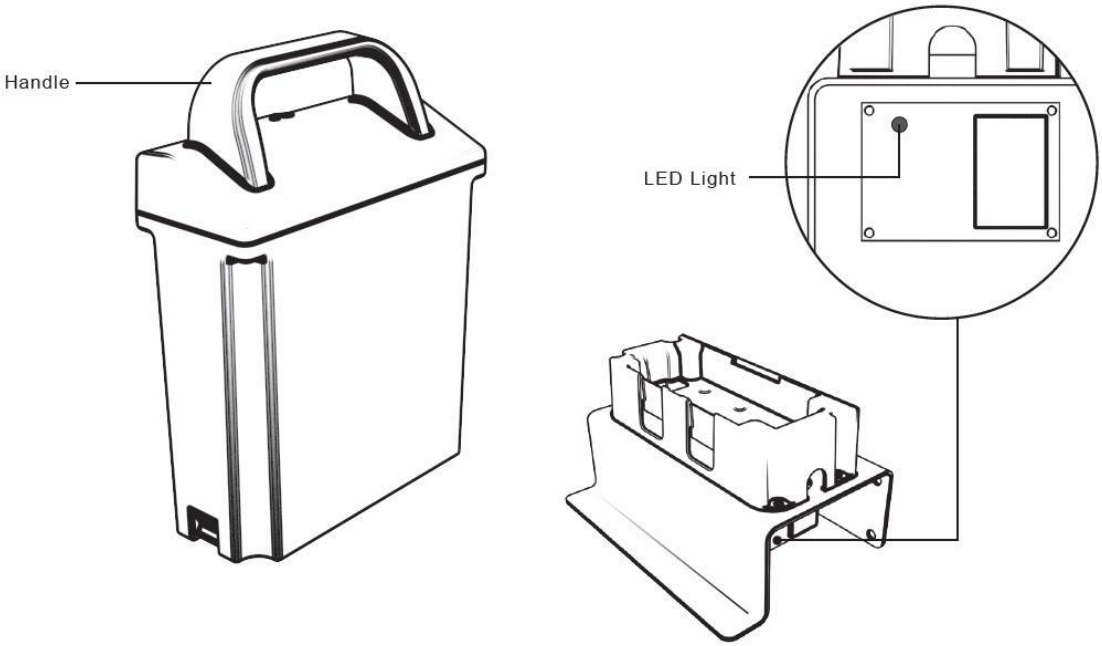
Warning: Once the above situation occurs, it may cause the battery to generate leakage, heat, smoke, and may cause serious fire or explosion.

·Charge the battery at an ambient temperature of 0 to 40°C.



Attention: In case of battery fault, please contact the dealer to make appointment for repair.
Never attempt to disassemble the battery.

4.2 Battery & Charger



4.3 Charging the battery

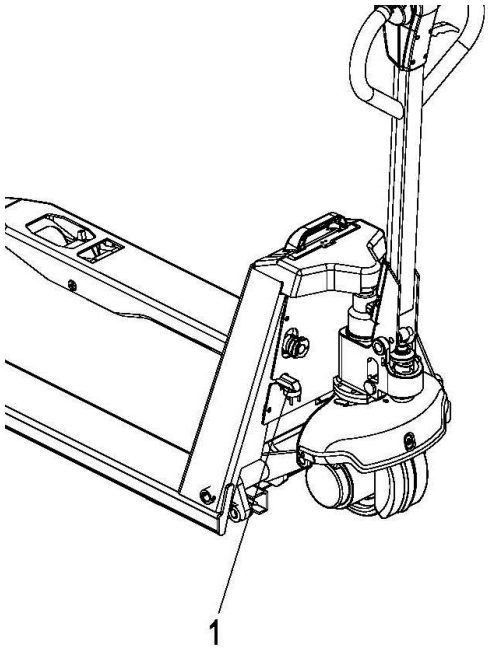
4.3.1 Vehicle charging

Safety regulations for Charging the battery

• To charge the battery, the truck must be parked in a closed and properly ventilated room. When charging, the tops of the battery cells must be exposed to provide sufficient ventilation.
• Before charging, check all cables and plug connections for visible signs of damage.
• Before start and finish charging to make sure power is turn OFF.
• It is essential to follow the safety regulations of the battery and charging station manufacturers.

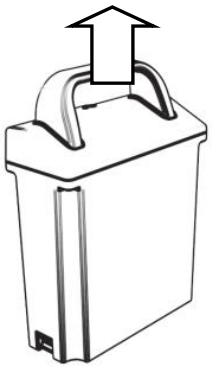
Charging step

• Check whether the condition is according with "Safety regulations for Charging the battery".
• Park the truck securely(See 3.2.4 Parking the truck securely).
• Pull out the body charging wire and insert the plug into the appropriate power supply (110V-240V).

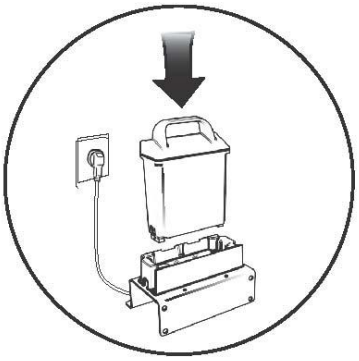


4.3.2 External charging

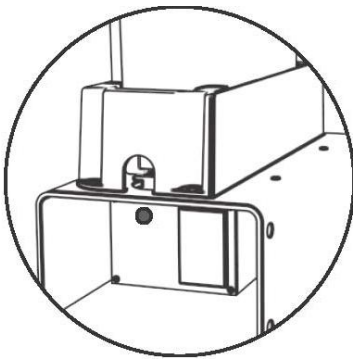
1. Lift the battery out of the vehicle.



2. Insert the battery into the charging base



3.The LED light lights up.



LED MODE

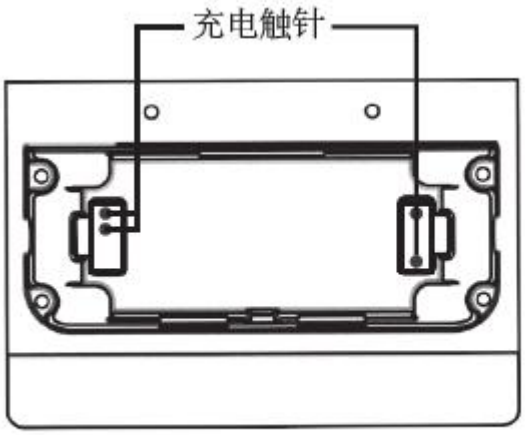
Charging mode : LED Red on Full charged : LED Green on

Charger fault : LED Yellow flash Battery fault : LED Yellow on

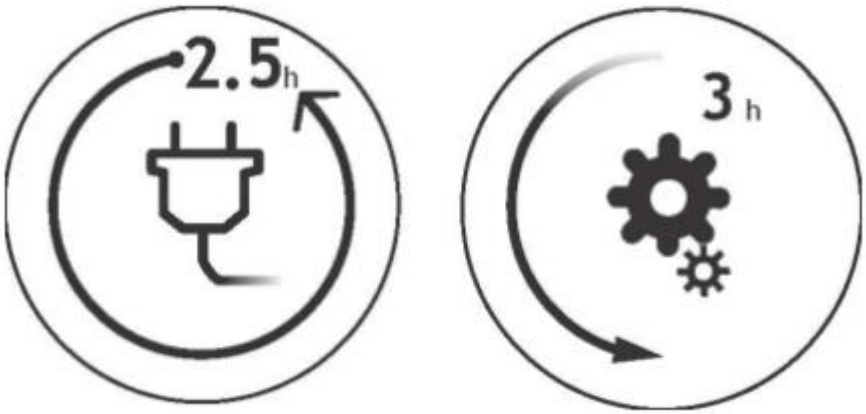
Before removing the battery, make sure that the vehicle is completely powered down.

The figure on the right shows the top view of charging base contact pins. Please plug the battery accordingly. Do not plug reversely.

If your battery is not fully charged after more than 5 hours, contact your dealer.



4.4 Charge Completed



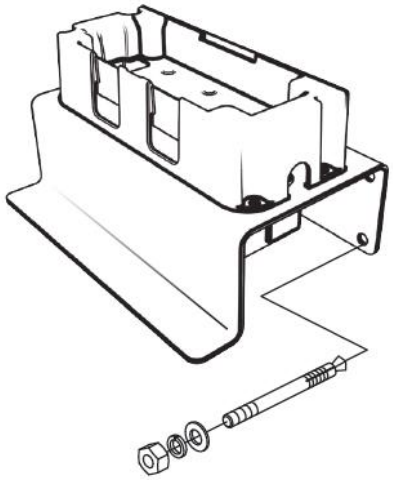
1.The battery is fully charged after 2.5 hours of charging at 100 ~240V AC.
2. Insert the battery into the battery compartment of the vehicle.
3.The battery can be operated continuously for 3 hours in a fully charged state.

Before plugging the battery back, please make sure that the vehicle is still in the power-off state.

Please identify the positive and negative electrodes according to the pins as shown on the previous page.Do not plug reversely.

Due to the particularity of lithium batteries, the battery capacity will have a certain attenuation when used in a low-temperature environment.

4.5 Charger Installation



Charger is recommended to be installed to the wall with expansion screws .

4.6 Maintenance & Care

Please replace the wheels with the tires specified by our manufacturer. Non-conforming tires can affect the performance and stability of the product.

Do not clean the truck with flammable liquids.

After the first 100 hours of operation, the truck must be fully inspected and maintained. Thereafter conduct maintenance once every 250 hours.

If the vehicle is to be parked for longer than a month, it must be placed in dry and frost-free environment.

When not in use, remove the battery.

If the parking time is within one month, fully charge the battery first, if over one month, battery needs to be charged once a month.

Before maintenance, make sure that the power supply has been completely disconnected.

Please shorten the maintenance interval if the working environment is dusty,working in fluctuant temperature place or heavy duty jobs.

If the battery has bad smell overheating or deformation during charging,stop the charging immediately and disconnect the charger power supply. Contact to your dealer.

5.Pallet Truck Maintenance

5.1 Operational safety and environmental protection

• The servicing and inspection operations contained in this chapter must be performed in accordance with the intervals indicated in the servicing checklists.

• Any modification to the Pallet truck assemblies, in particular the safety mechanisms, is prohibited. The operational speeds of the truck must not be changed under any circumstances.

• Only original spare parts have been certified by our quality assurance department. To ensure safe and reliable operation of the Pallet truck, use only the manufacturer's spare parts. Used parts, oils and fuels must be disposed of in accordance with the relevant environmental protection regulations. For oil changes, contact the manufacturer’s specialist department.

• Upon completion of inspection and servicing, carry out the activities listed in the “Recommissioning ” section.

5.2 Maintenance Safety Regulations

Maintenance personnel

Industrial trucks must only be serviced and maintained by the manufacturer’s trained personnel.

The manufacturer’s service department has field technicians specially trained for these tasks. We therefore recommend a maintenance contract with the manufacturer’s local service center.

Lifting and jacking up

When an industrial truck is to be lifted, the lifting gear must only be secured to the points specially provided for this purpose.

When jacking up the truck, take appropriate measures to prevent the truck from slipping or tipping over (e.g. wedges, wooden blocks).

You may only work underneath a raised load handler if it is supported by a sufficiently strong chain.

Cleaning

Do not use flammable liquids to clean the industrial truck.

Prior to cleaning, all safety measures required to prevent sparking (e.g. through short circuits) must be taken. For battery-operated trucks, the battery connect cable must be removed.

Only weak suction or compressed air and non-conductive antistatic brushes may be used for cleaning electric or electronic assemblies.

If the truck is to be cleaned with a water jet or a high-pressure cleaner, all electrical

and electronic components must be carefully covered beforehand as moisture can cause malfunctions.
Do not clean with pressurised water.
After cleaning the truck, carry out the activities detailed in the “Recommissioning” section.

Electrical System
Only suitably trained personnel may operate on the truck’s electrical system.
Before working on the electrical system, take all precautionary measures to avoid – electric shocks.
For battery-operated trucks, also de-energise the truck by removing the key.

Settings
When repairing or replacing hydraulic, electric or electronic components or assemblies, always note the truck-specific settings.

Tyres
The quality of tyres affects the stability and performance of the truck. When replacing factory fitted tyres only used original manufacturer’s spare parts, as otherwise the data plate specifications will not be kept.
When changing wheels and tyres, ensure that the truck does not slew (e.g. when replacing wheels always left and right simultaneously).

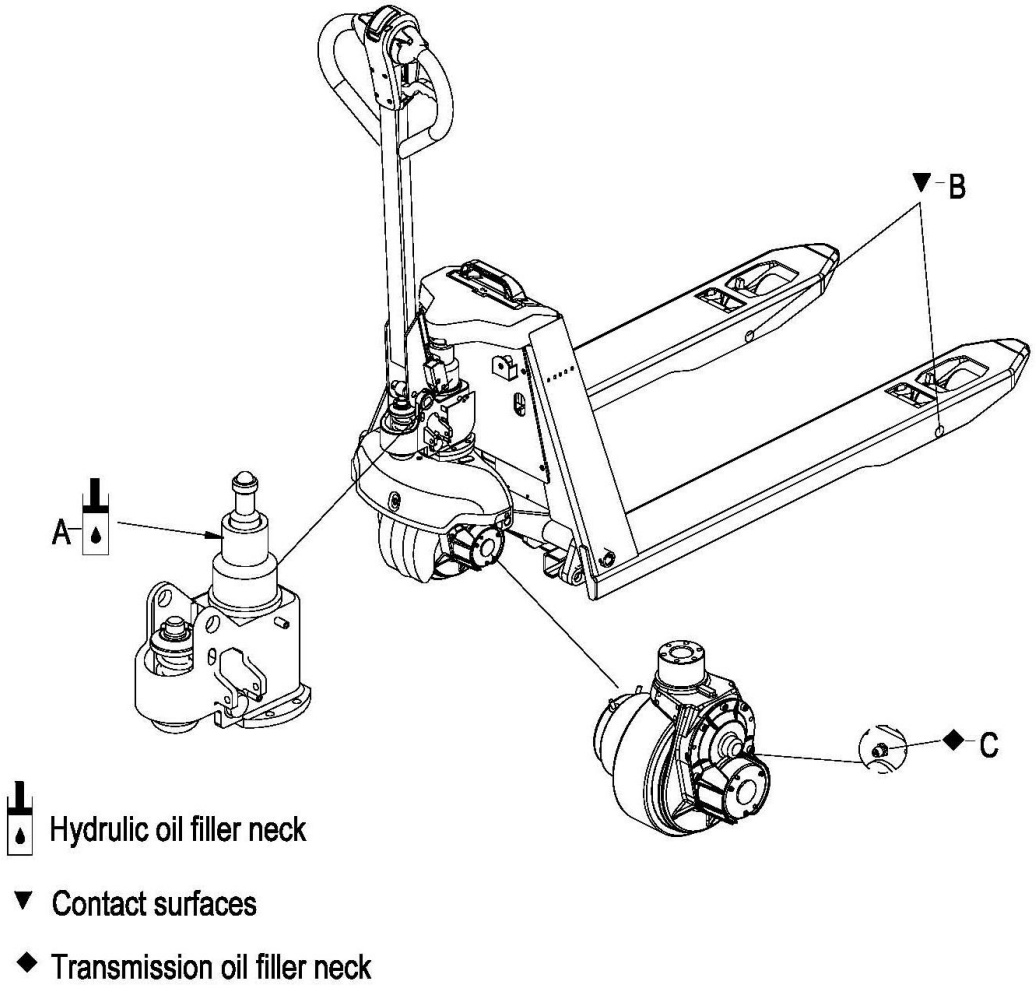
5.3 Servicing and inspection

Thorough and expert servicing is one of the most important requirements for the safe operation of the industrial truck. Failure to perform regular servicing can lead to truck failure and poses a potential hazard to personnel and equipment.
The service intervals stated are based on single shift operation under normal operating conditions. They must be reduced accordingly if the truck is to be used in conditions of extreme dust, temperature fluctuations or multiple shifts.
The following maintenance checklist states the tasks and intervals after which they should be carried out. Maintenance intervals are defined as:
W = Every 50 service hours, at least weekly
A = Every 500 operating hours
B = Every 1000 operating hours, or at least annually
C = Every 2000 operating hours, or at least annually
W service intervals are to be performed by the customer.
In the run-in period - after approx. 100 service hours - or after repair work, the owner must check the wheel nuts/bolts and re-tighten if necessary.

5.3.1Maintenance Checklist

		Maintenance interval ●			
		W	A	B	C
Brake	Check magnetic brake air gap.			●	
Electrics	Test instruments, displays and control switches.	●			
	Test warning and safety device.		●		
	Make sure wire connections are secure and check for damage.			●	
	Test micro switch setting.	●			
	Check relays.			●	
	Fix the motor and cable			●	
Power supply	Visually inspect battery		●		
	Check battery cable connections are secure, grease terminals if necessary.			●	
Travel	Check the transmission for noise and leakage.			●	
	Check travel mechanism, adjust and lubricate if necessary.Check control handle recuperating function.		●		
	Check wheels for wear and damage.			●	
	Check wheel bearings and attachments.			●	
Truck frame	Check truck frame for damage.			●	
Hydraulic operation	Test hydraulic system.		●		
	Check cylinders and piston rods for damage and leaks, and make sure they are secure.			●	

5.3.2 Lubrication Schedule



Fuels, coolants and lubricants

Handling consumables: Consumables must always be handled correctly. Follow the manufacturer's instructions.

Improper handling is hazardous to health, life and the environment. Consumables must only be stored in appropriate containers. They may be flammable and must therefore not come into contact with hot components or naked flames.

Only use clean containers when filling up with consumables. Do not mix consumables of different grades. The only exception to this is when mixing is expressly stipulated in the Operating Instructions.

Avoid spillage. Spilled liquids must be removed immediately with suitable bonding agents and the bonding agent/consumable mixture must be disposed of in accordance with regulations.

Code	Description	Used for
A	L-HM32	Hydraulic system
	L-HV32	
B	Polylub GA352P	Rotation gear
C	Grease(contain Mos_2)	Gear case

5.3.3 Maintenance Instructions

Prepare the truck for maintenance and repairs

All necessary safety measures must be taken to avoid accidents when carrying out maintenance and repairs. The following preparations must be made:

• Park the truck securely (See 3.2.4 Parking the truck securely).

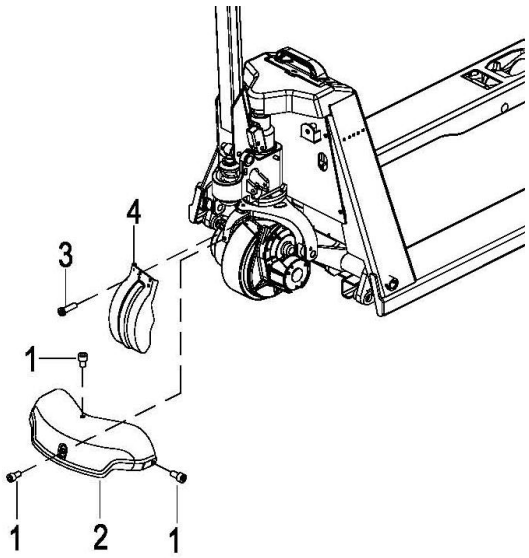
• Press the power switch to prevent the carrier from accidentally starting.

• When working under a raised lift truck, secure it to prevent it from tipping or sliding away.

Removing the cover

• remove the four screws(1),lift off Cover(2).

• remove the four screws (3) and remove the drive baffle (4)



Replacing the drive wheel

The drive wheel must only be replaced by authorised service personnel.

How to add grease

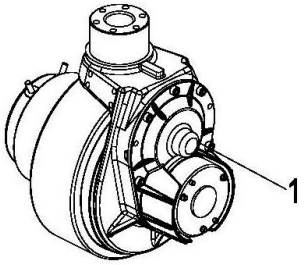
•Prepare the truck for maintenance and repairs (See Maintenance Instructions).

•Remove the front panel.

•Add grease of the correct grade (See Lubrication point).

•Add transmission oil every 500 operating hours, or at least annually.

Re-installation in the reverse order.



Recommissioning

The truck may only be recommissioned after cleaning or repair work, once the following operations have been performed.

• Test horn.
• Test brake.
• Lubricate the truck in accordance with the maintenance schedule.

5.4 Decommissioning the industrial truck

If the industrial truck is to be decommissioned for more than two months , e.g. For operational reasons,it must be parked in a frost-free and dry location and all necessary measures must be taken before, during and after decommissioning as described.

On decommissioning the truck must be jacked up so that all the wheels are clear of the ground. This is the only way of ensuring that the wheels and wheel bearings are not damaged.

If the truck is to be out of service for more than 6 months , further measures must be taken in consultation with the manufacturer's service department.

5.4.1 Prior to decommissioning

• Thoroughly clean the truck.
• Check the brakes.
• Check the hydraulic oil level and replenish as necessary (See 5.3.3 Maintenance Instructions).
• Apply a thin layer of oil or grease to any non-painted mechanical components.
• Lubricate the truck in accordance with the maintenance schedule (See 5.3.2 Lubrication Schedule).
• Charge the battery (See 4.3 Charging the battery).
• Disconnect the battery, clean it and apply grease to the terminals.
In addition,follow the battery manufacturer's instructions.
• Spay all exposed electrical contacts with a suitable contact spray.

Warning !

Charge every months:
– Charge the battery.
Battery powered trucks:
The battery must be charged at regular intervals to avoid depletion of the battery through self-discharge. The sulfatisation would destroy the battery.

5.4.2 Restoring the truck to operation after decommissioning

• Thoroughly clean the truck.
• Lubricate the truck in accordance with the maintenance schedule (See 5.3.2 Lubrication Schedule).

• Clean the battery, grease the terminals and connect the battery.
• Charge the battery (See 4.3Charging the battery).
• Check hydraulic oil for condensed water and replace if necessary.
• Start up the truck (see 3.2 Operate and run the truck).

If there are switching problems in the electrical system, apply contact spray to the exposed contacts and remove any oxide layers on the contacts of the operating controls by applying them repeatedly.
Perform several brake tests immediately after re-commissioning the truck.

5.5Safety checks to be performed at regular intervals and following any unusual incidents

Carry out a safety check in accordance with national regulations. We have a special safety department with trained personnel to carry out such checks. The truck must be inspected at least annually (refer to national regulations) or after any unusual event by a qualified inspector. The inspector shall assess the condition of the truck from purely a safety viewpoint, without regard to operational or economic circumstances. The inspector shall be sufficiently instructed and experienced to be able to assess the condition of the truck and the effectiveness of the safety mechanisms based on the technical regulations and principles governing the inspection of Pallet trucks.

A thorough test of the truck must be undertaken with regard to its technical condition from a safety aspect. The truck must also be examined for damage caused by possible improper use. A test report shall be provided. The test results must be kept for at least the next 2 inspections.

The owner is responsible for ensuring that faults are immediately rectified.
A test plate is attached to the truck as proof that it has passed the safety inspection. This plate indicates the due date for the next inspection.

5.6Final de-commissioning, disposal

Final, proper decommissioning or disposal of the truck must be performed in accordance with the regulations of the country of application. In particular, regulations governing the disposal of batteries, fuels and electronic and electrical systems must be observed.

6.Troubleshooting

This chapter is designed to help the user identify and rectify basic faults or the results of incorrect operation. When locating a fault, proceed in the order shown in the table.

Fault	Possible cause	Action
Truck does not start.	• Key switch in “OFF” position • Battery charge too low • Truck in charge mode	• Set key switch to “ON” • Check battery charge, charge battery if Necessary • Interrupt charging
Load can not be lifted	• Hydraulic oil level too low • Excessive load	• Check the hydraulic oil level • Note maximum capacity (see data plate)

If the fault cannot be rectified after carrying out the remedial procedure, notify the manufacturer’s service department ,as any further troubleshooting can only be performed by specially trained and qualified service personnel.

Error Message

The error message can be obtained in two ways: by reading the appropriate display on the hand set display or by observing the fault codes issued by the status LED.

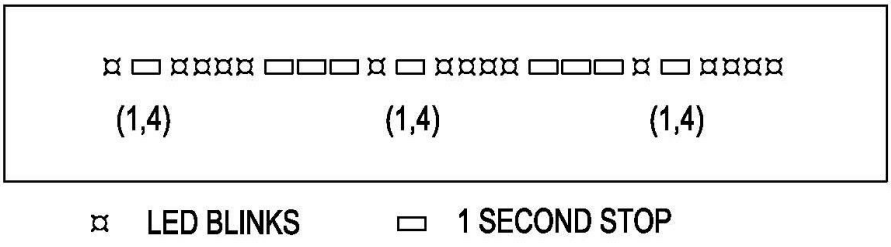
HAND SET DISPLAY DIAGNOSTICS

Faults are displayed in the Faults menu.

LED DIAGNOSTICS

During normal operation, with no faults present, the status LED is steadily on. If the controller detects a fault, the status LED flashes a fault identification code continuously until the fault is corrected.

The status LED uses a 2-digit code. For example, code “1,4”—UNDERVOLTAGE FAULT,appears as:



1212 MOTOR CONTROLLER

Error Message	LED BLINKS digit 1	LED BLINKS digit 2
THERMAL FAULT	1	1
THROTTLE FAULT	1	2
SPEED POT FAULT	1	3
UNDERVOLTAGE FAULT	1	4
OVERVOLTAGE FAULT	1	5
MAIN OFF FAULT	2	1
(not used)	2	2
MAIN FAULT	2	3
MAIN ON FAULT	2	4
(not used)	2	5
WIRING FAULT	3	1
BRAKE ON FAULT	3	2
PRECHARGE FAULT	3	3
BRAKE OFF FAULT	3	4
HPD FAULT	3	5
CURRENT SENSE FAULT	4	1
HARDWARE FAILSAFE	4	2
EE CHECKSUM FAULT	4	3
(not used)	4	4
BATTERY DISCONNECT FAULT	4	5

1212 MOTOR CONTROLLER

LED BLINKS digit 1	LED BLINKS digit 2	Error Message	EXPLANATION	Possible cause
		Error text		

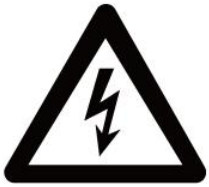
1	1	THERMAL FAULT	over-/under-temperature cutback	– Temperature >80°C or < -10°C. 2. Excessive load on vehicle. 3.Operation in extreme environments. 4.Electromagnetic brake not releasing.
1	2	THROTTLE FAULT	PotLow and/or PotWiper out of range	1.Throttle input wire open or shorted. 2.Throttle pot defective. 3.Wrong throttle type selected.
1	3	SPEED POT FAULT	speed limit pot wiper out of range	1.Speed limit pot wire(s) broken or shorted. 2. Broken speed limit pot.
1	4	UNDERVOLTAGE FAULT	battery voltage too low	1. Battery voltage <17 volts. 2. Bad connection at battery or controller.
1	5	OVERVOLTAGE FAULT	battery voltage too high	1. Battery voltage >31 volts. 2. Vehicle operating with charger attached. 3.Intermittent battery connection.
2	1	MAIN OFF FAULT	main contactor driver Off fault	1.Main contactor driver failed open.
2	3	MAIN FAULT	main contactor fault	1.Main contactor welded or stuck open. 2. Main contactor driver fault.
2	4	MAIN ON FAULT	main contactor driver On fault	1.Main contactor driver failed closed.
3	1	WIRING FAULT	HPD fault present >10 sec.	1.Misadjusted throttle. 2.Broken throttle pot or throttle mechanism.
3	2	BRAKE ON FAULT	brake On fault	1.Electromagnetic brake driver shorted. 2.Electromagnetic brake coil open.

3	3	PRECHARGE FAULT	precharge fault	1. Brake driver shorted. 2. Precharge circuit damaged. 3. MOSFET failure.
3	4	BRAKE OFF FAULT	brake Off fault	1.Electromagnetic brake driver open. 2.Electromagnetic brake coil shorted.
3	5	HPD FAULT	HPD (High Pedal Disable)	1. Improper sequence of throttle and KSI,push, or inhibit inputs. 2. Misadjusted throttle pot.
4	1	CURRENT SENSE FAULT	current sense out of range	1.Short in motor or in motor wiring. 2. Controller failure. ★
4	2	HARDWARE FAILSAFE	motor voltage out of range	1.Motor voltage does not correspond to throttle request. 2.Short in motor or in motor wiring. 3. Controller failure. ★
4	3	EE CHECKSUM FAULT	EEPROM fault	1. EEPROM failure or fault.
4	5	BATTERY DISCONNECT FAULT	battery disconnected	1. Battery not connected. 2.Poor connection to battery terminals.

Lithium battery operating instructions

Table of Content

Chapter 1 Safety Precautions

CAUTION	
 **PROHIBITION**	• DO NOT short-circuit the positive and negative terminals of the battery. • Do not collide, handle gently, and avoid the battery being subjected to excessive vibration, external impact, high drop, etc. • DO NOT place the battery or battery pack in a corrosive chemical environment. • DO NOT charge the battery without a charging device or with a charging device that we do not recognize. • DO NOT expose the battery or leave it in an environment above 45 °C for a long time. • DO NOT disassemble, squeeze, puncture or heat the battery. • Lithium batteries are forbidden for those who lack the knowledge of safe use of lithium batteries. • DO NOT immerse the battery in water or other conductive liquids. • DO NOT use the battery in series or in parallel with other models or types of batteries. • Serial and parallel operation of a complete power supply system containing a lithium-ion battery protection circuit board or battery management system is prohibited.
	• It is strictly forbidden to hot swap battery • It is easy to cause fire and electric shock
	• Be aware of corrosion • It may cause battery damage and shorten battery life
	• No burning • It may cause battery explosion

Chapter 2 Battery Introduction and Instructions

2.1 Battery Introduction

Battery model	EL20A	Battery weight	5kg
Rated voltage	24V	Cell material	LFP
Rated capacity	20Ah	Battery size	193x81x300mm
Charger voltage	24V	Charger current	10A

2.2 Instructions

1. Due to the product in transit or inventory, the lithium battery must be fully charged with the vehicle-specific charger before the first use (do not mix with other models of chargers or use other modified equipment), and then it can be used;

2. The lithium battery should be used at an ambient temperature of -20°C ~ 45°C, do not use or store the battery near a fire source/heat source where the temperature is outside the temperature range;

Caution!
Ambient temperature for use:
-20°C ~ 45°C

3. Lithium battery has the performance of charging and using whenever it is necessary, when the battery is low, please charge it in time to avoid over-discharge; the replaced battery should also be charged in time to avoid damage caused by over-discharge of the battery after self-discharge.

4. Do not place metal objects (such as wrenches, knives) on the lithium battery, or other objects that may cause short-circuiting of the battery to avoid short circuit between the positive and negative terminals;

5. Do not bump or strike the lithium battery during use, if the battery leaks or smells, please stop using it immediately and keep away from the fire source.

6. If the battery life is significantly shortened, please contact the after-sales for check;

7. If the lithium battery fails and cannot be used, please remove the battery from the handling equipment, the trained personnel can use our BMS special reading instrument to read the information for preliminary judgment; for problems that cannot be solved, please contact the after-sales service department for solutions;

8. Before installing and removing the battery, be sure to read the user manual; the weight of the battery body is evenly distributed, please pay attention to the installation and removal when there is an external weight; please use two hooks to hang on the

lifting rings during the lifting process, and gently lift it to keep it stable and not inclined;
9. The operator must read the instructions carefully before use and receive relevant safety training to be able to handle emergencies;

Chapter 3 Charging

1. This battery can only be charged with the vehicle-specific charger, other chargers may cause battery damage.
2. The normal charging temperature range of the battery is: 0°C ~ 45°C, please do not charge in the environment beyond the normal temperature range;
3. If the charging is still not completed within the specified time, stop charging the battery;
4. During the charging operation, it is necessary to have professional personnel to operate and care, in order to ensure that the charging plug and socket work normally without heat, to ensure that the charging device works normally, to ensure that the battery pack and its protection circuit work normally, and the whole power supply system has no sign of short circuit, over current, over temperature or overcharge.

Warning!
Lithium batteries are strictly prohibited from overcharging and over discharging.

5. When charging, connect the battery plug connector to the charger plug connector, and there will be contactor sound; after starting charging, the circular display meter will display the total voltage, the maximum and minimum cell voltages, power, temperature, charging current and other information; pay particular attention to the charging current and the maximum and minimum cell voltages, as well as the voltage difference between them; if there is abnormality, stop charging in time and contact the after-sales service department for solutions.

Caution!
1. The normal charging temperature range of the battery is: 0°C~45°C.
2. The voltage difference between the maximum and minimum cell voltages during charging is less than 0.1V.
3. The lithium battery voltage matches the charger voltage.
4. The charger should be periodically checked for charging over voltage protection device.

Chapter 4 Storage

1. Try to ensure that the battery or battery pack's power is ≥60% before long-term storage as the battery has the function of self-discharge, be sure to charge the battery once every 3 months to ensure the battery power is ≥60%;
2. The battery should be stored in a temperature environment of -20°C~45°C;
3. Store in a dry, ventilated and cool environment, avoid direct sunlight, high temperature, high humidity corrosive gas, severe vibration, etc.
4. DO NOT stack, stacking of this series of products is not allowed.
5. DO NOT store under the condition that the load or the hidden load is connected, that is, it is prohibited to have any form of discharge behavior when storing;
6. If the battery is found to be bulged, cracked, or has a low voltage value after long-term storage, the battery may be damaged; please contact the relevant technical department of the company for technical support.
7. After not using the battery for a long time, do not charge or discharge the battery if the smell of leakage is found near the battery.

Caution!
Ambient temperature for storage:
-20°C~45°C

Chapter 5 Transportation

1. During the loading, unloading and transportation process, severe vibration and large external impact should be avoided, and throwing, rolling, inverting, squeezing and excessive stacking are prohibited;
2. Prevent rain during transportation;
3. Ensure that the battery or battery pack has been disconnected from the load or charging device before transportation, without any form of charging and discharging.

Warning!
Don't bump, handle gently.

Chapter 6 Common Problems and Solutions

During the use and maintenance of the lithium-ion battery, the battery or battery system may have one or more of the following abnormal conditions, please organize the professional engineers and technicians to perform the necessary processing according to the instructions in this manual; if you have any questions about the status or solutions, please contact the relevant technical department or after-sales service department of the company to obtain professional technical support.

1. If the battery is found to have abnormal mechanical characteristics such as swelling, cracked casing, melted casing deformation, and distortion of the casing before and during installation, stop using the battery immediately and store it separately;
2. If abnormalities such as looseness, cracks, cracks in the insulation layer, burn marks, etc. of the battery's pole pressing bolts, conductive strips, main circuit wires and connectors are found before and during the installation, stop using the battery immediately, check the reason for analysis and give it a fix;
3. If the polarity of the positive and negative terminals of the battery is found not match the polarity identification before installation, please stop using the battery immediately and contact the after-sales service department to replace the battery or obtain other solutions;
4. If the temperature of the battery exceeds 65°C before and during installation, stop using the battery immediately and leave it separately, if the temperature continues to rise, it needs to be buried with sand;
5. If the battery is found to emit smoke before and during installation, immediately stop using the battery and bury it with sand, and notify the after-sales service department of the company for record and obtain technical support;

Chapter 7 Maintenance

7.1 Daily Maintenance

1. It is necessary to arrange professionals for care during the charging operation, especially when the battery is almost fully charged; make sure that the plug and the socket are in good contact during the charging process to ensure that the charging device works normally and ensure that the connection points of the battery pack are in good contact. If an abnormality occurs, the battery needs to be repaired before charging;
2. Check the battery voltage, temperature, voltage difference, etc. displayed on the circular display meter before charging and discharging to ensure that all values are within the normal range;
3. If there is a large amount of dust, metal shavings or other debris on the upper cover and poles of the battery pack, use compressed air or dry cloth to clean it in time, avoid cleaning with water or water-soaked objects;
4. When charging and discharging, try to avoid water or other conductive liquids splashing on the top cover and poles of the battery, for example, being exposed to heavy rain during use;
5. Estimate the charging time and discharging time of the battery according to the actual status of use of the battery or battery pack, observe whether there is any abnormality in the battery or battery pack at the end of charging and the end of discharging, such as the voltage difference of the battery.

7.2 Regular Maintenance

1. Check the nodes such as the conductive strips and voltage collection terminals for looseness, shedding, rusting or deformation, etc., to ensure that the series-parallel harness used in the battery pack is firm and reliable (once a month);
2. Check the battery casing for cracks, deformation, loose poles, bulging and other abnormal conditions (once a month);
3. Check the reliability of the charging device to ensure that the charging device performs the charging action in accordance with the voltage regulation and current regulation signals sent by the BMS and to ensure that the battery will not be overcharged (once a month);
4. Check discharge protection equipment, such as fast-acting fuses, DC contactors, relays, etc., to ensure that the battery pack can be quickly disconnected from the main circuit in the event of a dangerous situation such as short circuit or overcurrent (once a month);

5. Check the insulation resistance between the battery pack and the vehicle body to ensure that the resistance value meets the Chinese national standard (≥500Ω/V) and to ensure that there is no electric leakage with the battery (once a month);

7.3 Disposal of Used Battery Packs

To prevent environmental pollution, the battery should be sent to a local recycling center or a dedicated lithium battery processing facility.