

Specification

Counter Balanced Stacker

EK13/EK13-130/EK13-177

EK13S/EK13S-177



Note: Please read this manual before using product

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1: Models

1.1 Summary

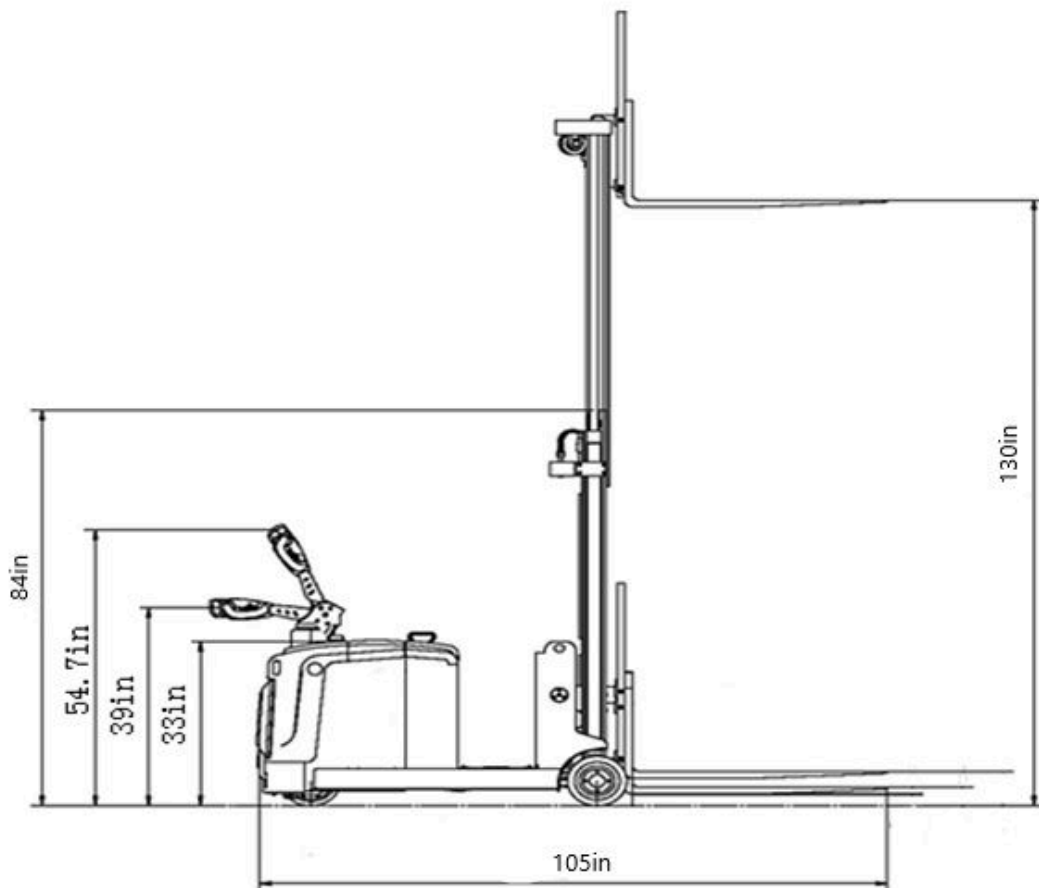
This specification includes the EK13 , EK13-130,EK14 and EK14-130 series of Fully Powered Counterbalance Walkie Stackers.

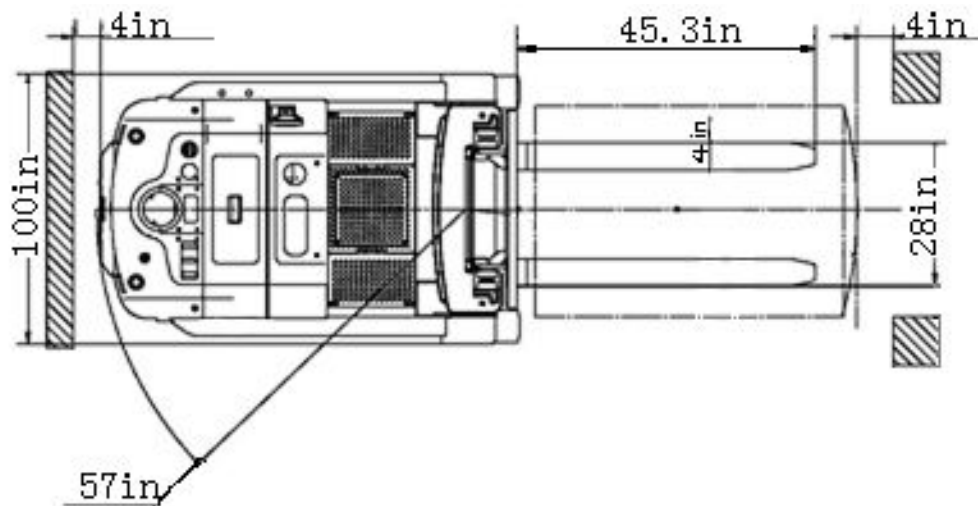
Models EK13 and EK13-130 load capacity is 2,860 lbs.

Model EK13 max lifting height is 118". Model EK13-130 max lifting height is 130"

Model EK14 and EK14-130 Load capacity is 3300lbs.Model EK14 max lifting height is 118". Model EK14-130 max lifting height is 130" (in accord with JB/T8452-1996 《Battery forklift truck model compilation method》 ,

1.2 Model of parameters





Model		EK13-130	EK13	EK14-130	EK14
Load capacity		Power	Power	Power	Power
Operator type		Walking	Walking	Walking	Walking
Load capacity	(lbs.)	2860	2860	3300	3300
Load center distance	(in)	24	24	24	24
Wheel base	(in)	47	47	47	47
Lifting height	(in)	130	118	130	118
Free lifting height	(in)	4	4	4	4
Lowered mast height	(in)	84	78	84	78
Extended mast height	(in)	167	155	167	155
Mast/Fork carriage tilt forward/backward	(°)	2/5	2/5	2/5	2/5
Overall length	(in)	105	105	109	109
Overall width	(in)	39	39	39	39
Fork size, Thickness/Width/Length	(in)	1.4/4/45.3	1.4/4/45.3	1.4/4/45.3	1.4/4/45.3
Fork adjust width	(in)	8.6-28.3	8.6-28.3	8.6-28.3	8.6-28.3
Turning radius	(in)	57	57	57	57

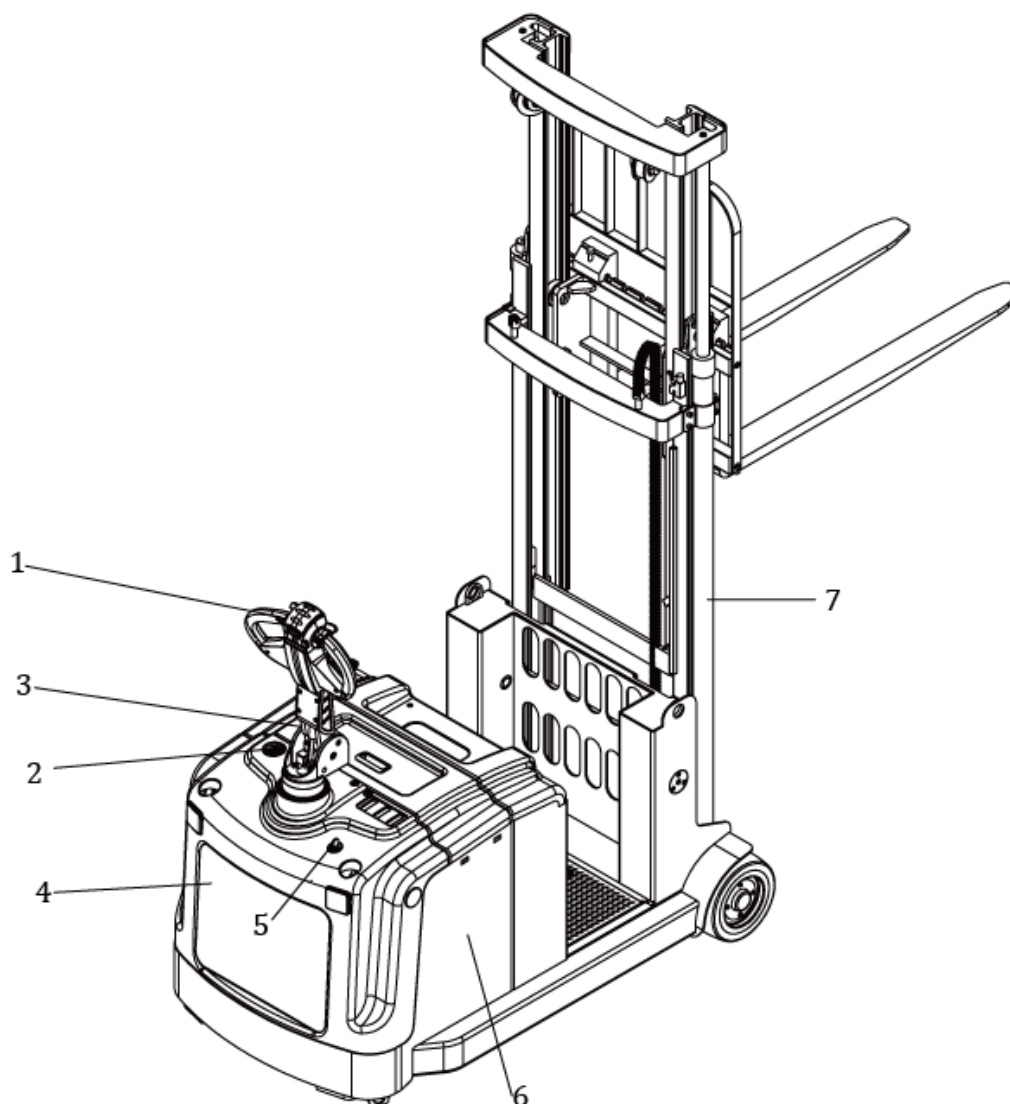
Max. gradient performance, laden/unladen	(%)	6/10	6/10	6/10	6/10
Lift speed, laden/unladen	(in/s)	4/5.1	4/5.1	4/5.1	4/5.1
Lowering speed, laden/unladen	(in/s)	5.3/4.7	5.3/4.7	5.3/4.7	5.3/4.7
Charger		24V/30	24V/30	24V/30	24V/30
Driving Motor		AC 24V/2.0kw	AC 24V/2.0kw	AC 24V/2.0kw	AC 24V/2.0kw
Lifting Motor		24V/2.5kw	24V/2.5kw	24V/2.5kw	24V/2.5kw
Steering Motor		24/0.2kw	24/0.2kw	24/0.2kw	24/0.2kw
Battery voltage		24V/210AH (Side)	24V/210AH (Side)	24V/210AH (Side)	24V/210AH (Side)
Service Weight	(lbs.)	3750	3652	3750	3652

2、 Basic structure and principle

2.1 Basic structure

With the battery as the power source, the stacker uses electrical and hydraulic power to control driving, lifting, lowering and steering.

Basic structure:



No.	Description	No.	Description
1	Operating handle	5	Key switch
2	Electricity meter	6	Main frame
3	Handle bar	7	Door frame assembly
4	Cover		

2.2 Operating principle

2.2.1 Running system

The unit's running system is powered by the battery. (The AC Motor gear reduces high speed low torque into low speed high torque, in the end by the driving wheel to perform efficiently. The speed of the driving is done by variable frequency control of motor speed.)

The gear box has been supplied with enough gear lubricating oil at the factory. Replace gear lubricating oil every 1000 hours under normal circumstances and use.

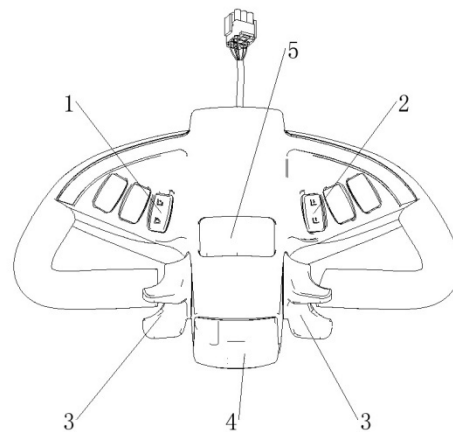
During normal operations, if sounds are heard from the gear box, immediately stop the unit and determine whether bearing damage or other gear problems are evident.

2.2.2 Steering system

The movements of the Counter Balanced Stacker are controlled by the steering wheel and operating commands located on the handle bar.

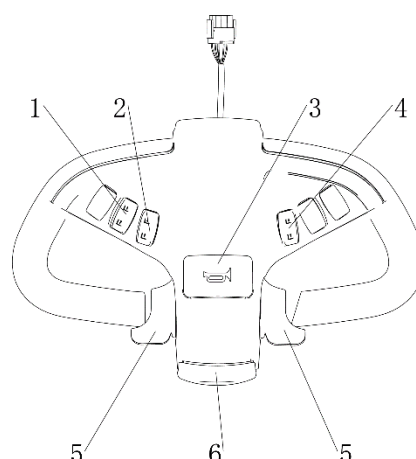
2.2.3 Operating system

1. Forward and hypokinesis switch
2. Lifting and lowering switch
3. Fahrschalter
4. Belly switch
5. Horn button



EK13/EK13-130/EK14/EK14-130 Operating handle

1. Side shifter switch
2. Tilt backward & forward switch
3. Horn
4. Lift up/ Lower down switch
5. Accelerator
6. Emergency revise switch



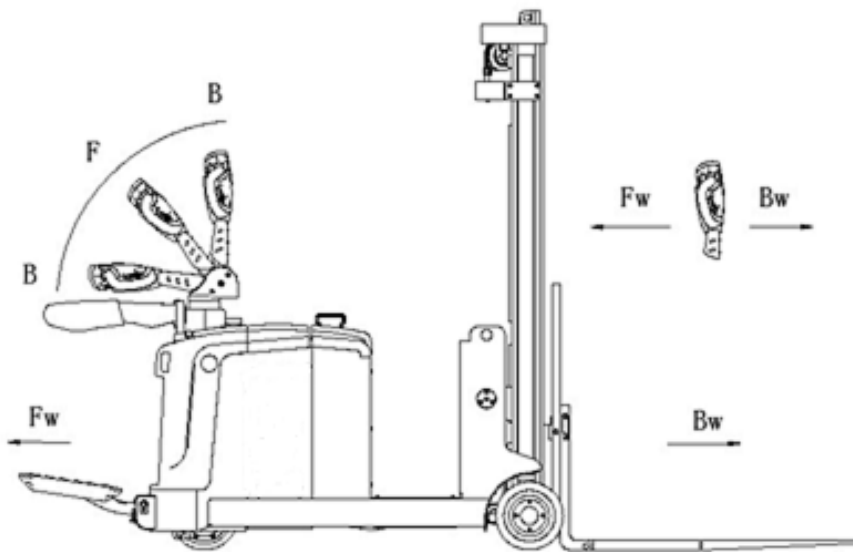
EK13S /EK14S With side shifter function Operating handle

2.2.4 Braking system

Braking performance depends on road conditions and vehicle load.

The brakes can be activated as follows:

- ① Move the Fahrschalter (3) to position '0'(middle position). The vehicle will brake until it stops.
- ② Move the Fahrschalter (3) in the opposite direction. The vehicle will brake until it begins to move in the opposite direction.
- ③ Vehicle braking, if the handle is upright or completely downright the unit will not function.
- ④ Pushing the belly safety switch (4) may prevent the operator from being pinned from behind.



2.2.5 Operating system

The stacker's main function is tray or cargo loading and unloading, stacking and short-distance transport operations.

The pallet fork is maneuvered into the pallet. The carriage is moved up and down inside the stacker door frame by driving chain (see 2.2.3: function 2: Lifting and lowering switch) to lift goods off of the ground or to

deposit them on shelves. The lifting chain and will move the whole inner frame by lifting the oil cylinder telescopic to activate Stacking process is implemented by the control operation of oil cylinder telescopic.

2.3 Electrical principle

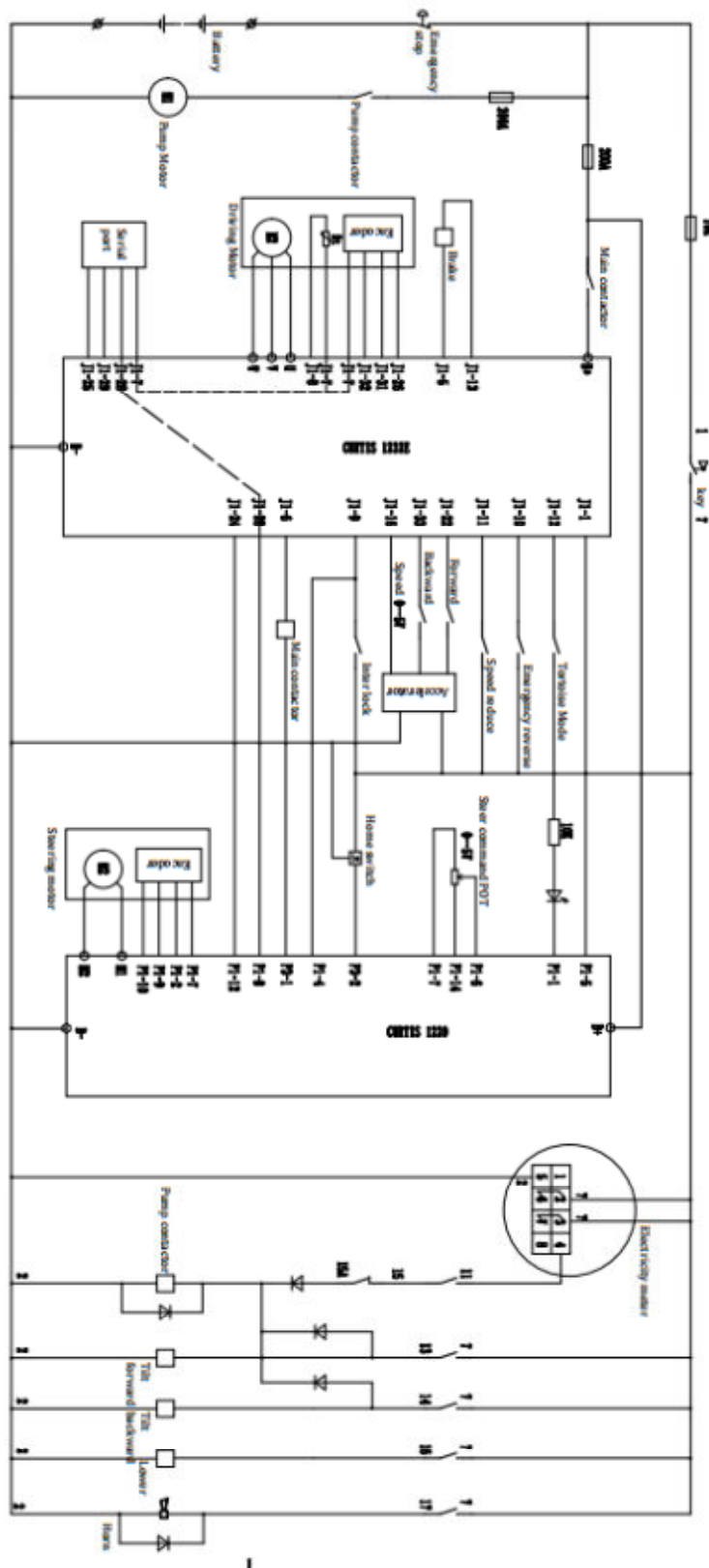
2.3.1 Electrical principle

The unit's electrical system provides the movement and function operations. The stacker is equipped with the communication electronic assembly CURTIS1232E and CURTIS1230E (Made in America). The instrument includes the functions of battery indicator, working time display and voltage protection. When the battery power is too low, the electricity meter will cut off the oil pump motor and the start control circuit. The Counter Balanced Stacker will only be able to walk and cannot lift/lower the forks. If this occurs, charge the battery immediately.

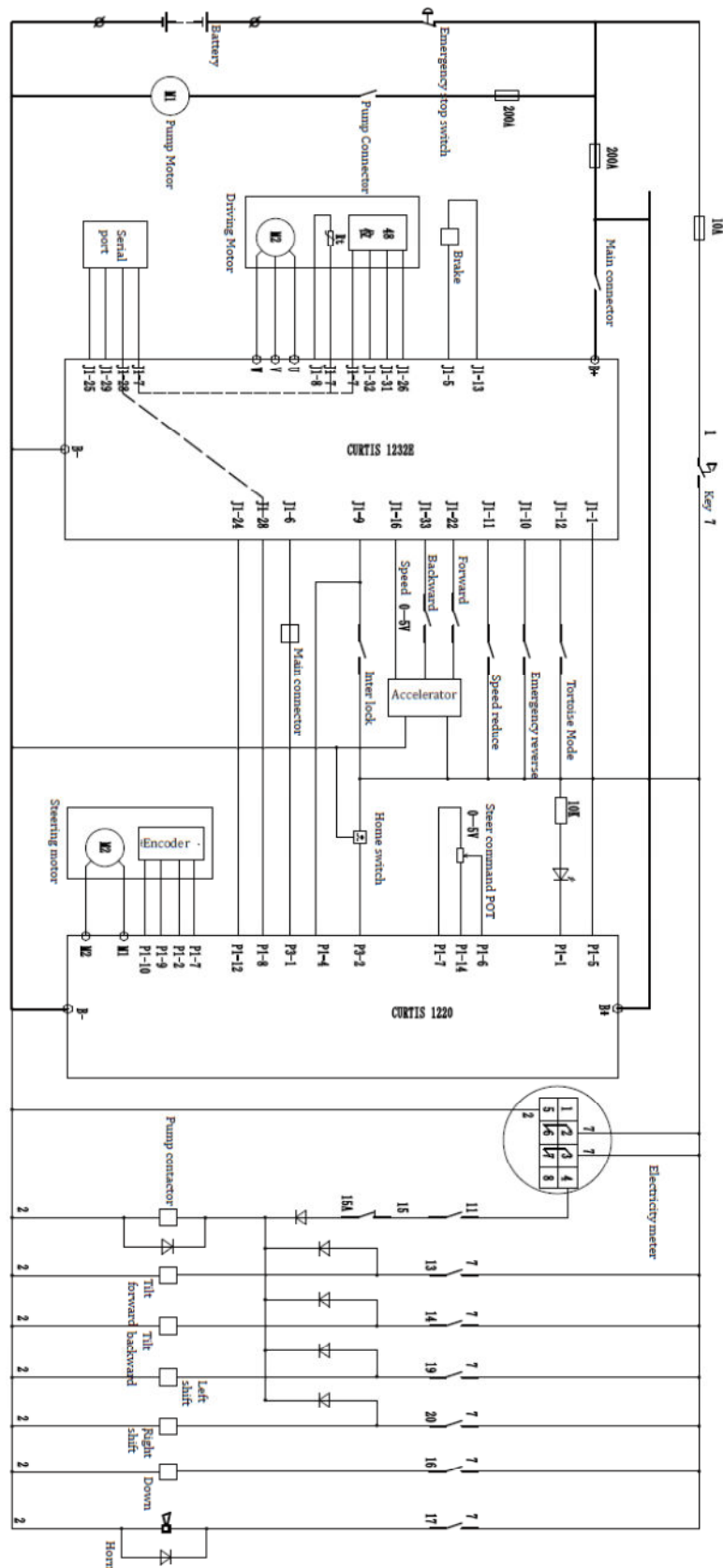
The oil pump motor is not designed for continuous operation over a long period of time. Lifting action should be limited rather than continuous, otherwise the motor will overheat and could become damaged.

Note: When the Counter Balanced Stacker has been in use over a long period of time, the oil pump motor may eventually fail. When this happens, immediately stop the unit, disconnect the power supply (which will make the oil pump motor stop running) and replace the starter.

Electrical Principle Chart (EK13/EK13-130/EK14/EK14-138)



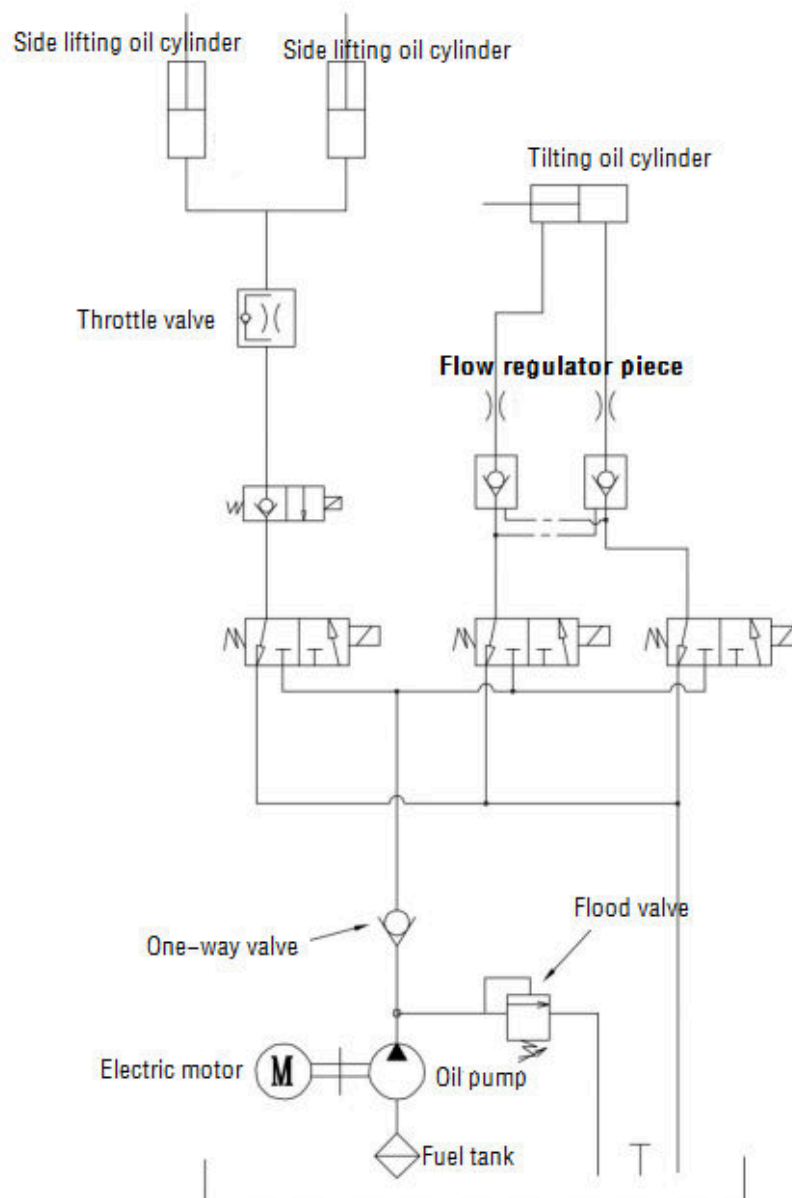
Electrical Principle Chart with side shifter (EK13S/EK14S)



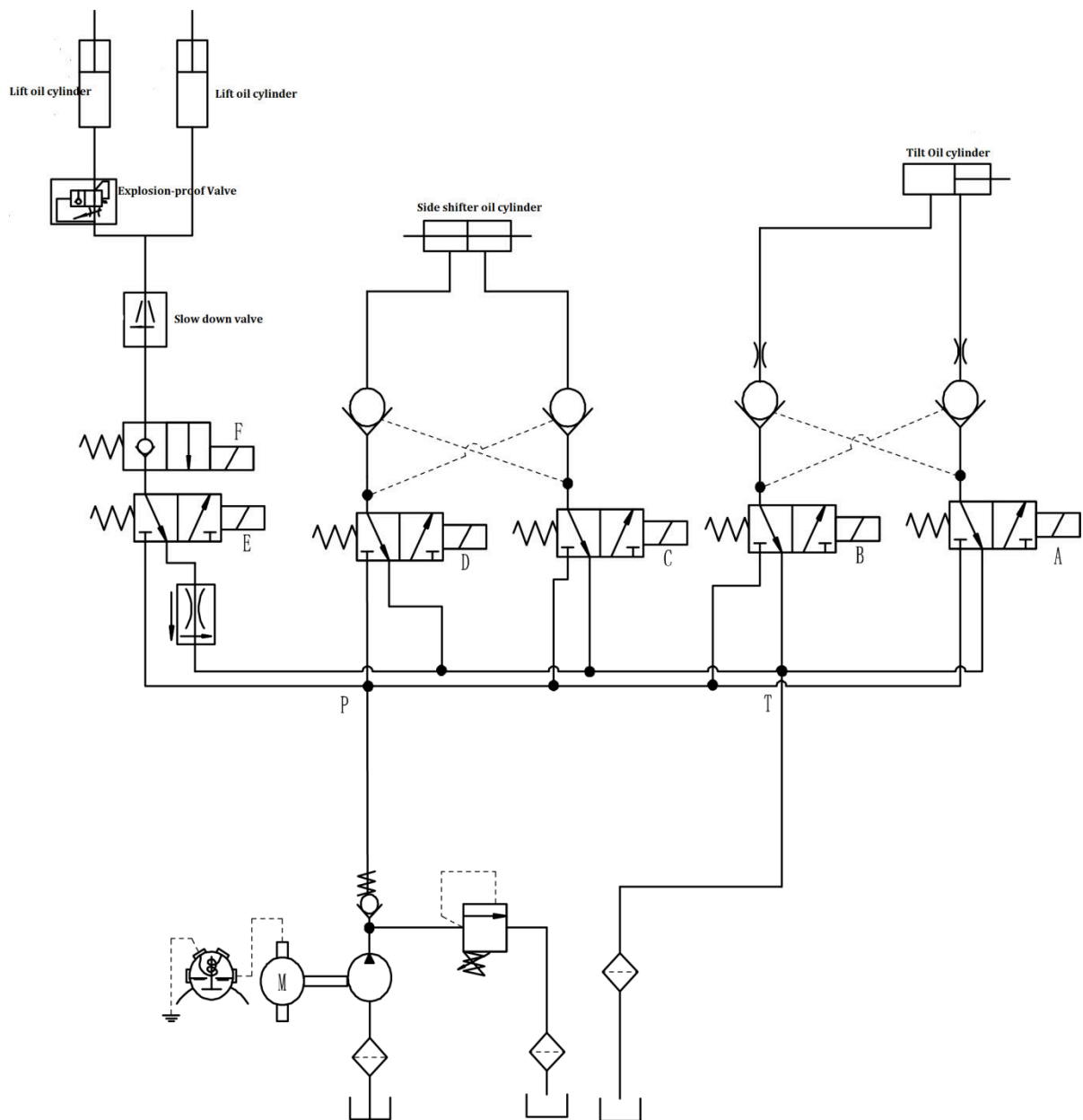
2.4 Hydraulic Principle

Hydraulic power is provided by the oil pump motor. Two lifting cylinders are used to raise the fork. The hydraulic system pressure is tested before installation. The hydraulic system cannot be adjusted by EKKO MHE.

Hydraulic Chart(EK13/EK13-130/EK14/EK14-138)



Hydraulic Chart with side shifter(EK13S/EK14S)



3 、 Safety operations and matters requiring attention

3.1 General rule

3.1.1 The operator must have a forklift operation qualification provided by the relevant departments of training before driving a forklift.

3.1.2 The operator must read the complete instructions before use. Only after fully understanding the operating method may the operator use the

forklift.

3.1.3 Forklift trucks may not carry passengers.

3.1.4 Operators must pay special attention to people nearby as well as fixed objects.

3.1.5 The user shall not modify, add or remove the forklift parts without the manufacturer's approval as this may affect the performance of the forklift.

3.2 Storage and transportation

3.2.1 Use container or flatbed for transportation:

⌚ Front and rear wheels should have a wedge at the wheel to prevent sliding in the process of transportation;

⌚ Using a tie down strap, on solid structure of the forklift truck;

⌚ When transporting the forklift should be in the truck's center of gravity position

3.2.2 When the forklift is not actively used, it should be parked in a dry ventilated clean warehouse to prevent weathering.

⌚ Turn unit off. Unplug the power cord.

⌚ Block front and rear wheels to prevent movement.

⌚ If use is discontinued for a long period of time the battery should be charged once every 15 days.

3.3 Check before using

3.3.1 New Unit: Do not use if any damage occurred in transit. Contact supplier immediately.

3.3.2 New Unit: Equipped with battery. The battery is charged before leaving the factory. If there is a significant time delay between charging (shipment) and use of the unit, the battery power may be low. Check the electricity meter before use. If the display shows the battery is low, charge immediately. Open the battery blocks every day before using or charging. Check the liquid level height. If the liquid level is too low add distilled water.

3.4 Operation specification

Before operating the forklift, please be familiar with the dashboard function of each switch/button.

3.4.1 Start, run and parking:

- ① Insert the key into the key switch. Turn the key to the right. Lift the red emergency power button. The equipment is not operational.
- ② The fork rises from the ground about 4 in.
- ③ Disengage parking brake.
- ④ Direct the forward or backward movement using the function keys on the steering handle.
- ⑤ Slowly and carefully depress accelerator pedal until reaching the desired speed.
- ⑥ In the event of an emergency, immediately press the red emergency power switch. This will disconnect the power supply from the unit.
- ⑦ Reduce speed when turning the unit.
- ⑧ The unit's carrying gradeability is 10%. Press the accelerator pedal down as far as possible when climbing a grade.
- ⑨ Reduce the accelerator throttle pressure when the unit is traveling downhill.

3.4.2 The using of emergency power safety switch

If the operator loses control of the unit, or smoke or burning odor occur, press the emergency switch on the dashboard to shut off the unit. Determine and correct the problem if possible. Clear the fault by resetting the emergency switch. Resetting method: turn the red button clockwise, button will pop up. Do not press down or turn clockwise too hard of switch may become damaged.

3.4.7 The operation of the hydraulic control rod

The hydraulic control rod is used for two functions and is controlled by the joystick.

3.4.8 Battery capacity indicator

The dashboard display for the forklift battery capacity includes a capacity display function. The operator can also use electricity time statistics (cumulative hour).

3.4.9 Handling stacking operation

(1) How to transport pallets using this unit

Drive the equipment to the front of the pallet. Make the fork parallel to the ground. Lifting the fork to the desired height, move the fork into the pallet insert and move forward slowly. When the fork is completely inserted into the pallet. Lift to a specific, move unit to where the pallet is

desired. Re-orient pallet to vertical position. Lower fork until pallet is on floor (or shelf). Reverse unit to remove fork from pallet.

3.5 Safe Operation Rules

3.5.1 Requirements for drivers: The equipment must be operated by a trained staff. They should demonstrate safe protocol and just as a driver of a vehicle.

3.5.2 Drivers' rights, obligations and responsibilities: Has been trained and certified for the operation of the vehicle, the driver must be clear on his rights and obligations; and he is familiar and comfortable with the contents of the relevant operating instructions. It is advisable that the driver wear safety boots.

3.5.3 Prohibit unauthorized personnel to operate: the driver is responsible for the vehicle at work. He must prevent unauthorized persons from driving or operating this vehicle. It is forbidden to use the vehicle to transport or lift personnel.

3.5.4 Malfunctions and defects: If there is any malfunction or defect of the vehicle, the operator must immediately inform management. If the vehicle cannot be safely operated (e.g.: wheel wear or brake failure), then it must not be used until it is fully repaired.

3.5.5 Safe operation and environmental protection: inspection and maintenance must be performed in accordance with the time intervals on the maintenance list.

Parts of the vehicle cannot be changed without permission, especially safety devices. The operating speed of the vehicle is not allowed to be changed.

All original spare parts have been verified by quality assurance department. To ensure the safety and reliability of the operation of the vehicle operators must use only the manufacturer's spare parts. The old parts, such as oils and fuels must be handled in accordance with the relevant environmental protection rules.

3.5.6 Hazardous area: Hazardous area usually refers to the following: vehicle or its load lifting devices (e.g. fork or accessories) is dangerous for personnel when running or lifting movements, or the ongoing regional transport loads. Typically, this range extends to the load or vehicle accessories landing area.

Unauthorized personnel must be asked to leave the danger zone. As long as the situation might cause some kind of damage, the driver must give a warning. If the driver asked the person to leave but they did not leave the danger zone, the driver must immediately stop the vehicle.

3.5.7 Risk environment: When working in high-risk environment, you must have a special design to be protected. The vehicle was not specially designed for the high-risk environment.

3.5.8 Safety devices and warning signs: Safety devices, warning signs

and warning notes described in the previous operating instructions must be used.

3.5.9 Driving in public places: the vehicle is forbidden to drive in public places other than special areas.

3.5.10 distance between vehicles: Keep in mind that the vehicle in front could suddenly stop at any time, so please keep an appropriate distance.

3.5.11 headroom: When the headroom is below the cargo or mast, this unit must not be used.

3.5.12 the use in the elevator and loading platform maneuvering: if there is sufficient loading capacity, does not affect the operation of the vehicle, and is agreed to by the user of the vehicle, lift and loading platforms can be used for vehicle transport. Before entering the elevator or loading station, the driver must personally inspect the affected area. The goods must be placed in front and occupy an appropriate place, when the vehicle enters the elevator, so as not to contact with the walls of the elevator. When personnel and vehicles take the elevator together, personnel must enter after the vehicle has safely entered, and personnel must leave before the vehicle moves.

3.5.13 With access and working area: The vehicle must be operated on the specified channel, all non-related personnel must leave the work area, and cargo should be stacked in designated places.

3.5.14 Operations Management: traveling speed must be adapted to local conditions. When around corners, narrow passages, swinging doors and closed places, the vehicle must slow down. Drivers must be able to visually determine an adequate braking distance between the vehicle and the vehicle in front, and he must remain in control of his vehicle at all times. Sudden stops (unless urgent needs), rapid U-turns, chasing each other in the channel is not allowed. It is forbidden to operate this unit while the operator's body is leaning outside the cabin.

3.5.15 Visibility: The driver must look in the direction of travel to ensure that the front area is clearly visible. When the vehicle is backing up with the carriage of goods blocking the line of sight, there must be a second person walking in front of the vehicle to give appropriate guidance and warnings.

3.5.16 Via the ramp: Only known (and tested) ramps are allowed to be used. The ramp should be clean, non-slip, and free of articles. The goods on the forks must face uphill. It is forbidden to turn back, move diagonally or park on the ramp. The driver must slow down when driving on the ramp, and prepare to brake at any time.

3.5.17 Ground load: Remember to check that the load pressure of the body weight does not exceed the capacity of the unit.

3.5.18 Vehicle Change: any possible changes or modifications for rated load, stability or safe operation of the vehicle, must obtain prior written approval from the original manufacturers or its successor. After the vehicle

manufacturer checks and approves the changes, nameplates, labels and markings of Operation and Maintenance Manuals must be modified as well.

4、 Maintenance and Service Manual

4.1 Repair and maintenance of safety procedures

Maintenance technician: The maintenance and service should only be performed by special personnel trained by the manufacturer. After the technician has been sent by the after-sales department of the manufacturer and completed maintenance and servicing work, they should sign on the service log.

Cleaning Operation: Flammable liquid cannot be used for cleaning the stacker. Before cleaning, take safety precautions to prevent electric sparks (e.g. sparks caused by short circuit). When operating the accumulator, connectors on it must be disconnected. Use soft air suction or compressed air, non-conductive and anti-static brushes to clean electric and electronic components.

Operation of Electric System: Operation on the electric system should only be performed by specially trained personnel. Before performing any operation on the electric system, precautions must be made to prevent electric shock. When operating the accumulator, connectors on it must be disconnected.

Installation: When repairing or replacing hydraulic components, electric and electronic components, make sure to install them back to their original positions.

Wheels: Quality of the wheels has significant effect on stability and driving performance of the stacker. Modification on wheels can be performed only with the approval from the manufacturer. When replacing wheels, ensure that the stacker is levelled as delivery state(wheels must be replaced in pairs, i.e. replace right wheel together with left one).

Lifting chain and rollers: Chain and rollers will be worn quickly without good lubrication. Perform periodic lubrication according to maintenance table below. Shorten the lubrication period under adverse operation conditions (such as in dusty and hot environment).

Hydraulic oil pipe: The oil pipe must be changed every 6 years. When

changing the hydraulic assembled parts, the oil pipe should be also changed.

4.2 Routine Maintenance (Before every shift)

4.2.1 Check the liquid level of electrolyte in the accumulator.

The liquid level will be higher when being recharged.

4.2.2 Check every pole, every cable and their covers.

4.2.3 Check if the accumulator box is secured.

4.2.4 Check the stacker for oil leakage.

4.2.5 Check the chain, rollers, fork, oil pipes and horn.

4.2.6 Check the brake.

4.2.7 Check the wear and tear of drive wheels and loading wheels.

4.3 Professional Maintenance Manual

It is very important for safe operation of the stacker to perform overall professional maintenance. Failure in performing maintenance according to specified interval may cause malfunction of the stacker, and potential risk to personnel and equipment.

Maintenance periods listed in this manual apply to single shift a day under normal operation conditions. If using in dusty environment, the ambient temperature varies remarkably or in multi-shift situation, the maintenance period has to be shortened.

Maintain the stacker according to following maintenance list. Maintenance periods are as follows:

W1 = Every 50 work hours, but at least once a week.

M3 = Every 500 work hours, but at least once every 3 months

M6 = Every 1000 work hours, but at least once every 6 months

M12 = Every 2000 work hours, but at least once every 12 months

Additional operations should be performed in trial run period:

(In initial 50 – 100 working hours or after 2 months)

--- Check the nuts on the wheels and tighten them if necessary.

---Check the hydraulic components for leakage, and tighten them if necessary.

---Replace the hydraulic filter.

List of maintenance

4.4 Maintenance, Recharging and Replacement of the accumulator

The stacker must be parked in a safe location before any operation on the accumulator.

4.4.1 Maintenance Technician

Only qualified technicians can perform operations on the accumulator such as recharging, maintenance and replacing. Before operation carefully read instruction, manuals including operation manual, replenishment preparation and recharging requirements.

4.4.2 Fire Prevention Measures

Never smoke or use open fire when performing operations on the accumulator. The accumulator should be away from flammable materials (at least two meters) when storing or recharging. The location for accumulator storage should be well ventilated and equipped with firefighting devices.

4.4.3 Maintenance of the Accumulator

- 1) Keep the nuts on every battery cell dry and clean. Tighten every terminal and cable end and brush them with grease to prevent corrosion. Naked cable ends, and terminal posts should be covered with a skid-proof insulating cover.
- 2) Every two cells should be well-connected. Check the nuts on each pole, if loose, tighten the nuts.
- 3) Keep the surfaces of accumulator clean and dry. After the completion of recharging, clean spilled acid with cotton yarns or brush. Clean with wet towel if necessary.
- 4) Over charging and over discharging should be avoided. Fast charging and insufficient recharging are also not recommended. Otherwise life span of the accumulator may be affected.
- 5) Do not put conductive objects including metal tools on the accumulator as short circuits or even explosions may occur.
- 6) Never spill any hazardous liquid or solid material on surfaces of the accumulator. When using a densimeter or a thermometer, make sure the surface is clean and clear.
- 7) Recharge the discharged accumulator on time. Delayed recharging may damage the accumulator. Do not delay recharging more than 24 hours. Recharging of the accumulator may not work outdoors in cold weather. In this case, move it indoors to perform recharging.
- 8) If the accumulator will not be in use for a long time, it should be recharged and discharged once every month and it should be fully recharged every time.

- 9) During recharging or using, the liquid level of electrolyte lowers because of water evaporation, so pure water should be added. It is not allowed to add electrolyte with a specific weight of 1.280.
- 10) If individual cell fails, identify the cause and repair the cell immediately. Replace the cell when it cannot be repaired.
- 11) The site for recharging should be well ventilated. It is prohibited to smoke or use open fire, avoiding the risk of hydrogen explosion.
- 12) The electrolyte in accumulator is toxic and corrosive. For this reason, always wear protective working suit, gloves and protection glasses to protect your body from contacting the electrolyte in accumulator.
- 13) If your clothes, skin or eyes are contacted with acid liquid in accumulator, flush with large amount of clean water and also seek doctor's treatment immediately. Acid spillage must be neutralized and treated immediately.
- 14) The weight and dimensions of the accumulator have remarkable effect on stability of the stacker. Therefore, do not modify the type of accumulator without approval from the manufacturer.
- 15) Never discharge in large current i.e., performing travel and lifting simultaneously.

4.4.4 Disposition of worn-out accumulators

Worn-out accumulators should be recycled according to local regulations and stored in specified zone or cast-off treatment zone. These works should be done by qualified specialized companies.

4.4.5 Specification of the accumulator

Battery		Charger	
Rated power: 24V	Rated capacity: 210/210Ah	Input: 195/265VAC 50/60Hz	Output: DC24V30A

Uninsulated terminal poles on the accumulator should be protected with an insulated cover. When connecting the accumulator and socket, make sure to stop the stacker and put the switch at position "0". When replacing or installing the accumulator make sure the accumulator is fixed securely in battery box.

4.4.6 Storage, transportation and installation of the accumulator

The stacker must be parked on level steady ground. To prevent short circuit, naked cable ends and the terminal posts should be covered with insulated covers. When pulling out the accumulator, properly arrange removed accumulator's connectors and cables without blocking access of the accumulator.

When installing or removing the accumulator with a crane make sure the load capacity is sufficient (weight of the accumulator is marked on both the nameplates of the accumulator and the stacker.) The crane must pull vertically to prevent the battery box from being damaged. The hooks of the crane should be safe and secure. Never let the hooks fall on an individual battery .

— Press emergency stop switch and turn the power supply switch to OFF

position.

— Remove the connectors of the accumulator cables.

—Connect the lifting device to lifting holes.

—Lift out the accumulator from the top and move away with handling equipment.

Perform installation in reverse order of above steps. It is vital to put the accumulator in the right position and connect the cables securely. After reinstalling the accumulator, always check all cable connections and connectors for any damage.

4.4.7 Battery power indicator

Battery power display table: ten panels represent 100% of the battery.

With the consumption of battery capacity, the glowing article shows will be from top to down.

The color of LEDs shows the different states :

Name	LED Color	
The standard battery remaining power	Green	70-100%
	Orange	30-60%

	Red blinking	0-20%
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Battery discharge of 70%: red lamp will be blinking "Energy storage";
 Battery discharge of 80%: two lamps will blinking "run out of battery",



Full



Need to recharge



Low battery

4.4.8 Charging

The Electric stackers are supplied with a special charger for recharging.

A:Read the instruction manual carefully before recharging.

B:The batteries should be recharged in well-ventilated areas. Make sure no metal objects are placed on the accumulator. Check all cable connections and connectors for any defects. Observe strictly all safety instructions, e.g. replenishment of the accumulator and preparation for recharging.

C:Hydrogen will be precipitated in the charging process. The accumulator room should be well-ventilated, and the hydrogen content shall be strictly controlled to ensure safety.

D:For the safety of the operation, the stacker should be draped with a protective cover before using.

5、 Repair Manual

5.1 Fault Diagnosis

fault	cause	Processing method
The vehicle can't move	The battery connector is not connected	Check the battery connector , reconnect if necessary
	Electric lock switch on "0"	Turn electric lock switch to the right

	Emergency Stop Switch not open	Open the Emergency stop switch
	Battery power ran out	Check the battery charge , recharge if it necessary
	The stacker is being charged	Interrupt charging process
	The fuse is damaged	Check the fuse
The goods cannot ascend	The stacker is not running	According to the "vehicle cannot move" listed in the fault processing method of operation
	Low hydraulic oil	Check the hydraulic oil
	The fuse is damaged	Check the fuse
	Over weight	Note the load capacity
	the micro switch for lifting contact is bad or damaged	Check the fuse
The goods can't drop	Dirty oil blocking control valve	Check the hydraulic oil and cleaning control valve, and if necessary change the hydraulic oil.
	Lowering solenoid valve not open or damaged	Check the lowering solenoid valve or change out.
Can't stop rising	Lifting micro switch damaged	Cut the power , change lifting micro switch.
Won't move in one direction	Micro switch and cable jumper contact is bad	Check the micro switch and connect jumper switch on the control handle.
The stacker moves slowing	Battery power shortage or homologous cable jumper contact is bad	Check the battery power led and homologous cable jumper contact.
The car suddenly started	Controller is damaged	Change the controller.
	The handle which controls the forward or back is not reset	Repair or change.

If above steps still cannot solve problems, please contact after-sales service department of the manufacturer and have the problems solved by specially trained technicians.

5.2 Preparation before repair

To prevent possible accidents during maintenance and repair work, following preparations must be done:

- Park the stacker safely.
- Press the emergency stop switch and disconnect the connectors on

accumulator.

5.3 Check hydraulic oil level

- Get the stacker ready for maintenance or repair.
- Open the cover of electric unit.
- Check hydraulic oil level in oil tank.

Check the hydraulic oil level only after the fork and main frame are lowered to their lowest position.

5.4 Use Preparation after maintenance or repairing

Use the stacker only after the following operations have been completed.

- Clean the stacker.
- Check the brake.
- Check the emergency stop switch.
- Check the horn.

This manual final interpretation retained by manufacturers.