



CQD15SD

Reach truck

Operation Manual





Fig0000-000110M

EP EQUIPMENT CO.,LTD. is one of the world's leading companies manufacture, design material handling equipment and provide related service. With over 100,000 square metres plant it produces over 100,000 trucks per year, and provides professional, effective and optimized material handling solutions worldwide, until now it has developed three major kinds of business:

- Material handling equipment: Focus on electric reach truck and warehouse equipment
- OEM parts: Global parts supply
- Imow industry,online: One-stop industrial products supply

Guided by our customer-oriented concept, EP has developed service centers in more than 30 countries around the world, from which customers are able to receive timely local service. Moreover, 95% of warranty parts can be shipped out within 24 hours after been ordered. Through our online after-sales service system, customers can process their warranty claims, order spare parts and consult the operation manuals, maintenance materials and spare parts catalogs.

With business all over the world, EP has thousands of employees and hundreds of agents worldwide to provide our global customers with prompt local service.

Based on the concept of sharing economy, EP also offer rental service for various logistics equipment. Adhering to the idea "Making the leasing of logistic equipment more simple", EP is devoted to providing customized one-stop leasing solutions for our customers with our high quality, reasonable price and prompt rental service.

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

The present operation manual is designed to provide sufficient instructions for the safe operation of the industrial truck. The information is provided clearly and concisely.

Our trucks are under ongoing development. EP reserves the right to alter the design, equipment and technical features of the system. No guarantee of particular features of the truck should therefore be assumed from the present operation manual.

Safety notices and text mark-ups

Safety instructions and important explanations are indicated by the following graphics:



DANGER

Means that failure to comply can cause risk to life and/or major damage to property.



WARNING

Please strictly adhere to these safety instructions to avoid personal injury or major damage to equipment.



CAUTION

Please pay attention to the important safety instructions.



NOTE

Pay attention to Instruction.

Internet address and QR code of Parts manual

By entering the address <http://www.ep-care.com> in a web browser or by scanning the QR code, Login after registration, Select "Parts purchase" function and input part number or model name to find the truck.



Note: After registration, please send email to info@ep-care.com to activate your account

Legal requirements for marketing

Declaration

EP EQUIPMENT CO., LTD.

Address: No.1 Xiaquan Village, Lingfeng Street, Anji, Huzhou, Zhejiang

We declare that the

Industrial truck: according to this operation manual

Type: according to this operation manual

complies with the most recent version of Machinery Directive 2006/42/EC.

Personnel authorised to compile the technical documents:

See EC/EU Declaration of Conformity

EP EQUIPMENT CO., LTD.

EC/EU Declaration of Conformity

The manufacturer declares that this industrial truck complies with the EC Machinery Directive and the provisions of other applicable EC/EU directives effective at the time of sale. This can be verified by means of the EC/EU Declaration of Conformity and the relevant certification label on the nameplate.

The industrial truck is supplied with the EC/EU Declaration of Conformity document. This declaration proves that this truck complies with the requirements of the EC Machinery Directive. Unauthorized modification or additional installation of equipment to the structure of the industrial truck may affect its safety, and will therefore invalidate the EC/EU Declaration of Conformity.

The EC/EU Declaration of Conformity must be carefully conserved and kept ready to be presented to the relevant authorities. If this industrial truck is sold, this declaration document must be handed over to the new owner.

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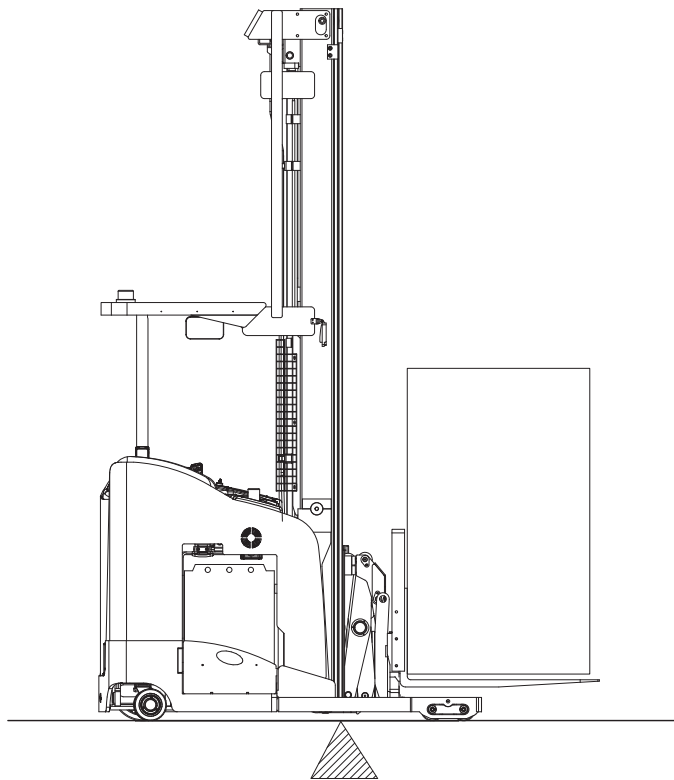
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A Introduction

The fork lift truck is designed to pick up and move materials. The basic lift truck has a lift mechanism with forks on the front to engage the load. The lift mechanism lifts the load so that it can be moved and stacked.

In order to understand how the lift truck can pick up a load, you must first know some basic things about the lift truck. The lift truck is based on the principle of two weights balanced on opposite sides of a pivot (fulcrum).

In order for this principle to work, the load on the forks must be balanced by the weight of the lift truck and battery. The weight of the battery is a major part of the total lift truck weight. The location of the center of gravity of both the lift truck and the load is also a factor. This basic principle is used to pick up a load. The ability of the lift truck to handle a load is discussed in terms of center of gravity and stability.



Many people make the mistake of thinking that operating a lift truck is the same as driving an automobile. This is not true. It is true that some lift truck operating procedures are as simple and obvious as driving the family automobile.

(Example: Look where you are going, start and stop smoothly, etc.) But a lift truck is a special machine designed to do a much different job than an automobile.

Because of the close areas in which a lift truck operates and its other operating characteristics (like rear wheel steering and tailswing), every operator must receive additional training, even if they have a license to drive an automobile.

It must be used, operated and maintained according to the information in this operation manual. Any other uses are outside the design envelope and can lead to injury to persons or damage to equipment and property. Above all, overloading caused by excessively heavy or unbalanced loads must be avoided. The max. admissible load to be picked up is indicated on the nameplate or load diagram label shown on the truck. The truck has been passed CE certification.

i NOTE

- 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.
- Manual pictures for reference only, the real car shall prevail, and shall not affect the manual use.
- Manual pictures only sign for one of the models in this series models.

Duties of the user

For the purposes of the present operating instructions, the operating company is defined as any natural or legal person who either uses the truck himself, or on whose behalf it is used. In special cases (e.g. leasing or renting). the operating company is considered to be the person who is to carry out the specified operational duties in accordance with existing contractual agreements between the owner and operator of the industrial truck.

The operating company must ensure that the truck is used only for its intended purpose and that dangers to the health and safety of the operator and third parties are prevented. Further more, accident prevention regulations, safety regulations and operating, servicing and repair guidelines must be followed. The operating company must ensure that all operator have read and understood these operating instructions.

Modification

Unauthorized modification to the truck can result in injury or death.

Can not remove, disable or modify any safeguards or other safety devices. These include any alarms, lights, mirrors, overhead guards, and load backrest extensions. If present, an overhead guard is intended to provide protection to the operator from falling objects, but cannot protect from every possible.

Safety devices and warning labels

The safety devices, warning signs and warning instructions in the present operating instructions must be strictly observed.

➤ **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. Unauthorized persons must be kept away from the hazardous area.

Where there is danger to personnel, a warning must be sounded with sufficient notice.

Give a warning signal with plenty of time for people to leave.

If unauthorized personnel are still within the hazardous area stop the truck immediately.

1.1 Intended use

- The industrial truck is used for moving and lifting the loads indicated on the load capability chart.
- Damages and other defects to industrial trucks or to attachments must be reported to the supervisor immediately. Industrial trucks and attachments which are not safe to operate may not be used until they have been properly repaired.
- Safety installations and switches may not be removed or rendered unusable. Specified settings may only be changed with the approval of the manufacturer.
- Only the areas approved by the operating company or its representative may be used for transportation purposes. Loads may only be deposited or stored at the intended places.
- Inclines used by industrial trucks shall not exceed the limits specified by the manufacturer and must have an adequately rough surface.
- Danger points on driving lanes or routes shall be secured or marked by the customary road traffic signs and by additional warning signs, if necessary.
- Driving routes shall be sufficiently paved, level and free of objects. Drain channels and railways crossings, etc., shall be levelled and, if necessary, covered with ramps in such a way that they can be driven over without bumps as far as possible.
- The EU Directive 89/654/EEC (Minimum Regulations for Health and Safety for the workplace) shall be observed. The respective national regulations apply for non-EU countries.
- The operating company is responsible for adequate fire protection in the vicinity of the industrial truck.

1.2 Improper use

The operating company or driver, and not the manufacturer, is liable if the truck is used in a manner that is not permitted. The following list is exemplary and is not intended to be exhaustive.

- Do not stack loads or turn when driving on a ramp.
- Never park the truck in a place that may obstruct fire extinguishers, fire escapes or aisles.
- Do not leave the truck unattended when the load is raised.
- Do not stand on the fork arms when raised.
- Do not increase the truck's load capacity, e.g. by attaching an additional weight.

1.3 Reach truck handover

To avoid the inconvenience of making a claim after use, check the reach truck is in perfect condition and repair, and confirm your satisfaction with the vehicle on the manufacturer's product qualification certificate upon handover.

B Truck Description

1.1 Application

It is an battery-powered truck. With maximum economic efficiency, safety and driving comfort. The series is a three wheel electric side seat, clear view reach truck. It is designed for internal and external use to lift and transport goods. Open bottom pallets or pallets with transverse boards can be lifted inside or outside the area of the load wheels or roll cage. Loads can be stacked, unstacked and transported over long distances. The lift trucks are available with a side stance operator compartment. The side-stance operator compartment is equipped with a multifunction handle to provide control of direction and speed, lift/lower, extend/retract, tilt, and optional sideshift.

Braking of the lift truck is accomplished by electronic braking of the traction motor. Normal braking of these lift truck models is through proportional plugging where the multifunction control handle is placed in the opposite direction of travel and the lift truck is electronically brought to a smooth stop. The parking brake is an electric on/off type brake attached to the end of the traction motor.

The lift truck battery can be removed from either side of the lift truck. Right side removal is preferred to avoid damage to the battery cables.

- The capacity can be obtained from the data plate.
- We adhered to all CE safety requirements.
- Indoor and outdoor use.
- The truck's max operation altitude is up to 2000m.
- The lowest environment temperature under normal outdoor conditions when operation -20°C .
- Average environment temperature under continuous operating condition $+25^{\circ}\text{C}$.
- The highest environment temperature in the short term ($\leq 1\text{h}$) $+40^{\circ}\text{C}$.
- The lowest environment temperature under normal indoor conditions when operation $+5^{\circ}\text{C}$.
- Do not negotiate inclines crosswise or at an angle. Transporting loads downhill.
- If you must travel on an incline, the gradients should be below A% at full load, or below B% without a load. (For the value of A and B, refer to the gradeability in Standard Version Specifications)

i NOTE

It's prohibited to use the truck in the area of the explosion.

Special equipment and authorisation are required if the truck is to be used in extreme conditions (e.g. cold stores). We recommend with special measures for the truck or buy cold store truck. If in doubt, contact the manufacturer's customer service department.

i NOTE

For constant operation below 0°C or if there are extreme fluctuations in temperature and humidity special equipment for forklift trucks is available for which permission is required.

1.2 Truck Assemblies

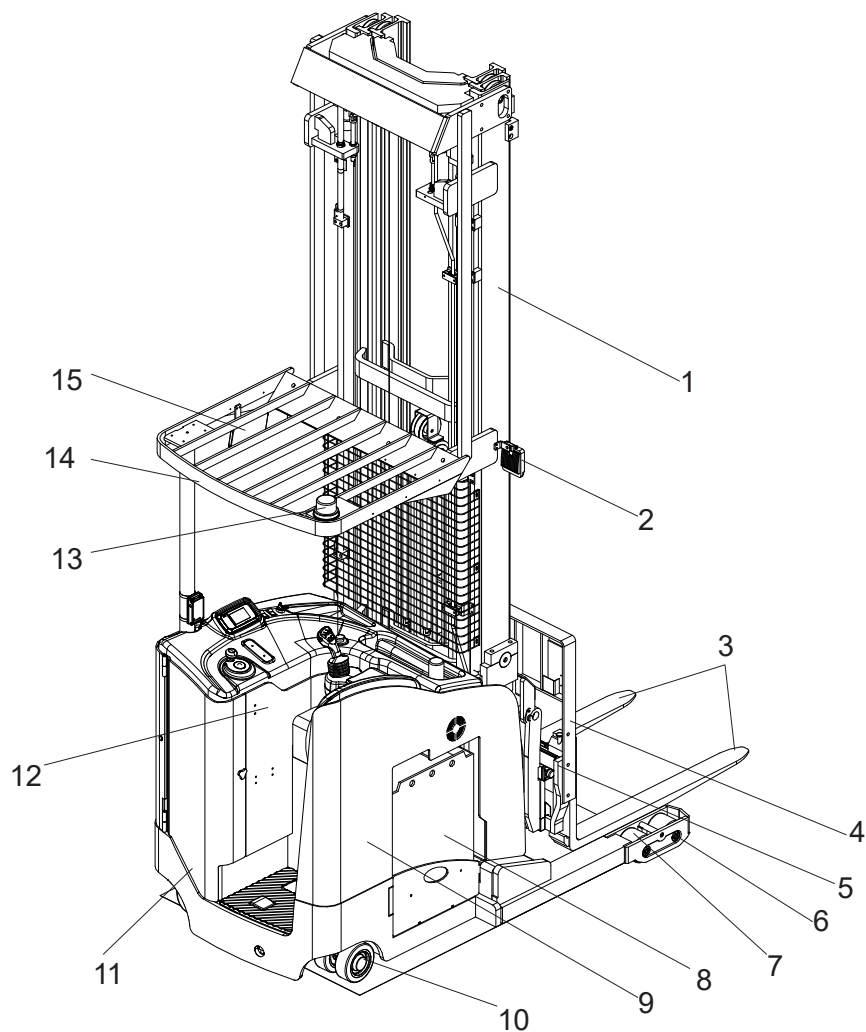
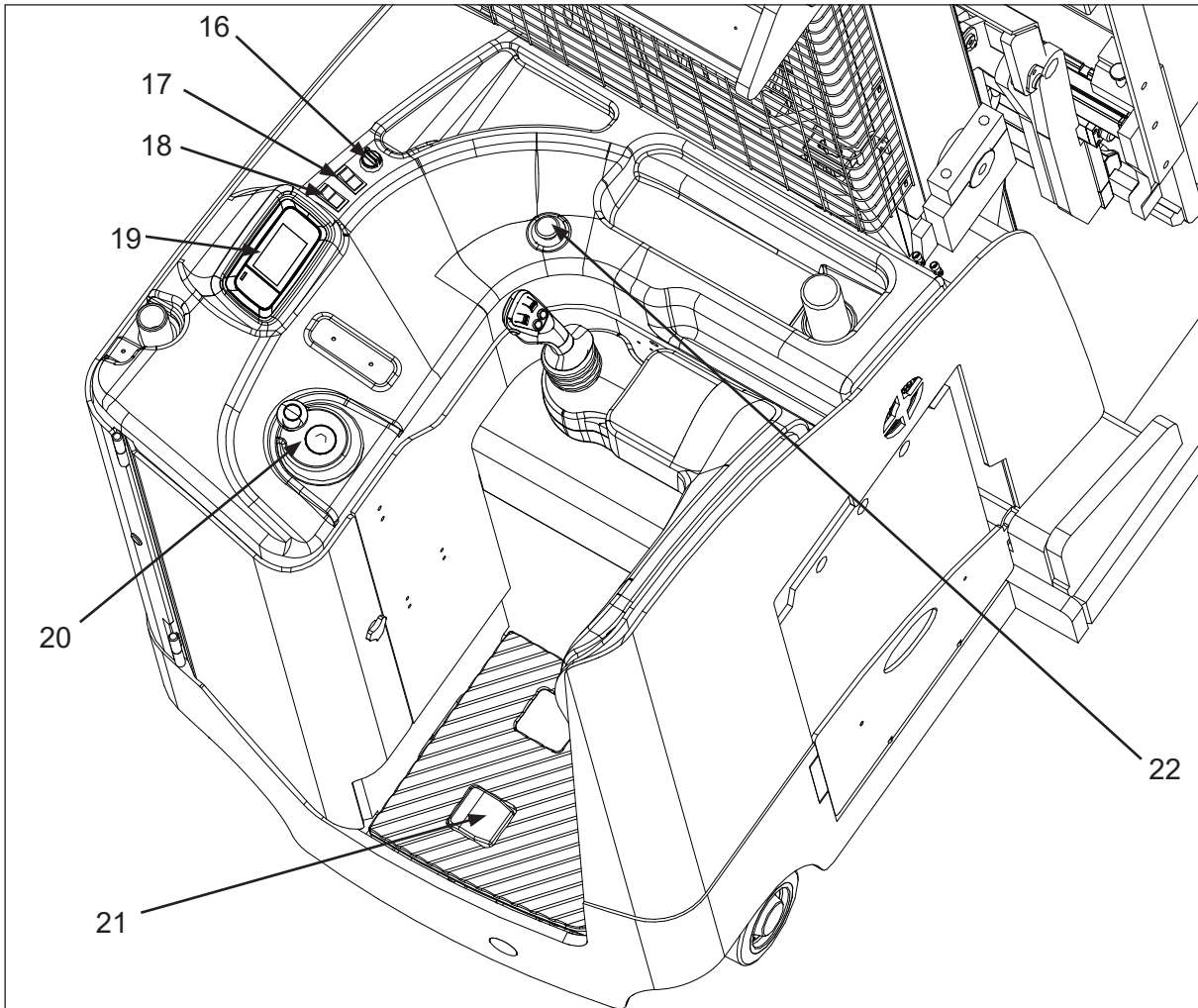


Fig3316-00001OM

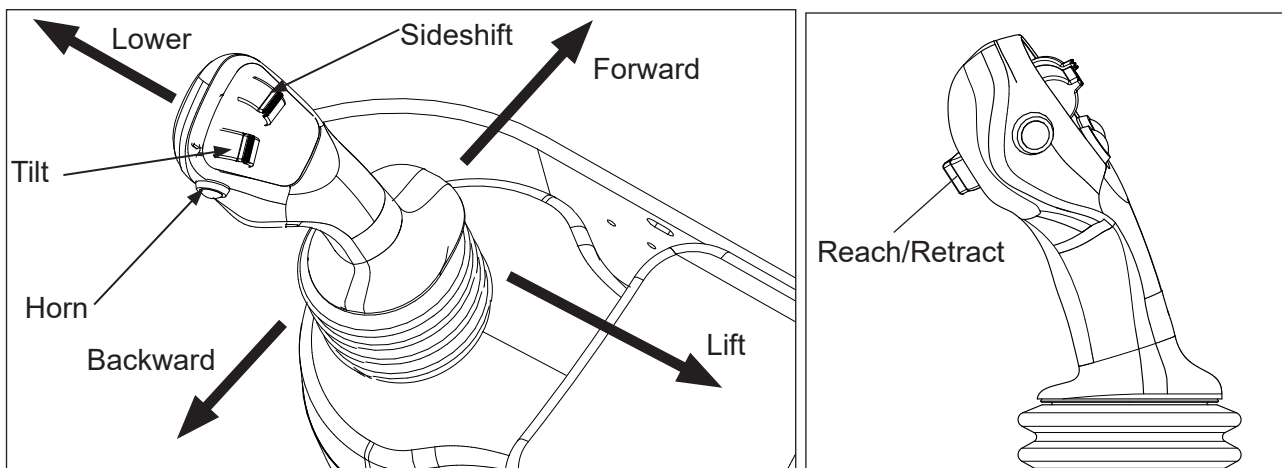
1	Mast
2	Headlight
3	Forks
4	Load backrest
5	Reach Mechanism
6	Basearms
7	Load wheels
8	Battery
9	Chassis

10	Caster
11	Drive wheel
12	Operator's compartment
13	Warning light
14	Overhead guard
15	Rearview mirror

1.2.1 Controls and Displays

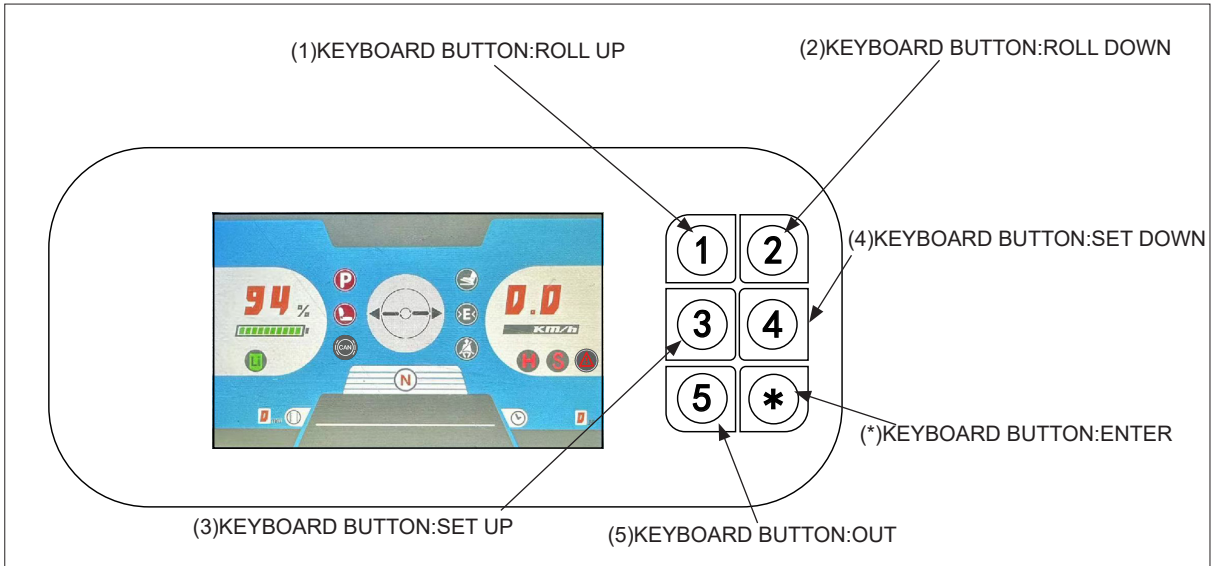


Item	Component	Function
16	Key switch	Switches control current on and off. Removing the key prevents the truck from being switched on by unauthorized personnel.
17	Handbrake switch	Apply and release the truck
18	Headlight switch	This switch controls the optional work lights when installed. Push the switch to turn the lights ON and OFF.
19	Display instrument	Operating information and warning message display.
20	Steering Disk	Steers the truck in the required direction.
21	pedal Switch	<ul style="list-style-type: none"> • Not applied: Travel inhibited, truck decelerates. • Applied: Travel released.
22	Emergency stop switch	Disconnects the supply current, deactivates all electrical functions, causing the truck to brake automatically.



Item	Component	Function
23	Side-Stance Control Handle	<p>Travel is activated by moving the control handle in the direction of travel. Pushing the control handle away from operator provides Forward Travel. Pulling the control handle toward operator provides Reverse Travel. The travel speed, for both forward and reverse directions, is proportional to the distance the handle is moved; the further the distance, the faster the lift truck travels.</p> <p>The control handle also controls the Lift/Lower functions. When the control handle is pushed downward, the carriage lowers. When the handle is pulled upward, the carriage lifts. The speed of the mast is proportional to the distance the control handle is moved.</p> <p>The Horn button is located on top of the control handle. The horn is activated by pressing the button with the thumb.</p> <p>Sideshift and Tilt functions are controlled by paddle switches.</p> <p>Back button switch which controls the Reach/Retract function.</p>

1.2.2 Instrument



Main interface displays instructions:

Speed display

Number is the speed value, and the speed unit is shown below. Km/h or MPH can be selected by parameters.

Parameter position is:

DISPLAY xxx---Parameter Set---Speed Unit



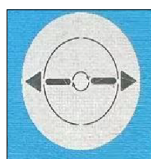
Battery status indicator

The figure is the percentage of battery status indicator. The figure below shows the number of battery status indicator grids (0-10 grids), in which, according to the number of remaining battery status indicator grids.

There are color changes as follows. At the same time, when the power is low, the flashover reminder (it can judge the different thresholds of lithium battery or lead acid intelligently) :



Steering Angle indication



Running time display



Fig0000-00257OM

Fork height display



Fig0000-00254OM

Accelerator output

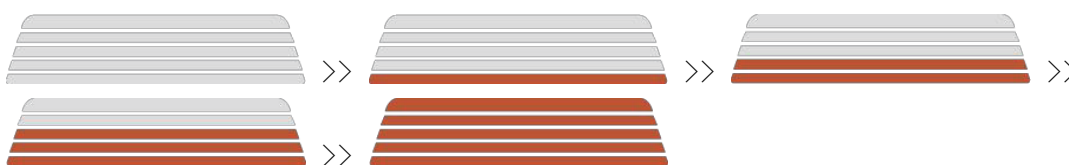


Fig0000-00258OM

Fault display area

- 1 fault code
- 2 failure node
- 3 troubleshoot



Fig0000-00255OM

When there is a fault at the same time, the meter has a buzzer to alert, and the corresponding failure icon indicates, if the truck failure, the failure icon is displayed next to the vehicle, if the lithium battery failure, the failure icon shows the power bar, the icon. Such as graphic:



Fig0000-00259OM

direction



Fig0000-00260OM

Pump function indication



1st SPEED



2nd SPEED



3rd SPEED



4th SPEED





Fig0000-00261OM

Proportional lift indication



Fig0000-00256OM

Red pedal(CAN brake)indicates [display only with this configuration]

 <small>Fig0000-00279OM</small> Gray: no output	 <small>Fig0000-00280OM</small> Green: low output	 <small>Fig0000-00281OM</small> Orange: medium output	 <small>Fig0000-00282OM</small> Red: high output
--	--	---	---

Where, if there is a fault or interruption of CAN message on the red pedal, the icon will flash to remind

Lithium battery related instructions [only for lithium battery truck]









Fig0000-00278OM

If the truck is equipped with lithium battery, the interface has the following icon to indicate. Among them, if the lithium battery CAN information is faulty or interrupted, the icon will flash to remind. In addition, the lithium battery model also has low battery protection level, as shown below:

 <small>Fig0000-00268OM</small>	Do not lifting	 <small>Fig0000-00269OM</small>	Do not lift and slow down 1
 <small>Fig0000-00270OM</small>	Do not lift and slow down 2	 <small>Fig0000-00271OM</small>	Disconnect the truck contactor

Drivability Settings

 <small>Fig0000-002720M</small>	Low Speed mode	 <small>Fig0000-002740M</small>	Medium speed mode	 <small>Fig0000-002760M</small>	High speed mode
 <small>Fig0000-002730M</small>	Slow acceleration rate	 <small>Fig0000-002750M</small>	Adding rate	 <small>Fig0000-002770M</small>	Fast acceleration rate

Which can be set through the instrument parameters, gear selection:

DISPLAY xxx----Parameter Set----SPE Mode Option)

0(default):Press 1 to switch the speed and acceleration rate at the same time. Switch from H/S mode to L/E mode. Mode 1: press the 1 key to switch the speed, l-m-h switch, and the default starting speed can be set by parameters:

DISPLAY xxx----Parameter Set----Start Speed

0(default):M medium speed mode,1: L Low Speed mode2:H High speed mode

Press 2 to switch the acceleration rate and switch between e-p-s. Meanwhile, the default starting acceleration rate can be set by parameters:

DISPLAY xxx----Parameter Set----Start ACC

0(default)):S Fast acceleration rate1: E Adding rate2:P Slow acceleration rate

Screen brightness adjustment

In the main interface, the screen brightness can be adjusted by pressing keys 3 and 4

Key 3: increase brightness key 4: decrease brightness

Language selection

English and Chinese language can be selected by parameters

DISPLAY xxx----Parameter Set----Language

0(default)):English 1:Chinese

Key Beep

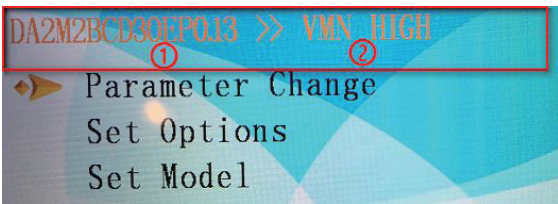
Key beep can be turned on or off by pressing the parameters

DISPLAY xxx----Parameter Set----Key Beep

ON(default) OFF

Current controller failure display

When the controller has a failure, enter the corresponding controller node, the top index column display

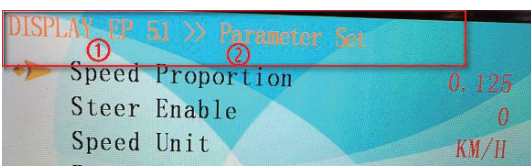


- 1. Current controller node
- 2. Current controller fault interpretation

Fig0000-00287OM

No failure, menu index display

When the controller is trouble-free, enter the corresponding controller node and the top index column will be displayed

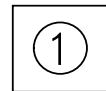


- 1. Current controller node
- 2. Current entry menu

Fig0000-00286OM

The meanings of six Button:

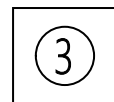
ENTER Button:
Save all changing



ROLL UP Button:
Change the digit marked by cursor



ROLL DOWN Button :
Change the digit marked by cursor



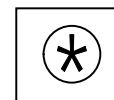
SET UP Button :
Shift cursor on previous digit



SET DOWN Button:
Shift cursor on following digit



OUT Button:
Cancel all changing



1.2.3 Components

➤ Overhead guard

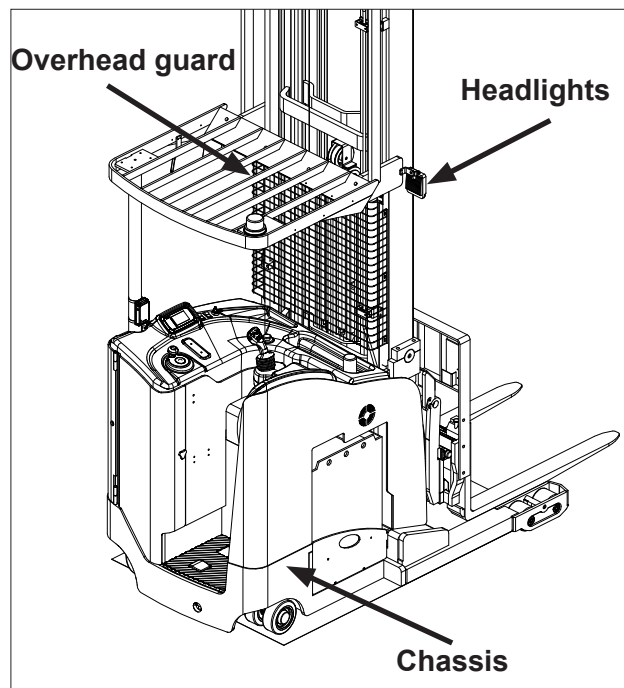
The overhead guard protects the operator against injury from falling objects. It must have sufficient impact strength. Its gap is used to lift battery. Do not use the forklift without the overhead guard.

➤ Chassis

The chassis, in conjunction with the counterweight, forms the supporting base structure of the truck. It is used to support the main components.

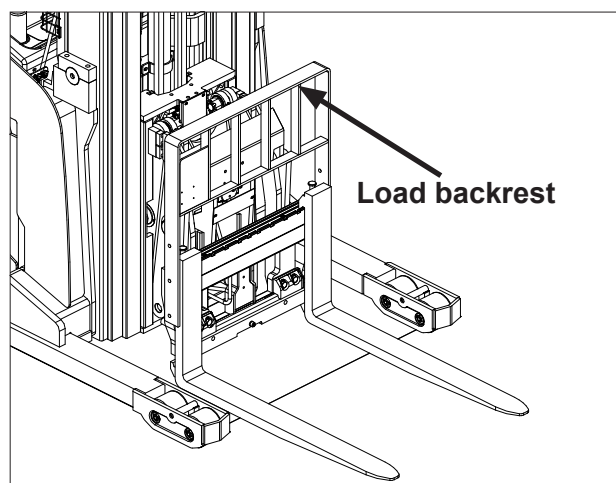
➤ Headlights

Front combination lights (turn signal and lighting) are installed on the front pillars of the overhead guard. Protect the lights from damage and clean them up if dusty. Any damaged lights must be replaced.



➤ Load backrest

Load backrest is an important safety part that prevents loads dropping. It's prohibited to dismantle and remould the load backrest. Never use truck without load backrest.

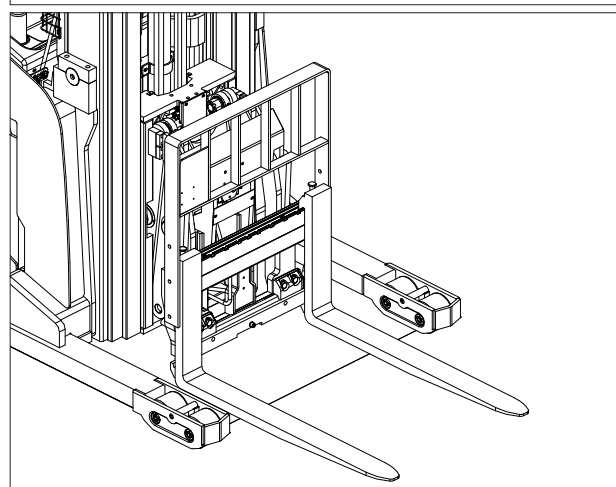


DANGER

Loads should be arranged so that they do not project beyond the edge of the truck loading surface and cannot slip, topple over or fall off.

➤ Fork stopper

Used when adjusting the spacing of the forks. Pull up the fork stopper and rotate it 90°, then adjust the forks to the desired positions according to the load to be handled.



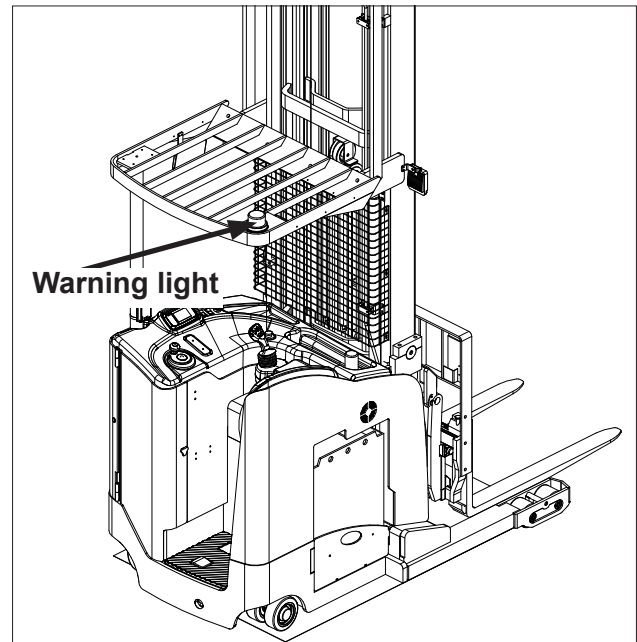
➤ **Warning light**

Press the caution light button, the caution light will flash.



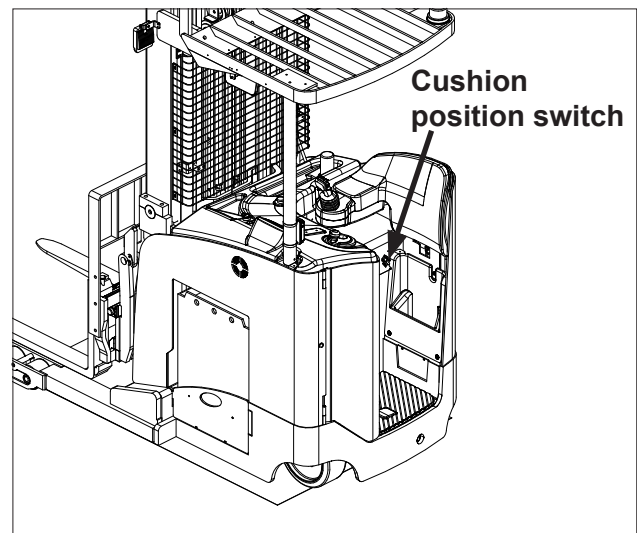
WARNING

When start the truck, you must press the warning light button to keep the caution light on.



➤ **Cushion position witch**

Pull the switch to adjust the cushion up and down



➤ **Operating attachments**

Attachments are optional equipment purchased by the user and installed onto the truck (for example: lateral forks, clamps etc.). Pay close attention to the working pressures and operating instructions for each attachment. An additional attachment lever should be installed for use by the attachments(see page B9).



NOTE

After installing each attachment, a label should be attached to the battery hood, explaining the truck's load capacity after installing the attachment. An attachment operating notice should also be attached to the front of the attachment.



CAUTION

If the attachment was not supplied with the truck, it can only be used if verified by your EP dealer and safe operation of the truck is guaranteed in terms of load capacity and stability after installation of the attachment.

1.3 Standard Version Specifications

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

1.3.1 Performance data for standard truck

Distinguishing mark				
1.1	Manufacturer			EP
1.2	Model designation			CQD15SD
1.3	Drive unit			Electric
1.4	Operator type			Standing
1.5	rated capacity	Q	t	1.5
1.6	Load center distance	c	mm	600
1.8	Load distance, centre of drive axle to fork	x	mm	215
1.9	Wheelbase	y	mm	1700
Weight				
2.1	Service weight (include battery)		kg	4490 (Table 1)
2.3.1	Axle loading, unladen driving side/loading side		kg	2590/1800
2.4.1	Axle loading, fork advanced, laden driving side/loading side		kg	1178/4712
2.5.1	Axle loading, fork retracted, laden driving side/loading side		kg	2297/3593
Types, Chassis				
3.1	"Tyre type driving wheels/steering wheels"			polyurethane
3.2.1	Tyre size, driving wheels		mm	Φ343× 40

3.3.1	Tyre size, steering wheels		mm	Φ127× 98
3.4	Tyre size, caster wheels(diameter×width)		mm	Φ178×73
3.5.1	Wheels, number driving/steering (x=drive wheels)		mm	1×, 2/4
3.6.1	Track width, front,driving side	b10	mm	721.5
3.7.1	Track width,rear,loading side	b11	mm	1006
Dimensions				
4.1	Tilt of mast/fork carriage forward/backward	α/ β (°)		2/4
4.2	Height, mast lowered	h1		3660 (Table 2)
4.3	Free lift (load backrest)	h2		2610 (Table 2)
4.4	Lift height	h3	mm	8500 (Table 2)
4.5	Height, mast extended	h4	mm	9540 (Table 2)
4.7	Height of overhead guard (cabin)	h6	mm	2330
4.8	Seat height	h7	mm	250
4.10	Height of wheel arms	h8(mm)	mm	130
4.19	Overall length	l1	mm	2790
4.20	Length to face of forks	l2	mm	1717
4.21	Overall width	b1/ b2	mm	1078/1148
4.22	Fork dimensions	s/ e/ l	mm	40/100/1070
4.23	Fork carriage class/type A, B			2A
4.24	Fork carriage width	b3	mm	800
4.25	Distance between fork-arms	b5		250-780
4.26	Distance between wheel arms/ loading surfaces	b4		864
4.28	Reach distance	l4		1067

4.31	Ground clearance, laden, below mast	m1	mm	45
4.32	The minimum ground clearance of frame	m2	mm	50
4.34.1	Aisle width for pallets 1000 × 1200 crossways	Ast	mm	3125 (Table 3)
4.34.2	Aisle width for pallets 800 × 1200 lengthways	Ast	mm	3195 (Table 3)
4.35	Turning radius	Wa	mm	1945
4.37	Length across wheel arms (exclusive fork)	l7	mm	2130

Performance data			
5.1	Travel speed, laden/ unladen	km/h	11/12
5.2	Lifting speed, laden/ unladen	m/ s	0.45/0.5
5.3	Lowering speed, laden/ unladen	m/ s	0.5/0.5
5.4	Reaching speed, laden / unladen	m/ s	0.2/0.23
5.8	Max. gradeability, laden/ unladen	%	10/12
5.10	Service brake type		Electromagnetic
	Park brake type		Electromagnetic
Electric-engine			
6.1	Drive motor rating S2 60 min	kW	7
6.2	Lift motor rating at S3 15%	kW	20
6.4	Battery voltage/nominal capacity K5	V/ Ah	48V/600Ah
6.5	Battery weight	kg	900
Addition data			
8.1	Type of drive control		AC
10.5	Steering type		Electronic
10.7	Sound pressure level at the driver's ear	dB (A)	75
15.1	charger output current	A	80

Table 1

Mast Type	Lift height(mm.)	Service weight (with battery)kg.
		/
3-stage	6500	4390
	6860	4425
	7000	4440
	7500	4490
	7600	4500
	8000	4540
	8150	4555
	8500	4590
	8660	4305
	9000	4640
	9300	4670
	9500	4690
	10000	4740
	10160	4755
	10500	4790
10700	4810	

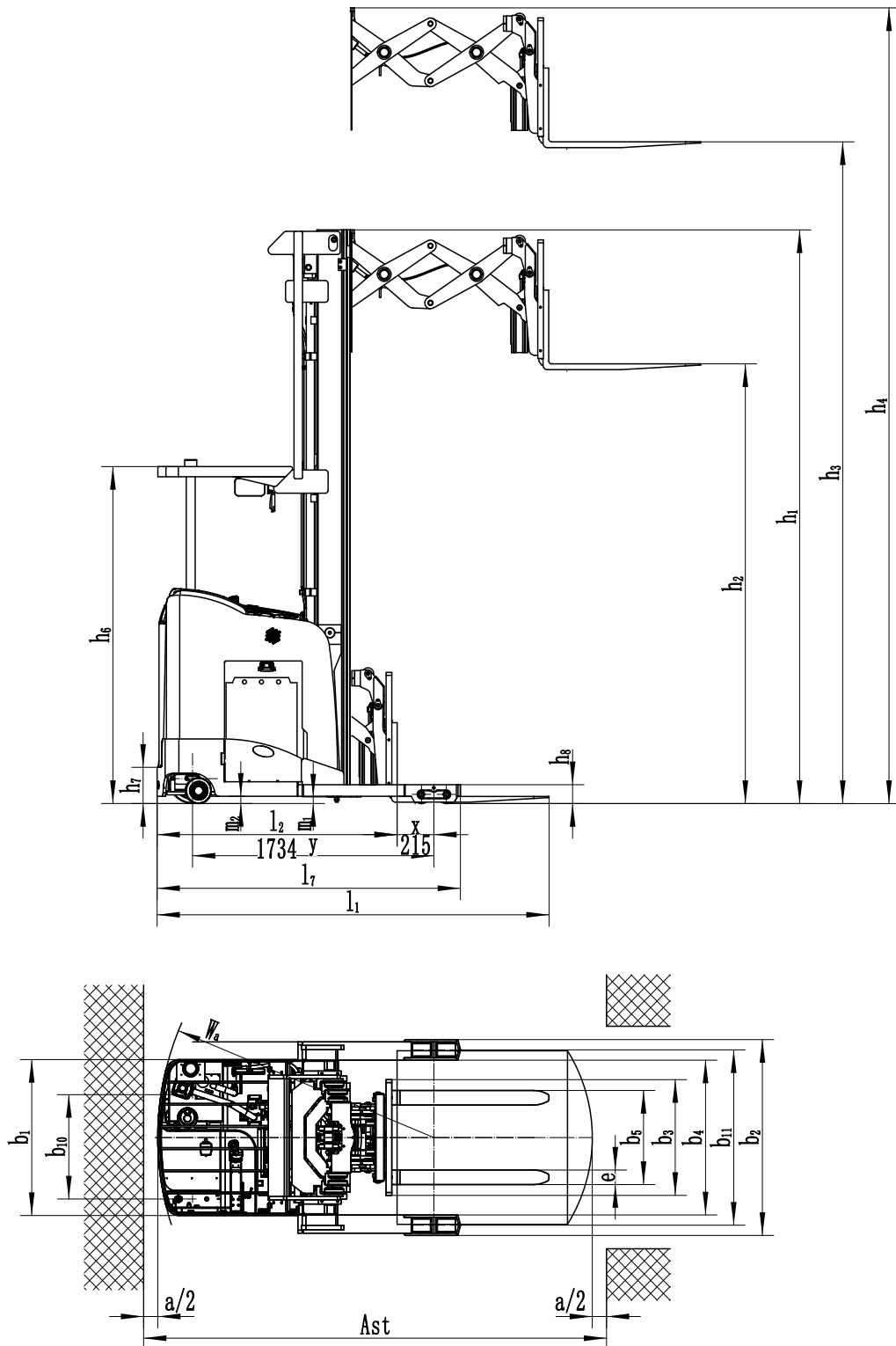
Table 2

Lift height(mm.)	Height, mast lowered(mm.)	Free lift (mm.)		Height, mast extended(mm.)	
		h2	h2(*)	h4	h4(*)
h3	h1				
6500	2965	1900	1900	7465	7465
6860	3085	2020	2020	7825	7825
7000	3130	2070	2070	7960	7960
7500	3295	2240	2240	8260	8260
7600	3330	2270	2270	8560	8560
8000	3495	2440	2440	8955	8955
8150	3545	2490	2490	9105	9105
8500	3660	2610	2610	9450	9450
8660	3715	2660	2660	9615	9615
9000	3860	2810	2810	9950	9950
9300	3965	2900	2900	10265	10265
9500	4030	2970	2970	10460	10460
10000	4230	3170	3170	10960	10960
10160	4285	3220	3220	11125	11125
10500	4395	3340	3340	11455	11455
10700	4465	3400	3400	11665	11665
11000	4630	3570	3570	11965	11965
11500	4795	3740	3740	12465	12465

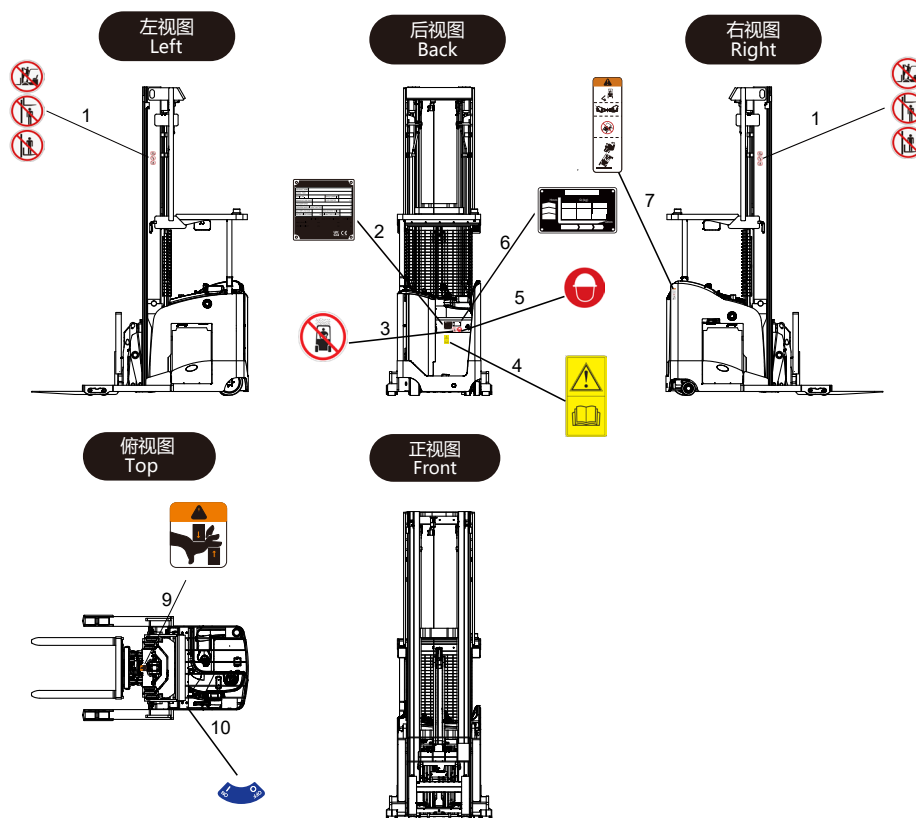
Table 3

pallet dimensions mm (L × W)	Width of the right-angle stacking aisle Ast1 (mm)	Recommended fork length(mm)	right-angle stacking aisle width utilizing shelf space Ast2(mm)	Recommended fork length(mm)
1200 × 1200	3090	1200	2920	1070
1200 × 1100	3060		2920	
1200 × 1000	3040		2920	
1200 × 800	2995		2930	
1100 × 1200	3005	1070	2820	960
1100 × 1100	2975		2820	
1100 × 1000	2950		2820	
1100 × 800	2905		2825	
1000 × 1200	2925	960	2720	860
1000 × 1100	2895		2720	
1000 × 1000	2865		2720	
1000 × 800	2815		2720	

1.3.2 Dimensions



1.4 Identification points

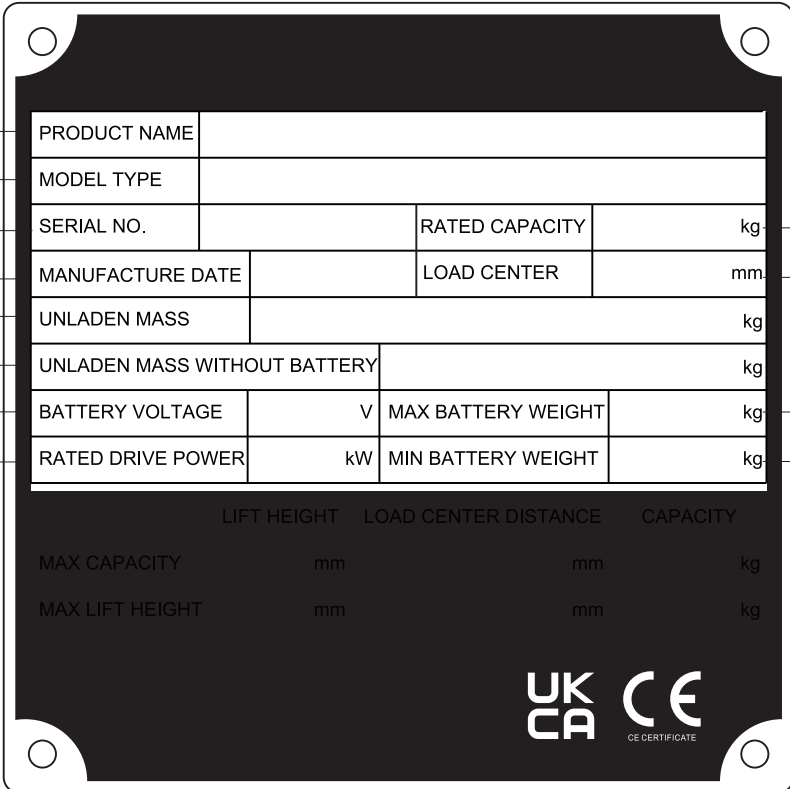


Item	Descriptions
1	Before operation: <ul style="list-style-type: none"> • Never climb the masts. • Never permit anyone to walk or stand under upraised forks or attachments. • Do not allow anyone to stand on the forks.
2	Nameplate
3	Driving prohibited in rainy weather.
4	Read the "Instruction handbook"
5	Operators must wear a helmet before operation
6	The load capability chart
7	The stability of your truck is ensured if used properly and as intended. But once it tips over during unapproved applications or incorrect operation, always follow the instructions below: <ul style="list-style-type: none"> • Stay buckled up; • Don't jump; • Hold on tight; • Brace feet; • Lean away.
9	Risk of serious injury or death due to entrapment. Never place your hands in between the inner and outer masts.
10	Key switch

1.5 Truck data plate

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

Item	Description	Item	Description
1	PRODUCT NAME	11	RATED CAPACITY
2	MODEL TYPE	12	LOAD CENTER
3	SERIAL NO.	13	MAX BATTERY WEIGHT
4	MANUFACTURE DATE	14	MIN BATTERY WEIGHT
5	UNLADEN MASS	15	
6	UNLADEN MASS WITHOUT BATTERY	16	
7	BATTERY VOLTAGE	17	
8	RATED DRIVE POWER	18	
9	MAX CAPACITY	19	
10	MAX LIFT HEIGHT		




1	PRODUCT NAME			
2	MODEL TYPE			
3	SERIAL NO.		RATED CAPACITY	kg
4	MANUFACTURE DATE		LOAD CENTER	mm
5	UNLADEN MASS	kg		
6	UNLADEN MASS WITHOUT BATTERY	kg		
7	BATTERY VOLTAGE	V	MAX BATTERY WEIGHT	kg
8	RATED DRIVE POWER	kW	MIN BATTERY WEIGHT	kg
		LIFT HEIGHT	LOAD CENTER DISTANCE	CAPACITY
	MAX CAPACITY	mm	mm	kg
	MAX LIFT HEIGHT	mm	mm	kg
				

Fig3218-00035OM

1.6 The load capability chart

The capacity plate gives the capacity (Q) of the truck in kg for a vertical mast. The maximum capacity is shown as a table with a given load centre of gravity D (in mm) and the required lift height H (in mm).

The capacity plate of the truck indicates the truck's capacity with the forks as originally supplied.

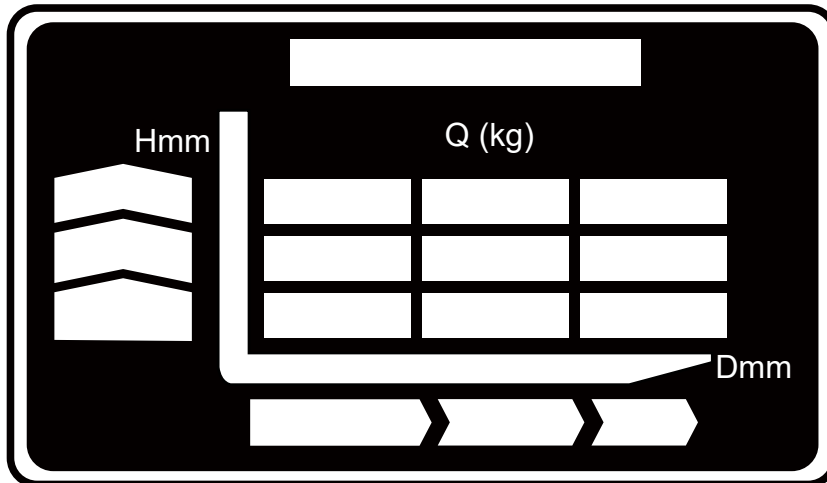


Fig0000-00012OM

C Safety

1.1 Before Operation

Before using the truck, inspect the work area. It should be neat, well lit, adequately ventilated, and free from hazardous material. Aisles and roadways should be unobstructed and well marked. Operators must know the classification for the truck and use the truck only in permissible areas. Ensure that there are no loose objects on the truck or in the operator compartment, especially on the floor plate where they could interfere with pedal operation (if equipped) or foot room. Fire extinguishers and other emergency equipment should be visible and easy to reach. Wear safety equipment when required. Don't smoke in "No Smoking" areas, or while charging batteries or refueling combustion engine trucks. Never operate the truck with greasy hands. This will make the controls slippery and result in loss of truck control. Any questions or concerns about safety should be brought to the attention of a supervisor. If an accident should occur, it must be reported immediately.

1.2 Safety

Safety Regulations For The Operation Of Reach Trucks

Operating safely is every operator's obligation and responsibility. The "Safety Instructions" cover basic safety procedures and warnings of general application to the reach trucktrucks. However, safety precautions given on the following pages are also applicable to lift trucks that have special specifications or attachments.

Read this manual carefully and become completely familiar with your truck to make sure the driver understands all the information, directives and safety guidelines that are applicable to your industrial truck are complied with.

1. Know your truck sufficiently

For the purpose of doing material handling job, the reach trucktruck is different from general passenger carrying vehicles in structure as follows:

View is partially obstructed due to the hoist system.

Rear wheel steering makes the rear of the truck swing outwards when going round comers.

Read the operator's manual and nameplates on the truck, and become familiar with your truck and operating procedures. If there is anything in the manual you do not understand, ask your service-partner to explain it to you.

2. Operation permissions

Only trained and authorized operator shall be permitted to operate the truck. This means the operator must be trained to drive the lift truck and it means that the operator must thoroughly understand the procedures for lift truck operation. It also means that a qualified person experienced in lift truck operation must guide the operator through several driving and load handling operations before the operator attempts to operate the lift truck alone. A basic education in proper driving and load handling techniques is absolutely necessary to prepare the new operator for proper defensive driving and to expect the unexpected.

3. Make periodic checks

Inspect the truck at periodic intervals for oil leak, deformation, lousiness, etc. If neglected, short life of components will be caused and in the worst case a fatal accident would occur.

Make sure to replace "key safety parts" during periodic check.

Wipe off oil, grease or water from the floor, foot and hand levers, if any.

Strictly prohibit smoking, fire and spark nearby the battery when checking it.

If maintenance is performed on high position, such as mast, front and rear lamp, please be careful of falling off or being clamped.

Be careful not to be scalded when inspect the motor, controller etc.

4. Stop using the reach truck when it malfunctions

Whenever malfunctions arise, you must stop using forklift, hang a sign of “danger” or “malfunction” and take off the key, then report the malfunction immediately. only after the malfunction is eliminated, you may use the forklift.

5. Protect yourself

Operator must wear helmet, safety shoes and work(protective) clothes, whenever you operate and maintain the truck, handle the consumables etc.

6. Prevent explosion

Because there will be explosive gas in the bosom of the battery, prohibit any flame or sparks nearby it strictly.

Don't let any metal tools contact the terminals of the battery to avoid sparks or short circuit.

7. Working condition

Make sure to operate the truck on fairly stable and even road surface.

If there is snow, ice accretion, or other obstacles, clean it before you operate the truck, or the truck may be out of control and even cause safety accidents.

Truck cannot be operated in potentially explosive atmosphere.

8. Tilting safely

Don't tilt the mast with load high.

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

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

To unstack loads from a high place, insert forks into the pallet, lift slightly and drive backwards, then lower the load. Tilt the mast backwards after lowering. Never attempt to tilt the mast with the load raised high.

9. To handle bulky, long loads

When handling bulky loads, which restrict your vision, operate the machine in reverse or have a guide to help you, and when you are guided, make sure you understand the meaning of the guide's gesture, flag, whistle or other signals.

When operating with long loads such as lumber, pipe, etc., or in the case of the Large-sized model or the truck with spreader(load or truck with a stretched-out attachment), be extremely careful of load at corners or in narrow aisles. Be alert for fellow workers.

10. Start safely

Before starting up(starting the truck), make sure that:

Your safety belt is fastened;

The truck doors is closed tightly(if necessary).

The foot switch is released securely.

The travel switch is in neutral.

No one is under, on and close to(in the vicinity of) the truck.

Don't step(depress) the accelerator pedal or control(operate) the lifting lever or tilting lever before turning on the power.

Start slowly and never travel at excessive speed.

11. Prohibit sudden stops, starts or sharp turns

Operate the controls smoothly. Avoid sudden stops, starts or sharp turns. It is dangerous to make a sudden brake. for it may cause the truck to overturn.

12.Focus on the travelling route

Pay attention to the route of the truck, be sure to keep a clear view of it and look in the direction of travelling.

13.Don't offer rides to others

Other person is not allowed to get on the fork, tray or forklift. Do not use people as an additional counterweight.

14.Carry the loads in a proper manner

- Taking account of the shape and material of loads to be handled, use a proper attachment and tools.
- Avoid hoisting the load with wire rope suspended from the forks or attachment, since the wire rope may slide off. If needed, a qualified personnel (should perform the slinging), making use of a hook or crane arm attachment.
- Take care not to protrude the forks out of the load. The protruded fork tips may damage or turn over/bump the adjacent load.
- Be careful not to let the forks touch the floor, so as to avoid damaging the fork tips or driving surface.

15. Concentrating on your work

Keep your mind on your work. Learn to estimate danger before it arises.

16.Mount and dismount properly

Never mount or dismount the moving truck. Use the safety steps and safety handgrip and face the truck when mounting or dismounting the truck. Don't jump!

17.Never operate the truck unless the operator is properly seated

Before starting the truck, adjust the seat so you can get easy access to all hand and foot controls.

18. Know the capacity of your truck

Know the rated capacity of your lift truck and its attachments, and never exceed it. Do not use a man as an additional counterweight. It's quite dangerous.

19. Be seated safely

Keep your head, hands, arms, feet and legs within the confines(cab) of the operator's compartment(truck). Never (stick your hands or any other parts of your body out of it) for any reason.

20. Use proper attachments

We afford all types of attachments, such as rotating roll clamp, bale clamp, side shifter, and crane jib. You should refit the truck under our license if you want (Modifications to the truck must be authorized by the manufacturer). Only specialists are permitted to fit the attachments and connect the energy supply for power-driven attachments.

It is forbidden to refit the truck by yourself.



21. Driving over a dock-board or bridge-plate

Before driving over a dock-board or bridge-plate, be sure that it is properly secured and strong enough to sustain the weight.



22. Overhead guard and load backrest

Safeguards protect you not to be hurt by the goods fallen. Load backrest can keep the load stable. It is forbidden to use truck without overhead guard or load backrest.

Any additional bores or welding to the overhead guard on the overhead guard will compromise its rigidity. It is therefore strictly prohibited to drill holes in the overhead guard or to weld to it.



23. Never climb the masts

It is forbidden to stand or walk under the upraised fork or the attachments.

It is also forbidden to walk up the or stand on the forks.

Fig0000-00029OM

24. Avoid being clamped by the mast

It is forbidden to put your hands, arms or head between the mast and overhead guard.

It is forbidden to put your hands between inner and outer masts.



Fig0000-00030OM

25. No off-center loads

The goods is easy to drop when turning or passing rough road for off-center loads. And the reach truck may topple over more probably.

26. Don't tilt the mast with load high

Use minimum forward and backward tilt when stacking and unstacking loads. Never tilt forward if load is over stack or at low lift height.

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

To unstack loads from a high place, insert forks into the pallet and drive backwards, then lower the load. Tilt the mast backwards after lowering. Never attempt to tilt the mast with the load raised high.

27. Tilt backwards when loaded

Travel with load as low as possible and tilt back. If operating with steel pallet or the like, be sure to tilt back the mast to prevent it from slipping off the forks.

28. Watch for doorways and slow down at corners

Watch for branches, cables, doorways, or overhangs. Be cautious when working in congested areas.

Slow down and sound the horn at the entrances and exits of the aisles and other locations where vision is restricted.

When make a turn, be sure the speed of the truck is lower than the 1/3 of the max. allowable speed.

29. Because of the wheel of the reach truck is small; it is not permitted to run on road. It is only used in special work ground. It is forbidden to tractor the reach truck when it cannot move.

30. Do not turn or travel in a horizontal direction when moving up a ramp in case of toppling over.

When operating loaded truck, have the rear end of your machine pointing downhill.

When operating unloaded truck, have the rear end of your machine pointing uphill.

31. After the protective device like overhead guard and mast load bracket is dismantled, it is prohibited to operate the truck or carry loads.

32. Ensure adequate lighting

The industrial truck working area must be adequately lit. Turn on the headlamps and lights when working in the dark area to make sure the operator can see clearly.

33. Avoid sudden movement of controls. Learn to use them smoothly at a moderate, even rate.

In the case of tip-over

The stability of your truck is ensured if used properly and as intended. But once it tips over during unapproved applications or incorrect operation, always follow the instructions below:

- Stay buckled up;
- Don't jump;
- Hold on tight;
- Brace feet;
- Lean away.



Fig0000-00225OM



Fig0000-00037OM



Fig0000-00038OM



Fig0000-00226OM



Fig0000-00227OM

33. Avoid the following possible instability related to loads:

- Loads are protruding to the side;
- Loads are too wide;
- Loads are too high;
- Loads exceed the capacity.
- The load is liquid, and its center of mass inside the container may shift due to inertial force such as pulling away, braking or turning.
- Loads are not homogeneous;
- Loads are off-center;
- Loads are not arranged properly or fastened tightly.
- Loads are swinging while operating;
- Loads are raised high while travelling;
- Loads are on the downhill side while driving on gradients.
- Loads are higher than the backrest while tilting.

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

35. Avoid lifting loads on a grade

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

36. Never lift a load over anyone

Never permit anyone to stand on or walk under upraised forks or other attachments if equipped. If unavoidable, use a safety stand or block to prevent a possibility of fork attachments falling down or moving unexpectedly.

When the mast of reach truck reaches out, don't drive it because of in this status, the truck has the trend of overturn when a sudden brake or turning. The truck must be driven when the mast and reach device shrink to bottom of slide slot.

37. Check the ground of the work area

Inspect the surface over which you will run. Look for holes, drop-offs, obstacles, and protrusions. Look for anything that might cause you the truck to lose control, or jolt.

Clear away trash and debris. Pick up anything that might puncture a tire or let the load lose balance.

Slow down for wet and slippery roads.

Stay away from the edge of the road.

Do not drive the truck up or down steps.

If the ground is bumpy, it will cause the truck jolt and bring much noise.

Do not operate the truck when the weather is execrable, such as windy, thunder storm, snow and etc. Especially when wind speed is higher than 10m/s, don't operate the truck outdoors.

38. Carry the load low

It is dangerous to travel with forks higher than appropriate position regardless of whether loaded or not. Keep the good traveling posture. (When traveling, the forks should be 15 to 30 cm above the ground or floor, and the mast should be tilted backwards.)

Do not operate the side shift mechanism, if equipped, when the forks are raised and loaded, this will cause the truck to be unbalanced.

39. Fire extinguishers

The workplace should be equipped with fire extinguishers. Users can also select a vehicle equipped with fire extinguisher which is usually placed on the frame.

Make sure operators know the fire extinguisher's location and are familiar with how to use it in an emergency situation. Relevant handling information is provided on the fire extinguisher.

40. Hydraulic system risks

Hydraulic system is under pressure, whenever take out the inspection or maintenance, be aware of the risk of injury, wear protective equipment.

Before connecting hydraulic lines or hydraulic couplings, the hydraulic system must be depressurized.

41. Residual risks

In spite of careful work and compliance with all applicable and regulations, the possibility of other dangers when using the industrial truck cannot be entirely excluded.

Residual dangers can include:

- Escape of consumables due to leakages or the rupture of lines, hoses or containers;
- Risks of accident when driving over uneven ground, wet, icy or greasy ground, gradients, irregular surfaces, or with poor visibility;
- Risks of fire and explosion due to the battery and electrical voltage;
- Risk caused by insufficient maintenance or testing;
- Risk caused by using the wrong consumables;
- Disregarding the safety regulations.

42. Braking distance

Taking into account the specified minimum braking distance, do not use the truck on a long slope with a gradient of more than 15%. If you need to use the truck on slopes with higher gradients, please first consult your dealer. The gradabilities given in the type sheet are calculated based on the truck's traction and are only applicable to situations in which the truck must surmount small obstacles or when driving on fairly even road surfaces.

43. If maintenance on high position, such as mast, front and rear lamp, please be careful to prevent fall down or be clamped.

44. If maintenance on high position, such as mast, front and rear lamp, please be careful to prevent fall down or be clamped.

45. It is forbidden to people to enter the clearance of the mast and truck body, for when the mast reach back, once be clamped, it will cause fatal dangers.

46. It is forbidden to people to enter the clearance of the mast and truck body, for when the mast reach back, once be clamped, it will cause fatal dangers.

47. Prohibited in the door between the frame and battery box to stand or walk.

48. Because of the wheel of the reach truck is small; it is not permitted to run on road. It is only used in special work ground. It is forbidden to tractor the reach truck when it cannot move.

49. This reach truck is not set up traction point, so the truck does not allow to be towed.

50. Never use the steering wheel or hydraulic levers as a means of pulling yourself onto the truck. When mounting or dismounting the truck always use the handle provided.

1.3 Battery Safety



WARNING

Batteries contain dissolved sulfuric acid, which is poisonous and caustic. Batteries also can produce explosive gases.

Remain aware of the following information.

- Wear protective equipment (protective apron and gloves) and protective glasses when working with battery acid. If clothing, skin or eyes come into contact with battery acid, immediately flush the affected areas with water. If acid contacts the eyes, seek medical attention at once. Clean spilled battery acid immediately with large amounts of water.
- Remove any metal rings, bracelets, bands, or other jewelry before working with or near batteries or electrical components.
- Never expose batteries to open flame or sparks.
- Areas in which batteries are stored or charged must be well ventilated to prevent concentration of explosive gases.
- If a battery is charged while installed in the truck, the battery cover must remain completely open during the entire charging period unless the battery is maintenance free and does not gas out.
- Shorting of battery terminals can cause burns, electrical shock, or explosion. Do not allow metal parts to contact the top surface of the battery. Make sure all terminal caps are in place and in good condition.
- Batteries may only be charged, serviced, or changed by properly trained personnel.
- Always follow all instructions provided by the manufacturers of the battery, charger, and trucks.

1.4 Related Safety Instruction and Standard(For CE)

The design and manufacture of electrical element comply with the low voltage standard 2006/95/EC.

Noise emission level

CQD15SD:75dB(A)

Noise will be according with EN12053:2001 and 2000/14/EC.

Sound pressure level on the operator's position is lower than 75dB(A), measurement uncertainty is 1.5dB(A).

Vibration and acceleration

Vibration parameters are measured according to standards of ISO5349-2:2001, EN13059:2002, ISO2631-1:1997, and the result meets the requirement of 2002/44/EC.

Whole body vibration is lower than 1.1m/s².

Electrical requirements

The manufacturer certifies compliance with the requirements for the design and manufacture of electrical equipment, according to EN 1175 "Industrial Truck Safety - Electrical Requirements", provided the truck is used according to its purpose.

EMC-Electromagnetic compatibility

Electromagnetic compatibility (EMC) is a key quality feature of the truck.

- EMC involves limiting the emission of electromagnetic interference to a level that ensures the troublefree operation of other equipment in the environment.
- Ensuring sufficient resistance to external electromagnetic interference so as to guarantee proper operation at the planned usage location under the electromagnetic interference conditions to be expected there An EMC test thus firstly measures the electromagnetic interference emitted by the truck and secondly checks it for sufficient resistance to electromagnetic interference with reference to the planned usage location . A number of electrical measures are taken to ensure the electromagnetic compatibility of the truck.
- Our truck has been successfully tested according to EN12895 as well as the standardized instruction contained there in.



CAUTION

The EMC regulations for the truck must be observed.

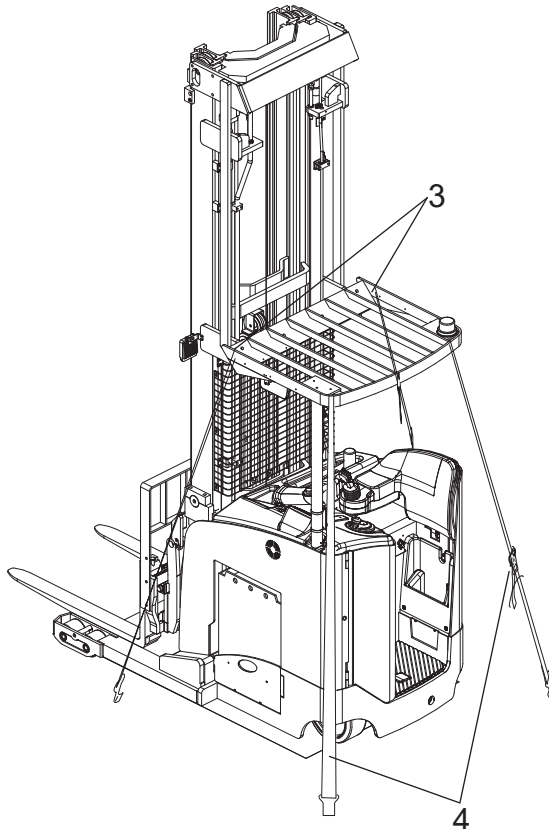
When replacing truck components its for repair the protective EMC components must be installed and connected again.

D Transport and Commissioning

1.1 Transport

The truck must be securely fastened when transported on a lorry or a trailer.
The lorry / trailer must have fastening rings.

- To fasten the truck pull the tensioning belt (3) through the guide on the overhead guard brace and attach it to the fastening rings.
- Tighten the tensioning belt with the tensioner (4).



WARNING

Loading must be carried out by specially trained staff in accordance with recommendations contained in Guidelines VDI 2700. In each case correct measurements must be taken and appropriate safety measures applied.

1.2 Use a hoist to lift the truck



DANGER

*Ensure that no one is in the working range of the hoist when using it to lift the truck!
Walking around under the lifted load is absolutely prohibited.*



CAUTION

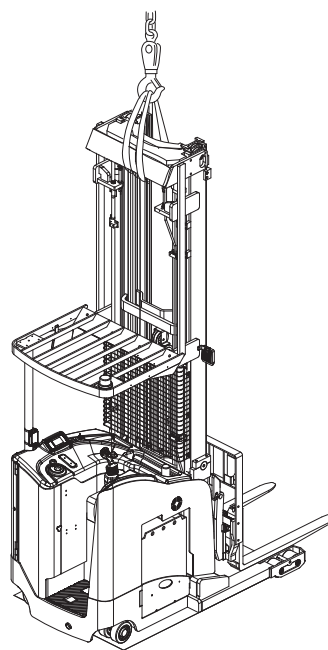
*Use lifting equipment and a hoist that has sufficient carrying capacity to lift the truck. For the truck weight (including the battery), see the factory nameplate.
The sling must be fastened at the designated lifting points when using the hoist.*

- Reach the mast fully back.;
- Fix two double loop slings around the mast upper cross membe;
- Protect the truck parts in contact with the slings.



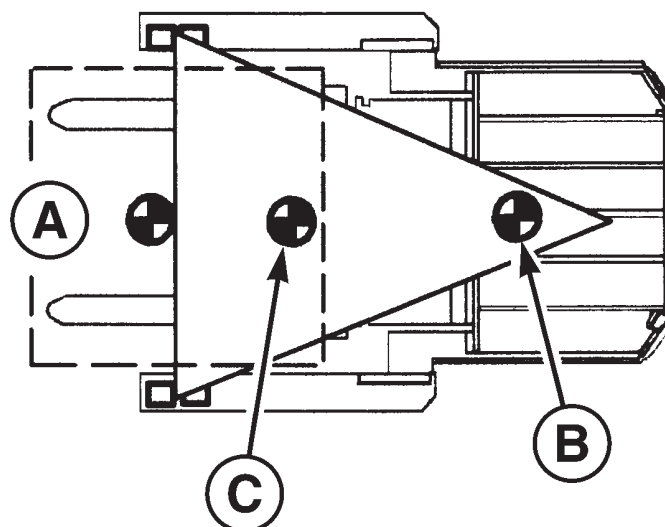
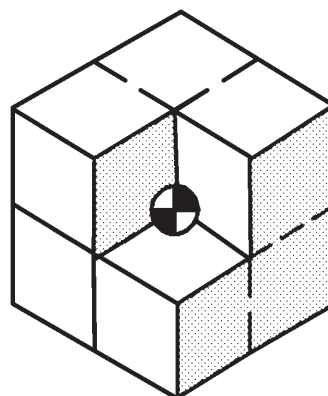
CAUTION

- After hanging the sling on the lifting hook, the safety lock must be fastened.
- Only use lifting gear with sufficient capacity
(Weight lifted = net weight + battery weight; see truck nameplate).
- Never walk under a reach truck when it is being lifted.



1.3 The structure and stability of truck

The center of gravity (CG) of any object is the single point about which the object is balanced in all directions. Every object has a CG. When the lift truck picks up a load, the truck and load have a new combined CG.



A CG LOAD

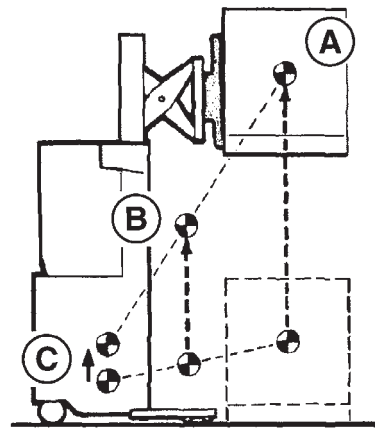
B CG TRUCK

C COMBINEN CG

The stability of the lift truck is determined by the location of its CG, or if the truck is loaded, the combined CG. The lift truck has moving parts and therefore has a CG that moves.

The CG moves forward and back as the forks are extended or retracted. The CG moves up and down as mast moves up and down. The center of gravity, and therefore the stability of the loaded lift truck is affected by a number of factors, such as size, weight, shape, and position of the load;

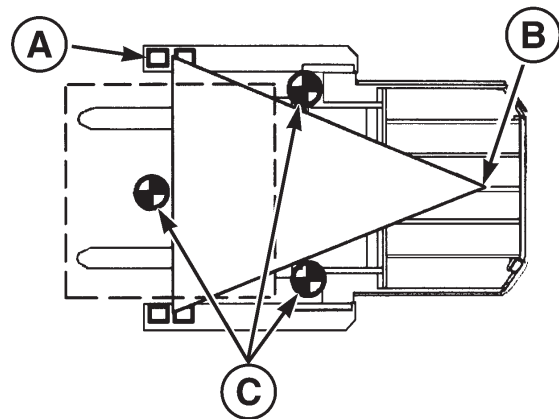
the height to which the load is raised; the amount of forward or backward tilt and the dynamic forces created when the truck is moving.



A CG LOAD B CG TRUCK C COMBINEN CG

These dynamic forces are caused by things like acceleration, braking, turning, and operating on uneven surfaces or on an incline. These factors must be considered when traveling with an unloaded truck, as well, because an unloaded truck will tip over to the side easier than a loaded truck with its load in the lowered position.

In order for the lift truck to be stable (not tip over forward or to the side) the CG must stay within the area of the lift truck represented by a triangle drawn between the load wheels and the pivot of the steering axle.



A LOAD WHEEL AXLE B CG-TRUCK WILL TIP OVER
C STEERING AXLE PIVOT

If the CG moves forward of the load wheels, the lift truck will tip forward. If the CG moves outside of the line represented by the lines drawn between the load wheels and the steering axle pivot, the lift truck will tip to that side.

Stability and traction will also be affected if the caster wheel articulation is not adjusted properly. The articulation must be adjusted to the proper setting as listed in the Maintenance Section.

1.4 Using the truck for the first time

Packaging

During delivery of the truck, certain parts are packaged to provide protection during transport. This packaging must be removed completely prior to initial start-up.

NOTE

The packaging material must be disposed of properly after delivery of the truck.

Only operate the trucks with battery current.

Preparing the trucks for operation after delivery or transport.

Procedures:

- Check whether is complete.
- Check the hydraulic oil level.
- Install the battery if necessary, (see "Battery removal and installation") do not damage battery cable.
- Charge the battery, (see "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.
- Check the condition and function of the driver's seat and seat belt.
- Check the entire truck as well as the surface beneath it for signs of fluid leakage.
- Check the oil level in the oil tank of the working and steering hydraulic systems.
- Check battery connector.
- Check decal condition.
- Check the tyres.
- Check the condition and function of the driver's seat and seat belt.
- Check brake system and parking brake.
- Check the foot switch and brake pedal.
- Check display/battery discharge indicator.
- Check working lights.
- Check forward and reverse functions.
- Check horn.
- Check lifting and lowering function.

1.5 During running-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 charge when remain power is 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.
- Carry only 70-80% of the rated load.



CAUTION

When the truck is in the running-in stage (approx. 100 hours of operation), the equipment user should check the fastening of the wheel nuts and bolts and refasten them if necessary.

E Operation

1.1 Run the truck

Checks and operations to be performed before starting daily work.

- Visually inspect the entire truck (in particular wheels) for obvious damage.
- Visually inspect the battery attachment and cable connections.
- Check the mast, load backrest and forks for visible damage such as cracks.
- Check wheels for wear and damage.
- Test the warning device.
- Make sure the load chains are evenly tensioned.
- Operate the lift, tilt, reach, and auxiliary functions to check for correct operation of the mast, carriage, and attachments.
- Pull up emergency stop switch.
- Turn on the key switch and start the truck.



WARNING

Never start the truck before any damage or failure to the truck has been settled.

1.2 Driving, Steering, Braking

➤ **Driving**

Enter Operator Compartment.

Insert the key and turn it to the "ON" position.

Pull up the emergency stop switch.

Step on the brake pedal switch.

The lift truck will enter a self test mode and check that all lift truck systems are operating correctly. Any errors will be noted and an error message will be displayed on the dash display. If no errors are noted, the lift truck is ready for operation.

Use the travel switch (4) to select the required driving direction.

Forward = the drive direction (V), the main travel direction.

Back = the load direction (R).

i **NOTE**

The operator can change the direction of travel while the lift truck is moving by moving the control handle in the opposite direction. This action uses the motor for braking and is called PLUGGING. Plugging can take place at any travel speed. The lift truck will come to a stop and then accelerate in the opposite direction. Plugging is a normal method used to stop the lift truck and is proportional to how much the control handle is moved in the opposite direction. To stop the lift truck quickly, step OFF the brake pedal to apply the brake.



WARNING

The truck can only be moved with or without a load when the mast support is retracted, the mast tilted back and the load handler lowered.

You should only travel in the load direction (R) for particular case, lifting or depositing a load, ect.

➤ Steering

Use Steering Disk to steer the truck in the required direction. The drive wheel position is indicated in the driver's display.

WARNING

Travel slowly when turning. Lift trucks can tip over even at very slow speeds. The combination of speed and the sharpness of a turn can cause a tipover.

A lift truck is less stable when the forks are raised, with or without a load. Most operators can understand the need to be careful when handling loads. But some operators do not realize that a tipover can occur with an empty lift truck

because similar dynamic forces are present. The lift truck will actually tip over easier when empty, than when loaded with the load lowered. Backward tilt, off center load, and uneven ground will aggravate these conditions.

WARNING

Do not move the Reach or Tilt control when the lift truck is traveling.

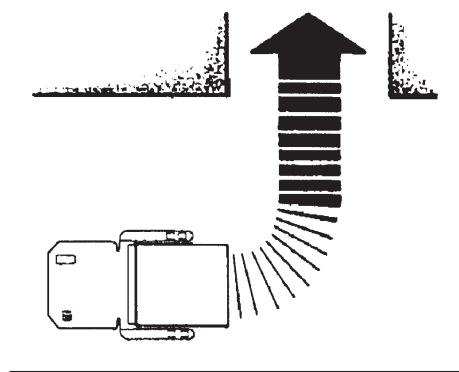
The attachment can be damaged if it is extended when the lift truck is traveling.

Do not turn on an incline. To reduce the possibility of a tipover, a lift truck must not be driven across an incline.

Failure to observe tailswing area when making a turn can injure or kill someone.

When turning the lift truck from a wide aisle into a narrow aisle, start the turn as close to the opposite stock pile as tailswing will permit.

This action permits the lift truck to enter the narrow aisle going straight ahead.



➤ Braking

The brake pattern of the truck depends largely on the ground conditions. The driver must take this into account when operating the truck.

The driver must be looking ahead when travelling. If there is no hazard, brake moderately to avoid moving the load .

The truck can brake in four different ways:

- with the reversing brake
- with the coasting brake
- with the emergency brake

- **With the reversing brake**

While the truck is travelling press the travel switch (4). It switches to the opposite travel direction and the truck decelerates through the traction current controller until it starts to move in the opposite direction.

- **With the coasting brake(plugging)**

Not apply the foot switch (6): Travel inhibited, truck decelerates.



WARNING

This method of braking only acts as a parking brake and not as a service brake.

- **With the emergency brake**

Press the emergency stop switch (2). The truck brakes until it comes to a halt.



WARNING

The emergency brake switch (2) must only be used in dangerous situations.

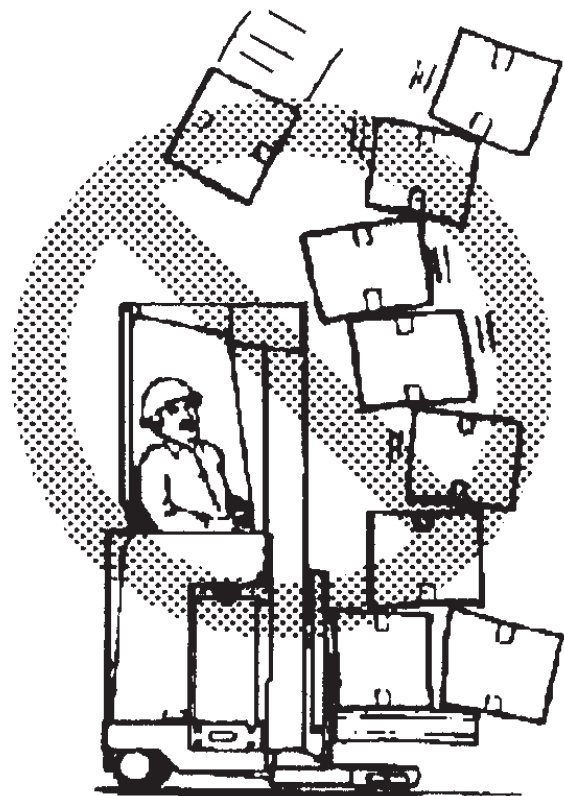
1.3 Loading

1. The capacity is the maximum load that the lift truck can handle for the load condition shown on the nameplate. The operator must know whether or not a load is within the maximum capacity of the lift truck before the load is handled.

However, such factors as weak floors, uneven terrain, special load handling attachments or loads having a high center of gravity can mean that the safe working load is less than the capacity. When such conditions exist, the operator must reduce the load so that the lift truck will remain stable.

2. Handle only stable loads. A load can have unstable items that can easily shift and fall on someone. Do not handle a load if any loose part of it is above the load backrest or any part of the load is likely to fall.

3. Position each fork the same distance from the center of the carriage. This action will help center the load on the carriage. Set the forks as far apart as possible for maximum support of the load. Center the weight of the load between the forks.



If the weight of the load is not centered between the forks, the load can fall from the forks when you turn a corner or hit a bump. An off center load will increase the possibility of the truck tipping over to the side. Make sure the pins that keep the forks in position are engaged so that the forks cannot move.

4. Check the condition of the driving surface. Make sure the floor will support the weight of the lift truck and the load.

Lifting, Lowering, and Tilting

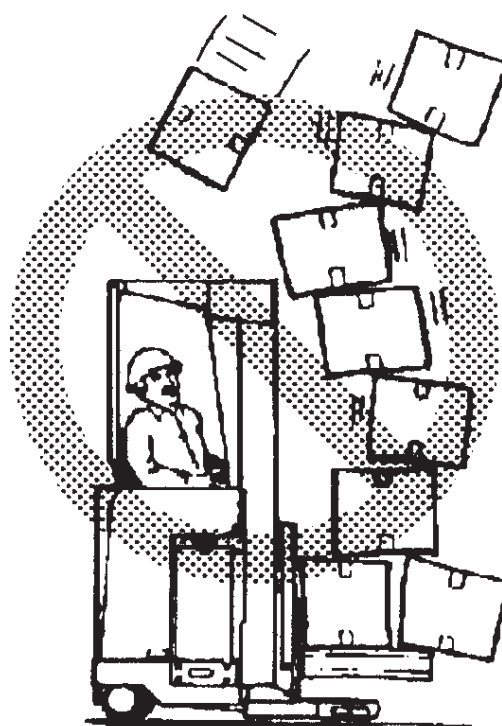
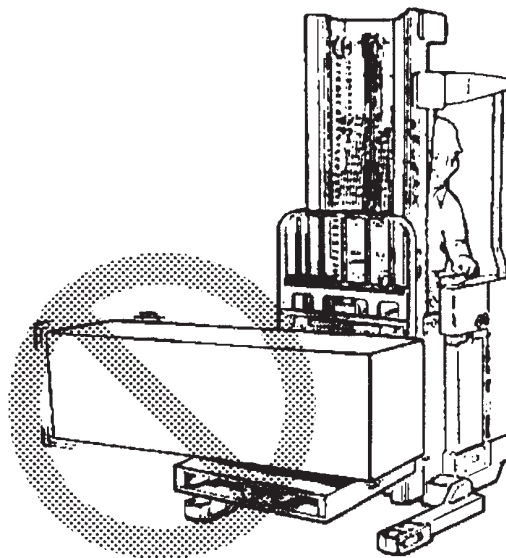
During most loading or unloading operations, the operator steers with the left hand. The right hand is used to operate the multifunction control handle.

The **LIFT, REACH, TILT,** and **SIDESHIFT** functions are operated by the multifunction control handle. See the Instruments and Controls section for the correct operation of the multifunction controls handles.

Do not lift or hit anything that can fall on the operator or a bystander. Remember, a lift truck equipped with an EP overhead guard and load backrest extension provides reasonable protection to the operator from falling objects, but cannot protect against every possible impact. A lift truck without an overhead guard provides no such protection and other personnel have no overhead protection.

Avoid hitting objects such as stacked material that could become dislodged and fall.

The operator must exercise care while working near such objects. Whether the lift truck is loaded or empty, do not travel with the load or carriage in a raised position. Lift and lower with the forks vertical or tilted slightly backward from vertical.



 **WARNING**

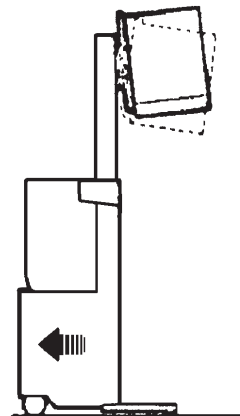
Keep yourself and all others clear of the lift and reach mechanisms. Never allow anyone under or on the forks. NEVER put hands, arms, head or legs through the mast or near the carriage or lift chains. This warning applies not only to the operator, but also a helper.

A helper must not be near the load or lift mechanism while the operator is attempting to handle a load. The lift mechanism has moving parts with close clearances that can cause serious injury.

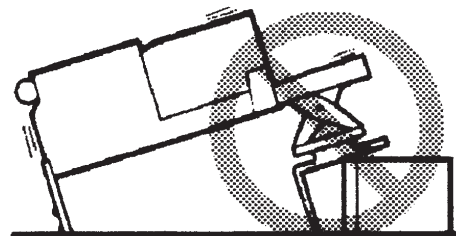


The lift truck can tip over forward when the load is raised. Forward tipping is even more likely when extending the forks, tilting forward, braking when traveling forward or accelerating in reverse.

Tilt elevated loads forward only when directly over the unloading place. If the lift mechanism is raised to pick up or deposit a load, keep the tilt angle in either direction to a minimum. Backward and forward tilt are helpful, but they affect side and forward stability.



Do not tilt in either direction more than necessary when handling a load that is raised. The lift truck can tip forward if the forks are tilted forward with a load in the raised position.



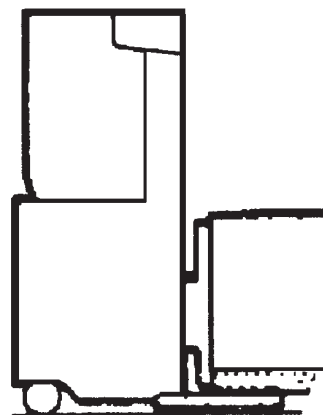
How to Engage and Disengage a Load

1. Avoid fast starts. Sudden movement can cause the lift truck to tip. People can be hurt or killed and material can be damaged. Approach the load carefully.

Make sure that the truck is perpendicular to the load. Raise the forks to the proper height for engaging the load.

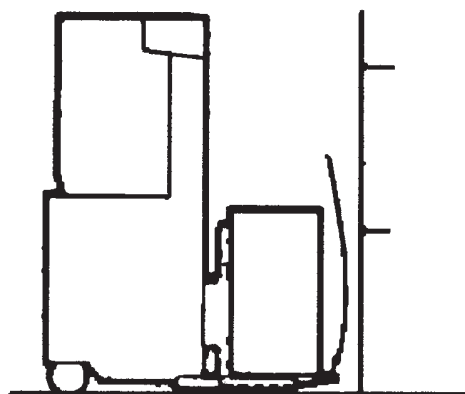
2. Move forward slowly or extend the forks slowly, until the forks are in position under the load. The forks must support at least two-thirds (2/3) of the length of the load.

Make sure that the load is centered between the forks. Make sure that the forks do not extend past the load so that loads or equipment that are behind the load being lifted are not damaged. Lift the load a small distance from the floor to make sure the lift truck has the capacity to lift the load.



BE CAREFUL OF FORKS BEYOND THE LOAD

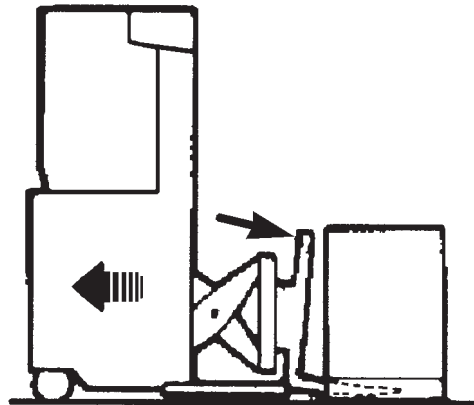
If the forks are longer than the load, move the forks under the load so that the tips of the forks do not extend beyond the load. Lift the load from the surface. Move backward or retract forks a few inches, then lower the load onto the surface and inch forward or extend forks to engage the load against the carriage. Tilt the forks backward just far enough to lift the load from the surface. Raise the load to clear the base arms and retract the forks.



3. Put the load on the floor. If the lift truck is equipped with a tilt function tilt the carriage forward to permit smooth removal of the forks. Carefully move the lift truck backward to remove the forks from under the load.

4. If the load is being removed from a stack without using the reach function, slowly move the lift truck away from the stack. If the load is being removed from a stack and the forks are extended, slowly retract the forks. When the load is clear of the stack, lower the load for traveling. Always lift and lower the load with the forks level. Always travel with the load as low as possible, retracted and tilted backward.

Lowering speed is controlled by the distance you move the multifunction handle or the distance the control lever is moved from neutral. Lower slowly and smoothly. Slowly return the multifunction handle or the control lever to the neutral position so that the load is not dropped or that the lift truck is not tipped over due to the rapid stop of the load.



WARNING

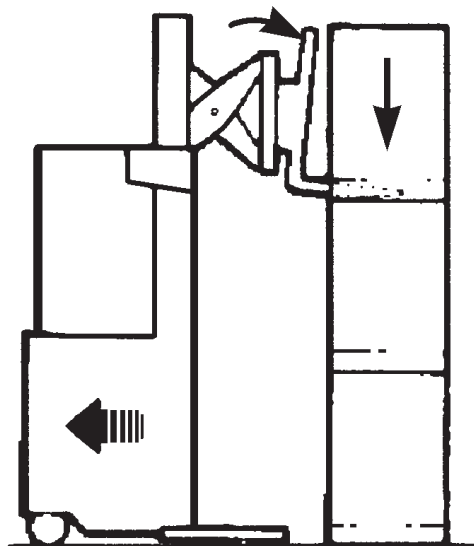
Move carefully and smoothly when the load is raised over a stack. When the load is elevated the center of gravity of the lift truck and the load is much higher. The lift truck can tip over when the load is raised.

Move forward, or extend forks slowly. When the load is in position, lower the load on to the stack or the rack. Lower the forks just enough to remove them from under the load. Do not lower the forks so that they will drag on the surface under the load.

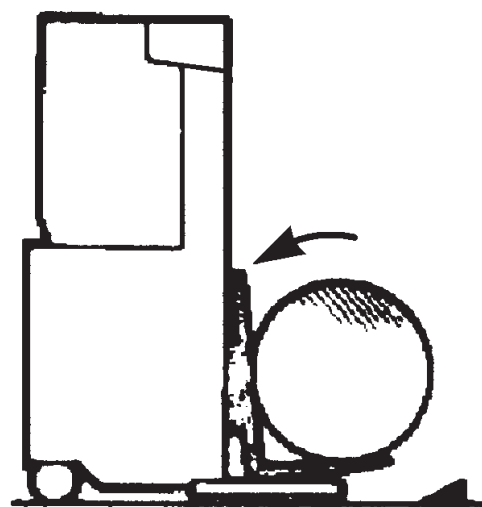
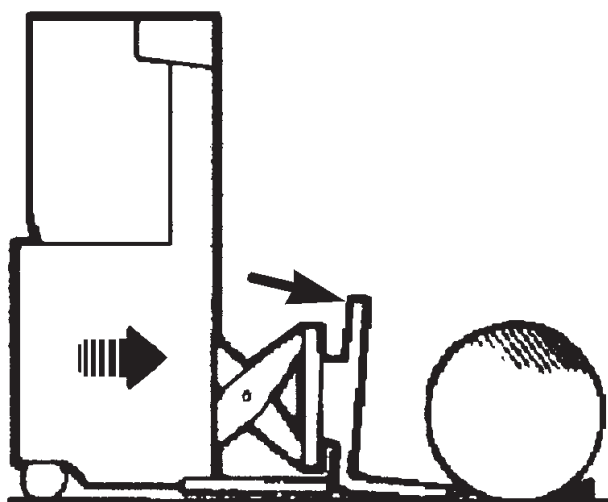
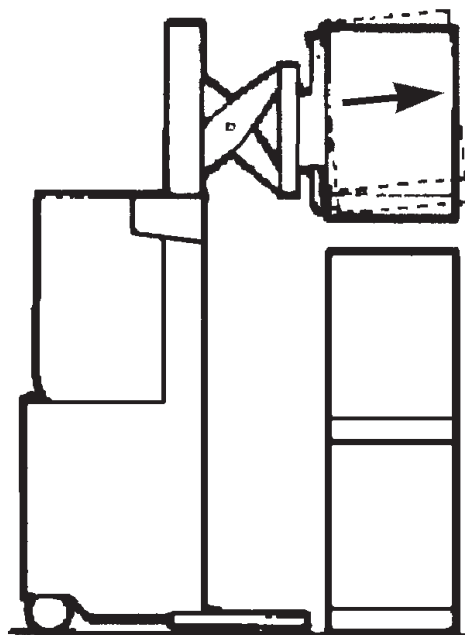
Carefully move the lift truck backward or retract the forks to remove the forks from under the load.

Lower the forks when traveling.

NOTE: Not every load can be lifted using only the forks of a lift truck. Some loads will require a special attachment.



5. To put the load on a stack, align the lift truck with the stack. Lift the load to eye level and then tilt the load forward until it is level. Raise the load higher than the point where it will be placed. Do not raise the load to a point below where the load is to be placed and jog the load up into position. This operation uses added energy, particularly with an electric lift truck. Be careful not to damage or move adjacent loads.



6. When lifting round objects, use a block behind the object. Tilt the forks forward so that the forks can slide along the floor under the object to be lifted. Tilt the mast fully backward to help keep the load on the forks.

➤ Stopping

Stop the lift truck as gradually as possible. Hard braking and wheel sliding can cause the load to fall off of the forks and damage the load or hurt someone. Gradually stop the lift truck using plugging.

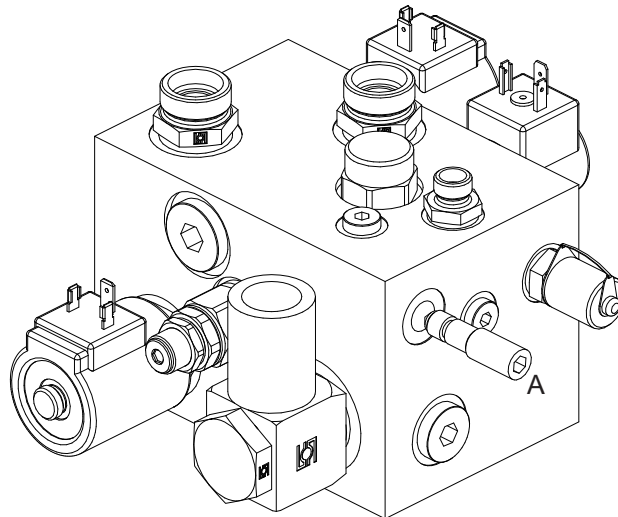
1.4 Manual Lowering



DANGER

Always verify that no one is under or near the lift mechanism or load during the manual lowering procedure. Verify that there are no obstructions beneath the lift mechanism or load. If the mast does not lower when the manual lowering valve is activated, deactivate the valve immediately and determine the cause.

Push screw A in and rotate counterclockwise 180 degrees. This can be used to manually lower the mast in case of a malfunction.



1.5 Parking the truck securely

The operator must never leave a lift truck in a condition so that it can cause damage and injury. When parking the lift truck, do the following operations:

1. Bring the lift truck to a stop. Release the control handle so that it returns to the neutral position.
2. Release pedal Switch.
3. Fully lower the forks or carriage. Fully retract the forks. Tilt the forks forward.
4. Turn the key switch to OFF. (If the lift truck is parked because of a malfunction, also disconnect the battery.)
5. Step out of the operator's compartment.
6. If the lift truck must be left on an incline, put blocks on the down hill side of the wheels so that the lift truck cannot move.
7. Do not park the lift truck so that it limits access to fire aisles, stairways, and fire equipment.

1.6 Operating the truck without its own drive system

If the truck has to be moved after a failure has rendered it immobile, proceed as follows:

- Set the emergency stop switch “OFF”.
- Set the key switch “OFF” and remove the key.
- Prevent the truck from rolling away.
- Remove the side cover (see chapter G see section 1.4.2).
- Tighten two screws (2), the truck can be moved (no braking action).



DANGER

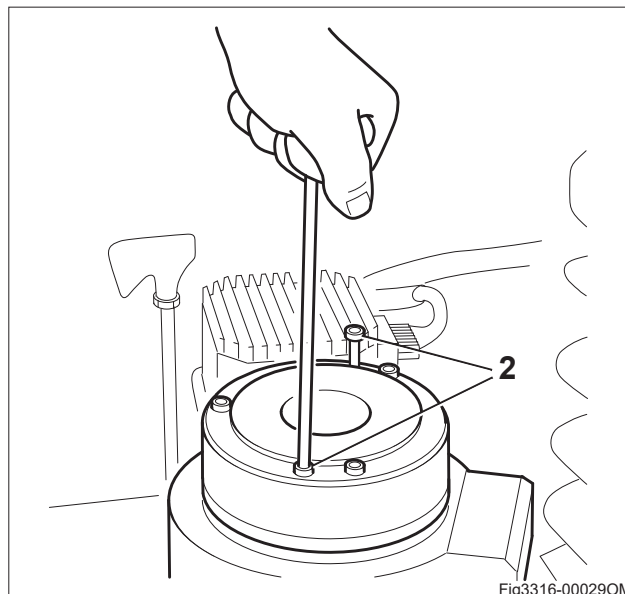
After setting down the truck at the destination, unscrew two screws (2).

Braking action is restored.



WARNING

This operating mode is not permitted when negotiating inclines and gradients.



1.7 Towing procedure



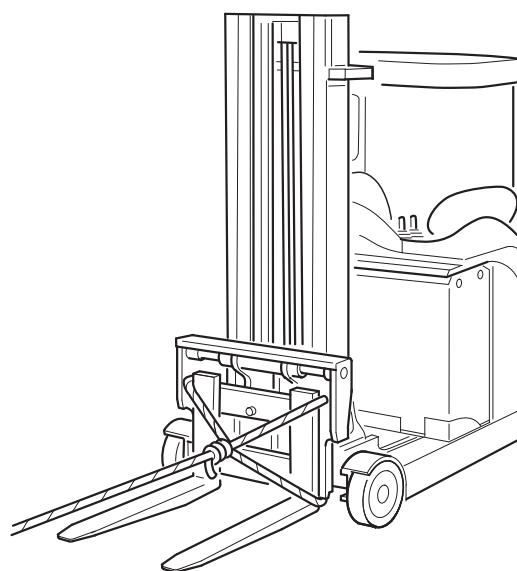
DANGER

With the battery disconnected and the drive wheel raised clear of the ground, only the load wheel hydraulic brakes are operative.

When towing the truck do not exceed the maximum recommended speed of 2.5 km/h.

When towing on slopes, reduce speed to an absolute minimum and keep chocks at hand.

- Reach the Reach Mechanism and lower the load.
- Remove the load.
- Attach the towing vehicle (with sufficient tractive and braking force) with a suitable rope or chain to the fork carriage.
- Disconnect the battery plug.
- Raise the drive wheel using a suitable maintenance dolly or fork lift truck.





DANGER

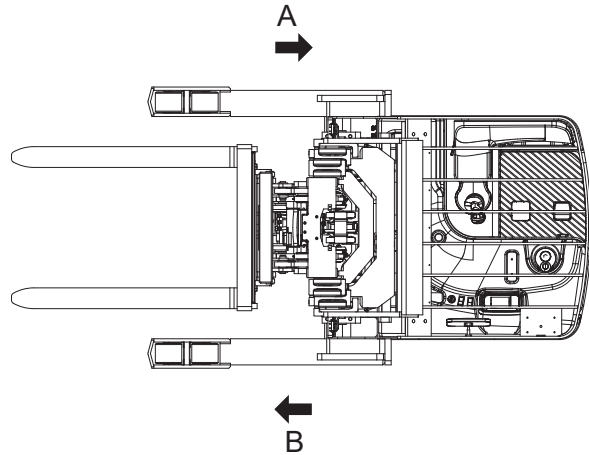
Do not raise the truck more than necessary.
Only raise the drive wheel just clear of the floor.
One person should be on the truck being towed to operate the brakes if necessary.

1.8 Definition of direction of travel

This manual defines the direction of travel as follows:

- (A) = Travel with forks trailing
- (B) = Travel with forks leading

The preferred direction of travel on level ground is with the forks trailing (A).



WARNING

- An unsecured truck can cause accidents
- *Parking the truck on an incline, without the brakes applied or with a raised load is dangerous and is strictly prohibited. Always park the truck on a level surface.*
- *In special cases the truck may need to be secured with wedges.*
- *Always fully lower the mast and load. Tilt the mast forward.*
- *Do not park and leave the truck on an incline.*



CAUTION

On slopes and inclines always carry the load facing uphill, never approach at an angle or turn.

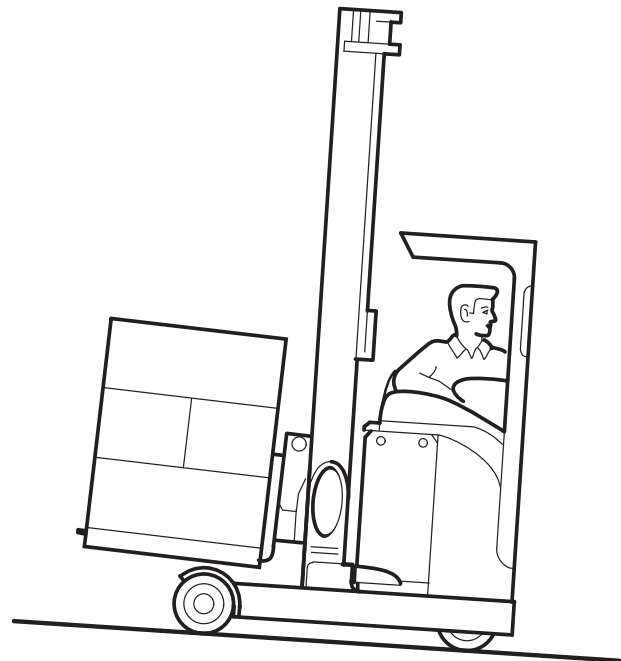


Fig3316-00032OM

1.9 Operator daily checklist

Operator's Daily Checklist		
Daily Check Items	O.K.(√)	Remark
Check the truck free from accumulation of grease, dirt, and other possibly combustible materials		
Check the condition of caster,load wheels		
Check chassis, bodywork,Dash Display, Horn, Lights, Fuses and fittings		
Check the condition and function of the cushion.		
Check brake system and parking brake.		
Check the Forks,frame, overhead guard		
Check the electrical Circuits		
Check the oil level in the oil tank of the working and steering hydraulic systems.		
Check the entire truck as well as the surface beneath it for signs of fluid leakage.		
Check electrical system		
Check Control Handle		
Check Header Hoses, Fittings, and Clamps		
Check the battery level		
Check the battery restraint panels		
Check the battery power Disconnect		
Operate the travel, lift, tilt, reach, and auxiliary functions to check for correct operation of the mast, carriage, and attachments.		
Inspect the battery connector and its cables for damage.		
Check Decal Condition		
Check lift chains		
Check ster drive unit and drive wheel and tire		
Checking of hazard area for the absence of persons		

F Battery Maintenance & Charging & Replacement

1.1 Battery type & dimension

Battery type & dimension as follow:

Tuck type	Battery type	Voltage/ rated capacity	Dimension (mm)	Charger	Charging time(h)
CQD15SD	Lead-acid battery	48V/700AH	1025*500*710	100A	10
CQD15SD	lithium-ion battery	48V/405Ah	1025*500*710	150A	3
CQD15SD	lithium-ion battery	48V/560Ah	1025*500*710	200A	3
CQD15SD	Lead-acid battery	48V/600Ah	1025*500*710	80A	10

➤ Checking the battery level

- Release the pedal switch.
- Press the emergency stop switch.
- Insert the key switch and turn clockwise.
- Check the power level shown on the discharge indicator.

i NOTE

Charge and maintain the battery in accordance with instructions from the manufacturer. If there are no instructions, please contact your maintenance agent. Optional battery chargers must also be operated according to instructions.

1.2 Charging the battery

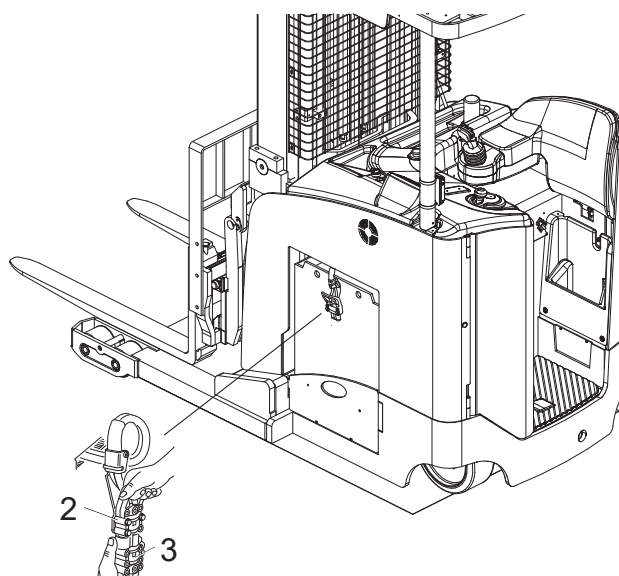
➤ Normal working conditions

- No rain or snow, no conductive dust, no explosion hazard;
- The altitude does not exceed 1000 meters;
- The relative humidity of the air is not more than 95% (when the medium temperature is $20\pm 5^{\circ}\text{C}$);
- No gas or steam which can corrode metals and destroy insulation;
- Always handle, charge and maintain batteries according to the manufacturer's instructions supplied with the battery.
- Only charge batteries in designated areas.
- Always follow the manufacturer's instructions supplied with the battery charger.
- Charging in non-charging area is prohibited;
- Do not use irregular charging sockets;
- Battery charging should be placed in a ventilated and dry place, away from high temperature, dust and corrosive gases;



WARNING

Batteries can be hazardous when being handled and maintained. During charging, explosive hydrogen gas is released for lead-acid battery.



➤ Charging Procedure

- Parking the truck securely (see chapter E section 1.4);
- Unplug the battery plug (2);
- Insert the charger connector (3) into the battery plug (2).
- Switch on the charger and charge the battery in accordance with the battery and charging station manufacturers' instructions;
- After the battery is fully charged. Connect the battery plug to electrical connector;

**WARNING**

The battery charging station should be plugged into a standard 380V, 3-phase, 50/60Hz wall outlet. The battery plug and socket may only be withdrawn or connected when the main switch and the charging equipment are switched off. Maximum input power is 13.3KW. Please strictly implement the above data to prevent equipment damage and accidental risks such as fire.

**WARNING**

Never connect the battery charger plug to the plug of the lift truck. You can damage the traction control circuit. Make sure the charger voltage is the correct voltage for the battery.

**WARNING**

Output voltage, current and application range of the charger must match the battery, otherwise it will influence the volume and service life of the battery. Charging cable polarity must match the charger output terminal polarity.

**WARNING**

Recharge the battery in time. Do not keep the battery fully discharged or lower than 10~15%.

**NOTE**

Capacity will be reduced when used in low-temperature environments.

1. **Normal Charge:** This charge is normally given to a battery that is discharged from normal operation. Many customers charge the battery at regular intervals that depend on use. This procedure will keep the battery correctly charged if the battery is not discharged below the limit. Always use a hydrometer to check the battery if the battery is charged at regular intervals. Frequent charging of a battery that has a two-thirds (2/3) or more charge can decrease the life of the battery.

2. **Equalizing Charge:** Is a low rate charge and balances the charge in all the cells. The equalizing charge is given approximately once a month. It is a charge at a slow rate for three to six hours in addition to the regular charging cycle. Do not give an equalizing charge more than once a week.

The most accurate specific gravity measurements for a charged battery will be taken after an equalizing charge. If the specific gravity difference is more than 0.020 between cells of the battery after an equalizing charge, there can be a defective cell. Consult your battery dealer.

**NOTE**

Use the recommendations of the battery manufacturer to charge the battery.

**WARNING**

Damage to battery and charger!

The charger must be matched to the battery in terms of voltage and charging capacity!

Observe the correct combination of battery and charger to avoid overheating and fire hazard.

Only use the charger that is suitable for the corresponding battery.

1.3 Battery removal and installation

- Parking the truck securely(see chapter E section1.4) ;
- Unplug the battery plug (2)
- Place the battery plug or the battery cable in such a way that they will not get caught on the truck when the battery is removed.
- The hooks(1) must be attached to the eyes of the battery in such a way.
- Lift the battery clear and move out to the side.
- Installation is in the reverse order of operations.



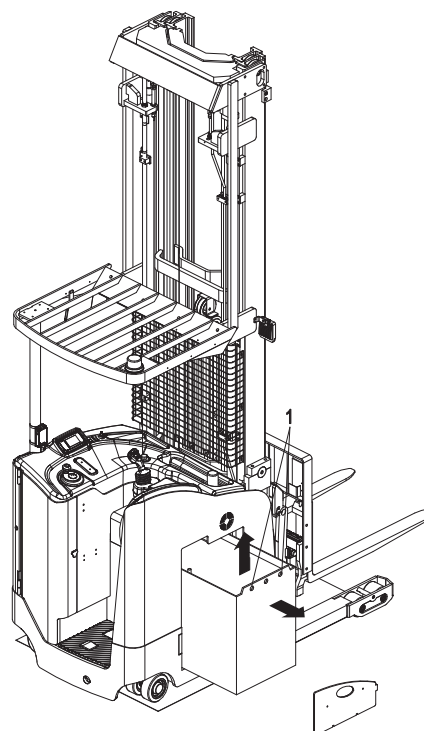
WARNING

Batteries are heavy and can cause an injury. Use care to avoid injury. Do NOT put hands, arms, feet, or legs between the battery and a solid object. To prevent personal injury and battery movement that is not expected, the battery must be level when it is moving. Make sure the battery stand is on a level surface and is aligned.



WARNING

To prevent short circuits, batteries with exposed terminals or connectors must be covered with a rubber mat. When replacing a battery with a crane, make sure the crane has sufficient capacity (see battery weight on the battery data plate on the container). The lifting gear must exert a vertical pull so that the battery container is not compressed. Hooks must be fitted in such a way that when the crane lifting harness is slackened, they do not fall onto the battery cells.



1.4 Battery maintenance(See APPENDIX)

Lead-acid Battery Use and Maintenance Manual

G Truck Maintenance

1.1 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 service checklists.
- Only use original spare parts that have been certified by our quality assurance.
- Used parts, oils and fuels must be disposed of in accordance with the applicable environmental protection regulations. Upon completion of inspection and servicing, carry out the activities listed in the "Recommissioning" section.

1.2 Maintenance Safety Regulations

➤ Servicing and maintenance personnel:

Only qualified personnel authorized by the owner are permitted to perform maintenance or repair work. All items listed in the Scheduled Maintenance Charts must be performed by qualified technicians only. They must have knowledge and experience sufficient to assess the condition of a truck and the effectiveness of the protective equipment according to established principles for testing trucks. Any evaluation of safety must be unaffected by operational and economic conditions and must be conducted solely from a safety standpoint.

Daily inspection procedures and simple maintenance checks, e.g. checking the hydraulic oil level or checking the fluid level in the battery, may be performed by operators. This does not require training as described above.

➤ Lifting and jacking up:

When a 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 it from slipping or tipping over (e.g. wedges, wooden blocks).

➤ Cleaning operations:

No inflammable liquids must be used when cleaning the truck. Prior to commencing cleaning operations, all safety measures that are required to prevent sparking (e.g. by short circuits) have to be taken. For battery-powered trucks, the battery plug must be removed. Only weak pressure, weak compressed air and non-conducting, antistatic brushes must be used for the cleaning of electric or electronic assemblies.

➤ Work on the electric system:

Work on the electric system of the truck must only be performed by personnel specially trained for such operations. Before commencing any work on the electric system, all measures required to prevent electric shocks have to be taken.

➤ Tires and Wheels

Wheels must be changed and tires repaired by trained personnel only. Always wear safety glasses. Inspect the tires for wire, rocks, glass, pieces of metal, holes, cuts, and other damage. Remove any wire strapping or other material that is wrapped around the axle. Make sure the drive wheel nuts are tight.

➤ Settings

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

1.3 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 250 operating hours

B = Every 500 operating hours, or at least annually

C = Every 1000 operating hours, At least once half year

D= Every 2000 operating hours, or at least annually

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.

1.3.1 Maintenance Checklist

		Maintenance interval●				
		W	A	B	C	D
Before starting maintenance work:	Clean the reach truck if necessary.					
	Check the time and date settings on the display unit; adjust if necessary.					
	Check for error codes on diagnostic software and delete.					
	Check battery state of charge					
Gearbox	Check whether the gearbox is leaking.				●	
	Check the gearbox fastenings.				●	
	Clean the traction motor, the power steering and working hydraulic pump motor.				●	
Functions and Control	Check alarm system functions.	●				
	Check service brake and parking brake functions.	●				
	Check the emergency stop switch functions.	●				
	Check the steering functions.	●				
	Check the cables for damage and if the terminals are secure.		●			
	Check the seat functions and safety.	●				
	Check and tighten the controllers and contactors.	●				
	Check pedal switch functions.	●				
Power Supply & Drive System	Check the battery cables for damage and replace if necessary.				●	
	Inspection for frayed and deteriorated insulations				●	
	Check the battery charge connector.				●	
	Check if the cable connections between battery mon-omers are secure, apply some grease to electrodes if necessary.				●	
	Check battery temperature.				●	
	Check drive wheel lug torque				●	
	Check and tighten motor mounting bolts.					●
	Check the connections of motor connectors.					●
	Check the position of various bearings for noise.				●	
	Check gear oil level.				●	
	Clean or replace the gear oil.				●	
	Check the gearbox for abnormal noise or leaks.				●	
	Check the condition and security of the wheels and tyres				●	
	Check and lubricate the wheel bearings.				●	
	Check the travel speed.					●

		Maintenance interval●				
		W	A	B	C	D
Frame and installation	Chassis, tilt cylinders and reach cylinders : Check fastening.			●		
	Check the counterweight, motors, chassis, speed reduction gearbox, overhead guard and steering axle fastenings.			●		
	Lubricate the overhead guard pin shaft.			●		
	Check and lubricate the other pins and swivel points.			●		
Chassis frame	Check for correct operation of the parking brake and readjust if necessary.			●		
	(As required) Check wheel fastenings and tighten if necessary (after each maintenance or repair, at the latest after 100 hours).		●			
	(As required) Wheel change.			●		
	Check/lubricate the steering axle.			●		
	Check the chassis for cracks or damages.				●	
	Lubricate Caster Wheel Assembly			●		
	Check Adjustment Gap of Caster Wheel Assembly			●		
Operating devices	Checking and lubricating the pedal mechanisms.			●		
	Check the horn for correct function.			●		
Load lift system	Lubricate the mast, mast rollers, lift chains and chain pulleys		●			
	Check the tilt cylinder bearing (particularly for any abnormal sounds when tilting forward or backward) for wear, and clean.				●	
	Check the lifting chains and chain guides for wear, adjust.			●		
	Adjust the length of the lift chains, and lubricate using chain spray.				●	
Reach Carriage Assembly	Lubricate Double Reach Scissor Arms			●		
	Lubricate Reach Cylinder Pivot Pins			●		
	Lubricate Tilting Frame			●		
	Lubricate Sideshift Carriage			●		

		Maintenance interval●				
		W	A	B	C	D
Hydraulics	Check the cylinders for leaks.			●		
	Check the hydraulic hoses and pipes for damage			●		
	Check the hydraulic oil level.			●		
	Clean or replace the hydraulic oil.					●
	Replace the air, pressure and suction filters.				●	
Braking System	Check the braking functions.	●				
	Check the parking brake gap.			●		
Other	Check the reach truck rollers, adjust if required				●	
	Lubricate the reach channels and rollers			●		
	Check if the signs are clear and complete			●		
	Carry out a functional test and test drive.				●	
	Attach the maintenance sticker.				●	
	Check the connections of bolts and nuts.			●		
	Check the engine hood and lubricate the hinges.			●		



NOTE

If the reach truck is used in an extreme environment (such as excessive heat, excessive cold or areas with high dust concentrations), the time intervals given in the maintenance tables should be reduced accordingly.

1.3.2 Lubrication Points

➤ Lubricant

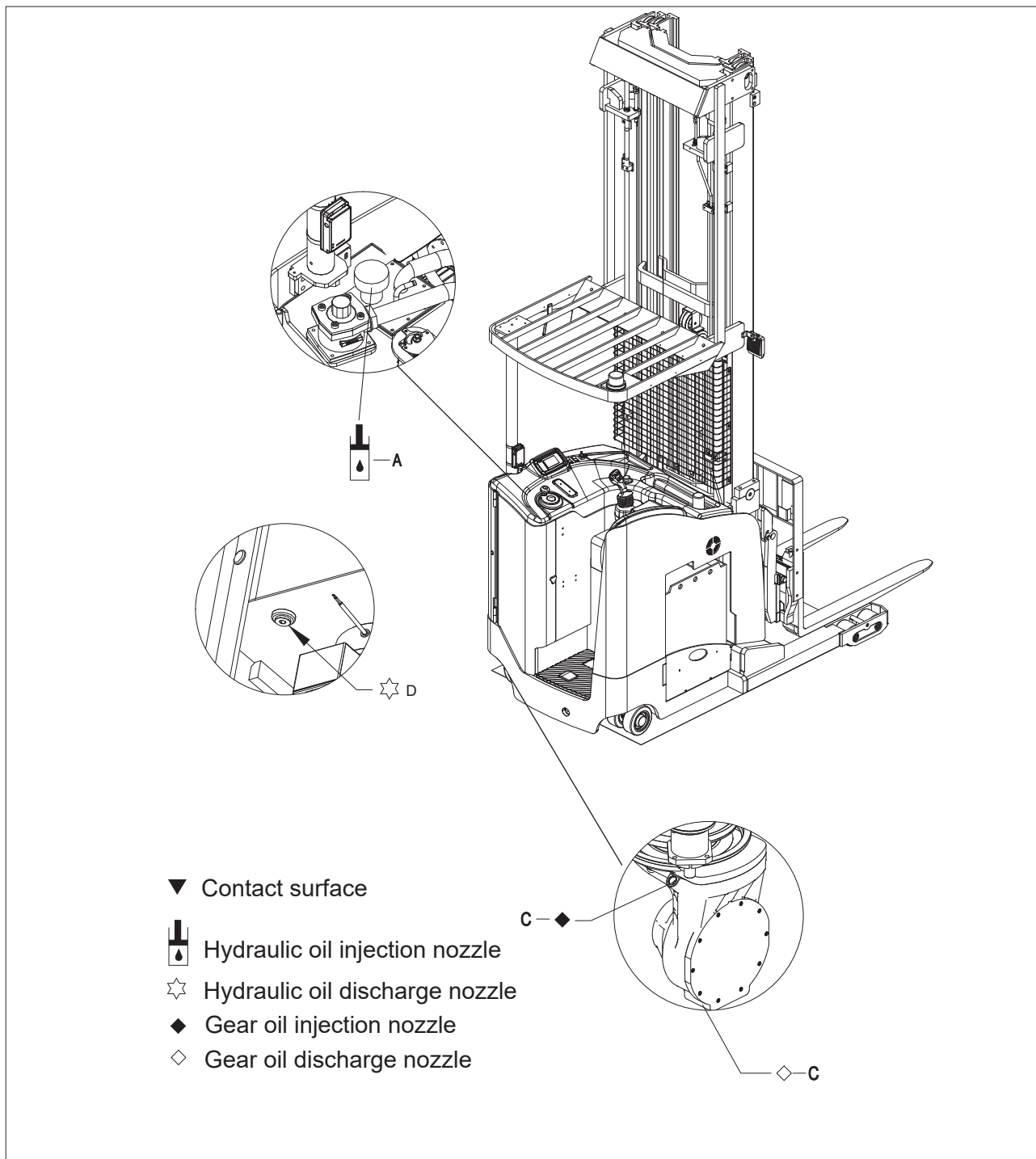
Improper operations may pose hazards to the operator's health and life, as well as to the surrounding environment.

When storing or adding lubricant, use clean containers. It is strictly forbidden to mix different types and specifications of lubricants (except for those can be mixed under clear statement).



CAUTION

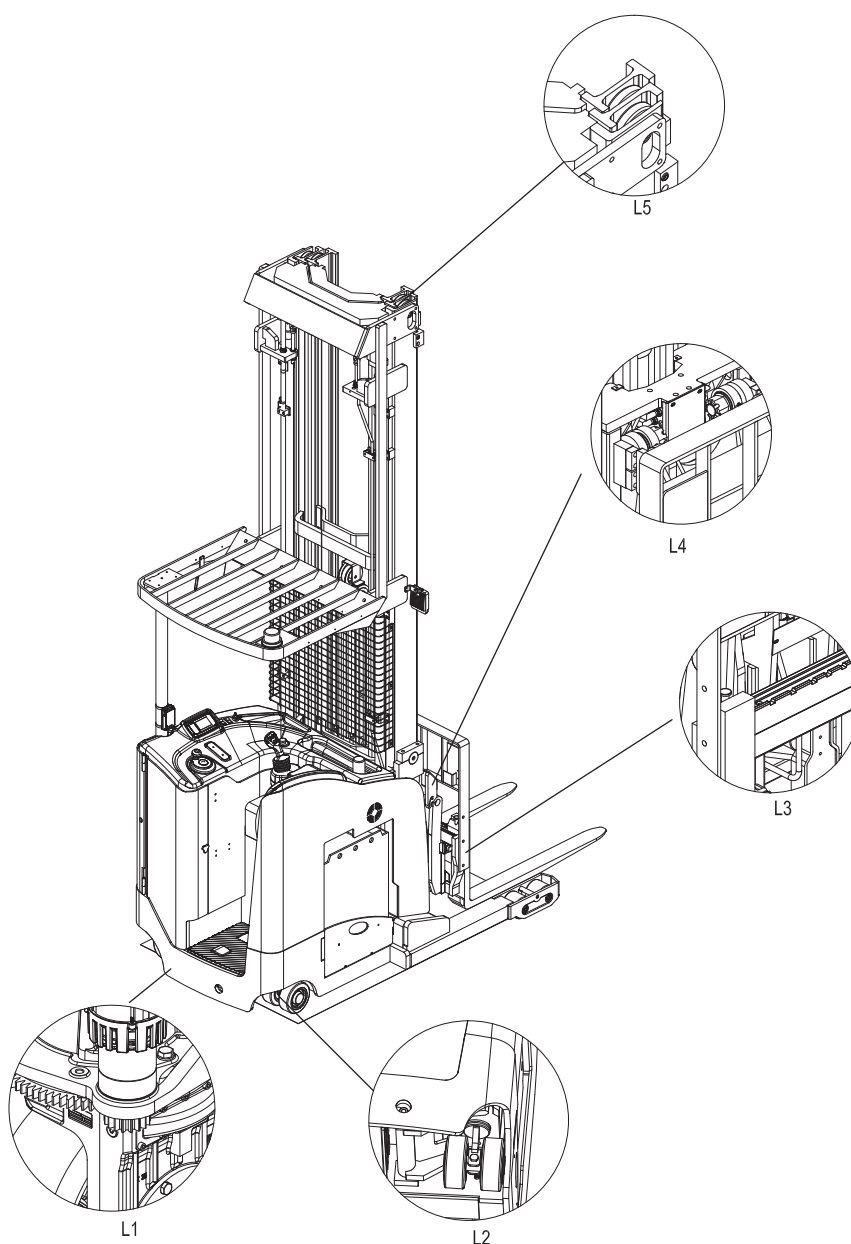
The use and disposal of lubricants must be carried out in strict accordance with the manufacturer's regulations.



Code	Type	Specification	Amount	Position
A	Anti-wear hydraulic oil	L-HM32	See Table 2.3	Hydraulic System
	Low temperature anti-wear hydraulic oil (cold storage)	L-HV32		
B	Multi-purpose grease	Polylub GA352P	Appropriate amount	Sliding surface (See Table 2.4)
C	Heavy duty gear oil	80W-90 GL-5	3.5L (Align with oiling port)	Gearbox

Mast Series	Lifting height (mm)	Amount (L)
3-stage Mast	6500	30
	6860	30
	7000	30
	7500	32
	7600	32
	8000	32
	8150	32
	8500	32
	8660	34
	9000	34
	9300	34
	9500	34
	10000	34
	10160	34
	10500	36
10700	36	

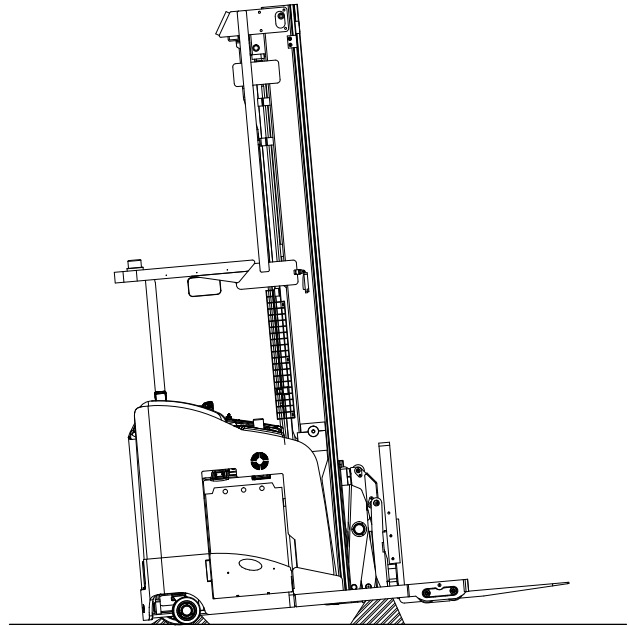
Table 2.4 Sliding Surface Lubrication Table	
Code	Position
L1	Steering gear
L2	Caster
L3	Fork carriage
L4	Scissors assembly
L5	Steel channel and rollers



1.4 Maintenance Instructions

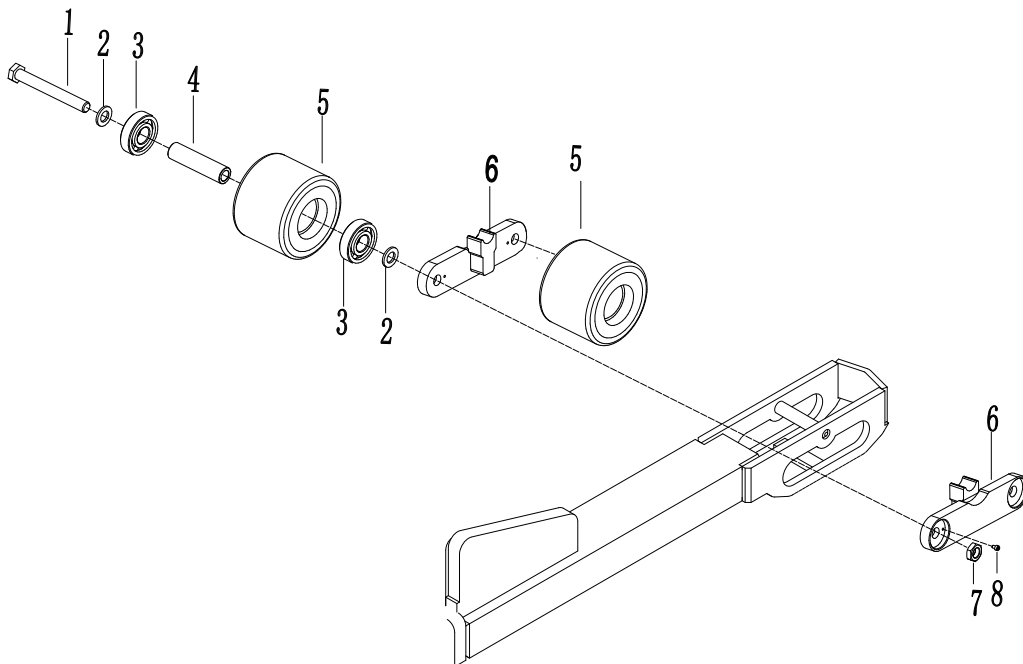
1.4.1 How to Raise the Load Wheels

1. Release the brake pedal to apply the brake. Put blocks on both sides (front and back) of the drive/steer tire and the caster wheels to prevent movement of the lift truck.
2. Use an overhead crane and web sling under the base arms at the mast to raise the load wheels. Another lift truck can also be used to raise the base arms. Make sure that the crane and sling or other lift truck has a capacity of at least 2/3 of the total weight of the lift truck as shown on the nameplate.
3. Raise the base arms only enough to suspend the wheels. Install blocks under the base arms at the rear of the wheels to support the lift truck.



➤ Load Wheel Removal

- Unscrew the screw (1) on the wheel bracket (6) ;
- Loosen the nut (7) and remove the bolt 1, bearing (3), washer (2), shaft sleeve (4) and load wheel (5) with hammer and jacking equipment;





WARNING

Make sure the lifting equipment is solid and secure, and the load capacity should be greater than the total weight of the vehicle.



WARNING

When replacing wheels, be sure that the truck won't tilt.

➤ Installation and Commissioning

Install according to the reverse order of removal;
Turn the wheel to see if it is rotating smoothly, and if there is blocking or not;
Run the truck to see if the load wheel is functioning properly. If there is blocking or noise, please install again.



CAUTION

When installing, please apply appropriate amount of grease on the axle first.

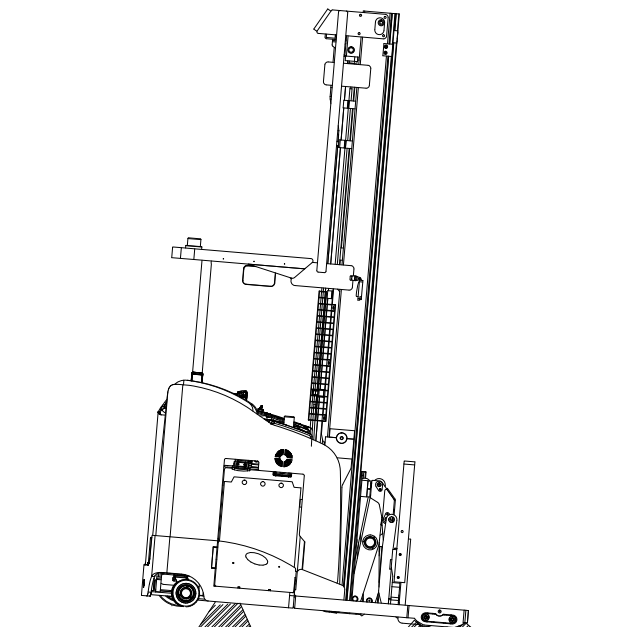
(See Section 1.3.2 for specifications)

Quality of tyres directly affects the stability and driving performance of the device.

If you need to replace the factory-fitted tyres, please use original spare parts provided by the equipment manufacturer to reach the original design performance of the truck.

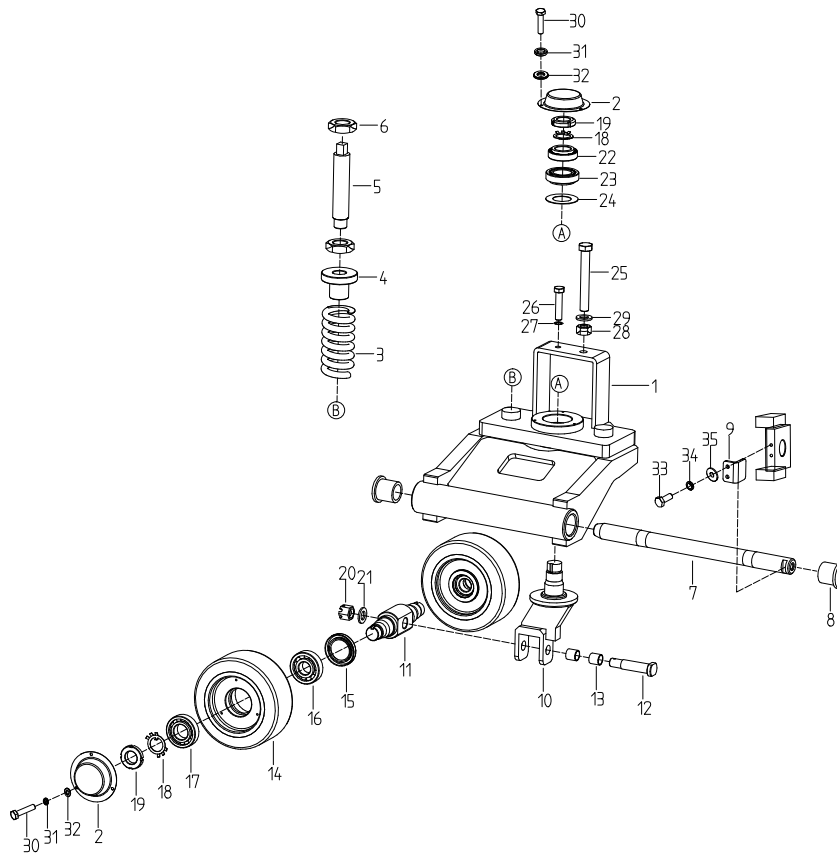
How to Raise the Drive/Steer Tire and Caster

1. Put blocks on each side (front and back) of the load wheels to prevent movement of the lift truck.
2. Use a special low clearance hydraulic jack under the rear frame to raise the drive/steer tire and caster wheels. Another lift truck can also be used to raise the lift truck. Make sure that the jack or other lift truck has a capacity of at least 2/3 the total weight of the lift truck as shown on the nameplate.
3. Raise the lift truck only enough to suspend the drive/steer tire and the caster wheels. Install blocks under the rear of the frame to support the lift truck.



➤ Caster Removal

Unscrew three bolt (1), remove the cover (2), Loosen the nut (19) knock out the snap ring (18) and remove the caster(14).



Installation

Install according to the reverse order of removal;



WARNING

Changes in steering and traction responses must be reported to a supervisor immediately.

As drive tires wear from normal use, the caster assembly will periodically need to be adjusted to maintain proper support. Steered and non-steered casters must be checked every 500 hours or 3 months for normal applications for proper gap measurements and adjusted as required to maintain proper load on the caster wheels. Caster adjustment must also be checked when the drive tire or caster wheels are replaced or anytime steering, acceleration, or braking responses suggest casters are not adjusted properly.



CAUTION

Tyre wear can affect the stability of the truck, adjust the caster with minor wear on a regular basis, or replace the caster with heavy wear.

Quality of tyres directly affects the stability and driving performance of the device. If you need to replace the factory-fitted tyres, please use original spare parts provided by the equipment manufacturer to reach the original design performance of the truck.

➤ Drive Wheel

Removal and Installation

Removal

Lift the vehicle carefully with lifting equipment through the lifting holes at front and back;

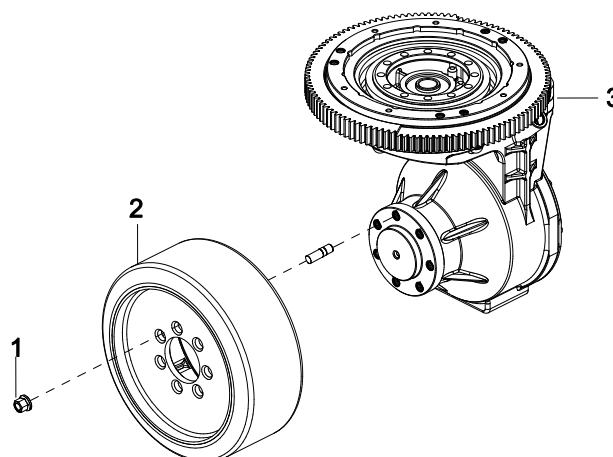


WARNING

Make sure the lifting equipment is solid and secure, and the load capacity should be greater than the total weight of the vehicle. Lifting height of not more than 300mm, to prevent the hazards to the maintenance personnel working under the vehicle for caster removal and installation.

Rotate the drive assembly to the right. Loosen the seven flange nuts (1) with wrench or socket wrench, and then unscrew the flange nuts and spherical washer by order.

Remove the drive wheel (2) from the gearbox (3).



Installation

Install according to the reverse order of removal;



WARNING

The lift truck capacity can change with different types of tires. Make sure the capacity on the nameplate is for the type of tires installed on the truck.



CAUTION

Screw the seven nuts. Tighten the nuts by order and mark with the torque: 206-243 N•M

➤ Check the drive wheel nuts

After taking delivery of the truck, or after removing the drive wheel, the security of the nuts **MUST** be checked within 50 hours of operation.

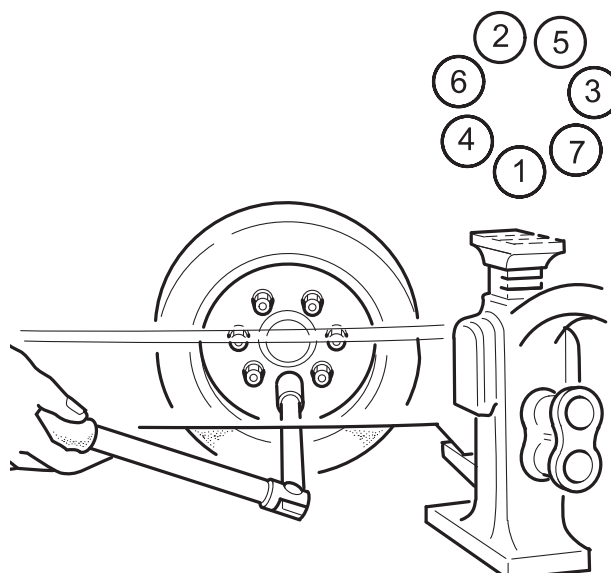
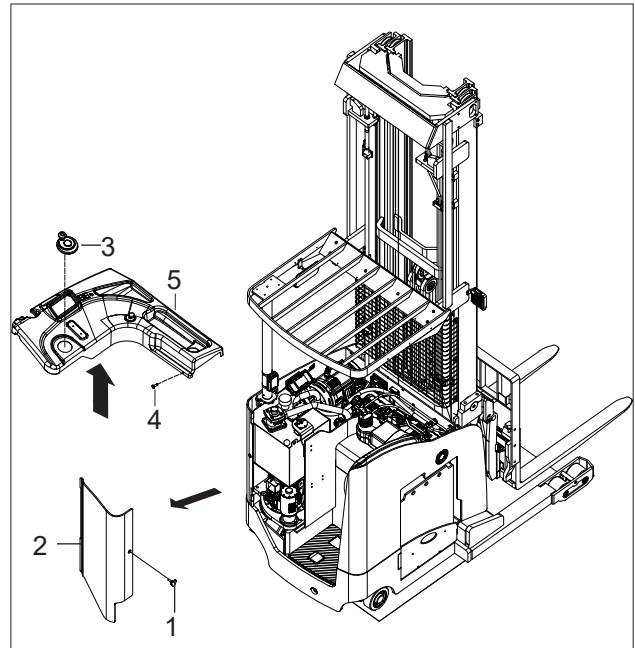


Fig0000-00228OM

1.4.2 Remove the cover

- Unscrew the Star-shaped handle (1) and open the side cover(2).
- Unscrew the screw and remove the steering disk(3).
- Unscrew the six screws(4) and remove the Upper cover(5).



➤ Check the hydraulic oil level

i NOTE

Open the drive unit compartment door and inspect the hydraulic system for leaks and damaged or loose components.



WARNING

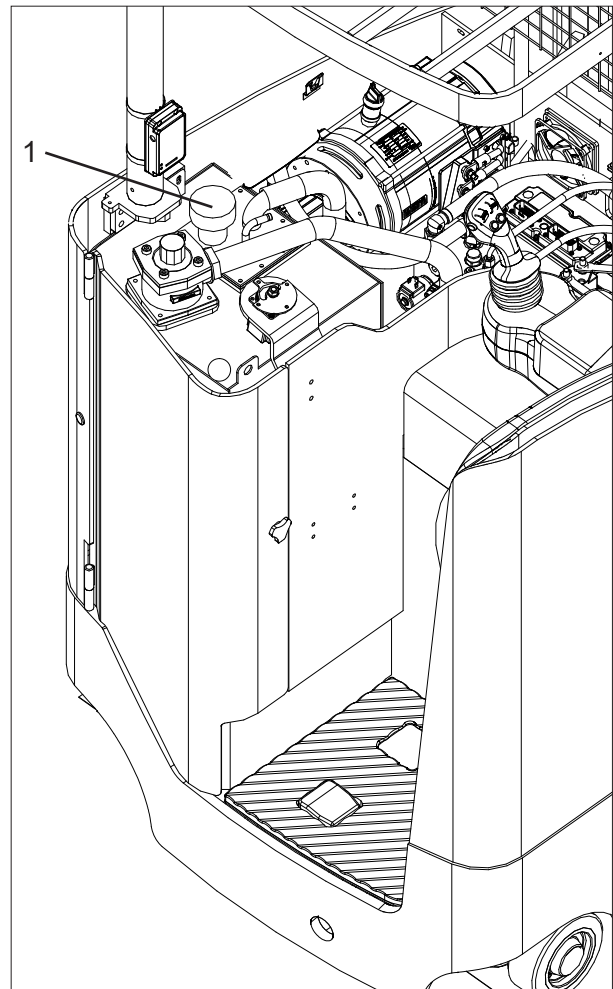
At operating temperature the hydraulic oil is **HOT**. Do not permit the oil to contact the skin and cause a burn.



CAUTION

Do not permit dirt to enter the hydraulic system when the oil level is checked or the filter is changed. Never operate the pump without oil in the hydraulic system.

The operation of the hydraulic pump without oil will damage the pump.



Visually check the hydraulic oil level when the oil is at operating temperature, the carriage is lowered, the reach mechanism retracted and the key switch is in the OFF position.

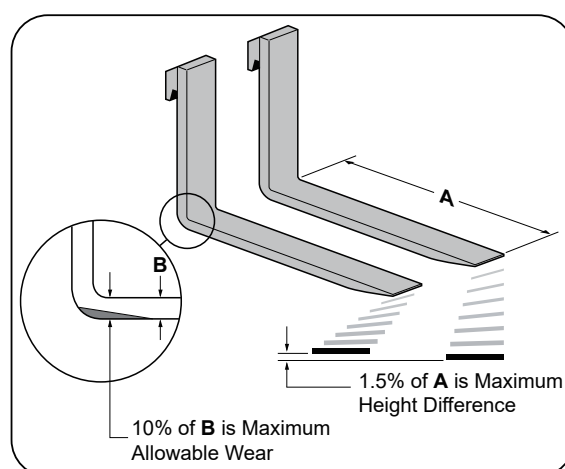
Add hydraulic oil only as needed. Be careful not to over fill.

- Prepare the truck for maintenance and repairs.
- Fully lower the mast.
- Press the emergency stop switch.
- Remove the cover(See 1.4.2).
- Unscrew the oil cap (1). This oil cap has a dipstick.
- Use a clean cloth to dry the dipstick.
- Reinstall the oil cap, then remove it again and check whether the traces of oil on the dipstick.

➤ Forks

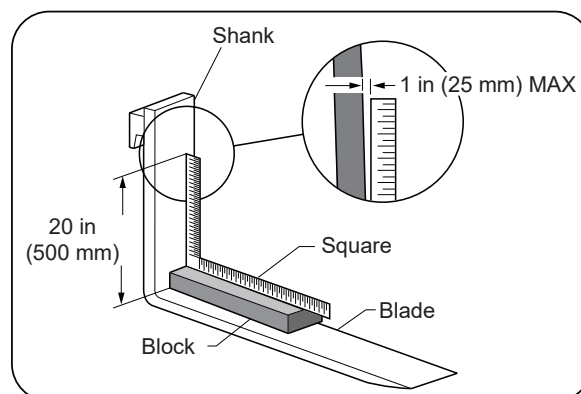
Inspect the load forks for bending and wear:

- The top surfaces of the forks should be level with each other.
- If the height difference between the fork tips is greater than 1.5% of the blade length (A), then the forks must be replaced.
- If the fork heel is worn by more than 10% of the thickness (B) of the fork blade, then the forks must be replaced. The load capacity of the forks is reduced when the forks have experienced excessive wear.



Inspect the forks for twists and bends:

- Position a 50 mm thick block, at least 100 mm wide and 600 mm long, on the blade of the fork with the 100 mm surface against the blade.
- Position a 600 mm square on the top of the block and against the shank.
- Check the fork gap at 500 mm above the blade. If the gap distance is greater than 25mm, then the forks must be replaced.



WARNING

DO NOT try to correct fork tip alignment by bending the forks or adding shims. Replace bent forks.

Never repair damaged forks by heating or welding.

Forks are made of special steel using special procedures.

Replace damaged forks. Forks are to be replaced only in sets and not individually.

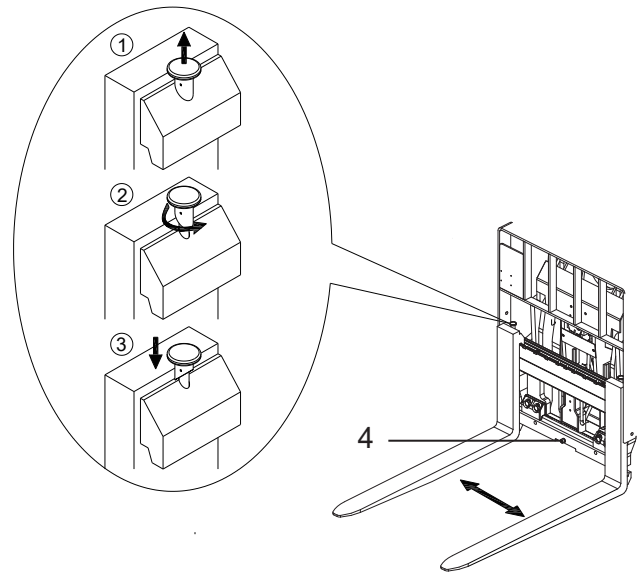
➤ Adjust and replace forks

Adjust fork distance

In order to guarantee safe operation of picking loads, before operation, adjust the fork distance to proper position according to the tray dimension.

Procedures

- Pull the fork locating pin upward (1), and rotate 180° in either direction (2) to unlock the fork.
- Based on fork carriage center line, adjust the fork position to both ends symmetrically.
- After adjusting fork distance, make sure the forks are positioned correctly and rotate pin until it drops into place (3).



CAUTION

Fork locating pin must be locked(keep in the slot of fork carriage), otherwise forks are easy to move during driving and loads may fall down.

Be careful when adjusting forks.

➤ Fork removal

Fork removal

When replacing forks, screw off the fixed bolt(4) in the middle of the fork carriage, move the fork to the middle opening of fork carriage beam, and then tilt forward and lower the forks until forks are off the fork carriage, then back the truck.

Fork assemble

Place forks on the ground against the truck, lower the fork carriage to the lowest, drive the truck forward slowly, aim at the upper and lower slot of fork and the upper and lower beam and gap of fork carriage, fully lift the fork carriage, adjust the left and right position of forks. Screw back on the fixed bolt from above to lock in place.

➤ Lift Chain Inspection and Lubrication

During normal operating conditions, inspect and lubricate the lift chains every 450 to 500 hours. If operating in corrosive or extreme working conditions, inspect more frequently.

When inspecting, check for: rust and corrosion, cracked plates, raised or turned pins, tight joints, excessive wear, and worn pins and holes.

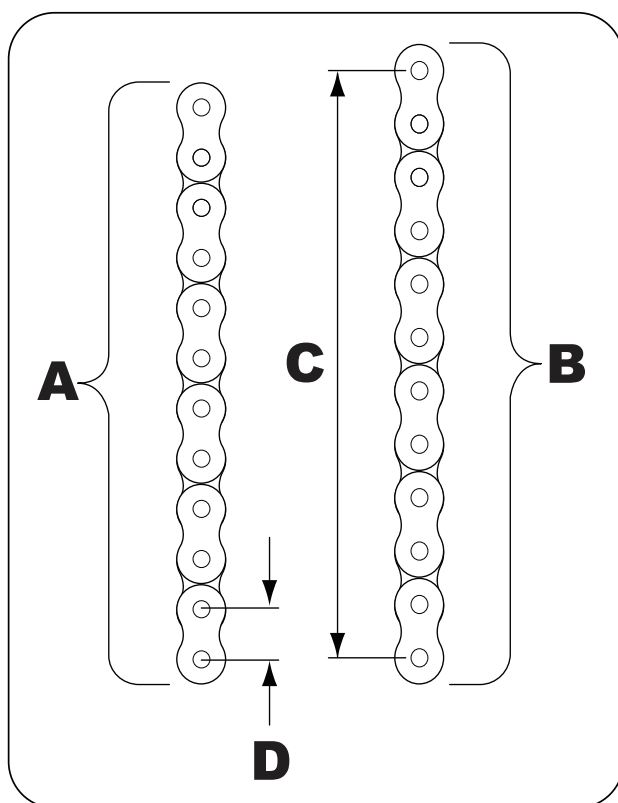
Lift chain lubrication is a crucial step of your Planned Maintenance program. The correct and

timely lubrication of the lift chains will maximize their service life.

Lift Chain Wear and Replacement Criteria:

The lift chain will gradually stretch over time during normal operation. When a section of chain has stretched 3% or more, it is considered excessively worn and must be replaced. When checking for chain stretch, always measure a segment of chain that moves over a sheave.

- New Chain Length (A): distance from the first pin counted to the last pin counted in a span while the chains are lifting a small load.
- Worn Chain Length (B): distance from the first pin counted to the last pin counted in a span while the chains are lifting a small load.
- Span (C): number of pins in the segment of chain to be measured.
- Pitch (D): distance from the center of one pin to the center of the next pin.



WARNING

Do not attempt to repair a worn or broken lift chain.

➤ **Check the electrical fuses**

- Prepare the truck for maintenance and repairs.
- Open the battery hood.
- Check condition and rating of the fuse(2) in accordance with your parts manual or service manual.



WARNING

When replacing for a new fuse, please choose the fuse of same capacity as the old one.

➤ **Check transmission oil level**

- Prepare the truck for maintenance and repairs.
- Carry out the pre-service preparations properly.
- Remove the battery hood(See 1.4.2 Open the cover).
- Check that the gear oil level reaches the position of the inspection screw.
- Add transmission oil every 2000 operating hours, or at least annually (See 1.3.2 Lubrication Schedule).

Install following the above steps in reverse order.

➤ **Reach, Tilt, and Sideshift**

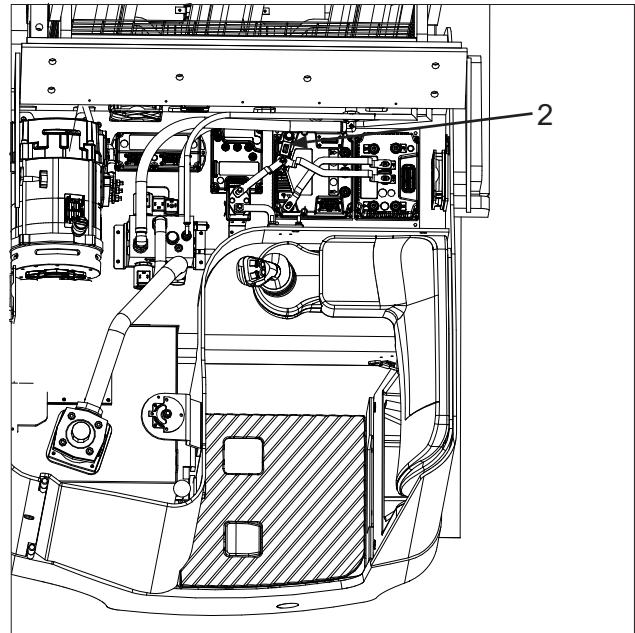
If the reach mechanism is retracted it will be necessary to extend the mechanism to make the following checks.



WARNING

Make sure the key switch is in the OFF position and the key is removed from the switch before doing this check.

1. Check for cracks at the welds on the reach frames and scissor arms.
2. Check the frame channel for excessive wear in the areas of roller contact. Check the rollers for wear or damage.
3. Check the load backrest extension for cracks and damage. Make sure that the nuts and bolts for the load backrest extension are tight.



1.5 Decommissioning the trucks

If the reach truck is to be used for over 2 months, it must be parked in a frost-free, clean and dry location.

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

1.5.1 Prior to decommissioning

- Clean the truck thoroughly;
- Lift and lower the fork carriage to its full extent and tilt the lift mast forwards and backwards several times. Repeat the same operation several times on attachments if they exist;
- Check the brakes;
- Check the hydraulic oil level and top up if required;
- Apply a thin layer of lubricating oil or grease to all nonpainted mechanical components;
- Lubricate the trucks in accordance with the lubrication schedule;
- Remove the battery and recharge it at least 2 months.
- Clean the battery and apply specialised grease to the terminals.
- Spay all exposed electrical contacts with a suitable contact spray.



WARNING

Charge the battery every 2 months to avoid depletion of the battery through self-discharge.



CAUTION

Jack up the reach truck to prevent permanent deformation of tire.



NOTE

Do not cover the reach truck with plastic film as it may gather water vapour.

1.5.2 Restoring the truck to operation after decommissioning

- Thoroughly clean the truck.
- Clean the battery. Grease the pole screws using pole grease and reconnect the battery.
- Recharge the battery.
- Check if the hydraulic oil contains condensed water and change if necessary.
- Follow the daily checklist.

1.6 Final decommissioning, 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, hydraulic oil, plastic and electronic and electrical systems must be observed.

H 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.

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.The manufacturer has a customer service department specially trained for these tasks.

Fault	Fault Symptom	Troubleshooting Order *	Troubleshooting Measures
Power supply failure	1. Whole vehicle power outage	a. Power supply failure b. Fuse failure c. Emergency stop switch or circuit failure d. Key switch or circuit failure	1. Check the voltage of battery 2. Check the fuses 3. Check emergency stop switch and its circuit 4. Check key switch and its circuit
Travel Fault	1. Forward and reverse moving failures of the vehicle, but other functions are normal	a. The foot switch don't depress b. Foot switch and seat switch or its circuit connection failure c. Electromagnetic brake locked (Non-mechanical failure, the instrument will display fault code) d. Travel switch or its circuit connection failure e. Drive motor or its circuit connection failure f. Controller failure	Controller failure error, carry out troubleshooting according to the fault code information on the instrument. 1) Check whether the foot switch is depressed. 2) Check if the foot switch and seat switch or the connection of its circuit is normal; 3) Electromagnetic brake and its connecting circuit; 4) Check the gearbox; 5) Check the travel switch and its connection circuit; 6) Check the drive motor and its connection circuit; 7) Replace the controller.
	2. The vehicle can travel at low speed, but cannot travel at high speed	Failures due to external factors: a. Electromagnetic brake locked (Non-mechanical failure, the instrument will display fault code) b. Motor bearing blocked c. Gearbox bearing blocked Failures due to internal factors: a. Drive motor speed encoder failure b. Controller failure	Controller failure error, carry out troubleshooting according to the fault code information on the instrument . 1) Check the electromagnetic brake or its connection circuit; 2) Check if the motor rotation is normal; 3) Check the speed encoder and its connection circuit; 4) Remove the gearbox, check if the gear rotation is smooth and if there is blocking; 5) Replace the controller

Fault	Fault Symptom	Troubleshooting Order *	Troubleshooting Measures
Hydraulic Failure	1. The vehicle cannot lift	1. Pump motor does not work: a. The foot switch don't depress for CQD12R/RF b. Foot switch and seat switch or its circuit connection failure; c. Pump motor or its circuit connection failure d. Control switch or its circuit connection failure e. Controller failure 2. Pump motor works: a. Overload b. Insufficient hydraulic oil c. Hydraulic pipeline leakage d. Pump motor reverse rotation e. Cylinder failure (blocked) f. Solenoid valve blocked and cannot reset g. Valve body failure: excessive wear of gear pump, serious internal leaks, insufficient pressure of relief valve or blocked, check valve blocked	1. Pump motor does not work: 1) Check whether the foot switch is depressed. 2) Check if the foot switch and seat switch or the connection of its circuit is normal; 3) Check the pump motor and its connection circuit; 4) Check the control button and its connection circuit; 5) Replace the controller. 2. Pump motor works: 1) Refer to the rated capacity marked on the nameplate; 2) Lower the mast to the bottom, check if the amount of oil in the oil tank can meet the requirements; 3) Check the pipe and hydraulic components for oil leaks; 4) Check the pump motor wiring; 5) Check the cylinder for damage or deformation, remove the cylinder to check for wear or aged seals inside; 6) Wash or replace the solenoid spool 7) Wash or replace the valve body
	2. The vehicle cannot be lowered	a. Solenoid valve (or manual valve) or its circuit connection failure b. Lowering switch or its circuit connection failure c. Valve failure; d. Cylinder deformation or blocked e. Explosion-proof valve blocked	1) Check the lowering button and its connection circuit; 2) Check the solenoid valve and its connection circuit; 3) Check the cylinder for deformation, remove the cylinder to check if the internal assembly is normal 4) Clean or replace the valve; 5) Replace the explosion-proof valve.

Fault	Fault Symptom	Troubleshooting Order *	Troubleshooting Measures
Lift Failure	3. Slow Lifting of Vehicle	a. Overload b. Hydraulic pipeline leakage c. Valve failure: Gear pump wear, internal leakage occurs Insufficient relief valve pressure or blocked	1) Refer to the rated capacity marked on the nameplate; 2) Check the pipe and hydraulic components for oil leaks; 3) Wash or replace the valve body
	4. Slow Lowering of Vehicle	a. Solenoid valve blocking b. Valve body failure: throttle valve failure or blocked	1) Wash or replace the solenoid spool 2) Wash or replace the valve body
	5. Unstable Lifting / Lowering of Vehicle	a. Chain loosening; b. Poor lubrication between steel channel and rollers; c. Improper adjustment of rollers, or blocked. d. Accumulator failure;	1) Adjust the chain tension; 2) Check if the steel channel grease is normal, clean and re-lubricate steel channel and rollers; 3) Adjust the side roller spacing through roller screw; or replace the roller. 4) Replace the accumulator
<p>* Under the circumstances of normal lifting and lowering, if failure occurs to any of other hydraulic actions (forward/backward shifting, forward/backward tilting and left/right shifting), perform troubleshooting to the corresponding control switch and its control circuit.</p>			
Steering Fault	1. The vehicle cannot be steered (the vehicle can travel)	a. Stepper motor or its circuit connection failure b. Steering motor or its circuit connection failure c. Proximity switch or its circuit connection failure d. Steering controller failure	Controller failure error, carry out troubleshooting according to the fault code information on the instrument . 1) Check if the mechanical connection between the steering wheel and stepper motor is solid; 2) Check the stepper motor or its connection circuit; 3) Check the steering motor or its connection circuit; 4) Check the proximity switch or its connection circuit. 5) Replace the controller

Fault	Fault Symptom	Troubleshooting Order *	Troubleshooting Measures
Other Failures	1. Lights do not light	a. Light failure or circuit not conducted	1) Check the light and its circuit connection;
	2. Horn does not sound	a. Horn switch or its circuit connection failure b. Horn failure	1) Check the horn button and its connection circuit; 2) Check the horn and its connection circuit;

Carry out troubleshooting in accordance with the order listed in the table, it can help you quickly identify problems and resolve accordingly.

- To provide targeted and rapid response to faults, the following details are useful and important to provide for the customer service department:
- Truck serial number
- Display unit error number (if present)
- Error description
- Current location of truck.

APPENDIX

1 Lead-acid battery operating instructions

1.1 Safety and Warnings

When operating on battery, you must wear protective glasses and protective clothing!

Electrolyte contains sulfuric acid and is highly corrosive. If it accidentally comes into contact with the skin, wash immediately with plenty of water, if the situation is serious, immediately seek medical advice.

The battery will produce hydrogen during charging, which may produce an explosive mixture. Smoking or ignition is prohibited near the battery that is being charged or just completes charging, there should not be flame or a hot wire, otherwise there may be fire or explosion hazards!



CAUTION

To avoid accumulation of hydrogen gas, keep the battery cover open during charging, charge the battery at a cool, well-ventilated place.

Dumping of battery is prohibited. Only use proper lifting equipment to lift or transport the battery.



WARNING

•It is necessary to add water regularly, other-wise may cause damage to the battery due to water loss.

•The water must be added after the battery is fully charged, adding water before charging can cause electrolyte overflow.

•The amount of water to be added must be strictly controlled, excessive adding of water may lead to electrolyte overflow.

•Only distilled water can be added, the adding of tap water or mineral water is prohibited.

•As for the decrease of battery capacity, or even damage to the battery due to failure to comply with the above provisions, the quality assurance will automatically void.

As for failure to comply with instructions for use, maintenance without using original parts, user corruption, or viola-tion of provisions when adding electrolyte and other circumstances, the quality assurance will automatically void.

➤ Accessories

•Do not use a charger that is not released by EP for lead-acid battery.

1.2 Use of Battery

1.2.1 Pre-use Checks

Check if the battery status is normal and also check for mechanical failures;

Connect the battery connectors, make sure the contact is solid, the electrodes are connected properly, otherwise may cause damage to the battery, truck or charger;

Check if the electrode bolt of each battery interface is tightened;

Check electrolyte fluid level. It must be ensured that the electrolyte level is higher than the upper edge of overflow outlet or separator;

Charge the battery according to the instructions on the operation manual;

Refill the electrolyte with distilled water to make the electrolyte level reach standard level.

1.2.2 Discharging

Do not close or cover the ventilation openings with objects;

When connecting or disconnecting the battery connector (such as, plug), the power supply must be disconnected first;

In order to meet or exceed the rated battery service life, the battery should avoid excessive discharge during runtime (capacity less than 20% of the rated capacity);

Re-charge the battery immediately after discharging without delay.

1.2.3 Charging

When charging, only DC can be used. Connect the battery with proper charger for specification and size to avoid overload of circuit and interface, and to avoid electrolyte foaming or overflow from the cell;

The charger purchased separately must be checked by the after-sales service department of our company before it can be used;

When connecting the battery with the charger, the circuit switch should be at "OFF" position, make sure the connection is correct. It is prohibited to connect the battery with live charger.

Before battery charging, make sure the electrolyte temperature is within the range of 10 ° C~ 45 ° C;

When charging, the cover or cover plate of the battery compartment must be opened or removed to ensure that the gas generated during charging can be smoothly discharged.

When the concentration of the electrolyte and battery voltage remain constant (for more than 2 hours), it indicates that the charging is completed.

1.2.4 Temperature

Rated temperature of electrolyte is 30 °C.

If the temperature is too high, it will reduce the service life of the battery; too low may reduce the battery capacity.

When the temperature reaches the limit temperature of 55 ° C, it is prohibited to run the battery.

1.3 Maintenance & Care

1.3.1 Daily Maintenance

Charge the discharged battery;

Visual inspection for excessive dirtiness and mechanical damage after the charging.

1.3.2 Weekly Maintenance

Control the electrolyte fluid level. Check the electrolyte fluid level when the charging is about to complete. If necessary, add distilled water into the electrolyte when the charging is about to complete to make the fluid level reach the rated standard.



CAUTION

Lower fluid level may reduce the battery capacity, and thus reduce the service life of battery. Higher liquid level may lead to electrolyte overflow when charging, which may cause corrosion to the battery compartment or even the vehicle.

Checking the battery condition, electrolyte level and specific gravity

- Inspect battery for cracks, raised plates and electrolyte leaks.
- Unscrew the battery cover and check the electrolyte level.
- If the battery has an inspection tube, then the electrolyte level should be at the base of the tube. If there is no inspection pipe, then the electrolyte level should be 10-15 mm higher than the plate.
- If the electrolyte level is excessively low, it can only be filled up with distilled water.
- Remove any sediment from the electrodes and lubricate with non-acidic lubricating grease.
- Retighten the electrode holder.
- Use a hydrometer to check the electrolytes. The specific gravity should be between 1.24-1.28.

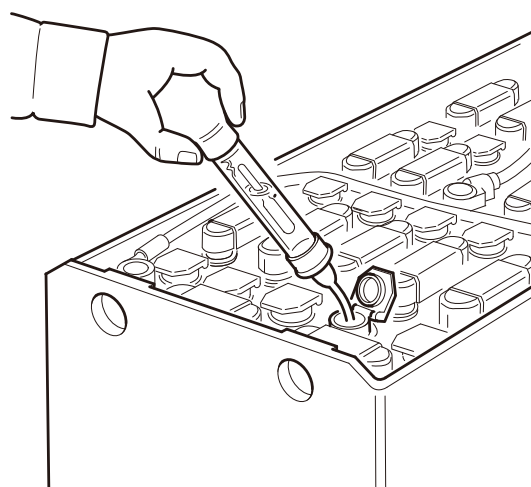


Fig3316-000500M

There are two types of battery filler cap used on battery cell:

1) Filler cap with buoy

Add distilled water, red buoy will float until while rod appears under the red scale.



WARNING

Batteries can be hazardous when being handled and maintained. During charging, explosive hydrogen gas is released.

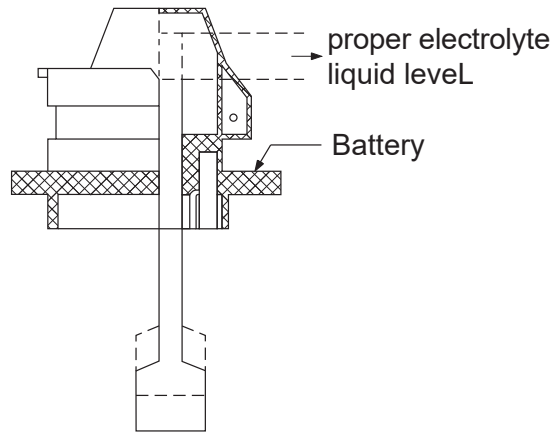


Fig0000-00229OM



WARNING

Add only distilled water. Before adding distilled water, check if the buoy can move up and down properly to prevent the buoy from failing to float up and resulting in excessive filling.

2) Filler cap without buoy

When adding water, stop filling when the electrolyte level is higher than the protective plate for 15~20 mm.



CAUTION

Please operate the electric watering device in accordance with its operating manual.

1.3.3 Monthly Maintenance

Before the charging is completed (while the charger is still energized), measure and record the voltage of battery cell the entire battery;

After the charging is completed, measure and record the electrolyte concentration and temperature of the battery cell.

How to tell if the battery is normal

As for a normal set of fully charged batteries, the voltage of each of the battery cell should be around 2.08V, specific gravity of electrolyte should be around 1.28;



CAUTION

After being fully charged, if the voltage of battery cell is lower than 1.85V or the specific gravity of electrolyte is less than 1.05, then that battery cell has been damaged and needs to be replaced.

As for a group of normal batteries, when the battery is discharged for 80% (the instrument alarms and prompts low battery, you should recharge in a timely manner), the open circuit voltage should be around 1.93V, specific gravity of electrolyte (under 30°C) should be around 1.14.



CAUTION

And you can identify if the battery is fully discharged according to the specific gravity of battery electrolyte when the instrument alarms, and identify if the capacity indicated on the instrument is accurate.

If there is fault, please notify service personnel for repairs.

1.3.4 Care

1. Keep it clean

Battery surface should be clean and dry to prevent the occurrence of leakage currents;

Battery cables, terminals and connectors must be tightened and clean, a small amount of special grease should also be applied.



WARNING

- Do not use a dry cloth or fabric to clean the surface of the battery, so that to prevent the occurrence of static electricity, resulting in explosion;
- Unplug the power plug;
- Wipe clean with a damp cloth;
- Please wear goggles, rubber boots and rubber gloves.

2. Make sure that the cable insulation is not damaged and the connection layer has no signs of heating.

3. Make sure that the "+" and "-" output terminals are not sulfated (with white salt).

Slight sulfation: clean top of the element with a damp cloth.

Severe sulfation: the battery must be removed for powerful cleaning; the battery base should also be cleaned.

Very severe sulfation (or a large amount of electrolyte overflow): please contact the after-sales service department as soon as possible.

DO NOT arbitrarily discharge acidic wastewater after cleaning, dispose such water in accordance with national laws and regulations!

1.4 Storage

When the battery is not used for a long time, the battery should be filled up and stored in a dry, frost-free space.

Regular equalizing charge may help extend the service life of battery and ensure that the capacity won't be reduced.

1.5 Troubleshooting

Upon battery or charger failure, please promptly notify the after-sales service department.

Refer to battery failure analysis to facilitate troubleshooting and elimination.

Battery Fault Analysis			
Fault	Negative Phenomena	Cause	Handling Methods
Insufficient Battery Charge	<ol style="list-style-type: none"> 1. Low static voltage 2. Low density, cannot meet the requirements after being charged 3. Short working time 4. When running, the instrument displays quick drop of capacity 	<ol style="list-style-type: none"> 1. Charger voltage and current are set too low 2. Insufficient initial charge 3. Charger failure 	<ol style="list-style-type: none"> 1. Adjust and repair the charger 2. Battery supplemental charge 3. Battery needs to be replaced in severe situations
Electrolyte has been improperly added to the battery	<p>- In case of high intensity:</p> <ol style="list-style-type: none"> 1. Electrolyte density is not less than 1.300g/cm³ after charging 2. Battery static voltage is higher 3. Initial capacity is good, but reduced after a period of use 4. Electrolyte is turbid <p>- Low density:</p> <ol style="list-style-type: none"> 1. Electrolyte density is still lower than the specified value after charging 2. Battery capacity is low <p>- Adding impure liquid:</p> <ol style="list-style-type: none"> 1. Battery capacity is low 2. Electrolyte is turbid and of abnormal color 3. Battery with severe self-discharge 	<ol style="list-style-type: none"> 1. Initial adding of electrolyte with excessive high or low density 2. Liquid level reduces, adding errors, failed to add pure water in accordance with provisions, but mistakenly adding dilute acid 3. Initial adding of liquid is impure (containing impurities and with odor) 	<ol style="list-style-type: none"> 1. Replace the battery electrolyte 2. Battery needs to be replaced in severe situations

Battery Fault Analysis			
Fault	Negative Phenomena	Cause	Handling Methods
Electrode plate sulfation	<ol style="list-style-type: none"> 1. Battery capacity drops during normal discharge 2. Density drops to be lower than normal value 3. Voltage drops quickly when discharging 4. Start charging under high voltage 5. Bubbles generated during charging 6. Coarse crystallization of PbSO₄ 	<ol style="list-style-type: none"> 1. Insufficient initial charge 2. Long time of storage under the state of discharge 3. Long-term insufficient charged 4. Electrolyte density is too high 5. Electrolyte level is too low, the upper part of electrode plate is exposed outside of the electrolyte 6. Impure electrolyte 7. Internal short circuit 	<ol style="list-style-type: none"> 1. Over-discharge method 2. Repeated charging method 3. Water treatment method
Excessive shedding of active substances	<ol style="list-style-type: none"> 1. There is gray-brown substance rising from the bottom when charging 2. Battery capacity reduced 	<ol style="list-style-type: none"> 1. Brown precipitation is due to excessive large charging current 2. White sediment is due to over-discharge 3. Battery electrolyte is impure 	<ol style="list-style-type: none"> 1. Clean up the precipitation 2. Adjust the density 3. Battery needs to be replaced if necessary
Battery overcharged	<ol style="list-style-type: none"> 1. Color of battery filling cap becomes yellow, and then red 2. Battery casin deformation 3. Battery spacers carbonization, deformation 4. Positive electrode corrosion, broken 5. Electrode pole rubber bushing raised, aged and cracked 6. Frequent water-adding, electrolytic turbidity during charging 7. Evenly shedding of active substances from electrode plate 8. Positive electrode plate detonation 	<ol style="list-style-type: none"> 1. Charger voltage and current are set too high 2. Charging time is too long 3. Frequent charging 4. Less discharging, but much charging 5. Charger failure 	<ol style="list-style-type: none"> 1. Adjust and repair the charger 2. Adjust the charging system 3. Battery needs to be replaced in severe situations
Battery Over-discharge	<ol style="list-style-type: none"> 1. Low static voltage 2. Electrolyte density is still low after charging 3. Positive and negative electrode plates curved or fractured 	<ol style="list-style-type: none"> 1. Go on using the battery despite of insufficient charge 2. Battery pack short circuit 3. Small current long time discharge 	<ol style="list-style-type: none"> 1. Supplementary charging 2. Repair the vehicle 3. Battery needs to be replaced in severe situations

Battery Fault Analysis			
Fault	Negative Phenomena	Cause	Handling Methods
Battery Short Circuit	<ol style="list-style-type: none"> 1. Low static voltage below 2V 2. Electrolyte density is too low 3. High temperature during charging 4. Truck is with short working time 	<ol style="list-style-type: none"> 1. Electrode plate deformed and short circuit 2. Spacer missing or broken during assembly 3. Positive electrode active substances shedding, short circuit at bottom 	Battery needs to be replaced
Broken circuits	<ol style="list-style-type: none"> 1. Abnormal and unstable voltage upon external connection with load 2. Current fails to input when charging 	<ol style="list-style-type: none"> 1. Poor welding during assembly of electrode pole or electrode plate 2. External short circuit 3. Large current discharge 4. Poor wiring connection or disconnected 5. Electrode plate corrosion 	<ol style="list-style-type: none"> 1. Battery needs to be repaired 2. Battery needs to be replaced if necessary
Battery Reverse Electrodes	<ol style="list-style-type: none"> 1. Negative voltage values 2. Electrolyte density is lower than 1.20g/cm³ after charging 3. Positive and negative electrode lugs, colors of electrode plates are reversed 	Wrong connections of positive and negative electrodes during charging	<ol style="list-style-type: none"> 1. Reverse charging is allowable 2. Battery needs to be replaced in severe situations
Battery Leaks	<ol style="list-style-type: none"> 1. Filling hole leaks 2. Leaks at sealing seams of tank and filling cap 3. Drainage 4. Marks of bumps on external surface of tank 	<ol style="list-style-type: none"> 1. Tank, filling cap with poor heat sealing 2. Electrode lug rubber ring problems 3. Sealing compound cracked 4 External impact due to negligence during use 	<ol style="list-style-type: none"> 1. Repair 2. Battery needs to be replaced if necessary

APPENDIX

J Lithium battery operating instructions
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1.1 Lithium Battery Use and Maintenance Manual

➤ Information on the conformity of lithium-ion batteries

The manufacturer of the lithium-ion battery and EP group provider declares that: the lithium-ion battery conforms with the provisions of the following EU directive 2014/30/EU in accordance with EN12895.

This declaration of conformity with EU directives applies only to battery use that conforms to the recommendations described in the operating instructions.

➤ Special lithium-ion safety rules



DANGER

There is a risk of fire.

Use water-based extinguishers, CO₂, dry chemical fire extinguishers.



DANGER

Electrical danger

Do not open the battery. Electrical risk.

Only the After-Sales Service Centre technicians can open the battery.

It is necessary to respect the following guidelines:

- Read the documents provided with the battery carefully.
- Only persons who have been trained to work with lithium-ion technology are permitted to work on the batteries (for example After-Sales Service Centre technicians).
- Do not place lithium-ion batteries on or near flames or hot heat sources (> 65°C). This may cause the batteries to overheat or burst into flames. This type of use also impairs the performance of the batteries and reduces their service life.
- Improper use may cause overheating or serious injury. Respect the following safety rules:
 - Never short circuit the battery terminals
 - Do not reverse the battery polarity
 - Do not open the battery
 - Do not submit the battery to excessive mechanical constraints

➤ Intended use

- Operational application temperature 0° C-40° C, humidity < 80%;
- Charging application temperature 5° C-40° C;
- The battery's maximum operation altitude is up to 2000m;
- Do not disconnect the battery for emergency stopping, use instead the emergency switch.
- The truck shall not be used in a potentially explosive atmosphere or in an especially dusty environment.

➤ Reasonably foreseeable misuse

- Never short circuit the battery terminals.
- Do not reverse the battery polarity.
- Do not overcharge.

➤ Accessories

Do not use a charger that is not released by your manufacturer for lithium-ion battery.

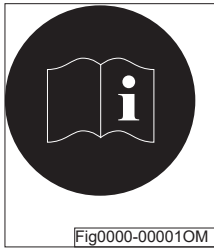
➤ BMS (Battery Management System)

The battery is permanently monitored by the BMS (Battery Management System).

This provides the communication with the truck.

The BMS continually monitors items such as the cell temperature, the voltage and the charge status of the cells.

1.2 Safety and warning



- Abide by the operation manual!
- All the operations related to the battery must be implemented under the instruction of professionals!



Always wear protective clothing (e.g. safety goggles and safety gloves) when working on cells and batteries.



- No smoke and fire!
- Avoid the existence of open fire, fiery metal wire or sparks around the battery, otherwise explosion or fire disaster may occur!



Don't trample on the battery to prevent it from fierce shaking or shacking!



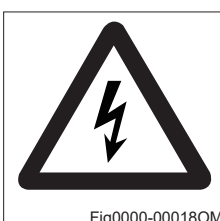
Do not place the battery on top of conductive objects.



- Explosion or fire disaster is likely to occur; avoid short circuit!
- Keep the battery away from all fire sources, heat sources and flammable or explosive materials.



- Don't knock over the storage battery!
- Using lifting and delivery devices as specified. Prevent the storage battery cell, interface and connection cable from being damaged by the lifting hook!
- If the materials leak out, do not inhale the fumes. Wear safety gloves.



- Dangerous voltage!
- Avoid hot plugging!
- Notice: the metal part of the storage battery cell is electrified, so don't place any external object or tool on the battery cell!



Keep the battery away from all fire sources, heat sources and flammable or explosive materials.



Avoid the battery becoming corroded by water or corrosive liquid.



WARNING

- Battery life will be shortened if the battery is used for a long time at low temperature or stored.
- Only temporary cold store application permissible as the permissible battery operating temperature is between 0°C and 40°C

1.3 Hazard of faulty or discarded battery

Please monitor the battery status when in use and in storage. If you find any broken batteries, electrolyte leakage, abnormal expansion or pungent odors due to shipping damage or abnormal vibration, please stop use immediately and keep at least a 5 meter perimeter around the effected batteries. Please dispose of the damaged batteries properly and contact a recycling company to recycle the batteries. For batteries that are under EP warranty policy, EP will access the warranty claim according to your submission of the battery nameplate photo .

During the period waiting for disposal or recycle, please stock damaged and old batteries carefully by following instructions:

1.Damaged and discarded battery temporary storage needs to be placed in an iron or plastic container with water that can cover whole battery at least 5 days (The battery may emit smoke when immersed in water. This is the process of consuming energy by the leaking battery, which is a normal reaction).

- Keep the container and batteries outdoors and 5 meters away from other things, especially flammable items.
- Use protective gloves when putting batteries in or out of water.
- Do not stack damaged or old batteries.

2.For big battery with inner and outer boxes structure, Keep the batteries outdoors at least 5 days. and contact a recycling company to recycle the batteries.



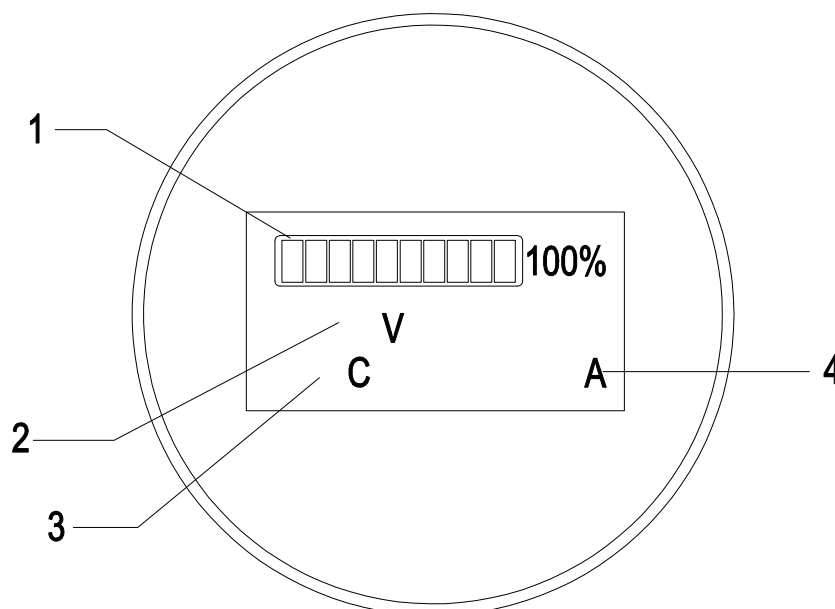
WARNING

1. *Do not store the battery for a long time;*
2. *No load bearing, squeezing and contact stacking when storing the batteries;*
3. *Do not place the batteries near cargo warehouses or near flammable and explosive dangerous goods.*

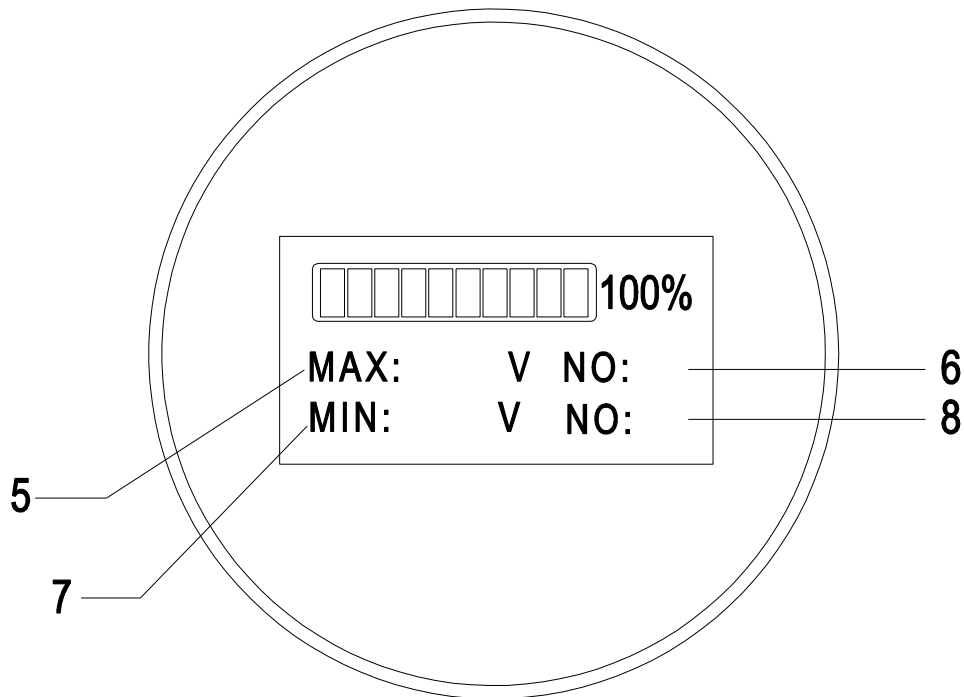
1.4 Instructions

- Before the first use, charge battery completely with original charger.
- The lithium battery should be used at an ambient temperature of 0 ~ 40°C, do not use or store the battery near a fire source/heat source where the temperature exceeds the safety range;
- When the battery is low, please charge the battery 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.
- 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;
- Do not bump or strike the lithium battery during use, If leakage is found on the battery, stop using it right away, pull out all the plugs connected to it, place it in open and well-ventilated space, and contact the after-sales service.
- If the battery life is significantly shortened, please contact the after-sales for check;
- If the lithium battery fails and cannot be used, please remove the battery from the material 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;
- 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;
- The operator must read the instructions carefully before use and receive relevant safety training to be able to handle emergencies;

1.4.1 Battery indicator

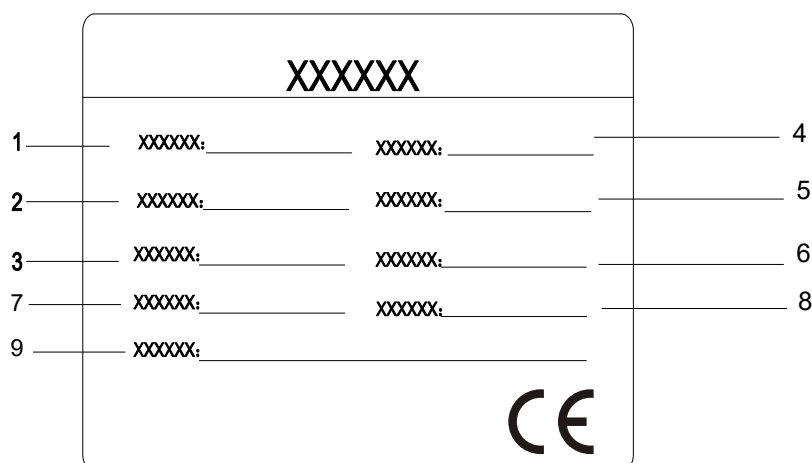


No.	Name	Description
1	Energy display	When all 10 cells are on, it indicates that the battery is full; When the first cell and the second flash alternately, it indicates that the battery is low and must be charged. The battery remaining charge is displayed; "100%" indicates that the battery is fully charged.
2	Total voltage	The sum of the total voltages of the lithium battery series
3	Temperature	Battery temperature
4	Charging current	Current value when charging the lithium battery



No.	Name	Description
5	Maximum cell voltage	Maximum value of cell voltage
6	No. of cell	Identification No. of the cell with maximum voltage.
7	Minimum cell voltage	Minimum value of cell voltage
8	Cell No. of minimum cell voltage	Identification No. of the cell with minimum voltage.

1.4.2 Lithium Battery Nameplate



No.	Name	No.	Name
1	Battery model	4	Cell Type
2	Nominal Voltage	5	Nominal Capacity
3	Nominal Energy	6	Version NO.
7	Battery Weight	8	Date
9	Serial No.		

1.4.3 Charging

- This battery can only be charged with the vehicle-specific charger, other chargers may cause battery damage.
- The normal charging temperature range of the battery is: 5°C ~ 40°C, please do not charge in the environment beyond the normal temperature range;
- If the battery is not fully charged in specified time, check the max. voltage of the cells of the battery, if it is higher than 3.65V, stop charging it immediately, and contact the after-sales service.
- 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.
- When charging, connect the battery to the charger; 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.
- Charging in non-charging area is prohibited;
- No modification of vehicles;
- Do not use irregular charging sockets;
- The net height of the charging area shall be higher than 5m, and the safe distance from other areas shall be greater than 5m.



WARNING

Lithium batteries are strictly prohibited from overcharging and over discharging.



CAUTION

1. *The normal charging temperature range of the battery is: 5°C~40°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.*

➤ Charging procedure:

- Move the truck close to the charger, turn off the key switch;
- Before charging, make sure the voltage of the battery matches that of the charger;
- Connect the charger and the battery;
- Check whether the data displayed on the indicators of charger and battery is normal or not;

1.5 Storage

- Try to ensure that the battery or battery pack's power is $\geq 50\%$ before long-term storage as the battery has the function of self-discharge, be sure to charge the battery once every 2 months to ensure the battery power is $\geq 50\%$;
- The battery should be stored in a temperature environment of $0^{\circ}\text{C}\sim 40^{\circ}\text{C}$;
- The battery in a dry, ventilated and cool environment, avoid direct sunlight, high temperature, high humidity, corrosive gas, severe vibration, etc.
- DO NOT stack, stacking of the batteries is not allowed.
- Disconnect the batteries from other electrical items before storage, it is prohibited to have any form of discharge behavior during storing;
- 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.
- 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.



WARNING

1. Dispose of used batteries in time;
2. Do not store used batteries for a long time.
3. No load bearing, squeezing and contact stacking when storing batteries;
4. Do not place batteries near cargo warehouses or near flammable and explosive dangerous goods.


1.6 Transportation

Before transporting any lithium-ion battery, check the current regulations on the transport of dangerous goods. Comply with these when preparing the packaging and transport. Train authorised staff to dispatch lithium-ion batteries.



NOTE

Recharge the lithium-ion battery before transporting it taking account of the transport mode (boat, road). Excessive discharge on arrival could damage the performance of the battery.

For UN3480	Lithium-ion Batteries	 <p>Fig0000-000800M</p>
For UN3481	Lithium-ion Batteries packed with Equipment or Lithium batteries built into Equipment	

➤ Shipping faulty batteries

To transport these faulty lithium-ion batteries, contact the manufacturer's customer service department. Faulty lithium-ion batteries must not be transported independently.

i NOTE

It is recommended that the original packaging is kept for any subsequent dispatch.

A lithium-ion battery is a special product.

Special precautions should be taken when:

- *Transporting a truck equipped with a lithium-ion battery*
- *Transporting only the lithium battery*

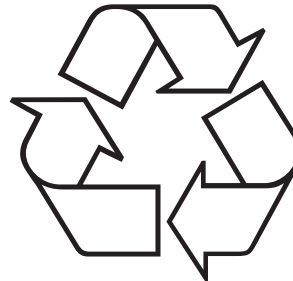
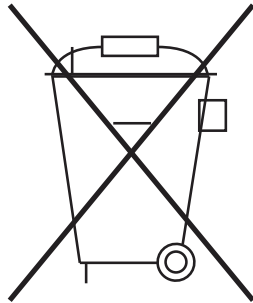
A class 9 danger label must be affixed to the packaging for transport.

It is different if the battery is transported on its own or in a truck. An example of a label appears in this supplement. Refer to the latest current regulations before dispatch as the information might have changed since this supplement was written.

Special documents must be sent with the battery. Refer to the applicable standards or regulations.

1.7 Instructions for disposal

- Lithium ion batteries must be disposed of in accordance with the relevant environmental protection regulations.
- Used cells and batteries are recyclable economic goods. In accordance with the mark showing a crossed rubbish bin, these batteries may not be disposed of as domestic waste. Return and / or recycling must be ensured as required by the Batteries Legislation.
- The method of battery recovery and reuse can be discussed with our company. We reserve the right to change the technology.



➤ The requirements of recycling

1. Only authorized EP dealers who have attended the after sales training, are authorized to do repairs on EP batteries;
2. All Li-ion battery should be placed in safe place according to the EP Li-ion battery Manual;
3. The transport of Li-ion battery must meet local regulation, EP will supply UN38.3 and MSDS files according with UN and ADR regulation;
4. The package of Li-ion battery before delivery must meet the UN 3480 or local carrier regulation.



WARNING

Don't bump, handle gently.

Used cells and batteries are recyclable economic goods. In accordance with the mark showing a crossed rubbish bin, these batteries may not be disposed of as domestic waste. Return and / or recycling must be ensured as required by the Batteries Act (Act regarding the commissioning, return and environmentally responsible disposal of batteries and accumulators). For battery disposal please contact the manufacturer's customer service department.

1.8 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 your dealer or after-sales service department of the company to obtain professional technical support.

- If the battery is found to have abnormal me-chemical characteristics such as swelling,cracked casing, melted casing deformation,and distortion of the casing before and dur-ing installation, stop using the battery imme-diatly and store it separately;
- If abnormalities such as looseness, 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;
- 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;
- If the temperature of the battery exceeds65°C before and during installation, stop us-ing the battery immediately and leave itseparately, if the temperature continues torise, it needs to be buried with sand;
- If there is fire or smoke happens to the battery, move it to the open air immediately, evacuate people in time,and contact a recycling company to recycle the batteries.

1.9.Service

Daily Maintenance

No.	Maintenance content	Method of operation	Note	Frequency
1	Check if battery capacity is too low	Check instrumentation SOC display	Make sure the battery is not stored without charge for a long time. If the battery system needs to be put on hold for a long time, it is best to keep the battery in half power state and charge the battery every 3 months to ensure that the battery system is in half power state.	Everyday
2	The battery pack charge and discharge current	Check instrumentation display	make sure battery pack charge and discharge current meet with operation manual	Everyday
3	Connector pins at the bottom of the battery(if necessary)	Perform a visual inspection	If any ablation or deformation occurs in daily inspection, the battery connector pins should be replaced in time.	Everyday
4	Check whether the appearance is deformed, whether the surface is oxidized, paint removing, the mounting position is offset, and the cabinet is damaged;	Perform a visual inspection	check the reason for analysis and give it a fix	Everyday
5	Check the entire battery as well as the surface beneath it for signs of fluid leakage.	Perform a visual inspection	check the reason for analysis and give it a fix	Everyday
6	Clean the lithium battery and charger with a dry cloth or compressed air.	Perform a visual inspection, Wear insulated gloves and shake it gently	Make sure it tight	weekly

No.	Maintenance content	Method of operation	Note	Frequency
7	Whether the external wiring harness has worn, imprint, creases and exposed line core	Perform a visual inspection	Make the wiring harness fixed well	weekly
8	Check that the surface of lithium-ion battery looks clean	No dust, no water, no corrosion, oxidation, rust, etc.	Clean surface if you found dust, corrosion, oxidation, rust by using dustless cloth or air compressor ,water battery is strictly prohibited to use	weekly
9	Check that the outside screws of the battery are fastened	Torque wrench correction requires no loosening	Reinforce screws	weekly
10	Check for water or foreign matter in the plug and socket and check for rust or charring(if necessary)	Perform a visual inspection	check the reason for analysis and give it a fix	Monthly
11	Check the cable for damage and loose joints(if necessary)	Perform a visual inspection	check the reason for analysis and give it a fix	Monthly
12	Check the battery case for abnormalities such as cracks, deformation, and bulging.	Perform a visual inspection	check the reason for analysis and give it a fix	Monthly



NOTE

The EP instrumentation is used for serviced.

➤ **Cleaning**

The manufacturer recommends to only use compressed air at less than 207 kPa (30 psi) or a slightly damp towel to clean the battery. The battery, or its charging station, may be equipped with fans, heat sinks, or other cooling devices that require periodic cleaning. Always know and follow the battery manufacturer's recommendations for cleaning and service.

➤ **Optimize Battery Life**

Always use and follow the battery management system (BMS). The BMS is the electronic system that monitors battery data and use that data to its operating environment to influence the battery's safety, performance, and service life. It also functions as a safety cut-off device in case of overcharging, overcurrent, or overheating. Lithium-ion battery life is greatly reduced if used outside a temperature range of 0°C to 40°C (32°F to 104°F) or in an environment with greater than 85% humidity. EP recommends to opportunity charge lithium-ion batteries. This is when the battery is recharged for short intervals during a shift period. It reduces or eliminates the need for long charging periods, changing batteries during a shift, and extending shift periods.