Let's grow together

Operation Manual

CQD20L

Original Instruction

Part No.508000004679
V1 02/2021

EP EQUIPMENT CO.,LTD. is one of the world's leading companies manufacture, design material handling equipment and provide related service. With over 100,000m^2 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 forklift 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".

EP EQUIPMENT CO., LTD
Address: No.1 Xiaquan Village, Lingfeng Street, Anji ,Huzhou ,Zhejiang, China
Tel: + 86-0571-28023920
Fax: + 86-0571-28035616
Website: www.ep-ep.com
Email: service@ep-ep.com

Foreword

Thanks for purchasing our reach trucks.

The present original operating instructions are designed to provide sufficient instruction for the safe operation and maintenance of the truck. Please be sure to read this operator manual carefully if you are operator or are in charge of the truck,before you operate and service the truck. Only in this way can you protect yourself and make the truck play a role as much as possible.

Our trucks are subject to ongoing development, so maybe there are some differences between your product and the description in this manual. And the operator manual details will be different because of customer's special requirements.

If you have any questions ,please keep in touch with the sales department of E-P Equipment or let the dealer know.

Notes:

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

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

OM3318 02.21

WARNING!

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

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

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

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

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

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

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

5. Do not use open flame to check lever, or for leakage of electrolyte and fluids or oil. Do not use open pans of fuel or flammable cleaning fluids for cleaning parts.

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

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

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

9. All hydraulic systems shall be regularly inspected and maintained in conformance with good practice. Cylinders, valves and other similar parts shall be checked to

assure that "drift" has not developed to the extent that it would create a hazard.

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

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

Catalog

Correct use and Application

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

Proprietor responsibilities

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

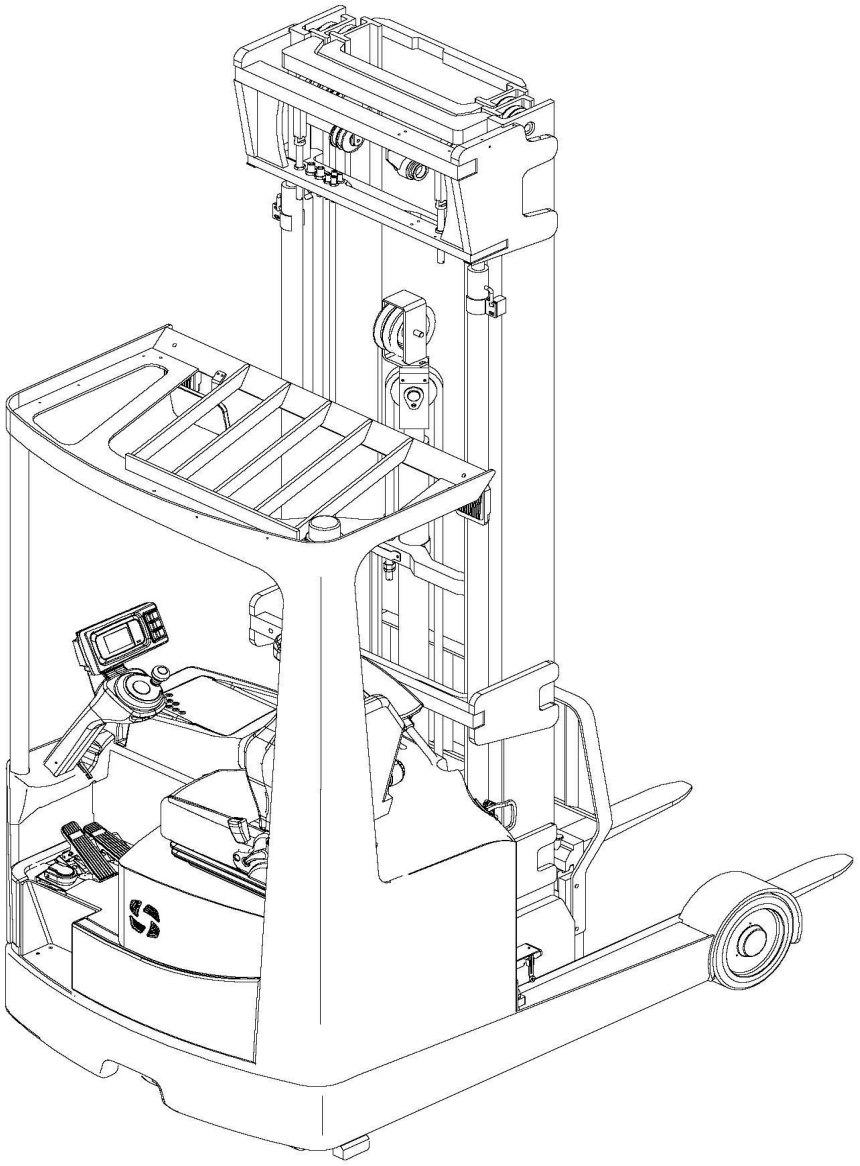
Adding accessories

The mounting or installation of additional equipment which affects or enhances the performance of the truck requires the written permission of the manufacturer. Local authority approval may also need to be obtained.
Local authority approval does not however constitute the manufacturer’s approval.

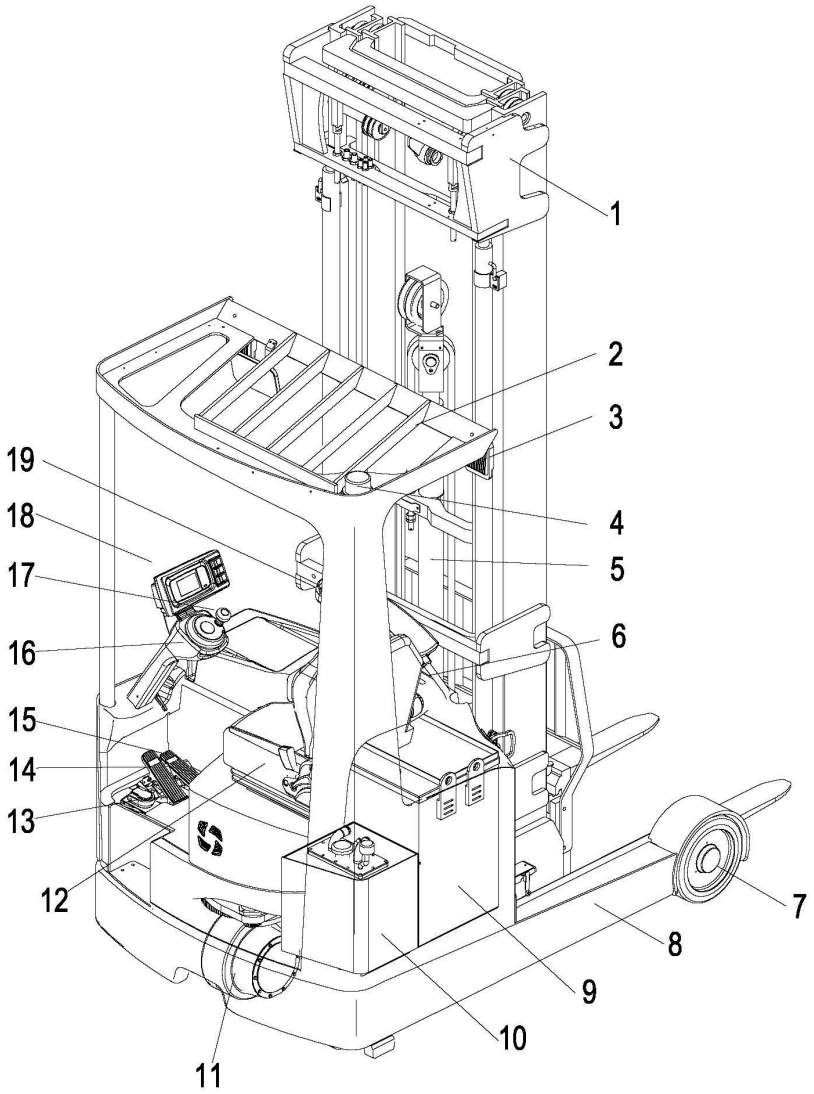
1. Truck Description

1.1Application

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 capacity can be obtained from the data plate.
Applicable environment temperature: -10 °C - 40 °C
The truck may only be operated in cold stores temporarily. If the truck remains too long in a cold store,we recommend cold store equipment for the truck.



1.2 Truck Assemblies



Item	Component	Item	Component
1	Mast	11	Drive wheel
2	Overhead guard	12	Driver's seat
3	Front lamp	13	Safe pedal
4	Warning lamp	14	Brake pedal
5	lift cylinder	15	Accelerator pedal
6	Controller	16	Steering arm
7	Load wheel	17	Steering wheel
8	Outriggers	18	Meter
9	Battery	19	Control arm
10	Tank		

Safety mechanisms: An enclosed truck geometry with rounded edges ensures safe handling of the truck. The driver is protected by the overhead guard (2). Pressing the Emergency brake switch disconnects all electrical functions in hazardous situations.The drive wheel (9) and the load wheels (5) are protected by a solid skirt.
Line brake safety devices in the lift cylinders limit the load lowering speed in the event of a hydraulic system failure.

Drive: The entire drive unit is enclosed in the truck chassis.
The electronic traction controller ensures the smooth rotation of the drive motor and as a result smooth driving, powerful acceleration.

Brake system: The braking system consists of 1. Loose accelerator 2. Push on brake pedal 3. Loose running switch 4.5. Parking brake (relying on the electromagnetic brake to pressurize) is composed of five independent braking systems.The motor reverses braking when the brake pedal is pressed down.Release the running switch to realize roll stop braking

Steering system: Extremely smooth steering with three phase drive system.The steering wheel is integrated in the control panel. The position of the steered drive wheel is shown in the control panel display unit.

Operator position: The driver’s position is ergonomically designed with ample legroom. The driver's seat and steering arm can be adjusted to suit the driver.

Controls and Displays： The functions are activated via ergonomic thumb movement to ensure fatigue-free operation without stressing the wrists; sensitive application of travel and hydraulic movements to spare and position the goods precisely.Driver's display unit for all important driver information such as steering wheel position,overall lift, truck status reports (e.g. faults), battery capacity and time etc..

Hydraulic system ： All hydraulic operations are controlled by a sturdy,

maintenance-free AC motor with no wear parts and with a flanged low emission gear pump.Oil is distributed via magnetic switch valves.

Electrical system: Highly efficient three phase technology with energy retention for the drive and lift motors provides high travel and lift speeds and better use of energy.

Mast support: The mast support is mounted on support rollers. A single telescopic reach cylinder extends and retracts the support.

For controls options see chapter three.

1.3 Standard Version Specifications

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

1.3.1 Performance data for standard trucks

	Description		CQD20L
	Drive unit		lithium-ion battery
	Operator type		Seated
Q	Load capacity	kg	2000
c	Load center	mm	600
	Travel speed, laden/ unladen	km/h	10/11
	Lifting speed, laden/ unladen	m/s	0.45/0.52
	Lowering speed, laden/ unladen	m/s	0.45/0.38
	Reach speed, laden/ unladen	m/s	0.2/0.2
	Max. Grade ability, laden /unladen	%	10/15
	Service weight （include battery）	kg	See form 1
	Axle loading, fork advanced, unladen driving side/loading side	kg	1670
	Axle loading, fork retracted, unladen driving side/loading side	kg	2300
	Axle loading, fork advanced, laden driving side/loading side	kg	560
	Axle loading, fork retracted, laden driving side/loading side	kg	1960
	Drive motor rating S2 60 min.	kw	7
	Lift motor rating at S3 15%	kw	20
	Tyre type driving wheels/loading wheels		PU
	Type of drive unit		AC
	Steering type		Electronic
	Park brake type		Electromagnetic
	Battery voltage/nominal capacity K5	V/ Ah	48V/360AH、48V/560AH
	Sound pressure level at the driver’s ear	dB(A)	75

1.3.2 Dimensions

Item	Description		
y	Wheelbase	1515	mm
b_{11}	Track width, Load end	1148	mm
α/β	Mast/fork carriage tilt, forward/backward	2 / 4	°
l_1	Overall length	2463	mm
b_1 /b_2	Overall width	1260/1270	mm
h_1	Height, mast lowered	See form 2	mm
h_2	Free lifting height	See form 2	mm
h_3	Lifting height	See form 2	mm
h_4	Height, mast raised	See form 2	mm
h_6	Height over overhead guard (cab)	2213	mm
h_7	Seat height	1074	mm
h_8	Height of wheel arms	330	mm
l_2	Length to face of forks	1393	mm
l_4	Reach distance	585	mm
l_7	Length across wheel arms （exclusive	1948	mm
b_3	Fork carriage width	990	mm
b_4	Distance between wheel arms/loading	915	mm
b_5	Distance between fork-arms	220/770	mm
s/ e/ l	Fork dimensions	40×120×1070	mm
m_1	Ground clearance, laden, below mast	69	mm
m_2	Ground clearance, center of wheelbase	73.5	mm
Wa	Turning radius	1770	mm
Ast	Aisle width for pallets 1000 × 1200	2835	mm
Ast	Aisle width for pallets 800 × 1200	2885	mm
	Tyre size, driving wheels	Φ343×140	mm
	Tyre size, loading wheels （diameter×width）	Φ310×118	mm
	Tyre size, caster wheels （diameter×width）	Φ102×51	mm
	Wheels, number driving，caster/loading	1x，2	

Form 1

NO.	Mast Type	Lift height(mm)	Weight (with battery) (kg)
1	2-stage	2700	2847
2		3000	2872
3		3300	2896
4		3640	2924
5		4000	2953
6		4300	2977
7		4520	3005
8		5000	3044
9		5480	3086
10		6000	3143
11	3-stage	4050	3138
12		4500	3180
13		5000	3223
14		5500	3271
15		6000	3320
16		6500	3363
17		7000	3479
18		7500	3510
19		8000	3569
20		8500	3629
21		9000	3688
22		9500	3736
23		10000	3850
24		10500	3898
25		11000	3944
26		11500	3991
27		12000	4037

Form 2

CQD20L **2-stage lifting height：**

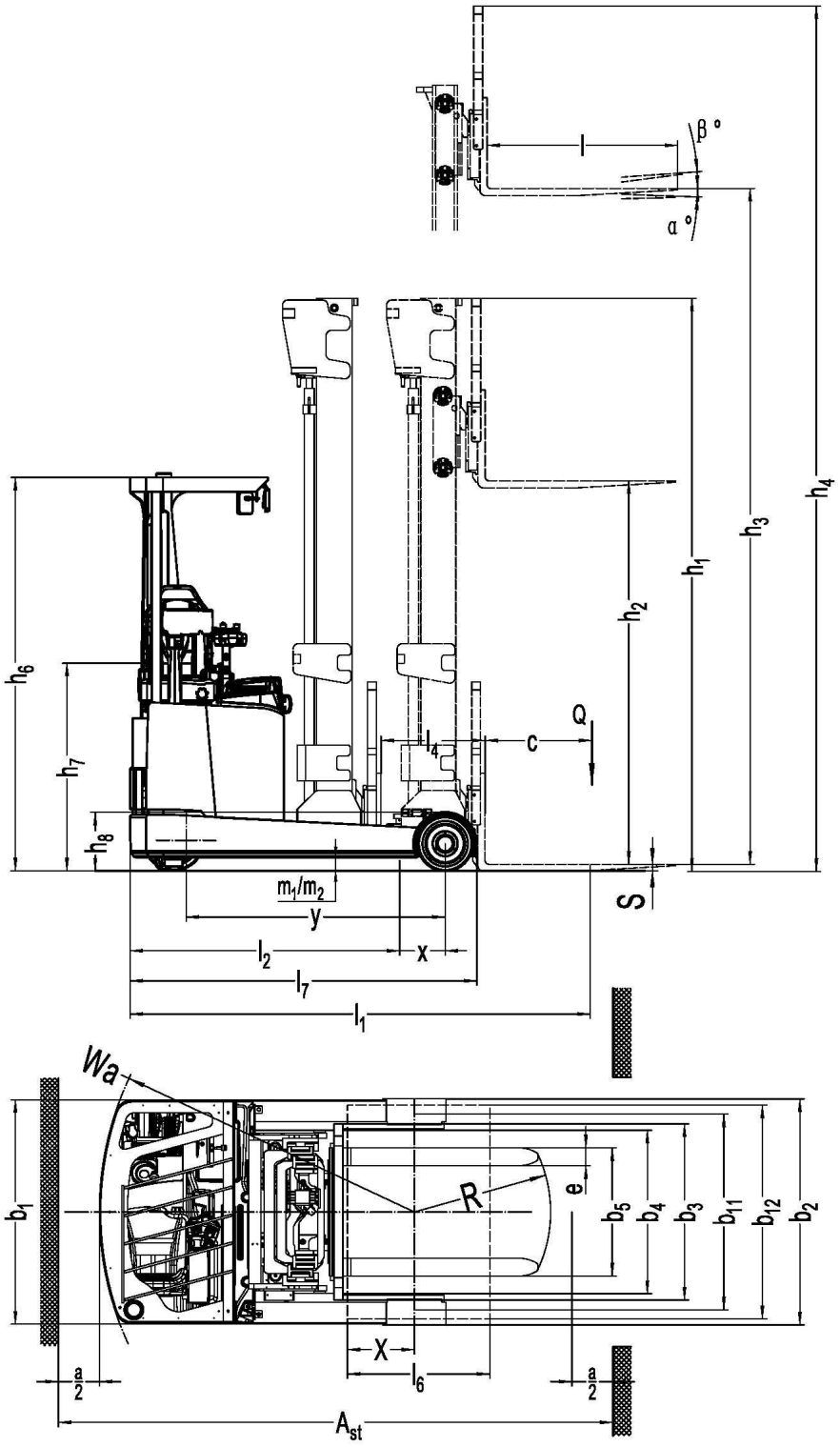
h3	h1	h2	h4	h4(*)
2700	1980	120	3765	3280
3000	2130	120	4065	3580
3300	2280	120	4365	3880
3640	2450	120	4705	4220
4000	2630	120	5065	4580
4300	2780	120	5365	4880
4520	2960	160	5585	5140
5000	3200	160	6065	5620
5480	3460	160	6545	6120
6000	3720	160	7065	6640

Note：with(*)for without backrest parameters

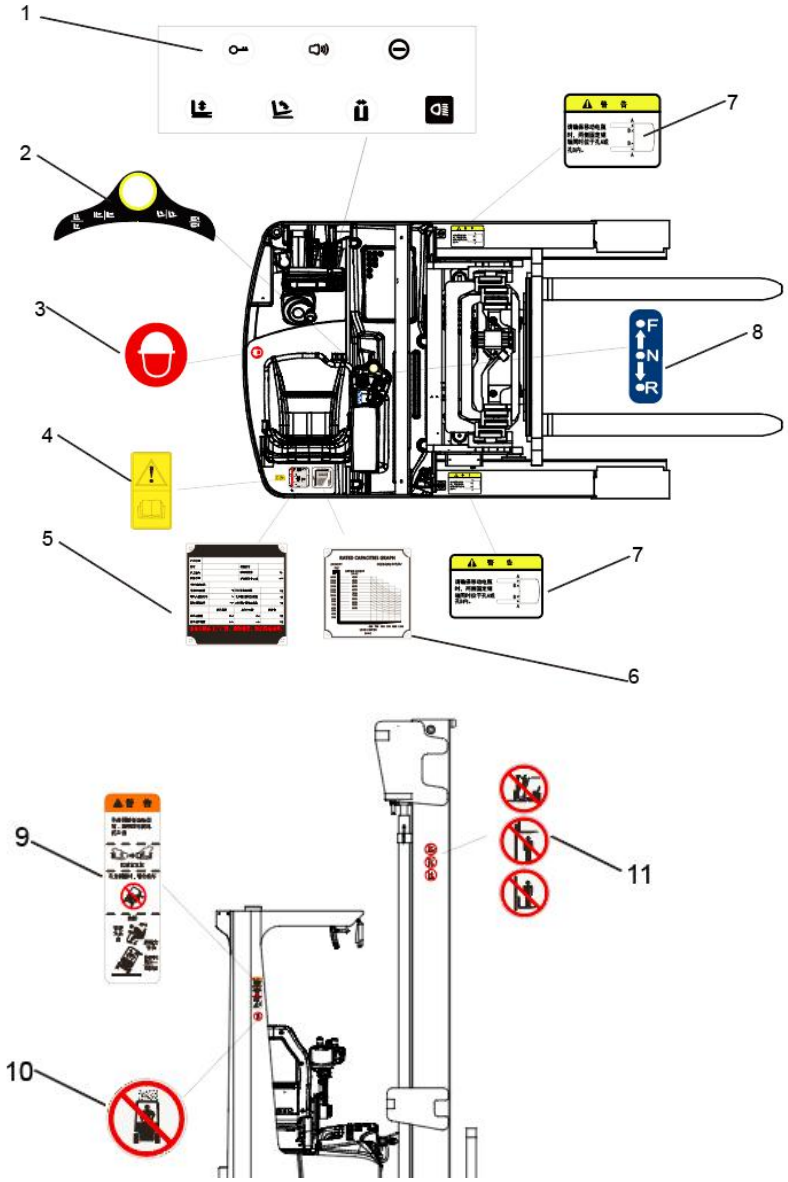
CQD20L **3-stage lifting height：**

h3	h1	h2	h2(*)	h4	h4(*)
4050	1999	522	522	5115	5113
4500	2149	672	672	5565	5563
5000	2299	772	772	6065	6063
5500	2469	952	952	6565	6563
6000	2649	1172	1172	7065	7063
6500	2799	1272	1272	7565	7563
7000	3049	1532	1532	8065	8063
7500	3219	1712	1712	8565	8563
8000	3389	1852	1852	9065	9063
8500	3609	2072	2072	9565	9563
9000	3769	2212	2212	10065	10063
9500	3939	2392	2392	10565	10563
10000	4159	2612	2612	11065	11063
10500	4329	2792	2792	11565	11563
11000	4489	2932	2932	12065	12063
11500	4659	3112	3112	12565	12563
12000	4819	3252	3252	13065	13063

Note：with(*)for without backrest parameters


β °
α °
h4
h3
h1
h2
h6
h7
h8
Q
l4
c
m1/m2
y
x
l2
l7
l1
S
Wa
b1
R
e
b5
b4
b3
b11
b12
b2
X
l6
a/2
a/2
Ast

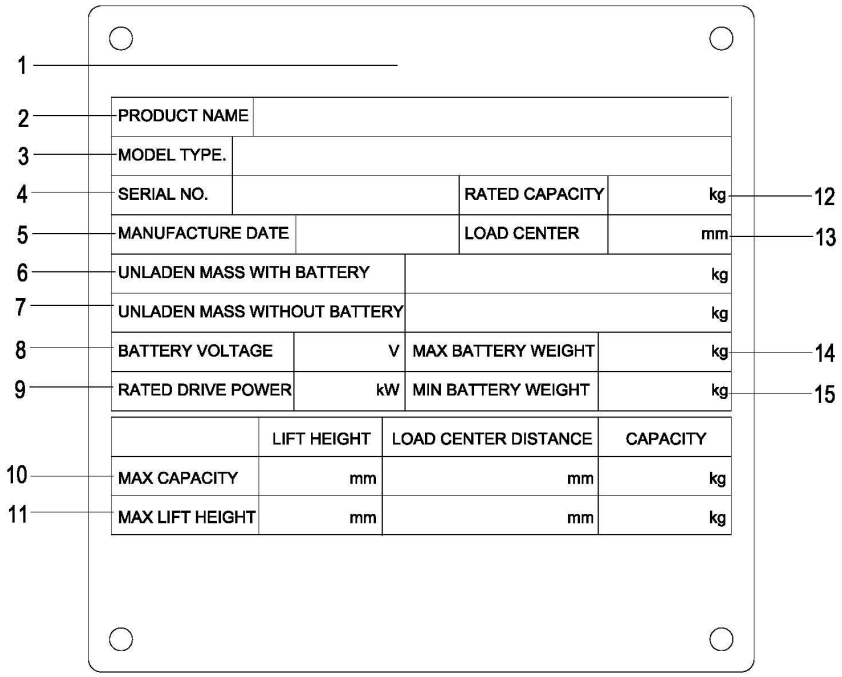
1.4 Identification points and data plates



Item	Description
1	“Never put your hands in inner and outer mast.“ warning
2	Warning decal
3	“Don't drive in rain.“ warning
4	Operator warning
5	Truck data plate
6	Operator warning decal
7	Operator decal
8	Security mark
9	Hydraulic pressure decal

10	Model decal
11	Capacity chart
12	“Never stand ” warning
13	CE decal
14	Strap points for crane lifting

1.4.1 Truck data plate

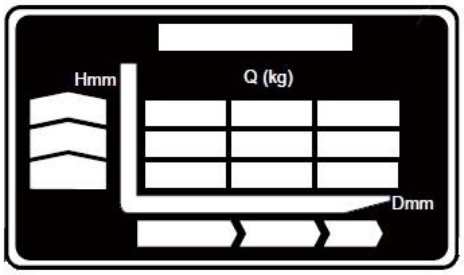


Item	Description	Item	Description
1	Manufacturer	9	Rated drive power
2	Product name	10	Max capacity
3	Model type	11	Max lift height
4	Serial NO.	12	Rated capacity
5	Manufacture date	13	Load center
6	Unladen mass with battery	14	Max battery weight
7	Unladen mass without battery	15	Min battery weight
8	Battery voltage		

For queries regarding the truck or ordering spare parts please quote the truck serial number(2).

1.4.2 Capacity chart

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



2. Commissioning

2.1 Using the truck for the First Time

Only operate the truck with battery current.
Preparing the truck for operation after delivery or transport.
Procedure

- Check the equipment is complete.
- Check the hydraulic oil level.
- Install the battery if necessary (where required), (see "4.5 Battery removal and installation") do not damage battery cable.
- Fully charge the battery, (see "4.4 Charging the battery").

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

2.2 During brake-in

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

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

3.Operation

3.1 Safety Regulations for the Operation of trucks

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

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

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

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

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

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

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

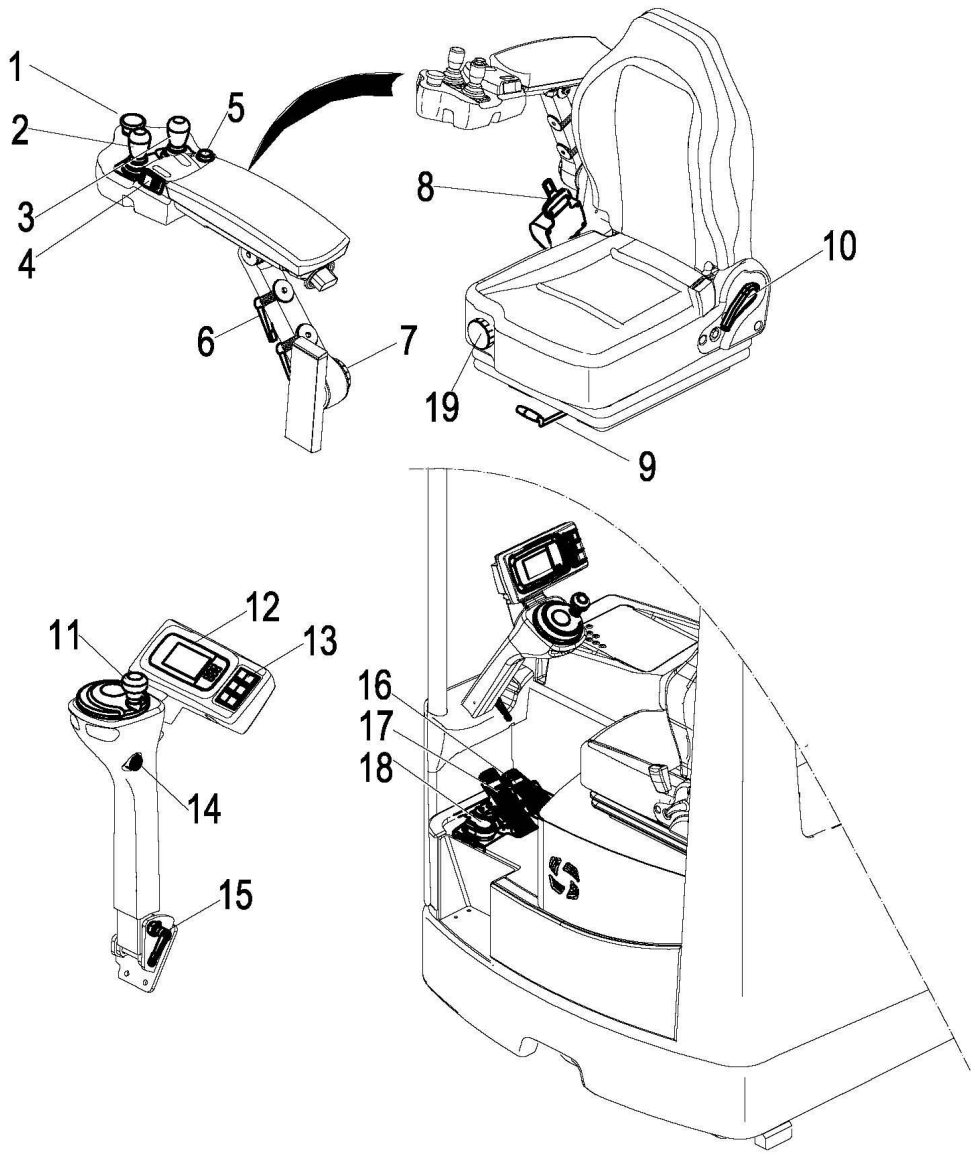
Safety Devices and Warning Signs: Safety devices, warning signs and warning instructions shall be strictly observed.

Conditions for application: Ambient temperature:during operation:-10 ℃ to 40 ℃

The truck must be specially equipped and approved for continuous use in environments with temperatures below 0°C or in cold stores respectively with extreme temperatures or humidity changes.

3.2 Controls and Displays

3.2.1 Control panel controls and displays



Item	Control / Display	Function
1	Emergency brake switch	Disconnects the supply current, deactivates all electrical functions, causing the truck to brake automatically.
2	Hydraulic control handle	Function operation: • Load handler lift/lower • Mast support extend / retract
3	Hydraulic control handle	Function operation: • Fork forward or backward tilt • Side shift left / right
4	Travel switch	Select the required driving direction.
5	"Horn" button	Activates the horn.
6	Operation armrest L/R adjustment	Operation armrest left and right adjustment handle
7	Operation armrest lifting/lowering adjustment	Operation armrest lifting/lowering adjustment handle
8	Driver’s seat lock	The driver’s seat can be horizontally adjusted.
9	Level adjustment seat	Adjust the driver's seat horizontally front and rear
10	Backrest adjustment	The backrest on the driver’s seat can be adjusted.
11	Steering wheel	Steers the truck in the required direction.
12	Display unit	Operating information and warning message display.
13	Button	Function control buttons.
14	Key switch	Switches control current on and off. Removing the key prevents the truck from being switched on by unauthorised personnel.
15	Steering-wheel arm adjustment	Steering-wheel arm adjustment handle
16	Accelerator pedal	Provides infinite control of travel speed.
17	Brake pedal	Brakes the truck.
18	Safe pedal	• Not applied: Travel inhibited, truck decelerates. • Applied: Travel released.
19	Weight adjustment - driver's seat	Adjusts driver’s weight for optimal seat cushioning

3.2.2 Display unit controls and displays

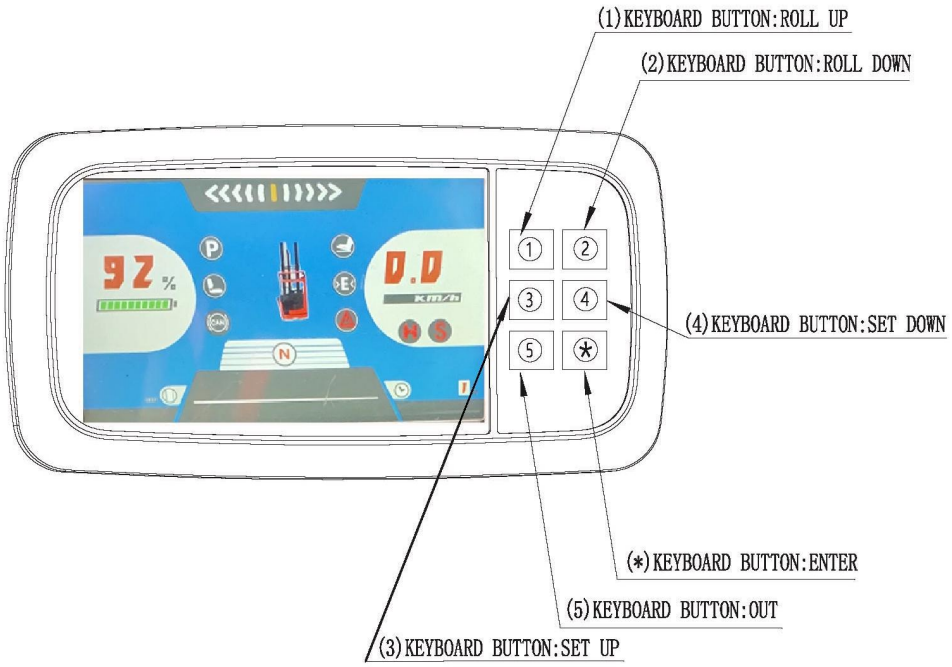


Fig0000-00250OM

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) :

Red **Yellow** **Green** Fig0000-00251OM

Steering Angle indication

Fig0000-00253OM

Running time display

Fig0000-00257OM

Fork height display

Fig0000-00254OM

Accelerator output

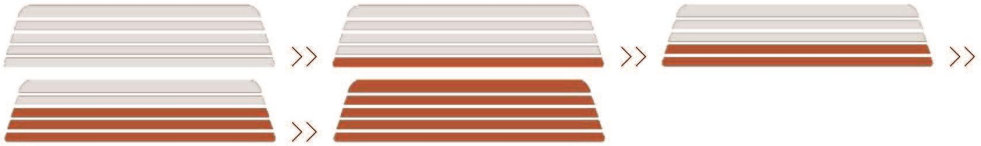


Fig0000-00258OM

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

Fig0000-00261OM

Proportional lift indication

Fig0000-0029501M

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

 Fig0000-0027901M	 Fig0000-0028301M	 Fig0000-0028101M	 Fig0000-0028201M
Gray: no output	Green: low output	Orange: medium output	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]

Fig0000-0027301M

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:

 Fig0000-0028501M	Do not lifting	 Fig0000-0028901M	Do not lift and slow down 1
 Fig0000-0027001M	Do not lift and slow down 2	 Fig0000-0027101M	Disconnect the truck contactor

Drivability Settings

	**Low Speed mode**		**Medium speed mode**		**High speed mode**
	**Slow acceleration rate**		**Adding rate**		**Fast acceleration rat**

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 rat1: 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

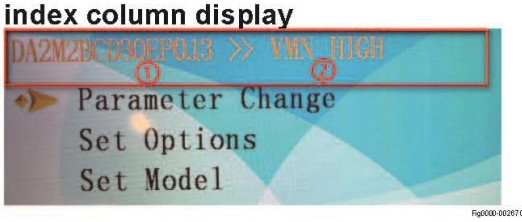
Key Beep

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

No failure, menu index display
When the controller is trouble-free, enter the corresponding controller node and the top index column will be displayed

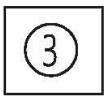
1. Current controller node
2. Current entry menu

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

3.3 Run the truck

3.3.1 Checking and Preparing

Checks and operations to be performed before starting daily work

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

• Visually inspect the battery attachment and cable connections.

• Check the load handler for visible damage such as cracks, bent or severely worn load forks.

• Test the warning device.

• Make sure the load chains are evenly tensioned.

• Check whether the normal function of all safety devices.

Warning!

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

3.3.2 Adjusting the driver's seat

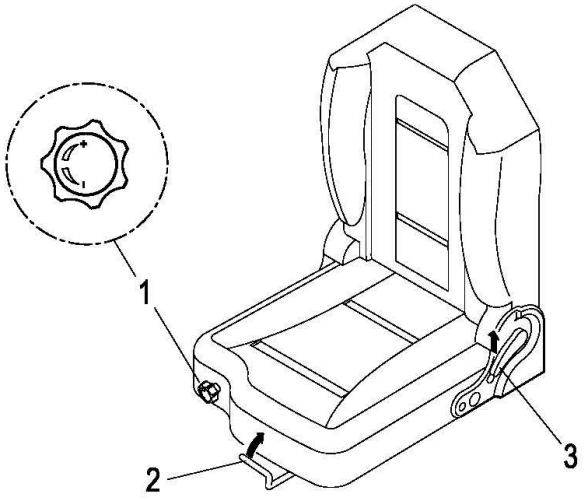
To avoid risk to health and property, check and adjust the individual driver's seat setting before starting up the truck. The driver's seat must be occupied in order to adjust to the driver's weight.

1. Adjusting the driver's weight

Rotary switch (1) as far as it will go in the arrow direction.

• Clockwise rotation for setting the seat to a higher weight.

• Counterclockwise rotation for setting the seat to a lower weight.



2. Adjusting the seat position

• Pull up the locking lever (2) of the driver's seat lock in the direction of the arrow and push the seat forwards or backwards to the desired position.

• Engage locking lever 2) in position again.

3. Adjusting the backrest

• Lift up the locking lever (3) and adjust the incline of the backrest.

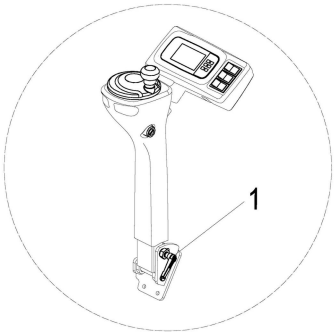
• Release locking lever (3) to lock the

Warning!

The seat setting must not be changed during travel.

backrest in position.

3.3.3 Adjusting the steering wheel



• Adjust the control pane (1) vertically and horizontally to the required position.

.

3.3.4 To prepare the truck for operation

• Insert the key in the key switch and turn it to the “ON” position .
• Pull up the emergency brake switch .
• Test horn.
• Check the operation of the brake.

3.4 Industrial Truck Operation

3.4.1 Safety regulations for truck operation

Travel routes and work areas: Only use lanes and routes specifically designated for truck traffic. Unauthorised third parties must stay away from work areas. Loads must only be stored in places specially designated for this purpose.

Driving conduct: The driver must adapt the travel speed to local conditions. The truck must be driven at slow speed when negotiating bends or narrow passageways, when passing through swing doors and at blind spots. The driver must always observe an adequate braking distance between the forklift truck and the vehicle in front and must be in control of the truck at all times. Abrupt stopping (except in emergencies), rapid U turns and overtaking at dangerous or blind spots are not permitted. It is forbidden to lean out of or reach beyond the working and operating area.

Travel visibility: The driver must look in the direction of travel and must always have a clear view of the route ahead. Loads that affect visibility must be positioned at the rear of the truck. If this is not possible, a second person must walk in front of the truck as a lookout.

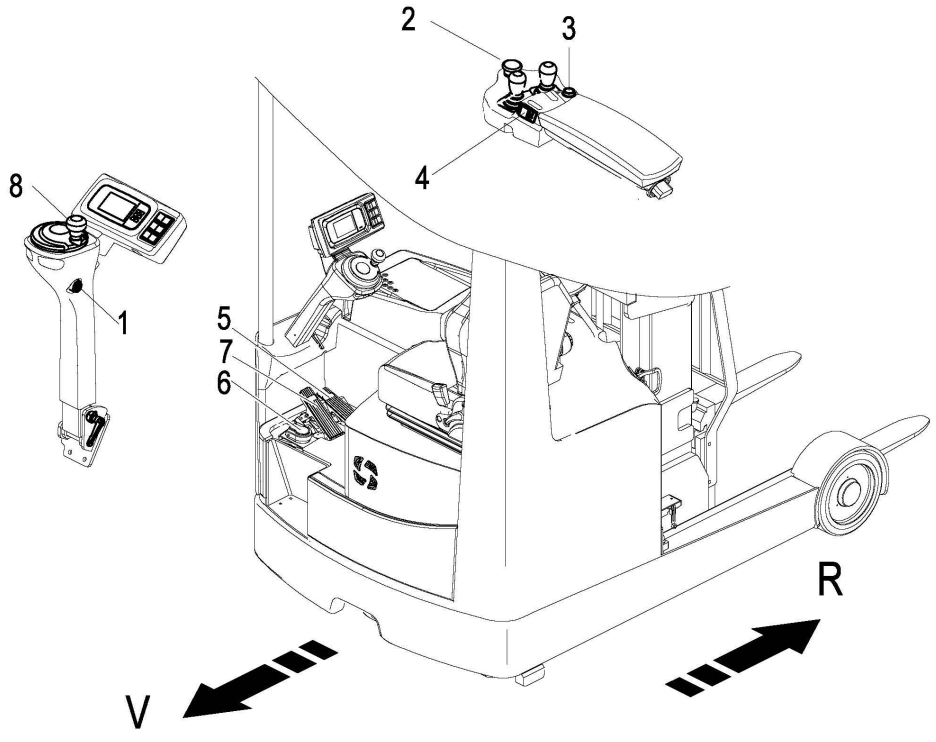
Negotiating slopes and inclines: Negotiating slopes or inclines is only permitted if such roads are clean and have a non-slip surface and providing such journeys are safely undertaken in accordance with the technical specifications for the truck in question. The truck must always be driven with the load unit facing uphill. The industrial truck must not be turned, operated at an angle or parked on inclines or slopes. Inclines must only be negotiated at slow speed, with the driver ready to brake at any moment.

Negotiating lifts and docks: Lifts and docks must only be used if they have sufficient capacity, are suitable for driving on and authorised for truck traffic by the owner. The driver must satisfy himself of the above before entering these areas. The truck must enter lifts with the load in front and must take up a position which does not allow it to come into contact with the walls of the lift shaft.
Persons riding in the lift with the forklift truck must only enter the lift after the truck has come to a rest and must leave the lift before the truck.

Nature of loads to be carried: The operator must make sure that the load is in a satisfactory condition. Only carry loads that are positioned safely and carefully. Use suitable precautions, e.g. a load guard, to prevent parts of the load from tipping or falling down.

3.4.2 Travel, Steering, Braking

Do not drive the truck unless the panels are closed and properly locked.
When you start up the truck the safe pedal must be applied.



1.Driving

• Insert the key in the key switch and turn it to the “ON” position .
• Pull up the emergency brake switch .
• Use the travel switch (1) to select the required driving direction.
Forward = the drive direction (V), the main travel direction.
Back = the load direction (R) .
• apply the safe pedal (6).
• The travel speed is governed by the accelerator (5).
• Use steering wheel (8) to steer the truck in the required direction.

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 shunting and lifting or depositing a load.

2.Steering

Use steering wheel (8) to steer the truck in the required direction.The drive wheel position is indicated in the driver’s display.

3.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 coasting brake
- with the emergency brake
- with the service 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

Not apply the safe pedal (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 brake switch（2）.
The truck brakes until it comes to a halt.

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

• With the service brake

Depress the brake pedal (7) the full stroke.
The truck brakes with the electric load wheel brakes.

3.4.3 Lifting and depositing loads

Before raising a load, the driver must ensure that it is correctly palletised and that the capacity of the truck is not exceeded.

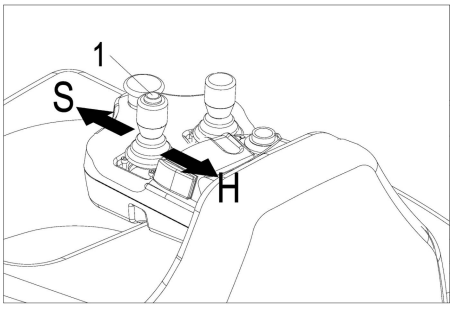
- Insert the forks as far as possible underneath the load.

1.Lifting - Lowering

Do not reach into the mast. Do not allow anyone to stand underneath a raised load.

Lifting

Pull the control switch (1) towards direction (H) until you reach the desired lift height.



Lowering

Pull the control switch (1) towards direction (S) until you reach the desired height.

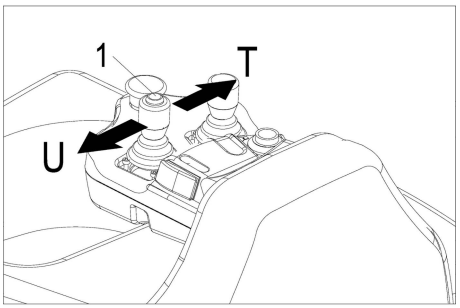
The lowering speed is determined by the inclination of the control switch/lever.

2.Extending - Retracting

Do not reach between the mast and the battery cover.

Extending

Move the control switch/lever (1) in direction (T) to extend the mast support forward.



Retracting

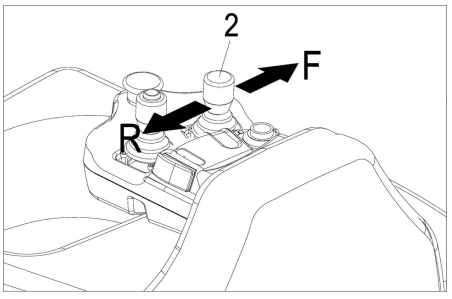
Move the control switch/lever (1) in direction (U) to retract the mast support backward.

3.Forward - Backward Tilting

Do not reach between the mast and the battery cover.

Tilting Forward

To tilt forward, push the control switch/lever (2) in direction (V).

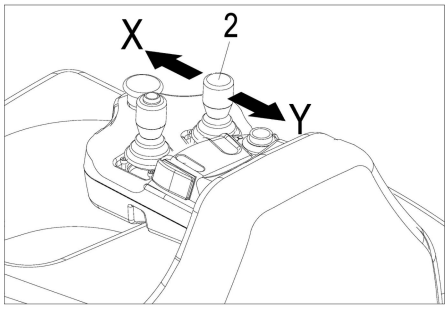


Tilting Backward

To tilt backward, push the control switch/lever (2) in direction (R).

4.Left - Right Sideshift

The references to left and right are based on the load handler as viewed from the operator's position.



Sideshift Left

Push the control switch/lever (2) in direction (X).

Sideshift Right

Push the control switch/lever (2) in direction (Y).

3.5 Parking the truck securely

When you leave the truck it must be securely parked even if you only intend to leave it for a short time.

• Lower the load completely and position it horizontally.
• Retract the mast support fully.
• Set the emergency brake switch (2) "OFF".（see3.4.2）
• Turn off the key switch and remove the key(1).（see3.4.2）

Warning!
Do not park the truck on a slope. The load must always be lowered to the ground.

4.Battery Maintenance & Charging

4.1 Safety regulations for handling acid batteries

Park the truck securely before carrying out any work on the batteries.

Maintenance personnel : Batteries may only be charged, serviced or replaced by trained personnel .The present operator manual and the manufacturer 's instructions concerning batteries and charging stations must be observed when carrying out the work.

Fire protection :

• Smoking and naked flames must be avoided when working with batteries.
• Wherever a truck is parked for charging there shall be no inflammable material or

operating fluids capable of creating sparks within 2 metres around the truck.
• The area must be well ventilated.
• Fire protection equipment must be provided.

Battery Disposal: Batteries may only be disposed of in accordance with national environmental protection regulations or disposal laws. The manufacturer's disposal instructions must be followed.

Warning!
The weight and dimensions of the battery have considerable affect on the operational safety of the truck. Battery equipment may only be replaced with the agreement of the manufacturer.

4.2 Battery type & dimension

Battery type & dimension as follow form :

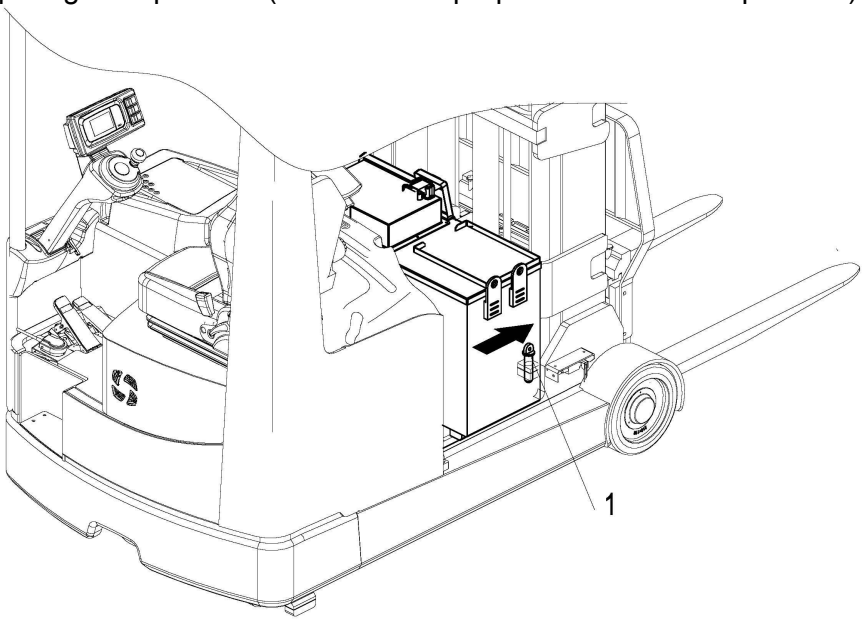
Form 4.1

Type	CQD20L	
voltage/ rated capacity （V/Ah）	48/360	48/560
Battery weight (kg))	350	350

When replacing or installing batteries, ensure that the battery is correctly secured in the battery compartment of the truck.

4.3 Exposing the battery

• Preparing for Operation (See 3.3.4 To prepare the truck for operation).



As shown in the figure above, first plug the left and right sides of the battery (1) and hang it on the pin hole of the connecting plate between the battery and the door frame.

• See 3.4.3, Operate handle (2) to move the door frame forward until the battery is exposed.

• Turn off the snap stop switch and switch lock.

Warning!

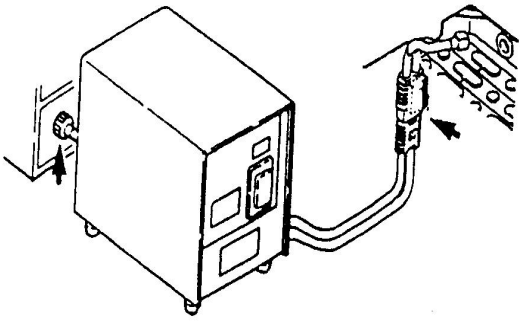
When exposing the battery, the battery latch must be hung right and left at the same time before moving the door frame forward.

Before putting the forklift back into operation, the battery must be returned to its original position and the battery latch can be removed after the battery is moved in place.

4.4 Charging the battery

• Expose the battery(See 4.3 Expose the battery).

Safety regulations for Charging



• Please charge in the well-ventilated and appointed site.

• Mark 'no smoking' on charging.

• ahead of charging，please examine wire and pin whether good or not. When wire and pin are damaged，please do not charge.

• When charging, the tops of the battery cells must be exposed to provide sufficient ventilation.

• In charging，electrical source switch or battery pin are not close，or，which destroys pin and electrical units as a rule， first press the stopping button on the charger，then unfix the pin.

•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.

It is essential to follow the safety regulations of the battery and charging station manufacturers.

Warning！

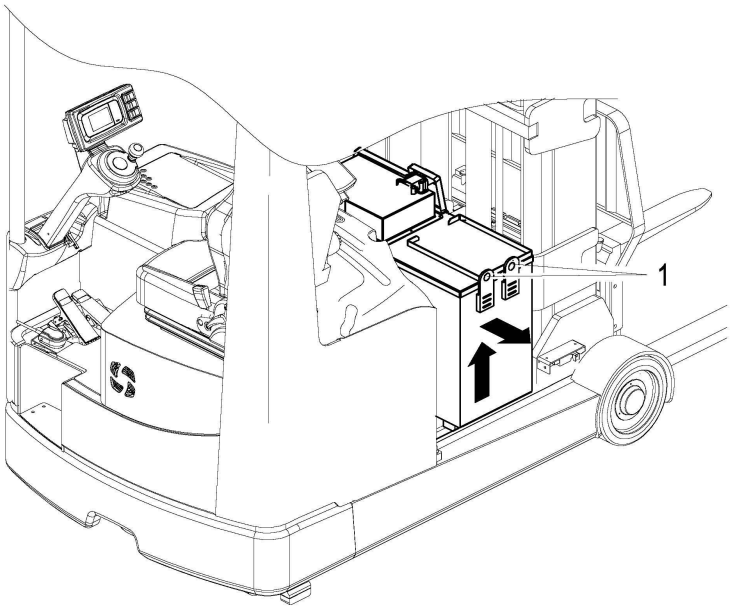
Maximum input power is 18.5KW .

Please strictly implement the above data to prevent equipment damage and accidental risks such as fire.

4.5 Battery removal and installation

• Expose the battery(See 4.3 Expose the battery).

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.



• 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.

4.6 Battery maintenance

Do not overuse battery:
• If you use up the energy of battery till the forklift immovability, you will shorten its working hours.
• Shower for battery appears need for charge，please charge it quickly.

Battery maintenance:
The battery cell covers must be kept dry and clean. The terminals and cable shoes must be clean, secure and have a light coating of dielectric grease.Batteries with non insulated terminals must be covered with a non slip insulation mat.

Warning!

1. Do not use dry cloth or fibre cloth to clean the battery，avoiding static to bring the explosion.
2. Unfixing battery plug.
3. Cleaning with wet cloth.
4. Wearing glasses for protecting eyes rubber overshoes and rubber glove.

Battery storage：

If batteries are taken out of service for a lengthy period they should be stored in the fully charged condition in a dry, frost-free room. To ensure the battery is always ready for use a choice of charging methods can be made:

- a monthly equalising charge as in point 4.4

5.Truck Maintenance

5.1 Operational safety and environmental protection

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

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

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

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

5.2Maintenance Safety Regulations

Maintenance personnel

trucks must only be serviced and maintained by the manufacturer’s trained personnel. The manufacturer’s service department has field technicians specially trained for these tasks. We therefore recommend a maintenance contract with the manufacturer’s local service centre.

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 the truck from slipping or tipping over (e.g. wedges, wooden blocks).

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

Cleaning

Do not use flammable liquids to clean the truck.

Prior to cleaning, all safety measures required to prevent sparking (e.g. through short circuits) must be taken. For battery-operated trucks, the battery connector must be removed. Only weak suction or compressed air and non-conductive antistatic brushes may be used for cleaning electric or electronic assemblies.

If the truck is to be cleaned with a water jet or a high-pressure cleaner, all electrical and electronic components must be carefully covered beforehand as moisture can cause malfunctions.

Do not clean with pressurised water.

After cleaning the truck, carry out the activities detailed in the “Recommissioning ” section.

Electrical System

Only suitably trained personnel may operate on the truck’s electrical system.

Before working on the electrical system, take all precautionary measures to avoid ‑ electric shocks.

For battery-operated trucks, also de-energise the truck by removing the battery connector.

Welding

To avoid damaging electric or electronic components, remove these from the truck before performing welding operations.

Settings

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

Tyres

The quality of tyres affects the stability and performance of the truck. When replacing factory fitted tyres only used original manufacturer’s spare parts, as otherwise the data plate specifications will not be kept.

When changing wheels and tyres, ensure that the truck does not slew (e.g. when replacing wheels always left and right simultaneously).

Hydraulic hoses

The hoses must be replaced every six years. When replacing hydraulic components, also replace the hoses in the hydraulic system.

5.3 Servicing and inspection

Thorough and expert servicing is one of the most important requirements for the safe operation of the truck. Failure to perform regular servicing can lead to truck failure and poses a potential hazard to personnel and equipment.

The service intervals stated are based on single shift operation under normal operating conditions. They must be reduced accordingly if the truck is to be used in conditions of extreme dust, temperature fluctuations or multiple shifts.
The following maintenance checklist states the tasks and intervals after which they should be carried out. Maintenance intervals are defined as:
W = Every 50 service hours, at least weekly
A = Every 500 operating hours
B = Every 1000 operating hours, or at least annually
C = Every 2000 operating hours, or at least annually
W service intervals are to be performed by the customer.
In the run-in period - after approx. 100 service hours - or after repair work, the owner must check the wheel nuts/bolts and re-tighten if necessary.

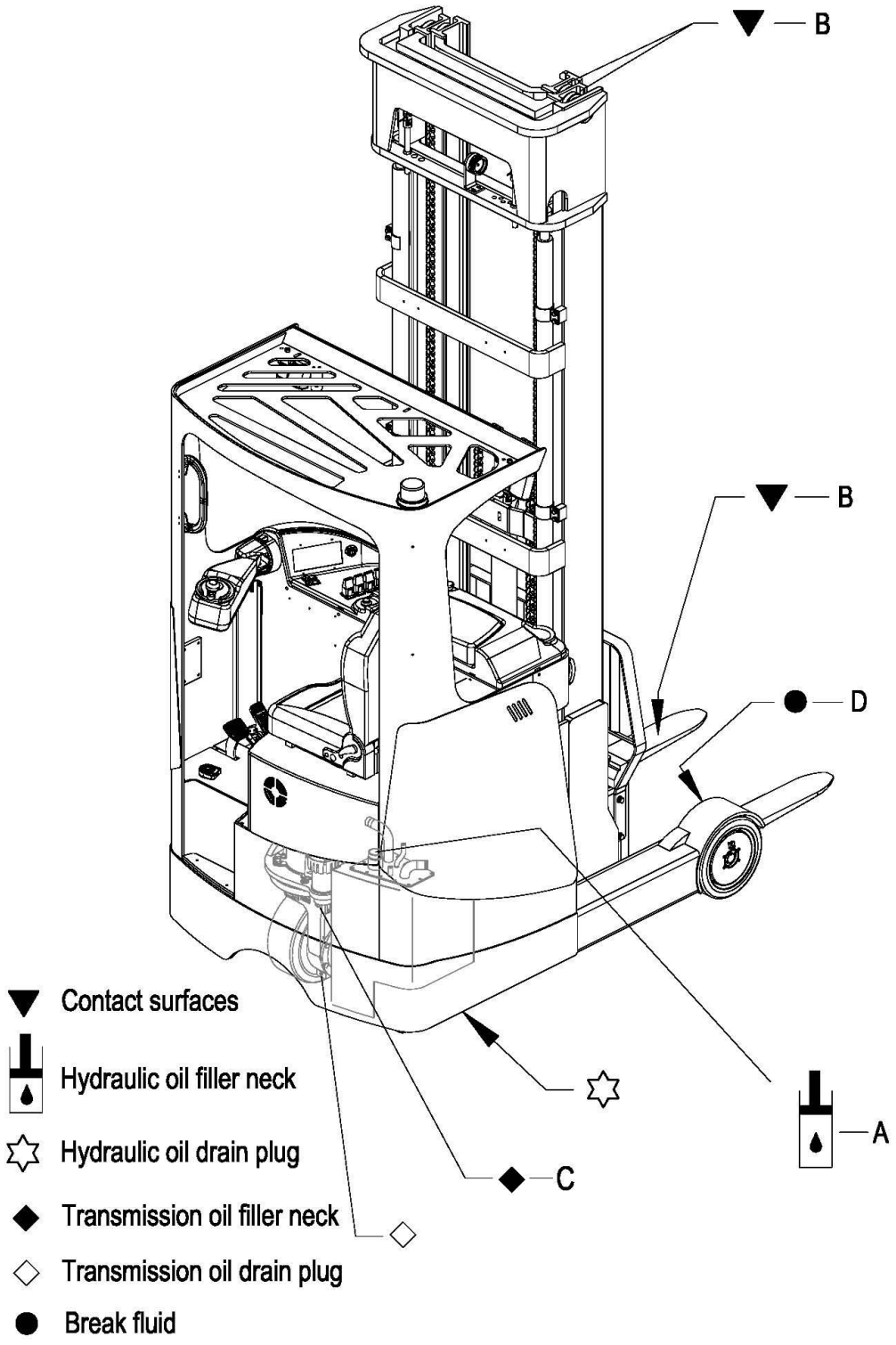
5.3.1 Maintenance Checklist

		Maintenance interval ●			
		W	A	B	C
Braking	Check magnetic brake air gap.			●	
	Test service and load brakes.			●	
Electrical system	Test instruments, displays and control switches.			●	
	Test warning and safety device.			●	
	Make sure wire connections are secure and check for damage.			●	
	Test micro switch setting.			●	
	Check contactors and relays.			●	
	Fix the motor and cable.			●	
Power supply	Visually inspect battery.			●	
	Visually inspect battery plug.			●	
	Check battery cable connections are secure, grease terminals if necessary.			●	
Travel	Check transmission for noise and leakage.			●	
	Check travel mechanism, adjust and lubricate if necessary.			●	
	Check wheels for wear and damage.			●	
	Check wheel suspension and attachments.			●	
	Check drive support plate.			●	
	Change transmission oil.				●
Truck frame	Check chassis for damage.			●	
	Check labels.			●	
	Check mast attachment.			●	
	Make sure overhead guard is secure and check for damage.			●	
	Check moving mast holder and wear rails.			●	

	Check driver's seat.			●	
	Test restraint systems.			●	
Hydraulic operations	Test hydraulic system.			●	
	Check that hose and pipe lines and their connections are secure, check for leaks and damage.			●	
	Check cylinders and piston rods for damage and leaks, and make sure they are secure.			●	
	Check hydraulic oil level.			●	
	Replace hydraulic oil.				●

		Maintenance interval ●			
		W	A	B	C
Lifting	Check lifting chains and chain guides for wear, adjust and grease			●	
	Check fork tines and fork carrier for wear and damage.			●	
	Perform sight check of rollers, sliding elements, and stops			●	
Steering system	Test electric steering.			●	
	Check steering toothing for wear and lubricate.			●	
Lubrication	Grease the vehicle in accordance with the lubrication schedule.			●	

5.3.2 Lubrication Schedule



Consumables

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

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

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

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

Code	Description	Used for
A	L-HM32#（Cleanliness grade 9, in compliance with NAS1638)	Hydraulic oil
C	GL-5 85W-90	Gear oil
B	Polylub GA352P	Lubrication grease

5.3.3 Maintenance Instructions

Prepare the truck for maintenance and repairs

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

• Park the truck securely (See 3.5 Parking the truck securely).

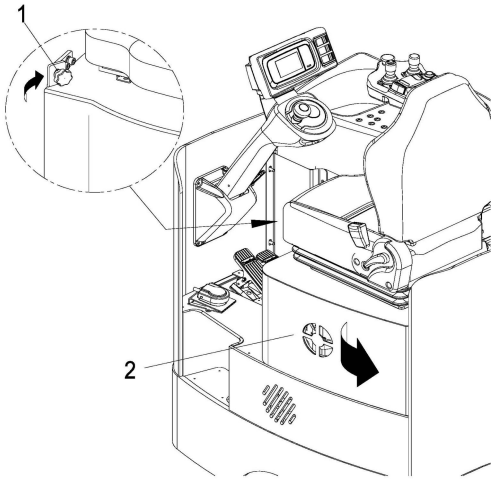
• Remove the key to prevent the truck from accidentally starting.

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

Open the cover

• Open the star-shaped handle (1) in the arrow direction.

• Open the cover(2) in the arrow direction.



Replacing the drive wheel

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

Check the hydraulic oil level

It is going to add hydraulic oil when you heard explosion sound from pipe during lifting.

• Prepare the truck for maintenance and repairs (See 5.3.3 Maintenance Instructions).

• Opening the cover.

• Add hydraulic oil of the correct grade (See 5.3.2 Lubrication Schedule) .

Warning!
Forbid adding hydraulic oil within impurity.

Add hydraulic oil till you cant hear explosion sound during lifting.

Installation is the reverse order.

Check transmission oil level

• Prepare the truck for maintenance and repairs (See 5.3.3 Maintenance Instructions).

• Open the cover (See 5.3.3 Maintenance Instructions).

• Check the transmission oil level, it should be at the control plug level (See 5.3.2 Lubrication Schedule).

Warning!
Forbid adding transmission oil within impurity.

•Add transmission oil every 2000 operating hours, or at least annually (See 5.3.2 Lubrication Schedule).

Installation is the reverse order.

Recommissioning

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

• Test horn.

• Test Emergency brake switch.

• Test brake.

• Lubricate the truck in accordance with the maintenance schedule.

5.4 Decommissioning the truck

If the truck is to be decommissioned for more than two months , e.g. for operational reasons,it must be parked in a frost-free and dry location and all necessary measures must be taken before, during and after decommissioning as described.
On decommissioning the truck must be jacked up so that all the wheels are clear of the ground. This is the only way of ensuring that the wheels and wheel bearings are not damaged.
If the truck is to be out of service for more than 6 months , further measures must be taken in consultation with the manufacturer's service department.

5.4.1Prior to decommissioning

• Thoroughly clean the truck.
• Check the brakes.
• Check the hydraulic oil level and replenish as necessary (See 5.3.3 Maintenance Instructions).
• Apply a thin layer of oil or grease to any non-painted mechanical components.
• Lubricate the truck in accordance with the maintenance schedule (See 5.3.2 Lubrication Schedule).

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

• Charge the battery (See 4.4Charging the battery).
• Disconnect the battery, clean it and apply grease to the terminals.
In addition, follow the battery manufacturer's instructions.
• Spay all exposed electrical contacts with a suitable contact spray.

5.4.2 Restoring the truck to operation after decommissioning

• Thoroughly clean the truck.
• Lubricate the truck in accordance with the maintenance schedule (See 5.3.2 Lubrication Schedule).
• Clean the battery, grease the terminals and connect the battery.
• Charge the battery (See 4.4 Charging the battery).
• Check hydraulic oil for condensed water and replace if necessary.
• Run the truck (see 3.3 Run the truck).

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

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

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

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

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

5.6 Final de-commissioning, disposal

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

6.Troubleshooting

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

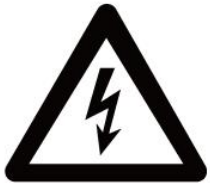
Fault	Possible cause	Action
Truck does not start.	• Battery connector not connected. • Key switch in “OFF” position • Battery charge too low • Faulty fuse • truck in charge mode	• Check the battery connector and connect if necessary. • Set key switch to “I” • Check battery charge, charge battery if Necessary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

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

APPENDIX

Lithium Battery Use and Maintenance Manual

Chapter 1 Safety Precautions

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

	Follow the user instructions and keep them in a visible position in the charging area. Work on the batteries should be performed only as instructed by specialist personnel.
	Always wear protective clothing (e.g. safety goggles and safety gloves) when working on cells and batteries. Always wash your hands after completing the work. Use only insulated tools. Do not physically alter the battery, strike, crush, compress, notch, dent or modify it in any way. Do not open the battery, damage, penetrate, bend, heat or allow it to become hot, do not throw it on the fire, short or immerse it in or wash it with water. Do not drop it or allow anything to fall on it, do not store it or operate it in a microwave oven, kiln or pressure vessel etc.
	Protect the battery from solar radiation or other forms of heat radiation. Do not expose the battery to any sources of heat.
	Used batteries must be treated as hazardous waste. These batteries are marked with the recycling symbol and the sign showing a crossed-out rubbish bin, and should not be disposed of with ordinary household waste. Buy-back terms and type of recycling are to be agreed with the manufacturer as described in § 8 of the battery legislation.

Chapter 2 Battery Introduction and Instructions

2.1 Battery Introduction

Rated voltage	48V	Cell material	LFP
Rated capacity	360Ah/560Ah(Option)	Battery size(mm)	928*378*708
Charger voltage	48V	Charger current	150A/100A(Option)

2.2 Instructions

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

2. The lithium battery should be used at an ambient temperature of 0°C ~ 40°C, do not use or store the battery near a fire source/heat source where the temperature is outside the temperature range;

Caution!
Ambient temperature for use:
0°C ~ 40°C

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

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

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

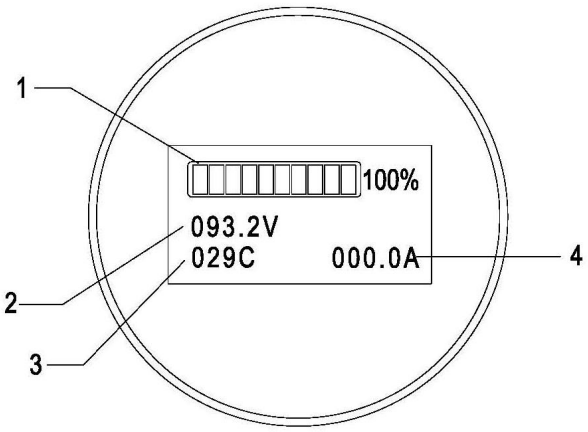
6. If the battery life is significantly shortened, please contact the after-sales for check;

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

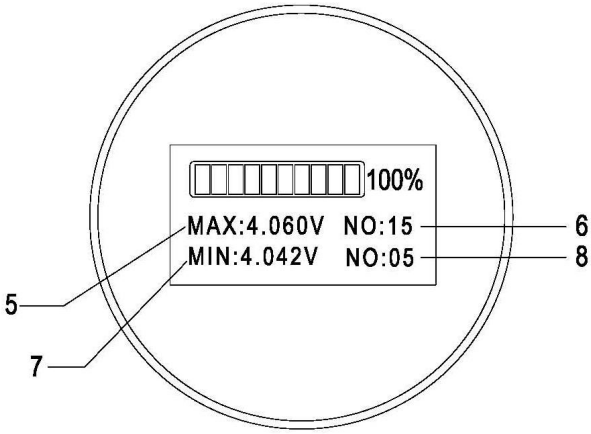
8. Before installing and removing the battery, be sure to read the user manual; the weight of the battery body is evenly distributed, please pay attention to the installation

and removal when there is an external weight; please use two hooks to hang on the lifting rings during the lifting process, and gently lift it to keep it stable and not inclined;
9. The operator must read the instructions carefully before use and receive relevant safety training to be able to handle emergencies;

2.3 Display Instrument



Display status 1



Display status 2

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 capacity 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
5	Maximum cell voltage	Maximum value of cell voltage
6	Cell No. of maximum cell voltage	The specific cell which is of the maximum voltage
7	Minimum cell voltage	Minimum value of cell voltage
8	Cell No. of minimum cell voltage	The specific cell which is of the minimum voltage

Chapter 3 Charging

1. This battery can only be charged with the vehicle-specific charger, other chargers may cause battery damage.
2. The normal charging temperature range of the battery is: 5°C ~ 40°C, please do not charge in the environment beyond the normal temperature range;
3. If the charging is still not completed within the specified time, stop charging the battery;
4. During the charging operation, it is necessary to have professional personnel to operate and care, in order to ensure that the charging plug and socket work normally without heat, to ensure that the charging device works normally, to ensure that the battery pack and its protection circuit work normally, and the whole power supply system has no sign of short circuit, over current, over temperature or overcharge.

Warning!
Lithium batteries are strictly prohibited from overcharging and overdischarging.

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

Caution!
1. The normal charging temperature range of the battery is: 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 overvoltage protection device.

Charging procedure:

• Move the forklift truck to the vicinity of the charger.

• Check the charger before starting charging.

• Check if the battery voltage to be charged matches the charger. (Please refer to the nameplate for rated output of the charger)

• Connect the output plug of the charger to the plug of the lithium battery box on the forklift truck.

Chapter 4 Storage

1. Try to ensure that the battery or battery pack's power is ≥60% before long-term storage as the battery has the function of self-discharge, be sure to charge the battery once every 3 months to ensure the battery power is ≥60%;

2. The battery should be stored in a temperature environment of 0°C~40°C;

3. Store in a dry, ventilated and cool environment, avoid direct sunlight, high temperature, high humidity corrosive gas, severe vibration, etc.

4. DO NOT stack, stacking of this series of products is not allowed.

Caution!
Ambient temperature for storage:
0°C~40°C

5. DO NOT store under the condition that the load or the hidden load is connected, that is, it is prohibited to have any form of discharge behavior when storing;

6. If the battery is found to be bulged, cracked, or has a low voltage value after long-term storage, the battery may be damaged; please contact the relevant technical department of the company for technical support.

7. After not using the battery for a long time, do not charge or discharge the battery if the smell of leakage is found near the battery.

Chapter 5 Transportation

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

Warning!
Don't bump, handle gently.

Chapter 6 Common Problems and Solutions

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

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

Chapter 7 Maintenance

7.1 Daily Maintenance

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

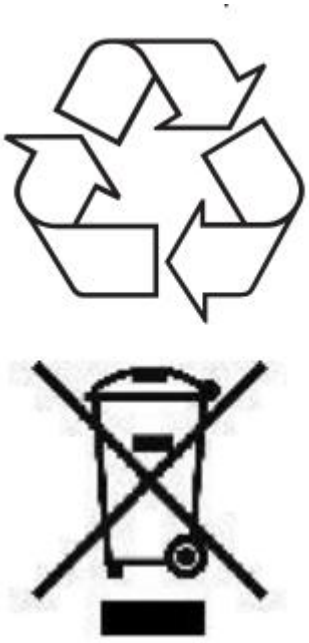
7.2 Regular Maintenance

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

ensure that the resistance value meets the Chinese national standard (≥500Ω/V) and to ensure that there is no electric leakage with the battery (once a month);

7.3 Disposal of Used Battery Packs

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.



Used batteries must be treated as hazardous waste.
Batteries marked with the recycling symbol and the sign showing a crossed-out rubbish bin should not be disposed of with ordinary household waste.
Buy-back terms and type of recycling are to be agreed with the manufacturer (for Germany - in accordance with paragraph 8 of the Battery Legislation).