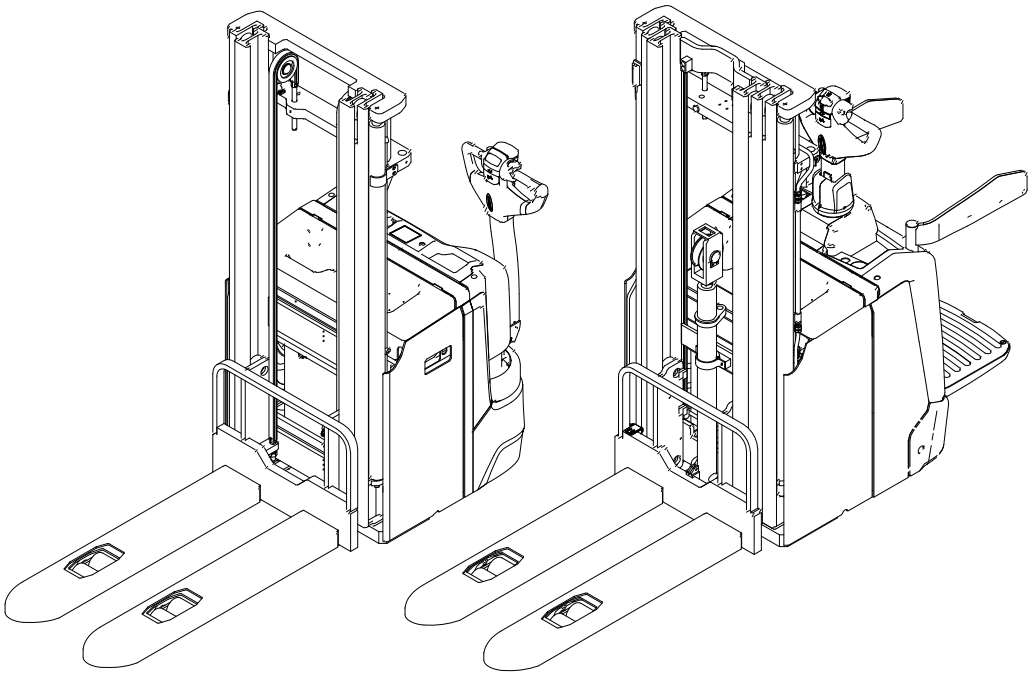
X series Pallet-Stacking Truck

Operation and Maintenance Manual



Original Instruction

HANGCHA GROUP CO., LTD.

12/2024

Foreword

Thank you very much for purchasing the X series pallet-stacking truck of Hangcha Group！

X series pallet-stacking truck is a new product specifically developed by Hangcha Group for warehouse logistic. It utilizes the latest AC control technology, with advanced performance, comfort operation, safety and security, low maintenance cost, and is an ideal tool for loading, unloading and handling palletized cargo in warehouse, supermarket and workshop.It can achieve better passability by raising the support legs.

Before starting to use the pallet truck, relative persons must read and understand the manual, get to know how to safely operate and maintain the pallet truck.

This manual provides instructions on the correct operation of the pallet-stacking truck, which will tell you how to operate safely and maintain preventively;To ensure safety and to fully utilize the performance of the pallet-stacking truck you have purchased, it is imperative that the operators thoroughly read this manual before use.

The design of our products will be constantly updated and improved, and the contents of this manual may differ from the pallet-stacking truck you have.

If you have any questions please keep touches with HANGCHA GROUP CO., LTD. sales department or the agent.

CDD12/14/16/20-XT1S-SI

CDD12/14/16/20-XT1-SI

CDD12/14/16-XT1S-SIL

CDD12/14/16-XT1-SIL

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Ⅰ Overview

1.1. Operating environment conditions of the truck

Standard truck operating conditions

- Use only in specific areas such as factories, tourist attractions, amusement parks, etc.
- Use only on fixed and level ground with adequate bearing capacity.
- Use only on roads with good visibility and permission from the equipment user.
- Use within the specified load rating.
- Average environment temperature under continuous operating condition is +25℃
- The highest environment temperature in the short term（≤1h）is +40℃.
- The lowest environment temperature under normal indoor conditions when operation is +5℃.
- The lowest environment temperature under normal outdoor conditions when operation is -20℃.
- Altitude ≤2000m.
- Maximum gradeability when traveling unloaded is 16%.
- Lateral or diagonal driving is prohibited when going uphill. When going uphill with a load, the truck must be driven with the forks facing forward; when going downhill with a load, it should be driven in reverse.

Warning

- It’s prohibited to use this pallet truck in the anti-explosion area.
- When using this pallet truck in extreme environments such as cold storage, it is necessary to install additional special equipment and obtain permission from the manufacturer.
- In conditions of strong wind, avoid high lifting operations as much as possible to prevent the cargo from falling or the truck from overturning.
- It should only be driven on solid, level surfaces with sufficient load-bearing capacity.

Warning

Non-ionizing radiation can interfere with medical devices:

Truck electrical equipment emitting non-ionizing radiation (such as wireless data transmission) may interfere with the function of medical devices worn by operators (pacemakers, hearing aids, etc.), leading to their malfunction. It is essential for a doctor or the manufacturer of the medical device to specify whether the device can be used in the vicinity of the truck.

1. 2. Intended use and application scope

X series pallet-stacking truck is a new product specifically developed by Hangcha Group for warehouse logistic. It utilizes the latest AC control technology, with advanced performance, comfort operation, safety and security, low maintenance cost, and is an ideal tool for loading, unloading and handling palletized cargo in warehouse, supermarket and workshop.It can achieve better passability by raising the support legs.

This truck is suitable for elevating and handling cargo on a level surface. Additionally, the use of a telescopic support leg lifting device can increase the ground clearance when transporting cargo on uneven surfaces.This truck is capable of performing stacking and de-stacking operations up to a height of 2.7 meters and can also transport goods over longer travel distances. The rated load is clearly indicated on the truck nameplate or load curve.

1. 3. Truck traveling direction and wheel trajectory

During the operation of a pallet truck, the direction of travel is defined as follows:

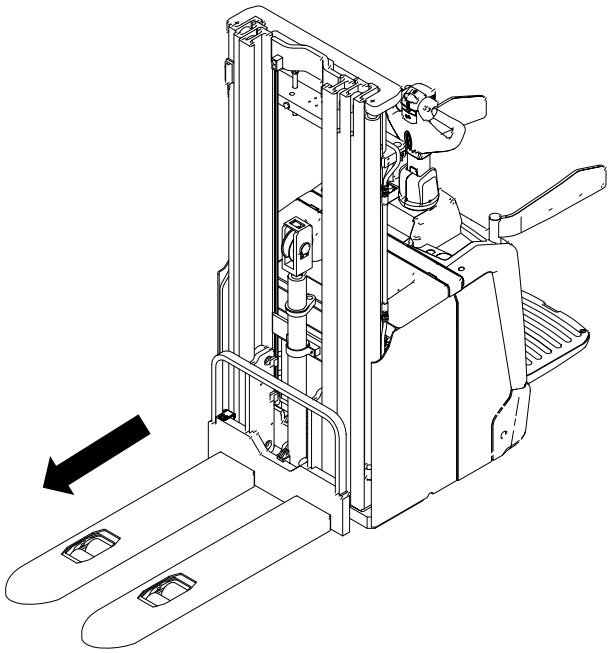


Figure1-1

This truck features rear-wheel steering, where during a turn, the rear side swings outward (the

rear wheel path deviates outwardly), which is different from a car's steering behavior (where the rear wheels follow a path that is angled more inward than that of the front wheels).

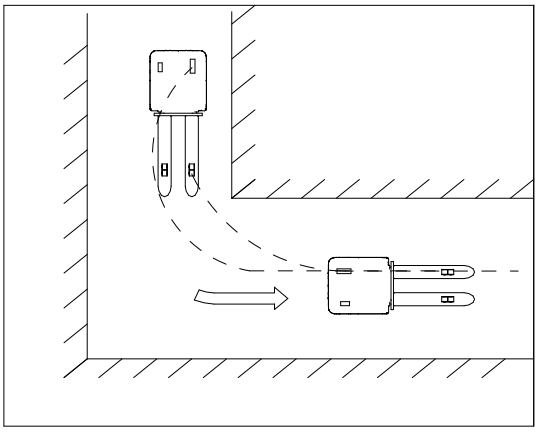


Figure1-2

1.4. Product Description

1.4.1. Appearance

The X series standard initial lift stacker truck adopts professional appearance design, with family-oriented and serialized considerations, featuring smooth and dynamic lines; it fully considers ergonomics and conforms to the latest trends in appearance design. The entire machine's periphery is made of stamped steel plate, which is strong, robust, durable, high-end, and meets environmental protection requirements.

1.4.2. Features

High-performance

The stand-on initial lift stacker is equipped with electric steering as standard, making operation more convenient and flexible.

Standard high-power travel motors ensure high travel speeds and strong climbing performance.

Adopting a permanent magnet synchronous drive system, performance is excellent with low energy consumption; a new 48V power supply system ensures low heat generation.

The entire machine is controlled by VCU for precise and stable operation, increasing efficiency.

The vehicle features regenerative braking and downhill protection to prevent slipping.

Standard proportional descent speed control system ensures smooth and accurate operation.

Comfort

Standard stepless speed control for lifting and lowering, allowing for more precise fork control and smoother lifting and lowering of loads.

A newly developed ergonomic control handle, sleek and simple, allows all operations to be easily performed with one hand.

The unique lighted turtle speed function allows for convenient slow movement of the vehicle, and enables stacking in very narrow spaces.

Optimized body structure ensures excellent visibility for operation, making entry and exit from pallets easier.

Compact body and large rounded corners design allow the vehicle to operate in tight spaces, with

a wedge-shaped chassis design greatly improving maneuverability.

Different fork lengths are available to suit various pallet handling needs.

Reliability

The 4-point low center of gravity design and the frame made of high-strength steel plate structure ensure a large residual load capacity and long service life.

The lifting rod system has been optimized for stability and reliability with reduced stress.

All series use waterproof connectors, and all wires and cables are reliably protected, greatly improving the reliability of the electrical system.

Non-contact proximity switches are used for long life and reliable operation.

The hydraulic power unit features low noise, low vibration, and stable and reliable lifting and lowering.

The stamped forks have higher strength and impact resistance, and with fork tip guidance, further improve operational efficiency.

H-shaped channel steel is used, which has better rigidity and stability than C-shaped channel steel.

The power plug is fixed to the body to prevent damage when lifting the battery.

The battery is securely fixed, and the battery cover uses flexible materials to reduce vibration and noise during vehicle operation.

The newly designed drive system of the stand-on initial lift stacker features a drive motor that does not rotate with the steering handle when turning, reducing the likelihood of cables breaking.

Safety

All series are equipped with a function that automatically reduces vehicle speed after the forks are raised 500mm.

The stand-on initial lift stacker is equipped with a standard height limit of 1.8 meters for lifting, and the guard rail can be raised to continue lifting, ensuring personnel can escape easily in case of high load falling.

Standard top-of-travel buffer function ensures the safety of the vehicle when lifting to the top.

The stand-on initial lift stacker is equipped with a function that automatically reduces vehicle speed with increasing steering angle.

Features release brake, reverse brake, and emergency brake functions to ensure safe driving.

Also features a downhill anti-slip function for safe operation.

The emergency reverse button on the handle head can effectively prevent driver injury in case of a rearward emergency.

The two-level mast has an intelligent buffer function for descent, automatically slowing down when the fork is less than 100mm from the ground, effectively protecting the load.

Standard electronic lift limit and intelligent controller limit provide dual protection, preventing impact when lifting to the top, effectively protecting the work motor and the safety of the load.

1.4.3. Product Model Description

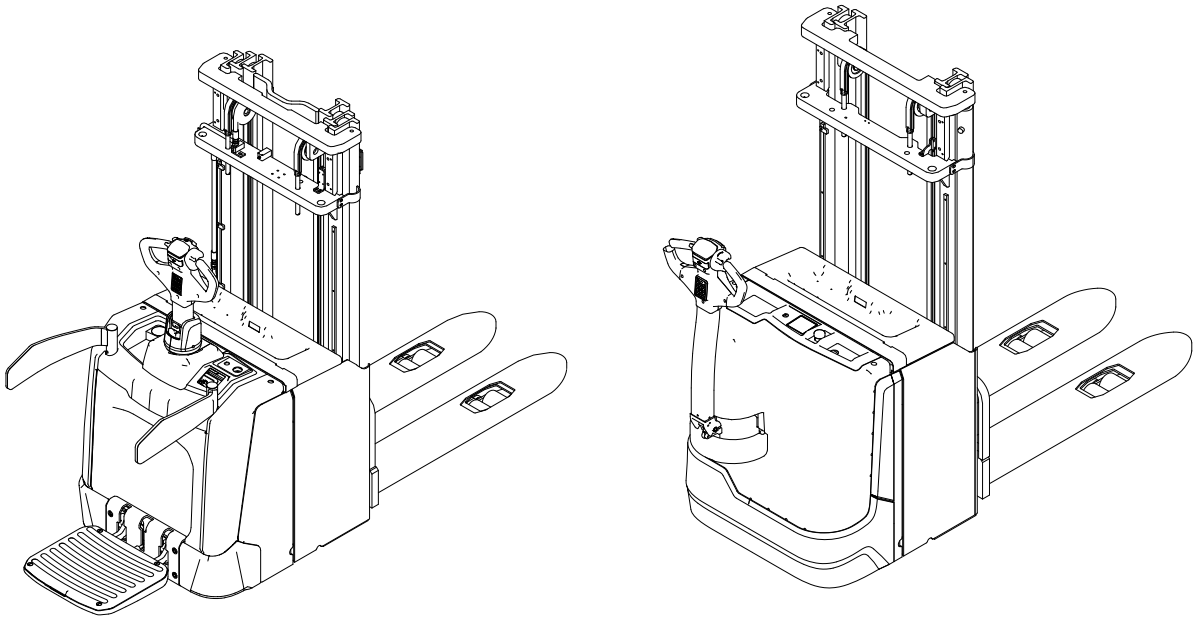


Figure1- 3

Customers can determine the rated capacity and other relevant information of the truck from the product model number.

CDD16-XT1S-SI	X Series stand-up lithium-ion battery Stacker	CDD16-XT1-SI	X Series pedestrian-propelled lithium-ion battery Stacker
CDD	Stacker	CDD	Stacker
16	Ton×100kg	16	Ton×100kg
X	Series	X	Series
T1	Controller type	T1	Controller type
S	Stand-up	/	Pedestrian-propelled

SI	Lithium-ion battery	SI	Lithium-ion battery

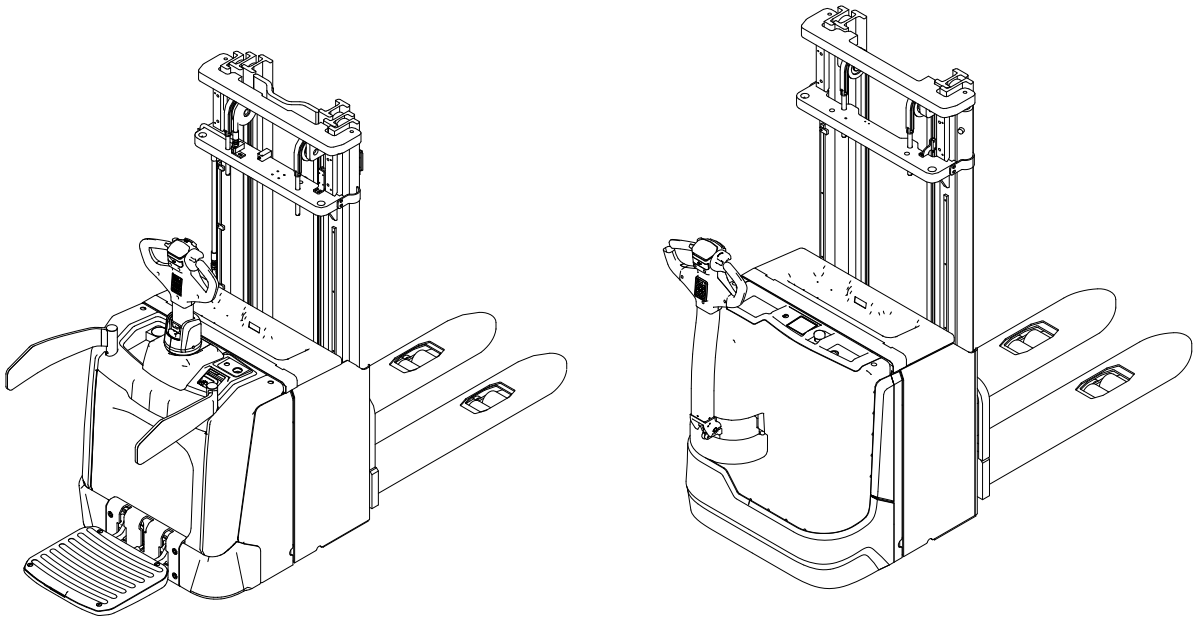


Figure1-4

Customers can determine the rated capacity and other relevant information of the truck from the product model number.

CDD16-XT1S-SIL	X Series stand-up lithium-ion battery initial lift Stacker	CDD16-XT1-SIL	X Series pedestrian-propelled lithium-ion battery initial lift Stacker
CDD	Stacker	CDD	Stacker
16	Ton×100kg	16	Ton×100kg
X	Series	X	Series
T1	Controller type	T1	Controller type
S	Stand-up	/	Pedestrian-propelled
SI	Lithium-ion battery	SI	Lithium-ion battery
L	Initial lift	L	Initial lift

1.5. Main part names and overview of system functions

1.5.1. Main part names

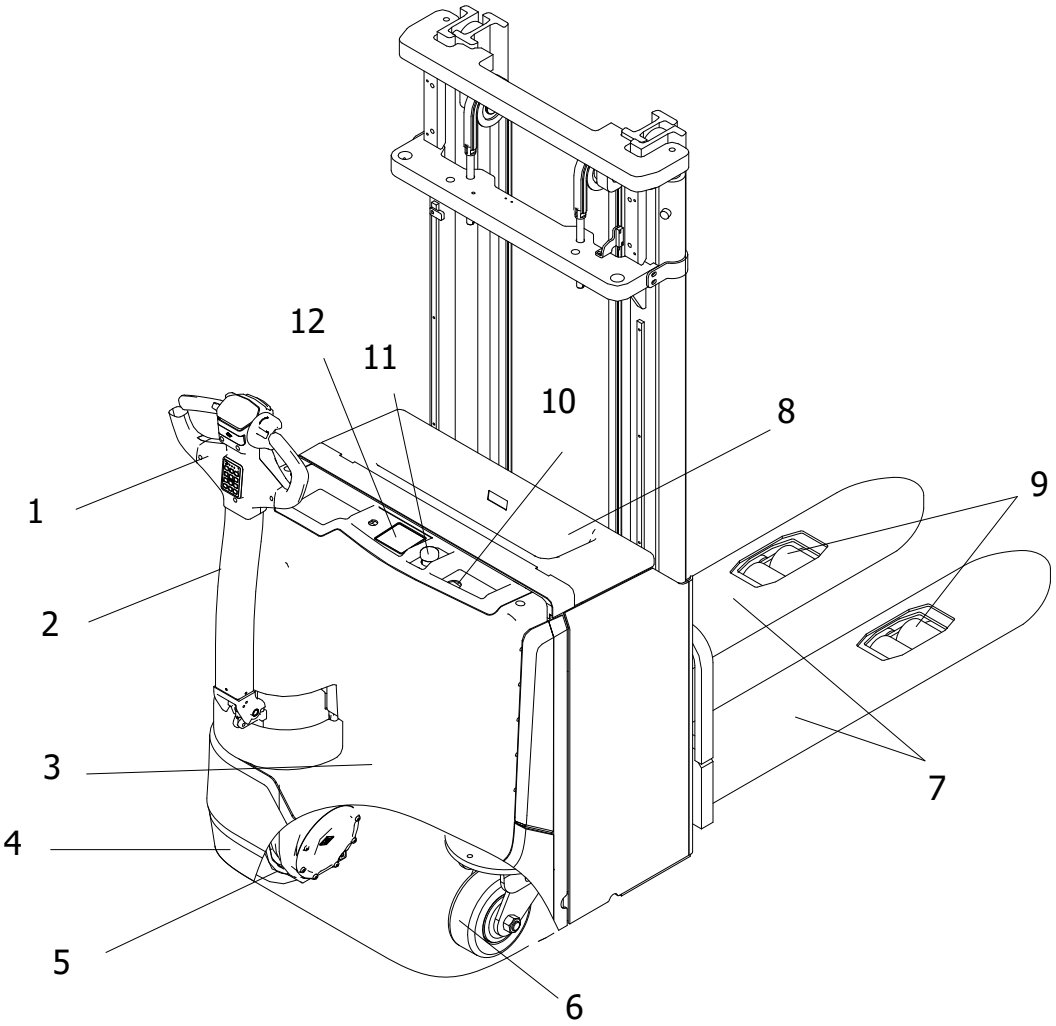


Figure1- 5 Pedestrian-propelled Stacker

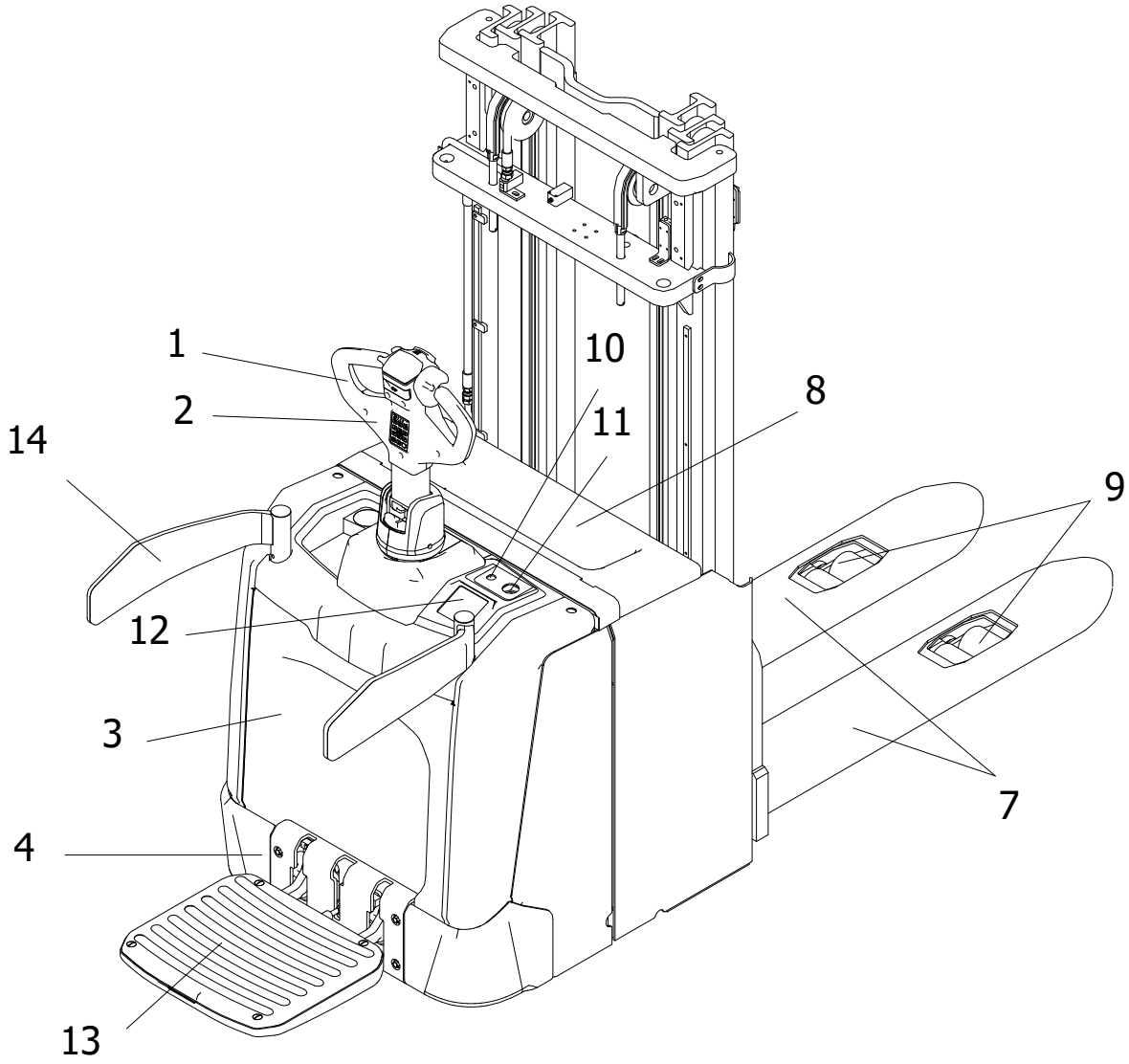


Figure1- 6 Stand-up Stacker

No.	Name	No.	Name
1	Control handle	9	Load-carrying wheel
2	Control stick	10	Key switch
3	Hood	11	Emergency Stop Switch
4	Frame	12	Dashboard
5	Drive wheel	13	Footboard
6	Auxiliary wheel	14	Guardrail
7	Fork	15	Fully enclosed guardrail
8	Battery Cover	16	Overhead Guard

1.5.2. Overview of system functions

Body system

Extensive use of steel stamping and injection molding processes ensures robustness and durability, providing the truck with overall structural support.

Driving and braking system

The drive motor is a permanent magnet synchronous motor, providing the truck with forward and reverse driving force，the vehicle uses electromagnetic brakes.

Steering system

Utilizing a permanent magnet synchronous motor, the steering wheels are located at the rear of the truck, enabling rear-wheel steering, and the drive wheels are powered for steering.

Control and display components

The control handle and dashboard, etc., allow the operator to control the truck's movements through the control handle and provide the driver with truck parameter information through the dashboard.

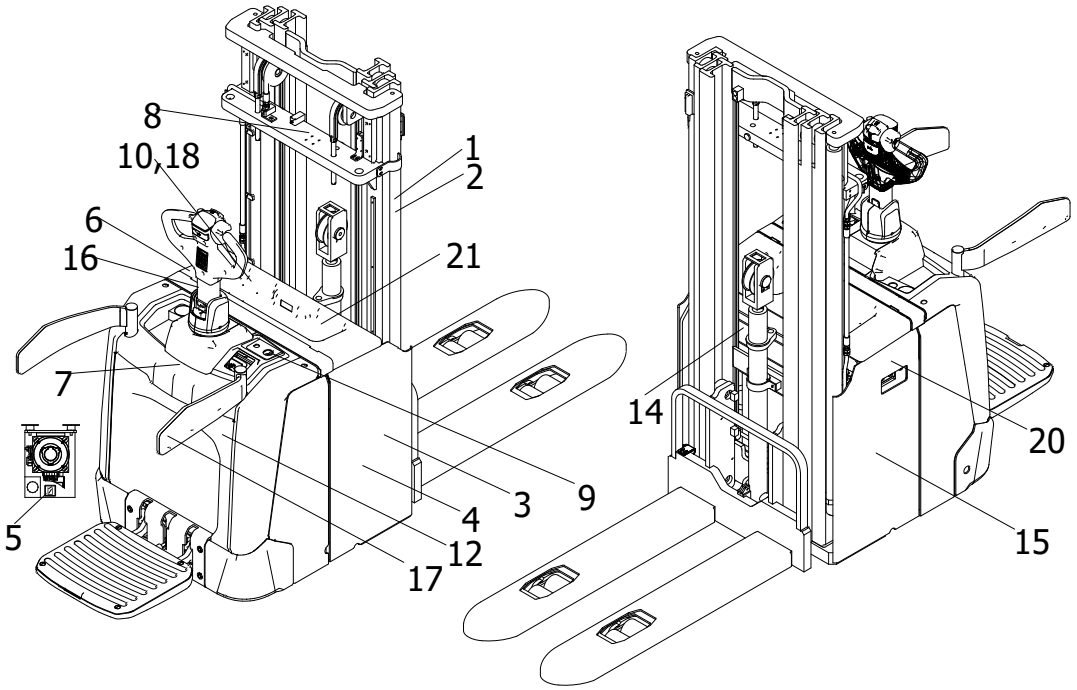
Hydraulic system

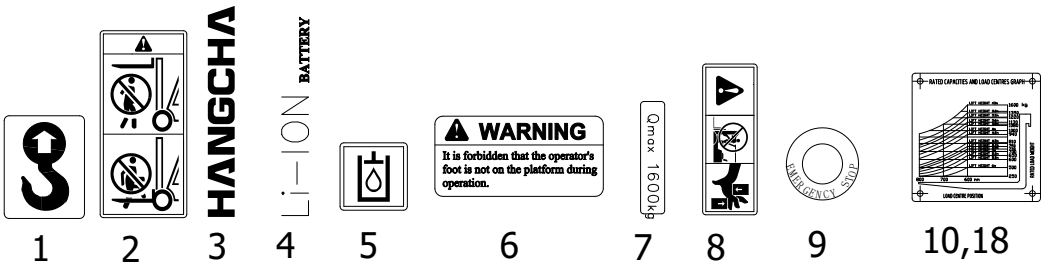
The lift and lower buttons on the control handle cause the pump assembly to start sending hydraulic oil from the hydraulic tank to the lift cylinder.

Electrical system

Servicing the truck's operating system, hydraulic system, and other services. Truck information can be retrieved through the computer interface during maintenance or in case of a malfunction.

1. 6. **Truck labels**





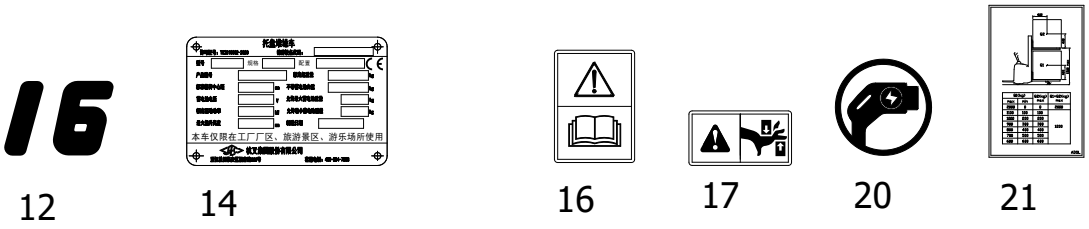
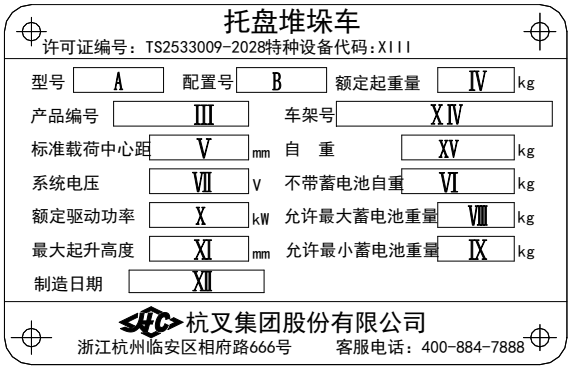


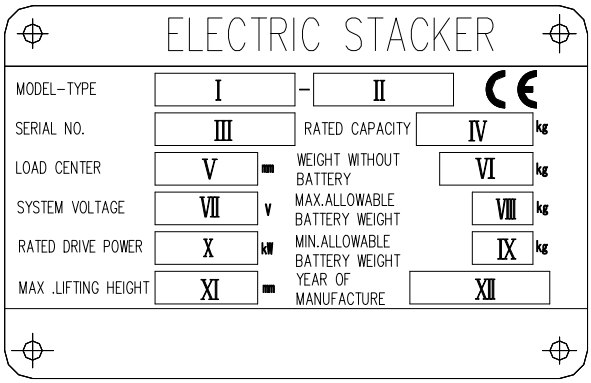
Figure1-7

1	Lifting label	This label indicates the lifting point for securing the lifting gear
2	Mast warning label	Caution against hazardous actions, prohibiting proximity to fork and mast.
3	Manufacturer's label	Manufacturer's label(for export)
4	Lithium-ion battery label	Lithium-ion battery truck model label
5	Hydraulic oil label	Hydraulic oil filler location label
6	Warning label	Do not extend feet outside the truck while operating (stand-up model)
7	Tonnage designation label	Maximum truck load label
8	Hazard label	Do not climb the mast, keep hands inside the truck at all times
9	Emergency power-off switch label	Emergency power-off switch location indicator label
10	Load curve sign	Indicate the maximum load at various lift heights of the truck (for export)
12	Tonnage label	Maximum truck load label
14	Product nameplate	Introduce the basic parameters of the truck
15	Logo label	Manufacturer logo (for domestic sales)
16	Safety instruction label	Before using the truck, it is mandatory to read the operator's manual in detail
17	Fork mast hand entrapment warning label	Beware of pinching hazards（stand-up model）
18	Load curve sign	Indicate the maximum load at various lift heights of the truck(for domestic sales)
20	Charging label	Charge port location indicator label

21	Twin pallet load plate	Indicates the maximum load for each lifting mechanism at various heights (initial lift truck)

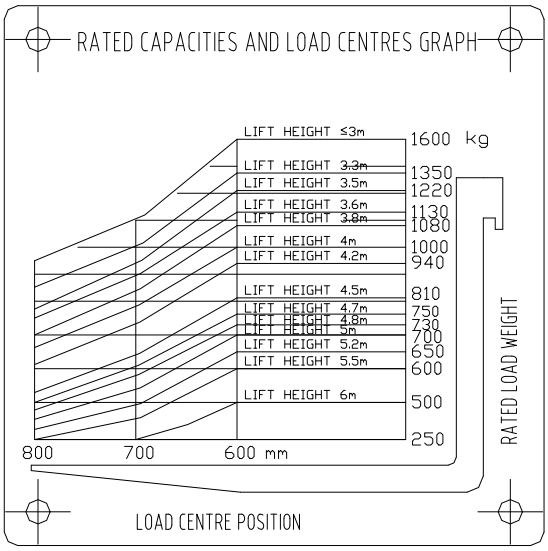
Product nameplate





Print location	Meaning
I	Model
II	
III	Product number
IV	Load capacity
V	Load center
VI	Service weight (without battery)
VII	System voltage
VIII	Maximum allowed battery weight
IX	Minimum allowed battery weight
X	Rated drive power
XI	Maximum lifting height
XII	Manufacture date

Load curve sign



Caution

- Changing to forks of different models may alter the load center distance and could lead to hazardous accidents.

The rated load curve sign indicates the truck's rated load capacity. The plate presents this information in tabular form, listing the maximum load corresponding to the load center distance and the required lifting height.

The horizontal axis represents the load center distance, which is the position of the load's center of gravity, and the vertical axis represents the rated load weight.

When the maximum lifting height of the mast is 6m and the load center distance is ≤600mm, the maximum allowable load weight is 500kg; that is, objects weighing no more than 500kg may be lifted to a height of 6m.

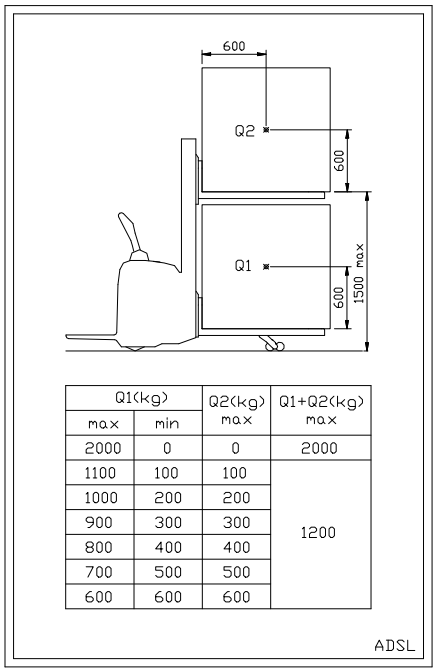
When the maximum lifting height of the mast is 4m and the load center distance is ≤600mm, the maximum allowable load weight is 1000kg; that is, objects weighing no more than 1000kg may be lifted to a height of 4m.

When the maximum lifting height of the mast is 3m and the load center distance is ≤600mm, the maximum allowable load weight is 1600kg; that is, objects weighing no more than 1600kg may be lifted to a height of 3m.

Caution

For example, when a 500kg object is lifted to a height of 6m with a load center distance of ≤600mm, the lifting weight or height must be reduced once the load center distance exceeds 600mm to accommodate the change in the center of gravity.

Twin pallet load curve sign (Initial lift)



Q1(kg)		Q2(kg)	Q1+Q2(kg)
max	min	max	max
2000	0	0	2000
1100	100	100	1200
1000	200	200	
900	300	300	
800	400	400	
700	500	500	
600	600	600	

The twin pallet load curve sign indicates the rated load capacity of the truck. The plate presents this information in tabular form, listing the maximum carrying load for two pallets. It is required that Q1 must be greater than or equal to Q2, and the sum of Q1 and Q2 must be less than Q1+Q2MAX.

For example, when Q2 is 200kg, Q1 must be greater than or equal to 200kg, and the sum of Q1 and Q2 must not exceed 1600kg.

When Q2 is 400kg, Q1 must be greater than or equal to 400kg, and the sum of Q1 and Q2 must not exceed 1600kg.

When Q2 is 800kg, Q1 must be greater than or equal to 800kg, and the sum of Q1 and Q2 must not exceed 1600kg.

1.7. Technical performance parameters table

Parameter	1.2	Model		CDD12-XT1S-SI	CDD14-XT1S-SI
	1.5	Rated load-carrying capacity	Q (t)	1200	1400
	1.6	Load center distance	c (mm)	600	600
	1.8	Axle centre to fork face	x (mm)	700	700
	1.9	Wheelbase	y (mm)	1296	1331
Weight	2.1.1	Service weight (including the battery)	（kg）	1200	1220
Tire	3.1	Tire material		Polyurethane	Polyurethane
	3.2	Driving wheel size	(mm)	Ø250×80	Ø250×80
	3.3	Load-bearing wheel size	(mm)	Ø83×80	Ø83×80
	3.4	Auxiliary wheel size	(mm)	Ø125×50	Ø125×50
	3.5	Wheel number	(mm)	1x +1/4	1x +1/4
	3.6	Wheel track (driving wheels)	b10 (mm)	516	516
	3.7	Wheel track (Load-bearing wheels)	b11 (mm)	385	385
Dimensions	4.4	Lift height	h3 (mm)	2700	2700
	4.15	Fork height, lowered	h13 (mm)	90	90
	4.19	Overall length	l1 (mm)	1987	2019
	4.2	Frame length	l2 (mm)	834 Note3	869 Note3
	4.21	Overall width	b1/b2 (mm)	800	800
	4.22	Fork dimensions	s/e/l (mm)	60/185/1150	60/185/1150
	4.25	Distance between fork-arms	b5 (mm)	570/680	570/680
	4.32	Ground clearance of forks	m2 (mm)	25	25
	4.34.1	Right-angle stacking channel width (1000×1200)	Ast (mm)	2201（2632）Note1	2236（2667）Note1
	4.34.2	Right-angle stacking channel width (800×1200)	Ast (mm)	2251（2682）Note2	2286（2717）Note2
	4.35	Turning radius	Wa (mm)	1551（1982）	1586（2017）
Performance	5.1	Travel speed, laden/unladen	(km/h)	9/11	9/11
	5.2	Lifting speed, laden/unladen	(m/s)	0.225/0.47	0.195/0.4
	5.3	Lowering speed, laden/unladen	(m/s)	0.45/0.4	0.45/0.4
	5.8	Max Gradeability, laden/unladen	(%)	10/16	10/16
Motor & Battery	6.1	Drive motor power (S2, 60min)	(kW)	2.2	2.2
	6.2	Power of the lifting motor	(kW)	4.2	4.2
	6.4	Lithium-ion battery (voltage/capacity)	(V)/(Ah)	48/105	48/105
	6.4.1	Optional lithium-ion battery (voltage/capacity)	(V)/(Ah)	48/125	48/125
	8.1	Driving type		PM synchronous	PM synchronous
Note 1: As per VDI2198 standard+220mm Note 1: As per VDI2198 standard+140mm Note 3: Full-free triplex mast+21mm					

Parameter	1.2	Model		CDD16-XT1S-SI	CDD20-XT1S-SI
	1.5	Rated load-carrying capacity	Q (t)	1600	2000
	1.6	Load center distance	c (mm)	600	600
	1.8	Axle centre to fork face	x (mm)	700	700
	1.9	Wheelbase	y (mm)	1331	1331
Weight	2.1.1	Service weight (including the battery)	（kg）	1230	1260
Tire	3.1	Tire material		Polyurethane	Polyurethane
	3.2	Driving wheel size	(mm)	Ø250×80	Ø250×80
	3.3	Load-bearing wheel size	(mm)	Ø83×80	Ø83×80
	3.4	Auxiliary wheel size	(mm)	Ø125×50	Ø125×50
	3.5	Wheel number	(mm)	1x +1/4	1x +1/4
	3.6	Wheel track (driving wheels)	b10 (mm)	516	516
	3.7	Wheel track (Load-bearing wheels)	b11 (mm)	385	385
Dimensions	4.4	Lift height	h3 (mm)	2700	2700
	4.15	Fork height, lowered	h13 (mm)	90	90
	4.19	Overall length	l1 (mm)	2019	2019
	4.2	Frame length	l2 (mm)	869 Note3	869 Note3
	4.21	Overall width	b1/b2 (mm)	800	800
	4.22	Fork dimensions	s/e/l (mm)	60/185/1150	65/185/1150
	4.25	Distance between fork-arms	b5 (mm)	570/680	570/680
	4.32	Ground clearance of forks	m2 (mm)	25	25
	4.34.1	Right-angle stacking channel width (1000×1200)	Ast (mm)	2236（2667）Note1	2236（2667）Note1
	4.34.2	Right-angle stacking channel width (800×1200)	Ast (mm)	2286（2717）Note2	2286（2717）Note2
	4.35	Turning radius	Wa (mm)	1586（2017）	1586（2017）
Performance	5.1	Travel speed, laden/unladen	(km/h)	9/11	8/10
	5.2	Lifting speed, laden/unladen	(m/s)	0.18/0.4	0.16/0.34
	5.3	Lowering speed, laden/unladen	(m/s)	0.45/0.4	0.5/0.4
	5.8	Max Gradeability, laden/unladen	(%)	8/16	8/16
Motor & Battery	6.1	Drive motor power (S2, 60min)	(kW)	2.2	2.2
	6.2	Power of the lifting motor	(kW)	4.2	4.2
	6.4	Lithium-ion battery (voltage/capacity)	(V)/(Ah)	48/105	48/105
	6.4.1	Optional lithium-ion battery (voltage/capacity)	(V)/(Ah)	48/125	48/125
	8.1	Driving type		PM synchronous	PM synchronous

Note 1: As per VDI2198 standard+220mm
Note 1: As per VDI2198 standard+140mm
Note 3: Full-free triplex mast+21mm

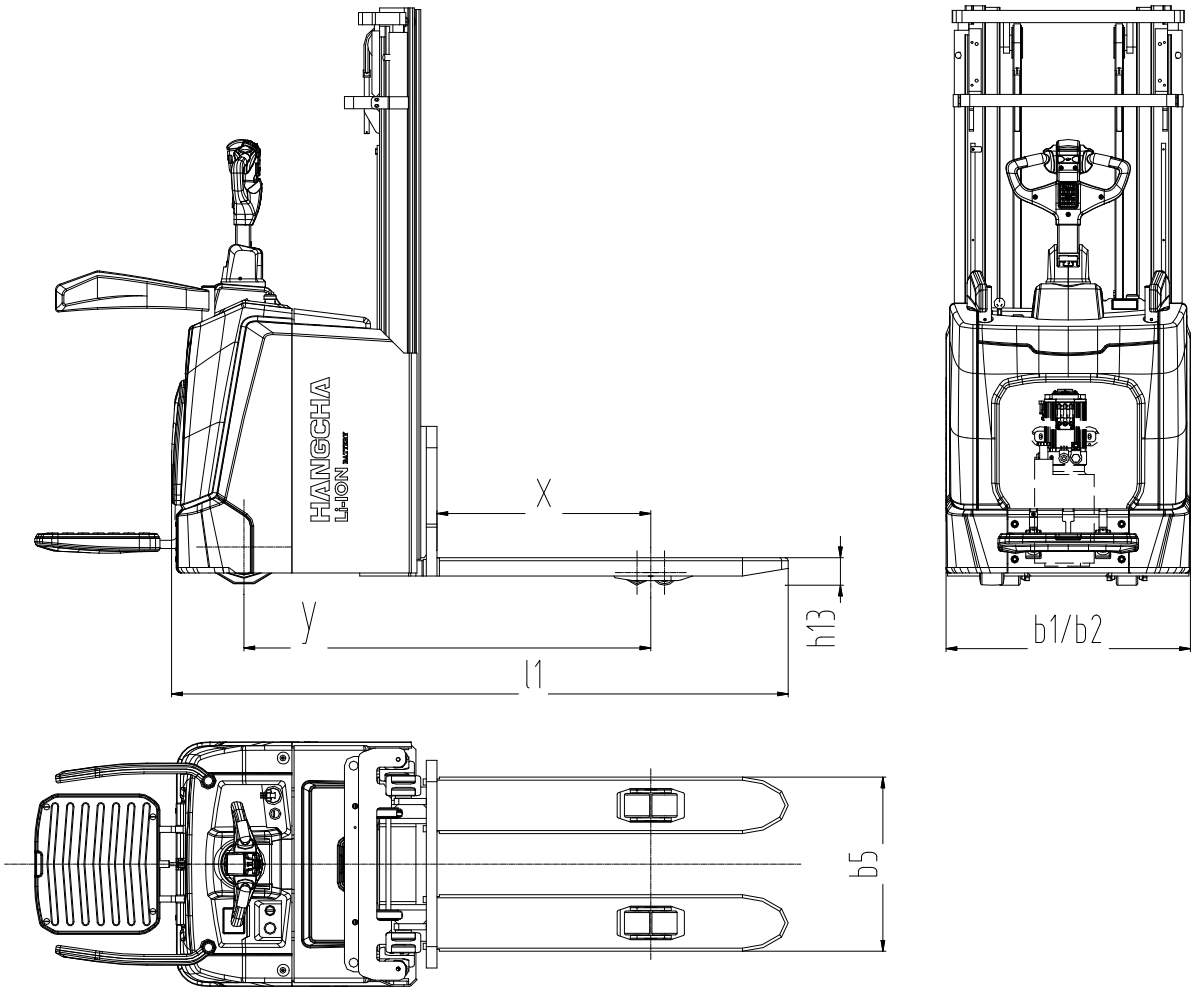


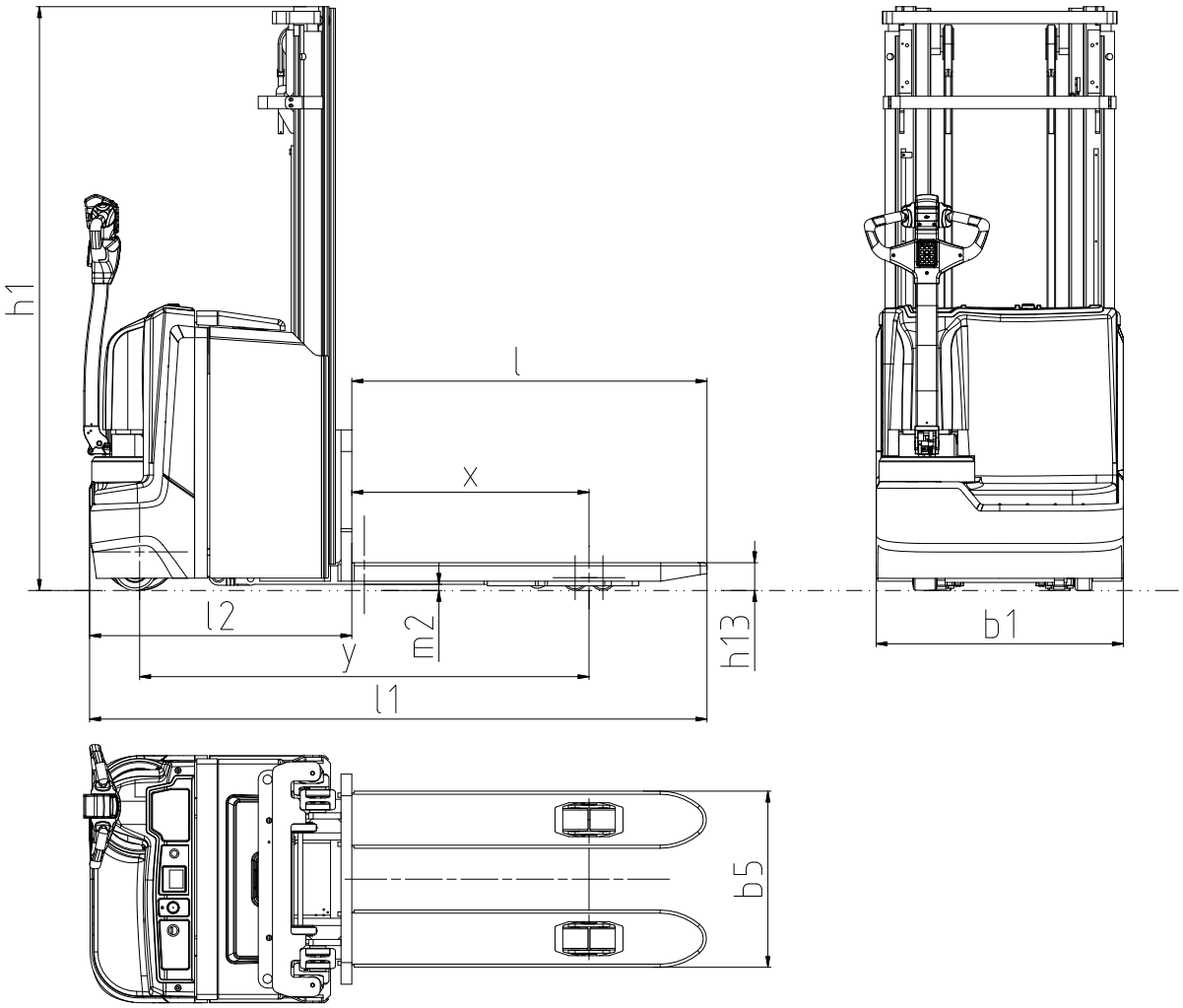
Figure1-8

Parameter	1.2	Model		CDD12-XT1-SI	CDD14-XT1-SI
	1.5	Rated load-carrying capacity	Q (t)	1200	1400
	1.6	Load center distance	c (mm)	600	600
	1.8	Axle centre to fork face	x (mm)	700	700
	1.9	Wheelbase	y (mm)	1318	1318
Weight	2.1.1	Service weight (including the battery)	（kg）	1020	1040
Tire	3.1	Tire material		Polyurethane	Polyurethane
	3.2	Driving wheel size	(mm)	Ø250×80	Ø250×80
	3.3	Load-bearing wheel size	(mm)	Ø83×80	Ø83×80
	3.4	Auxiliary wheel size	(mm)	Ø140×55	Ø140×55
	3.5	Wheel number	(mm)	1x +1/4	1x +1/4
	3.6	Wheel track (driving wheels)	b10 (mm)	510	510
	3.7	Wheel track (Load-bearing wheels)	b11 (mm)	385	385
Dimensions	4.4	Lift height	h3 (mm)	2700	2700
	4.15	Fork height, lowered	h13 (mm)	90	90
	4.19	Overall length	l1 (mm)	1934	1934
	4.2	Frame length	l2 (mm)	784 Note 3	784 Note 3
	4.21	Overall width	b1/b2 (mm)	800	800
	4.22	Fork dimensions	s/e/l (mm)	60/185/1150	60/185/1150
	4.25	Distance between fork-arms	b5 (mm)	570/680	570/680
	4.32	Ground clearance of forks	m2 (mm)	25	25
	4.34.1	Right-angle stacking channel width (1000×1200)	Ast (mm)	2200 Note 1	2200 Note 1
	4.34.2	Right-angle stacking channel width (800×1200)	Ast (mm)	2250 Note 2	2250 Note 2
	4.35	Turning radius	Wa (mm)	1550	1550
Performance	5.1	Travel speed, laden/unladen	(km/h)	6/6	6/6
	5.2	Lifting speed, laden/unladen	(m/s)	0.225/0.47	0.195/0.4
	5.3	Lowering speed, laden/unladen	(m/s)	0.45/0.4	0.45/0.4
	5.8	Max Gradeability, laden/unladen	(%)	8/16	8/16
Motor & Battery	6.1	Drive motor power (S2, 60min)	(kW)	2.2	2.2
	6.2	Power of the lifting motor	(kW)	4.2	4.2
	6.4	Lithium-ion battery (voltage/capacity)	(V)/(Ah)	48/80	48/80
	6.4.1	Optional lithium-ion battery (voltage/capacity)	(V)/(Ah)	48/105	48/105
	8.1	Driving type		PM synchronous	PM synchronous

Note 1: As per VDI2198 standard+220mm
Note 1: As per VDI2198 standard+140mm
Note 3: Full-free triplex mast+21mm

Parameter	1.2	Model		CDD16-XT1-SI	CDD20-XT1-SI
	1.5	Rated load-carrying capacity	Q (t)	1600	2000
	1.6	Load center distance	c (mm)	600	600
	1.8	Axle centre to fork face	x (mm)	700	700
	1.9	Wheelbase	y (mm)	1318	1318
Weight	2.1.1	Service weight (including the battery)	（kg）	1040	1080
Tire	3.1	Tire material		Polyurethane	Polyurethane
	3.2	Driving wheel size	(mm)	Ø250×80	Ø250×80
	3.3	Load-bearing wheel size	(mm)	Ø83×80	Ø83×80
	3.4	Auxiliary wheel size	(mm)	Ø140×55	Ø140×55
	3.5	Wheel number	(mm)	1x +1/4	1x +1/4
	3.6	Wheel track (driving wheels)	b10 (mm)	510	510
	3.7	Wheel track (Load-bearing wheels)	b11 (mm)	385	385
Dimensions	4.4	Lift height	h3 (mm)	2700	2700
	4.15	Fork height, lowered	h13 (mm)	90	90
	4.19	Overall length	l1 (mm)	1934	1934
	4.2	Frame length	l2 (mm)	784 Note 3	784 Note 3
	4.21	Overall width	b1/b2 (mm)	800	800
	4.22	Fork dimensions	s/e/l (mm)	60/185/1150	65/185/1150
	4.25	Distance between fork-arms	b5 (mm)	570/680	570/680
	4.32	Ground clearance of forks	m2 (mm)	25	25
	4.34.1	Right-angle stacking channel width (1000×1200)	Ast (mm)	2200 Note 1	2200 Note 1
	4.34.2	Right-angle stacking channel width (800×1200)	Ast (mm)	2250 Note 2	2250 Note 2
	4.35	Turning radius	Wa (mm)	1550	1550
Performance	5.1	Travel speed, laden/unladen	(km/h)	6/6	6/6
	5.2	Lifting speed, laden/unladen	(m/s)	0.18/0.4	0.16/0.34
	5.3	Lowering speed, laden/unladen	(m/s)	0.45/0.4	0.5/0.4
	5.8	Max Gradeability, laden/unladen	(%)	6/16	5/16
Motor & Battery	6.1	Drive motor power (S2, 60min)	(kW)	2.2	2.2
	6.2	Power of the lifting motor	(kW)	4.2	4.2
	6.4	Lithium-ion battery (voltage/capacity)	(V)/(Ah)	48/80	48/80
	6.4.1	Optional lithium-ion battery (voltage/capacity)	(V)/(Ah)	48/105	48/105
	8.1	Driving type		PM synchronous	PM synchronous

Note 1: As per VDI2198 standard+220mm
Note 1: As per VDI2198 standard+140mm
Note 3: Full-free triplex mast+21mm

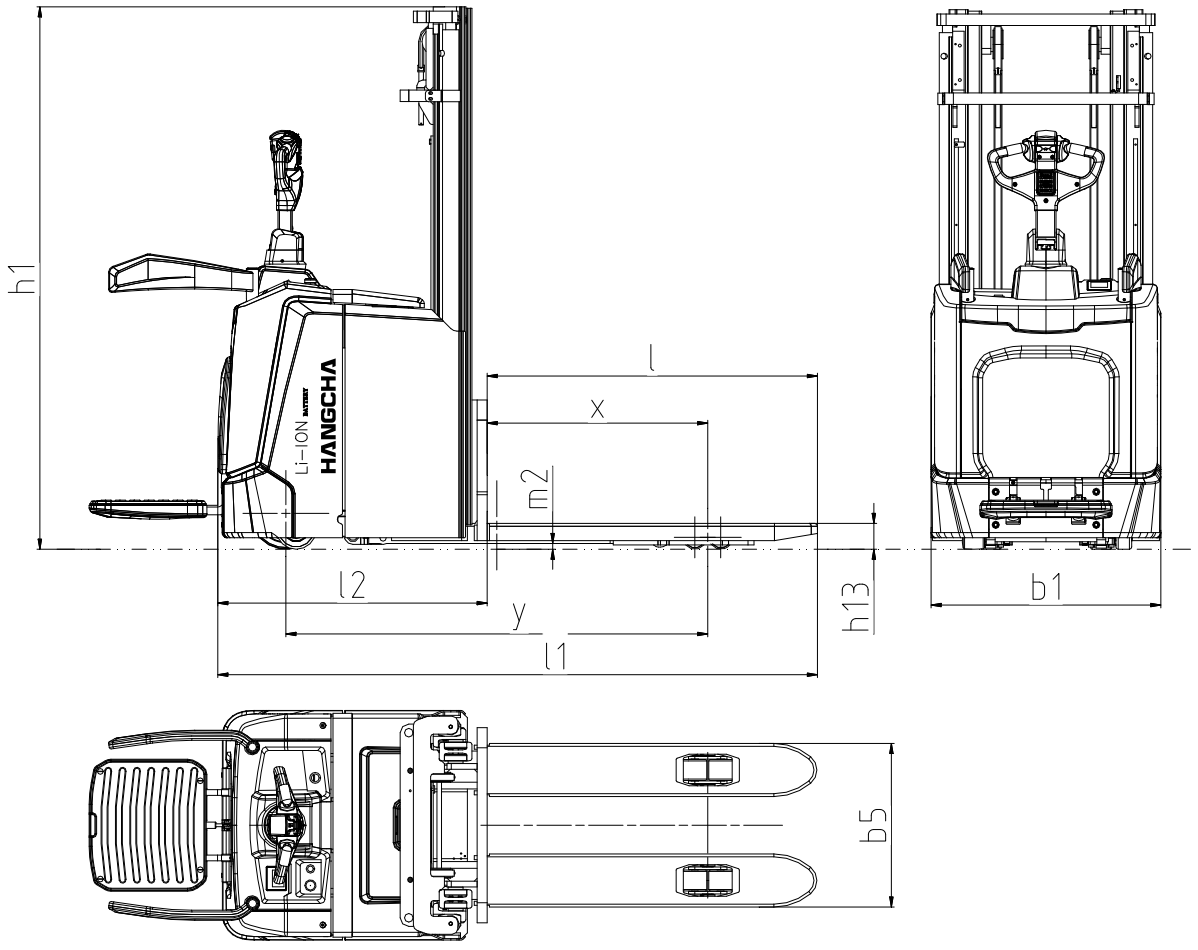

h1
l
x
l2
y
m2
h13
l1
b1
b5

Model Differentiation Marking	1.2	Manufacturer's product model		CDD12-XT1S-SIL	CDD14-XT1S-SIL	CDD16-XT1S-SIL
	1.3	Power Type: Electric, Hydrogen fuel cell		Electric	Electric	Electric
	1.4	Operation Modes: Manual, Pedestrian-Propelled, Stand-up, Sit-down, Order picking		Stand-up	Stand-up	Stand-up
	1.51	Mast lifting rated load	kg	1200	1400	1600
	1.52	Support leg lifting rated load	kg	2000	2000	2000
	1.6	Load center distance	c (mm)	600	600	600
	1.8	Axle centre to fork face (lifting/lowering)	x (mm)	700/768	700/768	700/768
	1.9	Wheelbase (lifting/lowering)	y (mm)	1366/1434	1401/1469	1401/1469
Weight	2.1	Service weight (including the battery)	kg			
	2.2	Drive wheels/Load-bearing wheels axle load(laden)	kg			
	2.3	Drive wheels/Load-bearing wheels axle load(unladen)	kg			
Wheels/suspension system	3.1	Tire Type (Solid, Pneumatic, Super Elastic, Polyurethane)		Polyurethane	Polyurethane	Polyurethane
	3.2	Driving wheel size (Diameter×Width)		Ø250×80	Ø250×80	Ø250×80
	3.3	Load-bearing wheel size(Diameter×Width)		Ø83×80	Ø83×80	Ø83×80
	3.4	Auxiliary wheel size(Diameter×Width)		Ø140×55	Ø140×55	Ø140×55
	3.5	Drive wheels, Auxiliary wheels/Load-bearing wheels quantity (X=Drive wheels)		1x +1/4	1x +1/4	1x +1/4

	3.6	Front wheel track,driving wheels	b10 (mm)	516	516	516
	3.7	Rear wheel track , Load-bearing wheels	b11 (mm)	385	385	385
Dimensions	4.2	Retracted mast height	h1 (mm)	1840	1890	1890
	4.3	Free lift	h2 (mm)	90	90	90
	4.4	Lift	h3 (mm)	2700	2700	2700
	4.5	Extended mast height	h4 (mm)	3190	3240	3240
	4.6	Initial lift height	h5 (mm)	125	125	125
	4.9	Height of tiller handle in drive position min./max.	h14 (mm)	1170/1400	1170/1400	1170/1400
	4.15	Height, lowered	h13 (mm)	90	90	90
	4.19	Overall length (with Standard Forks)	l1 (mm)	2053/2501Note3	2088/2536Note3	2088/2536Note3
	4.20	Overall length (to the vertical face of forks)	l2 (mm)	903/1351Note3	938/1386Note3	938/1386Note3
	4.21	Overall width	b1/b2 (mm)	800	800	800
	4.22	Fork dimensions (Thickness/Width/Length)	s/e/l (mm)	65/185/1150	65/185/1150	65/185/1150
	4.25	Width across forks	b5 (mm)	570	570	570
	4.32	Ground clearance (at the center of the frame)	m2 (mm)	15	15	15
	4.34.1	Right-angle stacking channel width (pallet 1000×1200 sideways	Ast (mm)	2268（2703） Note1 Note3	2302（2737） Note1 Note3	2302（2737）Note1 Note3
	4.34.2	Right-angle stacking channel width (pallet 800x1200 length)	Ast (mm)	2318（2753） Note2 Note3	2352(2787） Note2 Note3	2352(2787）Note2 Note3
	4.35	Turning radius	Wa (mm)	1619（2054） Note4	1654（2089） Note4	1654（2089）Note4
Performance data	5.1	Travel speed, laden/unladen	km/h	9/11	9/11	9/11
	5.2	Lifting speed, laden/unladen	m/s	0.225/0.47	0.195/0.4	0.18/0.4
	5.3	Lowering speed,	m/s	0.45/0.4	0.45/0.4	0.45/0.4

		laden/unladen				
	5.8	Max Gradeability, laden/unladen	%	10/16	10/16	8/16
	5.10	Service brake		Regenerative braking	Regenerative braking	Regenerative braking
Motor & Battery	6.1	Drive motor power, S2(Short-time duty cycle) 60 min	kW	2.2	2.2	2.2
	6.2	Lifting motor power，S3 15%	kW	4.2	4.2	4.2
	6.4	Battery (voltage/capacity)	(V)/(Ah) or kWh	48/80	48/80	48/80
	6.5	Standard battery weight	kg	60	60	60

a）Serial number column refers to appendix A of VDI 2198-2019 b）According to Q/HCC J01101, the letter "D" denotes a pallet-stacking truck	Note 1: As per VDI2198 standard+261mm Note 2: As per VDI2198 standard+157mm Note 3: Full-free triplex mast+21mm Note 4：Lift+68mm



Distinguishing mark	1.2	Manufacturer's type designition		CDD12-XT1-SIL	CDD14-XT1-SIL	CDD16-XT1-SIL
	1.3	Drive: electric (battery type, mains, ...), diesel, petrol, fuel gas		Electric	Electric	Electric
	1.4	Operator type: hand, pedestrian, standing, seated, order-picker		Pedestrian	Pedestrian	Pedestrian
	1.51	Load capacity at load centre distance c1	kg	1200	1400	1600
	1.52	Load capacity at load centre distance c2	kg	2000	2000	2000
	1.6	Load centre distance	*c* (mm)	600	600	600
	1.8	Load distance, centre of drive axle to fork	*x* (mm)	700/768	700/768	700/768
	1.9	Wheelbase	*y* (mm)	1387/1455	1387/1455	1387/1455
Weight	2.1	Service weight	kg	1090	1120	1120
	2.2	Axle loading, laden front/rear	kg	780/1510	860/1660	930/1790
	2.3	Axle loading, unladen front/rear	kg	740/350	760/360	760/360
Tyres/chassis	3.1	Tyres: solid rubber, superelastic, pneumatic, polyurethane		Polyurethane tire	Polyurethane tire	Polyurethane tire
	3.2	Tyre size, front		Ø250×80	Ø250×80	Ø250×80
	3.3	Tyre size, rear		Ø83×73	Ø83×73	Ø83×73
	3.4	Additional wheels (dimensions)		Ø140×55	Ø140×55	Ø140×55
	3.5	Wheels, number front/rear (× = driven wheels)		1x +1/4	1x +1/4	1x +1/4
	3.6	Tread, front	*b*10 (mm)	510	510	510
	3.7	Tread, rear	*b*11 (mm)	385	385	385
Dimensions	4.2	Height, mast lowered	*h*1 (mm)	1840	1890	1890
	4.3	Free lift	*h*2 (mm)	90	90	90

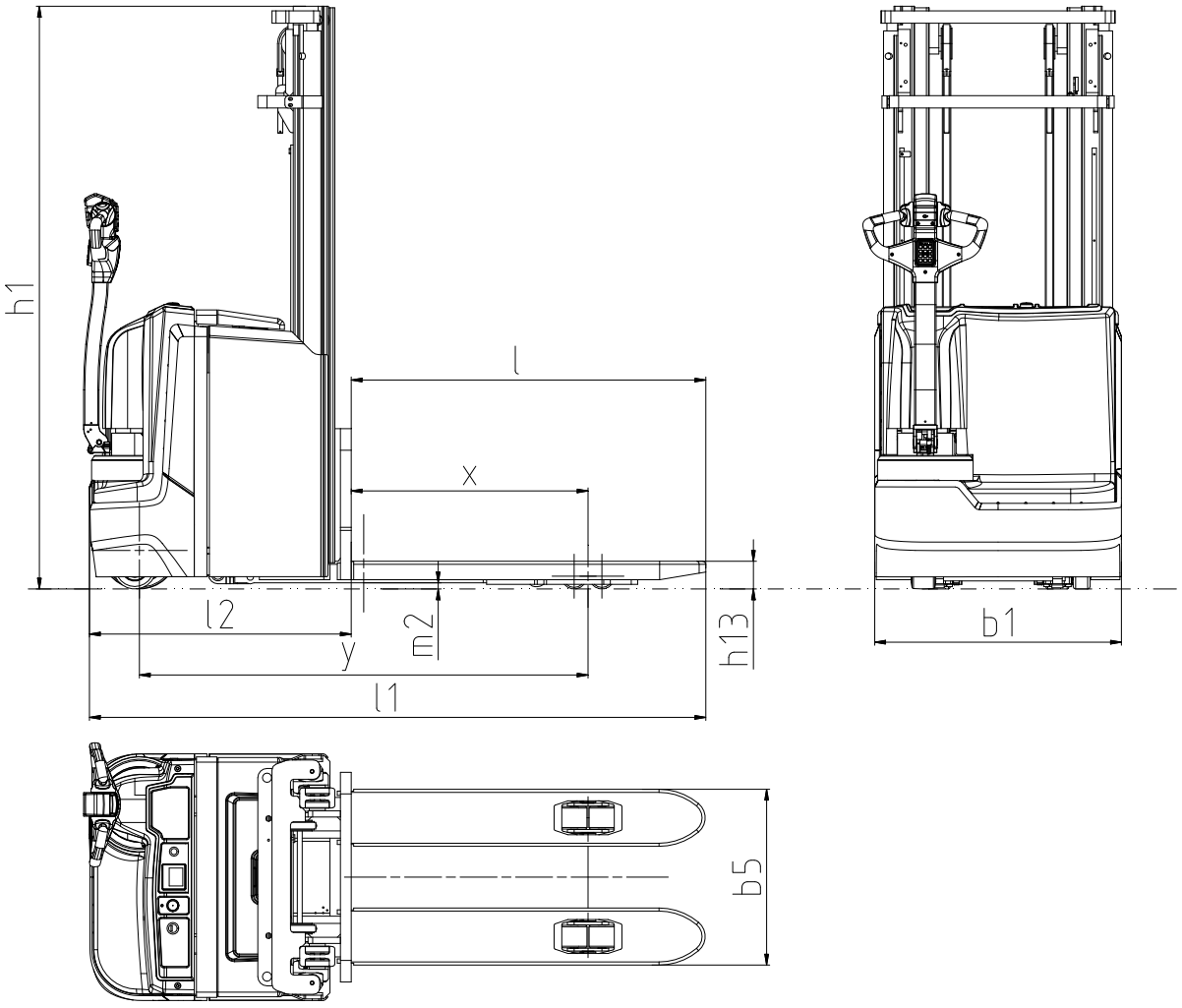
	4.4	Lift	*h*3 (mm)	2700	2700	2700
	4.5	Height, mast extended	*h*4 (mm)	3190	3240	3240
	4.6	Initial lift	*h*5 (mm)	125	125	125
	4.9	Height drawbar in driving position min./max.	*h*14 (mm)	790/1205	790/1205	790/1205
	4.15	Height, lowered	*h*13 (mm)	90	90	90
	4.19	Overall length	*l*1 (mm)	2000 Note3	2000 Note3	2000 Note3
	4.20	Length to face of forks	*l*2 (mm)	850 Note3	850 Note3	850 Note3
	4.21	Overall width	*b*1/*b*2 (mm)	800	800	800
	4.22	Fork dimensions DIN ISO 2331	*s*/*e*/*l* (mm)	65/185/1150	65/185/1150	65/185/1150
	4.25	Fork spread	*b*5 (mm)	570	570	570
	4.32	Ground clearance, centre of wheelbase	*m*2 (mm)	15	15	15
	4.34.1	Aisle width for pallets 1000 × 1200 crossways	*A*st (mm)	2267 Note1 Note3	2267 Note1 Note3	2267 Note1 Note3
	4.34.2	Aisle width for pallets 800 × 1200 lengthways	*A*st (mm)	2317 Note1 Note3	2317 Note1 Note3	2317 Note1 Note3
	4.35	Turning radius	*W*a (mm)	1620	1620	1620
Performance data	5.1	Travel speed, laden/unladen	km/h	6/6	6/6	6/6
	5.2	Lift speed, laden/unladen	m/s	0.225/0.47	0.195/0.4	0.18/0.4
	5.3	Lowering speed, lade/unladen	m/s	0.45/0.4	0.45/0.4	0.45/0.4
	5.8	Max. gradeability, laden/unladen	%	8/16	8/16	6/16
	5.10	Service brake		Regenerative braking	Regenerative braking	Regenerative braking
Electric-engine	6.1	Drive motor rating S2 60 min	kW	2.2	2.2	2.2
	6.2	Lift motor rating at S3 15 %	kW	4.2	4.2	4.2
	6.4	Battery voltage/nominal capacity	V/Ah	48/80	48/80	48/80
	6.5	Battery weight	kg	60	60	60

Note 1: According to VDI2198 standard +261mm

Note 2: According to VDI2198 standard +157mm

Note 3: Three-level full freedom +21mm

Note 4: Drop +68mm



1.8. **Load-bearing structural components**

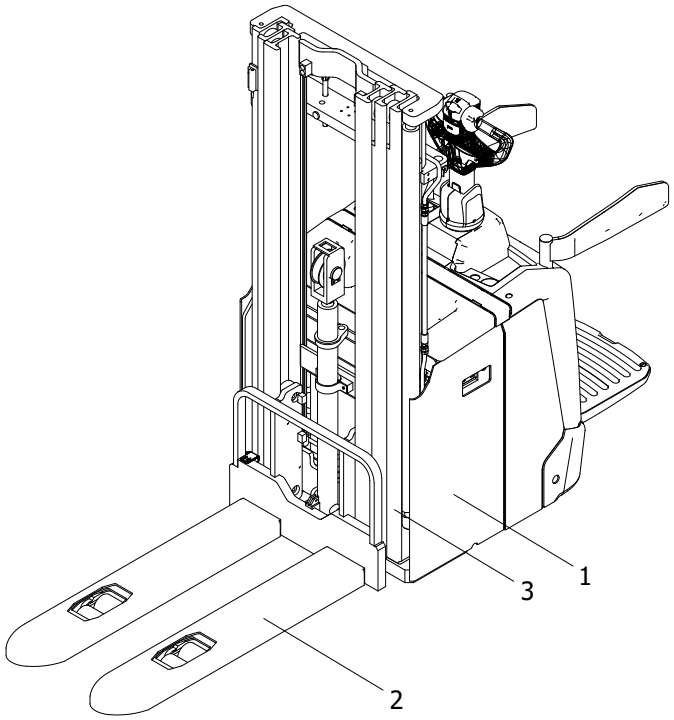


Figure1-9

1.Frame	2.fork arm carrier	3.Mast	4.Overhead Guard

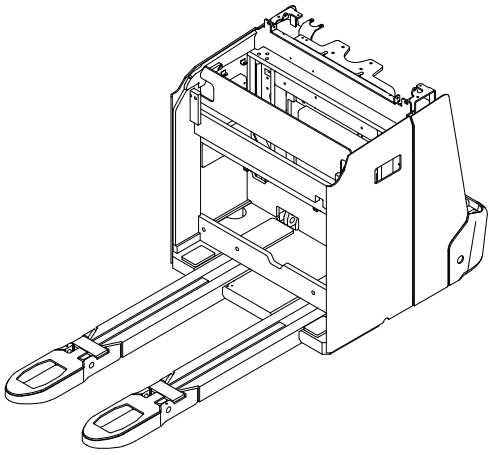


Figure1-10

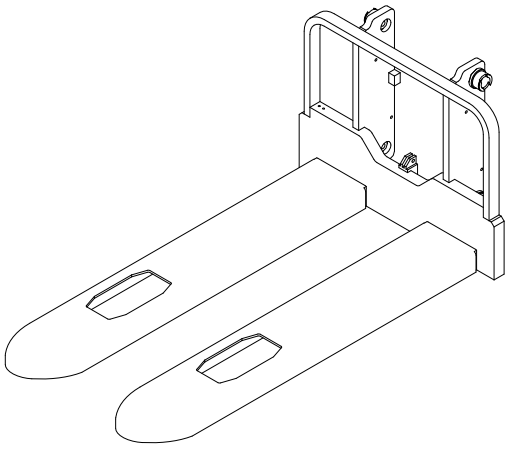


Figure1-11

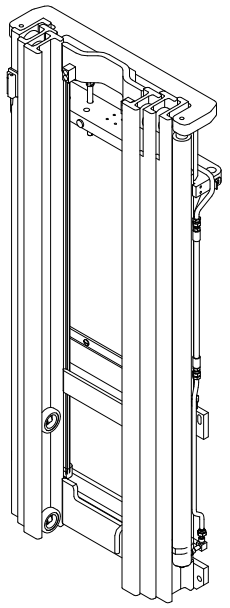


Figure1-12

1.9. Registration

1.9.1. Registration

Article 33 of the Special Equipment Safety Law and Article 25 of the Special Equipment Safety Supervision Regulations both stipulate the registration requirements for the use of special equipment, that is, the licensing requirements. Users must register with the special equipment safety supervision and management department of the municipality directly under the central government or the city with districts before the equipment is put into use, or within thirty days after it is put into use, and obtain the use registration certificate before they can continue to use the equipment.

1.9.2. Frame number

Each truck has a unique frame number imprinted on its frame, which is printed at a location on the right side of the front frame near the ground (Position A) and in the middle or bottom of the rear frame (Position B).

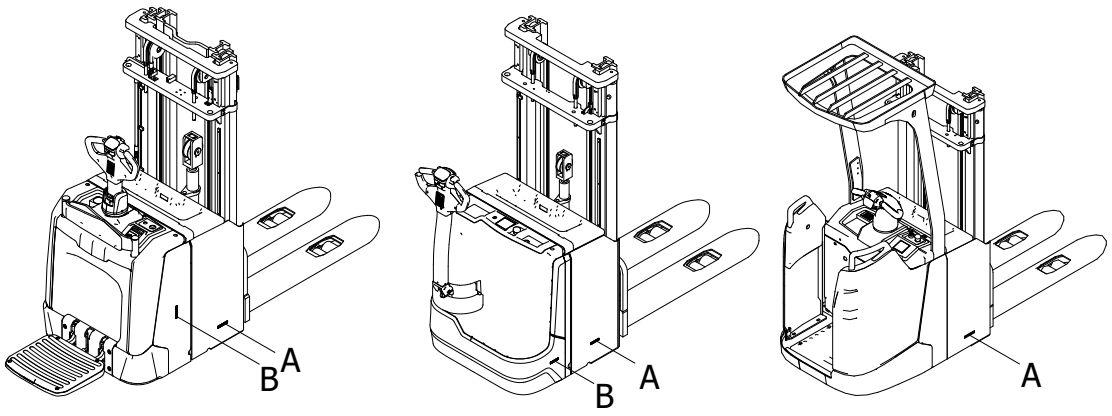


Figure1-13

1.9.3. Laws and regulations and technical standards to be followed

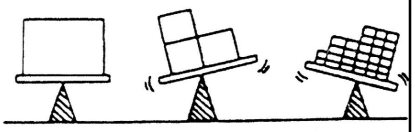
This truck is classified as special equipment, and its use and supervision should comply with the provisions of national laws, regulations, and technical specifications such as the "Special Equipment Safety Law of the People's Republic of China," the "Special Equipment Safety

Supervision Regulations," and TSG81-2022 "Safety Technical Code for Special Motor Vehicles in Factories (Plants)."

II Stability

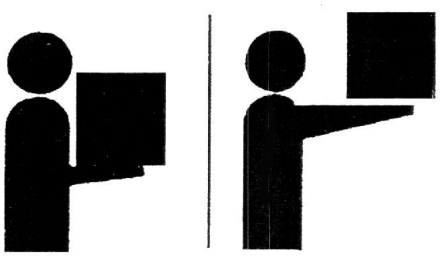
Caution | **Load center of gravity**

The load profiles handled by the truck vary; in order to evaluate the truck stability, it is very important to identify the center of gravity for loads in different shapes from boxes to boards and rectangular objects.



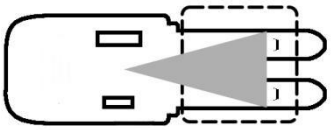
Caution | **Maximum load and load center distance**

The horizontal distance between the center of gravity of the load on a fork and the load backrest of the fork or the front surface of the fork (whichever is smaller) is called the load center distance. The maximum load refers to the maximum load that the fork can bear at the standard load center distance. The relationship between the maximum load and the load center distance is shown on the Loading Capacity Chart of the forklift truck. If the load center distance moves towards the front fork, the overall center of gravity will move forward, thus the load has to be reduced.



Caution | **Stable region of center of gravity**

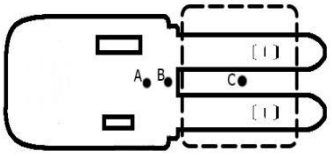
In order to make the forklift truck stable, the combined center of gravity has to be within the triangle formed by contact point of the front left and right tires and the midpoint of the rear axle.



If the combined center of gravity is on the rear axle, the two front tires will form a fulcrum and the forklift truck will tilt forward. If the combined center of gravity moves out of the stable center of gravity triangle, the forklift truck will roll over in the direction towards the combined center of gravity.

Caution | **Center of gravity and stability**

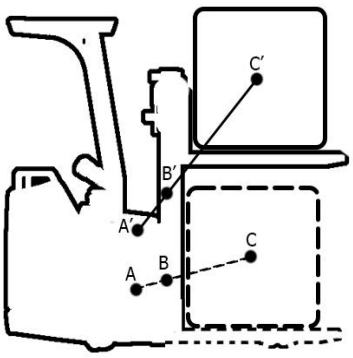
The stability of a truck depends on the combined center of gravity (B) formed by the truck's center of gravity (A) and the load's center of gravity (C). When the truck is unloaded, the center of gravity remains constant; when the truck is loaded, the center of gravity is composed of the truck's and the load's centers of gravity.



The load's center of gravity is determined by the mast's lifting or lowering, therefore, the combined center of gravity changes accordingly.

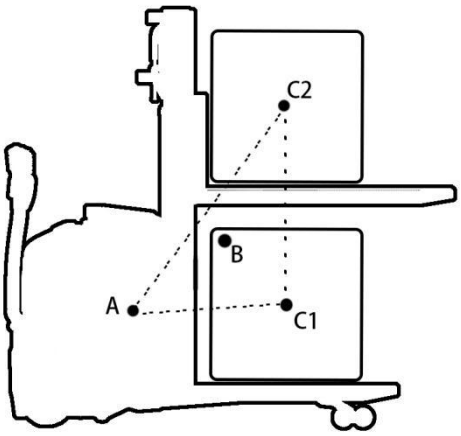
The combined center of gravity of the truck is determined by the following factors:

- Load magnitude, weight and shape;
- Lift height;
- Acceleration, deceleration and turning radius;
- Road conditions and road tilt angle;
- Attachment type.



Caution | The center of gravity of the initial lift stacker.

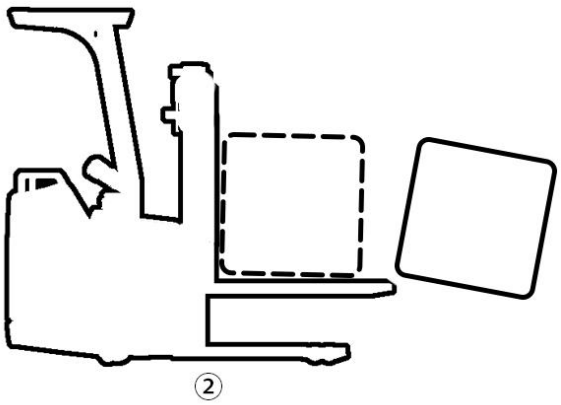
The stability of a truck depends on the combined center of gravity (B) formed by the truck's center of gravity (A) and the load's center of gravity (C1, C2). When the truck is unloaded, the center of gravity remains constant; when the truck is loaded, the center of gravity is composed of the truck's and the load's centers of gravity.



Caution | Speed and acceleration

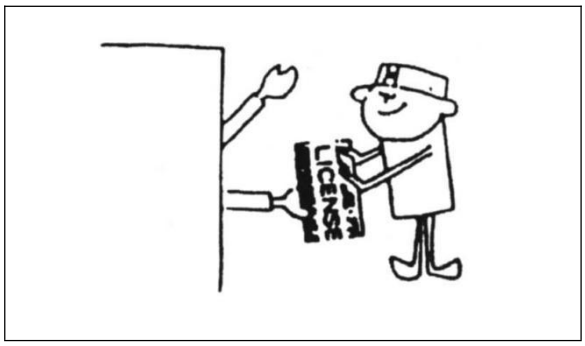
- A static object should remain static without an external force. Similarly, a moving object continues to move at the same speed without an external force, which is referred to as inertia.
- Due to inertia, when the forklift truck starts to move forward, a force acts backwards; when the truck stops, a force acts forward.
- It is dangerous to suddenly apply the brake, because the forklift truck will roll over or the load will slide when a large force acts forward.When the truck turns, a centrifugal force will be applied outwards from the turning center. This force pushes the forklift outwards and has a tendency to tip it over.
- The left and right stability regions are small, thus the forklift truck should slow down to avoid rolling over when turning. If the forklift truck carries a high load and the overall center of gravity is high, the forklift truck may easily tilt forward, to the left or to the right.



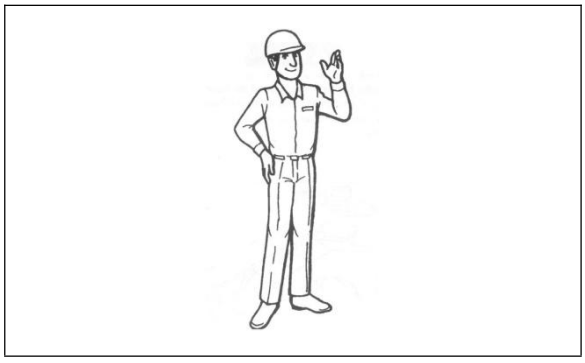


III Safety information

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



2. Operator must wear helmet, working shoes and uniform.



3. It is not allowed to reconfigure the truck without manufacturer's permission.

4. Do not work in flammable and combustible environment.

5. Check the oil and fluid leakage, as well as deformation and loosening of structural components and fasteners in certain time. If neglected, service life of forklift will be shorted and in serious condition there will be accident.

- Ensure that "safety critical parts" are replaced in regular checks.
- Wipe off the oil, grease or water on the soleplate, foot pedal and control lever.
- No smoking, sparks or flames near to the lithium-ion battery during inspection.
- Be careful of scald when checking motor and controller.

6. The controller equips with energy accumulator, do not touch between B+ and B- to avoid electric injury. In order to check or clean the controller, please power off first, and then a load device (such as contactor coil, horn, bulb or resistance) should be connected between B+ and

B- to discharge the capacitor inside the controller.

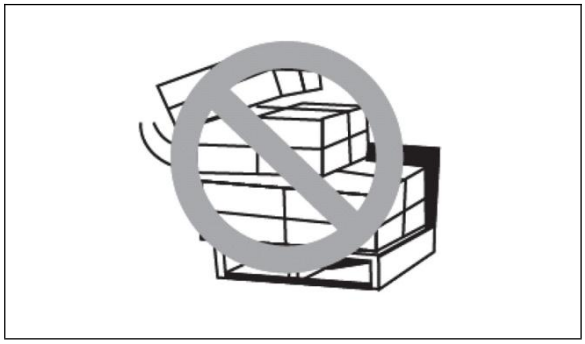
7. In the event of any faults, the operator should stop the truck immediately, hang the "Danger" or "Fault" sign, pull out the key and report to the management. The truck should not be used until all faults are eliminated.

– In the event of a sudden fault when lifting loads or driving on gradients, causing leakage of hydraulic oil or gear oil, personnel should be organized for repair immediately.

8. The driving route for trucks must be a solid and flat concrete road or similar roads suitable for truck operation. Pre-inspect the ground conditions of the work site. Tidy up the workplace, remove obstacles, sweep away debris and sand, and wipe off oil and water stains.

Do not overload! Before operating, familiarize yourself with the load curve chart on the load curve sign. It indicates the relationship between the rated load and the load center distance, as well as the maximum load the truck is allowed to carry.

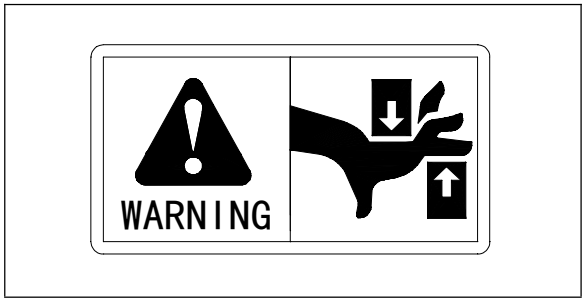
9. Before starting, sound the horn and make sure no one is around the truck.



10. Sudden starts, stops, or sharp turns are not allowed, as such operations may cause the truck to tip over, or the cargo to spill or fall.

11. Do not drive the truck on the road, only use it in designated stacking places suitable for its small wheels.

12. Do not put your head, hands, feet and body into the moving mechanisms.



13. Do not use the truck in sandstorms, snow, lightning, rain, wind and other bad weather

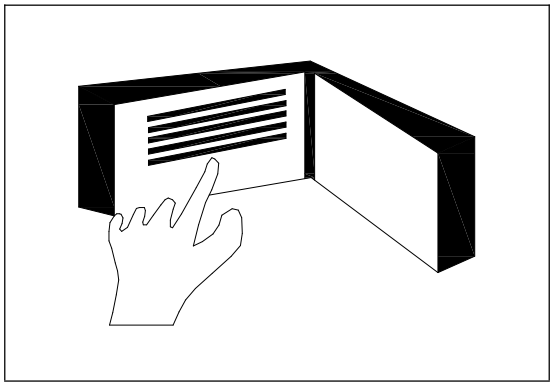
conditions. In particular, when the wind speed is more than 5m/s, it is better not to use the truck.

– The climate conditions the truck is designed for: temperature: -5℃ to 40℃; wind speed: no more than 5m/s; relative air humidity: no more than 90% (temperature: 20℃). Altitude ≤ 2,000m.

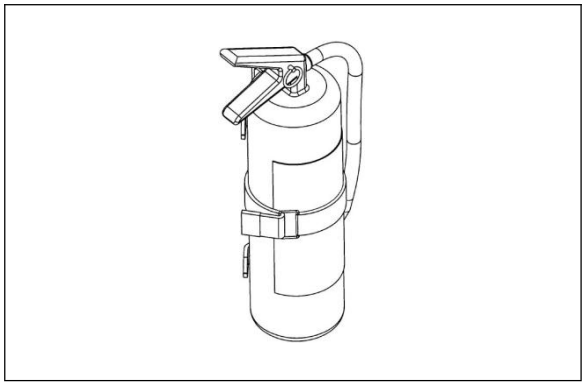
14. **When the truck is powered off, the brake will be applied, so it must not be towed.**

15. **For stand-up trucks, the user should stand on the footboard steadily with both hands holding the handle tight. The truck should turn at speeds below 3km/h.**

16. There are warnings and operation methods on the labels. Please operate the truck according to the instructions in this manual and the signs on the truck. Check labels, signs and marks, and replace them if they are damaged or missing.



17. The workplace should be provided with fire extinguishers. The truck can also be equipped with a fire extinguisher by the user. Drivers and managers should be familiar with the position and usage method of the fire extinguishers.

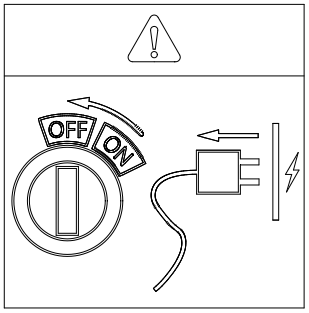


18. Do not flush the inside of truck with water, the truck should not be exposed to rain.

19. Use a pallet when handling small objects and do not place them on the forks directly.

20. Before any disassembly or repair of the vehicle, the battery power plug must be removed first.

21. The battery must be unplugged before dismantling or repairing.



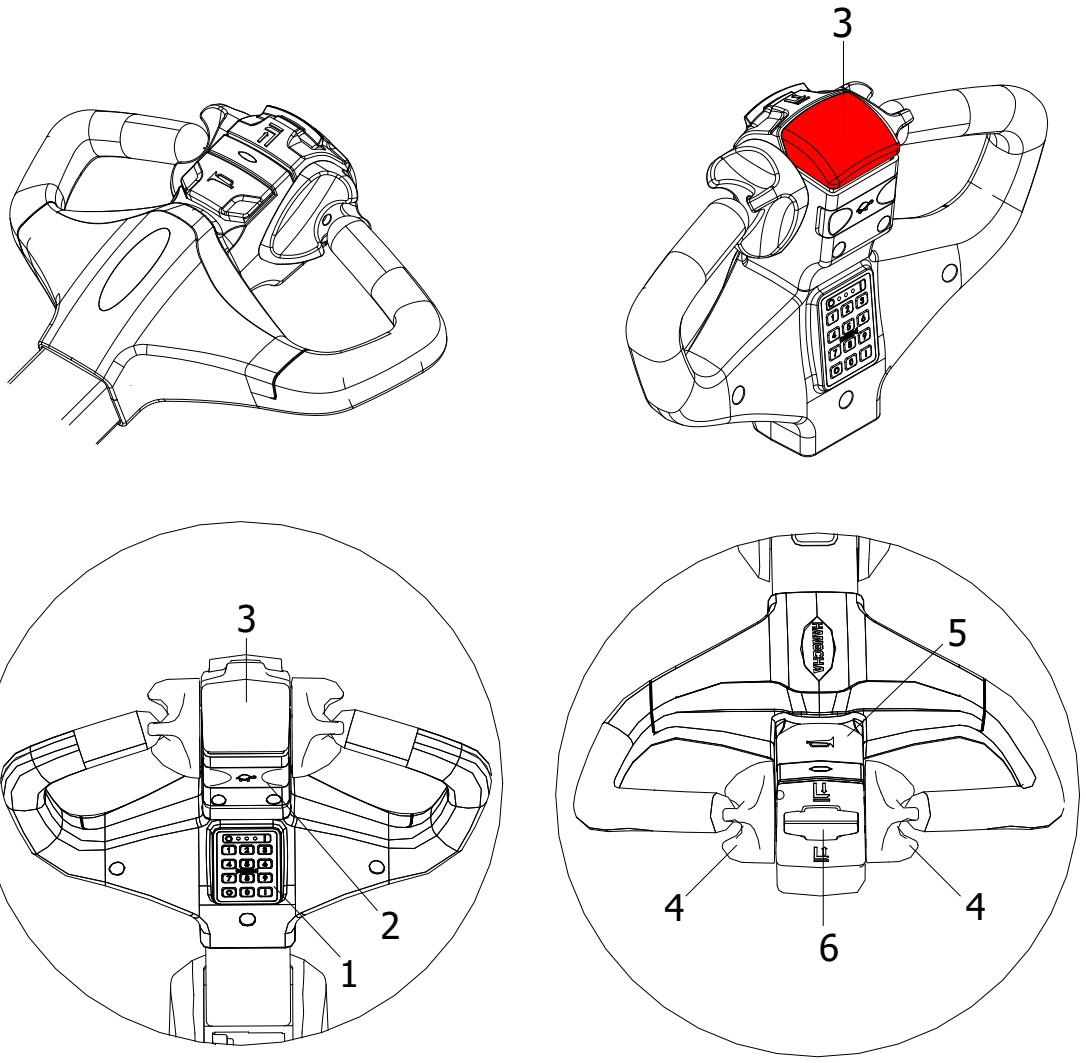
22. Only if the original manufacturer is no longer in the truck industry and no other enterprise specializing in this industry has taken over the business, is the user allowed to make modifications or refits to the truck, but the user should comply with the following rules:

- Arrange for the modification or alteration to be designed, tested and executed by an engineer(s) expert in the field of industrial trucks and their safety;
- Maintain a permanent record of the design, test(s) and execution of the modification or alteration to this truck;
- Modified its nameplates, labels, tags and operation instruction accordingly;
- Affix a permanent and readily visible label to the truck stating the manner in which the truck has been modified or altered together with the date of the modification or alteration, and the name and address of the organization that made the modification or alteration.

Ⅳ Control parts and dashboards

4.1. Control parts

CDD12/14/16/20-XT1(S)-SI Controller

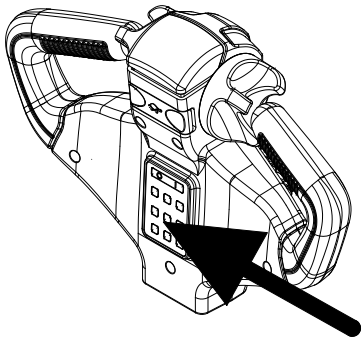


Number	Name	Function
1	Password lock and card reader	The vehicle must be verified through a password lock or card reader before starting.
2	Turtle Speed Driving	Activate turtle mode, speed slows down.

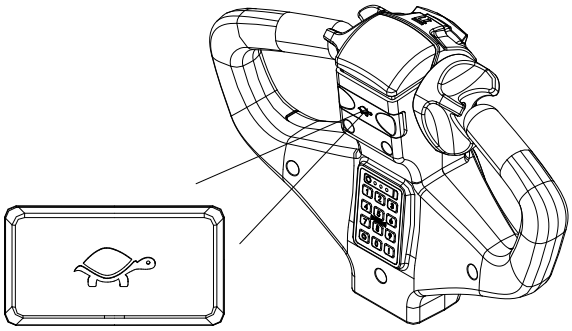
	Button	
3	Emergency Reverse Button	To protect the safety of the human body when being clamped by the joystick
4	Drive button	Used to control the forward and reverse movement and speed of a vehicle, the steering switch is used to control the direction and the magnitude of speed.
5	Horn button	Issue a warning signal
6	Forklift lift and lower button	Control the lifting or lowering of the fork.

Password lock and card reader[1]

The vehicle must be started for operation after verification through a password lock or card reader.(See section 4.4)

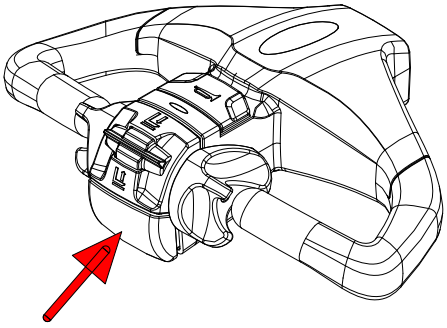


Turtle Speed Button[2]



Press this button, and the vehicle's maximum operating speed is reduced to 2.5km/h. Release this button, and the vehicle operates at normal speed.

Emergency Reverse Button[3]



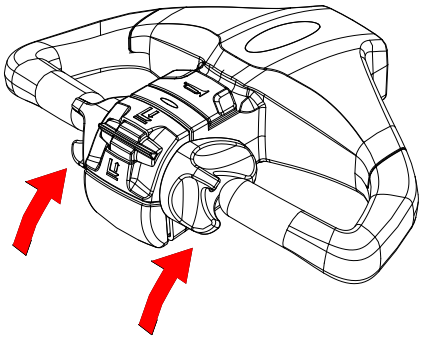
This switch is located at the head of the control handle. Once this switch is triggered, the vehicle will immediately move forward. It is used to ensure the safety of the human body in case it gets caught by the control handle.

Drive button[4]

The button is located on either side of the Joystick head,Linked movement on both sides.It is used to control the direction and speed of operation.

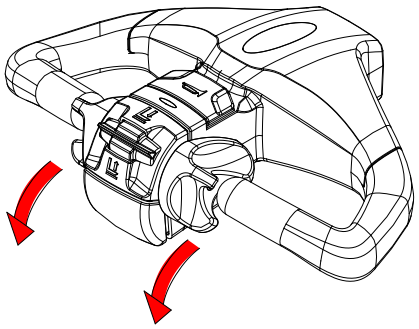
The vehicle is running towards the front side direction.

- Push down on the control handle with your hand.
- Gradually rotate the speed control button outward from the side of your body with your thumb.
- The vehicle moves in the direction of the side of the fork.



The vehicle is running towards the rear side direction.

- Depress the control handle. Gradually rotate the direction speed control button towards the body with the thumb.
- The vehicle moves in the direction of the handle side.



notice

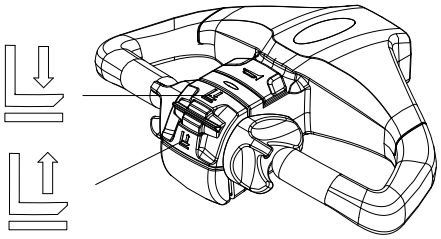
- **The directional speed control button automatically returns to its original position after the finger is released, causing the vehicle to brake. Therefore, to keep the vehicle running during operation, the finger must not be released.**

Horn button[5]



The horn button is located on the front surface of the Joystick head. Pressing the horn button causes the horn to sound

Elevator Up/Down Button[6]

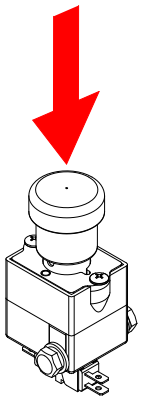


Press the lift button., Forklift lifting。

Press the down button., Fork lowering；

When the battery charge drops below 20%, the lifting function will be locked. At this point, charging should be done as soon as possible.

Emergency stop button

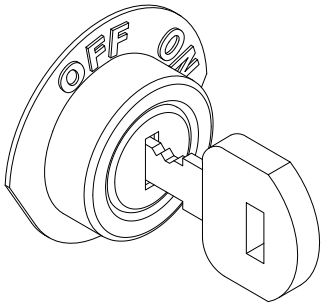


In case of emergency, press this button to cut off the main power supply.

Caution

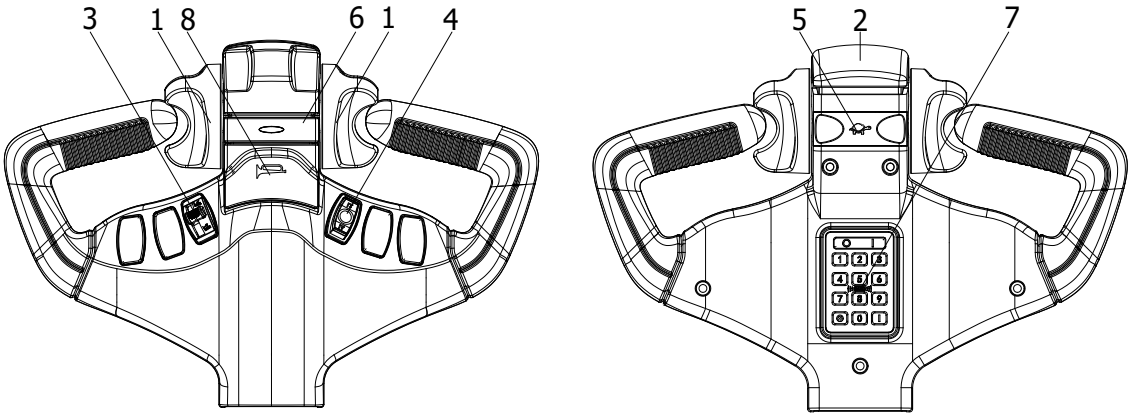
- Do not use the emergency stop button instead of the key switch.
- Pressing the hard stop switch cuts off the power and also the steering system, so pressing the switch while driving can result in serious consequences.
- Pressing the tight stop switch only turns off the vehicle power supply but does not provide mechanical braking. After pressing the switch while driving, the vehicle will continue to move for a certain distance due to inertia.
- Please do not replace the key switch with the emergency stop button switch.

Key Switch



The key switch has two positions, "OFF/ON". To start, first lift the emergency stop switch, then turn the key to the "ON" position, at which point the instrument panel lights up and the truck starts.

CDD12/14/16-XT1(S)-SIL Controller



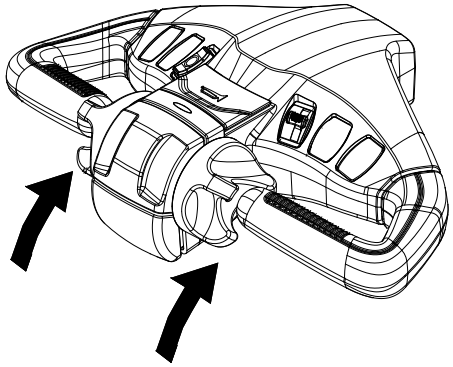
Number	Name	Function
1	Drive button	Used to control the forward and reverse movement and speed of a vehicle, the steering switch is used to control the direction and the magnitude of speed.
2	Emergency Reverse Button	To protect the safety of the human body when being clamped by the joystick
3	Forklift lift and lower button	Control the lifting or lowering of the fork.
4	Leg lift and lower button	Control the lifting or lowering of the outriggers.
5	Turtle Speed Driving Button	 Activate turtle mode, speed slows down.
6	Turtle speed indicator light	Press the turtle speed driving button, the indicator light stays on.
7	Password lock and card reader	The vehicle must be verified through a password lock or card reader before starting.
8	Horn button	Issue a warning signal 

Drive button（1）

The button is located on either side of the Joystick head,Linked movement on both sides.It is used to control the direction and speed of operation.

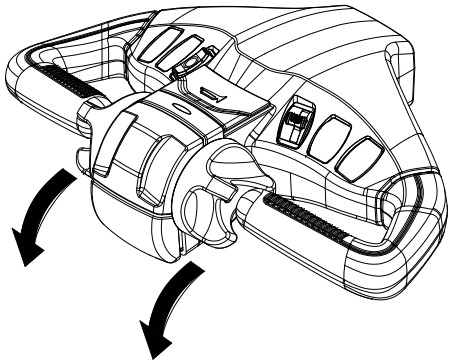
The vehicle is running towards the front side direction.

- Push down on the control handle with your hand.
- Gradually rotate the speed control button outward from the side of your body with your thumb.
- The vehicle moves in the direction of the side of the fork.



The vehicle is running towards the rear side direction.

- Depress the control handle. Gradually rotate the direction speed control button towards the body with the thumb.
- The vehicle moves in the direction of the handle side.

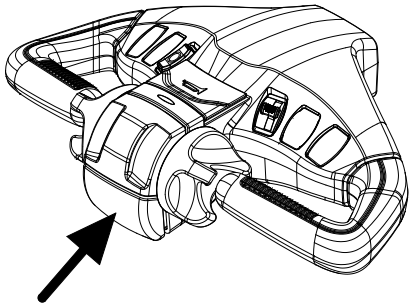


notice

- **The directional speed control button automatically returns to its original position after the finger is released, causing the vehicle to brake. Therefore, to keep the vehicle running during operation, the finger must not be released.**

Emergency Reverse Button[2]

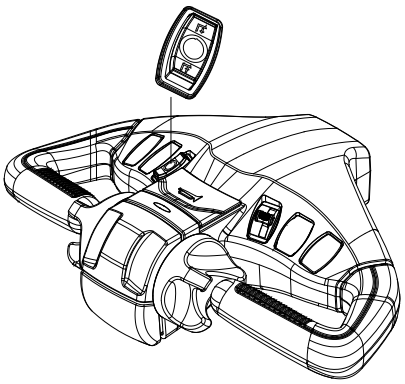
This switch is located at the head of the control handle. Once this switch is triggered, the vehicle will immediately move forward. It is used to ensure the safety of the human body in case it gets caught by the control handle.



Forklift lift and lower button[3]

Move the forklift lever up and down to control

the lifting or lowering of the forks.



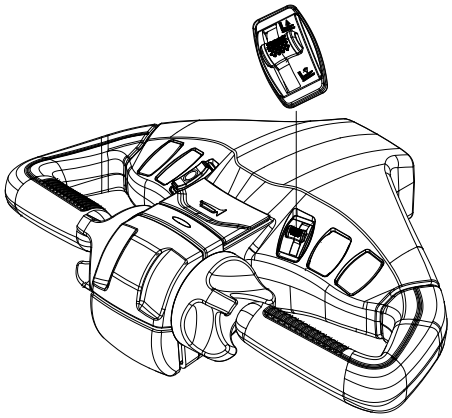
Swipe the button down ,Forklift lifting

Swipe up the button ,Fork lowering

When the battery charge drops below 20%, the lifting function will be locked. At this point, charging should be done as soon as possible.

Leg lift and lower button[4]

Press the leg lift and lower button to control the lifting or lowering of the legs.



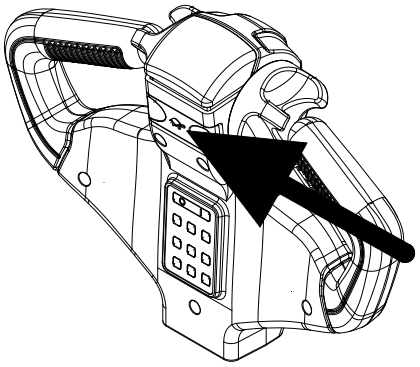
Press the button down. ,Lift the outrigger.

Push the button upwards , Lower the outrigger.

When the battery charge drops below 20%, the lifting function will be locked. At this point, charging should be done as soon as possible.

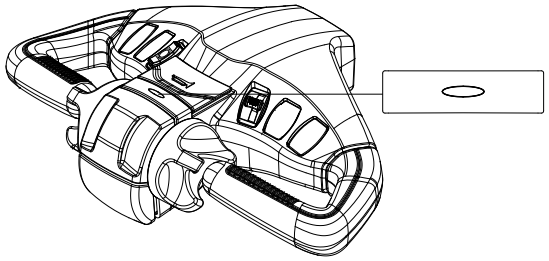
Turtle Speed Driving Button[5]

Press this button, and the vehicle's maximum operating speed is reduced to 2.5km/h. Release this button, and the vehicle operates at normal speed.



Turtle speed indicator light[6]

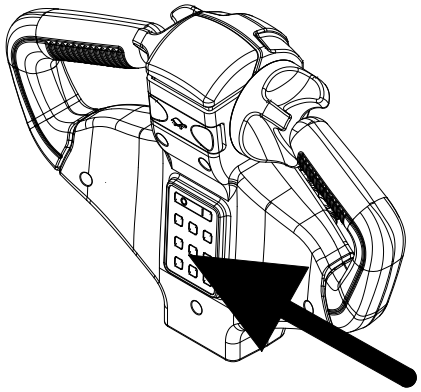
After pressing the turtle speed button [5], the turtle speed indicator light [6] stays on, and the vehicle travels at 2.5km/h; pressing the turtle speed button [5] again turns off the turtle speed indicator light [6], and the vehicle operates at normal speed.



Password lock and card reader[7]

The vehicle must be started for operation after

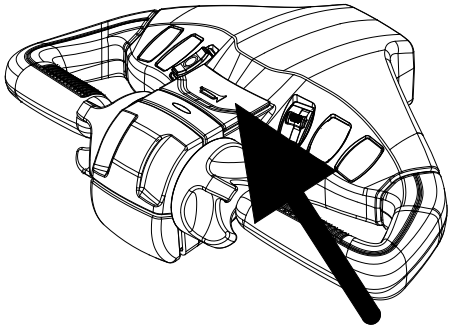
verification through a password lock or card reader.



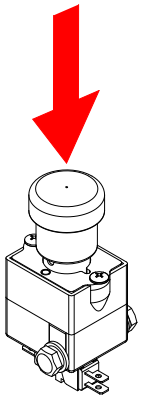
Horn button[8]



The horn button is located on the front surface of the Joystick head. Pressing the horn button causes the horn to sound



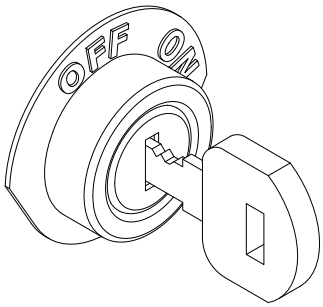
Emergency stop button



In case of emergency, press this button to cut off the main power supply.

> **Caution**
>
> - Do not use the emergency stop button instead of the key switch.
> - Pressing the hard stop switch cuts off the power and also the steering system, so pressing the switch while driving can result in serious consequences.
> - Pressing the tight stop switch only turns off the vehicle power supply but does not provide mechanical braking. After pressing the switch while driving, the vehicle will continue to move for a certain distance due to inertia.
> - Please do not replace the key switch with the emergency stop button switch.

Key Switch



The key switch has two positions, "OFF/ON". To start, first lift the emergency stop switch, then turn the key to the "ON" position, at which point the instrument panel lights up and the truck starts.

4. 2. Dashboards

4. 2. 1. Overview



Figure4-5

Key functions

Key	Initial interface key functions
1	Switch the truck operating mode.
2	Enter the switch inspection, operation inspection, fault display, and parameter adjustment interface
3	/
4	Enter the local settings and other settings interface

Meaning of each icon

NO.	Icon.	Parameter name	Description
1		Hour meter	Numerically displays the total operating time of the current truck; Unit: h.
2		Battery level display	Displays the battery icon and the current battery level, Unit:%
3		Operating mode	Displays the operating mode
4		Truck travel speed	Displays truck travel speed information
5		Fault display	When an electrical system fault occurs, this indicator light remains on. The light goes out after the fault is resolved
6		Lifting prohibition display	When the truck is in a lifting prohibition state, this indicator light remains on; when the lifting prohibition state is lifted, this indicator light goes out.

4. 2. 2. Dashboard operation manual

Press the function key 2 on the main interface to enter the menu. The menu interface display effect is shown in the figure.



Figure4-6

Select any menu bar in this interface (except for fault display), and press key 3 to enter the password input interface.

The password is *****



Figure4-7

Key functions in this interface.

Key	Corresponding icon	Function
1		Used for increasing the password number
2		Left arrow key, used for selecting the password digit
3		Confirm key, used for confirming the password
4		Return to the previous menu level

4. 2. 3. Switch monitoring

The input signals of various truck switches can be confirmed through this interface, with specific content as follows:



Figure4-8



Figure4-9



Figure4-10



Figure4-11

Key	Corresponding icon	Function
1		Page up display, when currently on the first page, pressing it will take you to the last page.
2		Page down display, when currently on the last page, pressing it will take you to the first page.
4		Return to the main interface display.

4. 2. 4. Operation monitoring

Truck output signals and statuses can be confirmed through this interface, with specific content as follows:



Figure4-12



Figure4-13



Figure4-14



Figure4-15

Key	Corresponding icon	Function
1		Page up display, when currently on the first page, pressing it will take you to the last page.
2		Page down display, when currently on the last page, pressing it will take you to the first page.
4		Return to the main interface display.

4. 2. 5. Parameter adjustment

- The values corresponding to P and E mode speeds indicate what percentage of the maximum speed is set for that mode. For example, a forward speed of 720 in P mode indicates that the forward speed in P mode is 72% of the maximum speed of the truck.
- The smaller the acceleration rate value, the faster the truck accelerates; the larger the deceleration rate value, the faster the truck decelerates.
- The lifting speed indicates the maximum rotational speed of the hydraulic pump motor during the lifting process. For example,a lifting speed of 4000 signifies that the maximum rotational speed of the hydraulic pump motor is 4000 revolutions per minute (RPM) during lifting.
- The lowering proportional valve current represents the maximum current controlled by the controller for the proportional valve.For example,a lowering proportional valve current of 400 indicates that the maximum current controlled by the controller for the proportional valve is 0.4 A.



Figure4-16



Figure4-17



Figure4-18

Key functions of this interface:

Key	Corresponding icon	Function
1		Used for switching options upward in the menu bar.
2		Used for switching options downward in the menu bar.
3		Confirm button, enter the parameter adjustment interface for the current menu bar option.
4		Return to the previous menu level.

4. 2. 6. Local settings

Language settings: Switch between Chinese and English.

Instrument brightness adjustment: Adjust the brightness of the instrument screen.

Unit switch: Switch between metric and imperial units of speed.

Hour meter display: Switch between working time and power-on time.



Figure4-19

Key functions of this interface:

Key	Corresponding icon	Function
1		Used for switching options upward in the menu bar.
2		Used for switching options downward in the menu bar.
3		Confirm key, enter the interface of the highlighted option in the current menu bar.
4		Return to the previous menu level.

4. 3. Body and other parts

Pull the armrest and pedal towards the body of the truck as shown in the figure to retract the armrest and pedal.

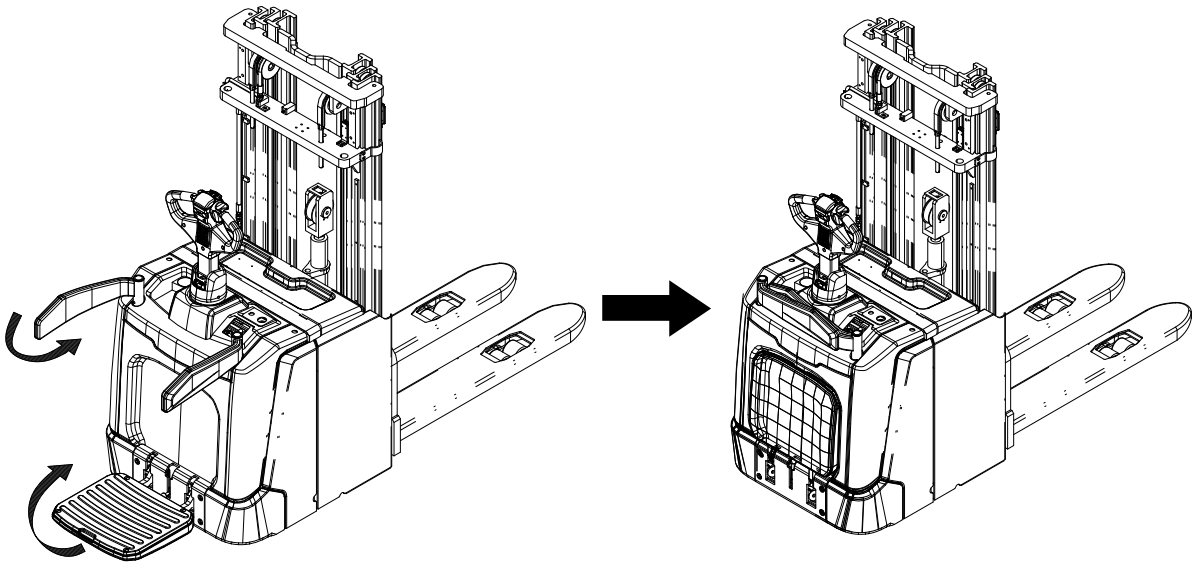
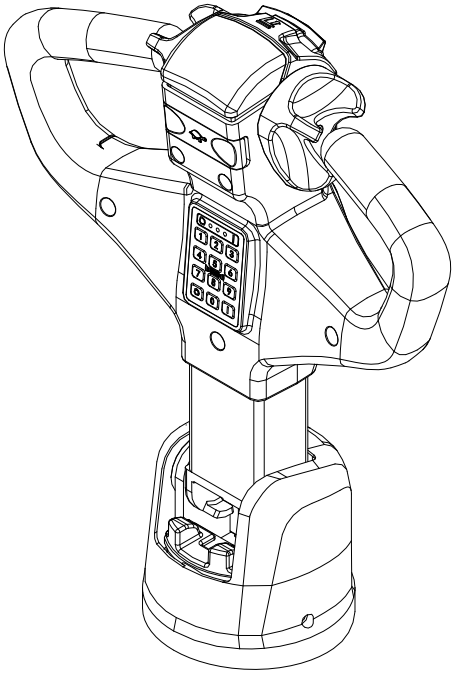


Figure4-20

4. 4. Password lock and card reader





4.4.1.1. Create/Modify User Password

1) In the event of a vehicle power failure, enter the administrator password (default: 42321), press the "I" confirmation key. If the entered administrator password is correct, the lock will emit a long beep, and the red indicator light will continue to flash. If the administrator password is incorrect, the red indicator light will flash three times, followed by three short beeps, and then the green light will flash.
2) Input function code 1, the green indicator light stays on, waiting for the administrator to input the user identity ID, which ranges from 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, a total of 10 groups.
3) After entering the user identity ID, press the "I" confirmation key, and the green indicator light will continue to flash;
4) Enter a 0-6 digit user password (any digit from 0-9, with repetitions allowed) and press the "I" confirmation key. If the password creation is successful, the green indicator light will remain on.
5) After the password matches, it will return to step 3 (the green light is on before operation), and the administrator can continue to add user IDs and passwords.
6) To exit the current function operation, press the "O" cancel key, the password lock will emit

two beeps, the red indicator light will flash twice, and then the green indicator light will continue to flash.

4.4.1.2. Change the administrator password.

1) Enter the administrator password, press the "I" confirmation key, the password lock will emit a long beep, then the red indicator light will keep flashing.
2) Enter function code 5, the green indicator light on the lock flashes;
3) Enter the new administrator password, press the "I" confirmation key. Password creation successful, red indicator light flashes;
4) To exit the current function operation, press the cancel key, the password lock will emit two beeps, the red indicator light will flash twice, and then the green indicator light will continue to flash.

4.4.1.3. Delete all users

1) In the event of a vehicle power failure, enter the administrator password (default: 42321), press the "I" confirmation key, a long beep will sound, followed by the red indicator light flashing continuously.
2) Input function code 3, the green indicator light on the password lock will flash once and then remain on.
3) changed), press the "I" confirmation key, and if the password is correct, the red indicator light will flash and the green indicator light will stay on for about 25 seconds (clearing other user data). Then, both the red and green indicator lights will flash three times together, accompanied by two short beeps, after which the green indicator light will flash, indicating that the password lock has been reset to factory settings, meaning only the admin password 42321 is valid and other user data will be cleared. If the entered password is incorrect, the red indicator light will flash twice, accompanied by two short beeps; then the password lock will automatically return to the main menu.
4) To exit the current function operation, press the cancel key, which will emit two short beeps, followed by the red indicator light flashing twice; (note that when inputting function code 3, pressing the cancel key will not allow you to exit, only after moving to the next step or the previous step).

Ⅴ Operation

5.1. Safety regulations for operating movements

Travel routes and working areas

Truck must only be driven on designated routes. Non-staff members must keep clear of the working area. Cargo should only be placed in designated locations. It is forbidden to stack cargo in travel lanes that need to be used at any time, emergency exits, and in front of safety devices and operating mechanisms.

Truck should only operate within well-lit working areas to prevent personal injury or damage to property.

Warning

- Do not exceed the area and point load allowed by the travel path.
- When visibility is obstructed, guidance from other staff members is required.
- The operator must ensure that the loading platform/charging platform is not removed or loosened during the loading and unloading process.

Driving permit:

The truck can only be operated by technicians who have received specialized training. Operators must pass a test administered by the equipment user, be proficient in the skills required for equipment operation and load handling, and be officially authorized by the equipment user or their authorized representative.

Driver's rights, obligations, and code of conduct:

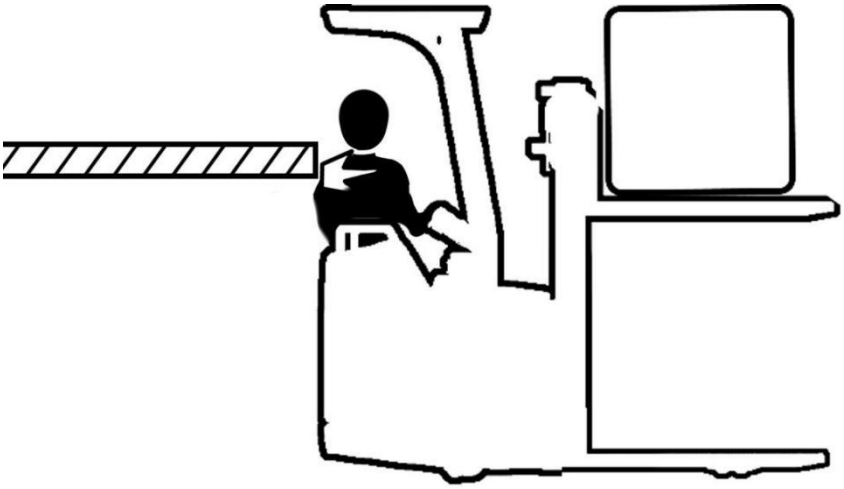
Drivers must understand their rights and obligations, have received instruction and training in the operation of the truck, and be familiar with all the contents of this operating manual. The user must grant the operator the rights they are entitled to. If the operator needs to walk alongside the vehicle while operating it, they must wear protective boots.

Precautions during operation

Drivers must control the driving speed according to the conditions on site. When turning, in narrow aisles, passing through swing doors, and in areas where visibility is obstructed, it is essential to drive slowly. Sufficient braking distance must be maintained from the vehicle in front, and the truck must be controlled at all times. Sudden stops (except in emergencies), sharp turns, or overtaking are not allowed in dangerous or obstructed visibility locations. It is prohibited to lean out of the operator's compartment or extend limbs outside the truck.

During travel, do not place your hands or arms on the backrest. Keep hands within the operator's area, and feet on the pedal platform without extending beyond the platform's boundaries.

Do not extend any part of your body outside the operator's area before the truck has come to a complete stop.



When entering a pallet to load cargo or when there are obstacles around, drive slowly to avoid collisions with the cargo or obstacles that could injure your hands, feet, or any other parts of your body.

Warning

- Multiple people are prohibited from entering the standing operating platform.
- It is forbidden to use the forks to elevate personnel.
- It is prohibited for personnel to enter and remain under raised forks or the cab.
- Do not insert your hand into the moving parts of the truck.
- Do not lean out or extend into areas beyond the work and operating zones.
- Drivers must face the direction of travel and must always have a clear view of the road ahead.

Non-staff are prohibited from using this equipment:

During the use of the truck, the driver is fully responsible for the equipment. It is their duty to prohibit non-staff from driving or operating this truck. This truck must not be used to transport personnel.

Driver's line of sight during operation:

Drivers must keep their line of sight directed towards the direction of travel and be attentive to the conditions on the driving route at all times.

Traveling up or down slopes:

When ascending or descending slopes, travel must be conducted along the designated routes. The surface must be kept clean, non-slip, and in accordance with the technical performance of the truck. During the process of going up or down slopes, it is prohibited to turn, drive diagonally, or stop midway. When traveling downhill, the truck speed must be reduced, and the driver must always be prepared to apply the brakes.

Equipment damage and defects:

If any damage or other defects are found on this truck or its attachments, the situation must be immediately reported to the supervisor. Truck with impaired operational performance (such as worn tires or malfunctioning brakes, etc.) must not be used until they have been properly repaired.

Driving the truck onto elevators or loading docks:

If it is necessary to drive the stacker onto an elevator, ensure that the elevator has sufficient load-bearing capacity, is designed to accommodate the stacker, and that permission from the equipment user has been obtained. Required checks must be performed before carrying out the operation. If other personnel are using the elevator at the same time, they must wait until the operator has completely parked the truck before entering. After reaching the designated height, the personnel should exit the elevator first.

Conditions required for the cargo to be handled on the load surface:

Truck drivers must carefully inspect the cargo to ensure that no hazards are present. Before starting to move the cargo, it must be properly placed and secured. If there is a risk of the cargo tipping over or falling during handling, suitable protective devices must be installed (such as securing to a fixed ring).

Equipment maintenance:

Drivers are not permitted to perform repairs or modifications to the truck without specialized training and authorization. Drivers must never disable or adjust safety devices and switches without proper authority.

Safety devices and warning signs:

- All provisions regarding safety devices, warning signs, and warning instructions in this manual must be strictly adhered to.
- Removing or deactivating safety devices (such as emergency stop switches, automatic accident braking pedals, alarms, warning lights, safety guards, protective glass, covers, etc.) may lead to accidents and personal injuries.
- ark the damaged truck and take it out of service. The truck may only be restarted after the faults have been identified and rectified.

Hazardous areas:

Hazardous areas are those where there is a risk of personal injury. These hazards primarily arise from the movement of the truck or the handling of loaded cargo. Hazardous areas also include zones where there is a risk due to the potential falling of loaded objects.

Malfunction:

If the truck loses control during operation, immediately press the emergency stop (main switch), apply the service brake, and engage the parking brake. Inspect the cause of the malfunction, and if necessary, contact the manufacturer's service department.

Warning

- Non-staff members must stay away from hazardous areas.
- Warning signs must be displayed in hazardous areas.
- If non-staff members refuse to leave the hazardous area, the truck must be stopped immediately.

5. 2. Adjust the truck's backrest, armrests, seat, etc

Before operating the truck, please ensure that the armrests and footboards are extended(if available).

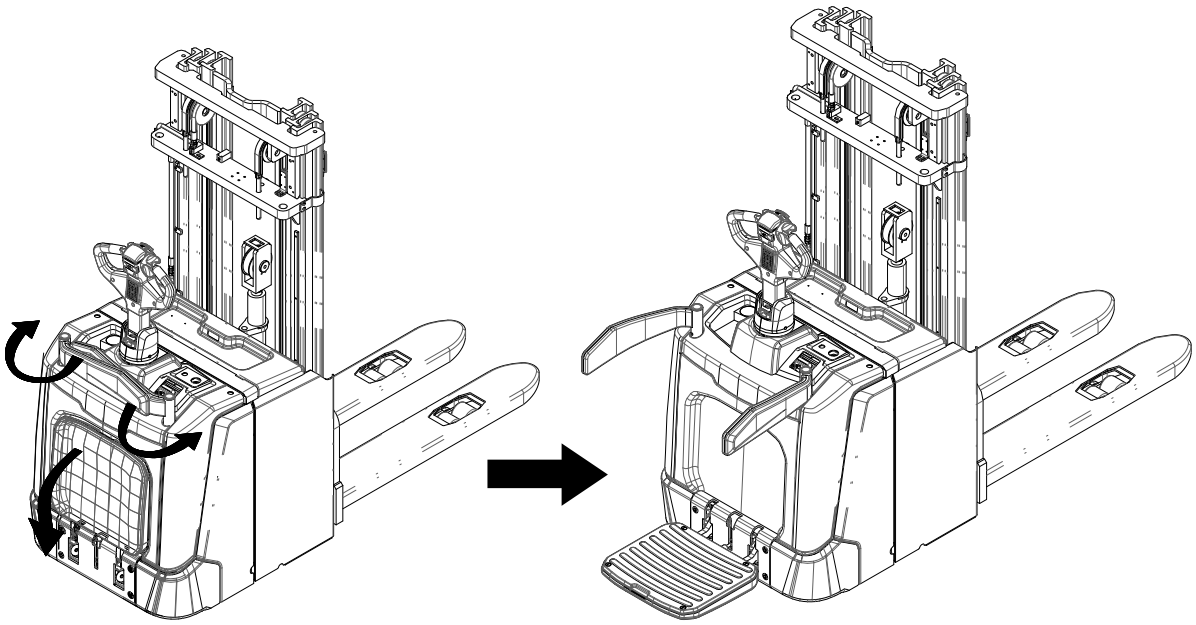


Figure5-1

5. 3. **Starting**

- Connect the battery plug.
- Turn on the key switch (2), or correctly enter the password.
- Lift the emergency power-off switch (1).
- For a stand-up truck, the user should stand on the footboard to operate the truck, and the footboard and guardrail should be unfolded first

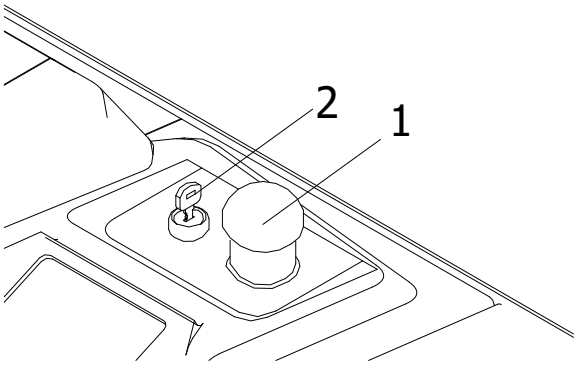


Figure5-2

Caution

- Ensure that the surface on which the stacker operates is in good condition and has sufficient load-bearing capacity.
- Control the stacker's operating speed.

5. 4. **Travelling**

Operating steps：

- Put the truck into service.
- The operator steps onto the footboard (1) (not applicable for Pedestrian-Propelled).
- Bend the handle downward to a certain angle (2).
- Control the direction and speed of the truck by manipulating the driving switch (4 or 5) on the control handle (3).
- Gently twist the driving switch to the desired direction, such as forward (V) or reverse (R).
- When the driving switch is released, it automatically returns to the neutral position, causing the truck to decelerate until it comes to a stop.
- Turn the handle to the left or right to steer the truck in the desired direction; the truck's speed automatically decreases when steering.
- When the handle is released, it will automatically rotate from the center position to a straight-line driving state. If the handle rotates too slowly or does not return to the center position for straight-line driving upon release, the truck must be stopped and not used until the cause is resolved. (This feature is only available on fully enclosed models).
-

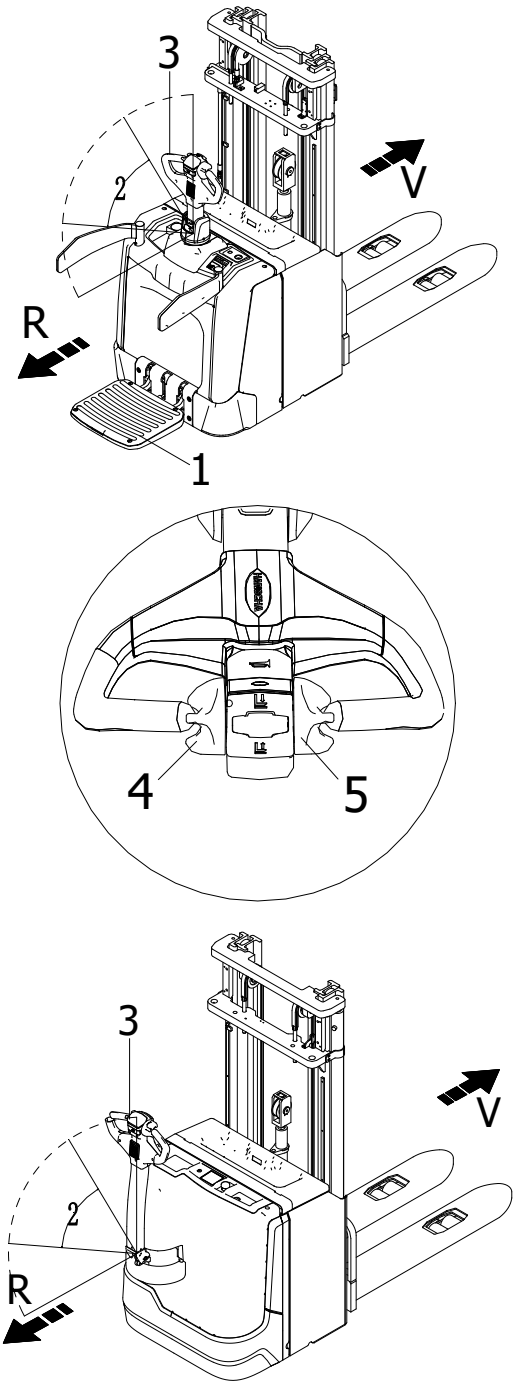


Figure5-3

Caution

- This truck will automatically enter sleep mode after 30 minutes of standby. To restart, power off for more than 5 seconds and then power on again.

Upright Walking:

Due to the extended length of the control handle, stand-up truck are equipped with an upright walking option, facilitating operation in confined spaces.

Operating steps：

-Put the truck into service.

-Press and hold the tortoise icon button (1) on the handle to activate the tortoise speed mode.

-At this point, you can operate the vehicle while the handle is in the upright position.

-Gently twist the driving switch to the desired direction, such as forward (V) or reverse (R).

-When the driving switch is released, it automatically returns to the neutral position, causing the truck to decelerate until it comes to a stop.

-Turn the handle to the left or right to steer the truck in the desired direction.

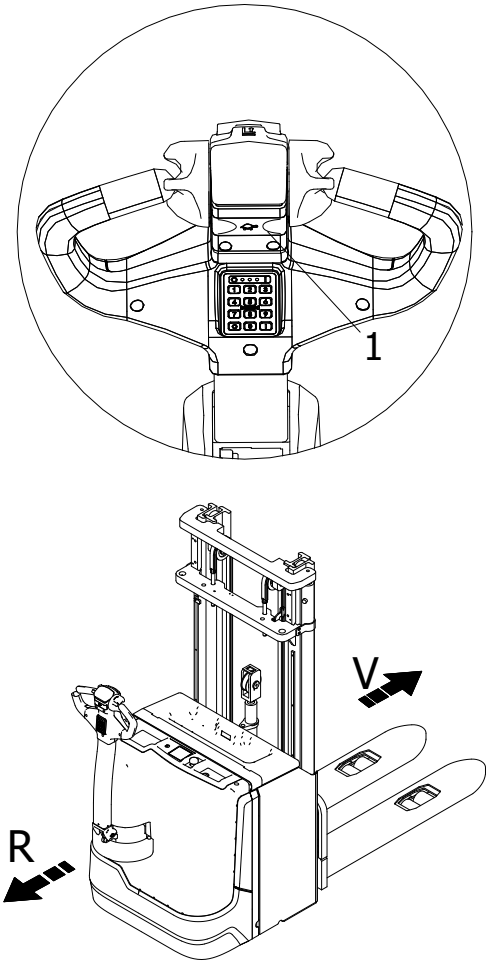


Figure5-4

Caution

- Maintain an appropriate distance from the stacker during pedestrian operation.
- The operator must walk alongside the stacker truck during pedestrian operation and must wear protective boots.
- Do not allow personnel to linger between the stacker and obstacles during pedestrian operation.

5. 5. Braking

The braking performance of this truck largely depends on the condition of the road surface. The driver must take this into consideration during the truck's operation.

This truck can be braked in the following four ways:

- Parking brake when the truck is stationary

- Using dynamic braking (driving switch)

- Using regenerative braking (coast-to-stop braking)

- Using the brake button

Caution

- In case of danger, only the emergency stop switch should be used to apply the brakes.
- The regenerative braking function may cause an increase in braking distance or a malfunction in the braking system.
- Before descending a slope, ensure that there are no personnel in the truck's path of travel or within the danger area.

Parking brake：

The truck has a parking brake function when stationary, preventing it from sliding due to uneven road surfaces.

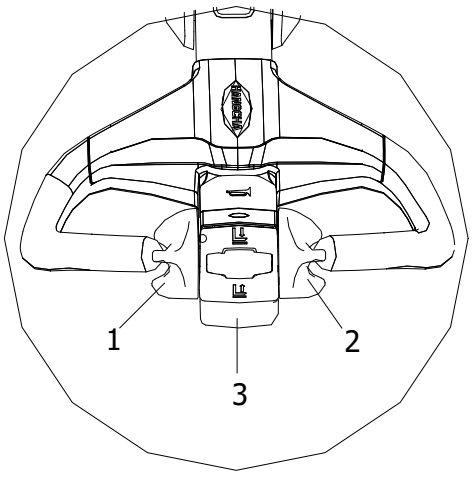


Figure5-5

Using regenerative braking

Operating steps：

–Release the driving switch (1, 2), and the driving switch (1, 2) returns to the neutral position. The truck uses coast-to-stop braking for regenerative braking until it comes to a stop. After that, the parking brake is activated.

Using dynamic braking

Operating steps：

–During travel, switch the driving switch (1, 2) to the opposite direction. The truck will brake using dynamic braking by reversing the current until it begins to travel in the opposite direction.

Using brake switch.

Operating steps：

–During operation, pressing the red brake switch (3) will cause the truck to brake immediately until it comes to a complete stop.

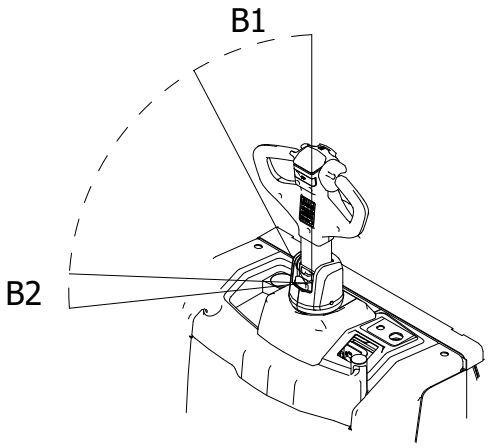


Figure5-6

- Remove your thumb from the direction and speed control buttons and engage the control handle to the brake position(B1 or B2) or the vertical position for further braking.

Caution

- **Find the cause and clear the fault if the control handle moves slowly or fails to automatically enter the brake position after the control handle is released and then engaged in the brake position. Replace the pressure spring if necessary.**

5. 6. Emergency braking


Caution

- Maximum braking can lead to the risk of accidents

If the emergency stop switch is activated during travel, the truck will brake with maximum braking force until it comes to a complete stop. During this process, the load on the truck may slide off the load-bearing components. There is an extremely high risk of accidents and injuries.

- The emergency stop switch should not be used as a service brake.
- The emergency stop switch should only be used during travel in dangerous situations.


Caution

A damaged emergency stop switch poses a risk of causing accidents

In the event of a dangerous situation, if the operator cannot press the emergency stop switch in time to stop the truck, there is a risk of an accident occurring.

- There should be no objects near the emergency stop switch that could interfere with its operational function.
- Any identified defects in the emergency stop switch must be immediately reported to the higher authorities.
- Mark the damaged truck and take it out of service.
- The truck can only be restarted after the fault has been identified and rectified.

Operating steps：

–Press the emergency stop switch.

All electric functions will be interrupted, and the truck will brake until it comes to a complete stop.

After pressing the emergency stop switch, the electric steering system is deactivated. The steering function cannot be used until it is reset.

Press the emergency stop switch only when the situation is dangerous.

Note: The emergency stop switch can be re-activated by pulling it upwards.

All electric functions are enabled when the truck is ready to operate again (provided that the truck was in a ready-to-run state before the emergency stop switch was activated).

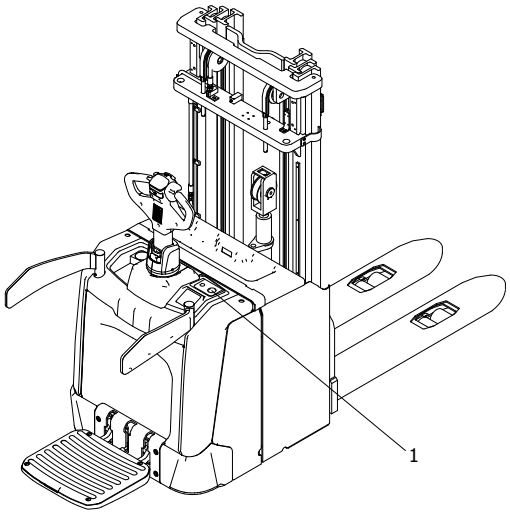


Figure5-7

5. 7. **Steering**

Operating steps：

– Turn the control handle (1) to the left or right, and the drive wheels will rotate accordingly.

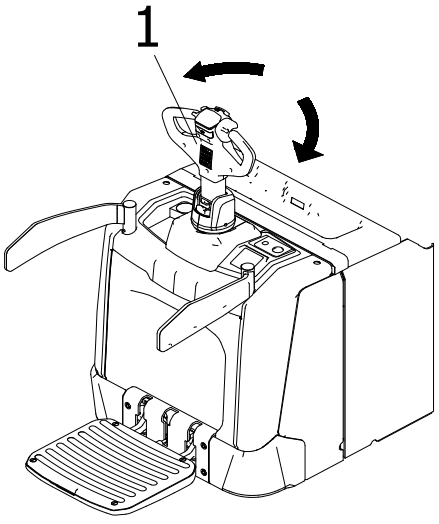


Figure5-8

Caution

- Drive slowly and carefully operate the control handle, and ensure there is enough space behind the truck.

5. 8. **Picking the cargo**

> Warning
>
> - If the truck is powered externally via a cable, stacking and handling of cargo is prohibited.

Operating steps：

- Maneuver the truck slowly to the side of the pallet.

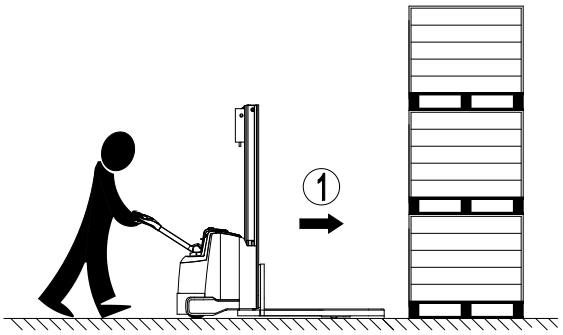


Figure5-9

- Adjust the fork height to align with the pallet.

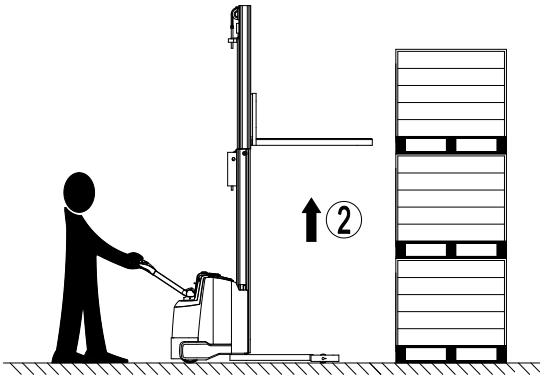


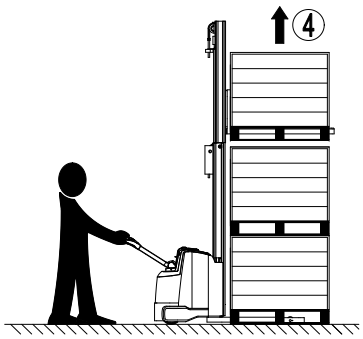
Figure5-10

- Operate the truck to move forward, allowing the fork to go as far into the pallet as possible, until the back of the fork is in contact with the pallet. The cargo must not extend more than 50mm beyond the end of the fork.



Figure5-11

- Press the "Lift" button (1) to raise the cargo by 5 to 10 cm and confirm if the cargo is securely in place.
- Press the "Lift" button (1) to raise the goods 5~10 centimeters and confirm whether the goods are secure.



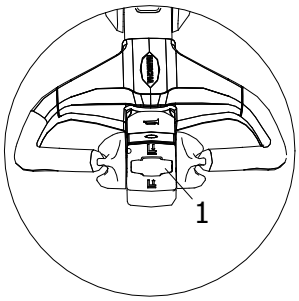


Figure5-12

- Operate the truck to move away slowly.



Figure5-13

- Lower the cargo to the bottom

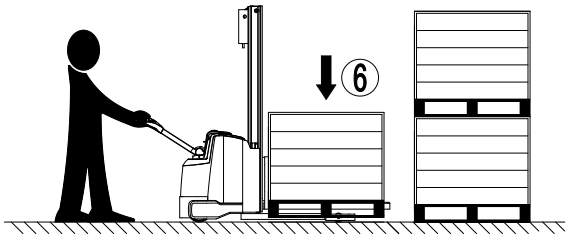


Figure5-14

- Handle the cargo.

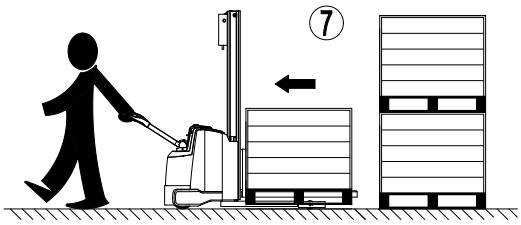


Figure5-15

Initial lift stacker

Operating steps：

- Approach the cargo that need to be handled.

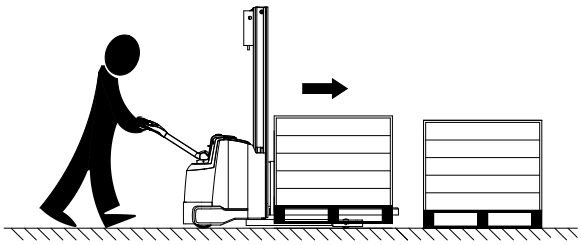


Figure5-16

- Lift the cargo to the designated height.

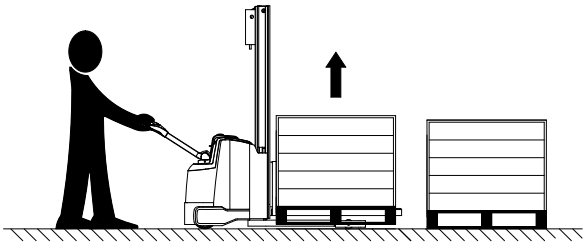


Figure5-17

- Operate the truck to move forward, position the fork under the cargo to be moved, and then stop.

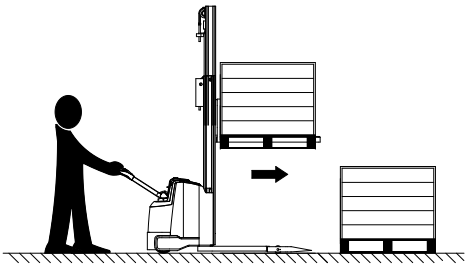


Figure5-18

> Warning
>
> - Simultaneously lifting both forks can lead to serious accidents.

- Raise the forks to lift the cargo to be transported.

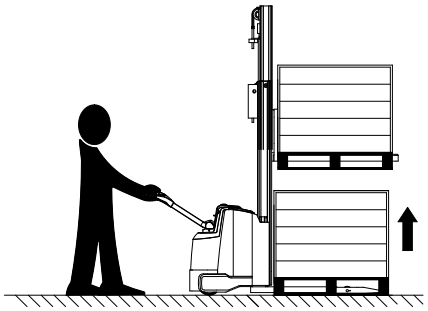


Figure5-19

- Handle the cargo

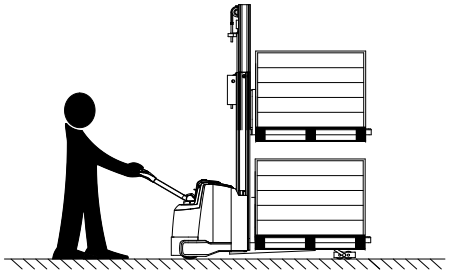


Figure5-20

Warning

- During double-deck operation, the lifting height of the load-bearing components must not exceed 1800 mm. At this time, the weight of the lower cargo must be greater than that of the upper cargo.

5. 9. Handling the cargo

Operating steps：

- Control the vehicle speed according to the driving route and the transported cargo.
- Accelerate and brake the vehicle smoothly and try to maintain a constant speed.
- Pay attention to other people and vehicles at intersections and aisles.
- Guidance from other operators should be provided if the view is obstructed.

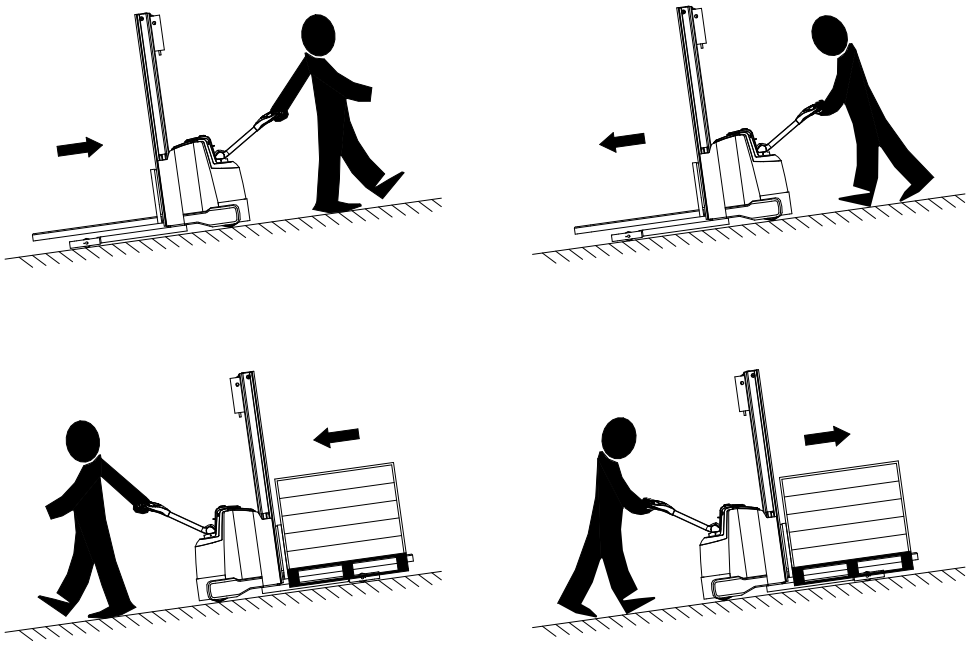


Figure5-21

Caution

- When driving uphill with cargo, the truck must move forward; when going downhill, it must reverse.
- Do not drive across slopes or turn around on slopes.

5. 10. **Placing the cargo**

Operating steps：

- Drive the truck to the place to unload the cargo.

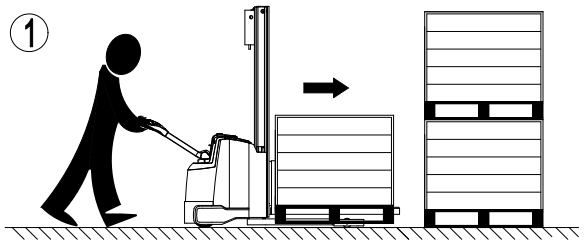


Figure5-22

- Lift the cargo to the designated height.

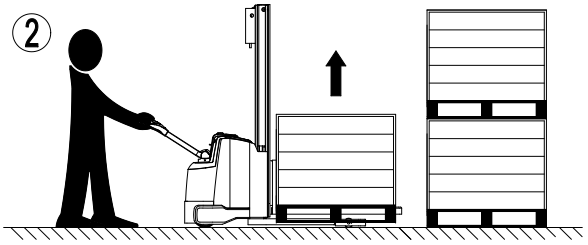


Figure5-23

- Drive forward, put the cargo on the unloading position and stop the truck.

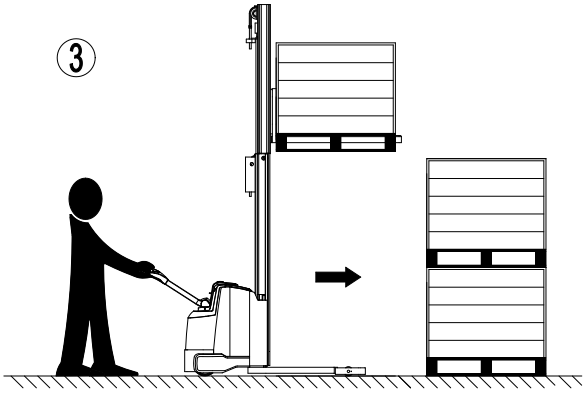


Figure5-24

- After confirming that the cargo are positioned directly above the unloading location, the fork should be slowly lowered until it is completely withdrawn from the cargo.

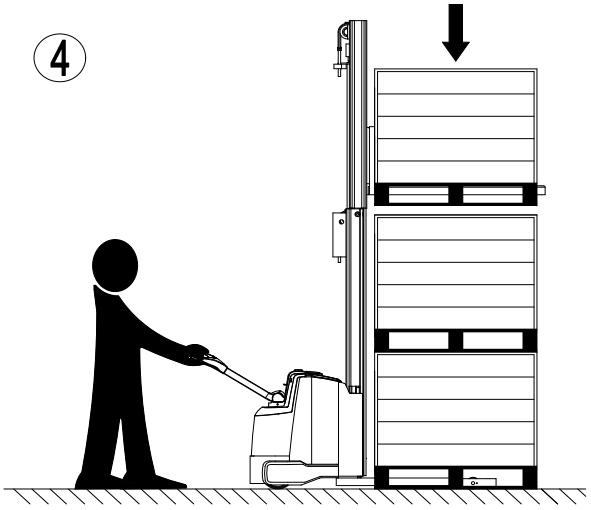


Figure5-25

- Reverse and take the forks out of the cargo.



Figure5-26

- Lower the fork to the specified position.

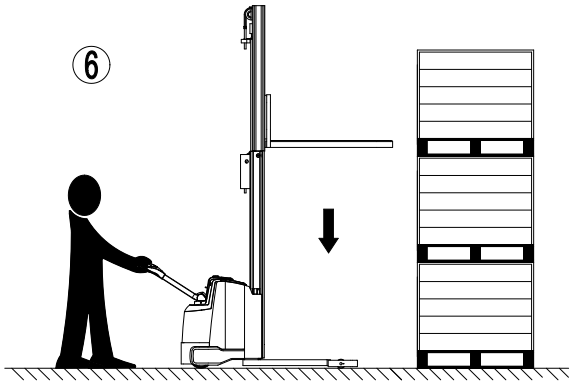


Figure5-27

- The cargo has been placed.

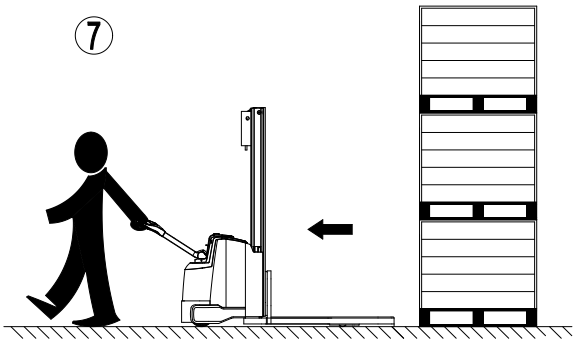


Figure5-28

5.11. Parking the truck safely according to rules and regulations

After the end of daily work, follow these steps to park the vehicle properly.Park the truck at the designated place.

- Lower the forks to the bottom.
- Press the emergency stop switch.
- Fold the footboard and guardrail.

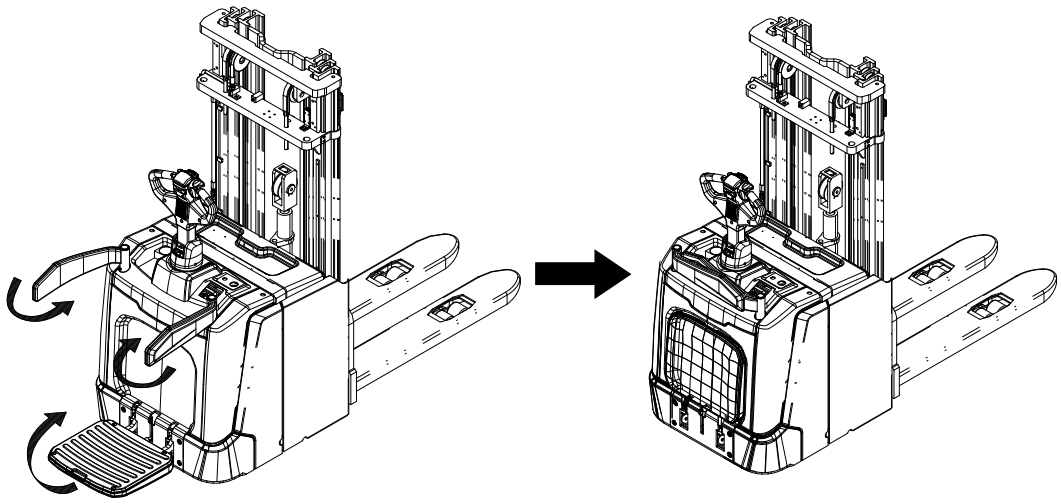


Figure5-29

Ⅵ Battery

6.1. Lithium-ion battery

6.1.1. Operating and safety precautions

(1) Users need to create a record file for the lithium-ion battery to assist with carrying out battery maintenance.

(2) The new battery must not be discharged or used until it is fully charged.

(3) There is a dedicated charger for the lithium-ion battery. Do not charge the battery with any other chargers to avoid damaging the battery.

(4) Do not open the lithium-ion battery case cover for maintenance. If there are any faults in the battery, promptly contact the manufacturer.

(5) Do not use the battery if its level is low. To prolong the service life of the battery, the discharging capacity should not exceed 80% of the rated battery capacity. Whether it is partially discharged or completely discharged, the battery should be charged immediately.

(6) Do not operate trucks equipped with a lithium-ion battery in an environment where the ambient temperature is higher than 55℃. Stop charging the lithium-ion battery when the ambient temperature is lower than 0℃.

(7) o not discharge the battery below the cut-off voltage and charge it promptly after discharge. Overcharging should be avoided.

(8) During the battery inspection and maintenance, the operator must wear work clothes and insulated gloves, and must not wear watches, metal bracelets, necklaces and other jewelry. The electrolyte inside the battery is highly corrosive, so the operator must wear protective equipment.

(9) Do not short circuit the positive and negative terminals of the battery under any circumstances, and prevent any metal or other conductive objects other than the battery post bolts and conductive band from touching the positive and negative terminals of the battery.

(10) Do not knock, throw or step on the battery, heat the battery, or throw the battery into water.

(11) Reverse charging of the battery is strictly prohibited. Reverse charging can cause the battery voltage drop to zero and the battery will have to be scrapped.

(12) If the battery emits any unpleasant odor or heat, changes color, or exhibits any deformation or abnormal phenomenon during use, storage or charging, the battery should be immediately removed from the device or charger and kept out of service. Please contact the relevant technical department or after-sales service department of the manufacturer for treatment.

(13) Do not use or place the battery next to high temperature sources, hazardous or dangerous materials, such as fires, heaters, corrosive chemicals, dangerous machinery and equipment, etc. When the battery is stored and not in service, it should be placed in a cool and dry environment.

(14) Do not immerse the battery in water or other conductive liquids, to avoid personal injury or property loss.

(15) Do not use the batteries in high-intensity electrostatic fields or magnetic fields, otherwise the battery safety protection device may be damaged, causing safety hazards.

(16) Do not use this battery in series or parallel with other models or types of batteries; do not connect the complete power system containing the lithium-ion battery protection circuit board or battery management system in series or parallel; and contact the relevant technical department of our company to obtain the correct technical support.

(17) Children and other people who are not familiar with the safe use of lithium-ion batteries should not use them

(18) Do not disassemble, extrude, puncture or store the battery at high temperature. Protect the battery from any severe vibration, external impact or falling.

(19) Do not charge the battery without a reasonable charging protection device (e.g. lithium-ion battery protection circuit board, battery management system) or using charging devices (e.g. charger, DC power supply) not approved by the battery manufacturer.

(20) If there is a large amount of dust, metal filings or other foreign objects on the top cover and posts of the battery pack, use compressed air to clean them promptly, rather than water or a wet cloth.

(21) Avoid splashing water or other conductive materials on the battery top cover and posts during charging or discharging, for example, do not use or operate the battery in heavy rain.

(22) If a conductor accidentally comes into contact with both the positive and negative posts of a single cell or the battery, it will cause a short circuit. Be sure to disconnect the short circuit in the shortest possible time.

(23) If the battery is subjected to a destructive impact a large amount of stored energy will be released instantly, in which case the operator should use a dry powder fire extinguisher to cool it down.

(24) If the battery is giving off smoke or burning, the operator should evacuate the people at site and immediately spray it with water or immerse it in water.

(25) Hazards from a burning or smoky battery: LFP batteries may leak/evaporate or decompose and release flammable electrolytes at 150℃ if they are used improperly or affected by a severe environment. Hydrogen fluoride (HF) and phosphorus oxide may be generated when the battery is burning, and the LIPF6 and water in the electrolyte will undergo a chemical reaction and produce fluoride and carbon dioxide.

(26) Fire extinguishing media: Spray a smoky or burning battery with water or immerse it in water. Class D, CO2, dry powder or foam extinguishers can also be used.

(27) Ingestion: In the event of ingestion of any battery electrolyte, it may result in throat or respiratory infection, the patient should drink plenty of water and seek immediate medical attention. Do not use emetics. Make sure the mucus is not blocking the respiratory tract and do not feed an unconscious person.

(28) Eye exposure: The battery electrolyte is irritating to the eyes. In case of an accidental eye exposure, do not rub your eyes, just rinse immediately with plenty of clean water for at least 15 minutes, and if necessary, go to a hospital immediately for treatment, or otherwise the eyes will be injured.

(29) Skin exposure: The battery electrolyte may cause skin infection. In the event of accidental skin exposure, immediately take off the stained clothes and wash the exposed skin with plenty of water and soap for at least 15 minutes, but do not apply unguent.

(30) Inhalation: In the event of any leakage or breakage of the battery, its internal compositions may cause mucus and edema in the respiratory tract; in case of accidental inhalation, immediately go to a place with fresh air and ventilate the contaminated area. If necessary, oxygen therapy or artificial respiration can be provided.

(31) Special protective articles: Use breathing apparatus to avoid inhaling irritating gases. Wear protective clothing or use other devices to avoid exposure to battery electrolyte.

6.1.2. Installation and usage instructions

Instructions for installation

(1) Instructions for installation:Installation personnel should have a relevant license for installation, be provided with labor protection, and pay attention to safety. Before installing the battery system, make sure that the low-voltage plug-in of the battery system is disconnected from the truck. When connecting the high-voltage system, pay attention to safety protection to prevent an electric shock during installation. During the installation of the battery system, the battery should be mechanically lifted and slowly installed into the battery compartment of the truck, do not crush or damage the battery case and external cables. During the installation of the battery system, avoid high-voltage reverse connection or short circuits, etc. To remove the battery system from the truck, make sure that the truck is powered off and the high-voltage cable and low-voltage connectors are disconnected from the truck.

(2) Post-installation inspection:After the battery system is installed, check the battery system stop pins and fixing bolts to confirm that they meet the battery system installation requirements. Check that the high-voltage cable and low-voltage plug-in are connected correctly and securely. Turn the key switch to the “ON” position, the relay should engage normally with no battery alarm. If there is a battery fault alarm, cut off the power immediately and notify our after-sales service center for a solution.

Instructions for use

(1) Battery Temperature Characteristics:Battery working temperature: -20℃ to 55℃; allowable charging temperature: 0℃ to 55℃; allowable discharging temperature: -20℃ to 55℃; storage temperature: -20℃ to 55℃.

(2) Pre-use Inspection:Check before use and make sure there is no battery system alarm message on the dashboard after the ignition key switch is turned off. Please check the remaining battery capacity before use. It is recommended to use the truck when the battery SOC is within the range of 50% - 100%. It is recommended not to use the truck when the battery SOC is below 30%.

(3) Charging Instructions:Charge the battery promptly when the battery system's SOC is below

20%. Please use the special charging device designated by the manufacturer. In case of a fault alarm during charging, both the battery system and charger will stop charging and the fault information will be displayed on the charger. The charging place should be dry and ventilated, with no flammable and explosive materials. The battery system should be fully charged once a week.

(4) Long-term storage:Before long-term storage, confirm that the battery level is not less than 50% of the rated capacity. Charge the battery every three months for maintenance, i.e. fully charge the battery. When the battery has been stored for more than three months, before using, please confirm whether there is a fault alarm in the power battery system. If so, please contact our after-sales service center for maintenance. Keep the storage place dry and well-ventilated and away from heat sources.


Caution

- When the ambient temperature is low, the charging time of the battery system will be extended, which is a normal phenomenon. The battery management system will automatically adjust the charging time with the temperature change to ensure the best performance.

6.1.3. Basic terminology

Battery system

The battery system is an energy storage device that typically includes one or more battery modules, battery management systems, thermal management systems, high/low voltage wires, connectors, and structural components.

SOC

The "State Of Charge" (SOC) of a battery is a measurement of how much energy is remaining (percent).

Rated voltage

It is an approximate value used to indicate the battery voltage.

Rated capacity

Under the specified conditions, the electric capacity provided by the fully charged battery, which is indicated by the manufacturer.

Over-discharge

The state when the battery voltage is below the discharge cutoff voltage, and it usually refers to the discharge state after the battery is fully discharged.

Overcharge

It can be usually regarded as the overcharge state when the battery voltage is higher than the maximum charging voltage.

Explosion

The battery housing is broken and solid material is flushed out of the battery with an explosive sound.

Fire:

Open fire comes out of the battery shell.

Leakage:

The internal composition of the battery (electrolyte or other substances) leak out of the battery.

CAN communication

Control Area Network.

6. 1. 4. Safety and warning labels

<table>
<tr>
<td>
</td>
<td>When handling spent lithium batteries, special attention should be paid:
Lithium-ion batteries with recycling symbols and no-disposal-in-trash signs must not be mixed with household waste.
You may discuss battery recycling and reuse methods with our company in accordance with local regulations.</td>
</tr>
<tr>
<td></td>
<td>Avoid the risk of fire and short circuits due to excessive temperatures!
Open flames, incandescent metal wires, or sparks must not be present or generated around lithium-ion batteries.
Keep lithium-ion batteries away from strong heat sources.</td>
</tr>
<tr>
<td></td>
<td>High surface temperature!
Battery packs can generate extremely high short-circuit currents, and thus become hot.</td>
</tr>
<tr>
<td></td>
<td>Dangerous voltage!
The battery can generate extremely high short-circuit currents, and thus become hot.
Comply with accident prevention regulations and local relevant laws.
 Caution
The metal parts of the battery cells are live, therefore it is forbidden to place any objects or tools on the lithium-ion battery.</td>
</tr>
<tr>
<td></td>
<td>When handling damaged batteries and lithium-ion batteries, wear personal protective equipment (such as safety goggles and protective gloves). Insulated tools must be used.
If internal materials spill, do not inhale the fumes.
Wash hands after operation.</td>
</tr>
</table>

	Mechanical processing, collision, squeezing, pressing, grooving, denting, or other modifications of lithium-ion batteries are prohibited. Do not open, damage, puncture, bend, heat, or overheat lithium-ion batteries, do not throw them into fire, do not short-circuit, do not soak them in water, and do not store or use them in pressure vessels.
	Please adhere to the operating instructions and install this label in a prominent place at the charging operation site! In case of a lithium-ion battery malfunction, please immediately notify our company's customer service department. Do not take remedial measures on your own. Do not open the lithium-ion battery!
	Ensure that lithium-ion batteries are kept away from heat sources and shielded from direct sunlight. Do not expose lithium-ion batteries near heat sources.

6.1.5. Daily maintenance

Cycle.	Item
Daily	Check the battery for any deformation, oxidation and paint removal on its surface, offset mounting, or any damage to the battery box, etc.
Weekly	Use a dry cloth or compressed air to clean the lithium-ion battery and charger.
Monthly	Check whether there is any water or foreign matter in the plug or socket and check them for any rust or scorching.
	Check the cable for any damage and check the connectors for any looseness.
	Check whether there are any cracks, deformation, lumps and other abnormalities in the battery case.

Lithium-ion Battery	Store the battery in a clean, dry and well ventilated indoor environment at an ambient temperature of 20℃ ± 5℃ and a relative humidity of not more than 75%. Do not place it upside down. Protect it from mechanical shocks and heavy pressure.
	Charge the battery once a month.
	The positive and negative terminals of the battery case should be wrapped with high-voltage insulating sleeves or other insulating materials to ensure that no metal parts are exposed, to avoid a short circuit. Ensure that the diagnostic port is free of dust and wrapped or covered properly.

(1) Battery case maintenance: Check the outer case of the battery system for foreign objects, obvious deformation, rust and corrosion and other abnormalities.

(2) Charging port maintenance: In the power-off state, check whether there are any damage, foreign objects, rust and corrosion and other abnormalities in the charging port.

(3) Plug-in maintenance: In the power-off state, check for looseness, damage and other abnormalities in the plug-in components.

(4) State detection: Observe the battery system voltage, temperature and other state information on the charger display while charging to ensure that all parameters are in the normal range.

(5) The battery should be charged immediately after each discharge. Estimate the charging or discharging time of the battery based on the actual power consumption of the battery or battery pack, and check whether there are abnormalities in the battery or battery pack at the end of charging or discharging, for example, voltage differences.

(6) The battery charging process should be always monitored by professional staff and the plug and socket should be properly connected during charging to ensure that the charger works normally. If there is any abnormality, it must be repaired before charging.

(7) Check the battery voltage, temperature and voltage difference displayed on the BMS screen before charging or discharging to ensure that all values are within the normal range.

(8) If there is a large amount of dust, metal filings or other foreign objects on the top cover and posts of the battery pack, use compressed air to clean them promptly, rather than water or a

wet cloth.

(9) Avoid splashing water or other conductive materials on the battery top cover and posts during charging or discharging, for example, do not use or operate the battery in heavy rain.

(10) For better performance, contact the manufacturer every six months for a battery performance check and equalization charge by the manufacturer's technical personnel. Failure to perform this test may reduce the lithium battery's working life.

6.1.6. Emergency plan

Severe abnormalities:

During use, users should be familiar with safety precautions and should not carry out inappropriate operations to avoid improper use of the battery (e.g. overcharge, over-discharge, short circuit, extrusion, puncture, overheating and high current discharge, etc.). In the charging and use process, the power battery system may develop abnormalities: the temperature of battery system or parts rises sharply; or abnormal smell or smoke from the battery system.

Emergency plan:

(1) Users should quickly leave the truck and call the emergency services.

(2) Carry out the following operations, if possible, provided that personal safety can be guaranteed:

a. If there is any smoke or burning in the external wiring harness, use a carbon dioxide or dry powder fire extinguisher for fire-fighting.

b. If there is any smoke from the battery, use a high-pressure water gun for fire-fighting at a distance.

c. If the user inadvertently inhales smoke, please leave the area and seek medical attention as soon as possible.

Contact the truck dealer for professional advice.

6. 1. 7. Size and weigh

Item		1.2t~2.0t
Length（L）	mm	630
Width（W）	mm	190
Height（H）	mm	605
Allowable min. weight	kg	60
Voltage	V	48
Battery Capacity	V/Ah	80

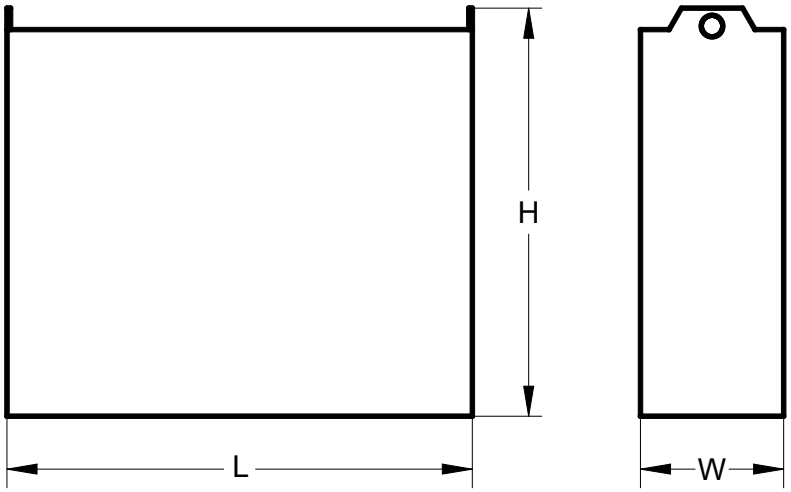


Figure6-1

Warning

- The weight and size of the battery have a great influence on the stability and load-carrying capacity of the truck operation.
- When installing or replacing the battery, attention should be paid to the fixed position of the battery on the truck.

6.1.8. Replacement

Operating steps：

- Parking the truck safely according to rules and regulations

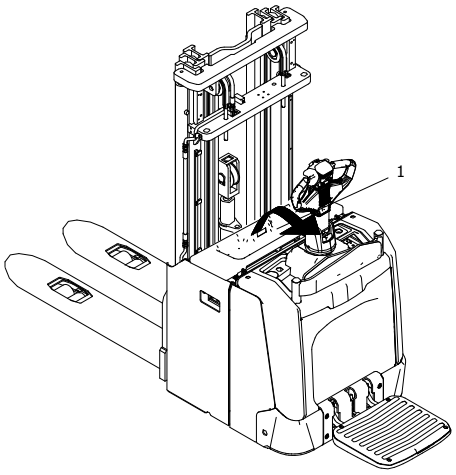


Figure6-2

- Lifting the battery cover plate（1）。
- Disconnect the battery charging plug from the truck socket, and place the battery charging plug and cable inside the battery case to ensure that the cable will not be scratched when the battery is taken out.

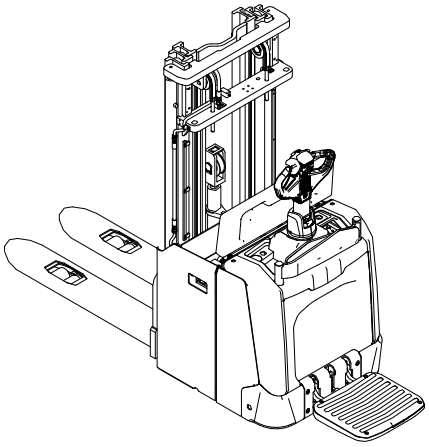


Figure6-3

- After disconnecting the battery connection circuit, lift the battery directly out of the truck compartment.
- Install the battery reversing the steps mentioned above and ensure the installation position and wiring are correct.

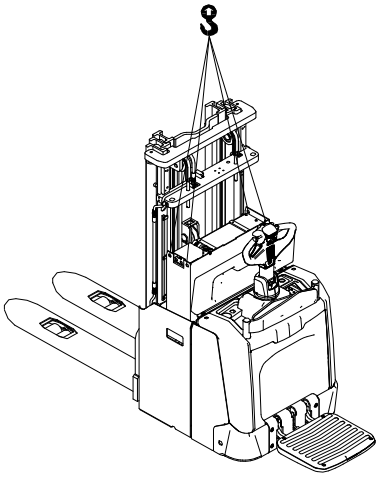


Figure6-4

Warning

- Before closing the battery cover, check for any damage to the cables, inspect the position of the plugs and cables, and ensure that the locking devices are secured.**
- Before closing the battery cover, ensure that the cables are not damaged due to clamping, compression, or rotation.
- There is a risk of hand injury when closing the battery cover.
- When closing the battery cover, ensure that no objects are trapped between the cover and the frame.
- The cover must be fully pressed down to ensure it is locked when closing the battery cover.

Warning

- When replacing the battery, safety shoes must be worn.
- Use lifting equipment with sufficient load-bearing capacity.
- Handle the battery replacement with care, avoid placing hands between the battery and the frame to prevent pinching.
- Only batteries approved by the manufacturer should be replaced.
- Permission from the manufacturer is required before replacing the battery.
- During the battery replacement process, ensure that the battery cables are positioned in such a way that they will not be damaged when closing the battery cover.
- The use of unauthorized batteries is strictly prohibited.

6.1.9. Charging

Operating steps:

–Park the truck in the designated charging area and position it properly according to regulations.

–Connect the charging connector of the charger to the charging connector of the battery.

–Initiate the charging process according to the operating instructions of the charger.

–After the battery is fully charged, terminate the charging process according to the operating instructions of the charger.

–Disconnect the connection between the battery charging socket and the charging connector of the charger.

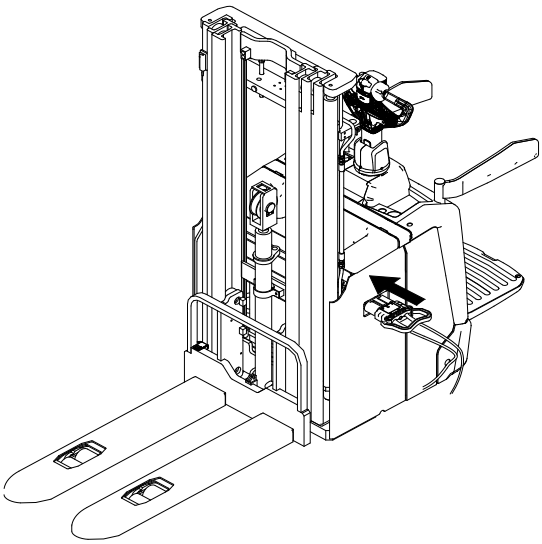


Figure6-5

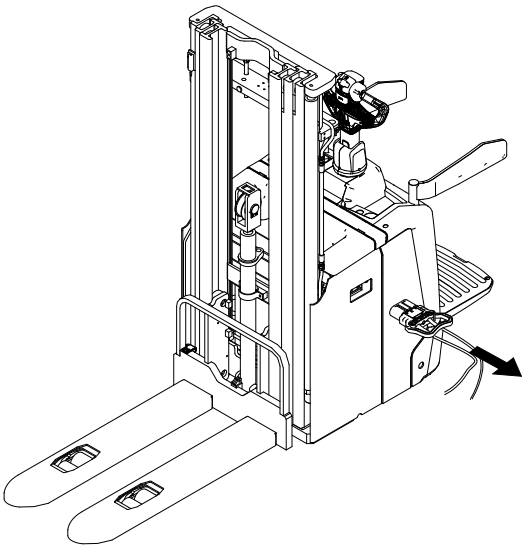


Figure6-6

Warning

- **Please charge in a designated and well-ventilated place.**
- **Put up a "No Smoking or Fire" warning sign in the charging area and provide fire extinguishers.**
- **Before charging, please check the electric wires and sockets for damage. Do not charge when the electric wires or sockets are damaged.**
- **Do not place metal objects on the battery.**

- **During charging, do not turn off the power switch or unplug the battery suddenly, as it will damage the plug and electrical components. Normally the charger should only be unplugged after pressing the stop charging button on the charger.**

Warning

- Use only the appropriate charger.
- Before starting to charge, inspect the cables and plugs for any damage.
- Keep flammable materials and work equipment that may generate sparks at least 2.5 meters away from the truck that requires charging.
- Only use the original cables provided by our company during charging.
- Do not exchange chargers with other trucks.

6.1.9.1. Charging machine operating methods

Charging steps:

1. Move and park the truck near the charger. Make sure the plug and your hands are dry before operating.
2. Inspect the charger before charging to ensure correct wiring and no faults or abnormalities.
3. Confirm the battery voltage and capacity match the charger. (Refer to charger specs and battery specs).
4. Before charging, first plug the output plug of the charger into the socket of the forklift battery, then plug the input plug of the charger into the power outlet. (For models without openings on the side, lift the battery box cover upwards.)
5. If there are no faults, the charger will receive the charging command (including charging voltage, charging current, start-up instructions, etc.) from the truck BMS. and automatically start charging the battery, and the indicator light will blink.
6. If an error occurs during charging, press "Pause" to stop charging until the fault is resolved.
7. After the battery is fully charged, the charger will automatically stop charging and the indicator light will be on.
8. After charging is complete, the indicator light stays on to show that charging is finished, and the display shows "Charging Complete." First, disconnect the AC breaker of the charger, then pull out the input plug, and finally, remove the battery output plug.
9. Truck application.



Caution

- The charging cable should be fully extended during charging.
- If the truck needs to be used before charging is complete, press "Pause" to stop charging and then disconnect the plugs. Improper operation can damage the battery or charger, or lead to other risks.

During charging, the indicator light blinks. The display sequentially shows the following 4 screens:

Status Charging in progress Current settings A Voltage settings V Charging voltage V	Current settings: Current set value sent by battery BMS to charger Voltage settings: Voltage set value sent by battery BMS to charger Charging voltage: Battery current voltage value
Status Charging in progress Battery temperature ℃ Max. Voltage V Battery SOC %	Battery temperature: Battery temperature during charging Max. voltage: Highest single cell voltage in battery pack Battery SOC: Battery's current SOC value
Status Charging in progress Module A current A Module B current A Module C current A	Module A current: Charger module A output current value Module B current: Charger module B output current value Module C current: Charger module C output current value
Status Charging in progress Voltage V Charging time M Total current A	Voltage: Battery current voltage value Charging time: Accumulated charging time Total current: Charger max output current value when operating
	Pause button: Press it to pause the charging; and press it again to restart charging. Indicator: It will light up continuously when the battery is fully charged; it will flash in the charging process; and it will not light up when it is in the standby state.

Regular maintenance and inspection of the charger

1. Check for damage on the input and output cables (inspect before charging or use);
2. Check for damage on the charger output plug (inspect before charging or use);
3. Promptly replace the relevant parts if damage is found (inspect before charging or use);
4. Regularly clear away dust and other foreign objects from the charger air inlet and outlet (inspect monthly);
5. Confirm whether the input circuit breaker of the charger is functioning properly. If any issues are found, please contact the dealer promptly.
6. Disconnect input power before finding out the cause of a fault, and unplug the charging AC input connector to avoid an electric shock.

VII Truck transportation

7.1. Lifting

Crane loading and unloading

Operating steps：

–Parking the truck safely according to rules and regulations.

–Secure the lifting tool to the designated lifting points (as shown in Figure), and ensure that it cannot fall off under any circumstances.

–At this point, a crane can be used to load and unload the truck.

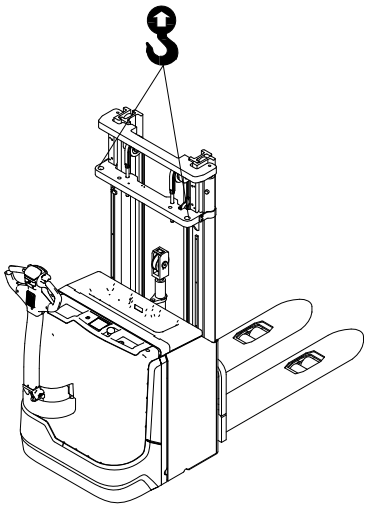


Figure7-1

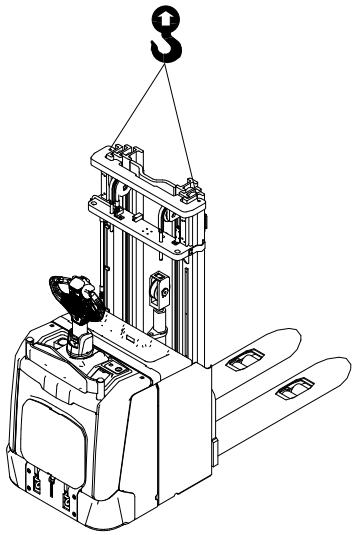


Figure7-2

Warning

- The truck must not collide or lose control during lifting. If necessary, secure the truck with a guide steel wire.
- Only personnel who have been trained in the operation of fixed tools and lifting tools are allowed to perform the loading and unloading of the truck.
- When lifting the truck with lifting equipment, the battery of the truck must be removed first.
- During crane loading and unloading, staff must wear protective boots.
- Do not stay under the load of the crane.
- Do not enter hazardous areas or stay in dangerous places.
- Only lifting equipment with sufficient load capacity (truck weight is indicated on the nameplate) should be used.
- Lifting tools must be secured only to the designated lifting points and must be prevented from slipping.
- Use the fixing tools only in the specified loading direction.
- When installing the fixed tools of the crane, it is essential to ensure that these lifting fixtures do not come into contact with the components of the truck during the lifting process.

7. 2. Securing during Transportation

Loading and unloading of the forklift should be operated by personnel who have received special training. When transporting with a truck or trailer, the forklift must be properly secured. The truck or trailer must have fixing rings.

Operating steps：

–According to the specific situation, secure and tighten the forklift with the tension strap (1) and fix it to the trailer's fixing ring.

–Use the tensioning device (2) to tighten the tension strap.

–Secure the front and rear wheels of the forklift with wedge-shaped blocks.

Note: The following figure is for reference only; please refer to the actual situation for specific operations.

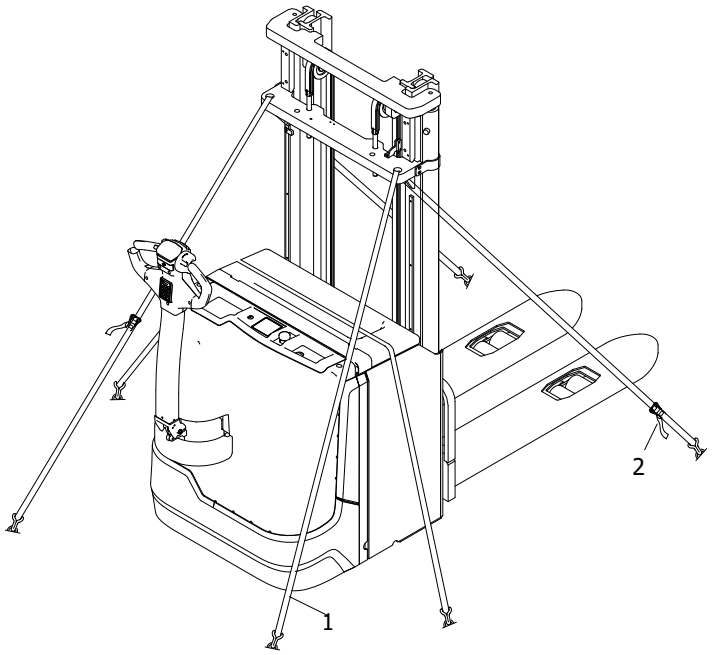


Figure7-4

7. 3. Transportation

The stacker is designed for short-distance material handling within the yard (factory) and is inappropriate for long-distance transportation. If needed, the stacker must be transported by using lifting device or platform to place it on truck, trailer or other long-distance means of transportation. Before operation, fix the stacker firmly on the transport vehicle with belt, and block the wheel to avoid relative motion during transportation.

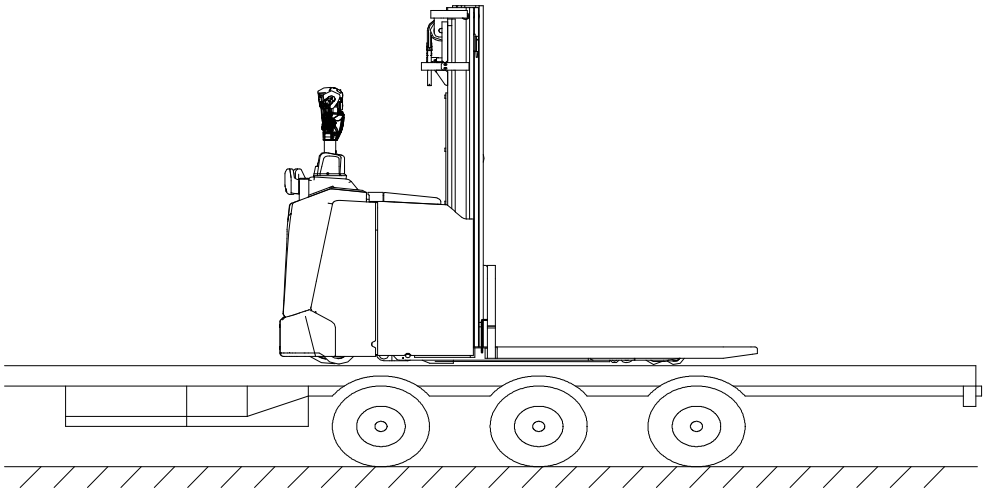


Figure7-5

How to move a damaged truck

The brake of this truck is of the normally closed type, so when the truck has a malfunction or is damaged and cannot be moved due to power loss, it should not be directly towed with the drive wheels on the ground. The truck can be transported on a pallet or towed by lifting the drive wheels off the ground.

Warning

- Only trained professionals are permitted to load and unload the stacker.
- When securing a stacker, effective measures must be taken according to specific circumstances to ensure the safety of transportation.
- When transporting with a truck or trailer, it is imperative to properly secure the stacker.
- The truck or trailer must have fixing rings.
- Secure the stacker with chocks to prevent unintended movement.
- Only use tension belts or securing belts with a sufficient nominal strength to fix the stacker.

- It is strictly forbidden to move or tow damaged vehicles directly on the ground, as this could damage the braking system of the stacker.
- Use anti-slip materials to secure loading and unloading aids (pallets, wedges, etc.), such as anti-slip mats.

VIII First-time use

Since the forks and mast are removed for ease of transportation, the user should install them first before using the truck for the first time.

Warning

- Only our designated serviceman can be responsible for the installation of the forks and mast.
- Only after the mast is installed correctly can the hydraulic pipeline joints be fitted onto the main hydraulic pipelines of the truck.
- Only after the hydraulic pipelines are connected correctly can the truck be used for the first time.
- If several forklift trucks are transported at the same time, the forks and masts should be installed into their corresponding truck bodies, mismatching is not allowed.

Caution

- See the Maintenance Manual for the installation of the forks and masts.
- Truck equipped with polyurethane wheels may experience temporary compressive deformation of the wheels after being parked for a long period, which can cause vibrations during driving. This situation is normal. The compressive deformation of the wheels will gradually recover over a period of normal use.

Carry out the following inspections after the forks and masts are installed:

a） Check whether the truck is complete.

b） Check whether the hydraulic oil level meets the requirements.

c） Check whether the amount of gear oil and transmission fluid meet the requirements.

d） Check whether the battery wiring is secure.

e） Check the battery electrolyte level (except for maintenance-free batteries).

f） Other checks (refer to daily maintenance items for inspection).

Start the truck after completing the inspections and making sure there are no problems with the truck.

Warning

- Only operators who have been trained and hold the corresponding special vehicle operation permit are allowed to use this truck.

IX Truck Cleaning

The truck should be cleaned after daily operations are finished.

a) Flush the piston rod of the cylinder with water to clear way the dirt and dust.

b) Flush the truck body and wheels with water.

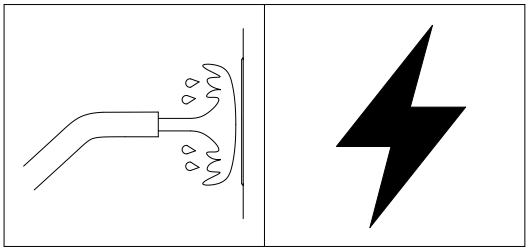


Figure9- 1

Caution

- When flushing, make sure the electrical components are not splashed with water.

c) Clean the dashboard, dashboard cover and electrical components on the cover with a clean damp dusting cloth.

d) The cleaning of electrical equipment should be done using low-intensity suction or compressed air (from a compressor with a desiccant dryer) and non-conductive, anti-static brushes.

Caution

- The electrical components should be cleaned with a low pressure dust collector or cleaned with compressed air.
- Do not clean the truck with steam jets.

Warning

- Do not clean the truck with flammable liquids!
- Power off the forklift truck and unplug the power supply before cleaning the truck.
- Before cleaning operations, all necessary safety measures must be taken!

- Do not directly clean the electrical components with water!
- Do not directly clean the pedal pad, hood assembly, dashboard assembly or other parts containing electrical components with a high-pressure water gun.
- Make sure to cover the electrical components in advance before cleaning the truck with a high-pressure water gun, otherwise, the electrical system will be damaged.

Ⅹ Disposal of scrap trucks

If the truck is scrapped, it should be disposed of in accordance with the current local laws and regulations. In particular, the used oil/fluid and battery should be recycled according to the local environmental protection laws and regulations to prevent pollution of the environment, rather than poured away or disposed of at will.

XI Inspection and maintenance

Careful and thorough maintenance keeps the truck in good working condition. Ensure the truck safety, that is, ensure your work and personal safety.

11.1. Maintenance regulations

- All inspections and maintenance operations introduced in this chapter must be performed according to the deadlines listed on the maintenance schedule.
- After the inspection and maintenance operations are completed, a check must be performed.

  （Ⅷ First-time use）
- The capacitors in the controller are energy storage components; before servicing, it is necessary to discharge between the B+ and B- terminals of the controller using a horn or resistor.
- It is necessary to perform regular checks and maintenance to keep the performance of the truck at optimum.
- Checks and maintenance are often neglected, so it is better to find the problems early and solve them in time.
- Use the spare parts from HANGCHA GROUP CO., LTD.
- When changing or adding oil, do not use oil which is not the same as the original.
- The waste oil and waste fluid from the lithium-ion battery should be disposed of in accordance with the local environmental protection laws and regulations, rather than dumped at will.
- Develop a comprehensive maintenance and repair plan.
- Complete records should be made after each maintenance and repair.
- Do not repair trucks without training.

Caution

- Smoke and fire are strictly prohibited.
- Before servicing, turn off the key switch, press the emergency stop switch and disconnect

the battery plug. (Except for fault diagnosis).

- Use compressed air to clean the electrical parts, rather than water.
- Do not put your hands, feet or any part of your body into the lifting assembly.
- The maintenance should be done ahead of the schedule when the operation environment is severe.
- Only the original spare parts comply with the quality management requirements of our company. Only the spare parts supplied by our company can guarantee that the truck can achieve reliable and stable operating performance. Worn parts and waste fluids should be disposed of according to the current environmental protection directives.

Warning

- Do not modify or refit the truck, especially the safety devices. Do not change the working speed of the truck.

Maintenance personnel

The maintenance and repair of the truck can only be carried out by technicians who have been professionally trained.

Safe lifting and jacking of the truck:

When lifting the truck, only install the lifting tools in the designated fixed positions. If it is necessary to work under the lifted load-carrying components/cab, it must be secured with sufficiently strong chains or safety pins. Please follow the instructions below for the safe lifting and jacking of the truck:

- The truck can only be jacked up and secured on a flat surface to prevent accidental movement.
- Only use jacks with a sufficient load capacity. When jacking up the truck, it is imperative to employ appropriate tools, such as wedges or hard wooden blocks, to secure the equipment and prevent the risk of accidental rolling or tipping over.
- When lifting the vehicle, lifting tools must only be installed in the designated fixed positions.

Cleaning Operations:

- Disconnect the battery connection (remove the battery plug) before starting the cleaning process.
- Before starting the cleaning operation, all necessary safety measures must be taken, and it is also important to prevent the generation of sparks during the operation (such as those that might occur due to short circuits).
- Electrical equipment should not be cleaned with water.
- Do not clean the truck with flammable liquids.
- The cleaning of electrical equipment should be done using low-intensity suction or compressed air (from a compressor with a desiccant dryer) and non-conductive, anti-static brushes.
- Make sure to cover the electrical components in advance before cleaning the truck with a high-pressure water gun, otherwise, the electrical system will be damaged.

Perform operations on the electrical system:

- Operations related to the electrical system must be carried out by professionals who have received electrical technical training.
- Before commencing operations, the operator must take all necessary precautions to prevent electrical accidents.
- Disconnect the battery connection (remove the battery plug) before starting work.

Warning

Work on electrical equipment can only be carried out when the voltage is cut off. Before performing maintenance and repair work on electrical equipment:

- Parking the truck safely according to rules and regulations。
- Press the emergency stop button.
- Disconnect the battery (remove the battery plug).
- Before working on electrical components, remove items such as rings and metal watches.

Waste oil and worn parts:

Waste oil and worn parts can be harmful to the environment and must be disposed of in accordance with current environmental regulations for used parts and replaced liquid media.

Set values:

When servicing and replacing hydraulic, electrical, and electronic components, it is essential to pay attention to the specified parameters related to the truck.

Wheels:

The quality of wheels directly affects the stability and driving performance of the truck. Using wheels that do not meet our company's specifications can lead to hazardous accidents. When wear is uneven, the stability of the truck is reduced, and the braking distance is increased.

- When replacing wheels, ensure that the truck does not tilt.
- Pairs of wheels must always be replaced simultaneously in pairs.
- If it is necessary to replace the tires that were originally installed, you must use original equipment parts provided by our company to meet our specifications.
- Truck equipped with polyurethane wheels may experience temporary compressive deformation of the wheels after being parked for a long period, which can cause vibrations during driving. This situation is normal. The compressive deformation of the wheels will gradually recover over a period of normal use.

11. 2. Regular replacement of key safety parts

It is difficult to find damage to certain parts through regular maintenance, thus in order to improve safety, the user should regularly replace the parts listed in the table below.

If the replacement time is not reached and any abnormality is found in these parts, the defective parts should be replaced immediately.

Key Safety Part Name	Service life (Years)
High-pressure rubber hose and flexible tube for the hydraulic system	2
Wheel connecting shaft	1
Sleeves and bushing for the truck	0.5(6 months)

11. 3. **Oil diagram**

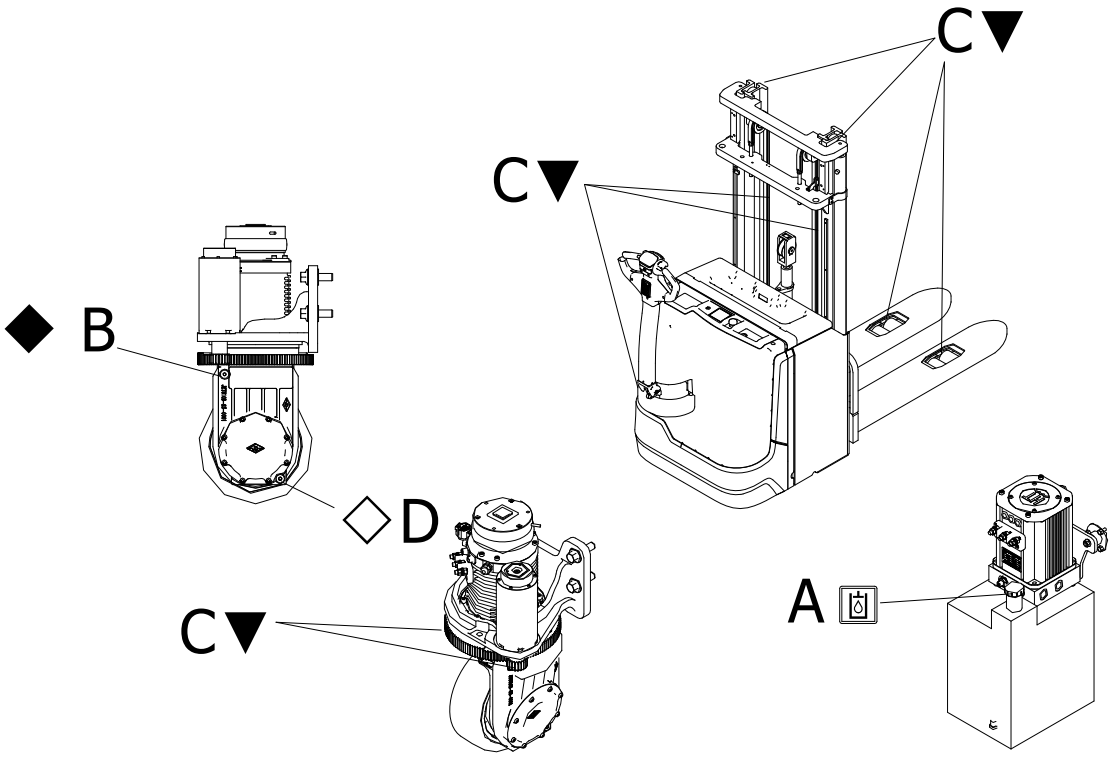


Figure11-1

Code	Name	Specifications	Remarks
A	Hydraulic oil	General environments: L - HM32 Severely cold environments: L - HV32	Hydraulic oil tank
◆ B	Gear oil	GL-5 85 W/90	Transmission
▼ C	Grease	3# general purpose automotive lithium grease	Filling port and lubricating surface
◇D			Gear oil outlet.

11. 4. Daily maintenance (8 hours)

11. 4. 1. Leakage inspection

Inspect hydraulic hose connections and gearbox for leaks, using touch and visual inspection. The use of an open flame is strictly prohibited.

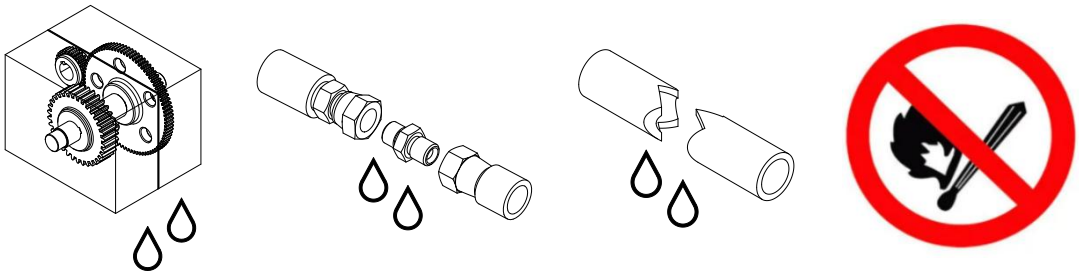


Figure11- 2

11. 4. 2. Visual inspection

- Perform a visual inspection of the truck, paying particular attention to any damage or looseness in the load-bearing components.

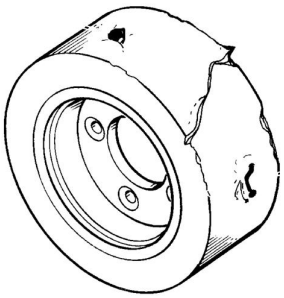


Figure11- 3

- Check if the lights and dashboards are functioning correctly.
- Inspect the wheels for any damage.

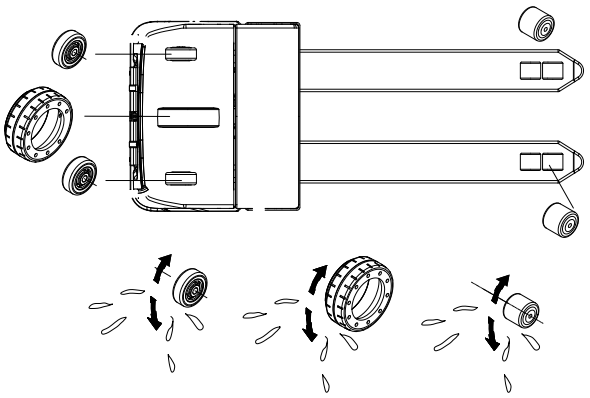


Figure11- 4

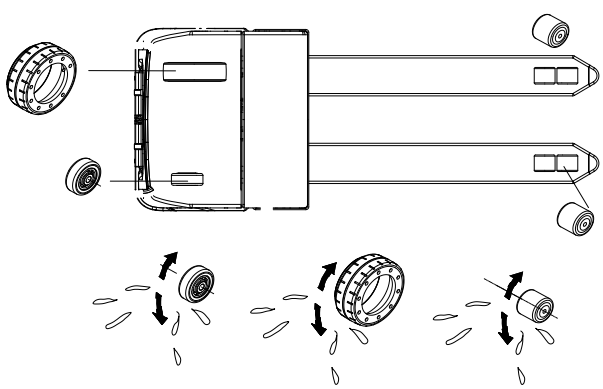


Figure11- 5

- Inspect between the wheels for any foreign objects that may be entangled.
- Check if the battery case is securely fastened.

11. 4. 3. **Brake inspection**

- Inspect the vehicle's braking capability and confirm if the braking distance is normal.

Drive the truck forward or backward slowly, push the control handle forward to the stop position or depress it downward to make it horizontal, and check the truck slows down.

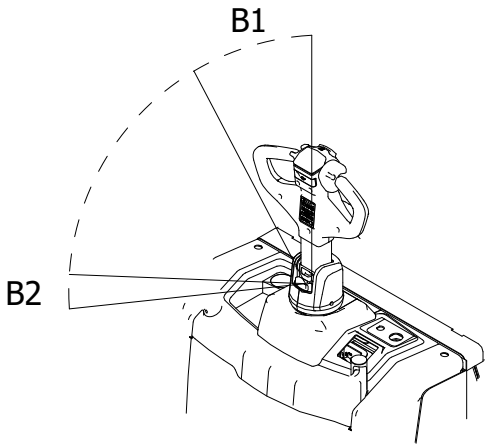


Figure11- 6

Caution

- **Find the cause and clear the fault if the control handle moves slowly or fails to automatically enter the brake position after the control handle is released and then engaged in the brake position. Replace the pressure spring if necessary.**

Drive the truck forward or backward slowly, and press the anti-collision switch on the control handle to observe the truck's braking response.

11.4.4. Driving switch inspection

- Operate the driving switch, and the truck's speed should vary with the extent of the switch's movement. Ensure that the acceleration is clearly distinguishable in its strength, and that the switch returns to its position properly.

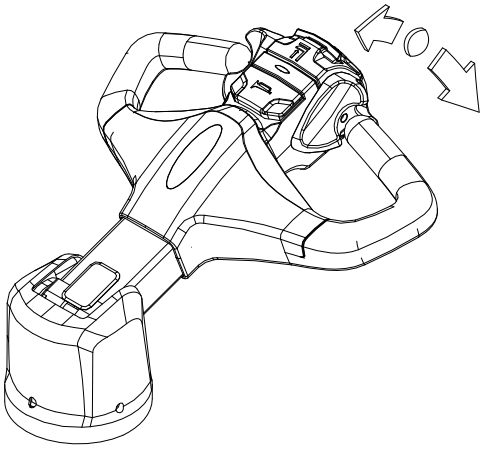


Figure11- 7

11.4.5. Hydraulic oil inspection

Open the hood, unscrew the hydraulic oil filling cover, pull out the dipstick, and check if the oil level is between the scale lines. If it is insufficient, add more. After the check is completed, reattach the hood.

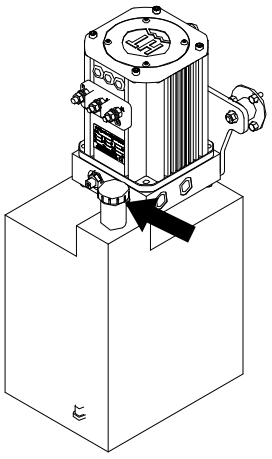


Figure11-8

11.4.6. Dashboard display inspection

Check if the dashboard is correctly displaying all the truck's data, for normal display conditions

refer to the dashboard section 4.2.



Figure11- 9

11. 4. 7. Steering system inspection

Operate the control handle to make the truck move to the left and right three times to check if the steering system is functioning properly.

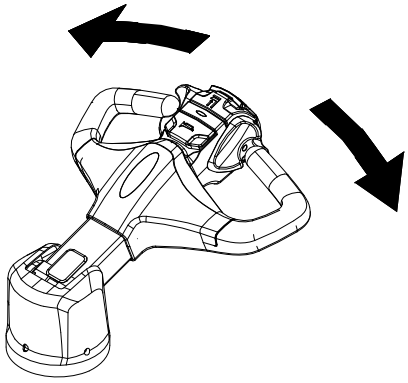


Figure11- 10

11. 4. 8. Horn and other function inspections

Press the horn button to check if the horn is functioning properly.

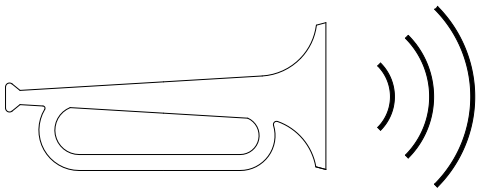


Figure11- 11

Inspect all other lights (including optional ones) and the buzzer.

11. 4. 9. Battery

Refer to Chapter 6, the Battery section.

11. 4. 10. Other

Inspect for any abnormal noises, etc.



Figure11- 12

11.5. Weekly maintenance (40 hours)

11.5.1. Wheel fastening condition inspection

Operating steps：

Parking the truck safely according to rules and regulations.

After lifting the truck, place a support block under the front end of the frame.

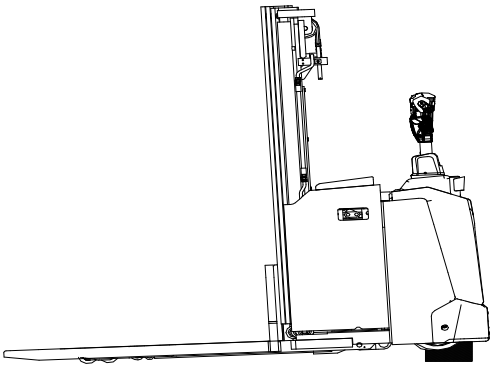


Figure11-13

Insert the socket wrench into this hole and use a torque wrench to cross-tighten the wheel fastening nuts.

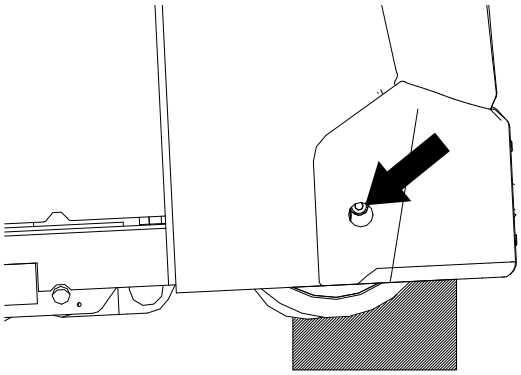


Figure11-14

Nut (42) torque:107-127 Nm

(Apply thread-locking compound to prevent loosening, such as Loctite 243 adhesive)

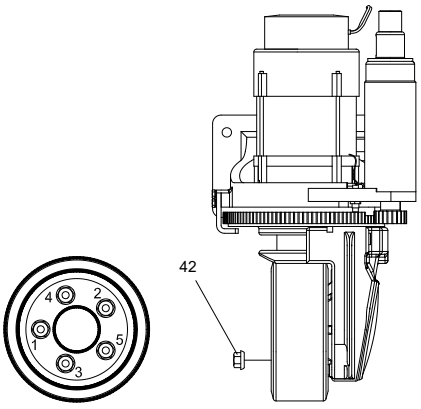


Figure11-15

Warning

- Do not loosen the nuts until the front wheels are lifted off the ground.
- Never go under the truck when it is supported only by wooden blocks.

11. 5. 2. Lifting System inspection

Use the control handle to raise and lower the fork, check if the fork operation is normal and if there are any abnormal noises in the lifting assembly.

Inspect the hydraulic cylinders and hoses for any oil leakage.

Inspect the inner and outer masts and the fork for any cracks, deformations, and bending.

Check the roller for any looseness

Inspect the grease, and if it is lacking, add it in a timely manner.

Lubricate the lifting component's pin shafts.

Carry out regular lubrication of the parts indicated in the figure according to the requirements of the regular maintenance and lubrication cycle.

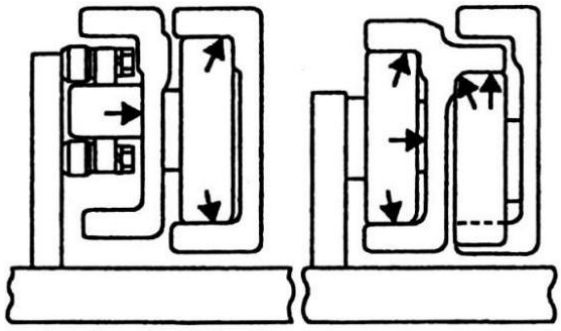
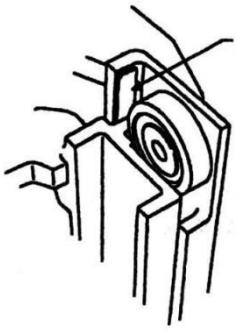


Figure11-16



Support guide rails

Figure11-17

Caution

- The lubrication cycle should be adjusted according to the operating conditions. In the busy months of operation, the lubrication cycle should be shortened.
- In order to ease the forklift truck operation, apply a layer of grease to the contact surface of the lifting guide wheel and the inner & outer mast.

Warning

- When applying grease, ensure the truck is parked on a flat road and parked safely. Be cautious to prevent hands and body from caught when applying grease. When lubricating at high positions, take care to avoid falls and ensure safety.

Spray the chain spray directly on the chain or take a brush and apply the lubricating oil to both sides of the chain.

11.5.3. Chain tension inspection

When the mast is lifted by 10cm to 15cm, press the middle part of the chain with your thumb to check if the tension of the left and right chains is consistent.

Tension adjustment: loosen the lock nut (1), screw the nut (2) to adjust the chains so that the tension of the two chains is the same, and then tighten the lock nut (1)

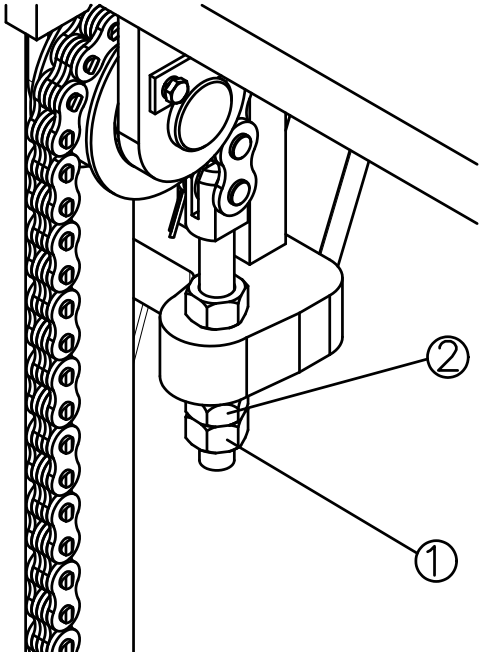


Figure11-18

11.5.4. Other parts lubrication condition inspection

Inspect the lubrication of the load wheel bearings.

11.5.5. Disconnect switch inspection

Loosening of the threads on the truck's disconnect switch can cause the power cut-off function to fail. Regular checks for thread looseness are required.

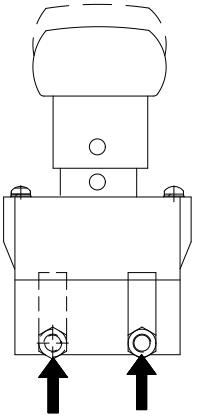


Figure11-19

11.5.6. Secure the motor cables

Usually there are U, V, W terminals on the motor to connect the cables, which should be regularly checked for loose threads.

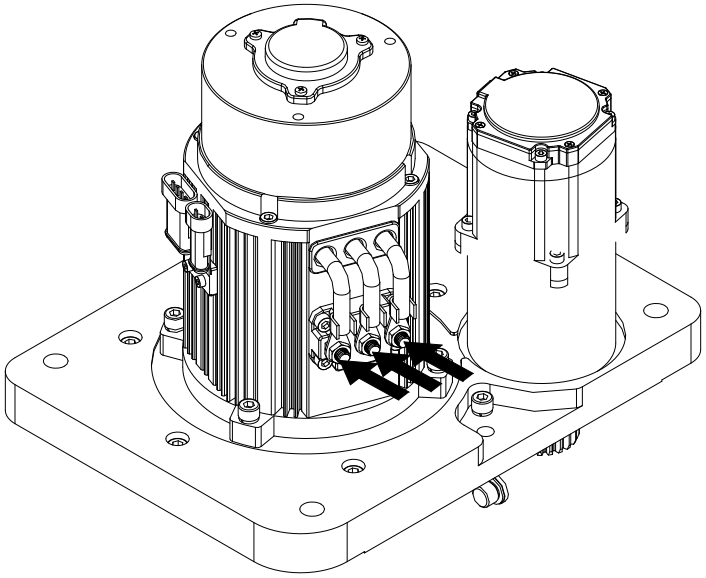


Figure11-20

Power off the truck and unplug the battery discharge cable for check. Check the connection for looseness by a visual check or wearing gloves (wear insulating gloves for high voltage), and tighten it if loose.The tightening torque can be found in the table below.

Name of check part	Bolt diameter	Recommended tightening torque（Nm）	Bolt grade
Motor terminal block bolts (U, V, W)	M6	6（5～6）	×
	M8	11（10～12）	×
	M10	23 (21～25)	×
	M12	26 (22～30)	×
	M16	55 (50～60)	×

Warning

- If the fasteners at the connection end of the cable and wiring harness become loose, electric leakage may occur and cause fires with serious consequences!
- During the check, the truck must be powered off and the battery cables must be disconnected to prevent electric shock!
- Operation in humid environments is strictly prohibited!

11.5.7. Secure the controller cables

Cables, fuses, contactors, copper busbars, terminals and other electrical components are all connected by threads to realize a closed loop of the circuit, If the connection loosens, it is prone to leakage and cause serious accidents like fire etc., so it is necessary to check the fasteners of these parts.

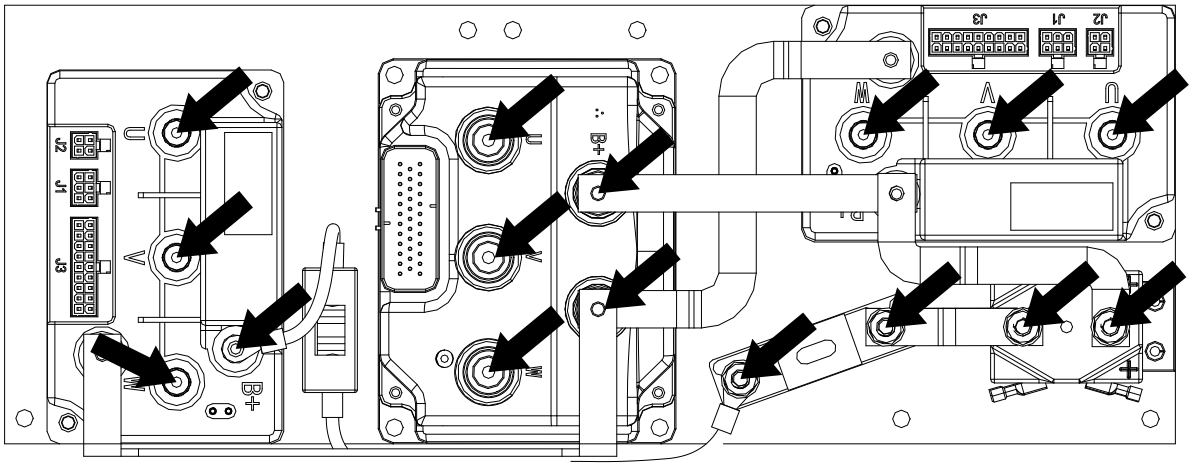


Figure11-21

Power off the truck and unplug the battery discharge cable for check. Check the connection for looseness by a visual check or wearing gloves (wear insulating gloves for high voltage), and tighten it if loose.The tightening torque can be found in the table below.

Name of check part	Bolt diameter	Recommended tightening torque（Nm）	Bolt grade	Base
Controller bolt Torque	M6	10（9～11）	8.8	Aluminum alloy
	M8	15（13～17）	8.8	Aluminum alloy
Terminal	M8	11（10～12）	/	Composite insulating material
Fuse assembly	M8	11（10～12）	/	Composite insulating material
Contactor	M8	11（10～12）	/	Composite insulating material
Contactor	M10	14（13～15）	/	Composite

				insulating material
Fuse	M6	10（9～11）	/	/
Fuse	M8	15（13～17）	/	/

11.5.8. **Terminal**

Pallet truck are sometimes installed with a separate terminal for wiring and the threads must be checked regularly for looseness.

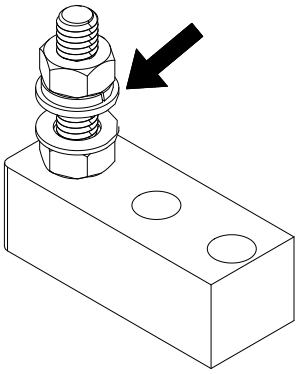


Figure11-22

Example 1 Check the terminal for loose threaded part

11.6. Monthly Maintenance (200 hours)

11.6.1. Motor

Inspect the drive motor, steering motor, and pump motor.

- Check for foreign objects on the motor housing;
- Check if the electrical connections are reliable;

11.6.2. Electronic Control Assembly

(1) Before replacing any defective fuse or relay, please investigate the cause of failure.

(2) Replace the fuse with a new one of the correct specification.

Inspect and replace components of the electronic control assembly

Operating steps：

- Parking the truck safely according to rules and regulations。
- Open the battery cover and remove the battery plug.
- Open the hood.
- Inspect the electronic control assembly for any damage and replace any blown fuses promptly.
- Replace the hood.

Caution

- Unplug the battery before any operations on the electrical system of the forklift truck.
- Take off the metal trim before any operations on the electrical system of the forklift truck.
- When replacing a fuse, select a fuse with the same specification as the fuse being replaced.

11. 6. 3. Adjust the height of the auxiliary wheels

In certain situations (such as drive wheel wear), the auxiliary wheels may be too high, causing the drive wheels to lift off the ground or even become suspended, losing power. At this time, the auxiliary wheel height should be adjusted as follows:

Operating steps：

Parking the truck safely according to rules and regulations.

Remove the hood.

After lifting the truck, place a support block under the front end of the frame. (Place one support block on each side; only one is shown in the figure for demonstration purposes.)

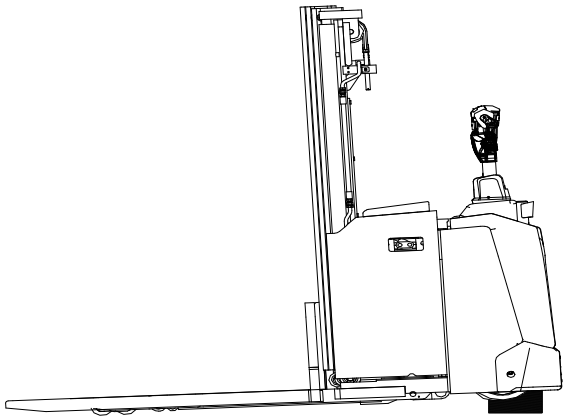


Figure11-23

Locate the auxiliary wheel mounting position.

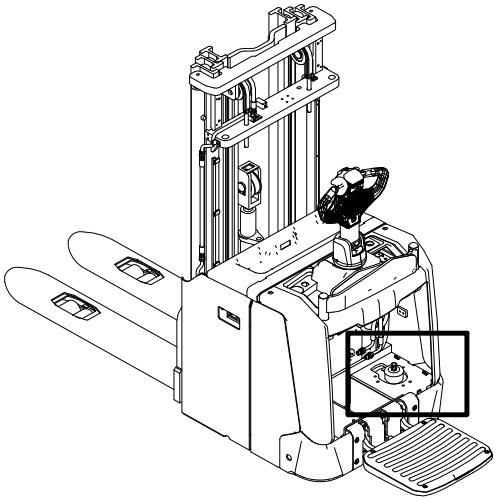


Figure11-24

After loosening the nut (1) indicated by the arrow, the height of the auxiliary wheel can be adjusted by turning the bolt (2) clockwise or counterclockwise.

Caution

- If for some reasons the auxiliary wheels are too high off the ground and cannot provide protection, you can also adjust the position downward to make the auxiliary wheels re-establish contact with the ground and restore their function.

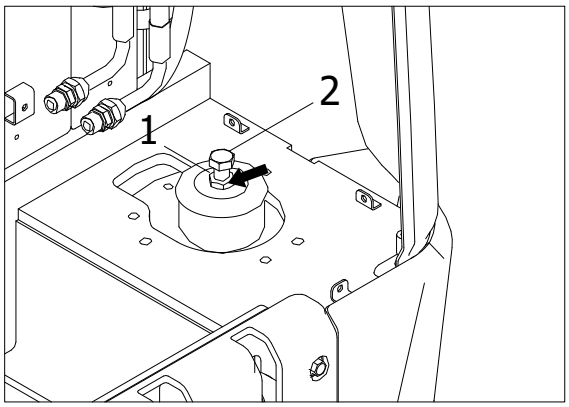


Figure11-25

11. 7. Annual maintenance (2,000 hours)）

11. 7. 1. Hydraulic oil replacement

–Stop the truck on a flat road.

–Operate the platform to lower it completely, and the fork is lowered to the ground.

–Secure the truck with support blocks.

–Open the hood, unscrew the hydraulic oil filling cover

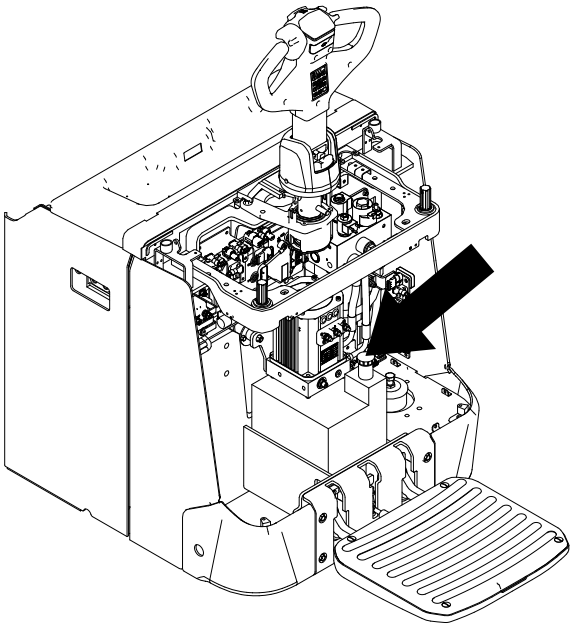


Figure11-26

–Place an oil container under the frame, remove the drain plug, and drain out the old oil;

–Take away the oil container, handle the waste oil according to local environmental regulations, do not dump it arbitrarily;

–Screw in the drain screw plug, add new hydraulic oil and check for leaks;

–Start the truck, lift the forks 3-5 times;

–Refill it with hydraulic oil to the specified line.

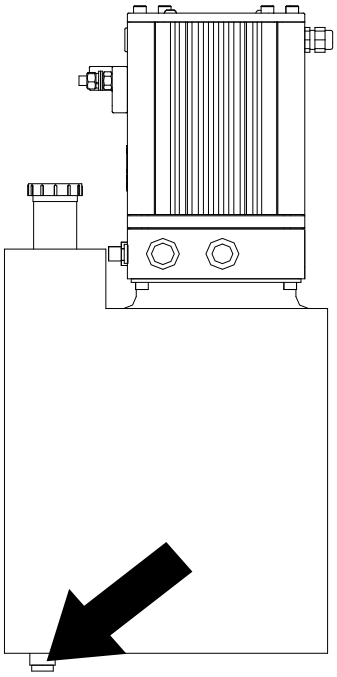


Figure11-27

11. 7. 2. **Drive wheel replacement**

Operating steps：

Parking the truck safely according to rules and regulations.

After lifting the truck, place a support block under the front end of the frame.

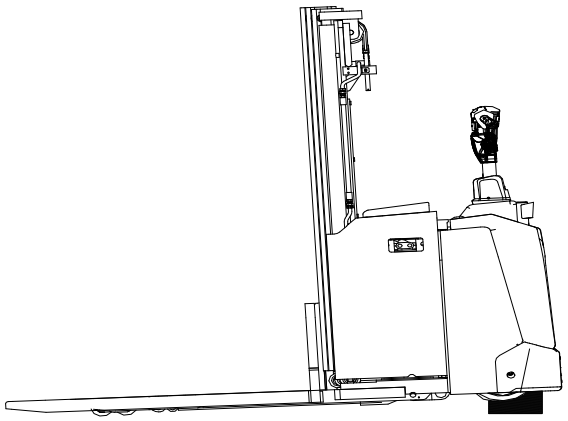


Figure11-28

Insert the socket wrench into this hole and use a torque wrench to loosen the wheel fastening nuts.

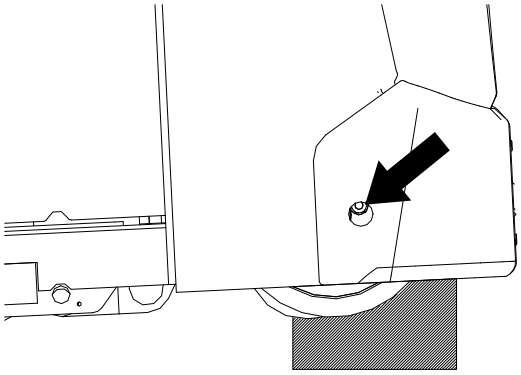


Figure11-29

Mount the new drive wheel, with the installation steps being the reverse of the removal steps.

Nut (42) torque:107-127 Nm

(Apply thread-locking compound to prevent loosening, such as Loctite 243 adhesive)

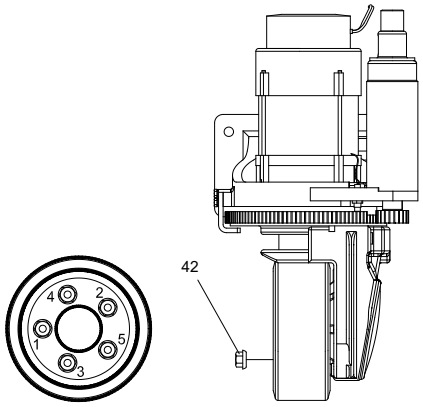


Figure11-30

Warning

- Do not loosen the nuts until the front wheels are lifted off the ground.
- Never go under the truck when it is supported only by wooden blocks.

11. 7. 3. **Auxiliary wheel replacement**

Operating steps：

Parking the truck safely according to rules and regulations.

After lifting the truck, place a support block under the lower part of the frame.

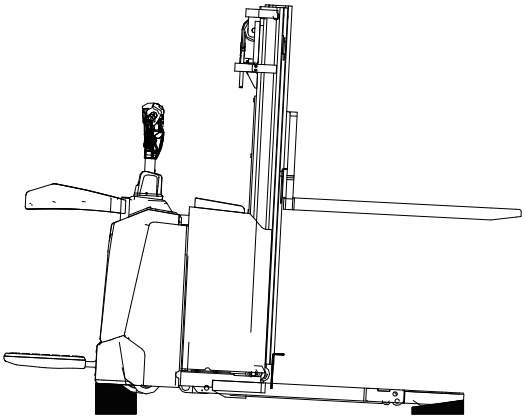


Figure11-31

The auxiliary wheel structure is as shown, loosen the nut in the direction indicated in the diagram.

Loosen the nut in the direction indicated in the figure and remove the bolt to take off the auxiliary wheel.

The installation procedure is the reverse of the disassembly procedure.

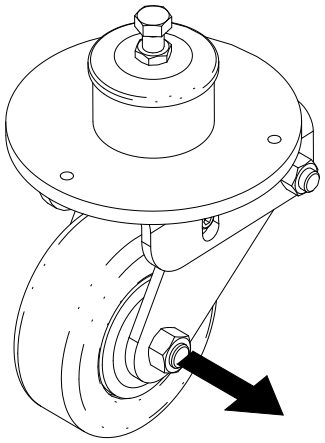


Figure11-32

11. 7. 4. Gear oil replacement

Gear oil replacement

–Park the truck on flat and solid ground.

–Remove the transmission. (Refer to the service manual)

–Wipe the oil filling plug and drain plug clean.

–Unscrew the drain plug (46).

–Put a suitable container under the oil drain plug (47), unscrew the oil drain plug (47) and drain the oil into the container.

–After the oil is drained from the transmission, screw in the oil drain plug (47).

–Add the specified gear oil into the oil filling port. Oil can be added with the aid of a funnel and hose for ease of operation. In principle, fill the oil reservoir with gear oil until it submerges the gears and reaches up to the filling port to prevent the gear oil spilling out.

–Screw in the oil filling plug (46) and wipe off any oil residue on the transmission surface.

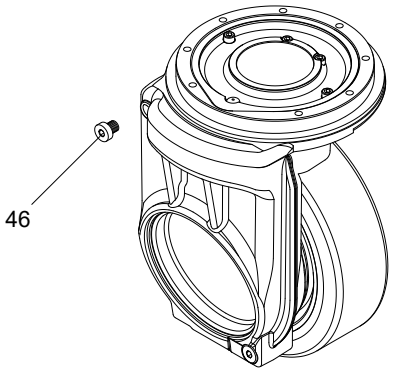


Figure11-33

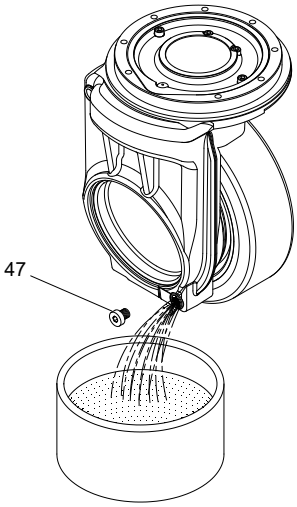


Figure11-34

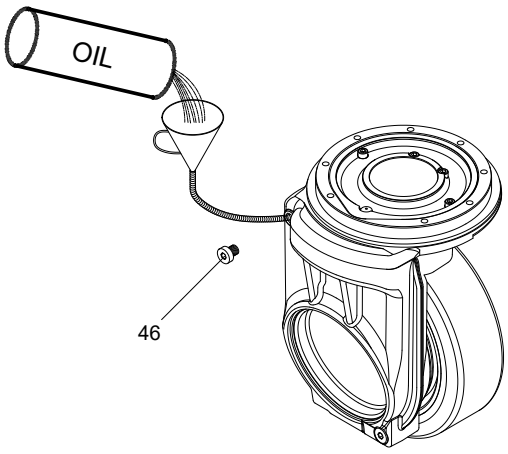


Figure11-35

Warning

- **The waste oil and fluid should be disposed of in accordance with the national laws and regulations, rather than dumped at will.**

11. 8. Maintenance Schedule Chart

Thorough and standardized maintenance is one of the most important prerequisites for ensuring stable and reliable operational performance of vehicles. Neglecting regular maintenance can lead to vehicle failures and malfunctions, posing potential threats to staff and operational safety.

The degree of wear on the components requiring maintenance largely depends on the actual operation and usage conditions of the vehicle.

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 servicing checklist indicates the operations to be performed and the respective intervals to be observed. Maintenance intervals are defined as:

D	= Every 8 service hours, at least daily
W	= Every 40 service hours, at least weekly
M	= Every 200 service hours, or at least every 1.5 months
T	= Every 500 service hours, or at least trimonthly
S	= Every 1000 service hours, or at least semiannually
Y	= Every 2000 service hours, or at least annually
●	= Standard maintenance interval
×	= First maintenance interval
○	= Maintenance interval for cold storage models (supplement to standard maintenance interval)

During the break-in period (approximately after 100 hours of operation), the equipment user should inspect the fastening condition of the wheel fastening nuts and bolts, and retighten them if necessary.

Battery		Tools	D	W	M	T	S	Y
1	Battery level		●	●	●	●	●	●
2	Check the wiring terminals for any looseness		●	●	●	●	●	●

3	Check the wiring for any looseness		●	●	●	●	●	●
4	Check the battery surface cleanliness			●	●	●	●	●
5	Check whether there are any tools on the battery surface.		●	●	●	●	●	●
6	Check whether the vent cap is mounted and well ventilated.			●	●	●	●	●
7	Check whether it is kept safe from smoke and flames		●	●	●	●	●	●
8	Check if the battery is securely fastened.		●	●	●	●	●	●
9	Check the battery for any deformation, oxidation and paint removal on its surface, offset mounting, or any damage to the battery box, etc.			●	●	●	●	●
10	Use a dry cloth or compressed air to clean the lithium-ion battery and charger.			●	●	●	●	●
11	Check whether there is any water or foreign matter in the plug or socket and check them for any rust or scorching.				●	●	●	●
12	Check whether there are any cracks, deformation, lumps and other abnormalities in the battery case.				●	●	●	●

Controller		Tools	D	W	M	T	S	Y
1	Check the contacts for any wear					●	●	●
2	Check whether the mechanical motion of the contactor is abnormal					●	●	●
3	Check whether the footboard switch works normally					●	●	●
4	Check whether the connections between the motor, battery and power unit are in good condition					●	●	●
5	Check whether the fault diagnosis system of the controller is normal							●
6	Inspect the fuses or relays.				●	●	●	●

7	Tightness of thread installation（Controller contact, terminal, etc.）			×	●	●	●	●

Motor		Tools	D	W	M	T	S	Y
1	Clean the motor enclosure				●	●	●	●
2	Clean and replace the bearings							●
3	Check the rectifiers for any wear and whether the spring force is normal				●	●	●	●
4	Check whether the wiring is correct and secure				●	●	●	●
5	Clear away the carbon powder in the commutator surface					●	●	●
6	Tightness of thread installation			×	●	●	●	●

Secure electrical cable connections		Tools	D	W	M	T	S	Y
1	Check the wire harness for any damage or looseness.			●	●	●	●	●
2	Check for any looseness in circuit connections			×	●	●	●	●
3	Tightening condition of the emergency power-off switch thread installation.			×	●	●	●	●

Gel battery		Tools	D	W	M	T	S	Y
1	Tightness of thread installation			×	●	●	●	●

Gearbox		Tools	D	W	M	T	S	Y
1	Check for any noises.		●	●	●	●	●	●
2	Check for any leakage		●	●	●	●	●	●
3	Replace the gear oil.							●

Brake		Tools	D	W	M	T	S	Y
1	Check the brake function.		●	●	●	●	●	●
2	Check the air gap of the electromagnetic brake						●	●

Steering		Tools	D	W	M	T	S	Y
1	Check whether the steering system functions normally, the steering is flexible and there is any noise.		●	●	●	●	●	●
2	Check the control handle for its auto-centering function.		●	●	●	●	●	●
3	Lubricate the steering system bearings.						●	

Wheels		Tools	D	W	M	T	S	Y
1	Check if the wheels are securely fastened.			●	●	●	●	●
2	Check wheels for wear and damage		●	●	●	●	●	●
3	Replace the drive wheel							●
4	Adjust the auxiliary wheels.				●	●	●	●
5	Lubricate the load wheel bearings.			●	●	●	●	●
6	Check if the wheel bolts are tightened properly.			●	●	●	●	●

Electrical system		Tools	D	W	M	T	S	Y
1	Check the function of the display and operating elements.		●	●	●	●	●	●
2	Check the function of the micro switches and sensors.		●	●	●	●	●	●
3	Check the safety device for correct values.				●	●	●	●
4	Check the electrical wiring for damage. Check that the cable connections are secure.			●	●	●	●	●
5	Inspect the functionality of the emergency stop switch.		●	●	●	●	●	●
6	Inspect if the turn signals, horn, and other electrical component switches are functioning properly.		●	●	●	●	●	●

Hydraulic system		Tools	D	W	M	T	S	Y
1	Check the hydraulic oil level.		●	●	●	●	●	●
2	Check the function of the hydraulic system.		●	●	●	●	●	●
3	Check hydraulic ports, hoses and pipes for fixation, leak and damage.		●	●	●	●	●	●
4	Check cylinders and piston rods for damage, leak and fixation.			●	●	●	●	●
5	Check the hydraulic oil level and correct if necessary.				●	●	●	●
6	Inspect the emergency descent function.					●	●	●
7	Check the function of the relief valve and adjust if necessary.						●	●
8	Replace the hydraulic oil.							●
9	Clean the hydraulic oil filter.							●

Lifting system		Tools	D	W	M	T	S	Y
1	Check the chain tension and check for any deformation, damage or rust.		●	●	●	●	●	●
2	Lubricate the chain				●	●	●	●
4	Check the chain wheel for any deformation or damage				●	●	●	●
5	Check the chain wheel gear for any looseness				●	●	●	●
6	Lubricate the pins and shafts.				●	●	●	●
7	Check if the fork's lifting and lowering are normal and if there are any abnormal noises.		●	●	●	●	●	●
8	Inspect the hydraulic cylinders and hoses for any oil leakage.			●	●	●	●	●
9	Check the piston rod, the thread and joint for any looseness, deformation or damage	Inspection hammer		●	●	●	●	●
10	Check the fastening bolts of the cylinder for any looseness.						●	●
11	Inspect the rolling condition of the lifting assembly rollers.		●	●	●	●	●	●
12	Check the roller for any looseness			●	●	●	●	●
13	Inspect the inner and outer masts and the fork for any cracks, deformations, and bending.		●	●	●	●	●	●
14	Inspect the grease of the lifting assembly.			●	●	●	●	●

XII Long-term parking and storage of truck

Long-term storage

If you intend to keep the truck out of service for an extended period of time (more than one month), park the truck according to the following steps.

- Park the truck in a well-ventilated, dry room out of direct sunlight. It is also important to avoid large temperature fluctuations, and to avoid exposure to significant moisture, dust, corrosive gases, etc.
- Unplug the battery.
- Check the overall condition of the vehicle, in particular check whether the tires are damaged.
- Check for any leakage of gear oil, hydraulic oil or electrolyte.
- Apply lubricating grease.
- Check the specific gravity and level of electrolyte once a month.(If available)
- An equalization charge should be made monthly.
- To prevent rusting of the bearings and other parts, please run the vehicle every 6 months to observe if the vehicle works smoothly and if there are any abnormal sounds.
- For unpainted machined surfaces, please apply a rust inhibitor every 6 months.
- Cover the whole truck.

Truck operation after long-term storage

- Remove rust inhibitor from exposed parts.
- Clear away the foreign matter and water in the hydraulic oil tank.
- Charge the battery, fit it on the truck and connect the battery leads.

Conduct an overall check and inspection on the truck before starting. Check its functions including starting, running, speed reduction, steering, braking and parking, etc.