



Operation and Maintenance Manual

SS0507

Scissors Type Aerial Work Platform
Original Instruction

⚠Warning
The operator and the maintenance staff must go through and understand this manual before the operation and maintenance. Otherwise, the injuries and death can be caused. Please appropriately keep this manual for reference of related staff.

Lingong Group Jinan Heavy Machinery Co., Ltd.

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Forewords

Thanks for purchasing and using the elevating work platform of Lingong Group Jinan Heavy Machinery Co., Ltd. The mechanism, drive, operation, maintenance, adjustment, technical parameter, repair adjustment data of SS0507 elevating work platform are specified in this manual for safety guidance and correct use & maintenance of this machine.

How to achieve the best benefit with this machine is our common pursue, which is greatly depending on the acknowledge and maintenance of your machine. We sincerely wish you can go through this manual before the first start, operation, repair and maintenance of this machine and wish you are familiar with the operation and maintenance specified.

The correct illustration and instructions are provided in this manual at the moment of publication. However, the structure and performance of our products are continuously improved and completed. Changes of related design, operation and maintenance instruction will be made without notice. Thanks for understanding. For any doubts of the latest machine information and the manual, please consult us.

This manual is applicable to the SS0507 elevating work platform. The user shall make the maintenance to the machine strictly according to the interval specified in the maintenance schedule.

Please keep the manual at the specified location for convenience of reference at any time. This manual is one part of this machine. When the ownership or use right of this machine is transferred, this manual shall be transferred with this machine. For any loss, damage or identification problem, please replace the manual in time.

Lingong Group Jinan Heavy Machinery Co., Ltd refers the copyright of this manual. The reproduction or copy of this manual is not allowed without the written approval of the company.

⚠Warning

- Only the staff receiving the professional training and having corresponding qualifications are allowed to operate, repair and maintain this machine.
- The incorrect operation, maintenance and repair are very dangerous and can cause the personal injury and death.
- Before the operation or maintenance, the operator shall carefully go through this manual. Do not make any operation, maintenance and repair on this machine before going through and comprehending this manual.
- The user shall load the platform strictly according to the rated one and shall be responsible for consequences caused due to overload or any modification without permission.
- The operation regulations and preventions in this manual are only applicable for the specified use of this machine. For any un-forbidden operation beyond the regulation, be sure to ensure such operation will not cause any personal injury.

Safety precaution

The operator shall understand and follow the existing safety regulations of the state and the local government. If these are unavailable, the safety instructions in this manual shall be followed.

Most accidents are caused due to the violation to the operation and maintenance regulations of the machine. To avoid accidents, please go through, comprehend and follow all warnings and precautions in this manual before the operation and maintenance.

The safety measures are specified in Chapter 1 Safety.

As it is impossible to foresee every possible hazard, the safety instructions in this manual may not cover all safety prevention measures. Be sure to ensure the safety of yourself and others and protect the machine against any damage, if the steps and operation beyond this manual are adopted. If you are unable to confirm the safety of some operations, please feel free to consult us or the distributor.

The operation & maintenance prevention measures listed in this manual are only applicable to the specified uses of this machine. Our company shall assume no responsibility if this machine is used beyond the range of this manual. The user and the operator shall be responsible for the safety of such operations.

Do not carry on any operation forbidden in this manual in any cases.

The following signal words are applicable for identifying the safety information of this manual.

- △ Hazard: if not avoided, the dangerous results as severe injuries or death can be caused. This word is also applicable to the situation that serious machine damage can be caused, if not avoided.
- △ Warning: if not avoided, the potential dangerous results as severe injuries or death can be caused. This word is also applicable to situation that the serious machine damage may be caused, if not avoided.
- △ Notice: if not avoided, the minor or intermediate injury may be caused. This word is also applicable to situation that the machine damage may be caused or the machine service life may be shortened, if not avoided.



Chapter 1 Safety



1.1 Illustration for rules and regulations

As this machine is not applicable for the road and its traveling speed is very slow, corresponding national traffic laws are unavailable at present. The safety instructions in this manual shall be followed.

1.2 Hazard

The death or severe injuries can be caused if the instruction and safety regulations in this manual are not followed.

1.3 Forbidden operation, unless

The safe operation rules of the machine are understood and practiced.

- 1) The dangerous conditions are avoided. The safety regulations shall be acknowledged and comprehended before the next step.
- 2) The pre-operation inspection is always made.
- 3) The function test is always made before the use.
- 4) The workstation is checked.
- 5) The machine is used for its design purposes.
- 6) The manufacturer's instruction and safety regulations, the safe operation manufacturer and machine's label, shall be read, comprehended and followed.
- 7) The safety regulations for user and the site regulations shall be read, comprehended and followed.
- 8) All applicable laws and regulations of the government are read, understood and followed.
- 9) The appropriate training on safe operation of machine is made.

1.4 Classification of hazards

The meanings of symbols, color codes and characters of Lingong's product are as follows:

- 1) Security warning and sign: be used for warning the potential personal injuries. Please observe all safety instructions below this sign, for fear of potential personal injury and death.
- 2) Red: remind the dangerous situations. If not avoided, the personal death or severe injury can be caused.
- 3) Orange: remind the dangerous situations. If not avoided, the personal death or severe injury may be caused.
- 4) Yellow: remind the dangerous situations. If not avoided, the minor or intermediate personal injury may be caused.
- 5) Blue: remind the dangerous situations. If not avoided, the property loss can be caused.

1.5 Design use

This machine is a self-traveling and electric elevating device, which is provided with a work platform on a scissors mechanism. The vibration produced by the running machine causes no hazards to the operators on the work platform. This machine can be used for carrying the workers and their tools to the specified height above the ground and also for reaching the workstation above the machine or equipment.

▲ SS0507 can be only used in indoor; It is forbidden to carrying the goods.

1.6 Maintenance of safety sign

- 1) Replace any missed or damaged safety sign and bear the safety in mind at any time.
- 2) Clean the safety sign with neutral soap and clean water.
- 3) Do not use any solvent detergent which may damage the material of the safety sign.

1.7 Electrocution hazard

- 1) This machine is not insulated that it does not provide any electric shock protection when touching



or getting close to the electric wire. Please keep the safe distance away from the power line and the power equipment according to the applicable laws and regulations and the description in the table below.

Voltage	Required clearance
0-300V	Do not touch
300V-50KV	3.05m
50KV-200KV	4.6m
200KV-350KV	6.10m
350KV-500KV	7.62m
500KV-750KV	10.67m
750KV-1000KV	13.72m

- 2) Please consider the influence to the displacement of platform and swinging & relaxation of electric wire by the strong or gust.
- 3) Please stay away from the machine if it contacts by a live electric wire. Do not touch or operate the machine on the ground or the platform before cutting off the power supply.
- 4) Do not operate the machine in the lightning or rainstorm weather.
- 5) Do not use the machine as an earth wire in the process of welding.
- 6) Do not touch charge when charging.

1.8 Tipping-over hazard

The staff, equipment and material on the platform shall not exceed the maximum bearing capacity of the platform and the extending platform.

Maximum carrying capacity	SS0507 (S0507SDTCE10)
Maximum number of people	For indoor use only: 2 persons
Maximum working load of platform	230kg
Maximum working load of extending platform	113kg

1.9 Safety of workstation

- 1) The platform can be lifted on a solid and flat ground only.
- 2) The running speed in case of the platform being lifted shall be no more than 0.5km/h.
- 3) Do not use the tilting alarm as a level indicator. The tilting alarm of chassis and platform only alarms when the machine is severely tilted.
- 4) In case the tilting alarm sounds: lower the platform and move the platform to a horizontal ground. In case the tilting alarm sounds when lifting the platform, pay special attention to lower the platform.
- 5) In case the machine is used outdoor, do not lift the platform when the wind speed is above 12.5m/stiff the wind speed exceeds the limit after lifting the platform, please immediately lower the platform and stop the machine operation.
- 6) The ambient temperature for use of this machine is -20°C to 40°C.
- 7) The relative humidity for use of this machine shall be greater than 90% (at 20°C).
- 8) The allowable voltage fluctuation of the machine is $\pm 10\%$.
- 9) Do not operate the machine under strong wind or gust. Do not increase the surface area of platform or load. Increase of exposure area in wind will reduce the stability of machine.



- 10) When the platform is caught, stuck or blocked by a nearby item and is unable to normally move, do not try to release the platform via the platform controller. All staff must leave the platform before releasing the platform via a ground controller.
- 11) Be especially careful and lower the speed when the machine in the folding status is driving on an uneven road, a gravel road, an unstable or smooth surface, near a hole and on a slope.
- 12) Do not travel the machine in any uneven or unstable road or in any other dangerous conditions, when the platform is lifted.
- 13) Do not push any item on the platform.
- 14) Do not use the machine as a crane.
- 15) Do not place, anchorage or suspend any load on the any part of the machine.
- 16) Do not push the machine or other items via the platform.
- 17) Do not operate the machine in case the chassis tray is stretched.
- 18) Do not lean the platform against any nearby structure.
- 19) Do not change or limit the use of the limit switch.
- 20) Do not bind the platform on a nearby member.
- 21) Do not place the load outside the platform guard rail.
- 22) Without the written consent of the manufacturer, do not modify or change the aerial work platform. Installing an additional device, used for carrying tools or other materials, on the platform, pedal or guard rail, will increase platform weight, platform surface area or load.
- 23) Do not change or damage any safety or stability related parts of the machine.
- 24) Do not replace the key stability-related parts with those with different weights or specifications.
- 25) Do not use the battery with the weight lower than that of the original one. The battery not only is used as the weight balance in the chassis, but also plays a key role to stabilize the machine. Each battery must reach 37kg .The minimum weight of each battery tray (including the battery) must reach110kg.
- 26) Do not place the stair or scaffold in the platform or lean the same against any part of the machine.
- 27) The tools and materials, evenly distributed and able to be safely moved by the person on the platform, can be transferred by the platform only.
- 28) Do not use the machine on a movable surface or vehicle.
- 29) Be sure to keep all tyres in good conditions and appropriately tighten the nuts.

1.10 Crush hazard

- 1) Do not stretch the arms and the hands to any position where there is a hazard of scissor wound or crush.
- 2) When folding the guard rail, keep the hands away from the position where there is a possibility of crush.
- 3) Be sure to hold the guard rail firmly when pulling out the guard rail locking pin, to prevent the platform guard rail from falling.
- 4) When the machine is running via a controller on the ground, please make the correct and planned judgment. Keep the safe distance between the operator, machine and the fixing item.

1.11 Hazard during operation on a slope

Do not drive the machine on a slope and side slope with overproof gradient. The rated value of slope is applicable to the lifting machine.

Model	S0507SDTCE10
Item	



Maximum allowable working angle (forward tilting (°))	3°
Maximum allowable working angle (backward tilting (°))	3°
Maximum allowable working angle (sideward tilting (°))	1.5°

1.12 Falling hazard

- 1) The workers on the platform must put on all safety devices and fix the accepted rope anchorage point with the safety strap hook in the operation process. Each rope anchorage point is only applicable to one clevis.
- 2) Do not climb on or sit on the guard rail of the platform. Please stably stand on the platform base plate in any time.
- 3) Do not climb down the platform when it is lifted.
- 4) Keep the platform floor free from debris.
- 5) Please shut down the entrance door before the operation.
- 6) Do not run the machine when the guard rail is not correctly installed or the safe operation cannot be insured by the entrance door.
- 7) Do not get in and out of the platform, except the machine is folded.

1.13 Hazard

- 1) Pay attention to the items within the sight line and the blackspot when starting or running the machine.
- 2) Pay attention to the position of the extending platform when moving the machine.
- 3) Check the workstation to avoid any overhead barrier or other possible hazards.
- 4) Pay attention to the crush danger when holding the guard rail of the platform.
- 5) The user must follow the service rules for the personal protection equipment, made by the owner, the service rules for the workstation and the laws and regulations made by the government.
- 6) Please observe and follow the traveling arrow and the turning direction arrows on the platform controller and the platform's label and nameplate.
- 7) Do not operate the machine on the line of any crane or movable overhead machine, unless the crane controller is locked and/or the potential bump prevention measure is taken.
- 8) Avoid dangerous driving or careless operation when running the machine.
- 9) The platform can be lowered only when there are no person and barriers below the platform.
- 10) Limit the traveling speed according to the ground status, traffic jam, road grade, person position and any other possible bump factors.

1.14 Component damage hazard

- 1) Do not charge the battery with any above 24V battery charger.
- 2) Do not use the machine as an earth wire in the process of welding.

1.15 Explosion and fire hazard

Do not operate or charge the machine at the location with possible inflammable or explosive gas or particles.

1.16 Machine damage hazard

- 1) Do not use any damaged or failed machine.
- 2) Please make an absolute operation check and test all functions before each shift. Attach a mark on the damaged or failed machine immediately and stop the operation.



- 3) Be sure to make all maintenance and operation according to the provisions in this manual.
- 4) Be sure to keep all labels at the appropriate locations and keep them recognizable.
- 5) Be sure to keep this manual in the manual box of the platform.

1.17 Personal injury hazard

- 1) Do not run the machine in case of hydraulic oil leakage. The leaked hydraulic oil may permeate or burn the skin.
- 2) The severe injury may be caused if any component below the cover is touched by mistake. Only the trained maintenance staff can maintain the compartment. It is suggested that the operator shall make the maintenance before the pre-operation inspection. Be sure to keep all compartments closed and locked during the operation.

1.18 Battery safety

Combustion hazard

- 1) The battery contains the acid material. Please put on the protective clothing and safety goggles when using the battery.
- 2) Take measures to protect the acid material from overflowing or being touched. Neutralize the overflowed acid material from the battery with soda and water.

Explosion danger

- 1) Keep the battery away from any spark, flame or alight cigarette. The battery can release the explosive gas.
- 2) Do not touch the battery terminal or the cable clamp with any tool which is possible to cause the spark.

Component damage hazard

Do not charge the battery with any above 24V battery charger.

Electrocution/burn hazard

- 1) The battery charger can be connected to the grounded AC three-wire power socket.
- 2) Check if the wire cable, electric cable and wiring are damaged every day. Replace the damaged items before the operation.
- 3) Take measures to prevent the electric shock caused due to the touch with the battery terminal. Take off the ring, watch and other decorations.

Tipping-over hazard

Do not use the battery with the weight lower than that of the original one. The battery not only is used as the weight balance in the chassis, but also plays a key role to stabilize the machine. Each battery must reach 37kg .The minimum weight of each battery tray (including the battery) must reach110kg.

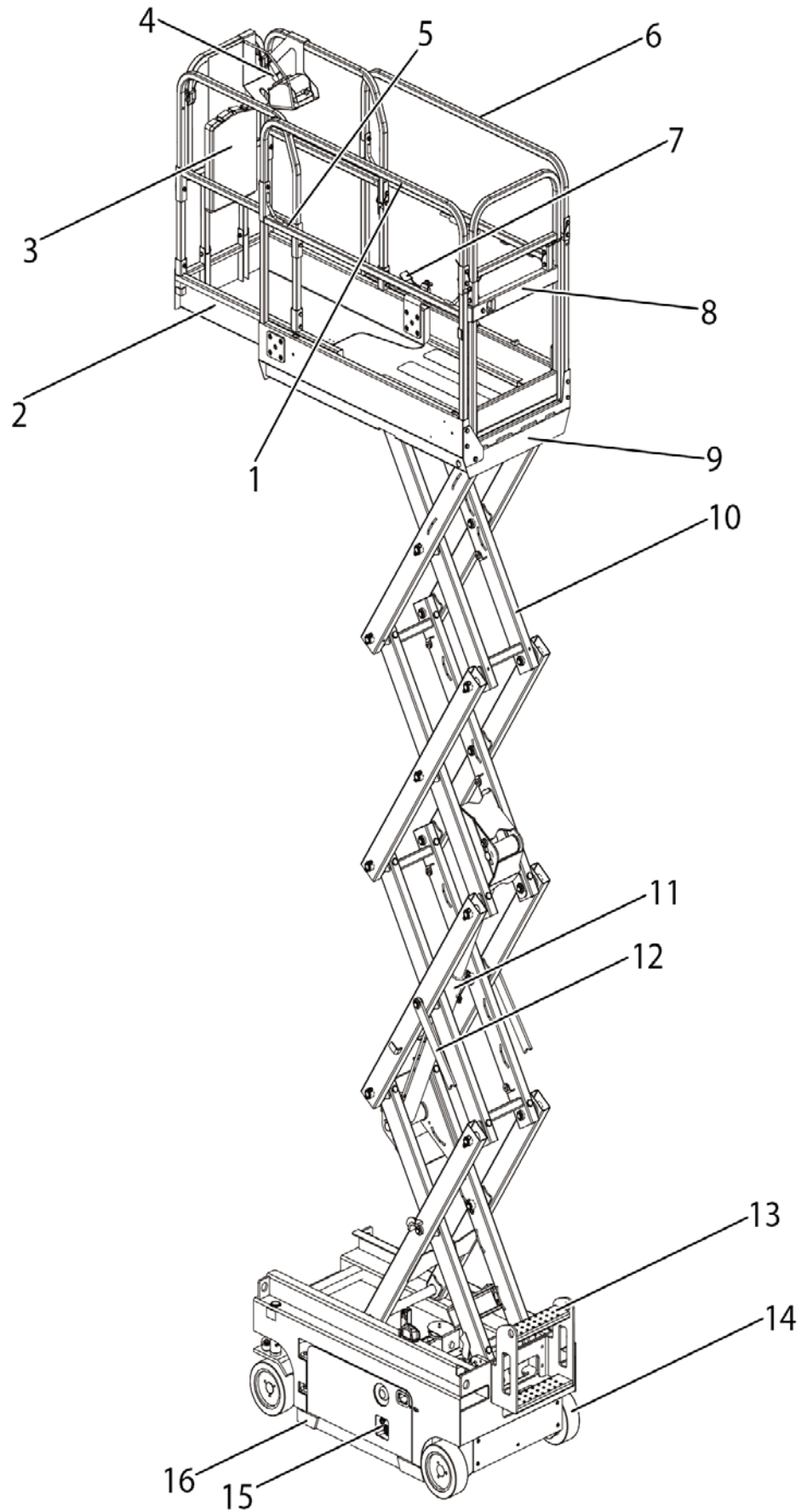
Hazard in the process of lifting

When lifting the battery, please choose the appropriate number of person and lifting method.

1.19 Lock after each use

- 1) Choose a safe parking position which can be a solid and horizontal ground where there is no barrier and any busy transport.
- 2) Lower the platform.
- 3) Rotate the key switch to the "OFF" position and pull out the key, to avoid unauthorized use.
- 4) Chock up the wheels with wedges.
- 5) Charge the battery.

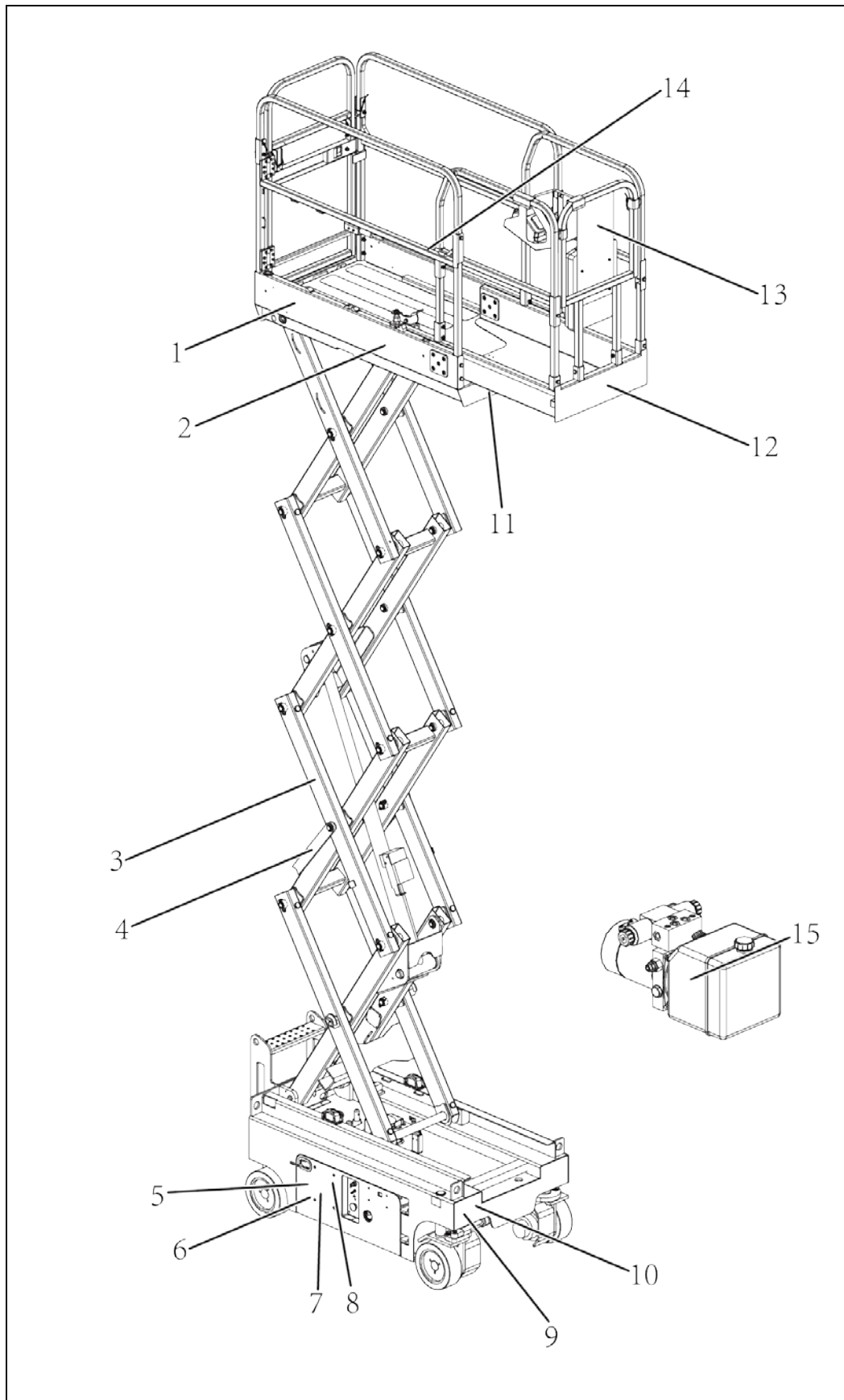
Chapter 2 Legend

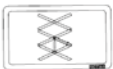
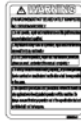




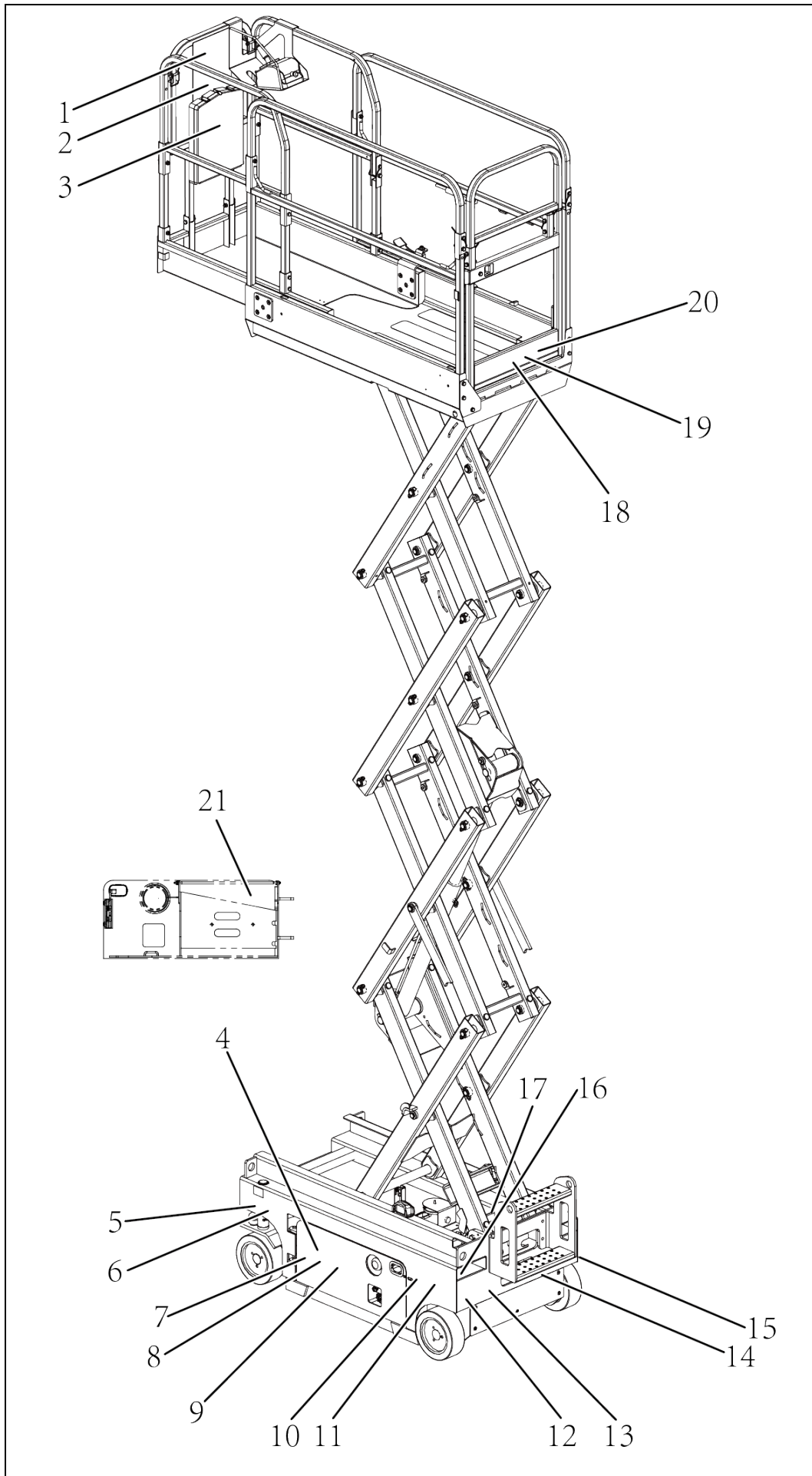
No	Name	No	Name
1	Left guard rail	9	Main platform
2	Extending platform	10	Yoke
3	File box	11	lifting cylinder
4	Platform controller	12	Safety prop
5	Lanyard anchorage point	13	Covering part accessory
6	Right guard rail	14	Tyre
7	Pedal	15	Charger
8	Door	16	Hollow protector

Chapter 3 Label



1-2534000335	2-2534000504	3-2534000142	4-2534000355	5-2534000010	6-2534000145
					
7-2534000011	8-2534000029	9-2534000027	10-2831990027	11-2534000272	12-2534000024
					
13-2534000220	14-2534000017	15-2534000100			
					

No	Code	Name
1	2534000335	Company Logo
2	2534000504	Product Model
3	2534000142	Keep Safe Distance Away from Machine
4	2534000355	Decal
5	2534000010	Close Chassis Tray
6	2534000145	Warning
7	2534000011	Caution mark for service in box
8	2534000029	Skin Injection Notice
9	2534000027	Lifting Position
10	2831990027	Lifting Position
11	2534000272	IPAF
12	2534000024	warning line
13	2534000220	Company Logo
14	2534000017	Lanyard Anchorage Point
15	2534000100	Oil position identification



1-2534000229	2-2534000033	3-2534000119	4-2534000008	5-2534000539	6-2534000102
					
7-2534000146	8-2534000144	9-2534000334	10-2534000143	11-2534000009	12-2534000016
					
13-2534000139	14-2534000018	15-2534000236	16-2534000101	17-2534000015	18-2534000535
					
19-2534000148	20-2534000147	21-2534000247			
					

No	Code	Name
1	2534000229	forbidden
2	2534000033	Directional Arrow
3	2534000119	Read Manual
4	2534000008	Battery as Balance Weight
5	2534000539	Wheel load capacity
6	2534000102	Forward
7	2534000146	Danger
8	2534000144	explosion burns
9	2534000334	Power off
10	2534000143	Crush Hazard
11	2534000009	Electrocution Hazard
12	2534000016	Brake Release
13	2534000139	Emergency lowering
14	2534000018	Battery Charging
15	2534000236	Nameplate
16	2534000101	Forklift Fork Position
17	2534000015	Tilting danger sign
18	2534000535	Rated Work Capacity
19	2534000148	Manual Load
20	2534000147	Manual Load
21	2534000247	Electrocution Hazard

Chapter 4 Specification



Specification

4.1 SS0507 (S0507SDTCE10) overall specifications

Overall performance specifications

Item	Specifications	Item	Specifications
Rated load (kg)	230	Minimum turning radius (exterior wheel) (m)	1.5
Load of extending platform (kg)	113	Maximum allowable working angle (forward tilting (°))	3°
Maximum number of worker	2	Maximum allowable working angle (backward tilting (°))	3°
Maximum working height (m)	6.3	Maximum allowable working angle (sideward tilting (°))	1.5°
Maximum height of platform (m)	4.3	Theoretical gradeability	25%
Extending size of platform (m)	0.6	Ground bearing information	
Traveling speed of machine (folding status) (km/h)	4	Maximum wheel load	480kg
Traveling speed of machine (lifting status) (km/h)	0.5	Tire contact pressure	1471.5Kpa
Lifting/lowering speed (S)	25/20	Ground pressure	10.94Kpa
Minimum turning radius (interior wheel) (m)	0.3		

Note: 1.The ramp rating is limited by the ground condition and the traction force.

2.The ground bearing information is approximate information, and the different options are not included. The information can be used only if the security coefficient is high enough.

Main size

Item		Specification s	Item	Specification s
Overall length (m)	With ladder	1.53	Wheel tread (mm)	730
	Without ladder	1.35		
Overall width (m)		0.81	Wheelbase (front/rear) (mm)	1120
Overall height (unfolded rail) (m)		2.13	Ground clearance(folding/lifting) (mm)	50/16
Overall height (folded rail) (m)		1.88	Tyre size (diameter×width×rim diameter)	230×80×180
Dimension of working platform (L×W) (m)		1.35×0.7	Overall weight (kg)	970

Note: The weight of the machine varies according to the configuration of the selected parts.

Electric system

Items		Parameters/Content
Motor	model	ZD035
	Rated voltage(v)	24
	Rated current(A)	34
	Rated power(/KW)	1.6



	Rated speed(r/min)	> 2900
Battery	model	T-1275
	Output voltage (V)	12
	Capacity (AH)	25A/280; 75A/70
	5 hours ah.	120
	20 hours ah.	150
	Unit weight (kg)	37
Charger	model	GPTC30-24V-AWP
	Nominal DC output voltage (V)	24
	Maximum DC output voltage(V)	34
	Maximum DC output current(A)	30
	Nominal AC input voltage (V)	100-240VAC

Hydraulic system

Items		Parameters/Content
Type		Open-type system
Main pump		Gear Pump, Displacement 1.1ml/r
System pressure (MPa)		19
Functional Main Valve	Setting Pressure Of Safety Valve (MPa)	19
	Nominal flow(L/min)	4.2
Lifting Oil Cylinder		$\Phi 60 \times \Phi 45-620-930$
Steering Cylinder		$\Phi 40 \times \Phi 20-152-400$

Refueling capacity

Item	Parameter
Hydraulic oil	4.5L
	Notes: After lifting,turning,and walking,the whole machine collects the height of the mailbox liquid at 4L.

△Note: the hydraulic oil shall be refueled according to the environment and temperature of use. Corresponding hydraulic oil shall be used by referring to the following description:

- 1) ISO grade 15 hydraulic oil shall be applied at the temperature of -40℃-0℃.
- 2) ISO grade 46 hydraulic oil shall be applied at the temperature of -18℃-48℃.
- 3) ISO grade 32 hydraulic oil shall be applied at the temperature of -28℃-48℃.

Vibration limit

Item	Specifications
Vibration Value	$< 2.5\text{m/s}^2$

Noise emission

Item	Specifications
Sound Pressure Level at Ground Workstation	$< 70\text{dBA}$
Sound Pressure Level at Platform Workstation	$< 70\text{dBA}$



Chapter 5 Controller

5.1 Basic operation

The following items will be discussed below:

For platform controller (PCU), see Fig.2 and Fig.3.

For chassis controller (ECU), see Fig.4.

Main power supply and safety

- 1) The key switch controls the power supply of the machine, for which three operating modes are available. When the key switch is set in the left position, the platform operation mode will be enabled; when the key switch is set in the right position, the chassis operation mode will be enabled; when the key switch is set in the middle position, the power off mode will be enabled.

Note: The key can be plugged or removed only when it is set in the middle position (some products is optionally equipped with the keys which can be plugged or removed at the three positions).

- 2) An emergency stop switch is installed on the chassis and the platform controller, respectively. The two switches are serially connected. The normal work can be done when the two switches are pulled out. The power supply will be cut off once any emergency stop switch on the chassis or the platform is pressed. The safety function is based on a complete loop which can be disconnected once any emergency stop switch is pressed.
- 3) The functions of running, turning, lifting or lowering can be initialized only when the enable switch on the handle is pressed.

Lifting and lifting security

- 1) The inclination switch on the chassis is used for indicating whether the chassis is horizontal.
- 2) In case the hollow protector is installed, the platform can be lifted to the height above the preset one only when the hollow protector is initialized.
- 3) The load shall not exceed the rated one of this machine model.
- 4) The platform can be lifted or lowered from two positions, the chassis or the platform. The operation position can be chosen via the key switch.

The platform can be only lifted or lowered via the toggle switch on the chassis.

The platform operator is allowed to choose the lifting mode on the platform. The up and down direction and the speed can be controlled by moving the handle. The platform can be lifted by moving the handle forward and lowered by moving it backward.

- 5) If the weight sensing set is available on the machine and the platform is overloaded, the main controller (ECU) of the platform will sound, alarm and disable the operation.
- 6) One mode that the platform is suspended during the lowering process is available, for safe lowering after the suspension. This is the mode of machine lowering delay setting.
- 7) The failure of lifting or lowering valve can be displayed via an error code on LED of PCU and ECU.

Traveling and traveling security

- 1) The traveling can be controlled only via the handle of PCU. In such case, the key switch must be in the position of the platform.
- 2) If it is intended to move the machine, be sure to choose the traveling mode and press the enable switch on the handle.
 - ① The traveling direction and speed can be controlled by moving the handle forward and backward.
 - ② The "high speed" or "low speed" mode can be selected only when the platform is folded. However, when the platform is lifted and the hollow protector is lowered, the machine can only work in the "acceleration after lifting" mode.
 - ③ If the platform is overloaded, the lifting action is not allowed.
 - ④ If the internal part of motor controller is overheated, the platform will be slowed down.



- ⑤ The brake will be uninitialized in any non-traveling mode.

Turning and turning security

- 1) The key switch must be placed in the platform position.
- 2) For hydraulic turning model, the turning function can be controlled only via the left and right buttons on top of handle on the PCU.
- 3) If it is intended to turn the machine, be sure to choose the traveling mode and press the enable switch on the handle.

Other operations

- 1) When the platform is lifting or moving, the stopwatch on the chassis will be initialized.
- 2) Two LEDs on the PCU are used for indicating the battery status, error code and setting data.

Low battery operation

- 1) The battery charging status is depending on the battery level set by the operator. The battery charging bar will be displayed on PCU.
- 2) The normal travel can be enabled when there are two or more battery charging bars.
- 3) The traveling speed will be reduced when there is only one battery charging bar.
- 4) The brake will be uninitialized in any non-traveling mode.

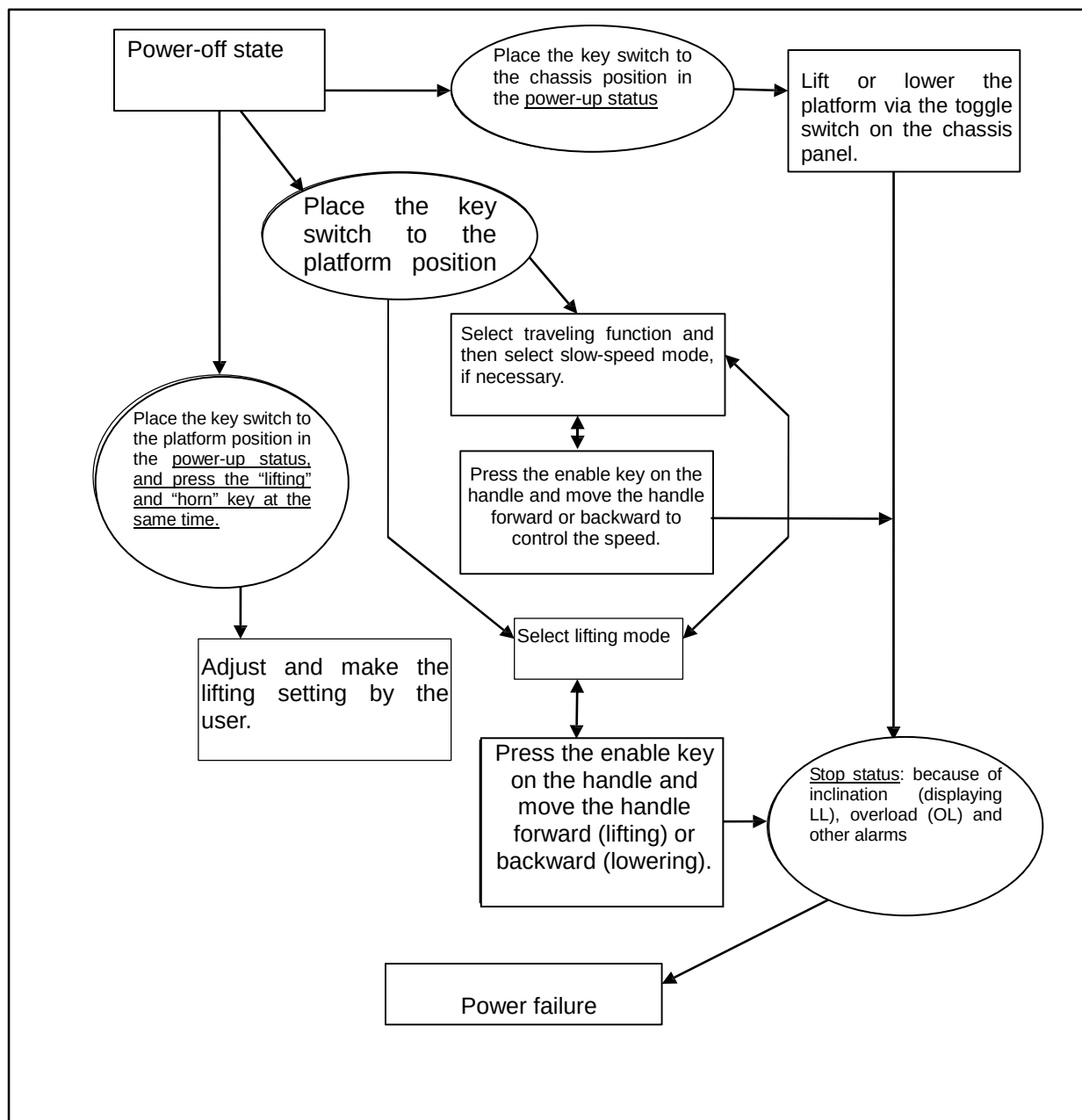


Fig. 1: Operation flow chart

5.2 Platform controller (PCU) and main controller (ECU)

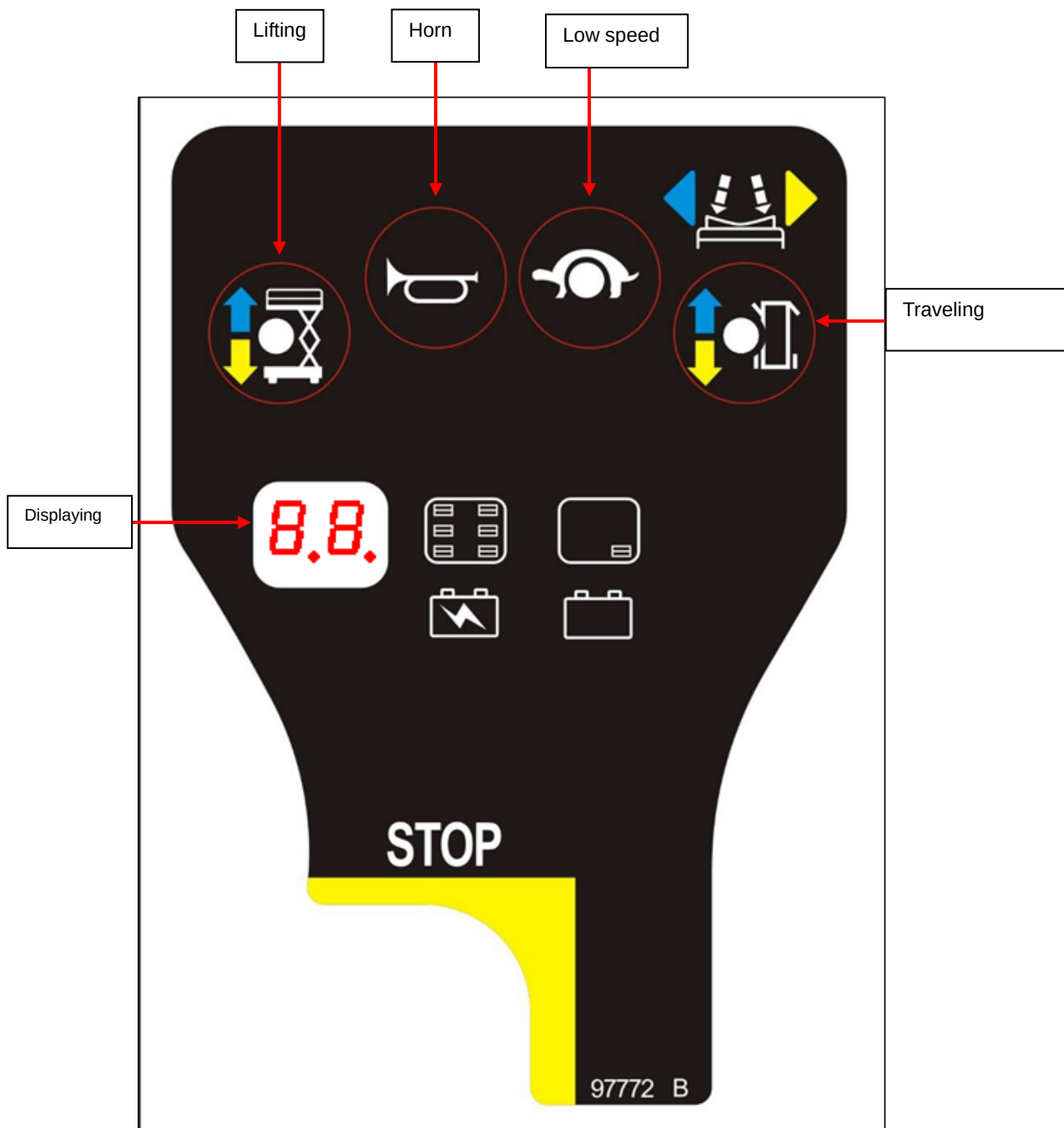


Fig. 2: Platform controller (PCU)



Fig. 3: Handle operation key



Fig. 4: Main controller (ECU)



5.3 Error state (alarm code)

In the error alarm status, the alarm code will flash once per second on the displays of ECU and PCU.

Table: alarm code

Display	Description	Reaction of machine
01 ☐	System initialization error	Stop all actions
02 ☐	System communication error	Stop all actions
03	Invalid option setting error	Stop all actions
12	Open error of lifting or lowering button on chassis in the starting process	Stop all chassis controls
18	Error of hollow protector	Stop lifting and traveling
31	Pressure sensor error	Stop all actions
32	Angle sensor error	Stop all actions
42	Press error of left turn button on the platform in the starting process	Display alarm only
43	Press error of right turn button on the platform in the starting process	Display alarm only
46	Press error of enable switch button on the platform handle in the starting process	Stop platform control
47	Error of platform handle not placing at the center in the starting process	The speed is decreased to the lifting speed
52	Error of forward coil	Stop lifting and traveling
53	Error of backward coil	Stop lifting and traveling
54	Error of raising and lifting coil	Stop lifting and traveling
55 ☐	Error of raising and lowering coil	Stop lifting and traveling
56	Error of right turn coil	Stop lifting and traveling
57 ☐	Error of left turn coil	Stop lifting and traveling
58 ☐	Error of brake coil (as the brake coil is optional, this function is screened temporarily)	Stop lifting and traveling
60	Motor Controller Comprehensive Fault	Warning, Unable to walk and lift
61	Controller Current Sensor Fault	Warning
62	Controller Hardware Or Software Failsafe Fault	Warning
63	Motor Controller Motor Output Fault	CURTIS ONLY
64	Motor Controller SRO Fault	Warning
65	Motor Controller Throttle Fault	CURTIS ONLY
66	Motor Controller Emergency Reverse Fault	CURTIS ONLY
67	Motor Controller HPD Fault	Warning
68	Low voltage alarm	Stop all actions
70	Steering Input Out of Range (Only ZAPI)	Warning, Unable to walk and lift
71	Motor Controller Main Contactor Fault	Warning, Unable to walk and lift
72	Motor Controller Over Voltage Fault	CURTIS ONLY



73	Motor Controller Analog Control Fault	Warning
74	Motor Controller Motor Fault	CURTIS ONLY
75	Pump Motor Fault	Warning
76	Left Drive Motor Fault	Warning,unable to walk and lift
77	Warning,unable to walk and lift	Warning,Unable to walk and lift
78	Pump Motor Short Or Pumping Speed Input Fault	Warning
79	Left drive Motor Short Fault	Warning,Unable to walk and lift
80 ☐	Alarm when exceed 80% load	Alarm only
81	Right drive Motor Short Fault	Warning,unable to walk and lift
82	Left Brake Coil Fault	Warning,Unable to walk and lift
83	Right Brake Coil Fault	Warning,Unable to walk and lift
89	drive Motor Excitation Open Fault	Warning,Unable to walk and lift
90	Alarm when exceed 90% load	Alarm only
91	Left drive Motor Excitation Open Fault	Warning,Unable to walk and lift
92	Right drive Motor Excitation Open Fault	Warning,Unable to walk and lift
99 ☐	Alarm when exceed 99% load	Alarm only
OL	Platform overload alarm	Stop all actions
LL	Error of machine inclination exceeding safety limit	Stop lifting and traveling



Table: troubleshooting and guide

Display	Description
01	System initialization error: ECU may fail and replace the failed ECU.
02	System communication error: check the communication line and other cable connection. If the failure is not solved, please replace PCU or ECU.
03	Invalid option setting error: set appropriate options to the machine.
12	Open error of lifting or lowering button on chassis in the starting process: check the wiring of toggle switch or check if the toggle switch is stuck.
18	Hollow protector error: check if the hollow protector is initialized. Check the limit switch, lower limit switch and wiring of the hollow protector.
31	Pressure sensor error: check the sensor wiring and the sensor. Or, check and confirm if the correct overload. Detection option is selected for the machine.
32	Angle sensor error: check the sensor wiring and the sensor. Or, check and confirm if the correct overload Detection option is selected for the machine.
42	Press error of left turn button on the platform in the starting process: make sure the keys on the handle are not pressed. If no, consider replacement of handle or PCU.
43	Press error of right turn button on the platform in the starting process: make sure the keys on the handle are not pressed. If no, consider replacement of handle or PCU.
46	Press error of enable switch on the platform handle in the starting process: make sure the enable switch on the handle is not pressed. If no, consider replacement of handle or PCU.
47	Error of platform handle not placing at the center in the starting process: confirm if the handle is placed at the center. Check the middle position parameter setting. It is correct, consider replacement of handle or PCU.
52	Forward coil error: check the coil connection and confirm if it is normal. If yes, check if the scissor coil is shorted or disconnected.
53	Backward coil error: check the coil connection and confirm if it is normal. If yes, check if the scissor coil is shorted or disconnected.
54	Raising and lifting coil error: check the coil connection and confirm if it is normal. If yes, check if the scissor coil is shorted or disconnected.
55	Raising and lowering coil error: check the coil connection and confirm if it is normal. If yes, check if the scissor coil is shorted or disconnected.
56	Right turn coil error: check the coil connection and confirm if it is normal. If yes, check if the scissor coil is shorted or disconnected.
57	Left turn coil error: check the coil connection and confirm if it is normal. If yes, check if the scissor coil is shorted or disconnected.
58	Brake coil error: check the coil connection and confirm if it is normal. If yes, check if the scissor coil is shorted or disconnected.
60	Cycle power to reset the Motor controller, If that doesn't resolve the issue, replace the Motor Controller.
61	Drive or Lift Motor may be overheating. Let the lift cool down. If that does not help, cycle power to reset the Motor controller. If the problem persists check the wiring and if OK, try replacing the Motor Controller.
62	Cycle power. If that does not resolve the issue check for noise sources. If still needed, try replacing the Motor Controller.
63	Check wiring first then cycle power. If needed replace controller.
64	Look at motor enable delay with the Scissor Programmer, it may be too short. Make sure other Motor Controller parameters are properly selected.



65	Check wiring. Make sure the correct throttle type is selected in the Motor Controller.
66	Ensure that the Emergency Reverse Check parameter is off in the Motor Controller
67	Look at motor enable delay with the Scissor Programmer, it may be too short. Make sure other Motor Controller parameters are properly selected
68	Low voltage error: check the battery voltage. Charge the battery, if necessary. Check the battery and the switch connection, reinforce the connection or clean connection. Check if the voltage of PCU and ECU is normal.
70	There is an inappropriate voltage at the steering input of the ZAPI motor controller. The ZAPI may need to be "trained" for the three steering voltages (on Differential Steered machines). Or the steering voltage from the ECU was at some point outside of the range that was recorded during the "training" session. Re- train the ZAPI and/or check for fluctuating voltages due to loose wires, etc
71	Check the connections to the main contactor. Replace the contactor if necessary. Replace the Motor Controller if necessary.
72	Check battery voltage and make sure the battery charger is not on. Then cycle power to the lift. If that does not resolve the issue, try replacing the Motor Controller.
73	Drive or Lift Motor may be overheating. Let the lift cool down. If that does not help cycle power to reset the Motor controller. If that doesn't resolve the issue, replace the Motor Controller.
74	Check connections to the motors. Cycle power to the lift and if that does not resolve the issue, replace the Motor Controller
75	Check connections to the Pump Motor. Cycle power to the lift and if that does not resolve the issue, replace the Motor Controller.
76	Check connections to the motors. Cycle power to the lift and if that does not resolve the issue, replace the Motor Controller
77	Check connections to the motors. Cycle power to the lift and if that does not resolve the issue, replace the Motor Controller
78	Check connections to the pump motor. Cycle power to the lift and if that does not resolve the issue, replace the Motor Controller.
79	Check the Motor connections and make sure they are tight. Check the Motor for a short
80	Alarm of exceeding 80% load: the load of the platform is approaching the limit and please do not increase the load.
81	Check the Motor connections and make sure they are tight. Check the Motor for a short.
82	Check the connections to the Coil's terminals and make sure they are tight. If so, check the coil itself to see if it is open or shorted
83	Check the connections to the Coil's terminals and make sure they are tight. If so, check the coil itself to see if it is open or shorted.
89	Check the Excitation open to the drive motor to see if it is open, including the connections and coil
90	Alarm of exceeding 90% load: the load of the platform is approaching the limit and please do not increase the load.
91	Check the left Excitation open to the drive motor to see if it is open.
92	Check the right Excitation open to the drive motor to see if it is open.
OL	Overload error of platform: immediately remove the excess load.
LL	Error of machine inclination exceeding safety limit: if the machine is inclined, take measures to recover its level. If the machine is level, check the level sensor wiring or the sensor.

5.4 Historical error status

- 1) The controller can display the latest 10 error alarm codes. Press the right turn key on top of handle and hold it for 10 seconds (do not press the enable key of the handle) to log in the historical error status. See Fig.3.
- 2) Press the left turn key to view the former error code until reaching the earliest one. Press the right turn key, to view the historical error code in the reverse sequence until reaching the latest one. For error codes, please refer to the table above.
- 3) Pressure the enable switch on the handle to recover the normal operation status.

5.5 Normal operation status

Once every expected parameter setting is made, the machine can normally run as per the setting values.

Forward and backward driving of folded platform

Place the key switch in the platform control position, draw out the emergency stop switches on the chassis and the platform controller and press the “driving” key on PCU. Press the enable switch on the handle and move the machine forward or backward by moving the handle forward and backward. The further the handle pushed (forward or backward), the faster the machine moves. Turn the machine leftward or rightward by pressing the left turn key or right turn key on the top of handle.

Platform lifting or lowering

PCU operation on the platform: when the machine is still and in the platform mode, press the “lifting” key on PCU. The platform can be controlled by moving the handle: Press the enable switch and push the handle forward to raise the machine. Press the enable switch and push the handle backward to lower the machine.

Chassis control panel operation on the ground: place the key switch on the chassis control position. Once the chassis control mode is initialized, the screen on the platform will flash the letters “CH”. In such case, the platform can be lifted or lowered by push the toggle switch on the chassis control panel.



Fig. 22 Chassis control position



Fig. 23 Toggle switch

Machine operation after lifting machine

When the platform is rising, the machine operation method is as the same as that on the ground. For safety consideration, the machine cannot be moved so fast, whether it is moved forward or backward. Press the walking key and operate the handle, as specified above. Of course, the machine shall be switched to the platform operation mode.

Display on PCU and ECU in normal operation

The following contents will be displayed on PCU and ECU in normal operation.

Table: PCU and ECU display

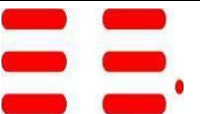
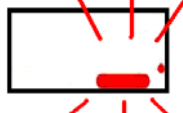
Operation mode	PCU display	ECU display
Power-up and no displacement	Battery status	□□ □□

Forward or backward traveling	Battery status	□ □ □ □
Lifting platform	Battery status	Machine mode code
Lowering platform	Battery status	Software version
Generating error	Error code	Error code
Chassis control mode	C H	C H

Battery charging status

Once the machine is initialized in the normal working status, the battery level will be displayed on the PCU screen in the form of percentage: 10, 20, 30, 50, 70 and 90. When only 10% battery level is left, the display will flash once per second.

Table 2: battery display

Platform display	Battery percentage	Description	Platform display	Battery percentage	Description
	90-100	Full battery		30	Percentage of residual energy of battery
	70	Percentage of residual energy of battery		20	The battery must be charged.
	50	Percentage of residual energy of battery		10	Extremely-low battery level (The machine automatic switches to the low speed mode)

Chapter 6 Emergency operation

6.1 Overview

The emergency operation steps, applicable systems and controllers for the emergency during the machine operation are specified in this chapter. The position, function and application method of the emergency descent button or emergency stop equipment are also introduced.

Notice: all personnel responsible for operating or contacting the equipment shall review the complete operation manual (including this chapter) before the machine operation and at the regular interval.

Emergency stop switch

There are two red emergency stop switches on the machine, which are the large buttons. One is located on the control handle of working table, while the other one is located on the ground control box. Once these emergency stop switches are pressed, the equipment will stop running immediately.

△Warning

Check the equipment every day. Ensure that the emergency stop switches are correctly positioned and the instructions and marks of ground controller are put in place and are clear.

Position of ground controller

The ground controller panel is located at the left side of machine. With this panel, the platform control handle can be operated and further the work platform can be lifted and lowered from the ground. Position the power supply selector switch on the "ground" position and operate the lifting and lowering switch to carry out the lifting and lowering operation.

Emergency descent

The manual lowering valve is applicable when the power is completely lost. The working table can be lowered under the gravity. The manual lowering handle is located at the right side of machine, over the right front wheel. The handle is connected to the manual lowering valve of the lifting hydraulic cylinder via a cable. The valve core can be opened by pressing the manual lowering handle to lower the working table.

6.2 Emergency operation

Application of ground controller

Notice: please understand how the ground controller is used in the emergency.

The ground operator must be very familiar with the operation characteristics and functions of ground controller. The training shall cover the equipment operation. Please read and understand the contents of this chapter and operate the controller in the stimulated emergency.

Failure to control equipment by operator

- 1) The equipment can be controlled via a ground controller with the assist of other staff and equipment (crane, hoisting device and etc.) only when this operation is the must for eliminating the hazard or emergency.
- 2) Other qualified operators on the working table are allowed to use the working table controller. If the controller fails, do not continue this operation.
- 3) If the equipment controller fails or breaks down in the normal operation, the staff can be evacuated and the equipment movement can be stabilized with a crane, forklift or other devices.

Stuck working table top

If the working table is stuck or blocked by a high structure or equipment, stop operating the equipment via the working table or ground operation equipment and transfer the operator and all staff to the safe position. In such case, the working table can be released with the assist of necessary equipment and staff. Do not operate the controller in such a way that one or more wheels get off the ground.

Lifting of tipped-over equipment

Please place the forklift with sufficient lifting capacity and the equipment with the same capacity on the lifting side below the chassis. When the forklift or the equipment is used for lowering the working table chassis, please slightly lift the working table with a crane or other appropriate equipment, for fear of tipping-over.



After-accident inspection

Please absolutely check the machine and test all functions of the ground controller first and then the platform controller after any accident. Keep the lifting height below 3m before repairing all damages (if necessary) and all controllers.

Chapter 7 Pre-operation inspection



7.1 Forbidden operation, unless

The safe operation principles of the machine are understood and practiced.

- 1) The dangerous conditions are avoided.
- 2) The pre-operation inspection is always made.
- 3) The workstation is checked.
- 4) The function test is always made before the use.
- 5) The machine is used for its design purposes.

7.2 Basic principle

- 1) The pre-operation inspection and the routine maintenance are within the responsibilities of the operator.
- 2) The pre-operation inspection is a visual process, which shall be made by the operator before each shift. The purpose of the inspection is to check if the machine has any significant problems before running the functional test.
- 3) The pre-operation inspection can also be used for confirming if the routine maintenance is required. The operator shall only carry on the routine maintenance items specified in this manual.
- 4) Please check the list in the next page and check every item.
- 5) If any damage is found or any un-permitted change different to the delivery status is found, please make the mark and stop the operation of the machine.
- 6) Only the qualified maintenance technicians are allowed to repair the machine as per the regulations of the manufacturer. After the maintenance, the operator must carry out the pre-operation inspection again before the function test.

7.3 Pre-operation inspection

- 1) Ensure the manual is complete and readable. Keep it in the manual box on the platform.
- 2) Keep all labels clear and readable and place them appropriately. Go through the label.
- 3) Check if there is any hydraulic oil leakage and if the oil level is appropriate. Go through the label.
- 4) Check if there is any electrolyte leakage and if the liquid level is suitable. Add the distilled water, if required.
- 5) Check if the following components or areas are damaged, if the installation is proper and the parts are lost and if there is any unauthorized change.
 - Electric element, wiring and cable
 - Hydraulic hose, connector, hydraulic cylinder and hydraulic valve
 - Battery pack and its connection
 - Drive motor/motor
 - Wear-resistant slide block and liner
 - Tyre and wheel
 - Static conductive belt
 - Limit switch, alarm and horn
 - Nut, bolt and other fasteners
 - Platform overload component
 - Platform entrance door
 - Indicator lamp and alarm

- Safety prop
 - Extending platform
 - Scissor arm pin and fastener
 - Platform control handle
 - Brake release component
 - Hollow protector
- 6) Check the complete machine to find:
- weld joint or crack of the structural member
 - Machine pitting or damage
 - Keep all structural members and other key parts complete, keep related fasteners and pins in the correct position and fasten the same.
 - Install the guard rail, place the guard rail pin in place and tighten bolts.
 - Keep the chassis battery tray and oil pump tray closed and locked and correctly connect the battery.

▲Notice: if the machine must be checked by lifting the platform, please keep the safety prop in the correct position. Refer to the “Operation notice”.

Chapter 8 Workstation inspection

8.1 Forbidden operation, unless

The safe operation principles of the machine are understood and practiced.

- 1) The dangerous conditions are avoided.
- 2) The pre-operation inspection is always made.

The workstation inspection is understood and comprehended before the next step.

- 3) The workstation is checked.
- 4) The function test is always made before the use.
- 5) The machine is used for its design purposes.

8.2 Basic principle

- 1) Via the workstation inspection, the operator can determine if the safe operation of machine is guaranteed in the workstation. The operator shall carry out this process before moving the machine to the workstation.
- 2) Understanding and bearing the hazards of the workstation are the responsibilities of the operator. Be careful and avoid this problems in the process of transferring, installing and operating the machine.

8.3 Workstation inspection

Be careful and watch out the following hazards:

- 1) Abrupt slope or cave
- 2) Uplift, ground barrier or debris
- 3) Inclined plane
- 4) Infirm or smooth surface
- 5) Overhead barrier and high-voltage power line
- 6) Dangerous location
- 7) Surface supporting unable to bearing all load of machine
- 8) Wind and weather
- 9) Unauthorized staff
- 10) Other possible unsafe conditions

Chapter 9 Function test



9.1 Forbidden operation, unless

The safe operation principles of the machine are understood and practiced.

- 1) The dangerous conditions are avoided.
- 2) The pre-operation inspection is always made.

The function test is understood and comprehended before the next step.

- 3) The workstation is checked.
- 4) The function test is always made before the use.
- 5) The machine is used for its design purposes.

9.2 Basic principle

- 1) The function test is aimed to find the failure before using the machine.
- 2) The operator must test all machine functions as per the step instruction.
- 3) Do not use the failed machine. Mark and stop using the failed machine.
- 4) Only the qualified maintenance technicians are allowed to repair the machine as per the regulations of the manufacturer.
- 5) After the maintenance, the operator must carry out the pre-operation inspection and the functional test again before running the machine.

9.3 Function test

- 1) Carry out the function test on a firm and horizontal ground without any barrier.
- 2) Ensure the battery pack is connected.

9.4 On the ground controller

- 1) Place the red emergency stop buttons on the platform controller and the ground controller to the "OFF" position.
- 2) Switch the key switch to the ground controller.
- 3) Observe the LED reading diagnosis device on the platform controller.

9.5 Test of emergency stop

- 1) Push the red ground emergency stop button inward to the "OFF" position.

Result: all functions shall be enabled.

- 2) Place the red emergency stop button to the "OFF" position.

9.6 Test of lifting/lowering function and initializing of function

The central alarm system will control the buzzer to output the alarms with different frequencies. The lowering alarm will ring 60 times per minute. If the hollow protector fails to reach the place, the buzzer will ring 180 times per minute. The buzzer will ring 180 times per minute for any overload.

- 1) Switch the key switch to the platform controller or the OFF position.
- 2) Push up and hold the platform lifting and lowering switch.

Result: the platform fails in lifting.

- 3) Switch the key switch to the ground control position.
- 4) Push up and hold the platform lifting and lowering switch.

Result: the platform shall rise.

- 5) Push down and hold the platform lifting and lowering switch.

Result: the platform shall descend. When the platform descends, the lowering alarm shall ring. The

platform shall lower to the height of 2m and then stop lowering.

- 6) Push down and hold the platform lifting and lowering switch again.

Result: the platform shall descend to the lowest position. When the platform descends, the lowering alarm shall ring.

9.7 Test of auxiliary lowering function

- 1) Push up the platform lifting and lowering switch to lift the platform by about 60cm.
- 2) Pull out the emergency lowering control button at the right front part of the machine.

Result: the platform shall descend. The lowering alarm shall not ring.

- 3) Switch the key switch to the platform controller.

9.8 Test on platform controller

- 1) Push the red ground emergency stop button to the "OFF" position.

Result: all functions shall not be enabled.

- 2) Place the red emergency stop button to the "OFF" position.

Result: the LED data diagnosis device indicator lamp shall light up.

9.9 Test of horn

- 1) Press the horn button.
- 2) Result: the horn shall ring.

9.10 Test of lifting/lowering function and initializing of function

- 1) Do not press the enable key on the control handle.
- 2) Slowly move the control handle as per the blue arrows and then move it as per the yellow arrows.

Result: all functions shall not be enabled.

- 3) Press the lifting function selector button.
- 4) Press the enable key on the control handle.
- 5) Slowly move the control handle as per the blue arrows.

Result: the platform shall rise. The hollow protector shall be stretched.

- 6) Release the platform control handle

Result: the platform shall stop rising.

- 7) Press the enable key. Slowly move the control handle as per the yellow arrows.

Result: the platform shall descend. When the platform descends, the lowering alarm shall ring.

9.11 Turning test

▲Notice: please stand on the platform and face to the machine turning port when testing the turning and driving function.

- 1) Press the drive function selector button and then the indicator lamp lights up.
- 2) Press the enable key on the control handle.
- 3) Press the rocker switch on top of control handle according to the direction indicated by leftward arrows on the control panel.

Result: the steering wheel shall move as per the direction indicated by the leftward arrows on drive chassis.

9.12 Test of driving and braking function

- 1) Press the enable key on the control handle.
- 2) Slowly move the control handle as per the directions of the up arrows on the control panel until the

machine is moving and return the handle to the center.

Result: the machine shall move as per the direction of the upward arrows on the control panel and suddenly stop.

▲Notice: the brake must be able to stop the machine at any grade.

9.13 Test of driving and braking function

- 1) Press the lifting function selector button and then the indicator lamp lights up. Press the enable key on the handle to lift the platform until reaching the height about 2m from the ground.

Result: the hollow protector shall be stretched.

- 2) Press the drive function selector button and then the indicator lamp lights up.
- 3) Press the enable key on the control handle and slowly move the control handle to the complete driving position.

Result: the lifting speed of platform shall not be greater than 0.5km/h when the platform is lifted.

Result: the lifting speed of platform is greater than 0.5km/h when the platform is lifted. Please immediately mark the machine and stop the operation.

9.14 Test for operation of inclination sensor

▲Notice: this test shall be carried out with a platform controller on the ground. Do not stand on the platform.

- 1) Please completely lower the platform.
- 2) Drive the two wheels on the same side to a 3.5×20cm cushion block.
- 3) Lift the platform by at least 2m.

Result: the platform shall stop moving and the inclination alarm shall ring 120 times per minute.

- 4) Move the control handle as per the up arrows and then move it as per the down arrows.

Result: the drive function shall be disabled at any direction.

- 5) Lower the platform and drive the machine away from the barrier.

9.15 Test of hollow protector

▲Notice: when the platform is lifted, the hollow protector shall be automatically stretched. The hollow protector can initialize another limit switch to enable the continuous operation of machine. If the hollow protector fails to be stretched, the alarm will ring and the machine shall stop driving at the same time.

- 1) Lift the platform.

Result: when the platform is lifted to the height 2m away from the ground, the hollow protector shall be stretched.

- 2) Press one side of the hollow protector at first and then other side.

Result: the hollow protector shall not move.

- 3) Lower the platform.

Result: the hollow protector shall be returned to the folding position.

- 4) Cushion the hollow protector with a 3.5×20cm wood brick or a similar one. Lift the platform.

Result: when the platform is lifted to the height 2m away from the ground, the alarm shall ring. In such case, the drive function shall be disabled.

- 5) Lower the platform and remove the 3.5×20cm wood brick.

Chapter 10 Operation notice



10.1 Forbidden operation, unless

The safe operation principles of the machine are understood and practiced.

- 1) The dangerous conditions are avoided.
- 2) The pre-operation inspection is always made.
- 3) The workstation is checked.
- 4) The function test is always made before the use.
- 5) The machine is used for its design purposes.

10.2 Basic principle

- 1) This machine is a self-traveling and electric elevating device, which is provided with a work platform on a scissors mechanism. The vibration produced by the running machine causes no hazards to the operators on the work platform. This machine can be used for carrying the workers and their tools to the specified height above the ground and also for reaching the workstation above the machine or equipment.
- 2) The details of each operation aspect are specified in the operation notice. The responsibilities of the operator are to follow all safety regulations and descriptions in the operation and maintenance manual.
- 3) It is unsafe and even dangerous to use the machine for any other purposes other than carrying the staff, equipment, tool and material to the overhead workstation.
- 4) Only the trained and authorized staff can operate this machine. If the machine is running by more than one operators of the same shift at different time, the operators must have the qualification and follow all safety regulations and description in the operation and maintenance manual. It means that each new operator shall make the pre-operation inspection, function test and workstation inspection before running the machine.

10.3 Emergency stop

- 1) Push the red emergency stop button on the ground or platform controller to the “OFF” position to disable all functions.
- 2) The recovery of any operation function must be done by pressing the red emergency stop button.

10.4 Emergency lowering

Push the emergency lowering control button outward.

10.5 Operation on the ground

- 1) Switch the key switch to the ground controller.
- 2) Place the red emergency stop buttons on the ground controller and the platform controller to the “ON” position.
- 3) Keep the battery well connected before running the machine.

10.6 Platform position adjustment

Move the platform lifting and lowering switch according to the mark on the control panel. The driving and turning functions are unavailable via the ground controller.

10.7 Operation on the platform

- 1) Switch the key switch to the platform controller.
- 2) Place the red emergency stop buttons on the ground controller and the platform controller to the “ON” position.
- 3) Keep the battery well connected before running the machine.

10.8 Platform position adjustment



- 1) Press the lifting function selector button.
- 2) Press the enable key on the control handle.
- 3) Move the handle according to the mark on the control panel.

10.9 Turning

- 1) Press the drive function selector button.
- 2) Press the enable key on the control handle.
- 3) Rotate the steering wheel via the rocker switch on the top of control handle.

10.10 Drive

- 1) Press the drive function selector button.
- 2) Hold the enable key on the control handle.
- 3) Speed increase: slowly move the control handle from the center.

Speed decrease: slowly move the control handle toward the center.

Stop: return the control handle to the center or release the enable key.

- 4) Determine the machine advancing direction with the direction arrows on the platform controller and the platform.
- 5) When the platform is lifted, the moving speed of machine is limited.
- 6) The status of battery will affect the machine performance.
- 7) When the battery level indicator lamp flashes, the driving speed and functional speed of machine will be degraded.

10.11 Driving speed option

The driving controller can be run at two different driving speeds. When the driving speed selector button lamp lights up, the slow driving speed mode is enabled. When the driving speed selector button lamp goes out, the rapid driving speed mode is enabled. Press the driving speed selector button to select the required driving speed.

10.12 Operation with controller on the ground

- 1) Keep the safe distance between the operator, machine and the fixing item.
- 2) Watch out the advancing direction of machine when the controller is used.
- 3) Identify the battery level with the LED reading diagnosis device.

10.13 Usage of safety prop

- 1) Lift the platform until reaching the height about 2.4m from the ground.
- 2) Lift the safety prop, move it to the center of the scissor sleeve center and rotate it upward until it is vertical.
- 3) Lower the platform height until the safety prop completely contacts the shaft sleeve. Keep the platform away from the movable parts in the lowering process.

▲Hazard: do not carry any load on the platform when the safety prop supporting is used. No long time(8 hours)to use safe arm support in empty state.

10.14 How to fold guard rail

The platform guard rail system comprises a folding guard rail part of extending platform and a folding guard rail of main platform. All parts are appropriate fixed via eight steel lock pins.

- 1) The platform is completely reduced and the extension platform is indented and the platform controller is removed.
- 2) From the inside of the platform ,two wire lock pins on the upper part of the front guardrail of the extension platform are removed.

- 3) Overturn the front guardrail of the extension platform, do not put your hands in a place that may be injured.
- 4) Install two disassembled steel wire latch back to each side of the guardrail bracket.
- 5) Remove two wire latches in the middle of the left guardrail and turn the left guardrail of the extended platform inward. Do not put the hand in the place where it may be injured.
- 6) Install two dismantled wire lock pins back to the guardrail bracket.
- 7) Remove two wire latches in the middle of the right guardrail and turn the right guardrail of the extended platform inward. Do not put the hand in the place where it may be injured.
- 8) Install two dismantled wire lock pins back to the guardrail bracket.
- 9) Remove the wire lock of the upper guardrail of the door, and turn the upper guardrail inward , and the hand should not be placed in the place where it may be injured.
- 10) Install two dismantled wire lock pins back to the guardrail bracket.
- 11) Remove the wire lock on the top of the left guardrail of the main platform and turn the left guardrail inward . Do not put the hand in the place where it may be injured.
- 12) Install two dismantled wire lock pins back to the guardrail bracket.
- 13) Remove the wire lock on the top of the right guardrail of the main platform and turn the right guardrail inward . Do not put the hand in the place where it may be injured.
- 14) Install two dismantled wire lock pins back to the guardrail bracket.

10.15 How to lift guide rail

Follow the guard rail folding instruction and adopt the sequence reverse to that of the installation.

10.16 Extending and retracting of platform

- 1) Step on the positioning pedal on the extending platform.
- 2) Push the guard rail of extending platform to extend the later to the expected position.

▲Notice: do not stand on the extending platform when extending the platform.

Chapter 11 Transport and lifting instruction

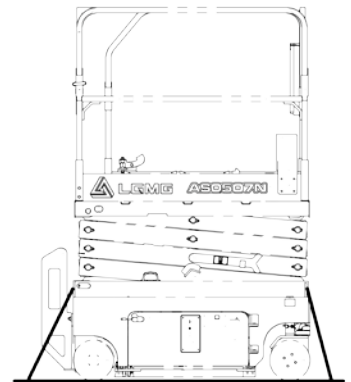
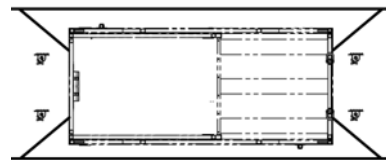


11.1 Compliance and obedience

- 1) When lifting the machine with a crane, please make the correct judgment and make a plan to control the displacement of machine.
- 2) Only the staff with the aerial lifting qualification is allowed to load and unload the machine.
- 3) The carrier vehicle must be parked on a level ground.
- 4) When loading the machine, be sure to fix the carrier vehicle, for fear of movement.
- 5) Ensure that vehicle volume, loading surface, chain or belt is sufficient to bear the machine weight. Please refer to the nameplate for the machine weight.
- 6) Be sure to place the machine on the horizontal plane or fix the machine before releasing the brake.
- 7) Takes measures to prevent the guard rail from falling when removing the bolt. Tightly hold the guard rail when folding the guard rail.
- 8) Do not drive the machine when climbing up and down a slope or when driving on a slope with overproof gradient. For "Slope driving", refer to the "Operation notice".
- 9) If the gradient of carrier vehicle exceeds the maximum gradient rating, be sure to load and unload the machine with a winch as per the instruction for brake releasing operation.

11.2 Transport safety

- 1) Please lock the machine wheels when preparing the transport.
- 2) Retract and fix the extending platform.
- 3) Switch the key switch to the "OFF" position and take off the key before the transportation.
- 4) The front and rear wheel with wedge blocks are respectively fixed and comprehensive inspection machine to prevent loose or loose parts.
- 5) Fix the machine on the transport surface via the anchorage part on the chassis.
- 6) Use at least four chains or belts.
- 7) Be sure to use used chains or belts of sufficient load density.
- 8) Please fix the folded guard rail (if any) with a belt before the transport.

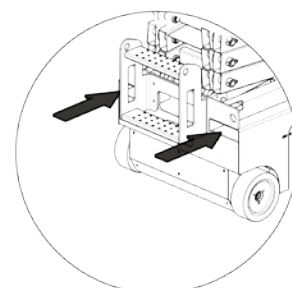


Compliance and obedience

- 1) Only the qualified hooker operator is allowed to assemble the lock and lift the machine.
- 2) Only the staff with the forklift operation qualification is allowed to load and unload the machine with a forklift.
- 3) Ensure that the lifting capacity, loading surface, belt or rope of the crane is sufficient to bear the machine weight. For serial number, please refer to the nameplate.

11.3 Forklift

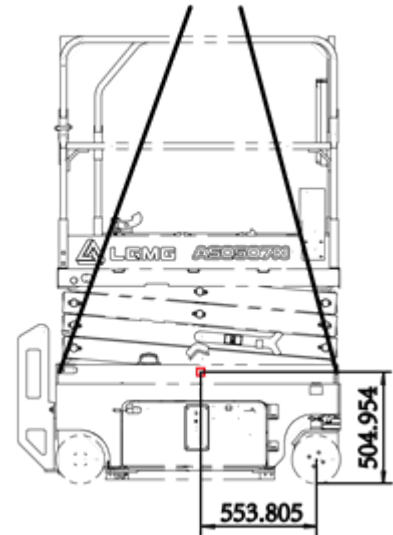
- 1) Be sure to safely and reliably fix the extending platform, the controller and the chassis tray. Remove all movable components from the machine.
- 2) Please completely lower the platform. Keep the platform folded in each transport process.



- 3) Please make use the forklift rebates on both sides of the ladder.
- 4) Place the fork of the forklift on the forklift rebates.
- 5) Drive the forklift forward to completely insert the fork into the rebates.
- 6) Lift the machine by 15cm and slightly tilting the fork backward to keep the machine stable.
- 7) Keep the machine level when lowering the fork.
- 8) Notice: the component damage may be caused if the machine is lifted on its side.

11.4 Lifting guide

- 1) Please completely lower the platform. Be sure to safely and reliably fix the extending platform, the controller and the chassis tray. Remove all movable components from the machine.
- 2) The spreader can only be attached to the specified lifting point on the machine shown. There are two long holes in the front panel of the machine, and there are two long holes in the rear end board. They are all used for lifting.
- 3) Adjust the lock tool in such a way that the machine is not damaged and the machine is kept horizontal.



11.5 Parking and storage

Please follow the parking and storage instructions below:

- 1) Drive the machine to the well-protected and good-ventilation area.
- 2) Be sure to completely lower the working table.
- 3) Place the emergency stop switch on the "OFF" position.
- 4) If necessary, cover the control panel and the warning signs to protect them against the severe environment influence.
- 5) If the machine is parked for a long period, please cover the wheels on both sides with a baffle plate.
- 6) Switch the power supply selector switch to the "OFF" position and unplug the key to avoid the starting and unauthorized use of equipment.
- 7) If the optional anti-breaking suit is provided, the working table and the ground control box can be covered and locked for fear of invasion.

Chapter 12 Maintenance



12.1 Compliance and obedience

- 1) The operator shall only carry on the routine maintenance items specified in this manual.
- 2) The regular maintenance and inspection shall be made by the trained maintenance technician as per the requirements of the manufacturer.

Legend of maintenance symbol

The symbols are given in this manual to express related meaning of the instruction. The meanings of one or more symbols ahead of the maintenance procedure are as follows:



Refer to that the tools are required for this procedure.



Refer to that new parts are required for this procedure.



Refer to that the procedure shall be done under the operation assist of the distributor.

12.2 Battery inspection



The good condition of battery is essential to performance and safe operation. The unsuitable electrolyte liquid level or damaged cable and wiring may cause the component damage and even the hazard.

Notice: this inspection is not required for the machine with the sealed battery or maintenance-free battery.

Electrocution hazard

The live operation may cause severe personal injury or death. Take off all rings, watches and other jewelry in the operation process.

Personal injury hazard

The battery electrolyte is corrosive. Do not expose the hands or any body parts to the overflowed electrolyte, for fear of injury. Please neutralize the overflowed electrolyte with the sodium bicarbonate solution.

Notice: the following inspections shall be made when the battery level is sufficient.

- 1) Put on the protective clothing and the safety goggles.
- 2) Ensure that the wiring of battery cable is firm and free of erosion.
- 3) Ensure that the battery locking rod is stable and firm.
- 4) Remove the battery ventilation cover.
- 5) Check the battery electrolyte fluid level. If necessary, add distilled water from the bottom of battery fluid add pipe. Do not add excessive distilled water.
- 6) Install the ventilation cover.

Notice: the wiring-end protector and the anti-corrosion sealant will protect the battery wiring end and the cable against corrosion.

12.3 Hydraulic oil level inspection



The suitable hydraulic oil level is essential to the machine operation. If the hydraulic oil level is unsuitable, the hydraulic component may be damaged. The hydraulic oil level change can be determined by the inspector via the daily inspection. This change mainly indicates the problem of the hydraulic system.

Notice: this process shall be done when the platform is folded.

- 1) Visually inspect the fluid level of the hydraulic oil tank.

Result: the hydraulic oil shall be located at the oil tank mark.

- 2) Please add the hydraulic oil based on the demand and do not add excessive hydraulic oil. Specification of hydraulic oil: LHV32

12.4 Pre-delivery preparation report

- 1) The pre-delivery preparation report shall cover the inspection items of each type.
- 2) The pre-delivery preparation report shall be prepared for each inspection. Such report shall be saved as required after being completed.

12.5 Maintenance schedule

The daily, quarterly, semi-annual, annual and once-per-two-year maintenance must be done as per the schedule. The product maintenance program and the pre-delivery preparation report can be divided into A, B, C, D and E subitems. The steps of each inspection are as shown in the table below.

Inspection cycle	Inspection item
Every day or every 8 hours	A
Every season or every 250 hours	A+B
Each half a year or every 500 hours	A+B+C
Each year or every 1000 hours	A+B+C+D
Every two years or every 2000 hours	A+B+C+D+E

12.6 Maintenance and inspection report

- 1) The maintenance and inspection report shall cover the inspection items of each type.
- 2) The maintenance and inspection report shall be prepared for each inspection. Please keep the report for at least 4 years after the inspection or keep it as specified by the owner and laws and regulations of the workstation and government.

12.7 Pre-delivery preparation report

Basic principle

- 1) The distributor shall be responsible for the pre-delivery preparation.
- 2) The priority shall be given to the pre-delivery preparation for each product delivery. This inspection is aimed to find the significant problem of equipment before use.
- 3) The damaged and modified equipment are forbidden to use. Once any damage or inconformity is found during the equipment delivery, please mark the machine at once and stop the work.
- 4) The equipment must be repaired by the authorized technical as per the specification of manufacturer and the requirements of this manual.

Description

- 1) Please follow the operation manual on the equipment.
- 2) The pre-delivery preparation composed of the operation check, maintenance item and function test.



- 3) Record the result with a table. Complete each completed item in corresponding table according to the description in the operation manual.
- 4) If any inspection result "N" appears, stop the equipment work, repair and check the equipment again. Make a mark on the position R after the inspection.

Legend description			
Y=Yes, completed			
N=No, un-completed			
R=Repaired			
Evaluation			
Pre-delivery preparation	Y	N	R
Operation inspection completed			
Maintenance item completed			
Function test completed			
Model			
Serial number			
Date			
Owner			
Inspector (printed)			
Signature of inspector			
Title of inspector			
Inspection company			

12.8 Maintenance and inspection report

Model	
Serial number	
Date	
Accumulated time	
Owner	
Inspector (printed)	
Signature of inspector	
Title of inspector	
Inspection company	

Description

- 1) One report is applicable for each inspection.
- 2) Choose the appropriate check list according to the check items.

	Every day or every 8 hours	A
	Every season or every 250 hours	A+B
	Each half a year or every 500 hours	A+B+C
	Each year or every 1000 hours	A+B+C+D
	Every two years or every 2000 hours	A+B+C+D+E



- 3) Tick on the corresponding position after each inspection.
- 4) Learn how to make the inspection step by step.
- 5) If the inspection result "N" is made, mark and stop the machine work until it is repaired and checked again. Tick on the position "R" after the repair.

Legend description			
Y=Accepted			
N=Rejected			
R=Repaired			
Check list A	Y	N	R
A-1 Inspection of manual and label			
A-2 Pre-operation inspection			
A-3 Function test			
40 hours later			
A-4 30-day maintenance			
Check list B	Y	N	R
B-1 Battery			
B-2 Wire			
B-3 Tyre and rim			
B-4 Emergency stop			
B-5 Key switch			
B-6 Horn			
B-7 Drive brake			
B-8 Driving speed in the folding status			
B-9 Driving speed in the lifting status			
B-10 Slow-speed driving			
B-11 Hydraulic oil analysis			
B-12 Exhaust System			
B-13 Chassis tray component			
B-14 Test of lower limit and hollow protector switch			
B-15 Test of upper limit switch			
Check list C	Y	N	R
C-1 Platform overload system			
C-2 Replacement of ventilation pipe of hydraulic oil tank			
Check list D	Y	N	R
D-1 Inspection for wear-resistance slide block of scissor			
D-2 Replacement of hydraulic oil filter core			
Checklist E	Y	N	R
E-1 Hydraulic oil			

12.9 Steps of checklist A

A-1

Inspection of manual and label

The completeness of operation and maintenance manual is the key of safe operation. Each equipment is supplied with a manual which is kept in a box on the platform. The illegible or incomplete manual is unable to provide sufficient safe operation information.

Besides, be sure to keep all safety labels in good conditions. The label can provide the potential operation hazards of the machine to the operator. Meanwhile, it also provides the operation and maintenance information to the user. The illegible labels cannot play the role of warning, but may cause the dangerous operation environment.

- 1) Check and ensure that the operation and maintenance manual is kept in the manual box.
- 2) Check the manual for its clear writing and completeness.

Result: the manual is matched with the model and all writings on the manual are clear and complete.

Result: the manual is not matched with the model and all writings on the manual are illegible and incomplete. Stop the work of machine before replacing the manual.

- 3) Open the label check diagram and carefully check if the label is illegible or complete.

Result: all labels are complete, clear and intact.

Result: the labels are missing, illegible or incomplete. Stop the work of machine before replacing the label.

- 4) Return the manual to its original position after the use.

Prompt: please contact Lingong Heavy Machinery for manual or label replacement, if necessary.

A-2

Pre-operation inspection

The pre-operation inspection is essential to the safe operation of machine. The pre-operation inspection is made in the form of visual inspection before the machine operation. This inspection is used for discovering the significant problems of machine before the function test and for determining if the routine maintenance procedures are necessary.

For all inspection procedures, please refer to "Pre-operation inspection" in this manual.

A-3

Function test

The function test is essential to the safe operation of machine. The function test is aimed to discovering the functional defects of the machine before the operation. The defected machine cannot be put into service. Once any functional defects are found, please mark the machine immediately and discontinue the use.

For all inspection procedures, please refer to "Function test" in this manual.

A-4

30-day maintenance



The 30-day maintenance is made on the first 30 day or the first 40h after the machine operation. After this step, Please continue to check the maintenance items on the check list.

The maintenance shall be made according to the steps below:

- 1) B-3 Tyre and rim
- 2) D-2 Replacement of hydraulic oil filter core

12.10 Steps of checklist B

B-1

Battery inspection



- 1) This check item shall be made once per 250h or per season, whichever is shorter.
- 2) The well battery status is essential to machine performance and operation safety. The incorrect electrolyte fluid level and the damaged cable or connector may cause the machine part damage and hazard.

Electrocution hazard

The live operation may cause severe personal injury or death. Take off the ring, watch and other jewelry in the operation process.

Personal injury hazard

The battery electrolyte is corrosive. Do not expose the hands or any body parts to the overflowed electrolyte, for fear of injury. Please neutralize the overflowed electrolyte with the sodium bicarbonate solution.

- 1) Put on the protective clothing and the safety goggles.
- 2) Release the battery tray lock on the chassis side and rotate the chassis battery tray outward.
- 3) Protect the battery cable connector against erosion.

Prompt: add a wiring end protector and coat the anti-corrosion glue to protect the battery connector cable against erosion.

- 4) Firmly fix the battery and the cable.
- 5) Fully charge the battery and stay it for at least 24h.

Make use of the non-free-maintenance battery and the sealed battery:

- 6) Open the battery cover, check the specific weight with a specific gravity hydrometer and make the record.
- 7) Check the ambient temperature and adjust the specific liquid gravity of each battery according to the instructions below:
 - Increase the specific liquid gravity by 0.004 per 5°C, if the temperature is higher than 27°C.
 - Decrease the specific liquid gravity by 0.004 per 5°C, if the temperature is lower than 27°C.

Result: the specific liquid gravity of each battery is greater than 1.277 after the adjustment. Fully charge the battery and turn to Step 12.

Result: if the specific liquid gravity of each battery is lower than 1.250, turn to Step 9.

- 8) Charge the battery in a balanced way or fully charge the battery and stay the battery still for at least 6h (preferably 24h).
- 9) Open the battery cover, check the specific weight with a specific gravity hydrometer and make the record.
- 10) Check the ambient temperature and adjust the specific liquid gravity of each battery according to the instructions below:
 - Increase the specific liquid gravity by 0.004 per 5°C, if the temperature is higher than 27°C.
 - Decrease the specific liquid gravity by 0.004 per 5°C, if the temperature is lower than 27°C.

Result: the specific liquid gravity of each battery is greater than 1.277 after the adjustment. Fully charge the battery and turn to Step 12.



Result: the specific liquid gravity difference between the battery cells is greater than 0.1 or the specific liquid gravity of more than one battery cell is less than 1.217. In such case, please replace the battery.

- 11) Check the battery electrolyte height. If necessary, add the distilled water to the highest liquid level indicator and do not add the excessive distilled water.
- 12) Close the battery cover and neutralize the spilled electrolyte with the sodium bicarbonate solvent.

The following checks are suitable for batteries of any kind:

- 13) Check if the battery cells in each battery pack are correctly connected.
- 14) Check the excessive abrasion and damage of the battery charger plug and the wire insulation. Replace the worn and damaged one in time, in any.
- 15) Correctly connect the battery charge to the 100-260V, 50/60HZ AC power supply.

Result: the charger is running and charging the battery.

Result: the charger alarm rings and the indicator flashes. Please check and correct the connection of fuse and charger.

Guarantee the normal operation of charger and charge the battery.

▲Notice: to achieve good effect, please make use of the wire with appropriate length. Keep the total length below 15m.

▲Notice: for more information of charger operation, please contact the after-sales service department of Lingong Heavy Machinery.

B-2

Wire inspection

- 1) This check item shall be made once per 250h or per season, whichever is shorter.
- 2) Keeping the wire in good conditions is essential to safe operation and good machine performance. If the burn, scratched, eroded or bent wire is not discovered and replaced and is used in the unsafe operation environment, the machine element may be damaged.

Electrocution/explosion danger

The thermal contact or the conductor may cause the serious injury and death. Do not put on the ring, watch and other jewelry.

- 1) Check if the ground wire below the chassis is lost or damaged.
- 2) Check if there is any burn, scratched, eroded, bent or loosened wire in the areas below:
 - Internal of ground controller box
 - Wire of hydraulic block
 - Wire in battery area of the battery tray
 - Internal of platform controller box
- 3) Switch the key switch to the platform controller and draw out the red emergency stop buttons from the ground and platform controller.
- 4) Lift the platform until reaching the height about 2.4m from the ground.
- 5) Lift the safety prop, move it to the center of the scissor sleeve center and rotate it upward until it is vertical.
- 6) Lower the platform height until the safety prop completely contacts the shaft sleeve.

Crush hazard

Be sure to put your hand on correct position of the safety prop when lowering the platform.

- 7) Check if there is any burn, scratched, eroded, bent and loosened wire in chassis and the scissor area.
- 8) Check if there is any burn, scratched, eroded, bent and loosened wire in the areas below:

- Wire of scissor arm
 - ECU to the platform
 - Harness connector connected on the platform
- 9) Check the free coating of the insulating oil on the positions below:
 - Harness connector connected between ECU and platform controller
 - All harness connectors connected the level sensor
 - 10) Raise the platform and recover the safety prop to the installation position.
 - 11) Lower the platform to the folding position and then shut down the machine.

B-3

Inspection of tyre and rim



This check shall be made once per 250h or per season, whichever is shorter.

Keeping the tyre and rim in good conditions is essential to safe operation and good performance. The failure of tyre and rim is possible to tip over the machine. The machine elements can also be damaged, if the defected tyres and rims are not discovered and repaired.

- 1) Check if the tread and sides of the tyre contain any scratch, crack, hole and other abnormal wear.
- 2) Check if the rim is damaged, bent and cracked.
- 3) Remove the cotter pin and check the nut torque.

▲Notice: the new cotter pin must be used when installing the tyre and rim again.

- 4) Install and lock a new cotter pin.

Torque of lubrication-free nut	410-540N
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Model suitable for electric drive

- 5) Check torque of each bolt

Torque of lubrication-free bolt	90N
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B-4

Inspection of emergency stop

- 1) This check shall be made once per 250h or per season, whichever is shorter.
- 2) The normal emergency stop function is essential to the safe operation of machine. It is unable to cut off the power supply and stop all functions of machine with the abnormal red emergency stop button. In such case, the hazard can be caused.
- 3) As a safe function, besides the red emergency stop button on the platform, the selection and operation of ground controller shall be superior to those of the platform controller.
 - ① Switch the key switch to the ground controller and draw out the red emergency stop buttons from the ground and platform controller.
 - ② Press the red emergency stop button on the ground controller to the OFF position.

Result: no action is enabled by the machine.

- 4) Press the red emergency stop button on the platform controller to the OFF position.

Result: no action is enabled by the machine.

▲Notice: the red emergency stop button of the ground controller can stop all operations of the machine,

even if the key switch is switched to the platform controller.

B-5

Test of key switch

- 1) This check shall be made once per 250h or per season, whichever is shorter.
- 2) The correct action of key switch and essential to the safe operation of equipment. The machine can be operated via the ground controller or the platform controller. The key switch is used for switching the control. The failed switch may cause the dangerous operation.
- 3) As this step is carried out on the ground with a platform controller, no person shall stand on the platform.
 - ① Draw out the red emergency stop buttons from the ground and platform controller.
 - ② Switch the key switch to the platform controller.
 - ③ Check the lifting and lowering functions of the ground controller.

Result: no action is enabled by the machine.

- ④ Switch the key switch to the ground controller.
- ⑤ Check the lifting and lowering functions of the platform controller.

Result: no action is enabled by the machine.

- ⑥ Turn the key switch to the OFF position.

Result: no action is enabled by the machine.

B-6

Test of horn

- 1) This check shall be made once per 250h or per season, whichever is shorter.
- 2) The horn is used for giving the warning to the ground staff by the control staff on the platform. It is unable to remind the hazard and unsafe status to the ground staff with the abnormal horn.
 - ① Switch the key switch to the platform controller and draw out the red emergency stop buttons from the ground and platform controller.
 - ② Press the horn button on the horn controller.

Result: the horn outputs the sound.

B-7

Test of driving and braking function



- 1) This check shall be made once per 250h or per season, whichever is shorter.
- 2) The normal braking function is essential to the operation safety. The brake shall be stable and free of delay, vibration and abnormal sound. The hydraulic releasing of braking system shall be normal.
- 3) Be sure to complete the braking function inspection on a solid and level ground without any barrier. Ensure the machine is folded and the extending platform is completely retracted.
 - ① Make a reference test line on the ground.
 - ② Switch the key switch to the platform controller and draw out the red emergency stop buttons from the ground and platform controller.
 - ③ Lower the platform to the folding position.

- ④ Press the drive function selector button.
- ⑤ Select one point (such as the touchdown point on the wheel) from the machine as the visual inspection reference of the test line.
- ⑥ Drive the machine at the maximum speed and release the handle at the moment when the reference point passes the ground test line.
- ⑦ Measure the distance between the reference point and the survey line.

Result: the machine is stopped within the specified braking distance. No action is required.

Result: the machine is not stopped within the specified braking distance.

▲Notice: the brake must be valid within the allowable gradeability range of the machine.

- ⑧ Replace the brake and repeat the process above from Step 1.

B-8

Test of driving speed-folding status

- 1) This check shall be made once per 250h or per season, whichever is shorter.
 - 2) The normal driving function is essential to the operation safety. With the driving function, a rapid and stable response shall be given to the operator. No delay, vibration and abnormal sound shall be outputted during the normal operation and driving process.
 - 3) Be sure to complete the driving test on a firm and level ground without any barrier.
- ① Draw two lines, spaced by 10m on the ground, as the starting line and the finishing line.
 - ② Switch the key switch to the platform controller and draw out the red emergency stop buttons from the ground and platform controller.
 - ③ Lower the platform to the folding position.
 - ④ Press the drive function selector button.
 - ⑤ Select one point from the machine as the visual inspection reference for the starting line and the finishing line.
 - ⑥ Drive the machine at the maximum speed and start to count when the reference point passes the starting line.
 - ⑦ Keep driving at the full speed and record the time when the reference point passes the finishing line. Refer to the specification.

B-9

Test of driving speed-lifting status



- 1) This check shall be made once per 250h or per season, whichever is shorter.
 - 2) The normal driving function is essential to the operation safety. With the driving function, a rapid and stable response shall be given to the operator. No delay, vibration and abnormal sound shall be outputted during the normal operation and driving process.
 - 3) Be sure to complete the driving speed test on a solid and level ground without any barrier.
- ① Draw two lines, spaced by 10m on the ground, as the starting line and the finishing line.
 - ② Switch the key switch to the platform controller and draw out the red emergency stop buttons from the ground and platform controller.
 - ③ Press the lifting function selector button.

- ④ Press the enable key.
- ⑤ Raise the platform to the height about 2.3m away from the ground.
- ⑥ Press the drive function selector button.
- ⑦ Select one point (such as the touchdown point on the wheel) from the machine as the visual inspection reference for the starting line and the finishing line.
- ⑧ Drive the machine at the maximum speed per hour and start to count when the reference point passes the starting line.
- ⑨ Keep driving at the full speed and record the time when the reference point passes the finishing line. Refer to the specification.

B-10

Test of driving speed-slow speed



- 1) This check shall be made once per 250h or per season, whichever is shorter.
- 2) The normal driving function is essential to the operation safety. With the driving function, a rapid and stable response shall be given to the operator. No delay, vibration and abnormal sound shall be outputted during the normal operation and driving process.
- 3) Be sure to complete the driving test on a solid and level ground without any barrier.
 - ① Draw two lines, spaced by 10m on the ground, as the starting line and the finishing line.
 - ② Switch the key switch to the platform controller and draw out the red emergency stop buttons from the ground and platform controller.
 - ③ Lower the platform to the folding position.
 - ④ Press the driving speed selector button.
 - ⑤ Select one point (such as the touchdown point on the wheel) from the machine as the visual inspection reference for the starting line and the finishing line.
 - ⑥ Drive the machine at the maximum speed and start to count when the reference point passes the starting line.
 - ⑦ Keep driving at the full speed and record the time when the reference point passes the finishing line. The driving time shall not be less than 22.5s.

B-11

Hydraulic oil analysis



- 1) This check shall be made once per 250h or per season, whichever is shorter.
- 2) The replacement or test of hydraulic oil is essential to the equipment performance and service life. The polluted hydraulic oil may affect the equipment performance and the equipment damage can be caused, if it is used still. The frequent inspection is the must for the poor working environment.
- 3) Test if it is necessary to replace the hydraulic oil with an oil separator.
- 4) If the hydraulic oil has not been replaced for two years, test once per quarter. If the test fails, please replace the hydraulic oil.
- 5) For test and replacement of hydraulic oil, please refer to E-1.

B-12

Inspection of ventilation system of hydraulic oil tank cover



- 1) This check shall be made once per 250h or per season, whichever is shorter.
 - 2) The well-ventilated hydraulic oil tank cover is essential to the good mechanical property and service life. The dirty or blocked exhaust cover may degrade the machine performance. The frequent inspection is the must for the poor working environment.
- ① Remove the exhaust cover from the hydraulic oil tank cover.
 - ② Check ventilation

Result: the air can pass through the exhaust cover.

Result: if the air is unable to pass through the exhaust cover, clean or replace the exhaust cover. Continue Step 3.

▲Notice: when checking the ventilation of the oil tank cover, the air shall freely pass through such cover.

- 3) Carefully wash the oil tank exhaust cover with mild solvent and dry it with the low-pressure compressed air. Repeat step 2.
- 4) Install the exhaust cover of hydraulic oil tank.

B-13

Inspection of chassis tray locking component



- 1) This check shall be made once per 250h or per season, whichever is shorter.
- 2) The good conditions of chassis tray locking component are essential to the equipment performance and service life. The tray may be unexpectedly opened and the safety hazard can be caused by the damaged chassis tray locking component. Check the abrasion and damage of each chassis tray locking component.

B-14

Inspection of lower limit and hollow protector switch



- 1) This check shall be made once per 250h or per season, whichever is shorter.
- 2) The good condition of limit switch is essential to the machine performance and safe operation. The operation of machine with defected limit switch will degrade the machine performance and cause the potential unsafe working environment.
- 3) Be sure to complete the inspection on a solid and level ground without any barrier.

Lower limit switch

- 1) Remove the platform controller.
- 2) Lift the platform until reaching the height about 3.2m from the ground.
- 3) Lift the safety prop, move it to the center of the scissor sleeve center and rotate it upward until it is vertical.

- 4) Lower the platform height until the safety prop completely contacts the shaft sleeve.

Crush hazard

Be sure to put your hand on correct position of the safety prop when lowering the platform.

- 1) Turn the key switch to the OFF position.
- 2) Mark and separate the platform controller connector.
- 3) Connect the platform controller connector to the cable connector of main harness.
- 4) Open the lower limit switch base cover and unplug the connector of lower limit switch.
- 5) Switch the key switch to the platform controller.
- 6) Slightly raise the platform and recover the safety prop to the installation position.
- 7) Press the lifting function selector button on the platform controller on the ground and lower the platform until it is folded.

Result: the diagnosis screen displays the code 18, the alarm is outputted and the lifting function response is normal. The function of machine is normal.

Result: the diagnosis screen dose not display the code 18, no alarm is outputted and the lifting function gives no response. In such case, the limit switch shall be replaced.

- 8) Press the drive function selector button and try to run the machine.

Result: the diagnosis screen displays the code 18, the alarm is outputted, but the turning function and the driving function are disabled. The function of machine is normal.

Result: the diagnosis screen dose not display the code 18, the alarm is outputted and the turning and driving function are enabled. In such case, the limit switch shall be replaced.

- 9) Press the lifting function selector button to raise the platform by about 0.3m.

Result: the diagnosis screen displays the code 18, the alarm is outputted and the lifting function is enabled. The function of machine is normal.

Result: the diagnosis screen dose not display the code 18 and the alarm is outputted. In such case, the limit switch shall be replaced.

- 10) Raise the platform until the hollow protector is stretched.

Result: the diagnosis screen dose not display the code 18 and the alarm is outputted. The function of machine is normal.

Result: the diagnosis screen displays the code 18 and the alarm is outputted. In such case, the limit switch shall be replaced.

- 11) Lift the platform to the height about 3.2m away from the ground.
- 12) Lift the safety prop, move it to the center of the scissor sleeve center and rotate it upward until it is vertical.
- 13) Lower the platform height until the safety prop completely contacts the shaft sleeve.

Warning: crush hazard

- 14) Turn the key switch to the OFF position.
- 15) Remove the platform control line connected to the main chassis harness.
- 16) Resume the connection between the platform controller connector and the main chassis harness.
- 17) Connect the platform control connector.
- 18) Safely and correctly connect the connector of lower limit switch.
- 19) Well install the lower limit switch box.
- 20) Switch the key switch to the platform controller.
- 21) Slightly raise the platform and recover the safety prop to the installation position.

22) Lower the platform to the folding position.

Inclination switch

- 1) Move the machine to the maximum allowable inclination angle of the level sensor. For the maximum allowable inclination angle, please refer to the nameplate.
- 2) Press the lifting function selector button and raise the machine to the height about 2.1m from the inclined ground.

Result: the diagnosis screen displays the code LL, no alarm is outputted and the machine function is normal.

Result: the diagnosis screen does not display the code LL, but the alarm is outputted. In such case, please check or replace inclination switch.

- 3) Press the drive function selector button and try to drive the machine on a slope.

Result: the diagnosis screen displays the code LL, the alarm is outputted, and the turning function and the driving function are disabled. The function of machine is normal.

Result: the diagnosis screen does not display the code LL, no alarm is outputted and the driving and turning function of machine are normal. Check or replace the inclination switch.

- 4) Lower the platform to the folding position and transfer the machine to the firm and flat ground.

Hollow protector switch

- 1) Place a wood block as high as about 5cm below the right hollow protector.
- 2) Press the lifting function button and try to lift the machine to the height about 2.1m.

Result: the hollow protector bumps the wood block and fails to be completely stretched. The diagnosis screen does not display the code 18, no alarm is outputted and the machine can still be lifted. In such case, the hollow protector limit switch shall be adjusted or replaced.

- 3) Press the drive function selector button and try to run and turn the machine.

Result: the diagnosis screen displays the code 18, the alarm is outputted, and the turning function and the driving function are normal. The function of machine is normal.

Result: the diagnosis screen does not display the code 18, no alarm is outputted and the driving and turning function of machine are normal. In such case, the hollow protector limit switch shall be adjusted or replaced.

- 4) Lower the platform until it is folded and then remove the wood block below the right hollow protector.
- 5) Repeat Step 31-34 below the left hollow protector.
- 6) Lower the platform until it is folded and then remove the wood block below the left hollow protector.
- 7) Turn off the machine.

B-15

Inspection of upper limit switch



- 1) This check shall be made once per 250h or per season, whichever is shorter.
- 2) The good conditions of limit switch are essential to performance and safe operation. The operation of machine with defected limit switch will degrade the machine performance and cause the potential unsafe working environment.
- 3) Be sure to complete the function inspection on a solid and level ground without any barrier.
- ① Switch the key switch to the ground controller. Lift the platform to the height about 3.2m from the ground.

- ② Lift the safety prop, move it to the center of the scissor sleeve center and rotate it upward until it is vertical.
- ③ Lower the platform height until the safety prop completely contacts the shaft sleeve.

Warning: crush hazard

Be sure to put your hand on correct position of the safety prop when lowering the platform.

- ④ Open the limit switch base cover on the chassis.
- ⑤ Slightly raise the platform and recover the safety prop to the installation position.
- ⑥ Lift the platform via the ground controller, while pressing the upper limit switch arm to initialize the upper limit switch.

Result: the platform stops rising and the function of machine is normal.

Result: the platform continues to rise. Adjust or replace the upper limit switch.

12.11 Steps of checklist C

C-1

Test of platform overload system



- 1) This step shall be made once per 500h or per 5 months, whichever is shorter. Or the check and re calibrate shall be made immediately when the overload failure appears.

Calibration Method

No load:

- 1: Turn the key switch to Platform Mode; (note: the platform is in stowed position at the very beginning)
- 2: Move the LIFT button as described below to activate the no-load automatic weighing procedure:
"DOWN" "DOWN" "DOWN" "DOWN" "DOWN" (5 times) "UP"
"DOWN" "DOWN" "DOWN" "DOWN" "DOWN" (5 times) "UP"
"DOWN" "UP" "DOWN" "DOWN" "DOWN"

Attention:

- a. Each operation of the button shall last for 0.15s – 2.5s;
- b. The calibration will be terminated when any operation of the button exceeds the limit, and in this case, the calibration shall be performed again from the very beginning.
- c. After the horn sounds 5 times, it suggests that the machine has entered the calibration procedure correctly.
- d. When the platform covers the whole travel and stops at the bottom, and the horn stops sounding, it suggests that the calibration has been finished successfully.

Full load:

- 1: Load the platform: Place the counterweight (1.1 times of the rated load) at the center of the machine platform;
- 2: Turn the key switch to Platform Mode; (note: the platform is in stowed position at the very beginning)
- 3: Move the LIFT button as described below to activate the full-load automatic weighing procedure:

“DOWN” “DOWN” “DOWN” “DOWN” “DOWN” (5 times) “UP”
“DOWN” “DOWN” “DOWN” “DOWN” “DOWN” (5 times) “UP”
“DOWN” “DOWN” “DOWN” “DOWN” “DOWN” (5 times)

Attention:

- a. Each operation of the button shall last for 0.15s – 2.5s;
 - b. The calibration will be terminated when any operation of the button exceeds the limit, and in this case, the calibration shall be performed again from the very beginning.
 - c. After the horn sounds 5 times, it suggests that the machine has entered the calibration procedure correctly.
 - d. When the platform covers the whole travel and stops at the bottom, and the horn stops sounding, it suggests that the calibration has been finished successfully.
- 2) The frequent test of platform overload mechanism is essential to the safe operation of machine. The continuous wrong operation of platform can cause the reaction failure to overload information of the system. The stability of machine will be affected and even the equipment may be tipped over.
 - 3) The platform overload system is used for preventing the operation of machine in case of overload. Such system is composed of two electric elements, an overload pressure switch and an angle sensor.
 - 4) The pressure sensor is adjustable, which determines the cylinder pressure and gives feedback to the platform overload system. When the pressure is excessively high, the pressure switch will send the signal to ECU and all functions of machine will be stopped until the excessive load is removed from the platform.
 - 5) The angle sensor in the scissor arm 1 is used for measuring the inclination angle of the scissor and further determining the platform height.
- ① Switch the key switch to the ground controller. Lift the platform to the height about 3.2m from the ground.
 - ② Lift the safety prop, move it to the center of the scissor sleeve center and rotate it upward until it is vertical.
 - ③ Lower the platform height until the safety prop completely contacts the shaft sleeve.

▲Warning: crush hazard

Be sure to put your hand on correct position of the safety prop when lowering the platform.

- ④ Open the limit switch base cover on the chassis.
- ⑤ Remove the limit switch cover.
- ⑥ Mark and remove two lines of the upper limit switch.
- ⑦ Make the short connection between the two removed lines.
- ⑧ Switch the key switch to the two ground controller and draw out the red emergency stop buttons from the ground and platform controller.
- ⑨ Slightly raise the platform and recover the safety prop to the installation position.
- ⑩ Raise the platform to the highest location and continue to press the lifting function selector button.

Result: the alarm is outputted.

Result: no alarm is outputted. Calibrate the platform overload system

- 6) Lower the platform via the manual lowering function until the platform is folded.
- 7) Carefully remove the short circuit lines of the upper limit switch.
- 8) Raise the platform to the highest location and continue to press the lifting function selector button.

Result: no alarm is outputted. The system function is normal.

Result: the alarm is outputted and the platform overload system is abnormal. Eliminate the failures of limit switch, its wire, installation bracket and the like or calibrate the overload system.

- 9) Lower the platform to the height about 3.2m from the ground.
- 10) Lift the safety prop, move it to the center of the scissor sleeve center and rotate it upward until it is vertical.
- 11) Lower the platform height until the safety prop completely contacts the shaft sleeve.

▲Warning: crush hazard

Be sure to put your hand on correct position of the safety prop when lowering the platform.

- 12) Connect the wire of limit switch to its original status and install the limit switch cover.
- 13) Install the limit switch base cover.
- 14) Install the platform limit switch base cover.
- 15) Slightly raise the platform and recover the safety prop to the installation position.
- 16) Lower the platform to the folding position.

C-2

Replacement of exhaust cover of hydraulic oil tank



- 1) This step shall be made once per 500h or per 6 months, whichever is shorter.
 - 2) The hydraulic oil tank is a ventilated oil tank. An air filter is provided inside the exhaust cover, which can be blocked as time goes on. In case the exhaust cover fails or is inappropriate installed, once any impurities invade into the hydraulic system, the component may be damaged. The frequent inspection is the must for the poor working environment.
- ① Take off the exhaust cover of hydraulic oil tank.
 - ② Replace a new exhaust cover of hydraulic oil tank.

12.12 Steps of checklist D

D-1

Inspection for wear-resistance slide block of scissor arm



- 1) This step shall be made once per 1000h or per year, whichever is shorter.
 - 2) The condition of the wear-resistance slide block of scissor arm is essential to the safe operation of machine. The worn wear-resistance slide block may cause the component damage and unsafe potential hazard.
 - 3) Please check the wear-resistant cushion when the platform is folded.
- ① Measure the distance from the outside diameter of steel pipe of battery chamber on the non-turning end to the plane of the base plate.

Result: the measurement value is greater than or equal to 24mm. Carry out Step 2.

Result: the measurement value is less than 24mm. Replace the wear-resistance slide block.

- ② Measure the distance from the outside diameter of steel pipe on the oil tank side to the plane of the

base plate.

Result: the measurement value is greater than or equal to 24mm. Carry out Step 3.

Result: if the measurement value is less than 24mm, replace the wear-resistance slide block.

- ③ Apply lubricant between the chassis sliding rail and the wear-resistance slide block.

12.13 Steps of checklist E

E-1

Test and replacement of hydraulic oil



- 1) This procedure is made once per 2000h or per two years, whichever is shorter.
- 2) The replacement or test of hydraulic oil is essential to the good equipment performance and service life. The polluted hydraulic oil and the filter can affect the machine performance, which can damage the parts, if being used still. The frequent operation is especially required in the poor operation situations.
- 3) Check if it is necessary to replace the hydraulic oil with an oil separator in advance.
- 4) If the hydraulic oil has not been replaced for two years, check it once per quarter. Replace the hydraulic oil, if the inspection fails.

▲Notice: this operation shall be made when the machine is folded.

- ① Disconnect the battery pack on the machine.

▲Warning: electric shock/burn hazard

- ② The operation of live circuit may cause the severe injury or even the death. Take off rings, watches and other jewelry in the operation process.
- ③ Open the installation try of hydraulic power unit.
- ④ Mark and disconnect the oil return pipe from the hydraulic filter to the hydraulic oil tank. Remove the pipeline from the oil tank. Cover the pipe joint to keep away the dust.
- ⑤ Make and disconnected the hydraulic pump and the oil suction pipe of oil tank and take out the oil pipe. Cover the pipe joint to keep away the dust.
- ⑥ Release the hydraulic oil tank fastener and take out the hydraulic oil tank.
- ⑦ Unscrew the hydraulic oil fueling cover and pour the oil in a proper container.

▲Warning: personal injury hazard

The ejected hydraulic oil may inject the skin. Please slowly unscrew the hydraulic joint to gradually reduce the oil pressure. Do not eject the oil.

- ⑧ Clean the overflowed hydraulic oil and correctly use the discharge hydraulic oil.
- ⑨ Clean the hydraulic oil tank with mild solvent and absolutely dry it with air.
- 5) Install the hydraulic oil tank and screw the hydraulic oil tank fastener. The torque shall follow the requirements below:

Torque specification	
Lubrication-free hydraulic oil tank fastener	25±2N

- 6) Connect the oil inlet of hydraulic pump to the oil tank.
- 7) Connect the oil return pipe of the oil return filter to the hydraulic oil tank.
- 8) Fill the oil tank with hydraulic oil. Do not overflow the oil and screw the tank filler cap.



- 9) Start the oil pump to fill the entire hydraulic system with hydraulic oil and eliminate the air.

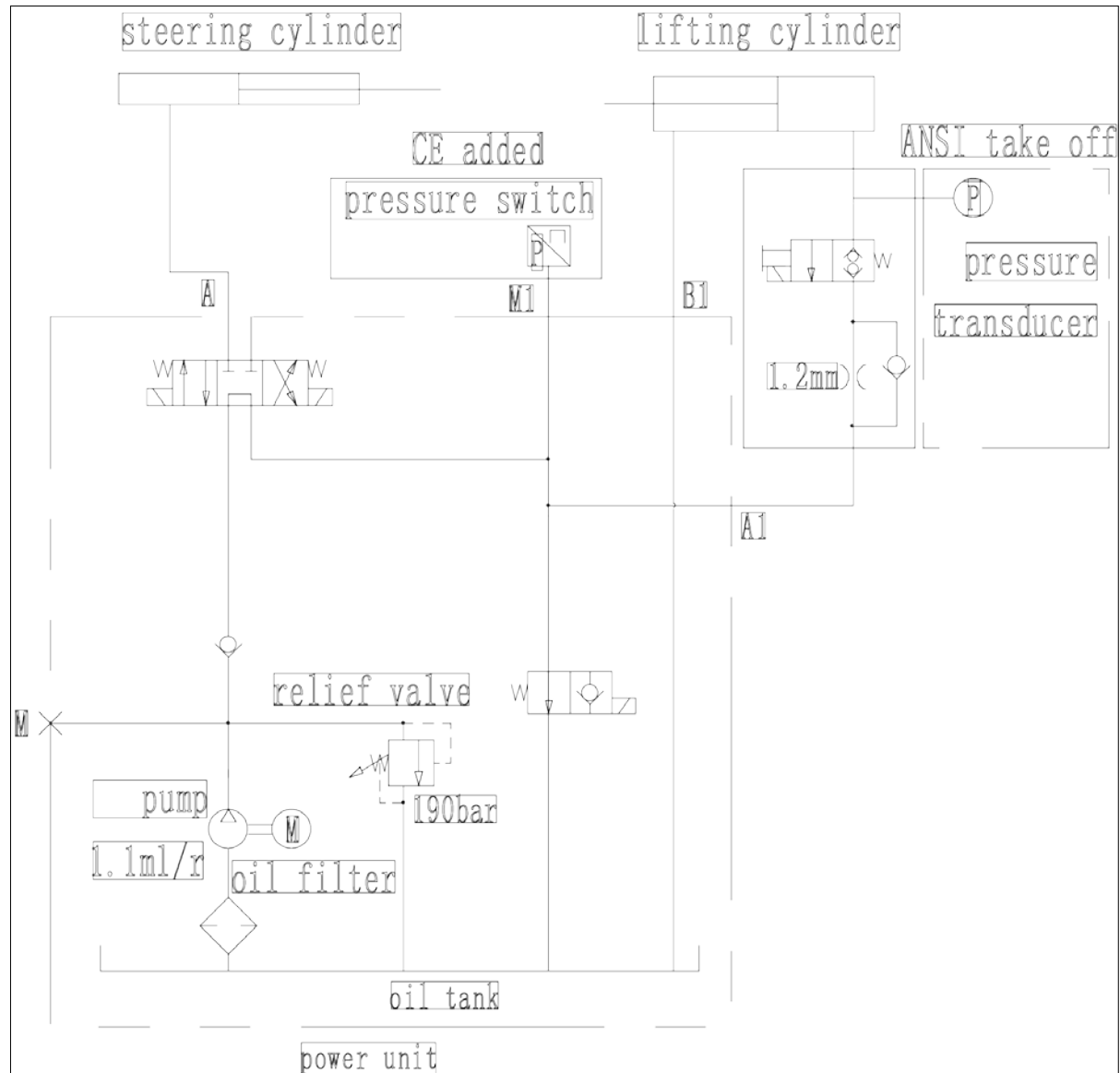
⚠Warning: component damage hazard

The operation without any fuel may damage the hydraulic pump. Carefully pump the oil tank when fueling the hydraulic system. Take measures to prevent the hydraulic pump from erosion.

Chapter 13 Schematic diagram



Hydraulic schematic diagram





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