

**CLG2012/15/20H-WF/RF**  
**CLG2012/15/20H-WS/RS**  
**PALLET STACKER**

(英文)

**OPERATION AND**  
**MAINTENANCE MANUAL**



# Important Safety Information

Most accidents involving product operation, maintenance and repair are caused by failure to observe safety rules or precautions. An accident can often be avoided by recognizing potentially hazardous situations before an accident occurs. A person must be alert to potential hazards. This person should also have the necessary training, skills and tools to perform these functions properly.

Improper operation, lubrication, maintenance or repair on this product can be dangerous and could result in injury or death.

Do not operate or perform any lubrication, maintenance or repair on this product, until you have read and understood the operation, lubrication, maintain and repair information.

Safety precautions and warnings are provided in this manual and on the product. If these hazard warnings are not heeded, bodily injury or death could occur to you or other persons.

The hazards are identified by the "Safety Alert Symbol" and followed by a "Signal Word" such as "WARNING" as shown following.

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## **WARNING**

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The meaning of this safety alert symbol is as follows:

Attention. Be alert. Your safety is involved.

The message that appears under the warning, explaining the hazard, can be either written or pictorially presented.

Operations that may cause product damage are identified by NOTICE labels on the product and in this publication.

LiuGong cannot anticipate every possible circumstance that might involve a potential hazard. The warnings in this publication and on the product are therefore not all inclusive. If a tool, procedure, work method or operating technique not specifically recommended by LiuGong is used, you must satisfy yourself that it is safe for you and others. You should also ensure that the product will not be damaged or made unsafe by the operation, lubrication, maintenance or require procedures you choose.

The information, specification, and illustrations in this publication are on the basis of information available at the time when it was written. The specification, torques, pressures, measurements, adjustments, illustrations, and other items can change at any time. These changes can affect the service given to the product. Obtain the complete and most current information before starting any job. LiuGong has the most current information available.

### **CALIFORNIA PROPOSITION 65**

Diesel engine exhaust and some of its constituents are known to the state of California to cause cancer, birth defects and other reproductive harm.

Battery post, terminal and related accessories contain lead and lead compounds, Always wash hands after handling.



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## Preface

This manual includes important instructions concerning operation, lubrication, checking, testing, adjusting the machine and permanent key components.

This manual should always be kept safe, clean and with the machine where it is convenient to find for operators to use. This manual should not be separated from the machine even when reselling or leasing.

Some photographs and illustrations in this manual show details of attachments those may be different from your machine. Guards and covers may have been removed for the purpose of illustration.

Read this manual carefully and follow all instructions for proper operation and maintenance of this machine. Instructions in this manual should help the reader avoid possible personal injury or damage to the machine. The operator should proficiently and correctly operate the machine to ensure safety.

Use this machine only for the purpose described in this manual. Contact your Liugong dealer for approval before making any modifications or adding attachments to the machine. The addition of any unauthorized attachment may cause operation of the machine to become unsafe and reduce the service life of the machine. Guangxi Liugong accepts no liability for any damage resulting from the use of unapproved attachments or working practices.

Only trained or experienced personnel should be allowed to operate or maintain this machine. Correctly record the machine type, serial number, engine serial number and all major component serial numbers for your reference when ordering parts or in the event of theft. Record the correct numbers to both the operator's manual and a secure place outside the machine.

## Safety

The safety section lists basic safety precautions. In addition this section identifies the text and locations of warning signs and labels used on the machine.

Read and understand the basic precautions listed in the safety section before operating or performing lubrication, maintenance or repairs on this machine.

## Operation

The operation section is a reference for the new operator and a refresher for the experienced operator. Read, understand and reference it whenever necessary. This section includes a description of gauges, machine controls, switches and other controls at the operators' station. It also provides transportation and towing information.

Photographs and illustrations guide the operator through correct procedures of checking, starting, operating and stopping the machine.

Operating techniques outlined in this publication are basic. Skill and techniques develop as the operator gains knowledge of the machine and its capabilities.

## Maintenance

The maintenance section is a guide for equipment care. The illustrated, step-by-step instructions are grouped by servicing intervals. Items without specific intervals are listed under the "When Required" service interval. Items in the "Maintenance Intervals" are referenced to detailed instructions that follow.

## **Maintenance Intervals**

Use the service hour meter to determine servicing intervals. Calendar intervals shown (daily, weekly, monthly, etc) can be used instead of service hour meter intervals if they provide more convenient servicing schedules and approximate the indicated service hour meter reading. Recommended service should always be performed at the interval that occurs first.

Under extremely severe, dusty or wet operating conditions, more frequent lubrication than is specified in the "Maintenance Intervals" may be necessary.

Perform service on items at multiples of the original requirement. For example, at every 500 service hours, also service those items listed under every 250 service hours, 50 service hours and every 10 service hours or daily.

All the information, figures, tables and specifications are the latest product information obtainable at the time of publication. Guangxi LiuGong Company will reserve the right to make change without notice.

## **Declaration**

The Pallet Stackers CLG2012H-WF, CLG2015H-WF, CLG2020H-WF, CLG2012H-RF, CLG2015H-RF, CLG2020H-RF, CLG2012H-WS, CLG2015H-WS, CLG2020H-WS, CLG2012H-RS, CLG2015H-RS, CLG2020H-RS manufactured by LiuGong are special industrial machines, which can be operated only in special areas that is stipulated in the Regulation on Safety Supervision for Special Equipment, such as factories, scenic spots and amusement sites.



## Safety Information

### Safety Symbol



The symbol for safety alerting appears on machines, safety signs, manuals or for important safety information at other places. When you see this symbol, you should follow the instructions in the safety information, guarding against any possibility of personal injuries or death.

"Caution" is also used to indicate safety information relating to unsafe operations which may cause personal injuries. "Danger" represents the most dangerous conditions. The safety signs "Danger" or "Warning" are placed near particular dangerous places. General notice information is placed on the safety sign "Caution."

### Safety Signs

Definitions of the safety signs with the words "Danger", "Warning" and "Caution" which appear in this manual and on the machine are as follows:

#### **DANGER**

- Danger: this word denotes an impending danger, failure to observe instructions could result in death or serious injuries.

#### **WARNING**

- Warning: this word denotes potential danger, failure to observe instructions could result in death or serious injuries.

#### **CAUTION**

- Caution: this word denotes potential danger, failure to observe instructions could result in minor to medium degree of injury.

## Introduction

Thank you for choosing our full electric stacker. For your safety and correct operation, please carefully read the manual before use.

### ***NOTICE***

**All of the information reported herein is based on data available at the time of printing. The factory reserves the right to modify its own products at any time without notice or incurring in any sanction. Please verify with the factory for possible updates.**

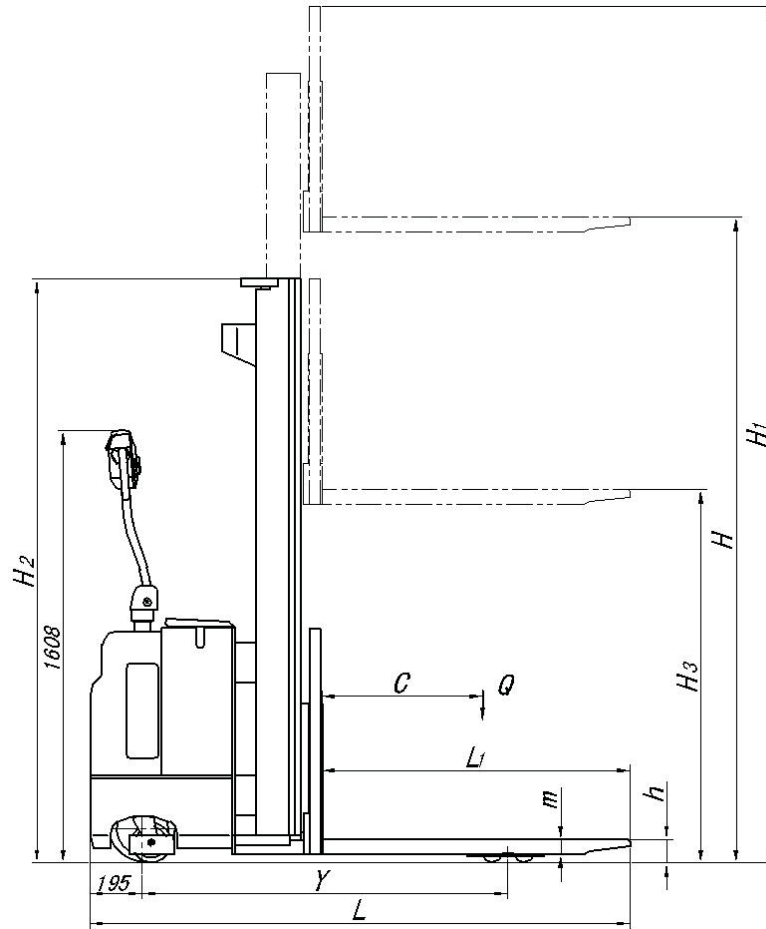
Pallet Stacker is mainly used in pallet stacking and short distance transportation at plants, warehouse and logistics systems. Powered by batteries and mounted with ferrous polyurethane wheels, the stacker is mainly operated on level surface.

The stacker has character of low noise, no pollution and low maintenance cost. The high capacity batteries ensure long continuous work time. Please read and understand this instruction manual before operating the stacker. To avoid the damage to people, vehicles and cargos, the stacker must be used and maintained according to the instruction in this operating manual. Any load exceeding the trucks maximum load or unbalanced load must be avoided. And any damage caused by the modification to the stacker without authorization, will not be responsive by the manufacture.

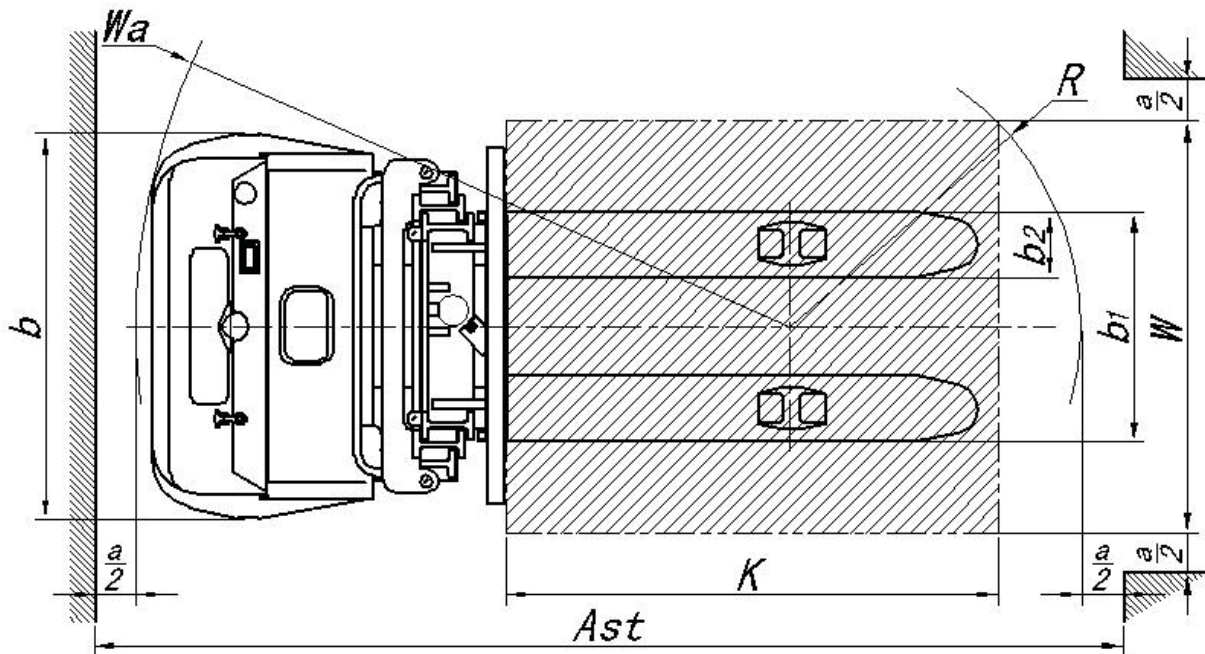
## Configuration and Parameters

### Specifications (FK/BK)

#### Dimension



## Dimension

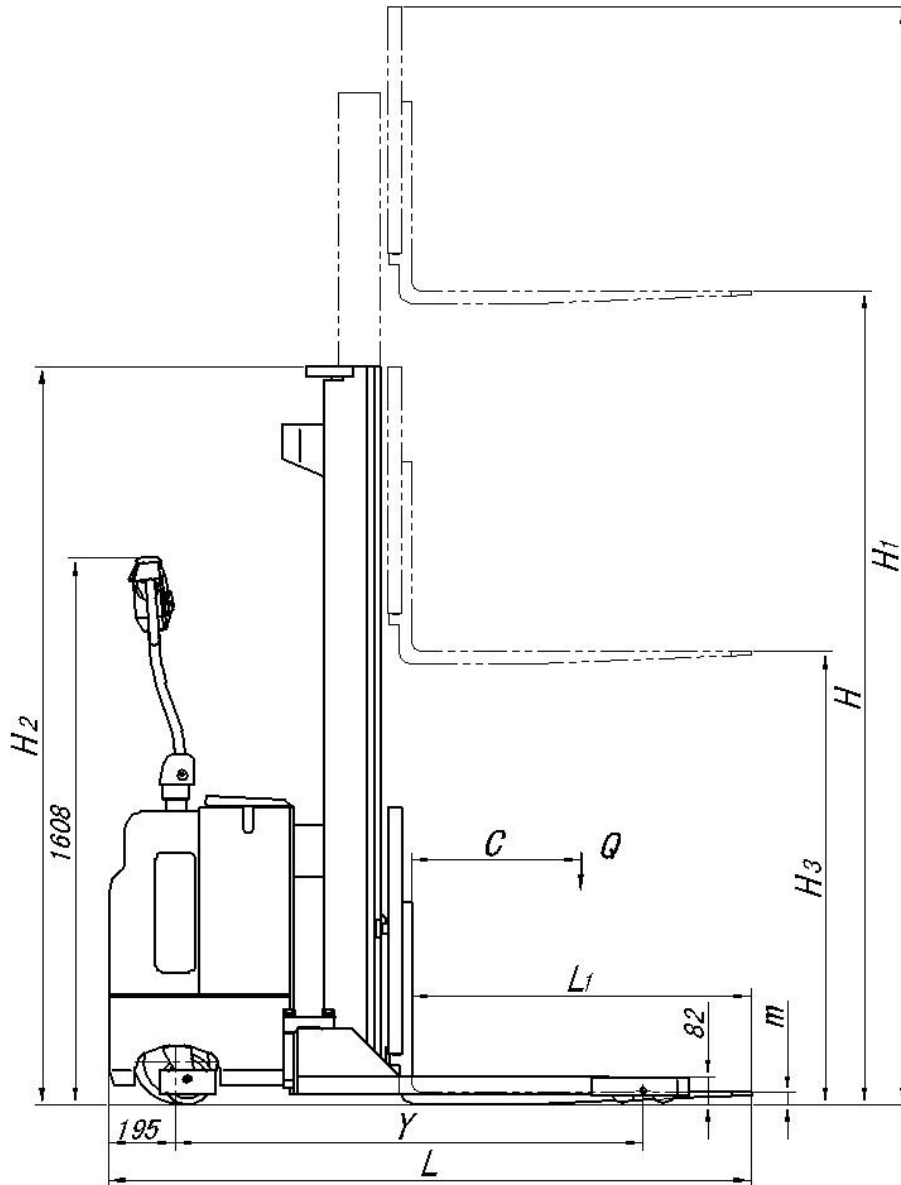


Model		CLG2012H-WF CLG2012H-RF	CLG2015H-WF CLG2015H-RF	CLG2020H-WF CLG2020H-RF				
<b>Characteristic</b>	Drive type	Electric-driven						
	Operate type	Walking /standing						
	Q: Capacity	kg	1200	1500	2000			
	C: Load center	mm	600					
<b>Basic dimension</b>	L: Overall length	mm	2017/(with platform 2062)					
	b: Overall width	mm	940					
	H2: Overall height	mm	2175	2342	2175	2342	2175	2342
	H: Lift height	mm	4500	5000	4500	5000	4500	5000
	H1: Max working height	mm	5373	5873	5373	5873	5373	5873
	H3: Free lift height	mm	1550	1717	1550	1717	1550	1717
	h: Lowered fork height	mm	90					
	Fork dimensions (L1×b2×m)	mm	1150×160×56					
	b1: Maximum fork width	mm	560/680/720					
	Y: Wheelbase	mm	1365					
Wa: Turning radius	mm	1600						

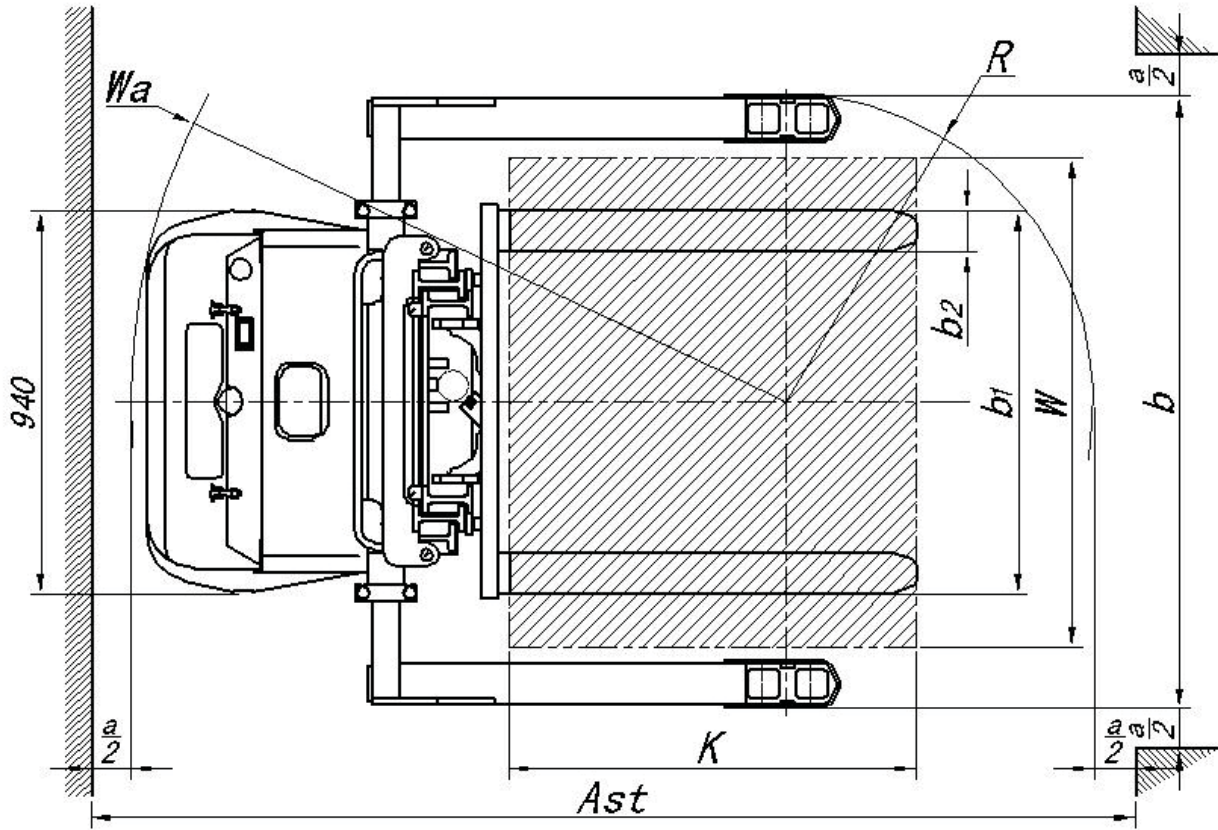
Model				CLG2012H-WF CLG2012H-RF		CLG2015H-WF CLG2015H-RF		CLG2020H-WF CLG2020H-RF	
<b>Performance</b>	Traveling speed	Loaded	km/h	5.8(AC)		5.6(AC)		5.3(AC)	
		Unloaded	km/h	6.4 (AC)					
	Lifting speed	Loaded	mm/s	148		127		100	
		Unloaded	mm/s	170		170		170	
	Lowering speed	Loaded	mm/s	127		150		185	
		Unloaded	mm/s	128		128		128	
	Brake type			Electromagnetic brake					
<b>Motor</b>	Traveling motor		kW	1.5(AC)					
	Lifting motor		kW	3.0					
	Battery capacity/voltage		Ah/V	240/24					
<b>Weight</b>	Weight without battery		kg	1010/ 1048	1085/ 1123	1010/ 1048	1085/ 1123	1030/ 1068	1105/ 1143
	Battery weight		kg	235					

## Specifications (BKW)

*Dimension (straddle type)*



Dimension (straddle type)

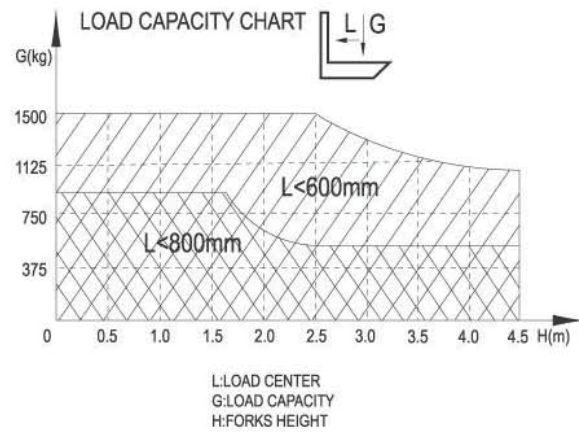
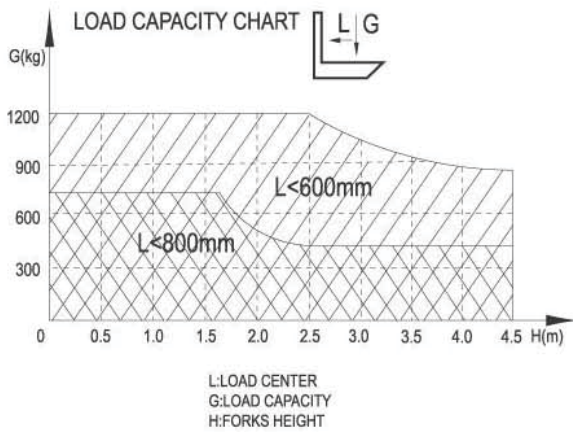


Model		CLG2012H-WS CLG2012H-RS	CLG2015H-WS CLG2015H-RS	CLG2020H-WS CLG2020H-RS	
<b>Characteristic</b>	Drive type	Electric-driven			
	Operate type	Walking /standing			
	Q: Capacity	kg	1200	1500	2000
	C: Load center	mm	500		

Model			CLG2012H-WS CLG2012H-RS			CLG2015H-WS CLG2015H-RS			CLG2020H-WS CLG2020H-RS		
<b>Basic dimension</b>	L: Overall length	mm	1891/(with platform 1936)								
	b: Overall width	mm	1197-1520								
	H2: Overall height	mm	2175	2375	2508	2175	2375	2508	2175	2375	2508
	H: Lift height	mm	4500	5000	5500	4500	5000	5500	4500	5000	5500
	H1: Max working height	mm	5363	5863	6373	5363	5863	6373	5363	5863	6373
	H3: Free lift height	mm	1550	1717	1884	1550	1717	1884	1550	1717	1884
	h: Lowered fork height	mm	65								
	Fork dimensions (L1×b2×m)	mm	1000×100×35						1000×122×45		
	b1: Maximum fork width	mm	210~950								
	Y: Wheelbase	mm	1365								
Wa: Turning radius	mm	1600									
<b>Performance</b>	Traveling speed	Load ed	km/h	5.8(AC)			5.6(AC)			5.3(AC)	
		Unloa ded	km/h	6.4 (AC)							
	Lifting speed	Load ed	mm/s	148			127			100	
		Unloa ded	mm/s	170			170			170	
	Lowering speed	Load ed	mm/s	127			150			185	
		Unloa ded	mm/s	128			128			128	
Brake type			Electromagnetic brake								
<b>Motor</b>	Traveling motor	kW	1.5(AC)								
	Lifting motor	kW	3.0								
	Battery capacity/voltage	Ah/V	240/24								
<b>Weight</b>	Weight without battery	kg	1195/ 1233	1245/ 1283	1295/ 1333	1195/ 1233	1245/ 1283	1295/ 1333	1263/ 1301	1313/ 1351	1363/ 1401
	Battery weight	kg	235								



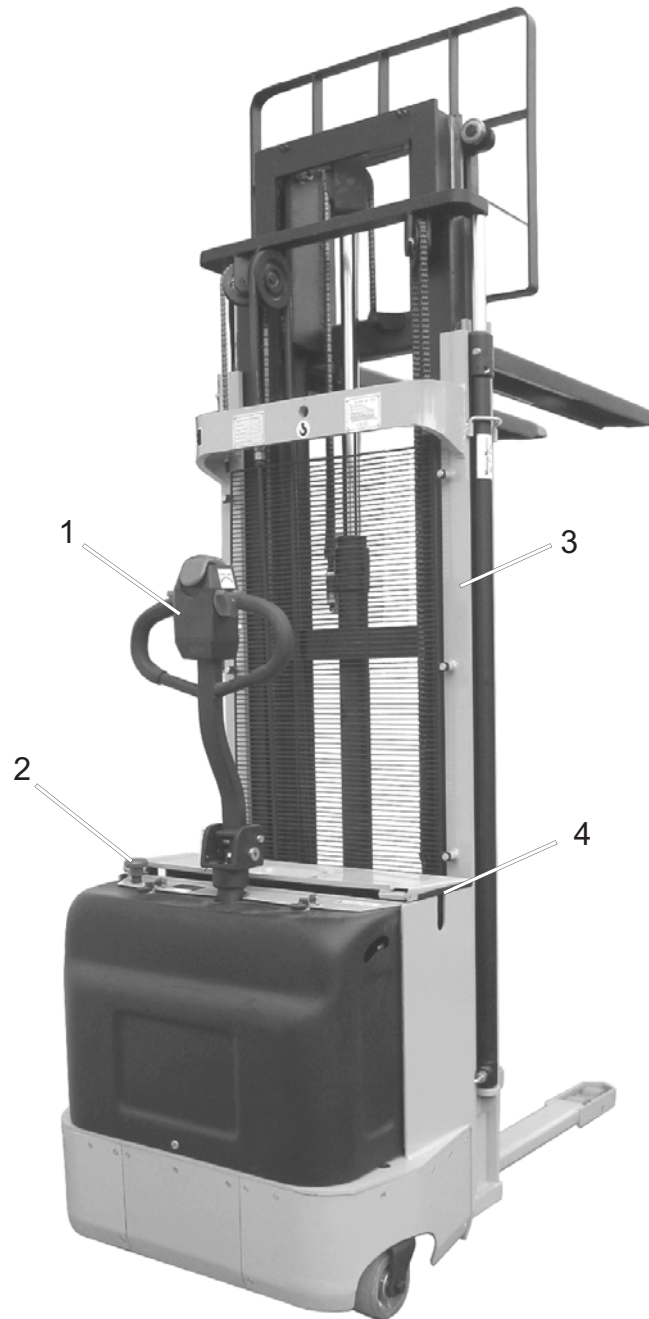
## The Load Capacity Chart



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## Main Parts of the Stacker

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- 
- 1. Operation Handle
  - 2. Emergency Switch

- 3. Frame
- 4. Battery Box

## Before Use Checking

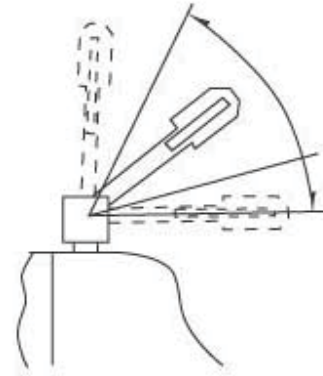
- Do not use the stacker in case of being damaged during transportation. And please contact with your vender immediately.
- Lubrication and oil filling have been made by the manufacturer.
- Check the batteries. Free of maintenance batteries have been charged before leaving factory. But maybe in low power after leaving the factory for a long time. Please pull up the Red Switch (Emergency Switch) and unlock the Lock Switch. If the voltage is below 21V, please make charging.

### Operation Handle



1. Lifting button
2. Lower button
3. Emergency switch
4. Safty stop
5. Speed regulator
6. Lock switch
7. Horn

### Brake Angle



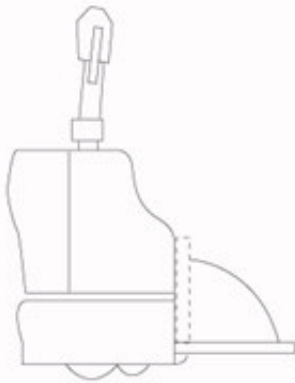
- If the Traction Battery is equipped, please open the battery cover before use. And put off the cap of batteries to check the level of electrolyte. (Please consult to the section of Battery)
- Battery Charger should be well kept, for the purpose of charging the Batteries when needed.

# Operation Manual

## Preparation before Using

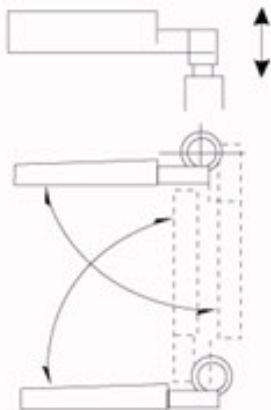
1. All operation functions are fixed on the Operation Handle. Figure *Operation Handle* indicates their positions and functions.
2. The stacker can be mounted with a Standing Platform. And the operator can operate the stacker by standing on the platform. The platform is foldable, it can be turned up (see the following Figure).

### Platform



3. The stacker can also be mounted with a pair of Armrests, You can turn to open the armrests by press down them (see the following Figure).

### Armrests



4. The Emergency Switch is the power switch of the stacker. The button should be pressed down after use or in some emergency situation. And the button should be pulled up before use, then turn on the lock switch. Please notice that the voltage indicated by the coulometer should be about 24V and not below 21V. Then the stacker can be operated.

## Stacking

1. Turn on the Lock Switch, pull up the red emergency button, press lifting button. The forks will lift. Loosen the button, the forks will stop.
2. Press lowering button, the forks will lower, loosen the button, the forks stop.
3. The stacker should be used on flat ground, when moving, the fork should not be higher than 300mm.
4. For the sake of safety, the stacker should move slowly and for a distance as short as possible with load.
5. Do not load a weight exceeding its capacity with the stacker, Please load the stacker according to the clad capacity chart.
6. Continuous lifting capacity: Because of the temperature rise effect of the oil pump motor, continuous full loaded lifting which should be avoided may cause over-heat of the motor.
7. According to the test, at normal temperature and full loaded condition, after lifting and lowering the forks at the height of 3300mm for 3 times, It should take 35 minutes to cool down the motor, So please notice that continuous full-loaded lifting should be avoided.

## Moving

1. The driving unit of the stacker consists of DC Motor, wheel speed reducer and braking unit. The rotation of the motor is controlled by a speed regulator. And stepless speed control makes the operation smooth, safe and precise.
2. When moving, operating handle should be set at the middle position (between the angle range of 45° , see Figure *Brake Angle*).When the handle is at a upper or low position, the stacker is braked and would not move.
3. Turn on the lock switch, turn the red speed regulator forward or backward smoothly, the stacker then starts to move forward or backward, You can control the moving speed freely by turning the speed regulator. Do not turn the rotary switch violently or the stacker will be damaged.
4. Loosen the speed regulator and put the operating handle to upper or low position, the stacker will be braked
5. Safety Stop provides a safety when the stacker is driven backward and it makes a collision with the operator the stacker will move forward at once to keep the operator from being injured

## Battery Charging

Battery charging is very important. When the battery voltage is lower than 21 volts, charging should be made immediately. If the stacker is operated at a low voltage, the large electric current may not only damage the batteries, but also destroy the circuit and the motor.

An automatic charger is provided. The operating and main technical data are described in the operating manual.

## Maintenance Manual

## Battery

### Daily checking

- Check the capacity of the batteries.
- Lift the forks to the top position to check the hydraulic oil volume. Fill in the oil YA-N32 if necessary.

### Weekly checking

- Check the abrasion wear of the chain, clean and lubricate it with oil.
- Ensure all screws and nuts are tightened.
- Check the abrasion wear of the brushes in the motor, make the brushes flat to keep good contact with the pole.

### Replacement of the hydraulic oil

Replace the hydraulic oil every 200 working hours is recommended. And if it is not often be used, replacement could be done every year.

The process of replacing the hydraulic oil:

1. Lower the fork to the bottom and disassemble the sole pipe joint at the bottom of the cylinder and put it into a container.
2. Press the Lifting button 1.to run the pump to evacuate the oil tank. Fill in YA-32 hydraulic oil or other similar oil 7L. If the temperature of the working condition is rather low, YA-10 hydraulic oil is recommended. Then operate the fork up and down without load several times to evacuate the air in the unit. More oil should be filled in if the fork can not reach the highest position.

## ⚠ CAUTION

**Charging should be made if the battery is in low power.**

1. Check the level of electrolyte at least once a week, The level should be 1-2cm higher than the filter net of the battery. If the liquid level is lower than the net, distilled water should be filled in.
2. Keep the surface of the battery clean and dry. Dirt and dampness on the battery may cause electric leakage and decrease the capacity of the battery. Tighten the joints of the battery and coat them with acid-proof grease to avoid the sulfurized layer come into being. The layer will decrease the contacting surface which may cause reduction of the voltage,
3. Batteries produce potentially explosive gasses during charging and should be charged in a well-ventilated area, Be far away from the fire to avoid the explosion accident.
4. Check the charging status with electrolyte gravity meter. The gravity of the electrolyte should not be lower than 1.160 (90% discharged).

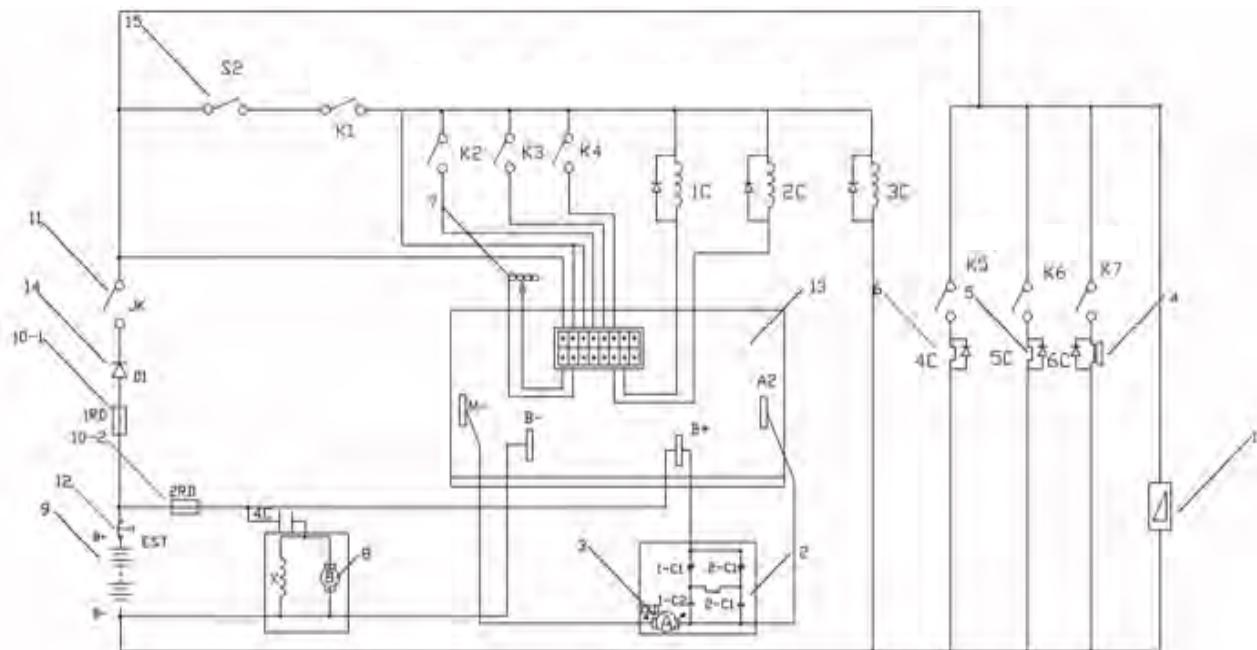
Gravity (at 30°C)	Charging Status
1.260~1.280	100%
1.230~1.250	75%
1.200~1.220	50%
1.170~1.190	25%
1.140~1.160	10% (90% discharged)

## Safety Operation

1. Before the stacker works, it is necessary to check whether the joint of the accumulator losses, whether the horn is in normal state, whether the quality of electricity is sufficient, and whether the steering wheel is flexible. The stacker is prohibited to dispatch with any failure.
2. Aside from the above-motioned problems, the stacker operation with alarms to ensure no people and barriers around. It must strictly operate within the range of nominal load curve, and it should reduce the loading capacity in accordance with the curve when the gravity center of goods exceeds the designed load center distance.
3. Slanting shipment or single-prong shipment is prohibited.
4. First, the operator must to lower the fork in a low height, and then move the stacker to the position where you want. When you load the goods at high position, please lower the fork to the safety height.
5. It is prohibited to lift people with the fork or truck when the stacker is in operation. No people are allowed to stay or walk under the stacker when it is lifting no matter whether there are goods on it or not.
6. Sharp turning is prohibited for the stacker, and it should operate in the uphill direction when it runs on the slope with the full load less than 5%: namely, reverse the fork truck to go down the slope with goods on the back.
7. Being a key carrying equipment, the stacker is crucial to production safety. It is necessary to frequently check whether there is any distortion, crack or other failure. Operation should be stopped immediately once any failure is found.
8. It is prohibited to operate two buttons simultaneously.

## Drawing of Electric and Hydraulic and Hydraulic Operating Principle

*Principle of electrical operation*

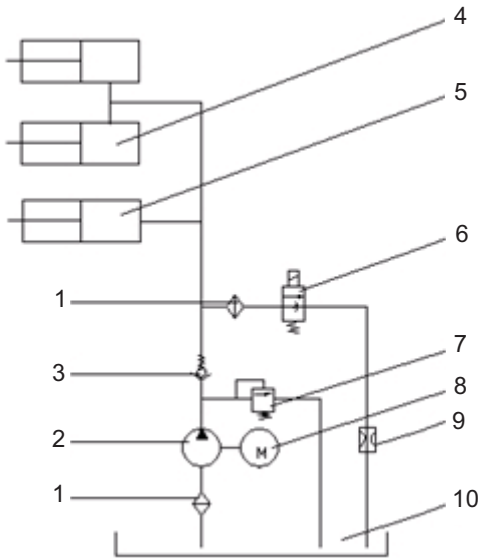


- |                             |                                  |
|-----------------------------|----------------------------------|
| 1. Coulometer               | 9. Battery group                 |
| 2. Drive wheel AS           | 10-1/10-2 Fuse                   |
| 3. Drive motor              | 11. Key open switch              |
| 4. Horn                     | 12. Emergency switch             |
| 5. Coil of unloading valve  | 13. Controller                   |
| 6. Coil of contactor        | 14. Diode                        |
| 7. 0-5000K speed controller | 15. Handle position-limit switch |
| 8. Pump house AS            |                                  |



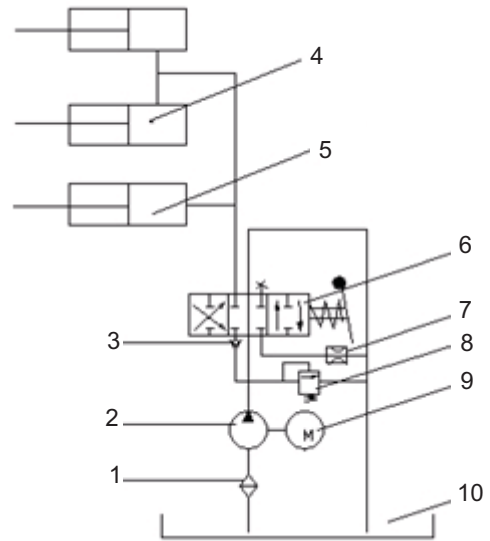
## Principle of Hydraulic Operation

*Magnetic exchange hydraulic schematic diagram*



- |                       |                     |
|-----------------------|---------------------|
| 1. Candle filter      | 6. Solenoid valve   |
| 2. Oil pump           | 7. Relief valve     |
| 3. One-way valve      | 8. Electro-motor    |
| 4. Side lift cylinder | 9. Throttling valve |
| 5. Main lift cylinder | 10. Oil tank        |

*Manual reversing hydraulic schematic diagram*



- |                       |                           |
|-----------------------|---------------------------|
| 1. Candle filter      | 6. Manual reversing valve |
| 2. Oil pump           | 7. Throttling valve       |
| 3. One-way valve      | 8. Relief valve           |
| 4. Side lift cylinder | 9. Electro-motor          |
| 5. Main lift cylinder | 10. Oil tank              |

## Easy Worn Parts

NO	Belong to	Code	Name	Qty
1	Free lifting cylinder	SP136362	Dust ring	1
		SP136363	Seal ring	1
		SP136366	O-ring	1
		SP136351	O-ring	1
		SP136355	Seal ring	1
2	Middle mast and side lifting cylinder	SP135153	Seal ring	2
		SP136407	O-ring	2
		SP136399	O-ring	2
		SP136398	Seal ring	2
		SP136396	Dust ring	2
3	Front wheel and balance wheel	SP136506	Balance wheel	2
		SP136498	Front wheel	2
4	Electric control	SP136545	Battery	1
		SP136196	Emergency switch	1
		SP136212	Fuse	1
		SP136199	Fuse	1
5	Oil pump	SP136552	O-ring	1
6	Operation handle	SP135236	Pneumatic spring	1
		SP148016	Micro-active switch	1
		SP135245	Shaft sleeve	1
		SP135249	Bush	1
7	Operation handle	SP135270	Micro-active switch	2
		SP135294	Button 1	1
		SP135295	Button 2	1
		SP135296	Button 3	1
8	Drive wheel AS	SP136268	Dust ring	1
		SP136272	Shaft sleeve	1

## Structure of the Electric Stacker



1. Shelf assembly
2. Rear seat assembly
3. Drive wheel assembly

4. Electric control system
5. Pump station assembly
6. Operation handle assembly

**Note:**

Pump station assembly refers to appendix 1;

Drive wheel assembly refers to appendix 2;

Operation handle assembly refers to appendix 3.



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