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## 1. Product Overview

## **1.1 Product features**

- Pneumatic unlocking, safe and reliable; wire rope fracture protection, avoiding wire rope fracture risks; ultra long body, with the effective platform length of 4510mm.
- High-strength material; overloaded performance, 1.5 times of static performance and 1.15 times of dynamic performance specified in CE European standard.
- Standard secondary lifting trolley.

## **1.2 Technical parameters**

Drive mode	Direct-acting hydraulic cylinder	
Rated lifting capacity	4500KG	
Hydraulic station	2.2 KW aluminum alloy	
Unlock method	Pneumatic unlocking	
Minimum lifting height	210mm	
Maximum lifting height	1700mm	
Overall length of platform	4510mm	
Inner width of the post	2830mm	
Overall width	3185mm	
Motor parameters	1PH, 220VAC, 3KW, motor with an aluminum alloy housing	
	3PH, 380VAC, 3KW, motor with an aluminum alloy housing	

# 1.3 Dimension diagram



Fig 1

### 1.4 Main structure principles of the product

#### Lifting mechanism:

The hydraulic cylinder (pull type) is installed inside the left bridge. When the hydraulic oil enters the front chamber of the cylinder, the piston rod moves backward, and drives the front and rear beams to move upward as a whole via the lifting wire rope.

#### Supporting mechanism:

The left and right bridge plates are installed on the front and rear beams to form a supporting platform. After the vehicle enters the working area, the front and rear wheels of the vehicle shall be basically on the center lines of the left and right bridge plates. The secondary lifting mechanism can be moved between the left and right bridge plates and the stay bar of proper length can be used to adapt for the vehicles of different chassis heights.

#### Balance mechanism:

Four lifting wire ropes are synchronized forcibly in order to keep balance during the lifting/lowering of the vehicle. In this way, the four wire rope ends fixed on the post shall be preset to keep the tension of four lifting wire ropes consistent.

#### Manual safety mechanism:

The four posts are equipped with the safety guard. During the lifting of sliding table, the safety block leans against the safety guard and works under the action of the spring. To lock the sliding table, press the LOCK button, after which the sliding table will descend and the safety block will be stuck in the safety guard. To lower the sliding table, press the DOWN button, after which the sliding table will rise a little, the safety block will be unlocked pneumatically, and then the sliding table will descend automatically.

#### Wire rope fracture protection safety mechanism:

The front and rear beams are equipped with safety claws, which are usually held down by the lifting wire rope through the safety wheel to make the safety claws draw inward. When the wire rope fractures, the safety claws will recover under the action of the spring and get stuck in the positioning board at the same time.

#### Working travel of safety mechanism:

These safety mechanisms will work when the height of sliding table is within the range of 210mm (both front and rear beams off the ground) to 1700mm (effective lifting height).

#### Presetting for levelness:

Keep the left and right bridges horizontal by adjusting the four adjusting screws on the four posts.

# 2. Installation and Adjustment Tools

Prepare the following common tools to ensure smooth installation and adjustment:

Tools	Specification
Level gauge	Carpenter type
Chalk line	Minimum 6.0m
Hammer	1.5kg
Adjustable wrench	40mm
Open end wrench set	11mm-23mm
Pawl mount set	
Flat head screwdriver	150mm
Impact drill	18mm
Carbide drill (new)	¢ 18mm

## 3. Installation

Open the packing case, remove the surrounding packing materials, inspect the machine for damage during transportation, and inspect the main components and accessories for completeness as per the packing list.

Keep packing materials away from children so as not to pose any danger, and properly dispose them if they may cause pollution.

#### 3.1 Installation precautions

- (1) Improper installation will result in lift damage or personal injury. The manufacturer will not be liable for any damage caused by improper installation or use of this product, either directly or indirectly.
- (2) The proper installation location should be the "level" ground and ensure a horizontal lifting. In case of slight inclination in the ground, the appropriate thin pad may be used. Any great inclination will affect the height of the pad or the horizontal lifting performance of the product. If the floor is suspected to be slanted, a visual inspection may be carried out, or, where possible, a new horizontal concrete slab may be fabricated. In brief, the maximum horizontal lifting height of the lift in the best horizontal lifting state can only be up to that when the lift is installed on the horizontal ground. Do not expect to compensate for severe inclination.
- (3) Do not install the lift on any asphalt surface. According to the minimum specifications specified in the general floor requirements, do not install the lift on any surface, except for concrete surface. Do not install the lift on the cracked or defective concrete surface. Please inspect the mounting position together with the architectural engineer.
- (4) Do not install the lift on the first floor of the building with a basement without the written approval of the architectural engineer.
- (5) Overhead obstacle: The mounting area of the lift shall be free from any overhead obstacles such as heaters, building supports, electrical piping, etc.
- (6) Ground drilling test: The installation personnel may identify the concrete thickness of each site by a ground drilling test. If more than one lift is to be installed at the same place, it is best to perform ground drilling test in each specific site.
- (7) Power: Prepare proper power before installation. It is recommended to have the electrical wiring done by the certified electrician.

### 3.2 Installation procedures

Select the mounting position of the lift according to the requirements listed below:

- (1) The lift can only be installed on the concrete slab with a minimum thickness of 500mm and a minimum curing time of 7 days.
- (2) The concrete slab shall be reinforced with the reinforcing bar.
- (3) The concrete slab must be placed horizontally.

## 3.3 Schematic diagram of installation on foundation

#### Foundation diagram of the product





## Working space layout



## 3.4 Installation and principle of wire rope

The lift consists of posts, longitudinal beams, cross beams, hydraulic drives, electrical devices, wire ropes, pulley blocks and others.

The drive diagram of the work platform is as follows. The cylinder 1 is located in the main longitudinal beam, the front end of the piston rod is fixed with a rope shaft 2, and the left and right ends of the rope shaft are respectively used to fix the wire ropes a, b, c and d. The wire rope a is fixed at the upper end of the post A bypassing the double-groove pulley block 3 and the pulley 5; the wire rope b is fixed at the upper end of the pulley 7; the wire rope c is fixed at the upper end of the post C bypassing the double-groove pulley block 3 and the pulley 6; the wire rope d is fixed at the upper end of the post D bypassing the double-groove pulley block 4 and the pulley 6; the single-groove pulley block 4 and the upper end of the post D bypassing the double-groove pulley block 4 and the pulley 8.

To lift the work platform, press the UP button to start the motor, then the oil pump rotates, the pressure oil enters the front chamber of the cylinder to push the piston to move backward, then the wire ropes a, b, c and d are pulled through the rope shaft 2, and finally the work platform rises stably through the pulley block and the cross beam pulley.

To lower the work platform, press the lowering handle on the pump station to open the hydraulic valve oil return passage, then the hydraulic oil in the cylinder is discharged back to the hydraulic oil tank under the force of gravity, and the piston rod is pulled outward through the wire rope, and finally the work platform is lowered stably. The opening size of the oil return passage can be changed by the pressing force of the handle so as to control the lowering speed on the premise of safety and stability.



### 3.5 Installation and principle of safety strip

The hanger plate 5 is suspended in the post, and has a screw at the upper end thereof, and can be adjusted up and down by adjusting the nut; the hook 4 is hinged in the cross beam, and enters the hole of the hanger plate under the pulling force of the spring 8. When the work platform rises, the hook also rises along with the cross beam; when the hook rises to the required height, lower the work platform slightly so that the hook can be supported in the rectangular hole of the hanger plate to ensure that the work platform is safely at the required height during the repair. At this time, the hanger plate bears the weight of the work platform and the vehicle, and the wire rope is not loaded temporarily for the purpose of safe operation.

To lower the work platform, first press the UP button to raise the work platform slightly, then turn the safety handle on the longitudinal beam clockwise (and lock the handle), and pull the hook off the hanger plate by the pull rod 7. Then press the lowering handle on the pump station, open the oil return passage to drain oil from the cylinder, and then the work platform will be lowered under the action of gravity. Please note that if the work platform is lowered to a certain height and other repairs are required, it is still necessary to support the hook in the hole of the hanger plate to ensure safety.

The eccentric wheel 2 is hinged on the cross beam, and the roller 1 rests on the wire rope 3 under the tensile force of the spring 6. During the operation, the roller moves up and down along the tensioned wire rope to maintain a certain gap between the eccentric wheel and the hanger plate. When the wire rope breaks, the roller loses its support, and the eccentric wheel 2 rotates rapidly under the tensile force of the spring to lock the cross beam on the hanger plate, effectively preventing the work platform from falling.



#### **Cross beam installation**





## Safety bar installation





### **Platform installation**



Fig 8



## Pump station installation

## Air pipe installation



Fig 10

#### Lock sensor installation



#### Oil pipe installation





#### **Electrical wire installation**



Fig 13

Schematic diagram of hydraulic circuit



Fig 14

Schematic diagram of electrical installation



Fig 15

How to adjust the detector position when encountering a malfunction of the protection detector?

This product is equipped with a safety detection device as standard. When any pillar of the four pillar lift cannot open the safety, the lift will stop lowering.

When the descent button cannot be pressed, it is possible that the position of the safety detection device is loose and the following adjustments need to be made:

- (1) Check if the air supply pressure is normal.
- (2) Turn off the four detection switches and check if they can descend.



Fig 16

- (3) If step 2 can lower, gradually turn on four switches to "ON".
- (4) If the down button cannot be pressed, the corresponding column detection switch of this switch needs to be adjusted.
- (5) 5. Turn the switch to the "TEST" position.



Fig 17

- (6) Loosen the detection switch screw on the corresponding cylinder of the column.
- (7) Keep pressing the down button while moving the position of the cylinder detection switch until the detection switch lights up, and then the position of the detection switch has been adjusted. Tighten the screws of the detection switch.
- (8) The same applies to others.
- (9) Turn on all detection switches and set the mode to "Work".
- (10)Adjustment completed.



Fig 18

Voltage	Power	Start current	Operating current	Wire size	Air switch	Applicable to
380V	3KW	21A-35A	8.5A	At least 2.5 mm <sup>2</sup>	C63	Scissor lift
220V	3KW	60A	21A-25A	At least 4mm <sup>2</sup>	C63	Scissor lift
380V	2.2KW	18A-30A	7.5A	At least 2.5 mm <sup>2</sup>	C63	Two posts, the gantry, four posts
220V	2.2KW	60A	20A-22A	At least 4mm²	C63	Two posts, the gantry, four posts

Note: Please use the power wires with minimum size of 2.5 mm<sup>2</sup> to connect the power supply interface U, V and W to the motor interface X, Y and Z.

Note: Connect the safety device test wire to S1 (blue) and S0 (red). Please remove the wire between S1 and S0 before use.

Limit switch: Remove the wire J&E first and connect to J&E

Air valve: 3&0

#### Oil return magnetic valve: 5&0







Fig 20

Connection of incoming power wire

Connection of motor wire



Fig 21

Instruction for connecting motor wire (which has been left outside the control cabinet): the live wires are red, blue and green, the ground wire is yellow and arranged at the position where the arrow indicates.

## Installation of pneumatic circuit



S/N	ltem	Quantity
203	Muffler	3
204	Plug 1/8	1
205	Solenoid valve	1
206	Plug 1/4	1
207	Air pipe PU0604	1
208	T-joint APE6	1
209	Small cylinder	4
211	Air pipe PU0806	5

## 4. Operation Instructions

#### 4.1 Precautions for auto repair

- (1) The centre-of-gravity position and tread of different vehicles differ. Know the centre-of-gravity position, tread, and wheelbase of the vehicle in advance, and keep the centre-of-gravity of the vehicle at the center of the lift as far as possible when driving into the lift. Keep the front wheels at the center of the index plate during indexing operation (the index plate can be moved forward and backward).
- (2) Read the warning signs carefully.
- (3) Since all hydraulic valves have been well adjusted before delivery, the user shall not adjust such valves without authorization; otherwise, they shall be responsible for all consequences.
- (4) Some parameters in the manual can be changed in accordance with the production requirements.

#### 4.2 Preparations before operation

- (1) Apply a little general grease to the rotating parts of the front and rear beams and the moving parts of the secondary lifting mechanism.
- (2) Inspect that the motor power is properly installed.
- (3) Turn on the gas source and inspect if the air pressure is normal (5-8bar). 4 Inspect if all connecting bolts are firm.
- (4) 5. Inspect that the 10L hydraulic tank of the hydraulic power unit is filled with N46 anti-wear and antifreezing hydraulic oil.

### 4.3 During operation

- (1) Press the UP button to lift the sliding table.
- (2) Press the LOCK button to lock the sliding table.
- (3) Press the DOWN button, after which the sliding table will first rise a little, then be unlocked pneumatically, and finally descend.

### 4.4 Vehicle lifting

- (1) Remove the debris around the lift.
- (2) Lower the sliding table to the lowest position.
- (3) Drive to an appropriate position in the middle of the lift.
- (4) Press the starting switch to slowly lift the vehicle and ensure load balance, and then lift the sliding table to the required height.
- (5) Release the UP button.
- (6) Press the LOCK button, after which the lift will be locked by the mechanical lock and proper vehicle repair is allowed.

#### Note:

(1) Block the wheels with wedges when lifting the vehicle.

- (2) Inspect all pipe joints and ends for oil leakage before lifting the vehicle. Do not use the lift in case of leakage. Remove the leaky joint and seal the connection. Install a new joint and inspect for oil leakage.
- (3) Make sure the safety lock works after the vehicle is lifted.
- (4) The safety lock will not automatically reset after it works.

## 4.5 Vehicle lowering

- (1) Remove all obstacles under and around the lift.
- (2) Press the DOWN button, after which the sliding table will first rise a little, then be unlocked pneumatically, and finally descend.
- (3) Press the LOCK button, after which the lift will be locked by the mechanical lock.

## 5. Safety Rules of Electrical System

- (1) Only the trained personnel with professional knowledge is allowed to carry out electrical repair and troubleshooting.
- (2) Do not modify or omit the protective interlocking device.
- (3) Read carefully and pay attention to warning signs before start.
- (4) Cut off the power and lock the main switch before troubleshooting.
- (5) Pay attention to prevent electric shock when working in wet places.
- (6) All personnel must stay away before the power is supplied to any device. Do not open the electrical box unless there is a need to inspect the electrical equipment.
- (7) Do not modify the circuit unless proper authorization is obtained from the manufacturer.
- (8) Inspect if the new electrical part meets the proper specifications (including the color code of wire) before replacement.
- (9) Do not wear metal glasses, necklaces, etc. when operating electrical equipment. In addition, do not wear rings, watches and bracelets.

# 6. Details of Equipment Parts

## Exploded view of front beam



Fig 23

Item No.	Name	Item No.	Name
1	Cross beam	12	Spring 2
2	Wire rope pulley bearing	13	Cross beam trim panel
3	Wire rope pulley	14	Wire rope lock screw
4	Spacer sleeve	15	Spring mounting screw
5	Guide wheel shaft	16	Sliding block mounting screw
6	Guide wheel shaft circlip	17	Sliding block
7	Wire rope guide wheel	18	Cylinder with opened safety device
8	Safety jaw	19	Safety hook circlip
9	Circlip	20	Safety jaw shaft
10	Wire rope fracture safety jaw	21	Safety jaw
11	Spring 1	22	Plastic cover plate

## Exploded view of post components



Item No.	Name	Item No.	Name
1	Post	9	Pneumatic valve seat
2	Safety gear rack	10	Pump station mounting screw
3	Pump unit	11	Pump station mounting screw washer
4	Control cabinet	12	Pump station mounting screw washer nut
5	Set nut	13	Pump station mounting screw spring washer
6	Set nut	14	Control cabinet mounting screw
7	Gasket	15	Wire rope
8	Pneumatic valve		



Fig 25

Item No.	Name	Item No.	Name
1	Bridge plate	11	Single-groove wire rope sheave
2	Side slide plate	12	Single-groove wire rope sheave shaft
3	Oil cylinder	13	Wire rope sheave shaft set screw
4	Inner oil pipe	14	Wire rope lock screw
5	Side slide plate wheel	15	Double-groove wire rope sheave
6	Nut	16	Wire rope sheave shaft
7	Wire rope mount	17	Ramp shaft
8	Wire rope mount pin	18	Ramp
9	Stop plate	19	Side slide plate pin
10	Wire rope sheave bearing	20	Turntable recess cover

# 7. Common Faults and Solutions

Fault symptom	Fault causes	Troubleshooting methods
	The fusible core is burnt out	Replace the fusible core
Motor does not work	The motor voltage is improper	Supply proper voltage to the motor
	Motor is burnt out	Replace the motor
The motor works but fails to raise the lift	The motor rotates reversely.	Change the motor by changing the motor lead

	Pump is damage or leaks inside	Inspect the hydraulic circuit
	Oil level is low	Add oil to the hydraulic tank
	Operating voltage of motor is low	Supply proper voltage to the motor
The motor works but can raise	Gear pump may be damaged	Inspect the pump pressure
the unloaded lift only	Pressure of relief valve is adjusted insufficiently	Adjust the pressure of relief valve
	Lift is overloaded	Inspect the weight of vehicle
Lowering speed of the lift is	There are foreign matters in the lowering solenoid valve	Clean the lowering solenoid valve
slow	Opening of lowering throttle valve is too small	Rotate the throttle valve counterclockwise to appropriate position
Lifting speed of the lift is slow or oil overflows the oil cap	The oil contains air	The oil shall not be mixed with air

## 8. Repair and Maintenance

## 8.1 Daily maintenance

- (1) Wipe the machine frequently to keep it clean. Always cut off the power before wiping to ensure safety.
- (2) Sweep the working environment of the machine out well frequently, as too much dust in the working environment will accelerate the wear of parts and shorten their service lives.
- (3) Carefully inspect that all safety mechanisms of the machine works flexibly and reliably before work. In case of any abnormality, adjust, repair or replace the relevant parts immediately.
- (4) Inspect that the lift pit is dry and clean.
- (5) Inspect that the air pressure regulating valve is free from air leakage and the lubricating oil is sufficient.

## 8.2 Monthly maintenance

- (1) Inspect if the anchor screws are loose, and tighten them if any.
- (2) Inspect all hydraulic lines for wear and oil leakage; immediately replace the seal as per the original specifications in case of leakage caused by the wear of seal.
- (3) Inspect that the slideway of sliding block is well lubricated with the high-quality #2 lithium base grease.
- (4) Apply #2 lithium base grease to each lubrication point every month.

## 8.3 Maintenance every 6 months

(1) Inspect all moving parts for possible wear, interference and damage.

- (2) Inspect the lubrication of all rollers. Apply an appropriate amount of lubricating oil to the wheel shaft if dragging of pulley occurs during lifting.
- (3) After the first 6 months, clean the hydraulic system with diesel oil and change the hydraulic oil. Use N32 hydraulic oil in winter and N46 hydraulic oil in summer ever since.

### 8.4 Maintenance every 3 years or after operation for 5,000 times

- (1) Replace the compound bush at each articulation point.
- (2) Replace the sealing ring at each oil pipe joint.
- (3) Replace the sliding block.

## 9. Storage and Disposal

#### 9.1 Storage Before storing the equipment for a long time

- (1) Cut off the power.
- (2) Lubricate all parts requiring lubrication, i.e., the moving contact surface of sliding block, etc.
- (3) Empty all oil/liquid reservoirs.
- (4) Cover the equipment with plastic cover to prevent dust.

#### 9.2 Disposal

When the service life of the equipment expires, cut off the power and dispose the equipment properly as per the relevant local regulations.

### Dispose the oil and grease for installing the 4-post lift.

N32 mechanical oil (for winter use)

ltem	Quality index
Kinematic viscosity at 40°C	28.8~35
Pour point (°C) ≤	-15
Flash point (°C) ≥	175

#### **N46** mechanical oil (for summer use)

Item	Quality index
Kinematic viscosity at 40°C	41.4~50.6
Pour point (°C) ≤	-9
Flash point (°C) ≥	185

#### Warranty

THIS WARRANTY IS EXPRESSLY LIMITED TO PERSONS WHO PURCHASE SMARTSAFE PRODUCTS FOR PURPOSES OF RESALE OR USE IN THE ORDINARY COURSE OF THE BUYER'S BUSINESS.

SMARTSAFE electronic product is warranted against defects in materials and workmanship for one year from date of delivery to the user.

This warranty does not cover any part that has been abused, altered, used for a purpose other than for which it was intended, or used in a manner inconsistent with instructions regarding use. The exclusive remedy for any automotive meter found to be defective is repair or replacement, and SMARTSAFE shall not be liable for any consequential or incidental damages.

Final determination of defects shall be made by SMARTSAFE in accordance with procedures established by SMARTSAFE. No agent, employee, or representative of SMARTSAFE has any authority to bind SMARTSAFE to any affirmation, representation, or warranty concerning SMARTSAFE automotive meters, except as stated herein.

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The above warranty is in lieu of any other warranty, expressed or implied, including any warranty of merchantability or fitness for a particular purpose.

#### Purchase Order

Replaceable and optional parts can be ordered directly from your SMARTSAFE authorized dealer. Your order should include the following information:

- Order quantity
- Part number
- Part name

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