

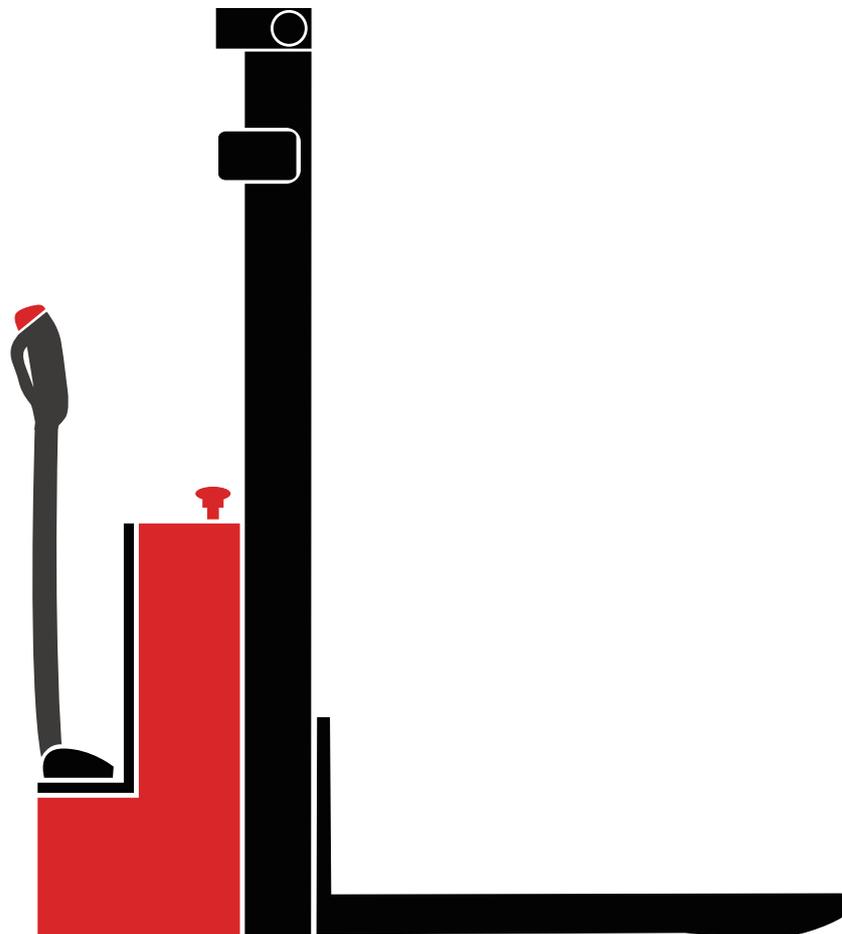
Operation Manual

ES10-10ES/ES12-12ES/ES15-15ES

ES10-10MM/ES12-12MM/ES12-12MMi

ES10-22MM/ES12-25MM/ES10-22DM

ES12-25DM/ES15-33DM





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

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

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

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

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

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

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Preface ►

Thank you for buying our products.

The manual will show you the way of correctly using the truck as well as relevant preventive maintenance and safety operation. The truck should be operated only by well-trained professionals and by no means by non-working personnel. Operators are supposed to read through the manual before actually operating the truck.

● Explanations on the manual

With the continuous upgradation and improvement of our company's products, you may find a slight difference existing between your carrier and some introductions in the manual.

All the information, specifications and illustrations in the manual are effective in times of printing and our company maintains the right to modify the specification (s) or design (s) of our products at any time without any beforehand notification.

● Safety signs and corresponding explanations



DANGER

Indicates an extremely hazardous situation. Failure to comply with this instruction will result in severe irreparable injury and even death.



WARNING

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



CAUTION

Please pay attention to the important safety instructions.



NOTE

Pay attention to Instruction.

Internet address and QR code of Parts manual

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



Fig0000-00017OM

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

Intended use ►

The lift truck is designed for transporting and stacking the loads stated in the load capacity diagram.

In particular we refer to:

- the safety rules of your trade association.
- the special measures required for driving on public roads in accordance with the StVZO (Road Traffic Licensing Regulations).
- other local regulations.

The rules for the intended and approved use of industrial trucks must be followed under all circumstances by the responsible persons, especially by the operator and service personnel.

The user, and not EP, is responsible for any danger arising from applications not authorised by the manufacturer.

If you want to use the truck for applications not mentioned in this manual, please first contact your authorised dealer.

No changes, particularly no modifications and additions, may be made to the truck without the approval of the manufacturer.

● Obligations and responsibilities of equipment user

In the manual, “equipment user” refers to any natural person or legal person directly using or appointing or authorizing others to use the carrier. In such special situations as renting or sales, the “equipment user” represents the interested parties supposed to bear operation obligations as specified by the contractual terms concluded between equipment owner and corresponding users. Equipment users must ensure the use of the carrier only for purposes specified and timely eliminate all the dangers that may threaten the life and health of the users themselves or any other third party, in addition to which they must also strictly abide by accident prevention provisions, other safety technology provisions and equipment operation, maintenance and repair guidelines, and ensure that all the operators seriously read and completely understand the contents of the operation instruction.

Should any violation of the operation instruction occur, the quality guarantee of our company will be invalid automatically, and our company will assume none of the responsibilities for losses resulting from any nonstandard operation of the equipment implemented by any client, equipment user or any third party without the authorization of the client service department of our company.

● Series

This product has a compact chassis, 4-point ground contact, balanced tiller and a microprocessor electronic control system. The machine is lightweight, highly efficient and easy to handle.

● Design

The latest ergonomic and practical design, adaptable to all operators and working conditions.

● Control handle

The composite construction control handle head provides excellent impact resistance. The ergonomic control layout is suitable for left-handed and right-handed operators. The horn, lifting and lowering devices can be operated using one hand without changing grip. The emergency reverse switch integrated into the tiller head protects the operator if the truck recoils.

● Driving

The electronic control unit ensures comfortable use and lower costs.

Precise control of driving speed.

Jolt-free starting and smooth acceleration to maximum speed.

Simply release or turn the drive direction switch to brake.

Booster circuit prevents the truck rolling back when starting on a gradient.

● Hydraulics

Gear pump driven by fully enclosed air-cooled motor.

Safety valve and lowering brake protect the hydraulic system.

● Brake system

The electromagnetic brake with dust protection function can be used as a safety brake and parking brake. Braking is controlled by the drive controller, the brake's electromagnet acts on the motor shaft and automatic braking is activated when the tiller is in the horizontal or vertical position (end stop brake).

● Battery

It uses a large-capacity lead-acid battery or lithium-ion battery and the battery charge can be viewed on the display unit.

● Modification

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

Can not remove, disable or modify any safeguards or other safety devices.

Exception: Only in the event that the truck manufacturer is no longer in business and there is no successor in the interest to the business, may the user arrange for a modification or alteration to a powered industrial truck, provided, however, that the user

- a) arranges for the modification or alteration to be designed, tested and implemented by an engineer(s) expert in industrial trucks and their safety.
- b) maintains a permanent record of the design, test(s) and implementation of the modification or alteration.
- c) approves and makes appropriate changes to the capacity plate(s), decals, tags and operation manual.
- d) affixes a permanent and readily visible label to the truck stating the manner in which the truck has been modified or altered, together with the date of the modification or alteration and the name and address of the organization that accomplished those tasks.

● Wind loads

Wind forces can affect the stability of a truck when lifting, lowering and transporting loads with large surface areas .

Light loads must be especially secured when they are subjected to wind forces. This will prevent the load from sliding or falling.

Stop the truck in both cases.

● Conformity marking

The manufacturer uses the conformity marking to document the conformity of the industrial truck with the relevant directives at the time of placing on the market:

- CE: in the European Union (EU)
- UKCA: in the United Kingdom (UK)

The conformity marking is applied to the nameplate. A declaration of conformity is issued for the EU and UK markets.

An unauthorised structural change or addition to the industrial truck can compromise safety, thus invalidating the declaration of conformity.



Legal requirements for marketing

Declaration

EP EQUIPMENT CO., LTD.

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

We declare that the machine

Industrial truck type: corresponding to these this operation manual

Model: corresponding to these this operation manual

Serial No.: corresponding to these this operation manual

Fulfills all the relevant provisions of Directives

- "Machinery Directive 2006/42/EC" ¹⁾
- "EU directive 2014/30/EU"¹⁾
- "Supply of Machinery Safety Regulations 2008(2008 No. 1597)" ²⁾
- "Electromagnetic Compatibility Regulations 2016 (SI 2016 No.1091)²⁾

Personnel authorised to compile the technical documents:

See EC/EU Declaration of Conformity

EP EQUIPMENT CO., LTD.

1) For the markets of the European Union, the EU candidate countries, the EFTA States and Switzerland.

2) For the United Kingdom market.

The declaration shown explains the conformity with the provisions of the EC Machinery Directive 2006/42/EC and the Supply of Machinery Safety Regulation 2008, 2008 No. 1597. The declaration shown explains the conformity with the provisions of EU directive 2014/30/EU (Electromagnetic Compatibility - EMC) and Electromagnetic Compatibility Regulations 2016, SI 2016 No.1091.

An unauthorised structural change or addition to the industrial truck can compromise safety, thus invalidating the declaration of conformity.

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A

Identification points and data plates

Item	Description	Item	Description
1	/	7	Anti pinch hand label
2	/	8	Nameplate
3	Sling label	9	Safety label
4	Key label	10	Instructions label
5	No riding label	11	Mast safety label
6	Emergency stop switch label	12	Charging light indicator

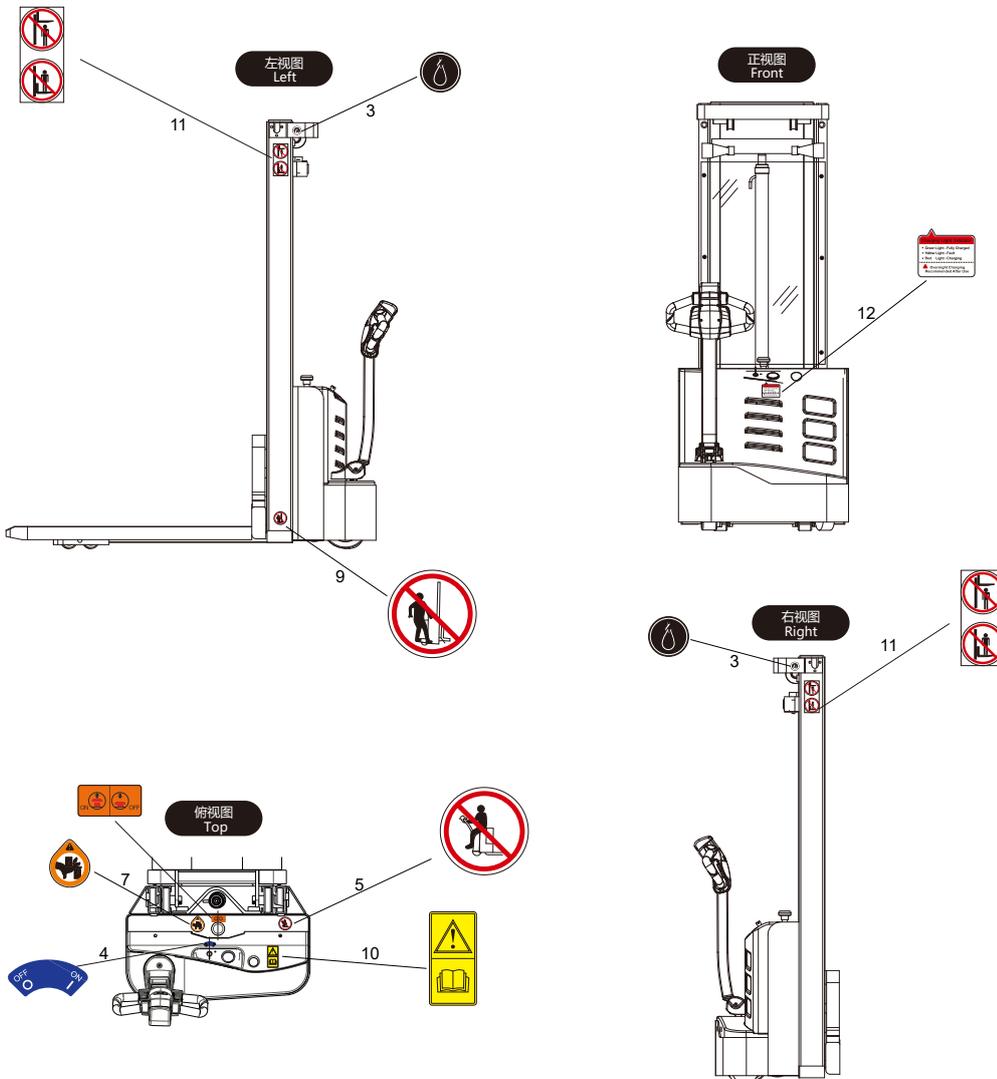


Fig2111-000010M

➤ The load capability chart

The capacity plate gives the capacity (Q) of the truck in kg for a vertical mast.

The maximum capacity is shown as a table with a given load centre of gravity D (in mm) and the required lift height H (in mm).

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

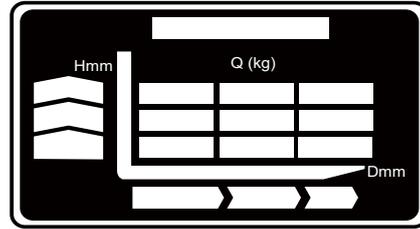


Fig0000-00012OM

➤ Truck nameplate

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

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

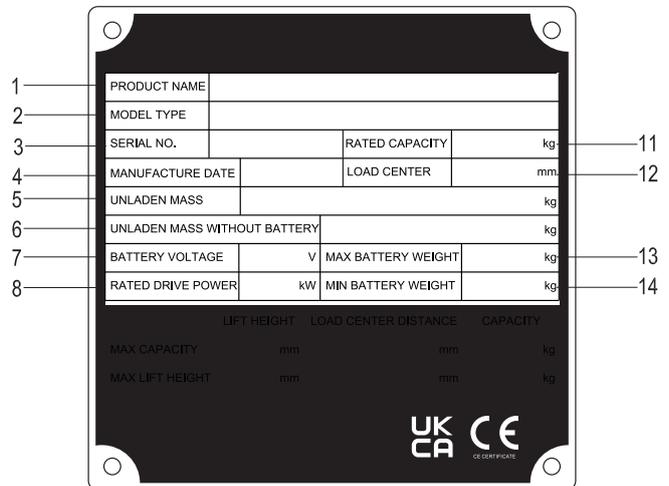


Fig0000-00015OM

B

Operation

2.1 Utilization safety specification

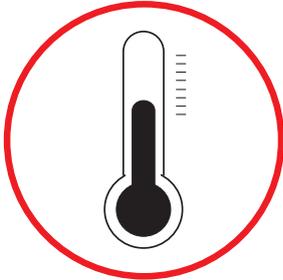


Fig0000-00016OM

- Average ambient temperature for continuous duty: + 25°C ;
- Maximum ambient temperature, short term (up to 1h): + 40°C ;
- Lowest ambient temperature for trucks intended for use in normal indoor conditions: + 5°C ;
- Lowest ambient temperature for trucks intended for use in normal outdoor conditions: - 20°C ;

Don't use the truck in non-position.

i NOTE

Special equipment and authorisation are required if the truck is to be constantly used in conditions of extreme temperature or air humidity fluctuations. We recommend with special measures for the truck or buy the truck for cold store. If in doubt, contact the manufacturer's customer service department.

➤ Improper use



Avoid the use of the truck by non-working personnel.
Don't ride on the truck.
Don't carry or lift people by the truck.



Don't use the truck on slippery road surfaces. (such as road surfaces with oil stain or residual snow or those frozen ones)



Fig0000-00181OM

Don't carry goods on steep slope to prevent goods from sliding off.

i NOTE

Conditions of operation road surface: the truck should run on solid, flat, level and paved road surfaces (including both running and lifting)



WARNING

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



CAUTION

When working environment is not enough light, please add extra lighting of the working area.



Don't leave the truck before it is parked as regulated.



Don't use the truck when any non-working personnel is in the dangerous area.

Don't be distracted when using the truck.

Don't be distracted when using the truck.



2.1.1 EN standards

Continuous sound level: 74 dB(A)

according to EN 12053 as stipulated in ISO 4871

The continuous sound level is a value averaged according to standard regulations, taking the sound pressure level into account when driving, lifting and idling. The sound pressure level is measured at the ear.

Vibrations to which the hands and arms are exposed

The following value is valid for all truck models:

- $\bar{a}_w < 2.5 \text{ m/s}^2$

It is mandatory to specify the hand-arm vibrations, even where the values do not indicate any danger, as in this case.

The value expressed above can be used to compare forklift trucks of the same category. It cannot be used to determine the operator's daily exposure to vibrations during real operation of the truck; these vibrations depend on the conditions of use (floor conditions, method of use etc.) and therefore daily exposure must be calculated using data from the place of use.

EMC-Electromagnetic compatibility

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

EMC involves

- limiting the emission of electromagnetic interference to a level that ensures the trouble free operation of other equipment in the environment.
- ensuring sufficient resistance to external electromagnetic interference so as to guarantee proper operation at the planned usage location under the electromagnetic interference conditions to be expected there .

An EMC test thus firstly measures the electromagnetic interference emitted by the truck and secondly checks it for sufficient resistance to electromagnetic interference with reference to the planned usage location . A number of electrical measures are taken to ensure the electromagnetic compatibility of the truck .

The EMC regulations for the truck must be observed.

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

2.1.2 Conditions for application



Working condition requirements:

- Indoor use and outdoor use
- The walking, lifting and lowering devices, harness and components are IP55 dust and water-resistant.
- The truck's maximum operation altitude is up to 2000m.
- Trucks can only be operated in adequately illuminated working areas to avoid injuries. In case of insufficient light, an additional lighting equipment is needed to ensure that the driver can see properly.
- If you must travel on an incline, the gradients should be below A% at full load, or below B% without a load.(For the value of A and B, refer to the Gradability in technical data)

2.1.3 Stability

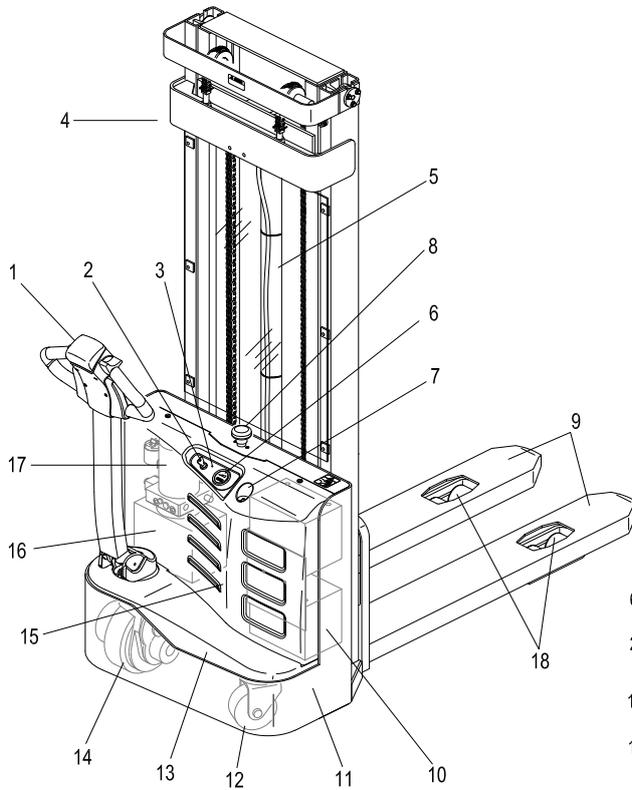


Stability is guaranteed if your truck is used properly in accordance with its intended purpose. Common reasons for a loss of truck stability include:

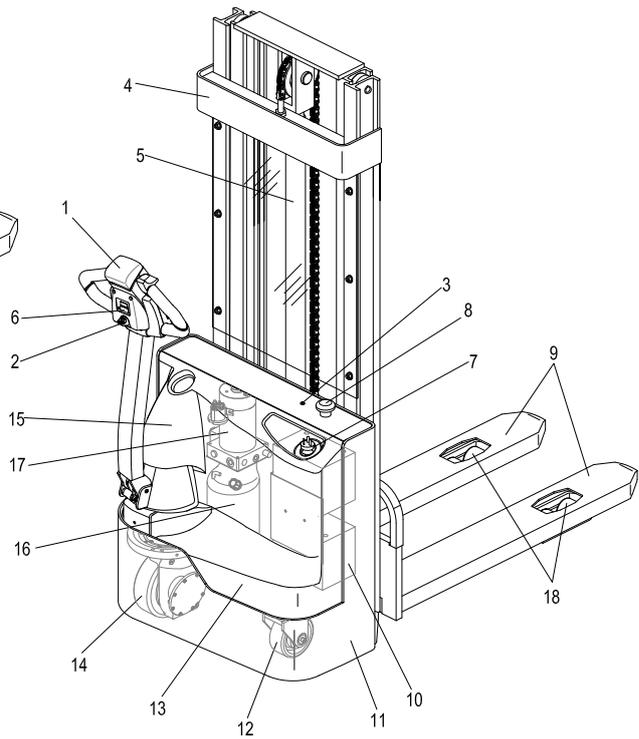
- Emergency stops or sharp turns.
- Driving with a raised load or a load handling device.
- Turning the vehicle around on or driving across a slope.
- Driving up or down a slope with the load pointing downhill.
- Driving with a wide load.
- Carrying a swinging load.
- Driving near the edge of a ramp or up steps.
- Tilting the mast forward while carrying a raised load.
- Driving on uneven surfaces.
- Overloading the truck.
- Carrying bulky loads in strong winds.
- When carrying liquid, its centre of mass inside the container may shift due to inertial force (such as when pulling away, braking or turning).

2.2 Truck Assemblies

ES10-10ES/ES12-12ES

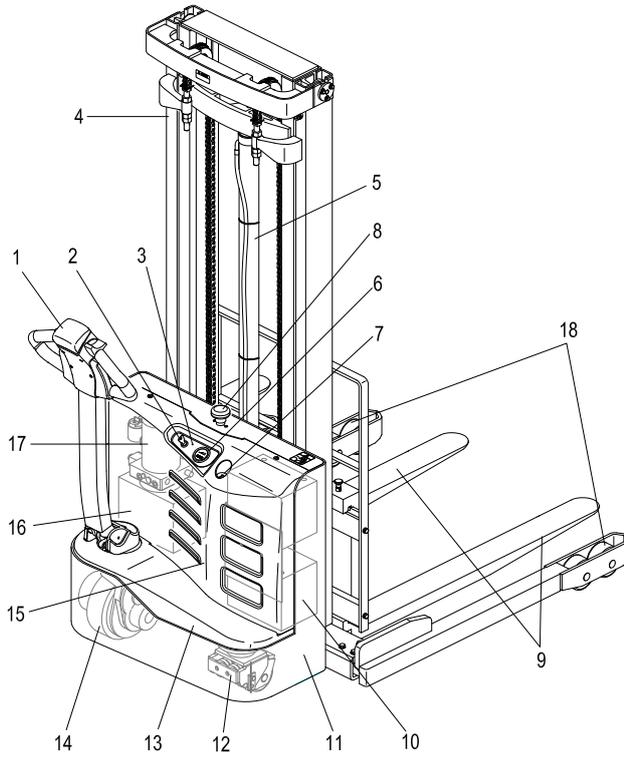


ES15-15ES

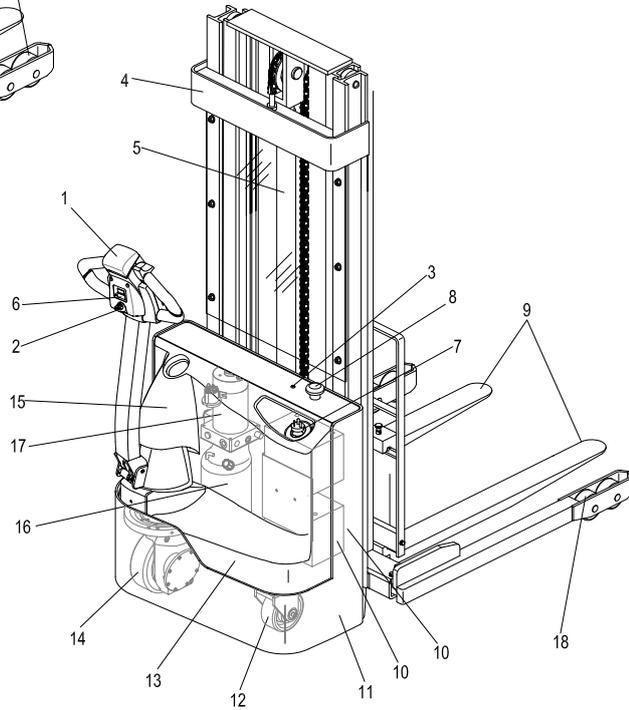


1	Control Handle	10	Battery
2	Key switch	11	Chassis
3	LED Lamp	12	Caster
4	Mast cover	13	Cover (nether)
5	Lift Cylinder	14	Driving wheel
6	Battery discharge indicator	15	Cover(upper)
7	Battery charge connector	16	Tank
8	Emergency stop switch	17	Hydraulic Pump
9	Forks	18	Load wheels

ES10-22DM/ES12-25DM

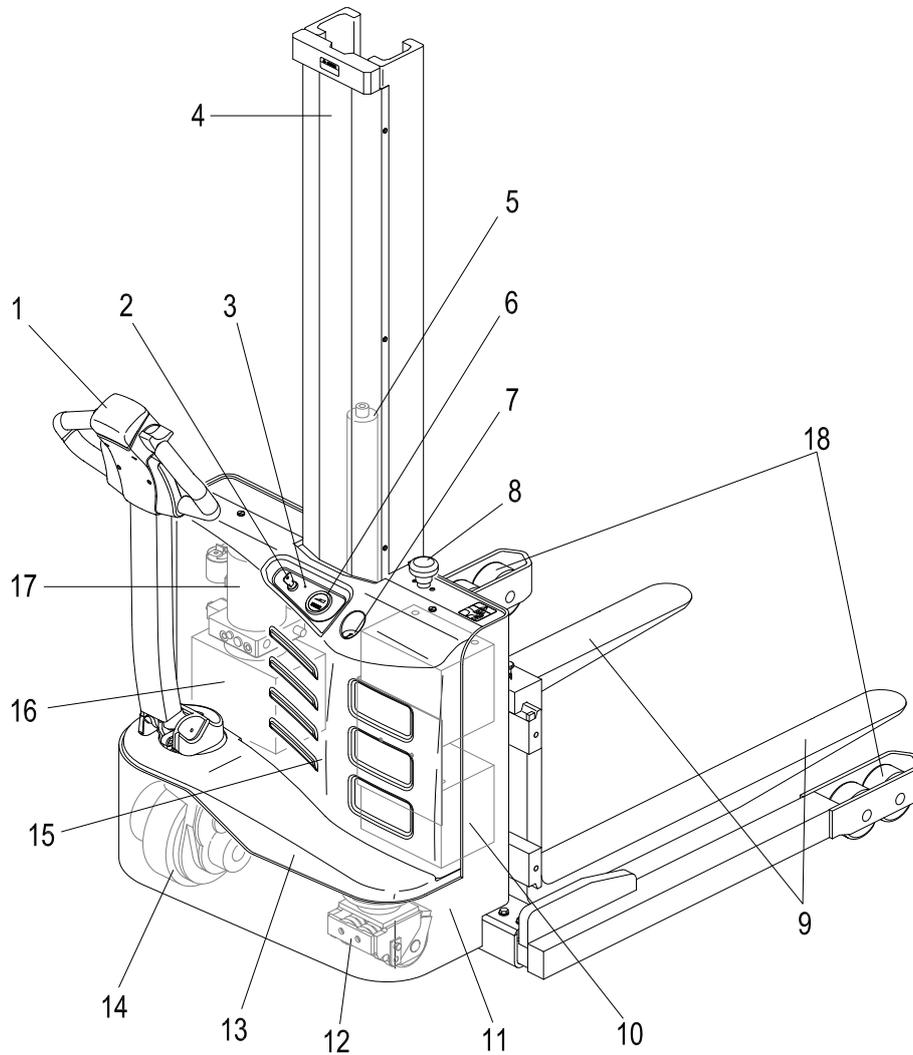


ES15-33DM



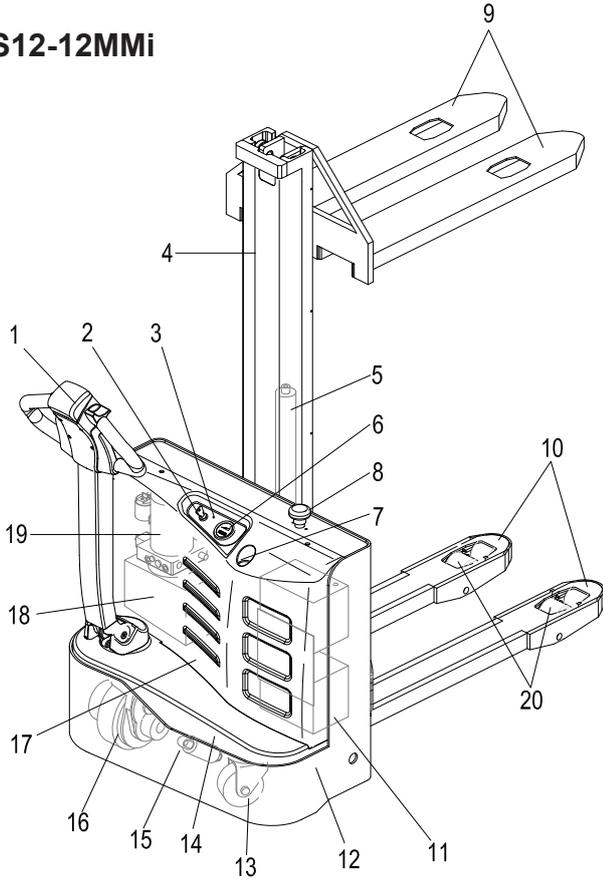
1	Control Handle	10	Battery
2	Key switch	11	Chassis
3	LED Lamp	12	Caster
4	Mast cover	13	Cover (nether)
5	Lift Cylinder	14	Driving wheel
6	Battery discharge indicator	15	Cover(upper)
7	Battery charge connector	16	Tank
8	Emergency stop switch	17	Hydraulic Pump
9	Forks	18	Load wheels

ES10-22MM/ES12-25MM

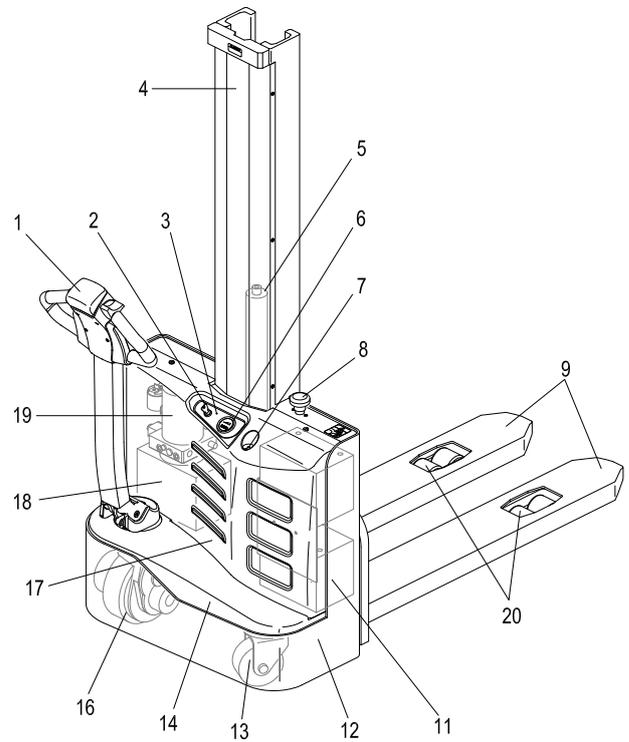


1	Control Handle	10	Battery
2	Key switch	11	Chassis
3	LED Lamp	12	Caster
4	Mast cover	13	Cover (nether)
5	Lift Cylinder	14	Driving wheel
6	Battery discharge indicator	15	Cover (upper)
7	Battery charge connector	16	Tank
8	Emergency stop switch	17	Hydraulic Pump
9	Forks	18	Load wheels

ES12-12MMi



ES10-10MM/ES12-12MM



1	Control Handle	11	Battery
2	Key switch	12	Chassis
3	LED Lamp	13	Caster
4	Mast cover	14	Cover (nether)
5	Lift Cylinder	15	Cylinder II
6	Battery discharge indicator	16	Driving wheel
7	Battery charge connector	17	Cover(upper)
8	Emergency stop switch	18	Tank
9	Lift fork	19	Hydraulic Pump
10	Inner fork	20	Load Wheels

2.3 Display and manipulation

2.3.1 Control handle



(For ES10-10ES / ES12-12ES/ES10-22MM/ES12-25MM/ES12-25DM/ES12-25DM/ES12-12MMi/ES10-10MM/ES12-12MM)

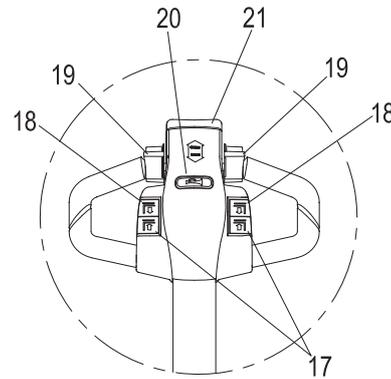


Fig0000-000680M

(For ES15-15ES/ES15-33DM)

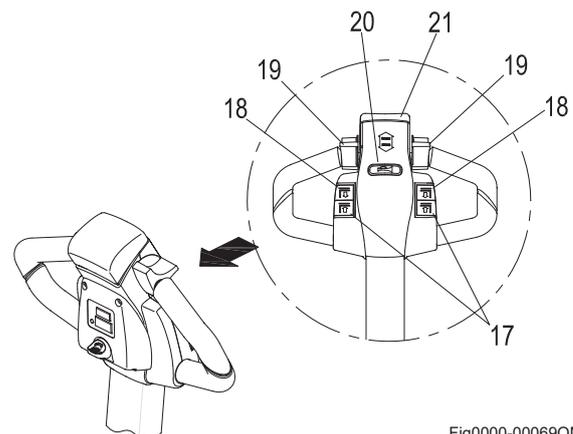


Fig0000-000690M

17	Lowering button	Lower loading parts
18	Lifting button	Lift loading parts
19	Drive switch	Controls travel direction and speed
20	Horn button	Send out sound warning signals
21	Emergency reverse swith	Through touching the button, truck drives away from operator.

2.3.2 Key switch

1.Key switch

Connect and interrupt control current.

- When the key rotates to gear “OFF”, the control current of the truck will be interrupted;
- When the key rotates to gear “ON”, the control current of the truck will be connected.

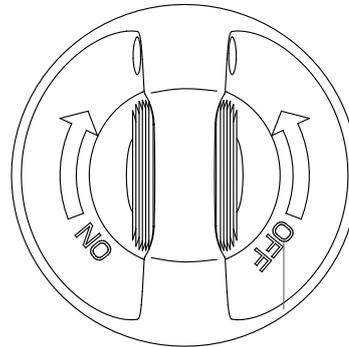


Fig0000-000700M

2.3.3 Display instrument

For ES10-10ES / ES12-12ES/ES10-22MM/ ES12-25MM/ES12-22DM/ES12-25DM/ ES12-12MMi)

- The LED (1) show the total operation time of the truck.
- The LCD (2) show the remaining charge.

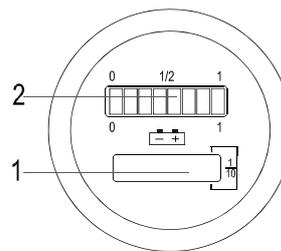


Fig2108-000170M

for ES15-15ES/ES15-33DM

- LED (1) displays the remaining electric of the battery;
- LCD (2) displays the total operation time of the truck;
- LCD (3) is a fault indicating light.

DISPLAY	DESCRIPTION
Continuous red	Normal
Flashing	Truck failure.

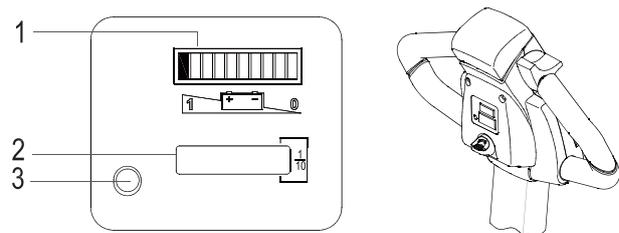


Fig2108-000180M

Refer to relevant descriptions in “discharge indicator and hour meter” for the display functions of LED (1).

i NOTE

Truck failure is in the service manual controller error message section.

The LCD display (1) show battery remaining charge.
 When the truck has been released via the key switch, the battery charge status is displayed.
 The color of the LCD (1) represent the following conditions:

LCD color	Remaining charge capacity (reference value)
Green	70-100%
Orange	30-60%
Flashing Red	0-20%

If remaining battery capacity is below 30%, A flashing red LCD shows warning.
 If remaining battery capacity is below 20%, Two flashing red LCDS show warning, And lifting is now prohibited. The battery must be charged.

The battery discharge indicator has a memory function, it can remember the battery power after the power is turned off, and next time when it is turned on, it will show the power in it's memory.
 If you want to reset battery discharge indicator, please turn on the key after properly charging.

Operating hours display(2)

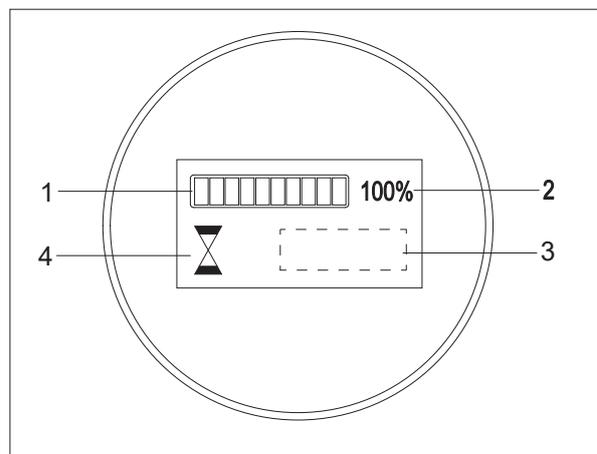
Display range between 0.0 and 99,999.0 hours. Travel and lifting are logged. This is a backlit display.

Power up test on power up the display shows:

- the operating hours.
- the charge status.

Truck featuring lithium-ion battery

- The first row is the discharging indicator, more clear and precise. When the percentage equal or below 20%, the truck is required to charge. 10% will cut down the lifting function, reduce traction speed.
- Row 2: The funnel shows the working status of the truck. While it is empty, the truck is in standby status, the default setting like this, the working hour is not counted.
- When the funnel is flashing, the truck is in working status and the working hour is running. Another tip: when you press the accelerator, the funnel will be filled from corresponding direction. When the tool (spanner) shows in display, there should be certain fault on truck. At same time, it shows a string of codes. 02A means main controller/traction controller. 05A hydraulic controller. 06A steering controller.
- Usually we have only main controller, so it shows only 02A. The following 3 figures is the error codes. How we can read it? If the first figure is "0", we ignore it, we use the rest 2 figures. For example 041=4.1.



2.4 Truck use and operation



2.4.1 Preparation for use



WARNING

The following are inspection and preparation operations that must be implemented before the truck is put into daily use.

Daily Check Items	O.K.(√)	Remark
Check for Fluid Leakage		
Check operation switch, display equipment and component functions.		
Check horn.		
Check forward and reverse driving control functions.		
Check the function of the emergency brake by activating the emergency stop switch.		
Check lifting and lowering control functions.		
Check safety reverser function.		
Check the battery installation, making sure not to damage the battery cables.		
Check the function of the steering system		
Check the battery charging connector.		
Check the drive wheels and rollers for wear and damage.		
Check the hydraulic functions.		
Check brake function of electromagnetic brakes.		
Check whether optional functions are operating normally.		

Table 1: Table of Daily Inspections by Operators is only a sample table for the daily inspections of operators, and it can be adjusted according to specific requirements.



WARNING

The truck should be regularly maintained by qualified maintenance engineers or technicians that have passed the training of and also been authorized by the manufacturer.



2.4.2 Commissioning

The truck must only be operated on battery current!

To prepare the truck for operation after delivery or transportation, the following operations must be performed:

- Check the equipment for completeness.
- If necessary, install the battery. Make sure that the battery cable is not damaged.
- Fully charge the battery.
- Check for Fluid Leakage.
- Check the brake function.
- Check the lifting and lowering function.
- Check the driving function.
- Check the steering function.
- The truck can now be started, see 2.3.3 Truck starting

i NOTE

If the truck is delivered in multiple parts, setup and commissioning must only be performed by trained, authorised personnel.

Wheel flattening

If the truck has been parked for a long period, the wheel surfaces may tend to flatten. This flattening has a negative effect on the safety and stability of the truck. Once the truck has covered a certain distance, the flattening will disappear.

2.4.3 Truck starting



1. Release the emergency stop switch(1);

2. Turn the key switch (2) to start the truck;

3. Test the horn button(3);

The truck is now operational. Put the tiller in the drive position(M) and use the drive switch to control direction and speed.

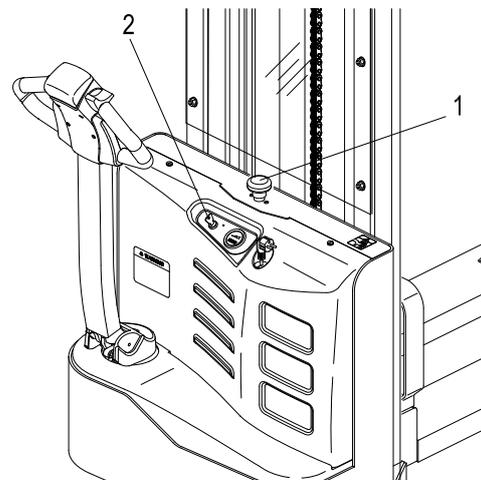
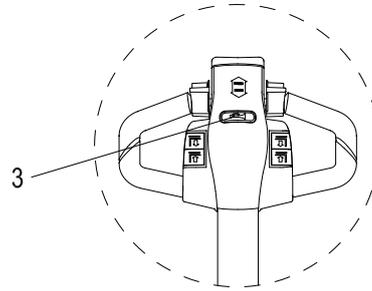


Fig2108-00019OM

2.4.4 Running, steering and braking

1. Running

➤ Running area

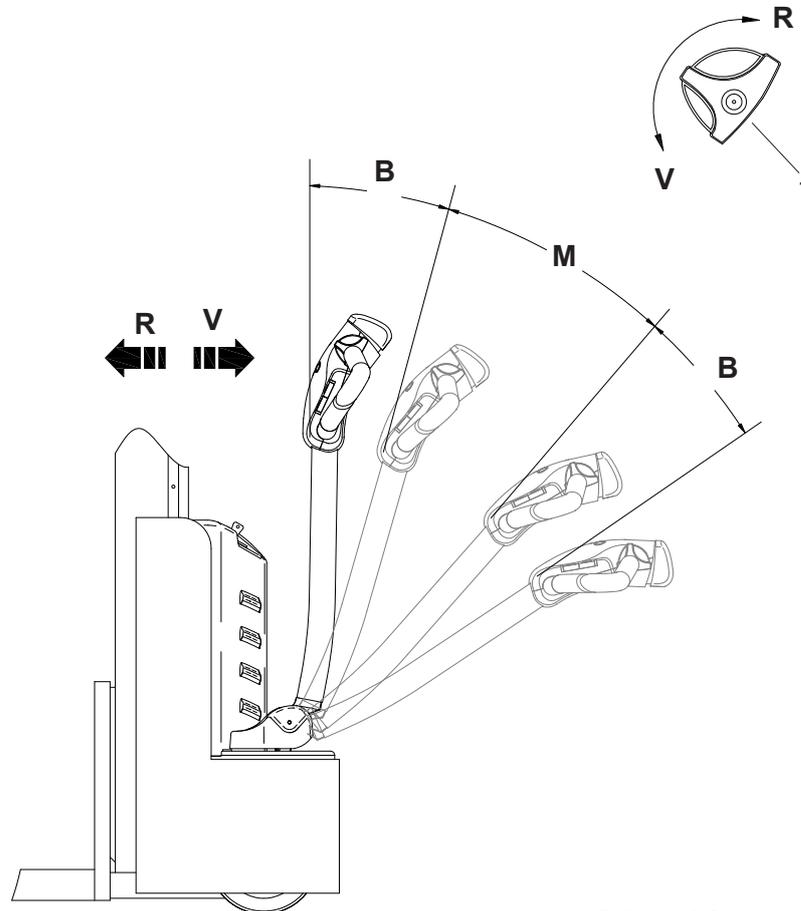


Fig2108-000200M

Tilt the control shaft into the running area (M) and control the running direction and speed of the using the drive switch(1). (the larger the turning angle, the faster corresponding speed)

i NOTE

When using the truck on a ramp or a uneven road, please lift the mast to prevent its bottom from colliding with the road surface.

i NOTE

V is forwards.

R is reverse.

B is brake.

M is running area.

2. Steering

Turn the control handle (1) left or right according to the desired direction.

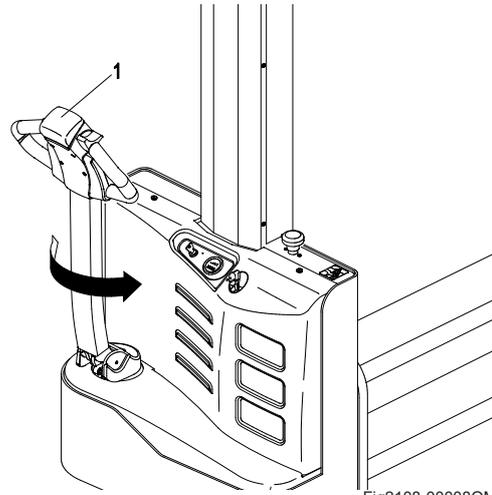


Fig2108-00008OM

3. Braking

Mechanical operating brake

The truck is braked when the operating handle is released.
The mechanical brake engages when the tiller is positioned in Braking area.

CAUTION

If the control handle moves slowly into the brake position, identify the cause and rectify the fault. If necessary, replace the gas spring!

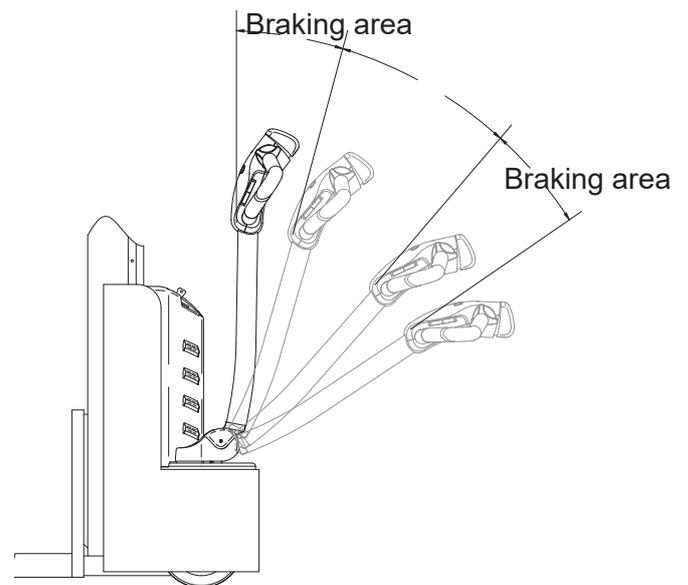


Fig2108-00021OM

➤ **Emergency stop switch**

Press the emergency stop switch, and then all the electrically propelled functions will be interrupted.

➤ **Regenerative braking**

Release the drive switch. The drive switch will automatically return to the initial position and the vehicle will begin to enter the regenerative braking state. When it decelerates to <math><1\text{ km/h}</math>, the electromagnetic brake will bring the motor to a stop.

 **CAUTION**

Open the drive switch; if the drive switch cannot quickly return to the initial position or resets very slowly, identify the cause and rectify the fault.

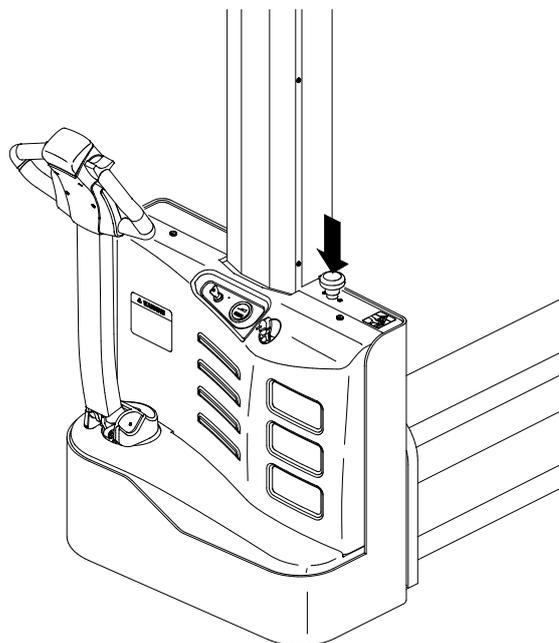


Fig2108-00022OM

➤ **Reverse braking**

Braking can be accomplished by changing the direction of travel.

Press the reverse switch in the opposite direction until the truck comes to a stop, then release the drive switch.

➤ **Emergency reverse switch**

To protect the driver from any risk of being trapped between an obstacle and the machine, the end of the tiller is fitted with an emergency reverse switch. Once the safety reverser is triggered, the equipment will stop immediately, then slowly move back in the direction of the fork.

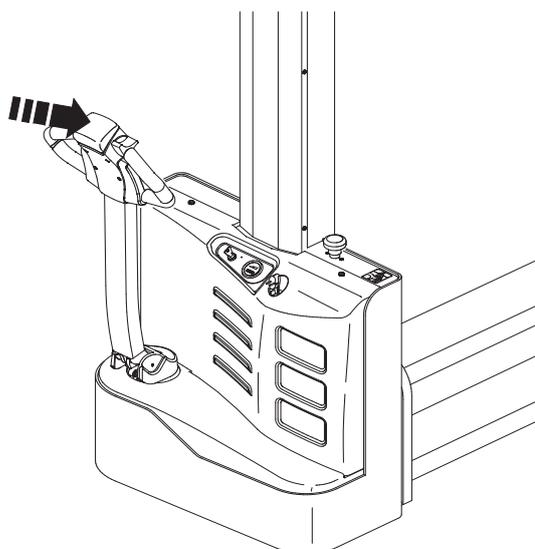


Fig2108-00023OM

2.4.5 Goods picking



1.Lifting

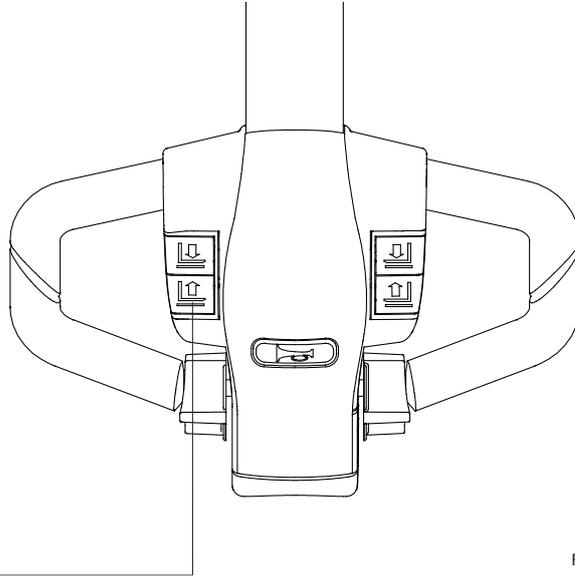


Fig2108-00024OM

Keep pressing the lifting button until reaching the required lifting height

2.Lowering

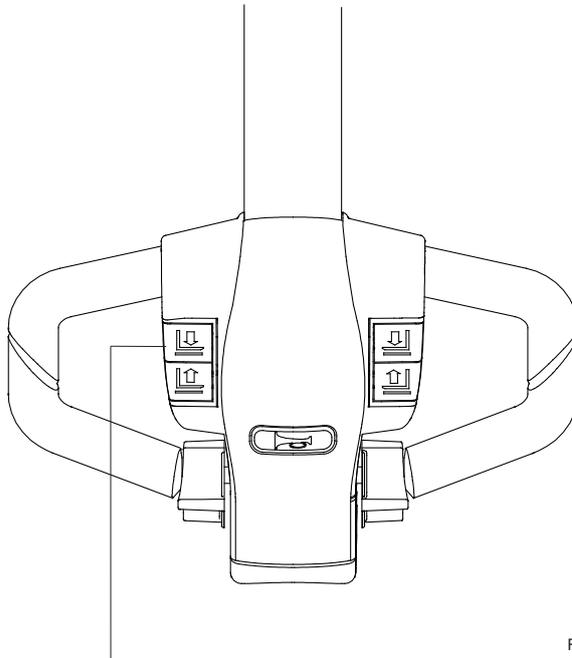


Fig2108-00025OM

Lower the truck to the bottom through pressing the lowering button.

 **WARNING**

Goods failing to be arranged and fixed may result in accidents.

 **NOTE**

To avoid shortening the service life of the oil cylinder, try not to lift the stacker mast to the highest state for every lifting operation.

➤ **Emergency lowering**

The solenoid valve is equipped with an emergency lowering screw for manual emergency lowering. This operation can be executed if the hydraulic system develops a fault. The solenoid valve with the emergency lowering screw is located on the valve body of the hydraulic pump.

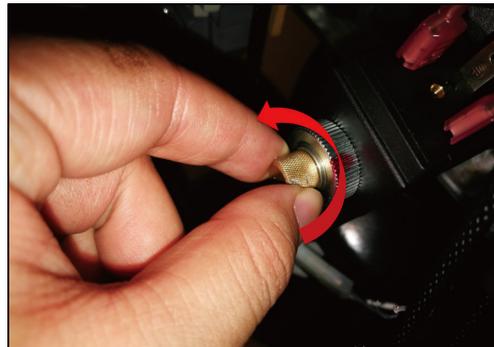


Fig2108-00065OM

Do not stand in the vicinity of the forks when the fork arms are being lowered. Always keep your hands on the screw during lowering, so you can stop the lowering operation at any time.

Unscrew the two large screws(1) and pull out the cover(2).

The emergency lowering screw is located on the solenoid valve(2).

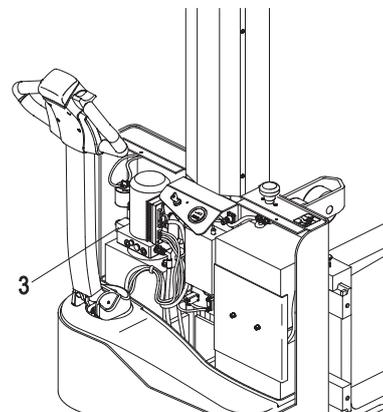
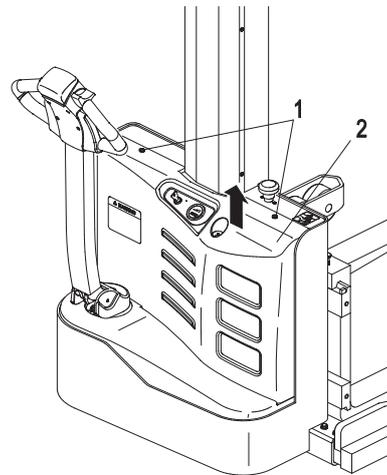


Fig2108-00064OM

2.4.6 Parking the truck securely

- Lower the mast to the bottom;

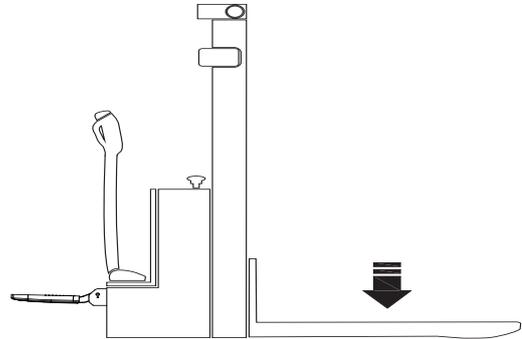


Fig2108-00026OM

- Turn off the key switch;

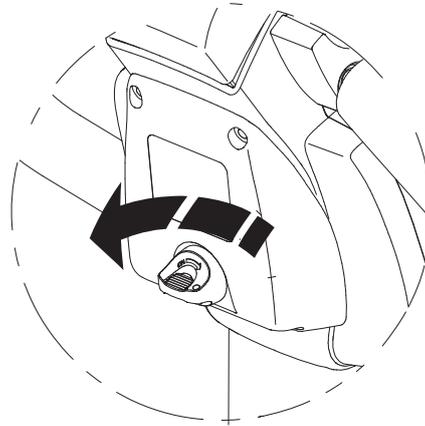


Fig2108-00027OM

2.4.7 Drive directions

The drive directions of the truck are forward (2) and reverse (1).

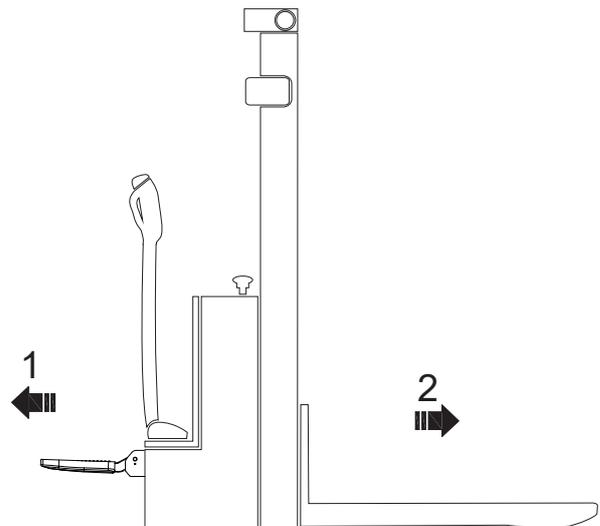


Fig2108-00028OM

2.4.8 Loading



Before lifting a load, ensure that its weight does not exceed the truck's maximum load capacity.

- Refer to the rated load capacity specified on the truck's nameplate.
- Ensure that the load is stable and uniform to prevent any partial spillage.
- Check that the width of the load is compatible with the width of the forks.

CAUTION

Safety footwear must be worn.

CAUTION

*Do not touch nearby loads or loads positioned at the side or in front of the load being handled.
Arrange the loads with a small space between them to prevent them coming into contact with one another.*

Picking up a load from the ground

- Approach goods carefully when driving the vehicle.
- Lower the forks so that they can easily be inserted into the pallet.
- Insert the forks below the pallet.
- If the goods are shorter than the forks, move the goods a few centimetres from the end of the forks so as not to scratch the goods in front.
- Lift the goods a few centimetres.

➤ **Carrying a load**

 **DANGER**

Personnel must not stand under or near the mast when the load is in the raised position.

 **DANGER**

Never transport a load with the forks in the raised position as the equipment may become unstable.

- *Always drive forwards for optimum visibility.*
- *When carrying a load on a slope, always climb and descend with the load up-hill.*
- *Never travel diagonally across the slope or make a U-turn.*
- *Reverse gear must only be used for deposit-ing a load. Since visibility in this direction is restricted, you should only travel at very low speed.*
- *Never drive with an unstable load.*
- *If visibility is poor, let someone guide you.*
- *Be careful of low passageways, low door-ways, scaffolding, pipes etc.*
- *To facilitate movement over obstacles, increase the ground clearance.*
- *Check that the width of the load is compatible with the width of the aisle.*

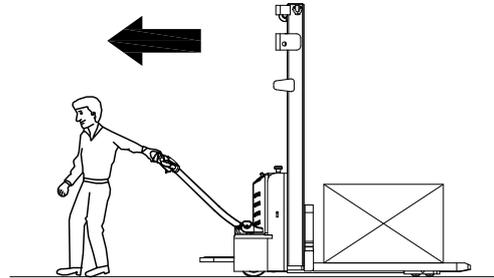


Fig2108-00029OM

➤ **Setting a load down on the ground**

Carefully move the load into the deposit area.
Lower the load until the fork arms are free.
Move the forks straight back.
Lift the forks a few centimeter again.

CAUTION

Be careful not to touch nearby loads or those behind the equipment.

CAUTION

Do not touch nearby loads or loads positioned behind the equipment.

CAUTION

Before you remove the load, ensure that there are no people in the vicinity.

➤ **Stacking a load**

Carefully drive the machine to the required location.
Raise the forks clearly above the level where the load is to be placed.
Drive the truck backward into the racking.
Lower the load until the fork arms are free.
Move the forks straight back.
Lower the forks again until they are a few centimeters away from the ground.

DANGER

Personnel must not stand under or near the truck when the load is in the raised position.

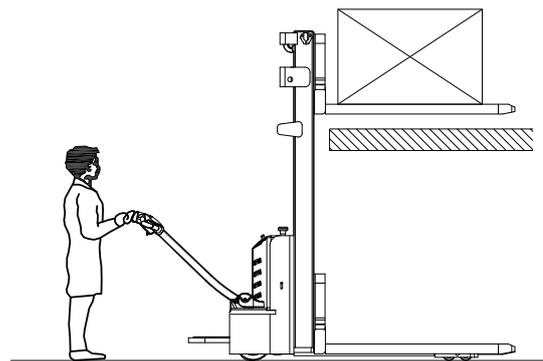


Fig2108-000300M

➤ **Picking up a load at height**

Carefully drive the machine to the required location.

Raise the forks to the height of the pallet.

Carefully move the forks forward under the pallet.

Lift the forks until the pallet moves away from the racking.

Reverse the truck to free the pallet.

Lower the goods again until they are a few centimeters away from the ground.

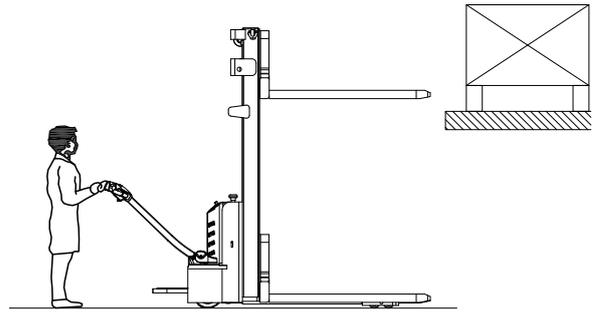


Fig2108-00031OM

! CAUTION

If the equipment has an initial lift control, separate the goods from the racking. To maintain maximum stability, never use the initial lift control, to avoid overloading the equipment.

2.4.9 Using the truck on a slope



i NOTE

Incorrect use of the truck on slopes places stress on the traction motor, brakes and battery.

- Be particularly careful near slopes:
- Never attempt a slope with a gradient greater than that specified in the truck's data sheet.
- *Make sure that the ground is dry with a nonslip surface and that the route is clear.*

➤ Ascending slopes

Travel up slopes must always be forward, with the load uphill. Without a load, we recommend that you ascend slopes forwards.

➤ Descending slopes

Travel down slopes must always backwards, with the load uphill.

Without a load, it is recommended that slopes are descended forwards. In all cases, travel at a very low speed and brake very gradually.

⚡ DANGER

- *In all cases, you must travel at a very low speed and brake very gradually.*
- *Risk to life and/or risk of major equipment damage.*
- *Never park the truck on a slope.*
- *Never park the truck on a slope. Never make a U-turn or take shortcuts on a slope. The driver must drive very slowly on slopes.*

➤ Starting on a slope

If you have to stop and then start on slope, proceed as follows:

- Stop on the slope by pressing the accelerator in the opposite direction until the machine comes to a standstill.
- Return the accelerator to the neutral position, then release the accelerator control button to apply the parking brake.
- To restart, press the accelerator button for the desired direction.
- The truck will move.

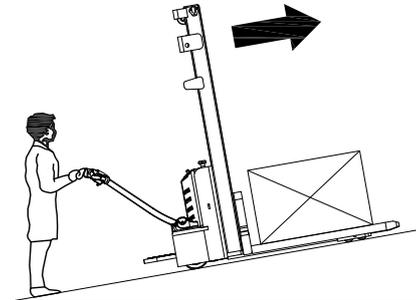


Fig2108-00032OM

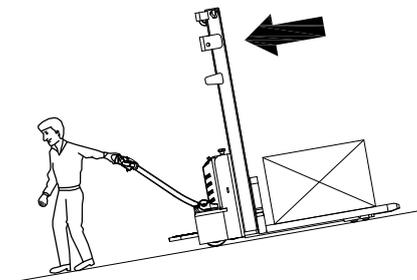


Fig2108-00033OM

2.4.10 Operating the truck without its own drive system

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

- Set the emergency stop switch "OFF".
- Set the key switch "OFF" and remove the key.
- Prevent the truck from rolling away.
- Lift the vehicle carefully with lifting equipment.
- Screw in two screws(1), M4*35mm(Tighten two screws 1 for ES15-15ES/ES15-33DM) until the truck can be moved (no braking action).
- Set the emergency stop switch "ON".
- Set the key switch "ON", which the truck powered all the time.
- After setting down the truck at the destination, unscrew two screws(1).
Braking action is restored!

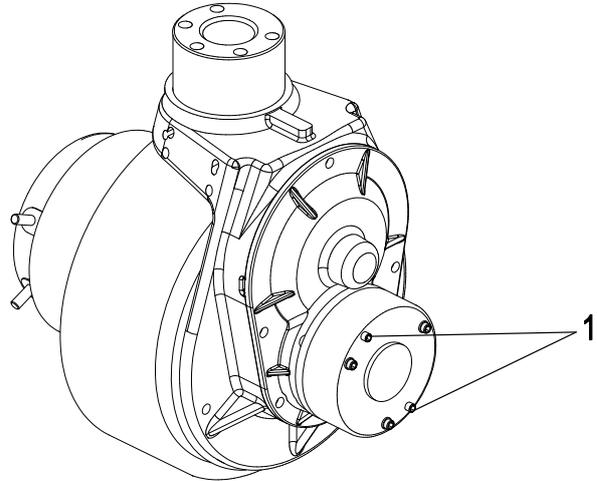


Fig0000-000670M

i NOTE

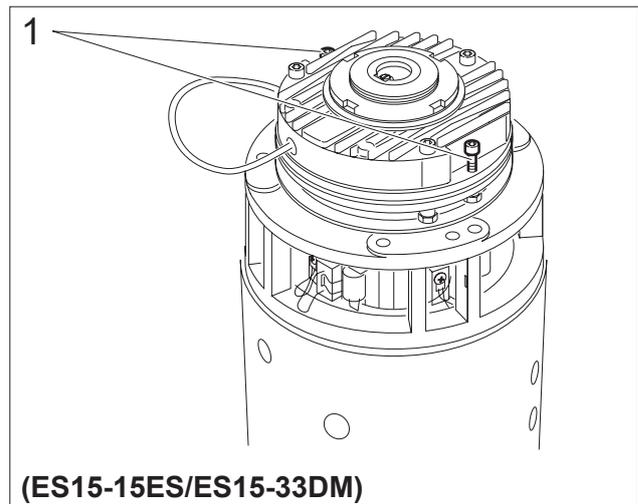
Inoperative trucks movement after brake release must ensure that the power of the truck is on or risk damaging the truck controller.

⚡ DANGER

After setting down the truck at the destination, unscrew two screws(1).
Braking action is restored.

⚡ WARNING

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





2.4.11 Transport

The truck is designed for short-distance lifting, lowering and transporting load units, not suitable for long-distance travel. If needed, the truck must be transported by using lifting device or platform to place on truck or trailer.

➤ Lifting the truck by crane



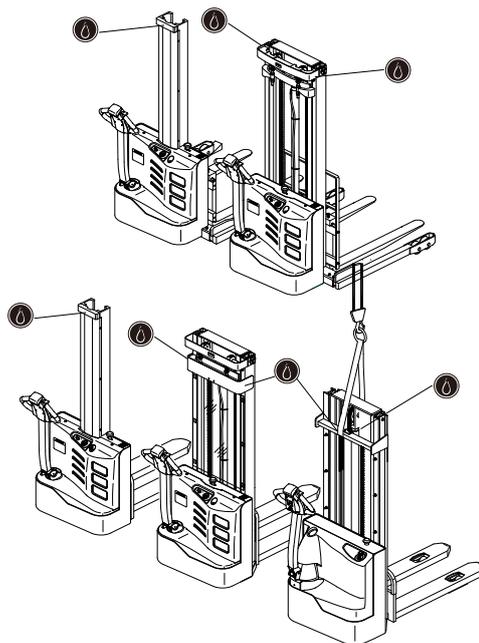
DANGER

Suspended load!

The use of unsuitable lifting gear can cause the truck to crash when being lifted by crane. Prevent the truck from striking other objects when it is being raised, and avoid any involuntary movements.

If necessary secure the truck with guide ropes.

- The truck should only be handled by people who are trained in using lifting slings and tools.
- Wear safety shoes when lifting the truck by crane.
- Do not stand under a swaying truck.
- Do not walk into or stand in a hazardous area.
- Always use lifting gear with sufficient capacity (for truck weight see truck data plate).
- Always attach the crane slings to the prescribed strap points and prevent them from slipping.
- Use the lifting gear only in the prescribed load direction.
- Crane slings should be fastened in such.
- Park the industrial truck safely.
- Disconnect the power supply, remove the lithium-ion battery if necessary.
- Secure the lifting slings at the fastening points.
- Load the truck and park it securely at its destination.



➤ Securing the truck for transport

Correctly fix the forklift truck to avoid move when using truck or trailer.

Procedure:

- Park the truck securely.
- Sling the tensioning belt around the truck and attach it to the fastening rings of the transporting vehicle.
- Use wedges to prevent the truck from moving.
- Tighten the tensioning belt with the tensioner.



WARNING

- The truck or trailer must have fastening rings.
- Use wedges to prevent the truck.
- Only use tension belt or fastening belt of good nominal strength.

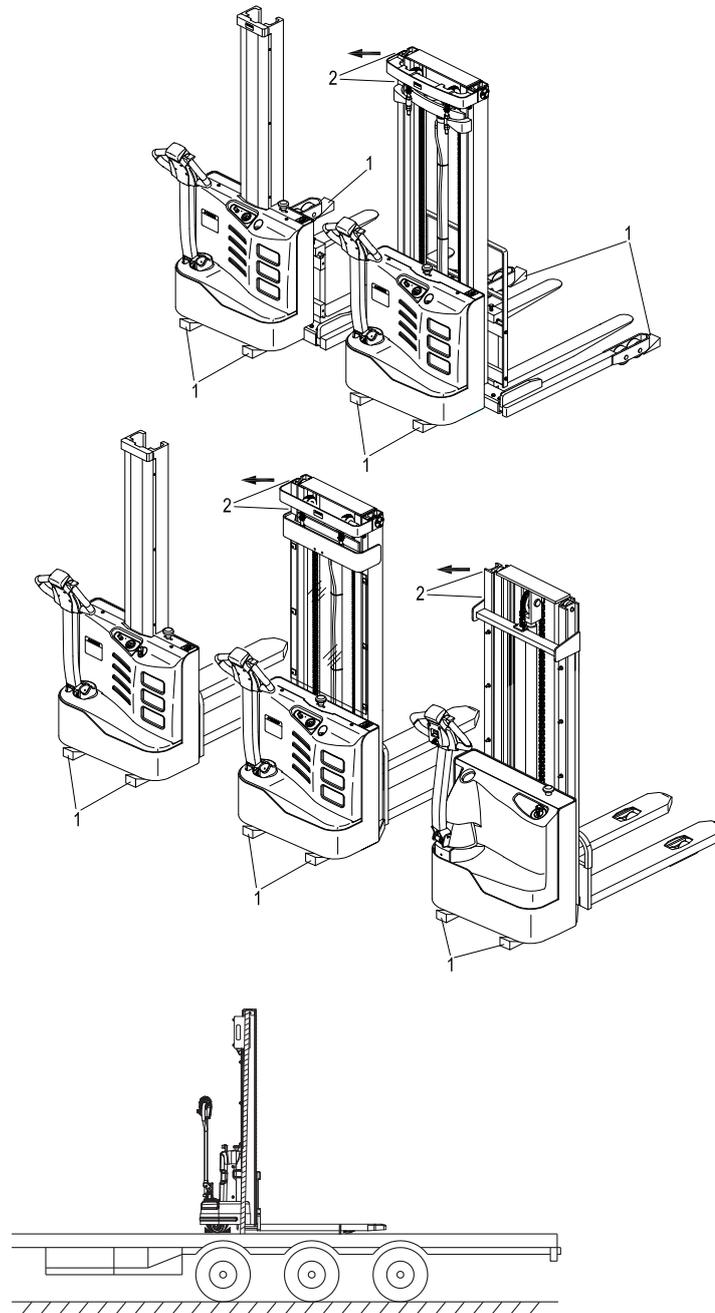
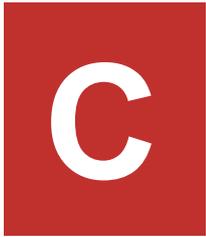


Fig2108-00035OM



Battery use and maintenance

3.1 Handling the battery

3.1.1 Safety regulations for handling maintenance-free batteries

These trucks are equipped with maintenance-free batteries. No distilled water can be added to this battery type. The cell covers are fixed tight and must not be opened. Opening the covers will damage the battery.

Refilling batteries with an electrolyte solution is prohibited if they are a type that does not require maintenance.

Battery maintenance or charging can only be performed by qualified personnel in accordance with these instructions and the battery manufacturer's instructions.

Batteries are recycled in accordance with national regulations; please comply with the relevant regulations.

Smoking and naked flames are not permitted when handling batteries. No inflammable substances or spark-generating materials must be present or stored within a distance of 2 meters of the truck parked for battery recharging. The location must be well ventilated and fire fighting equipment must be kept ready.

3.1.2 Safety and warning



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



- Explosion or fire disaster is likely to occur; avoid short circuit!



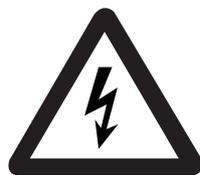
- Always wear protective clothing (e.g. safety goggles and safety gloves) when working on cells and batteries.



- Don't knock over the storage battery!
- Using lifting and delivery devices as specified. Prevent the storage battery cell, interface and connection cable from being damaged by the lifting hook!



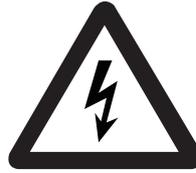
- No smoke and fire!
- Avoid the existence of open fire, fiery metal wire or sparks around the storage battery, otherwise explosion or fire disaster may occur!



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



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



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



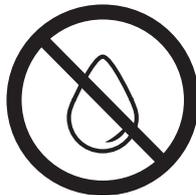
- Don't trample on the storage battery to prevent it from fierce shaking or shacking!



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



Do not place the battery on top of conductive objects.



Avoid the battery becoming corroded by water or corrosive liquid.

➤ Accidental contact, "first aid"

Acid and alkaline electrolytes create burns in eyes and on the skin.

A source of clean water, from tap or a dedicated sterile reservoir, shall be provided in the vicinity of the battery under charging or maintenance for removing electrolyte splashed onto body parts.



WARNING

In the event of accidental contact with electrolyte, the eyes shall be immediately flooded with large quantities of water for an extended period of time. In all cases immediate medical attention shall be obtained.

In the event of accidental skin contact with electrolyte, the affected parts shall be washed with large quantities of water or with adequate neutralizing solutions. If irritation of skin persists medical attention shall be obtained.

3.2 Battery charging

3.2.1 Precautions

- Charging the batteries shall only be carried out in adequately ventilated rooms and e.g. not in the offices or break rooms for equipped with lead-acid battery truck.
- Avoid the existence of any metal object in the surface of the battery;
- Do not pierce the battery case with nails or other sharp objects.
- Do not short-circuit the battery with wires or other metal objects!
- The plug connection parts should be inspected in terms of obvious damages before charging;
- Fire-fighting equipment must be kept in the charging place;
- Before charging, check if there is damage on cable connection and plug connection pieces.
- Do not use irregular charging sockets;
- The net height of the charging area shall be higher than 5m, and the safe distance from other areas shall be greater than 5m. Charging in non-charging area is prohibited;
- No inflammable substances or spark-generating materials being present or stored within a distance of 2 metres of the truck parked for battery charging.
- No smoking or open fire around when charging.
- When charging, do not wrongly connect the battery polarity, otherwise it may damage the battery.
- The safety provisions related to the battery and the manufacturer of charging station must be strictly abode by.

3.2.2 Charging the battery with integrated charger

Park the truck in the designated charging area. Pull the charger cord (1) from the truck and examine it for damage. If undamaged, plug the charger into voltage range 100-240V, 50/60Hz wall outlet. As long as the built-in charger is connected to the outlet, the truck should not be moved.



WARNING

*Charger maximum input power 500W.
Other models maximum input power 290W. Please strictly implement the above data to prevent equipment damage and accidental risks such as fire.*

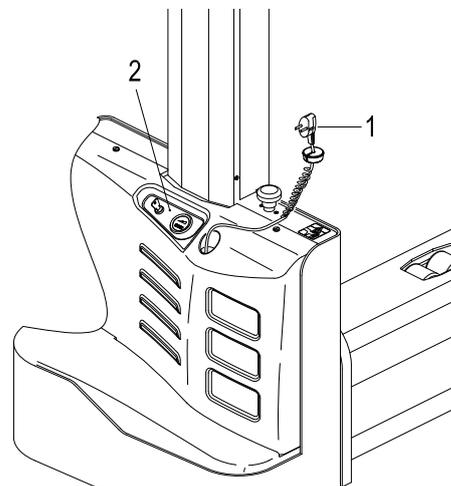


Fig2108-00037OM

Charging indicator(2)

NO.	LED status	Phenomenon	Cause	Remedy	Description
1	Red light is on		Trouble free	/	Charging
2	Green light is on		Trouble free	/	End of charging
3	No indicator light	Current/voltage changes	Indicator failure	Return to factory maintenance	Charger failure
4		No change in current/voltage	The power input line is in good contact with the socket and the charger	Charger failure, return to factory maintenance	Charger failure
5	Red light flashes		The power input cable is not in good contact with the socket	Check if the input power line is in good contact	
6	Yellow light is on		Storage battery fails. (battery reverse connection)	Eliminate battery failure	
7			Storage battery fails. (battery is not connected)	Eliminate battery failure	
8	Yellow light flashes		Ambient temperature is too high	Ambient temperature drops to normal	
9			Storage battery voltage exceeds 32.5V	Eliminate battery failure	
10			Charger failure	return to factory maintenance	

Integrated charger

The integrated charger must not be opened.

In case of malfunctions, the customer service or the manufacturer's customer service must be notified.

The charger may only be used for the batteries supplied by EP.

Swapping with other industrial trucks is not permitted.

The battery must not be connected to two chargers at the same time.

The mains connection may vary depending on the size of the integrated charger.

Observe the correct voltage and amperage when using.



DANGER

Damaged and unsuitable cables can lead to electric shock and, due to overheating, to fire. Only use mains cables with a maximum cable length of 3m.

Unroll the cable reel completely when in use.

Only use original mains cables from the manufacturer.

Insulation protection classes and resistance to acids and alkalis must correspond to the manufacturer's mains cable.



NOTE

Depending on the vehicle model and battery type, the battery is permanently connected to the vehicle and the battery plug does not need to be disconnected.

3.2.3 Battery type & dimensions & Charging time



All the batteries are maintenance free.

Battery types & dimensions are as follows:

Tuck type	voltage/ rated capacity	Dimension	Charger	Charging time
ES10-10ES	2x12/105	325x180x230	10A	7
ES10-10MM	2x12/85	270x180x230	10A	6
ES12-12MM	2x12/85	270x180x230	10A	6
ES10-22MM	2x12/85	270x180x230	10A	6
ES12-25MM	2x12/85	270x180x230	10A	6
ES10-22DM	2x12/105	325x180x230	10A	7
ES12-25DM	2x12/105	325x180x230	10A	7
ES12-12ES	2x12/105	325x180x230	10A	7
ES15-15ES	2x12/125	330x190x240	15A	9
ES15-33DM	24/125	330x190x24	15A	9
ES12-12MMi	2x12/85	300x180x230	10A	6

3.3 Battery removal and installation

Removing and installing from the top

Park the truck securely as described in paragraph 2.4.6 of chapter B and turn off the power before removal and installation of the battery.

Battery removal and installation steps:

a: Unscrew the 2 screws (1) and remove the cover(2).

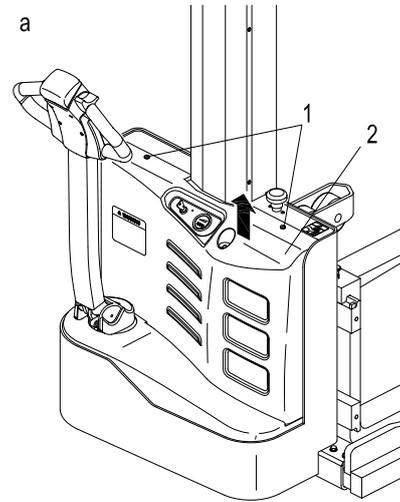


Fig2108-00038OM

b: Unscrew the 2 screws(3) and remove the battery cover(4).

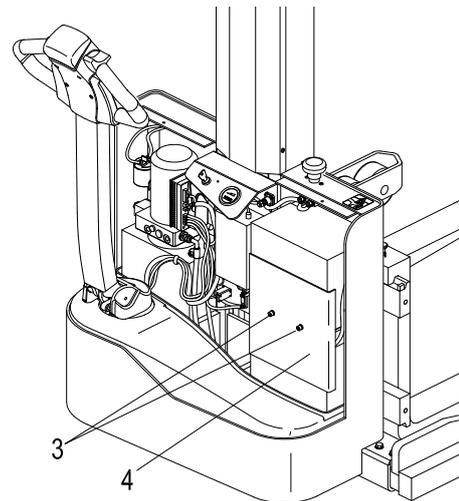


Fig2108-00039OM

c: Remove the three battery cables shown in the image(5).

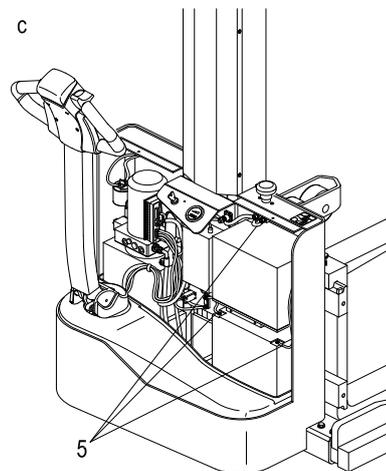


Fig2108-00040OM

Remove the battery(6).

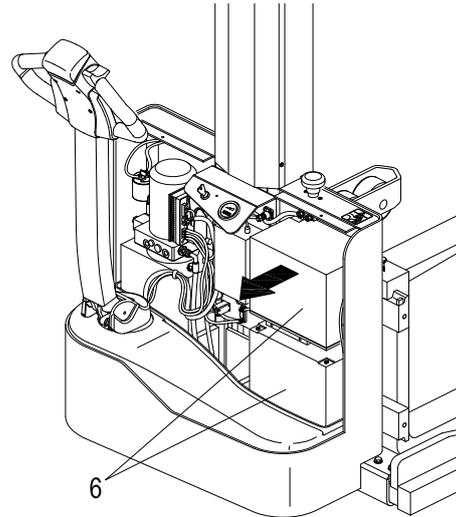


Fig2108-00041OM

i NOTE

Pay attention to the operation of the battery to avoid short circuits.

i NOTE

Route the battery cable so that it is not trapped when the battery is inserted.

Installing the battery

Installation is in the reverse order, pay attention on battery installation position and cable connection. Make sure to protect the cables to avoid damage when you install the battery.

Well place cables to avoid be damaged when you remove and install battery.

D

Maintenance

4.1 Truck maintenance

Only through regularly implementing truck maintenance work can the sustainable and reliable use of the forklift be ensured.

Only those receiving professional training and approved as qualified can be competent in various equipment care maintenance operations. If you intend to independently implement maintenance, you are recommended to have your maintenance personnel receive on-site training from the service representative of the equipment supplier.

4.1.1 Safety announcement

- It is improper to clean the truck using inflammable liquid.
- Ensure that the power supply has been completely disconnected before actual maintenance operation.
- Use only approved spare parts.

4.1.2 Decommissioning the industria

- If required to be parked for over one month, the truck must be placed in a dry and frost-free environment.
- Raise and chock the truck: the wheels must not touch the ground in order to prevent irreversible deformation of the tyres.
- Clean the truck carefully.
- Check the hydraulic oil level and replenish if necessary, see page D5.
- Coat any unpainted metal parts with a thin layer of oil or grease.
- Recharge the battery every 2 months.

4.1.3 Restoring the truck to operation

Thoroughly clean the truck.

Clean the battery. Grease the pole screws using pole grease and reconnect the battery.

Recharge the battery.

Check if the hydraulic oil contains condensed water and change if necessary.

Follow the daily checklist.



4.1.4 Maintenance table

50-hour/7-Day maintenance	
Check the functions of the operation switches and display	
Check alarm system functions	
Check the emergency switch functions	
Check steering system functions	
Check the drive wheel and load wheel for worn or damage	
Check the functions of hydraulic system	
250-hour/60-Day maintenance	
After operating for 250 hours in total, the truck should also be maintained according to the following procedures in addition to the 50-hour maintenance mentioned above	
8	Inspect where there is any damage in the cables and whether the terminals are reliable
9	Inspect whether there is any screw losing or slipping out
10	Inspect whether there is any abrasion or damage in the oil pipes
11	Inspect where is any leakage in the hydraulic oil
500-hour/3-month maintenance	
After operating for 500 hours in total, the truck should also be maintained according to the following procedures in addition to the 50-hour maintenance and 250-hour maintenance mentioned above	
12L	Inspect or add the gear grease
13L	Inspect and lubricate using the lithium-based lubrication grease the lubrication mouths in moving parts
14	Inspect and lubricate using the lithium-based lubrication grease the bearing between the driving engine and the gear box
1000-hour/6-month maintenance	
After operating for 1000 hours in total, the truck should also be maintained according to the following procedures in addition to the 50-hour maintenance, 250-hour maintenance and 500-hour maintenance mentioned above	
15	Inspect and fasten the controller and other electrical apparatus elements
16	Inspect whether there is any abnormal sound or disclosure of the gear box
17	Inspect the abrasion situations of the driving wheel/bearing wheel/caster and please timely replace seriously abraded ones
18	Inspect whether all the oil pipes, pipelines and joints are reliably connected and whether all the sealing elements are reliable
19L	Inspect the level of the oil liquid, and if the level fails to reach the minimum one as required, please timely add hydraulic oil with the same specifications
21	Check that the oil tank is fixed and check it for leaks.

After operating for 1000 hours in total, the truck should also be maintained according to the following procedures in addition to the 50-hour maintenance, 250-hour maintenance and 500-hour maintenance mentioned above	
22	Inspect the running, lifting and lowering speed, braking distance and other operation performances of the truck Inspect and add gearbox lubrication grease
23L	Inspect and replace gearbox gear oil
24	Inspect where there is any damage in the oil cylinders and whether corresponding installations are reliable
25	Check hoses, pipes and interfaces for damage and ensure their tightness and sealing.
27	Inspect whether the bearing capacity reaches the rated load and implement corresponding adjustment through the flood valve adopted in the hydraulic station
28	Inspect whether all the labels are clear and intact
2000-hour/12-month maintenance	
After operating for 2000 hours in total, the truck should also be maintained according to the following procedures in addition to the 50-hour maintenance, 250-hour maintenance, 500-hour maintenance and 1000-hour maintenance mentioned above	
29	Inspect and replace the hydraulic filter
30	Check the condition and tightness of the mast and chains
31	Adjust the length of the mast chains
32	Clean and lubricate the chains
33	Lubricate the mast
34	Check the condition and mountings of the mast protectors
35L	Inspect the level of the oil liquid, and if the level fails to reach the minimum one as required, please timely add hydraulic oil with the same specifications

➤ **Maintenance operations that do not require special training**

Simple maintenance operations such as checking the hydraulic fluid level or checking the battery electrolyte level (if necessary) can be carried out by persons with no special training. A specific qualification is not necessary.

Complicated maintenance operations such as replacing the battery, replacing the wheels and so on should be carried out by the authorised service centre.

Refer to the maintenance section of this manual for further information.

(ES10-10ES / ES12-12ES/ES10-22MM/
 ES12-25MM/ES12-25DM/ES12-25DM/
 ES12-12MMi/ES10-10MM/ES12-12MM)

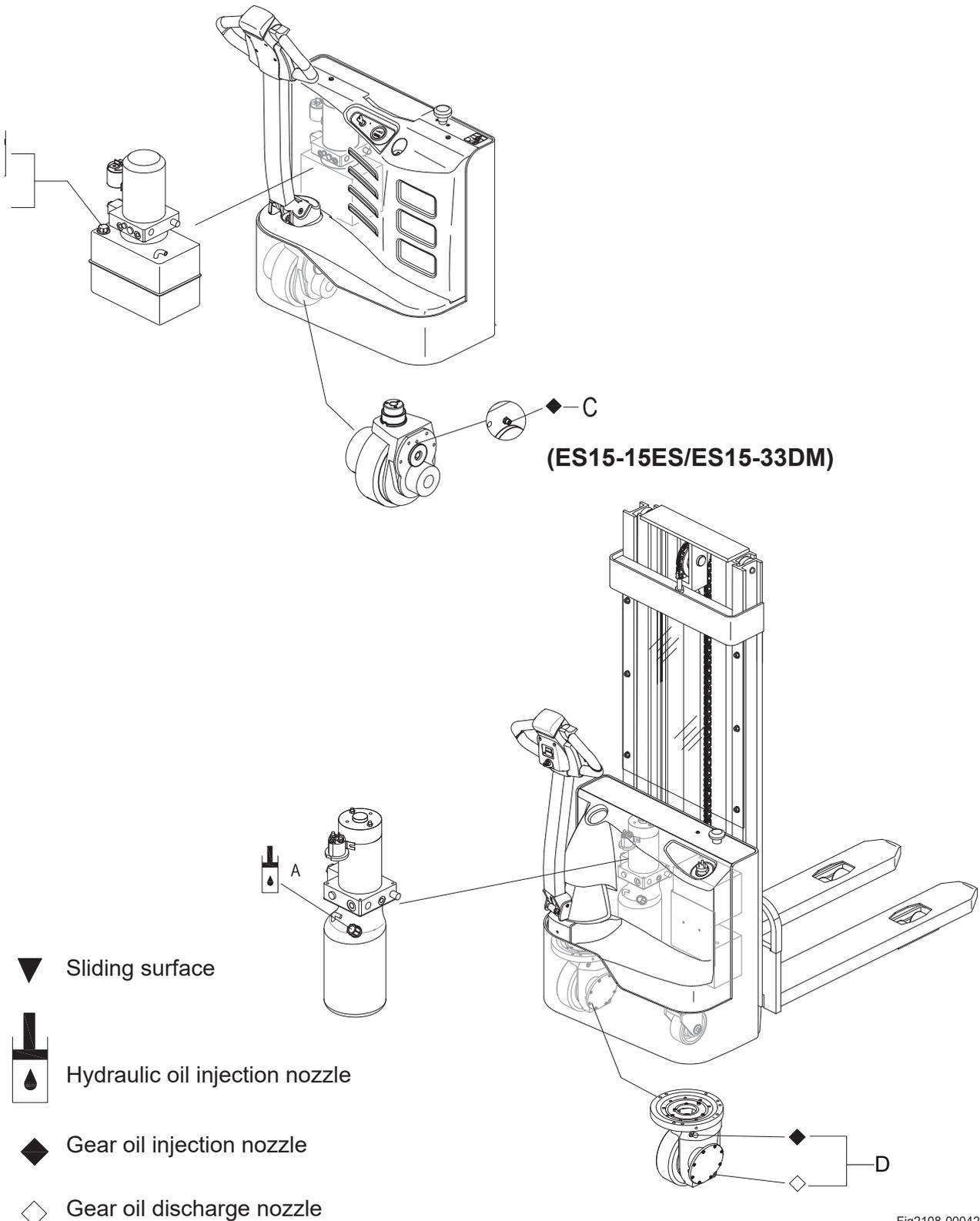


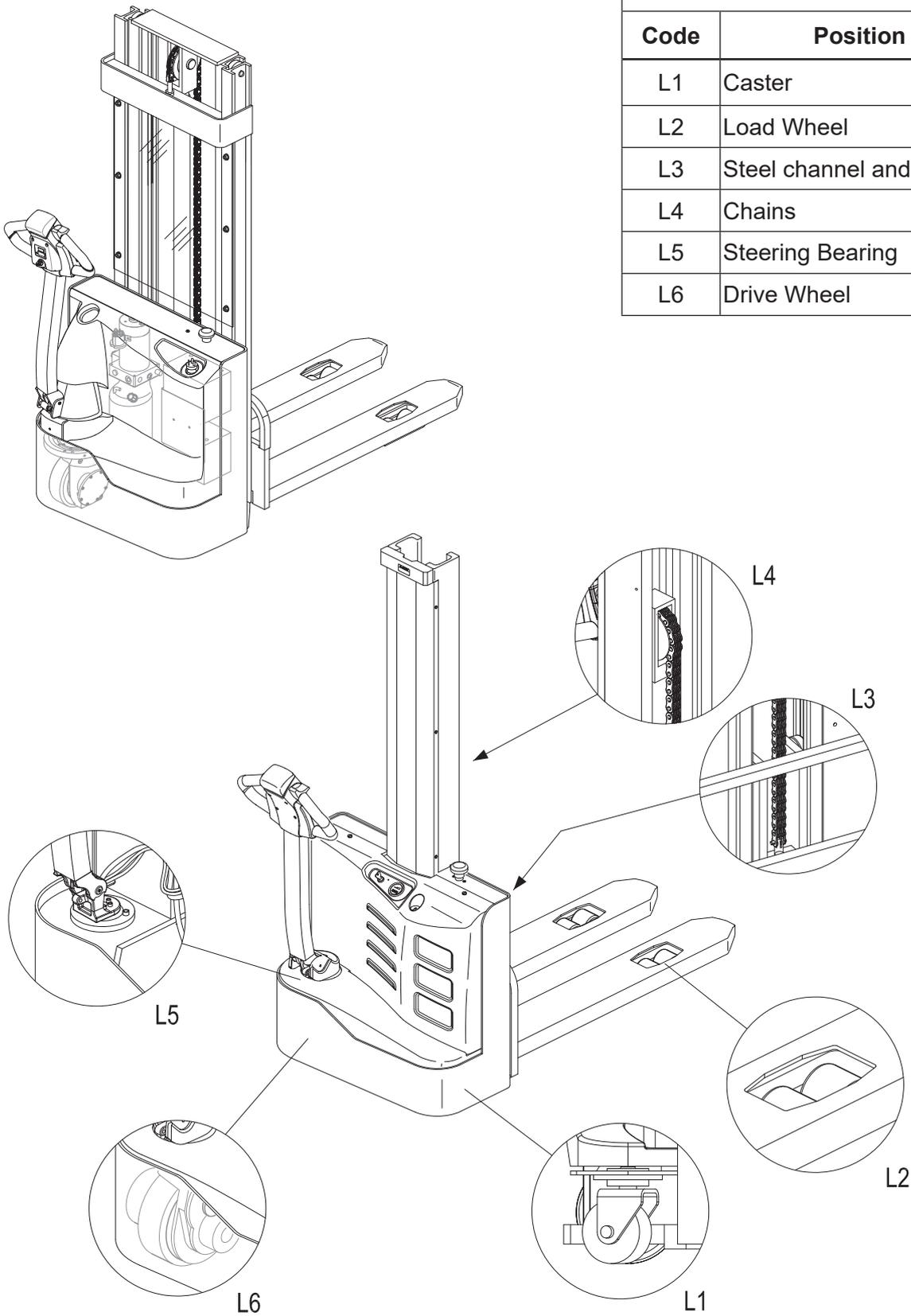
Fig2108-000420M

Lubricants				
Code	Type	Specification	Amount	Position
A	Anti-wear hydraulic oil	L-HM32	See Table 1	Hydraulic System
	Low temperature anti-wear hydraulic oil (cold storage)	L-HV32		
B	Multi-purpose grease	Polylub GA352P	Appropriate amount	Sliding surface (See Table 2)
C	Grease (MoS ₂)	-	100 grams	Gearbox
D	Heavy Duty Gear Oil	GL-85W-90	1.38 L	Gearbox

Table 1 Application Amount of Hydraulic Oil		
Mast Series	Lifting height (mm)	Amount (L)
Simplex Mast	1600	3.8
	2000	3.8
Duplex Mast	2300	4.0
	2500	4.2
	2700	4.2
	3000	4.5
	3300	4.8
	3600	4.8

**Table 2 Sliding Surface
Lubrication Table**

Code	Position
L1	Caster
L2	Load Wheel
L3	Steel channel and rollers
L4	Chains
L5	Steering Bearing
L6	Drive Wheel



4.2 Maintenance Instructions

4.2.1 Check the hydraulic oil level

NOTE

If there are popping noises coming from the tubing when lifting, this indicates that the hydraulic oil is insufficient and should be promptly replenished.

CAUTION

Do not add hydraulic oil that contains impurities.

- Fully lower the mast.
- Press the emergency off switch.
- Unscrew two screws(1).
- Remove the front hood(2).

Check the hydraulic oil quantity on the hydraulic tank according to Lubrication Points.

NOTE

You can lift again after you have finished adding the oil. You must continue checking the hydraulic oil level if there is still a banging noise.

Reinstall the disassembled parts in reverse order.

NOTE

Only use hydraulic oil that meets the specifications. Refer to “Lubricants Points”.

4.2.2 How to add oil

- It is necessary to add hydraulic oil when you heard explosion sound from pipe during lifting.
 - Prepare the truck for maintenance and repairs (See Maintenance Instructions).
 - Open the front panel.
 - Add hydraulic oil of the correct grade (See Lubrication point).
 - Add hydraulic oil till you can't hear explosion sound during lifting any more.

Re-install in the reverse order.

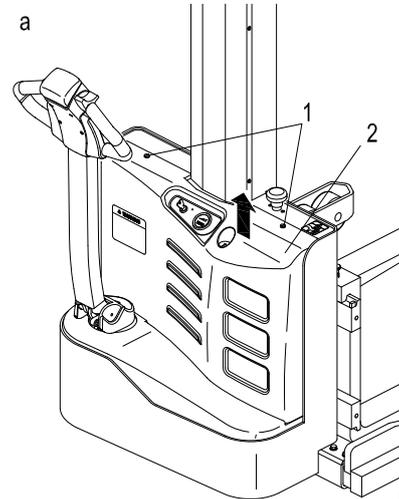


Fig2108-000380M

4.2.3 How to add grease or grease oil

- Prepare the truck for maintenance and repairs (See Maintenance Instructions).
- Remove the front panel.
- Add grease of the correct grade (See Lubrication point).
- Add transmission oil every 500 operating hours(800-1000 operating hours for ES15-15ES/ES15-33DM), or at least annually.

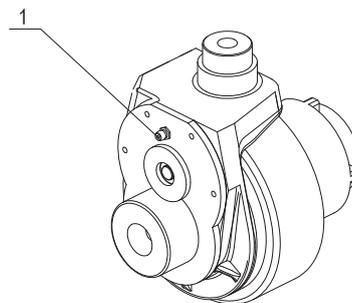
Install following the above steps in reverse order.



WARNING

Don't not add gear oil that contains impurities.

(ES10-10ES / ES12-12ES/ES10-22MM/ES12-25MM/ES12-25DM/ES12-25DM/ES12-12MMi/ES10-10MM/ES12-12MM)



(ES15-15ES/ES15-33DM)

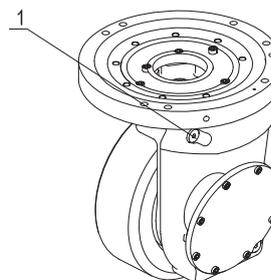


Fig2108-00044OM

4.2.4 Checking fuses

- Fully lower the mast.
- Press the emergency stop switch.
- Remove the front hood.
- Check that all fuses are in working order.
- If necessary, replace them with fuses that match the parameters specified in the table below.

No.	Checking fuses for the following functions or components	Value
1	Traction / Lift motor fuse	150A
2	Wire harness fuses	10A

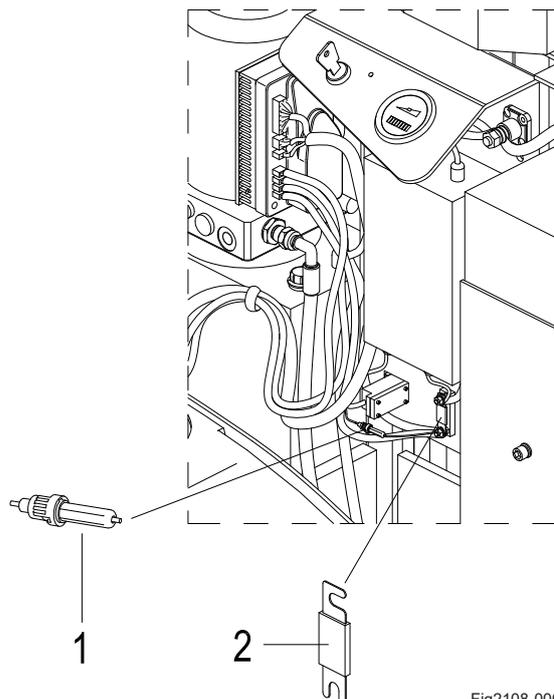
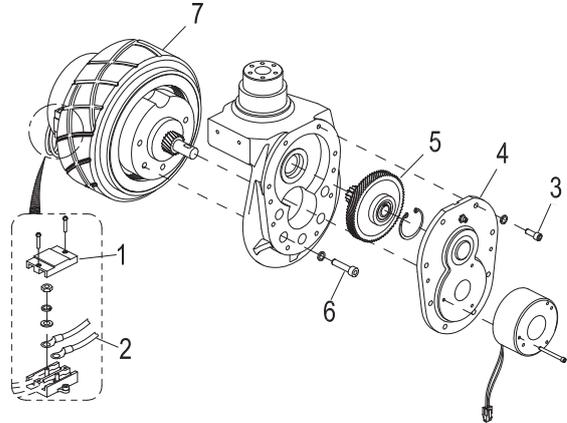


Fig2108-00046OM

4.2.5 Drive Wheel

Removal

- Remove the drive assembly.
- Dismantle the motor cable mounting base(1), and remove the motor cables(2);
- Loosen the eight screws(3) with a wrench, and remove the gearbox cover(4) and gear set(5);
- Unscrew the five screws(6) and knock out the assembly from the gearbox(7);
- Knock out the drive motor(13), and remove the oil seal(8);
- Loosen the six screws(9) with a wrench, and dismantle the large ring gear(10), bearing(11) and drive wheel(12) by order.



Installation

Install according to the reverse order of removal.

Fig2108-000470M



CAUTION

Tyre wear can affect the stability of the truck, adjust the caster with minor wear on a regular basis, or replace the caster with heavy wear. Quality of tyres directly affects the stability and driving performance of the device. If you need to replace the factory-fitted tyres, please use original spare parts provided by the equipment manufacturer to reach the original design performance of the truck.

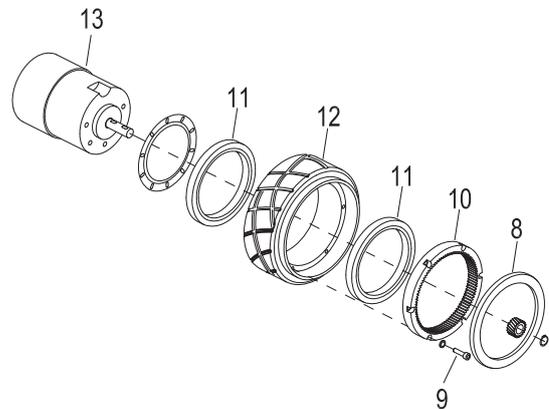


Fig2108-000450M

Faults and Causes

1	Fault	Drive wheel slipping or jumping
	Cause	Wear
2	Fault	Drive wheel cracking or degumming
	Cause	Improper use
3	Fault	Vehicle sways while running
	Cause	Drive wheel lock nut loosening

4.2.6 Load Wheels-Removal and Installation

Removal

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

CAUTION

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

Place a wooden wedge under the chassis near load wheel, make the load wheel off the ground.

CAUTION

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

- Remove the coiled elastic cylindrical pin(2) within the wheel bridge(1) with an ejector pin of 4mm in diameter;
- Turn the wheel bridge to vertical direction, knock out the wheel pin shaft(3) from side, and remove the load wheel and bearing assembly;
- Remove the bearing(5) of load wheel(4) with hammer and jacking equipment.

Loosen the set screw (1) in the fork leg with a wrench;

Knock out the wheel pin shaft (2) from side, and remove washers(3), load wheel and bearing assembly;

Remove the bearing (5) of load wheel (4) with hammer and jacking equipment.

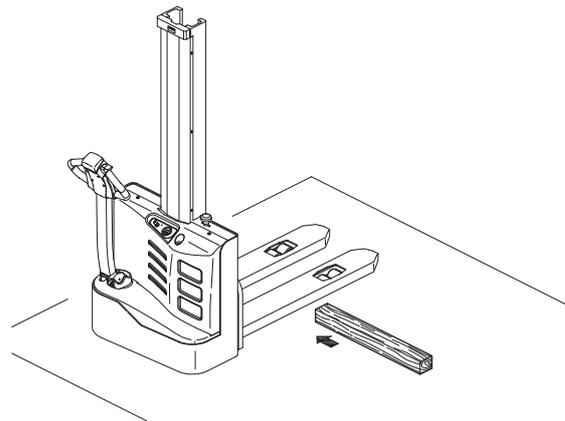


Fig2108-000600M

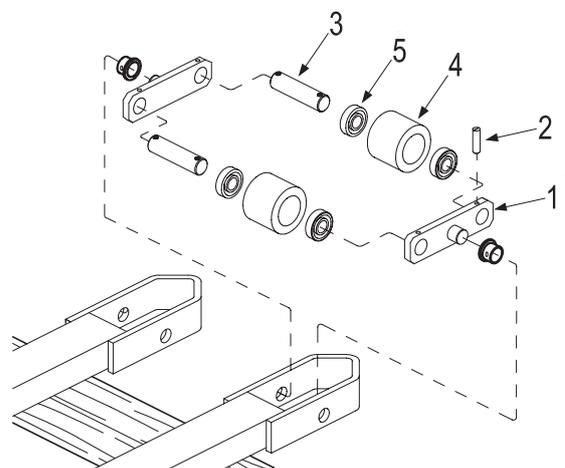


Fig2108-000490M

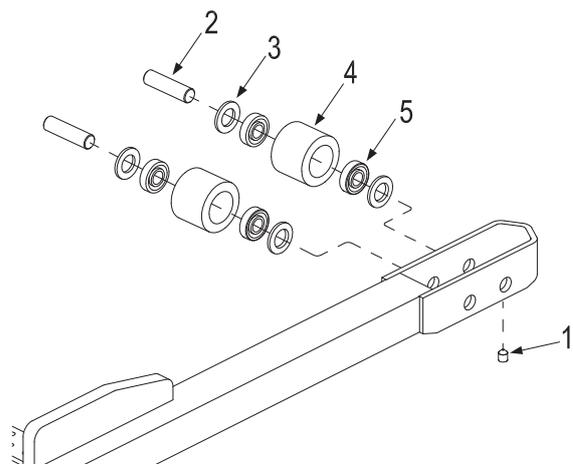


Fig2108-000500M

Installation and Commissioning

Install according to the reverse order of removal;
Run the truck to see if the load wheel is functioning properly. If there is blocking or noise, please install again.



CAUTION

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

4.2.7 Caster - Removal and Installation

Removal

Remove the cover;
Lift the truck carefully with lifting equipment through the lifting holes at front and back.



WARNING

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

Unscrew four screws(1), then remove the caster(3) and adjustment shim(2).

Installation

Install according to the reverse order of removal.

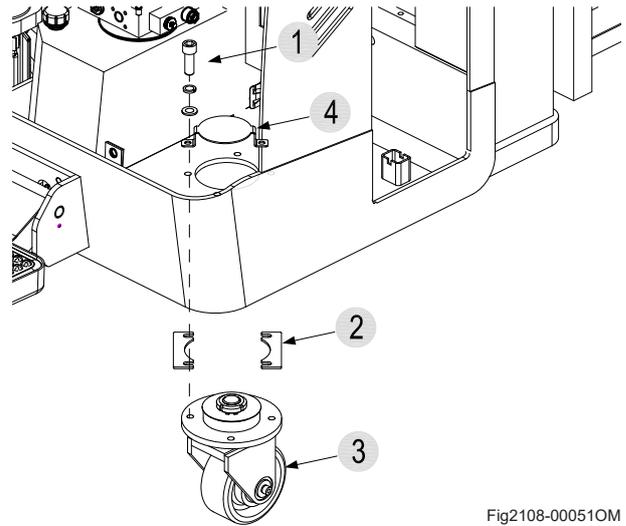


Fig2108-00051OM

Adjustment

Park the truck with replacement completed on level ground to see if the casters and drive wheel can both be in contact with the ground;

When the truck is running, check if the caster is functioning properly.

After long time of use, the drive wheel will wear and tear to certain level, at this time, adjust the height of caster(3) through increasing or decreasing the number of adjustment shims(2) to make the two casters and drive wheel to be in close contact with the ground.

Upon maintenance or replacement for parts of the caster, please refer to two figures as below:

**ES10-22DM/ES12-25DM/
ES10-22MM/ES12-25MM/ES15-33DM**

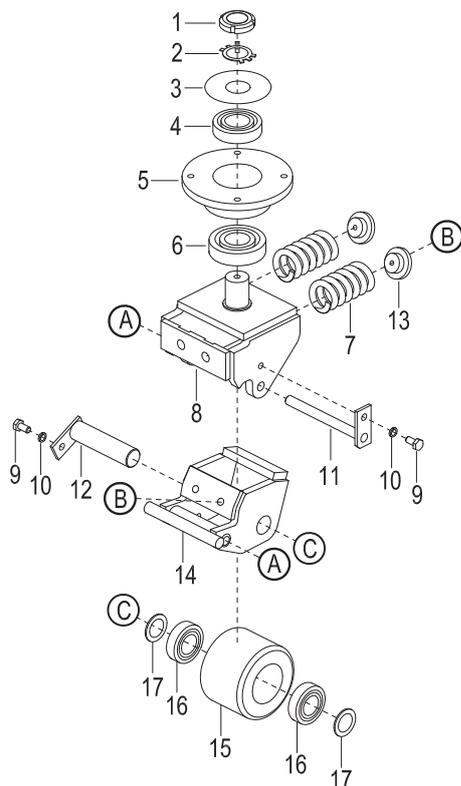


Fig2108-00052OM

**ES10-10ES/ES12-12ES//ES15-15ES/
ES12-12MM/ES10-10MM/ES12-12MM**

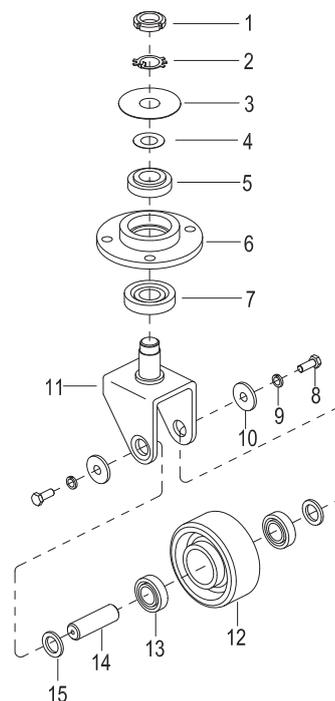


Fig2108-00053OM

➤ **Troubleshooting**

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

Fault	Probable Cause	Action
Truck does not start.	<ul style="list-style-type: none"> -Battery connector not plugged in -Key switch in "0" position -Battery charge too low -Faulty fuse -Truck in charge mode 	<ul style="list-style-type: none"> -Check the battery connector and connect if necessary. -Set key switch to "1" -Check battery charge, charge battery if necessary -Check fuses. -Interrupt charging
Load cannot be lifted	<ul style="list-style-type: none"> -Charging capacity too low -Truck not operational -Hydraulic oil level too low 	<ul style="list-style-type: none"> -Charging the battery -Carry out all measures listed under "Truck does not start" -Check the hydraulic oil level

➤ **Final decommissioning, disposal:**

The final scrap treatment of the forklift must be implemented according to the current laws and regulations of China, especially the provisions related to such aspects as storage battery, consumables, fuel oil and electric equipment.



Technical data

Standard Version Specifications

Technical specification details in accordance with VDI 2198. Technical modifications and additions reserved.

Performance data for standard trucks

Distinguishing mark						
1.2	Model designation			ES10-22MM	ES10-22DM	ES10-10MM
1.3	Drive unit			Electrics	Electrics	Electric
1.4	Operator type			Pedestrian	Pedestrian	Pedestrian
1.5	rated capacity	Q	kg	1000	1000	1000
1.6	Load center distance	c	mm	600	600	600
1.8	Load distance	x	mm	850	845	805
1.9	Wheelbase	y	mm	1210	1290	1126
Weight						
2.1	Service weight (include battery)		kg	543	625	462
2.2	Axle loading, laden driving side/loading side		kg	683/860	720/905	641/821
2.3	Axle loading, unladen driving side/loading side		kg	420/123	497/128	343/119
Types, Chassis						
3.1	"Tyre type driving wheels/loading wheels"			PU/PU	PU/PU	PU/PU

3.2	Tyre size, driving wheels(diameter×width)		mm	Φ210x70	Φ210x70	Φ210x70
3.3	Tyre size, loading wheels(diameter×width)		mm	Φ100x50	Φ100x50	Φ80x60
3.4	Tyre size, caster wheels(diameter×width)		mm	Φ100x50	Φ100x50	Φ130x55
3.5	Wheels, number driving, caster/loading (x=drive wheels)		mm	1 x ,+1 / 4	1 x ,+1 / 4	1 x +1 / 4
3.6	Track width, front,driving side	b10	mm	533	533	533
3.7	Track width,rear,loading side	b11	mm	1060/1160/1260	1060/1160/1260	380
Dimensions						
4.2	Height, mast lowered	h1	mm	1940	2056	1940
4.3	Free lift	h2	mm	1407		1505
4.4	Lift height	h3	mm	1520	2930	1520
4.5	Height, mast extended	h4	mm	2053	3895	1971
4.9	Height drawbar in driving position min./max.	h14	mm	860 / 1200	860 / 1200	860 / 1200
4.10	Height of wheel arms			100	100	
4.15	Lowered height	h13	mm	60	60	88
4.19	Overall length	l1	mm	1570	1650	1615
4.20	Length to face of forks	l2	mm	500	580	465
4.21	Overall width	b1/ b2	mm	1135/1235/1335	1135/1235/1335	800
4.22	Fork dimensions	s/ e/ l	mm	35/100/1070	35/100/1070	60/170/ 1150
4.24	Fork carriage width	b3	mm	780	800	680
4.25	Distance between fork-arms	b5	mm	200-765	200-765	550
4.26	Distance between wheel arms			100	100	
4.31	Ground clearance, laden, below mast	m1		/	/	/

4.32	Ground clearance, center of wheelbase	m2	mm	40	40	30
4.34.1	Aisle width for pallets 1000 × 1200 crossways	Ast	mm	2175	2255	2137
4.34.2	Aisle width for pallets 800 × 1200 lengthways	Ast	mm	2100	2180	2062
4.35	Turning radius	Wa	mm	1329	1404	1295
Performance data						
5.1	Travel speed, laden/ unladen	km/ h	km/h	4 / 4.5	4 / 4.5	4/4.5
5.2	Lifting speed, laden/ unladen		m/ s	0.12/0.22	0.12/0.22	0.12/0.22
5.3	Lowering speed, laden/ unladen		m/ s	0.12/ 0.11	0.12/ 0.11	0.12/0.11
5.8	Max. gradeability, laden/ unladen		%	3 / 10	3 / 10	3/10
5.10	Service brake type			Electromagnetic	Electromagnetic	Electromagnetic
Electric-engine						
6.1	Drive motor rating S2 60 min	hp	kW	0.65	0.65	0.65
6.2	Lift motor rating at S3 15%	hp	kW	2.2	2.2	2.2
6.3	The maximum allowed size battery	in.	mm	270×180×230	325×180×230	270X180X230
6.4	Battery voltage/nominal capacity K5	V/ Ah		2×12/85	2×12/105	2×12/85
6.5	Battery weight	lb.	kg	2×25	2×30	2×25
Addition data						
8.1	Type of drive control			DC	DC	DC
10.5	Steering type			Mechanical	Mechanical	Mechanical
10.7	Sound pressure level at the driver's ear		dB (A)	74	74	74

Distinguishing mark						
1.2	Model designation			ES12-12MM	ES12-25MM	ES12-12ES
1.3	Drive unit			Electrics	Electrics	Electric
1.4	Operator type			pedestrian	pedestrian	pedestrian
1.5	rated capacity	Q	kg	1200	1200	1200
1.6	Load center distance	c	mm	600	600	600
1.8	Load distance	x	mm	805	850	795
1.9	Wheelbase	y	mm	1126	1210	1240
Weight						
2.1	Service weight (include battery)		kg	462	543	661
2.2	Axle loading, laden driving side/loading side		kg	741/921	783/960	845/1016
2.3	Axle loading, unladen driving side/loading side		kg	343/119	420/123	536/125
Types, Chassis						
3.1	"Tyre type driving wheels/loading wheels"			PU/PU	PU/PU	PU/PU

3.2	Tyre size, driving wheels(diameter×width)		mm	Φ210x70	Φ210x70	Φ210x70
3.3	Tyre size, loading wheels(diameter×width)		mm	Φ80x60	Φ100x50	Φ80x60
3.4	Tyre size, caster wheels(diameter×width)		mm	Φ130x55	Φ100x50	Φ130x55
3.5	Wheels, number driving, caster/loading (x=drive wheels)		mm	1 x ,+1 / 4	1 x ,+1 / 4	1 x +1 / 4
3.6	Track width, front,driving side	b10	mm	533	533	533
3.7	Track width,rear,loading side	b11	mm	380	1060/1160/1260	400
Dimensions						
4.2	Height, mast lowered	h1	mm	1940	1940	2056
4.3	Free lift	h2	mm	1505	1407	
4.4	Lift height	h3	mm	1520	1520	2930
4.5	Height, mast extended	h4	mm	1971	2053	3487
4.9	Height drawbar in driving position min./max.	h14	mm	860/1200	860/1200	860/1200
4.10	Height of wheel arms				100	
4.15	Lowered height	h13	mm	88	60	88
4.19	Overall length	l1	mm	1615	1570	1740
4.20	Length to face of forks	l2	mm	465	500	590
4.21	Overall width	b1/ b2	mm	800	1135/1235/1335	800
4.22	Fork dimensions	s/ e/ l	mm	60/170/1150	35/100/1070	60/170/ 1150
4.24	Fork carriage width	b3	mm	680	780	680
4.25	Distance between fork-arms	b5	mm	550	200-765	570
4.26	Distance between wheel arms				100	
4.31	Ground clearance, laden, below mast	m1				

4.32	Ground clearance, center of wheelbase	m2	mm	30	40	30
4.34.1	Aisle width for pallets 1000 × 1200 crossways	Ast	mm	2137	2175	2225
4.34.2	Aisle width for pallets 800 × 1200 lengthways	Ast	mm	2062	2100	2150
4.35	Turning radius	Wa	mm	1295	1329	1408
Performance data						
5.1	Travel speed, laden/ unladen	km/ h	km/h	4 / 4.5	4 / 4.5	4/4.5
5.2	Lifting speed, laden/ unladen		m/ s	0.12/0.22	0.12/0.22	0.12/0.22
5.3	Lowering speed, laden/ unladen		m/ s	0.12/ 0.11	0.12/ 0.11	0.12/0.11
5.8	Max. gradeability, laden/ unladen		%	3 / 10	3 / 10	3/10
5.10	Service brake type			Electroma gnetic	Electroma gnetic	Electrom agnet ic
Electric-engine						
6.1	Drive motor rating S2 60 min	hp	kW	0.65	0.65	0.65
6.2	Lift motor rating at S3 15%	hp	kW	2.2	2.2	2.2
6.3	The maximum allowed size battery	in.	mm	270×180 ×230	270×180 ×230	325X180 X230
6.4	Battery voltage/nominal capacity K5	V/ Ah		2×12/85	2×12/85	2×12/105
6.5	Battery weight	lb.	kg	2×25	2×25	2×30
Addition data						
8.1	Type of drive control			DC	DC	DC
10.5	Steering type			Mechanical	Mechanical	Mechanical
10.7	Sound pressure level at the driver's ear		dB (A)	74	74	74

Distinguishing mark					
1.2	Model designation			ES15-33DM	ES15-15ES
1.3	Drive unit			Electrics	Electric
1.4	Operator type			Pedestrian	Pedestrian
1.5	rated capacity	Q	kg	1500	1500
1.6	Load center distance	c	mm	600	600
1.8	Load distance	x	mm	730	805
1.9	Wheelbase	y	mm	1165	1240
Weight					
2.1	Service weight (include battery)		kg	915	755
2.2	Axle loading, laden driving side/loading side		kg	825/1590	805/1450
2.3	Axle loading, unladen driving side/loading side		kg	560/355	545/210
Types, Chassis					
3.1	"Tyre type driving wheels/loading wheels"			PU/PU	PU/PU

3.2	Tyre size, driving wheels(diameter×width)		mm	Φ230x75	Φ230x75
3.3	Tyre size, loading wheels(diameter×width)		mm	Φ102x73	Φ80x60
3.4	Tyre size, caster wheels(diameter×width)		mm	Φ100x50	Φ130x55
3.5	Wheels, number driving, caster/loading (x=drive wheels)		mm	1 x ,+1 / 4	1 x +2 / 4
3.6	Track width, front,driving side	b10	mm	538	538
3.7	Track width,rear,loading side	b11	mm	1170/1270/1370	400
Dimensions					
4.2	Height, mast lowered	h1	mm	2128	2128
4.3	Free lift	h2	mm	/	/
4.4	Lift height	h3	mm	3230	3230
4.5	Height, mast extended	h4	mm	4210	3743
4.9	Height drawbar in driving position min./max.	h14	mm	1150 / 1480	1150 / 1480
4.15	Lowered height	h13	mm	60	88
4.19	Overall length	l1	mm	1650	1740
4.20	Length to face of forks	l2	mm	580	575
4.21	Overall width	b1/ b2	mm	1270/1370/1470	800
4.22	Fork dimensions	s/ e/ l	mm	40/100/1070	60/170/ 1150
4.24	Fork carriage width	b3	mm	800	680
4.25	Distance between fork-arms	b5	mm	200-765	570
4.26	Distance between wheel arms				
4.31	Ground clearance, laden, below mast	m1			

4.32	Ground clearance, center of wheelbase	m2	mm	30	28
4.34.1	Aisle width for pallets 1000 × 1200 crossways	Ast	mm	2250	2340
4.34.2	Aisle width for pallets 800 × 1200 lengthways	Ast	mm	2200	2260
4.35	Turning radius	Wa	mm	1400	1500
Performance data					
5.1	Travel speed, laden/ unladen	km/ h	km/h	5 / 5	5/5
5.2	Lifting speed, laden/ unladen		m/ s	0.14/0.2	0.13/0.2
5.3	Lowering speed, laden/ unladen		m/ s	0.13/ 0.11	0.13/0.13
5.8	Max. gradeability, laden/ unladen		%	8 / 16	8/16
5.10	Service brake type			Electroma gnetic	Electrom agnetic
Electric-engine					
6.1	Drive motor rating S2 60 min	hp	kW	1.27	1.27
6.2	Lift motor rating at S3 15%	hp	kW	3	3
6.3	The maximum allowed size battery	in.	mm	330×190 ×240	330X190 X240
6.4	Battery voltage/nominal capacity K5	V/ Ah		24/125	2×12/125
6.5	Battery weight	lb.	kg	60	60
Addition data					
8.1	Type of drive control			AC	AC
10.5	Steering type			Mechanical	Mechanical
10.7	Sound pressure level at the driver's ear		dB (A)	74	74

Distinguishing mark				
1.2	Model designation			ES10-10ES
1.3	Drive unit			Battery
1.4	Operator type			Pedestrian
1.5	rated capacity	Q	kg	1000
1.6	Load center distance	c	mm	600
1.8	Load distance	x	mm	795
1.9	Wheelbase	y	mm	1240
Weight				
2.1	Service weight (include battery)		kg	540
2.2	Axle loading, laden driving side/loading side		kg	640/852
2.3	Axle loading, unladen driving side/loading side		kg	419/121
Types, Chassis				
3.1	"Tyre type driving wheels/loading wheels"			PU/PU

3.2	Tyre size, driving wheels(diameter×width)		mm	Φ210x70
3.3	Tyre size, loading wheels(diameter×width)		mm	Φ80x60
3.4	Tyre size, caster wheels(diameter×width)		mm	Φ130x55
3.5	Wheels, number driving, caster/loading (x=drive wheels)		mm	1 x +1 / 4
3.6	Track width, front,driving side	b10	mm	533
3.7	Track width,rear,loading side	b11	mm	400
Dimensions				
4.2	Height, mast lowered	h1	mm	2026
4.3	Free lift	h2	mm	/
4.4	Lift height	h3	mm	2930
4.5	Height, mast extended	h4	mm	3487
4.9	Height drawbar in driving position min./max.	h14	mm	860 / 1200
4.15	Lowered height	h13	mm	88
4.19	Overall length	l1	mm	1740
4.20	Length to face of forks	l2	mm	590
4.21	Overall width	b1/ b2	mm	800
4.22	Fork dimensions	s/ e/ l	mm	55/160/ 1150
4.24	Fork carriage width	b3	mm	600
4.25	Distance between fork-arms	b5	mm	560
4.26	Distance between wheel arms			/
4.31	Ground clearance, laden, below mast	m1		/

4.32	Ground clearance, center of wheelbase	m2	mm	30
4.34.1	Aisle width for pallets 1000 × 1200 crossways	Ast	mm	2225
4.34.2	Aisle width for pallets 800 × 1200 lengthways	Ast	mm	2150
4.35	Turning radius	Wa	mm	1408
Performance data				
5.1	Travel speed, laden/ unladen	km/ h	km/h	4/4.5
5.2	Lifting speed, laden/ unladen		m/ s	0.12/0.22
5.3	Lowering speed, laden/ unladen		m/ s	0.12/0.11
5.8	Max. gradeability, laden/ unladen		%	3/10
5.10	Service brake type			Electromagnetic
Electric-engine				
6.1	Drive motor rating S2 60 min	hp	kW	0.65
6.2	Lift motor rating at S3 15%	hp	kW	2.2
6.3	The maximum allowed size battery	in.	mm	325X180 X230
6.4	Battery voltage/nominal capacity K5	V/ Ah		2×12/105
6.5	Battery weight	lb.	kg	2×30
Addition data				
8.1	Type of drive control			DC
10.5	Steering type			Mechanical
10.7	Sound pressure level at the driver's ear		dB (A)	74

Distinguishing mark					
1.2	Model designation			ES12-12MMi	ES12-25DM
1.3	Drive unit			Electric	Electric
1.4	Operator type			Pedestrian	Pedestrian
1.5	rated capacity	Q	kg	1200	1200
1.6	Load center distance	c	mm	600	600
1.8	Load distance	x	mm	805	845
1.9	Wheelbase	y	mm	1260	1290
Weight					
2.1	Service weight (include battery)		kg	520	676
2.2	Axle loading, laden driving side/loading side		kg	560/1160	837/1039
2.3	Axle loading, unladen driving side/loading side		kg	350/170	549/127
Types,Chassis					
3.1	"Tyre type driving wheels/loading wheels"			PU/PU	PU/PU

3.2	Tyre size, driving wheels(diameter×width)		mm	Φ210x70	Φ210x70
3.3	Tyre size, loading wheels(diameter×width)		mm	Φ80x60	Φ100x50
3.4	Tyre size, caster wheels(diameter×width)		mm	Φ130x55	Φ100x50
3.5	Wheels, number driving, caster/loading (x=drive wheels)		mm	1 x ,+1 / 4	1 x ,+1 / 4
3.6	Track width, front,driving side	b10	mm	533	533
3.7	Track width,rear,loading side	b11	mm	370	1060/1160/1260/1360

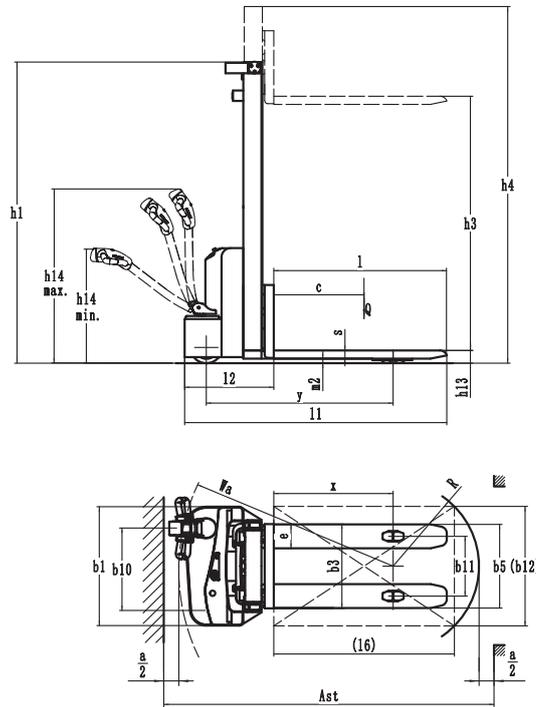
Dimensions

4.2	Height, mast lowered	h1	mm	1940	2086
4.3	Free lift	h2	mm	1480	/
4.4	Lift height	h3	mm	1520	2930
4.5	Height, mast extended	h4	mm	2090	3895
4.6	Initial lift	h5	mm	115	
4.9	Height drawbar in driving position min./max.	h14	mm	860/1200	860/1200
4.15	Lowered height	h13	mm	95	60
4.19	Overall length	l1	mm	1750	1650
4.20	Length to face of forks	l2	mm	600	580
4.21	Overall width	b1/ b2	mm	796	1135/1235/1335/1435
4.22	Fork dimensions	s/ e/ l	mm	60/190/1150	35/100/1070
4.24	Fork carriage width	b3	mm	680	800
4.25	Distance between fork-arms	b5	mm	560	200-765
4.26	Distance between wheel arms				100
4.31	Ground clearance, laden, below mast	m1			

4.32	Ground clearance, center of wheelbase	m2	mm	26	40
4.34.1	Aisle width for pallets 1000 × 1200 crossways	Ast	mm	2340	2255
4.34.2	Aisle width for pallets 800 × 1200 lengthways	Ast	mm	2260	2180
4.35	Turning radius	Wa	mm	1500	1404
Performance data					
5.1	Travel speed, laden/ unladen	km/ h	km/h	4 / 4.5	4 / 4.5
5.2	Lifting speed, laden/ unladen		m/ s	0.10/0.14	0.12/0.22
5.3	Lowering speed, laden/ unladen		m/ s	0.10/ 0.07	0.12/ 0.11
5.8	Max. gradeability, laden/ unladen		%	3/ 10	3 / 10
5.10	Service brake type			Electromagnetic	Electromagnetic
Electric-engine					
6.1	Drive motor rating S2 60 min	hp	kW	0.65	0.65
6.2	Lift motor rating at S3 15%	hp	kW	2.2	2.2
6.3	The maximum allowed size battery	in.	mm	300×180 ×230	325×180 ×230
6.4	Battery voltage/nominal capacity K5	V/ Ah		2×12/85	2×12/105
6.5	Battery weight	lb.	kg	2×25	2×30
Addition data					
8.1	Type of drive control			DC	DC
10.5	Steering type			Mechanical	Mechanical
10.7	Sound pressure level at the driver's ear		dB (A)	74	74

Dimensions

ES10-10ES



ES10-22DM

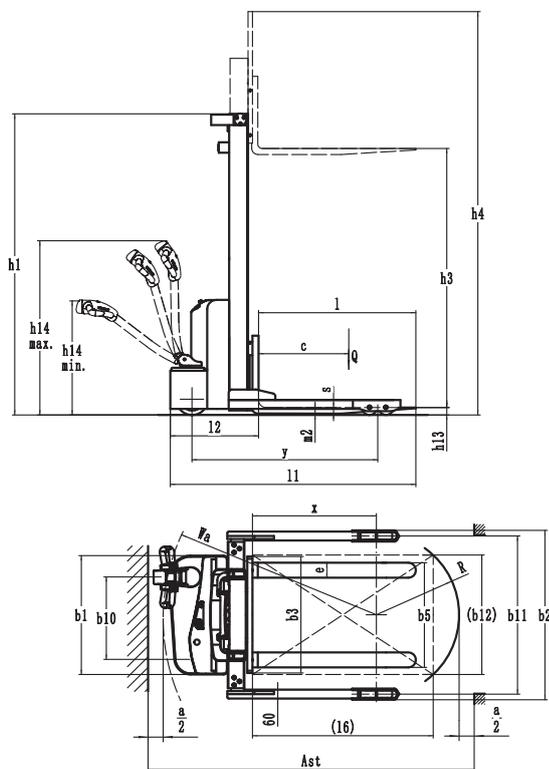
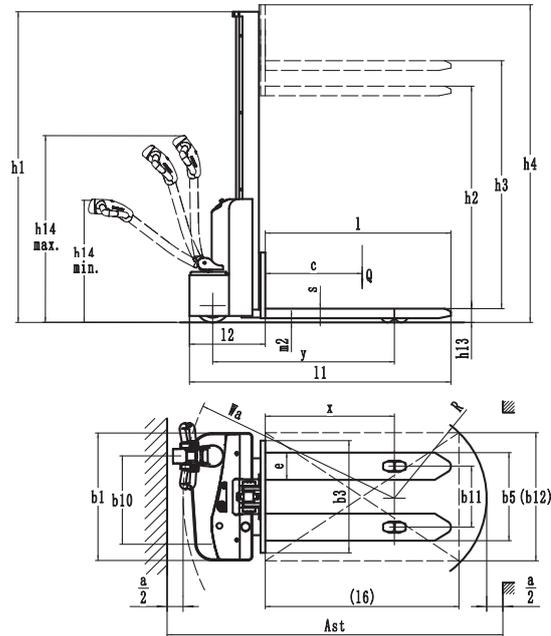


Fig2108-000540M

ES10-10MM



ES10-22MM

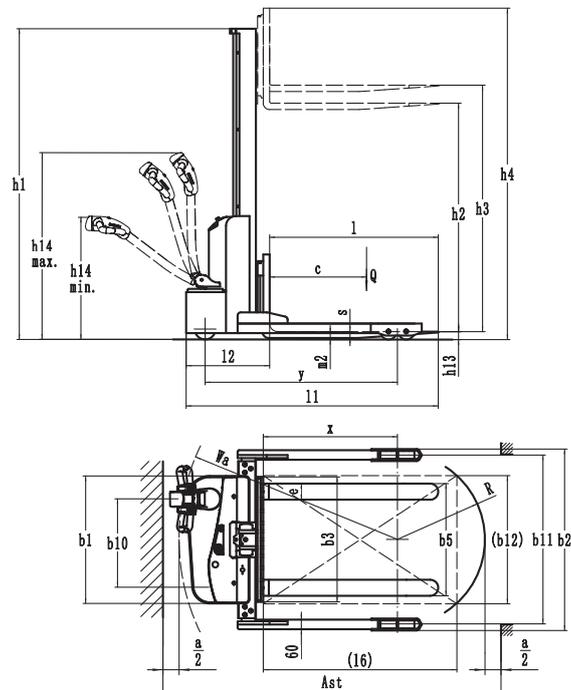
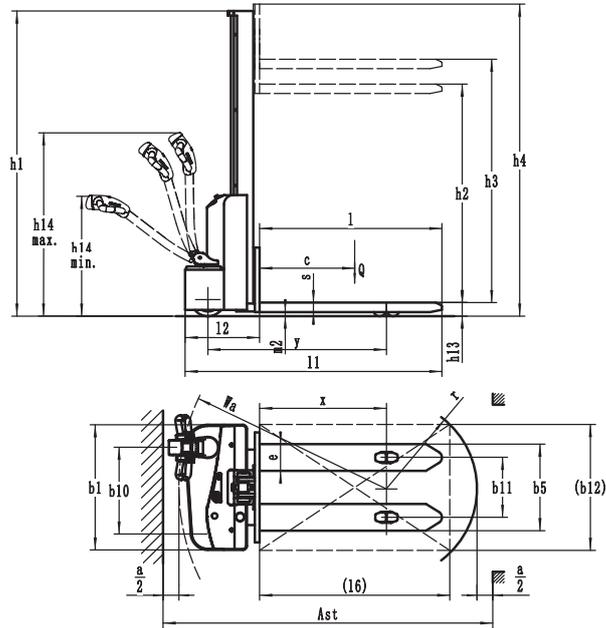


Fig2108-00055OM

ES12-12MM



ES12-12ES

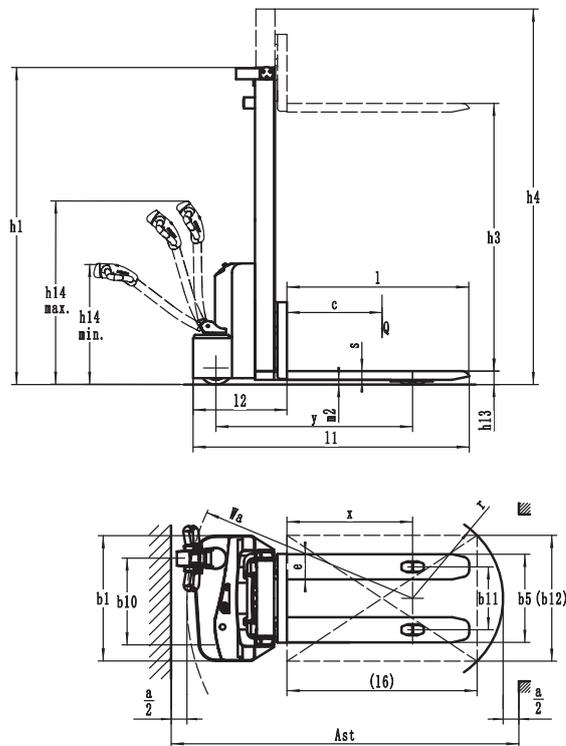
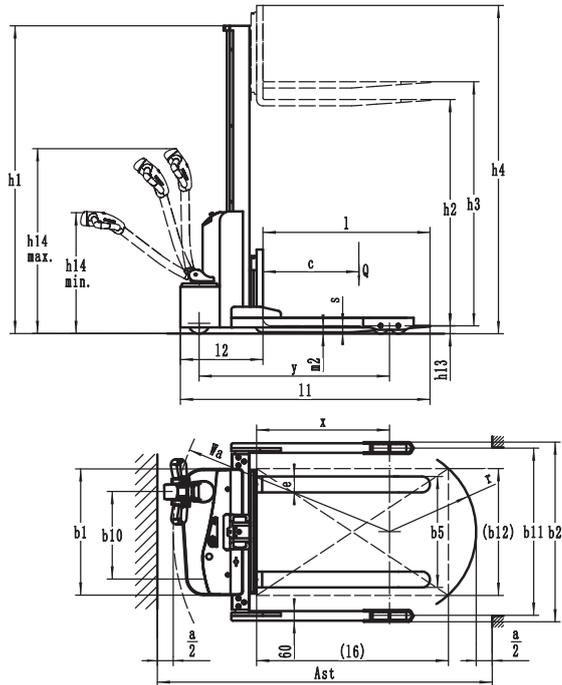


Fig2111-00055OM

ES12-25MM



ES12-25DM

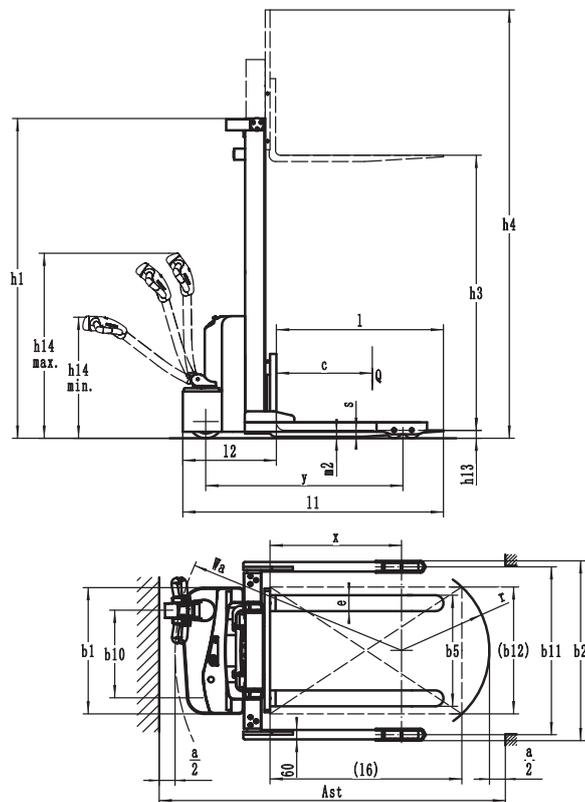
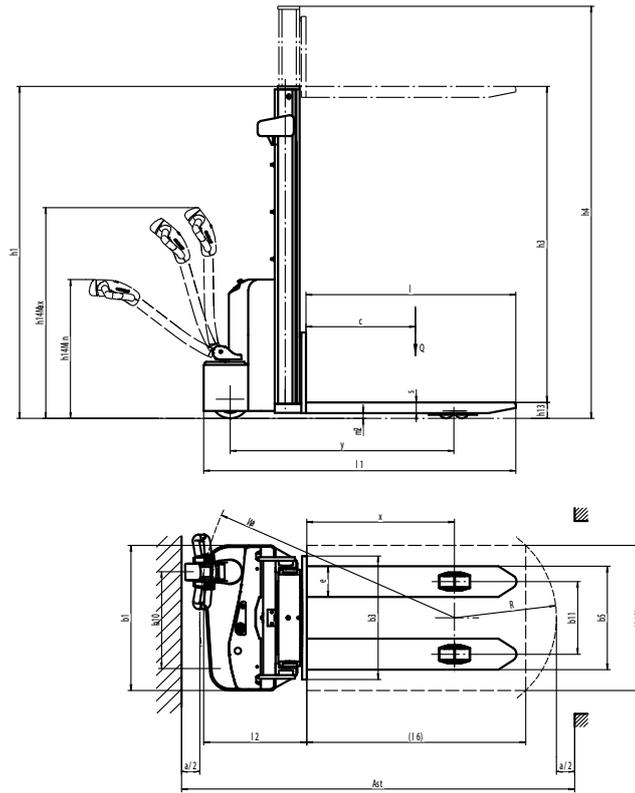


Fig2111-00056OM

ES13-13ES



ES13-15ES

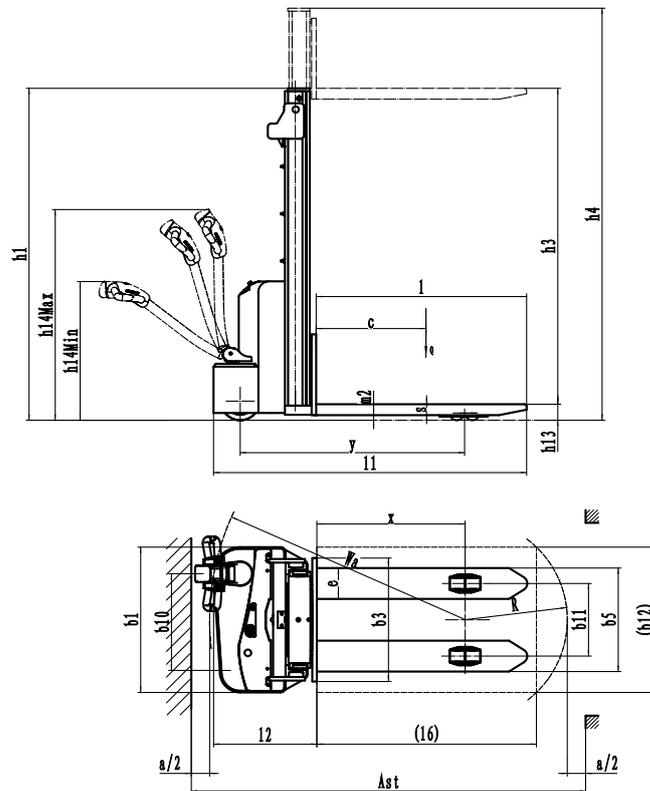


Fig2105-00057OM

Lithium-ion battery

1 Information on the conformity of lithium-ion batteries

- The manufacturer of the lithium-ion battery declares that: the lithium-ion battery conforms with the provisions of the following EU directive 2014/30/EU and Electromagnetic Compatibility Regulations 2016 (SI 2016 No.1091) in accordance with EN12895.
- These batteries has been certified according to EN 62619:2017 for safe use and according to UN38.3 for safe transport.

2 It is necessary to respect the following guidelines:

- Read the documents provided with the battery carefully.
- Only persons who have been trained to work with lithium-ion technology are permitted to work on the batteries (for example After-Sales Service Centre technicians).
- Do not drop it or allow anything to fall on it.
- Do not expose the battery unit to humidity or water (> 80%).
- Protect the battery from solar irradiation.
- Do not physically machine or modify the battery.
- Do not open the battery. Electrical risk. Only the After-Sales Service Centre technicians can open the battery.
- Do not place lithium-ion batteries on or near flames or hot heat sources (> 65°C). This may cause the batteries to overheat or burst into flames. This type of use also impairs the performance of the batteries and reduces their service life.
- It is forbidden to take out the battery in the charging state state.
- It is forbidden to use and store the battery at low power (the use and storage of power loss will cause the early loss of battery system capacity and accelerate the service life of the battery pack);
- During the charging process, liquid and metal substances are not allowed on the charger, and it is forbidden to use the charger in a high temperature and high humidity environment;
- It is forbidden for unqualified personnel to dismantle and overhaul the battery system and supporting charger and other devices; the battery system is a dangerous product, and maintenance and replacement can only be performed by professionals;
- Before the vehicle is started, power on through the button switch. After the vehicle is stopped, the battery system must be powered off and stopped through the button switch, which can be judged by the state of the display screen. If the time is too long, the battery will be over-discharged. In severe cases, it will affect the battery performance);
- The battery should be fully charged for the first time;
- After each use, it should be charged in time (the initial state of charging should keep the battery system temperature below 40° C to ensure the smoothness of charging);
- Use water-based extinguishers, CO₂, dry chemical fire extinguishers.
- Do only use in trucks manufactured by EP and if the battery type is released for that truck.

3 Intended use

- Operational application temperature 0° C-40° C, humidity < 80%;
- Charging application temperature 5° C-40° C;
- The battery's maximum operation altitude is up to 2000m;
- Do not pull out the battery for emergency stopping, use instead the emergency switch (see page B14).
- The truck shall not be used in a potentially explosive atmosphere or in an especially dusty environment.

4 Reasonably foreseeable misuse

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



DANGER

Failure to comply with these safety instructions can result in fire and explosion or the leakage of harmful materials.

5. Accessories

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



WARNING

Should such issues as failing to abide by the operation manual, failing to use the original parts for maintenance or damaging caused by users themselves occur, the quality guarantee will be invalid automatically!

6. BMS (Battery Management System)

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

This provides the communication with the truck.

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

7 Safety and warning



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



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



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



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



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



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



Do not place the battery on top of conductive objects.



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

8 Hazard of faulty or discarded battery

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

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

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

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

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



WARNING

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

9 Transportation

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

i NOTE

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

A lithium-ion battery is a special product.

Special precautions should be taken when:

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

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

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

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

For UN3480	Lithium Ion Batteries	
For UN3481	Lithium Ion Batteries packed with Equipment or Lithium batteries built into Equipment	



WARNING

Do not pack higher than 1.2 m above the floor of the container and secure properly.

i NOTE

"Overpack" is the name for the outer packaging of the dangerous goods.

i NOTE

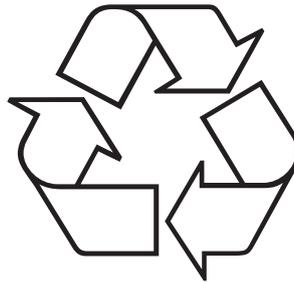
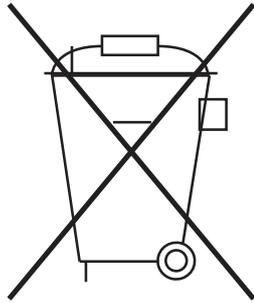
Recharge the lithium-ion battery before transporting it taking account of the transport mode (boat, road). Excessive discharge on arrival could damage the performance of the battery.

9.1 Shipping faulty batteries

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

10 Instructions for disposal

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



➤ The requirements of recycling

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



WARNING

- *Check the status of used batteries regularly and dispose of the batteries in time;*
- *Do not store used batteries for extended periods;*
- *Do not load bearing, squeezing or contact stacking when storing batteries;*
- *Do not keep batteries in cargo warehouses or near flammable and explosive dangerous goods.*



WARNING

Don't bump, handle gently.

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

11 Charging

- This battery can only be charged with the vehicle-specific charger, other chargers may cause battery damage.
- The normal charging temperature range of the battery is: 5°C ~ 40°C, please do not charge in the environment beyond the normal temperature range;
- If the battery is not fully charged in specified time, check the max. voltage of the cells of the battery, if it is higher than 3.65V, stop charging it immediately, and contact the after-sales service.
- During the charging operation, it is necessary to have professional personnel to operate and care, in order to ensure that the charging plug and socket work normally without heat, to ensure that the charging device works normally, to ensure that the battery pack and its protection circuit work normally, and the whole power supply system has no sign of short circuit, over current, over temperature or overcharge.
- When charging, connect the battery to the charger; after starting charging, the circular display meter will display the total voltage, the maximum and minimum cell voltages, power, temperature, charging current and other information; pay particular attention to the charging current and the maximum and minimum cell voltages, as well as the voltage difference between them; if there is abnormality, stop charging in time and contact the after-sales service department for solutions.
- Charging in non-charging area is prohibited;
- No modification of vehicles;
- Do not use irregular charging sockets;
The net height of the charging area shall be higher than 5m, and the safe distance from other areas shall be greater than 5m.

12 Storage

Before a long period of inactivity, the battery must be fully charged.

We recommend that batteries are stored at a height between 60 and 120 cm.

- Store the battery in a dry place at a temperature between 0 and 40° to preserve its service life. This area must not be hermetically sealed to allow air renewal;
- If the battery system needs to be placed on hold for a long time, it would better keep the battery in the semi-electric state and charge the battery every 2 months to ensure that the battery system is in the semi-electric state;
- The positive and negative terminals of the battery system are prohibited from contacting with metal objects during storage.



WARNING

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

13 Common Problems and Solutions

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

- If the battery is found to have abnormal mechanical characteristics such as swelling, cracked casing, melted casing, and distortion of the casing before and during installation, stop using the battery immediately, place it in open and well-ventilated space, and contact the after-sales service.
- If abnormalities such as looseness, cracks, cracks in the insulation layer, burn marks, etc. of the battery's pole pressing bolts, conductive strips, main circuit wires and connectors are found before and during the installation, stop using the battery immediately, check the reason for analysis and give it a fix;
- If the polarity of the positive and negative terminals of the battery is found not match the polarity identification before installation, please stop using the battery immediately and contact the after-sales service department to replace the battery or obtain other solutions;
- If the battery is found to emit smoke , immediately stop using the battery, using fire sand or explosion-proof box for burial and isolation,wearing respirator and fireproof gloves move the battery to a safe area,notify the after-sales service department of the company for record and obtain technical support.

14. Service Daily Maintenance

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

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

**NOTE**

The EP instrumentation is used for serviced.

➤ Cleaning

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

➤ Optimize Battery Life

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

This is when the battery is recharged for short intervals during a shift period. It reduces or eliminates the need for long charging periods, changing batteries during a shift, and extending shift periods.