HANGCHA

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TELESCOPIC BOOM LIFT

HB280P

HB250P

HB230P

CE

Operation manual

(NOTICE ORIGINALE)

The operation manual shall be kept permanently, and the operator Shall read and understand it carefully.

Catalogue

Preface

Thank you for purchasing the machine of HANGCHA group. Before using the machine, you should master the use and operation requirements of the machine! Any operation of the machine has risks. Only when we master the safety rules and operate carefully can we effectively prevent personal injury, property loss and accidents. Your safety needs us to work together!

The machine is limited to transporting personnel and tools to the working position and working on the working platform. Human safety is related to the operation and use of the machine. It is very important to train competent and careful personnel to use the machine, and carry out the safe operation of the machine.Only trained and authorized personnel are allowed to operate the machine.

This manual is used to guide the user / operator to operate and use the machine. Before operating and using the machine, the user / operator is responsible for reading, understanding and implementing this manual and the manufacturer's instructions; Read, understand and abide by safety rules and operating instructions; The service parameters and expected environment of the equipment shall be considered; The requirements for safe use shall be strictly observed.

This manual, together with the maintenance manual and parts manual, should be regarded as part of the machine and kept with the machine at all times! The manager of the machine shall ensure that all necessary information about the operation and daily inspection / maintenance of the machine provided by the machine manufacturer is provided to each lessee. If sold, it shall be distributed randomly, and the manager of the machine shall also provide the manufacturer's maintenance information to the trained maintenance personnel responsible for the machine.

Our product design will be continuously updated and improved. The contents of this manual may be different from the equipment in your hand.

If you have any questions, please contact the sales company or agent of HANGCHA group.

Chapter 1 product performance parameters

This manual introduces the HB series telescopic boom lift, and users can obtain information on working height and other information from the product model.

The same working height has different working power and power sources. Unless otherwise specified in this manual, the parameters of machine models of different working power and power source are the same.

Model	Meaning
H	Abbreviation of HC, representing the brand of Hangcha Group
B	Telescopic boom lift
280	Maximum working height, unit decimeters
P	Working power is permanent magnet motor
C	Working power is internal combustion engine (can be omitted and not labeled)
B	Power source is lead-acid battery pack (can be omitted and not labeled)

HB280P Parameter	
Dimension parameters	
Maximum platform height	27.95m
Maximum working height	25.95m
Maximum horizontal extension	22.75m (19.35m Limited)
Maximum horizontal working distance	23.25m (19.85m Limited)
Length	12.19m
Length (Transportation status)	12.19
Width	2.49m
Width (Transportation status)	2.30m
Height	2.86m
Height (Transportation status)	2.60m
Wheelbase	2.85m
Maximum ground clearance	0.43m
Platform width (length × width × height)	2.44m×0.91m×1.1m
Tire model	385/45-28
Performance parameter	
Rated load	310kg (460kg Limited)

Maximum number of operators	3 person
Maximum manual force	400N
Maximum driving speed (retracted state)	6km/h
Maximum driving speed (lifting state)	0.8km/h
Turn radius (inner/outer)	3.66m/6.55m
Gradeability	45%
Maximum chassis tilt angle	5°
Body rotation	360° continuous
Turntable tailswing	1.6m
Maximum allowable wind speed	12.5m/s
Platform rotation angle	±90°
Jib luffing angle	77° /-58°
Lifting arm luffing angle(upward)	
Lifting arm luffing angle(downward)	
Telescopic arm extension speed	
Telescopic arm retraction speed	
Turntable rotating speed	
Platform rotation speed(left or right)	
Jib luffing angle(upward)	
Jib luffing angle(downward)	
Power parameters	
Drive mode (drive × Steering)	4WD×2WS
Drive motor	7.9kW
Pump Motor	26kW
Pump	45cc
Hydraulic Oil Tank Capacity	100L
Hydraulic system pressure	28Mpa
Battery specification (voltage, capacity)	80V, 560Ah (80V, 540AH lead-acid)
System voltage	80V
Control voltage	12V
Weight	
Total weight	18800kg (lithium)
	19000kg (lead-acid)
Ground bearing information	
Maximum tire load	9200kg

HB25OP Parameter	
Dimension parameters	
Maximum platform height	23m
Maximum working height	25m
Maximum horizontal extension	17m（15m limited）
Maximum horizontal working distance	17.5m（15.5m limited）
Length	10.9m
Length（Transportation status）	10.9m
Width	2.49m
Width（Transportation status）	2.30m
Height	2.82m
Height（Transportation status）	2.58m
Wheelbase	2.5m
Maximum ground clearance	0.4m
Platform width (length × width × height)	2.44m×0.91m×1.1m
Tire model	355/55 D625
Performance parameter	
Rated load	310kg（460kg limited）
Maximum number of operators	3 person
Maximum manual force	400N
Maximum driving speed (retracted state)	6km/h
Maximum driving speed (lifting state)	0.8km/h
Turn radius (inner/outer)	2.05m/5.35m
Gradeability	35%
Maximum chassis tilt angle	5°
Body rotation	360° continuous
Turntable tailswing	1.55m
Maximum allowable wind speed	12.5m/s
Platform rotation angle	±90°
Jib luffing angle	77° /-58°
Lifting arm luffing angle(upward)	
Lifting arm luffing angle(downward)	
Telescopic arm extension speed	

Telescopic arm retraction speed	
Turntable rotating speed	
Telescopic arm extension speed	
Telescopic arm retraction speed	
Platform rotation speed(left or right)	
Jib luffing angle(upward)	
Jib luffing angle(downward)	
Power parameters	
Drive mode (drive × Steering)	4WD×2WS
Drive motor	7.6kW
Pump Motor	16kW
Pump	28cc
Hydraulic Oil Tank Capacity	100L
Hydraulic system pressure	28Mpa
Battery specification (voltage, capacity)	80V, 400Ah (80V, 375Ah lithium)
System voltage	80V
Control voltage	12V
Weight	
Total weight	13200kg (lithium)
	13700kg (lead-acid)
Ground bearing information	
Maximum tire load	6700kg

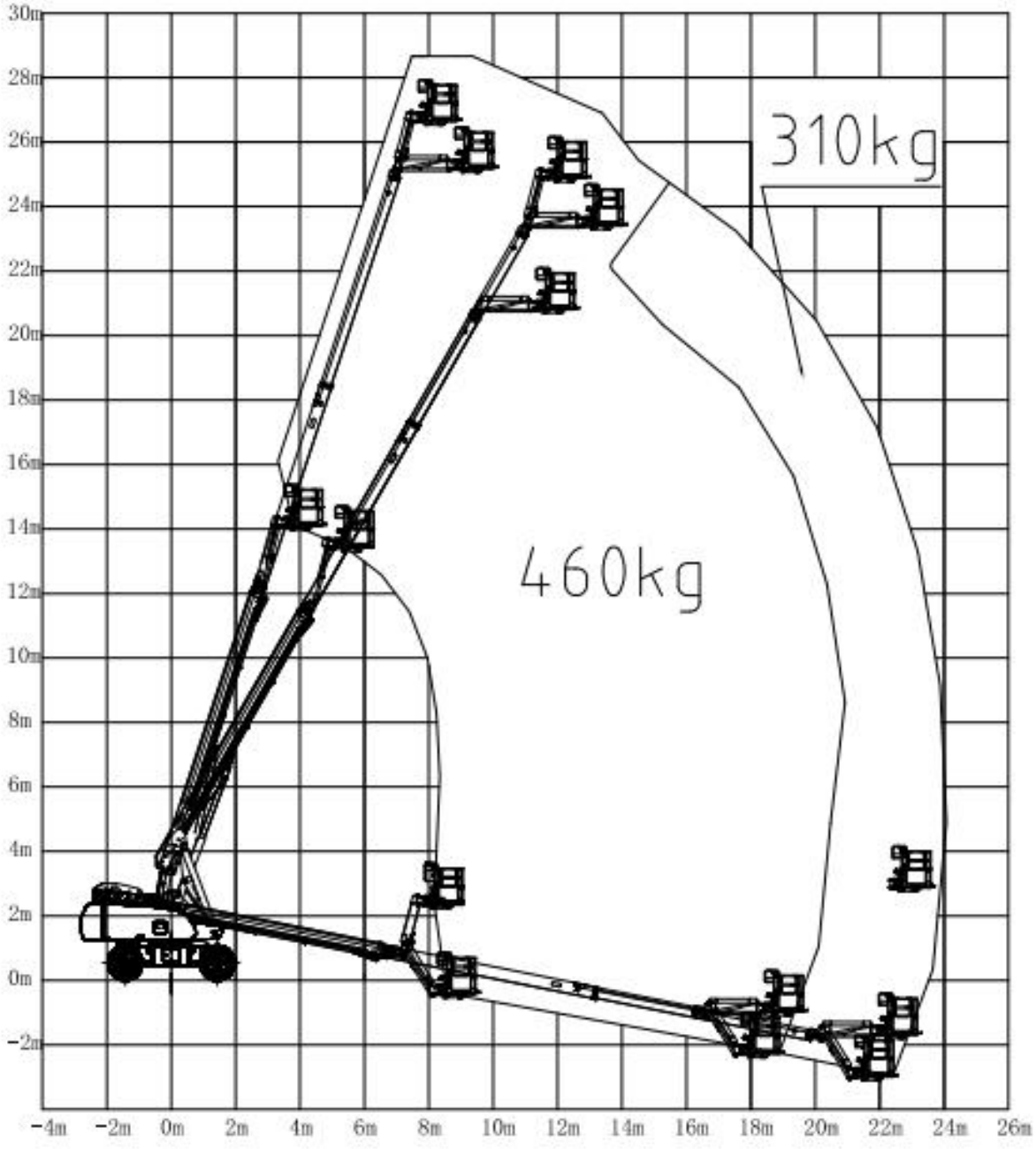
HB230P parameter	
Dimension parameters	
Maximum platform height	21.4m
Maximum working height	23.4m
Maximum horizontal extension	15.5m (12.5m limited)
Maximum horizontal working distance	17m (14m limited)
Length	10.2m
Length (Transportation status)	10.2m

Width	2.49m
Width（Transportation status）	2.30m
Height	2.82m
Height（Transportation status）	2.58m
Wheelbase	2.5m
Maximum ground clearance	0.4m
Platform width (length × width × height)	2.44m×0.91m×1.1m
Tire model	355/55 D625
Performance parameter	
Rated load	310kg（460kg limited）
Maximum number of operators	3 person
Maximum manual force	400N
Maximum driving speed (retracted state)	6km/h
Maximum driving speed (lifting state)	0.8km/h
Turn radius (inner/outer)	2.05m/5.35m
Gradeability	35%
Maximum chassis tilt angle	5°
Body rotation	360° continuous
Turntable tailswing	1.55m
Maximum allowable wind speed	12.5m/s
Platform rotation angle	±85°
Jib luffing angle	/
Lifting arm luffing angle(upward)	
Lifting arm luffing angle(downward)	
Telescopic arm extension speed	
Telescopic arm retraction speed	

Turntable rotating speed	
Telescopic arm extension speed	
Telescopic arm retraction speed	
Platform rotation speed(left or right)	
Power parameters	
Drive mode (drive × Steering)	4WD×2WS
Drive motor	7.6kW
Pump Motor	16kW
Pump	28cc
Hydraulic Oil Tank Capacity	100L
Hydraulic system pressure	28Mpa
Battery specification (voltage, capacity)	80V, 400Ah (80V, 375Ah lithium)
System voltage	80V
Control voltage	12V
Weight	
Total weight	13000kg (lithium)
	13500kg (lead-acid)
Ground bearing information	
Maximum tire load	6700kg

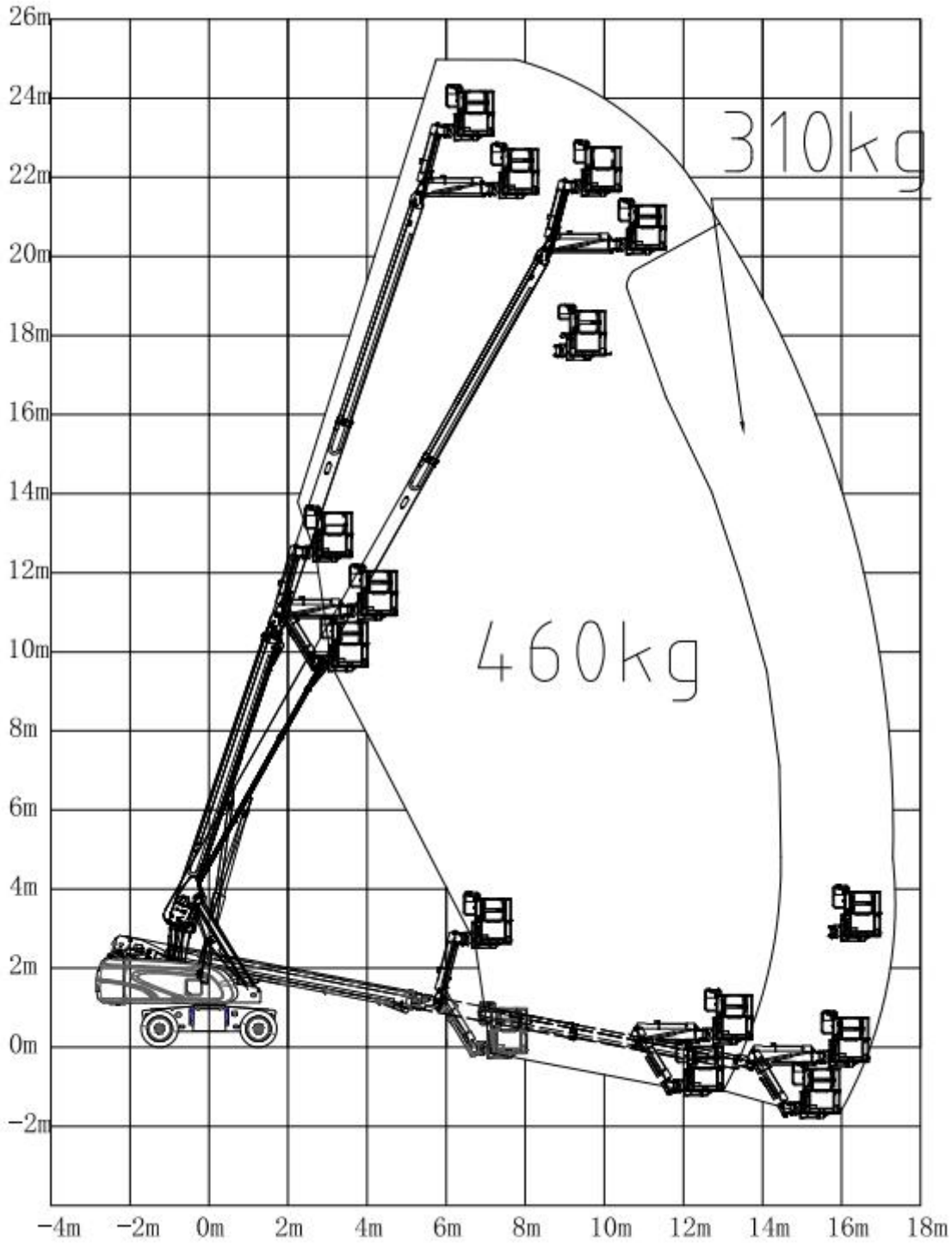
Operation Scope Diagram

（HB280P）



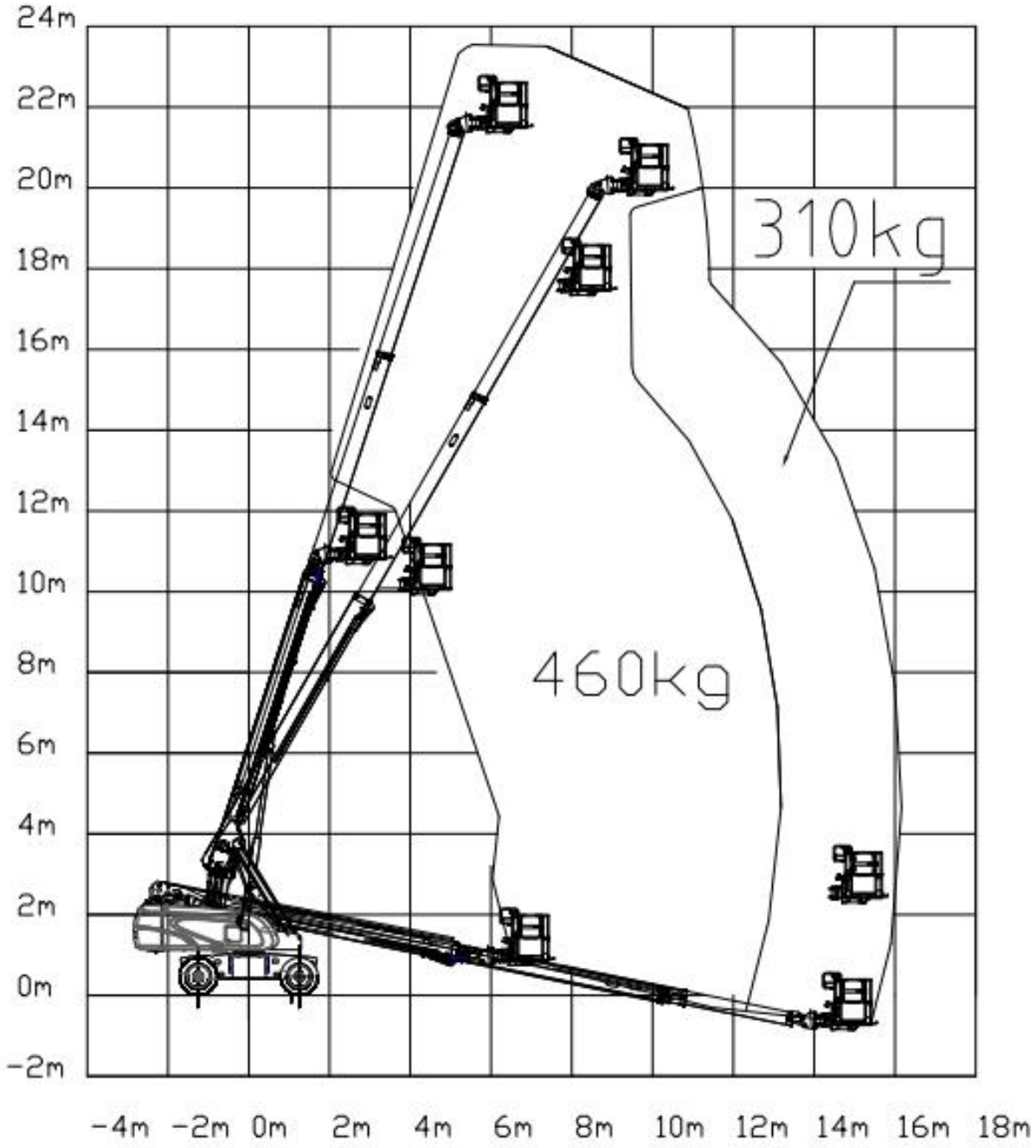
Operation Scope Diagram

（HB250P）



Operation Scope Diagram

（HB230P）



Chapter2 Important safety rules

2.1 Summary

This chapter covers how to use your machine correctly and safely in most applications.In order to achieve this goal, we have established a set of daily checklist, which is mandatory for qualified quality inspectors to carry out daily maintenance in strict accordance with this checklist, so as to ensure that the machine can operate without fault and ensure safe operation.

Read, understand and comply with safety rules, job site requirements and government regulations.

Whether you are the owner, user or operator of the machine，Before operating the machine for the first time，You must read and correctly understand the contents of this manual，The machine can only be operated independently after the whole process is operated from beginning to end under the supervision of qualified personnel with practical operation experience. If you have any questions about the use or operation of the machine, please call HANGCHA group in time for consultation.

Before operating the machine, ensure that the personal protective devices listed in the following table are worn correctly and in good condition：

- Fall safety rope
- Protective gloves
- Safety helmet
- Safety shoes

Most of the accidents involved in the operation, maintenance and repair process are caused by the failure to follow the basic safety operation procedures and precautions in the actual operation.In fact, if we can analyze the applied construction safety hazards and take corresponding safety measures before each construction operation, most accidents in practice can be completely avoided.Therefore, before each use and operation, it should be evaluated by the safety officer who has been trained and has the experience and ability of safety hazard analysis, and remind the personnel operating the machine to take necessary countermeasures to avoid the occurrence of danger.

Incorrect operation, lubrication, maintenance and repair are very dangerous, which may cause personal injury or casualties. Therefore, only after you read the manual thoroughly and fully understand the knowledge and information about operation, lubrication, maintenance and repair, can you take maintenance for the equipment.

2. 2 Symbol description

This safety symbol appears in most safety statements. This means that you need to pay attention and be vigilant at all times, and your safety will be affected! Please read and observe the relevant information of safety warning symbols.

It is used to indicate that there is an emergency and dangerous situation. If it is not avoided, it will cause death or serious injury.

It is used to indicate that there is a potentially dangerous situation. If it is not avoided, it will cause death or serious injury.

It is used to indicate that there is a potentially dangerous situation, which, if not avoided, may cause slight or moderate injury to personnel.

Notice

Conditions that may cause damage to the power plant, loss of personal property or harm to the environment, or lead to improper operation of the equipment.

Note: these steps, instructions or conditions should be followed in order to make the power unit or component work in the expected way.

2. 3 Accident notification

In case of any accident involving the machinery of HANGCHA Group Co., Ltd., HANGCHA Group Co., Ltd. must be notified immediately. Even if there is no personal injury or property damage in the accident, HANGCHA Group Co., Ltd. must be contacted by telephone and all necessary details must be provided.If the manufacturer is not notified within 48 hours after the accident involving the machinery of HANGCHA Group Co., Ltd., the warranty of the product may be invalidated.

Notice
After any accident, thoroughly check the machine and its function.First test all functions from the ground controller, and then test from the platform controller. Before all damages are repaired and all controllers can be operated correctly, the lifting height must not exceed 3m.

2.4 Electric shock danger

Notice:

All operators and managers shall comply with the relevant national or local regulations on the minimum safety distance of live conductors above the ground. If there is no such requirement, the operators and managers shall comply with the requirements of the minimum safety distance in.

Notice
This machine is not insulated and does not have the function of electric shock protection.

Electric shock danger

- Follow relevant government rules and always keep a safe distance from power lines and electrical equipment. See 2-1 for details.
- Platform movement, wire swinging or sagging shall be considered, and strong wind or gust shall be avoided. Do not operate the machine in case of lightning or rainstorm.
- If the machine contact with live wires, stay away from the machine. Personnel on the ground or on the platform are not allowed to touch or operate the machine until the power is cut off.
- Do not use the machine as ground wire during welding, grinding and other operations.

Chart 2-1 Minimum safety distance of electrified body

Voltage range（Phase to phase，kV）	Minimum approach distance m（ft）
0～50	3（10）
50～200	5（15）
200～350	6（20）

350～500	8（25）
500～750	11（35）
750～1000	14（45）

2. 5 Tipping danger

Chart 2-2 Maximum rated load of platform

Rated load	
Rated load	310kg（460kg limited）
Maximum number of people allowed	3 persons
Maximum manual operating force	400N

Overturn danger

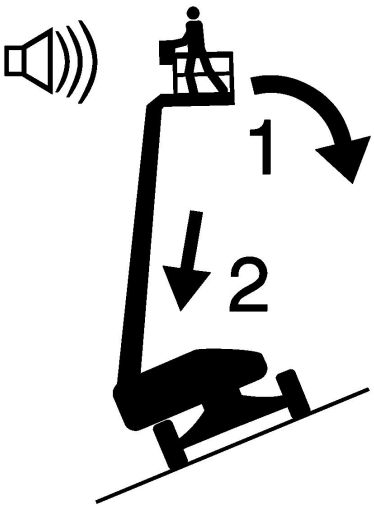
- Personnel, equipment and materials on the platform shall not exceed the maximum load capacity.
- The platform can only be lifted or extended when the machine is on solid and flat ground.

Overturn danger

- Do not use the tilt alarm as a level indicator.The tilt alarm on the platform will sound only when the machine is heavily tilted.If the tilt alarm sounds: be very careful to lower the platform and transfer the machine to a solid and level ground. Do not change the level or limit switch.
- Do not drive faster than 0.8 km / h when the platform is raised.
- When the platform is raised, the machine cannot travel on uneven, unstable surfaces or other dangerous conditions.
- Do not operate the machine during strong wind or gust, and do not increase the surface area of the platform or load.Increasing the area exposed to the wind will reduce the stability of the machine.
- Be careful and reduce the speed when the machine is driving in uneven areas, gravel, or other uneven surfaces, or near holes and steep slopes.
- Do not push or pull any object outside the platform. The maximum allowable lateral force is 400N（90 lbf）
- Do not change any machine parts that may affect safety and stability.

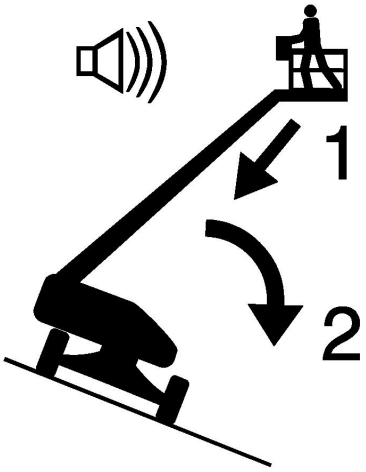
- Do not replace key parts that affect the stability of the machine with parts of different weights or specifications.
- Do not use batteries smaller than the weight of the original battery pack, and other components such as counterweights in the battery box cannot be removed or modified without authorization. The battery pack not only provides power, but also serves as a counterweight, which is crucial for maintaining the stability of the machine.
- Do not modify or change the aerial work platform without the written permission of the manufacturer.
- Do not install additional devices for placing tools or other materials on the platform or guardrail, which will increase the weight and surface area of the platform or increase the load.
- Do not place or fix any suspended load on any part of this machine.
- Do not place ladders or scaffolds in the platform or lean against any part of the machine.
- Do not use the machine on moving or moving surfaces or on vehicles.Ensure that all tires are in good condition and that the tire nuts are tightened.
- Do not use the platform to push the machine or other objects.
- Do not allow the platform to contact adjacent components.
- Do not tie the platform to adjacent components with ropes or other binding materials.
- Do not place loads outside the perimeter of the platform.
- Do not use the platform controller to lower the platform when the platform is tripped, stuck, or other nearby objects hinder its normal movement.If it is intended to lower the platform using the ground controller, it must be operated after all personnel leave the platform.

If the tilt alarm sounds when the platform is raised, be very careful. The tilt warning light on the upper control panel lights up and restricts the walking drive function of the machine. At this point, it is necessary to check the status of the boom on the slope, as shown below. Before moving the machine to a sturdy and level ground, follow the steps below to lower the boom. Do not to rotate the turntable when lowering. Only well-trained and authorized person can use recovery mode.



If the tilt warning light comes on when the platform is uphill:

1. Lifting arm luffing downward
2. Retraction of telescopic arm



If the tilt warning light comes on when the platform is downhill:

1. Retraction of telescopic arm
2. Lifting arm luffing downward

2. 6 Work environment danger

Unsafe workplace danger

- Do not operate the machine, on surfaces、edges or potholes that cannot bear the weight of the machine.The platform can only be raised or extended when the machine is on solid and flat ground.
- Do not use the tilt alarm as a level indicator. The tilt alarm on the platform will sound only when the machine is tilted seriously.
- When the platform is raised, if the tilt alarm sounds, carefully lower the platform and do not change the level or limit switch.
- Do not exceed 0.8 km / h when the platform is raised.
- If the machine can be used outdoors, do not operate the machine in strong winds or gusts.When the wind speed exceeds 12.5m/s (28mph)， Do not lift the platform ； If the wind speed exceeds 12.5m/s (28mph) after lifting the platform,lower the platform immediately and do not continue to operate the machine.
- When the platform is raised, the machine cannot travel in uneven areas, unstable surfaces or other dangerous conditions.
- When the machine is stowed, be careful and reduce the speed when the machine is driving in uneven areas, gravel, unstable or smooth surfaces, steep and near holes.
- Do not drive or lift the machine on a slope, step or arched ground that exceeds the maximum climbing capacity of the machine.

Before or during the use of the machine, check the possible hazards in the workplace and pay attention to environmental restrictions, including flammable and explosive gases or dust.

Chart 2-3 The Beaufort Scale

Beaufort scale	m/s	mph	Instruction	Ground condition
0	0～0. 2	0～0. 5	No wind	No wind, smoke vertical upward.
1	0. 3～1. 5	1～3	Soft wind	Smoke can indicate the wind direction.
2	1. 6～3. 3	4～7	Soft wind	The skin feels bare. The leaves make a slight noise.
3	3. 4～5. 4	8～12	Breeze	The twigs began to shake.
4	5. 5～7. 9	13～18	Gentle wind	Dust and scraps of paper rose and twigs began to shake.
5	8. 0～10. 7	19～24	Cool breeze	The tree shook.
6	10. 8～13. 8	25～31	Fierce wind	Tree branches shake, overhead wires whir and sound, and it is difficult to carry an umbrella.
7	13. 9～17. 1	32～38	strong wind	The whole tree shook. It is difficult to walk against the wind.
8	17. 2～20. 7	39～46	Gale	The branch broke. Vehicles on the road were blown off course by the wind.
9	20. 8～24. 4	47～54	Strong wind	Minor damage to buildings.

Notice

Maximum slope angle： The maximum climbing capacity shall be applied to the machine with the platform in the retracted state.
The climbing capacity is the maximum allowable inclination angle when the machine is on solid ground and the platform carries only one person.When the platform increases weight, the rating of the slope will be reduced.

2. 7 Unsafe operation danger

The operation of the machine shall strictly comply with the requirements of this manual and maintenance manual. If there are more stringent regulations in the industry or place, the latter shall be followed.

Unsafe operation danger

- Do not push or pull any object outside the platform. Maximum allowable lateral force： 400 N(90 lbf)
- Do not change any machine parts that may affect safety and stability.
- Do not replace key parts that affect the stability of the machine with parts of different weights or specifications.

- Do not modify or alter the aerial work platform without the written permission of the manufacturer.
- Do not install additional devices for placing tools or other materials on the platform or guardrail, which will increase the weight and surface area of the platform or increase the load.
- Do not place ladders or scaffolds in the platform or lean against any part of the machine.
- Do not use the machine on moving or moving surfaces or on vehicles. Ensure that all tires are in good condition and that the tire nuts are tightened.
- Do not place or attach any suspended loads on any part of the machine.
- Do not use the machine as a crane.
- Do not use the platform to push the machine or other objects.
- Do not allow the platform to contact adjacent components.
- Do not tie the platform to adjacent components.
- Do not place the load outside the platform.
- Do not use the platform controller to lower the platform when the platform is tripped, stuck, or other nearby objects hinder its normal movement.If it is intended to lower the platform using the ground controller, it must be operated after all personnel leave the platform.
- When one or more tires are off the ground, evacuate all personnel before stabilizing the machine and use cranes, forklifts or other suitable equipment to stabilize the machine.

2. 8 Fall danger

The operation of the machine shall strictly comply with the requirements of the operation manual and maintenance manual. If there are more stringent regulations in the industry or place, the latter shall be followed.

Fall danger

- Personnel on the platform must wear safety belts or use safety device in accordance with government regulations.Tie the anchor to the fixed points of the platform, and only one person can tie the anchor at each fixed point.
- It is forbidden to sit, stand or climb on the protective guardrail of the platform.Stand steadily on the platform floor at all times.
- When the platform is lifted, do not climb down from the platform.
- Keep the platform floor clear of obstacles.
- Do not enter or exit the platform unless the machine is in the fully stowed position.
- Close the entrance door before operation.
- Do not operate the machine if the guardrail is not installed correctly and the entrance door is not closed.

2. 9 Collision danger

The operation of the machine shall strictly comply with the requirements of the operation manual and maintenance manual. If there are more stringent regulations in the industry or place, the latter shall be followed.

Collision danger

- When moving or operating the machine, pay attention to the sight range and the existence of blind spots.
- heck the work area to avoid overhead obstacles or other possible hazards.
- Be careful when using the platform controller and ground controller.The color marked direction arrows show the driving, lifting and steering functions.
- Users must comply with user, workplace and government regulations on "use of personal protective equipment" （ Safety helmet, safety belt and gloves, etc）.
- Before releasing the brakes, the machine must be level or fastened.
- Lower the platform only when there are no people and obstacles in the bottom area.
- Limit travel speed based on ground conditions, congestion, ground slope, personnel location and any other factors that may cause a collision.

Collision danger

- Do not operate the machine in the range of any crane or mobile overhead unless the crane controller is locked or precautions have been taken to prevent any potential collision.
- Keep your hands and arms away from places where they may be squeezed.
- Do not work under the platform or near the telescopic boom.
- When using the controller to operate the machine on the ground, please maintain correct judgment.Keep proper distance between the operator, the machine and fixed objects.
- When operating the machine, do not drive or play with danger.

2. 10 Squeeze danger

There is a potential danger of squeeze during machine movement. During the operation of the machine, body and clothes should always keep a safe distance from the machine.

Squeeze danger

- Keep your hands and arms away from places where they may be squeezed.
- Do not work under the platform or near the telescopic boom.
- When using the controller to operate the machine on the ground, please maintain correct judgment and keep an appropriate distance between the operator, the machine and fixed objects.

2. 11 Danger of explosion and fire

Danger of explosion and fire

- Do not use the machine, charge the battery or refuel the machine in dangerous or flammable and explosive places.

2. 12 Danger of machine damage

Notice

Follow the use and maintenance requirements of parts in this manual and maintenance manual, otherwise the machine will be damaged.

Danger of machine damage

- Unsafe operation hazard.
- Do not use damaged or faulty machines.
- Before every startup,the machine shall be checked before operation and all functions shall be tested.Damaged or faulty machines shall be marked immediately and stop operation.
- Ensure that all maintenance operations have been carried out in accordance with the provisions of the manual and the corresponding maintenance manual.
- Ensure that all labels are properly positioned and easy to identify.
- Ensure that the operation manual and maintenance manual are intact and easy to read, and stored in the document box on the platform.

2. 13 Danger of physical injury

All operation and maintenance requirements in the manual and maintenance manual shall be observed.

- Hazards of unsafe operation.
- Do not operate the machine when there is hydraulic oil leakage.Hydraulic oil leakage may penetrate and burn the skin.

2. 14 Battery danger

- The battery contains sulfuric acid and can produce an explosive mixture of hydrogen and oxygen.Any equipment that can cause sparks or flames (including cigarette / smoke materials) should be kept away from the battery to prevent explosion.
- Do not touch the battery terminals or cable clamps with spark generating tools.

2. 15 Danger of welding and polishing operations

- Follow recommendations of the welding equipment manufacturer for the correct use of welding procedures.
- Only after turning off the power,the wires or cables for welding or polishing operations can be connected.
- Welding and polishing operations can only be carried out after correctly connecting wires or cables.
- During welding operations, the machine cannot be used as a grounding wire.
- At any times, it should be ensured that electric tools are completely stored on the work platform. Do not hang their wires on the guardrails or work areas of the work platform, or directly hang electric tools with wires.

Chapter 3 Operator responsibilities, equipment preparation and inspection

3. 1 Personnel training

The equipment of aerial work platform is controlled by the operator. Only the trained and qualified personnel can operate and maintain the equipment.

It is strictly forbidden for people who cannot control themselves after drinking or taking medicine, dizziness and other people, as well as people with acrophobia, to operate and use the equipment.

3. 1. 1 Operator training

Operator training includes but is not limited to the following contents:

- Use and function restrictions of various control handles and switches on the upper and lower control panels, emergency operation and safety devices, etc.
- Various control knowledge labels, operation instructions, warning signs, etc. On the equipment.
- Regulatory requirements of the employer and local government.
- How to use the allowed fall prevention facilities.
- Master the relevant knowledge of equipment operation to understand and judge the faults and potential faults of the machine.
- Master how to operate in the safest way in various narrow spaces, mobile equipment, various obstacles, pits and other environmental conditions.
- How to avoid conductive or charged objects and avoid electric shock.
- Operation methods under special operation and application conditions.

3. 1. 2 Training supervision

The training shall be conducted in an open place without obstacles and under the supervision of authorized personnel with training qualification. Novices should not operate machines and equipment independently until they are approved by the training supervisor.

3. 1. 3 Operator responsibilities

The operator must be instructed and authorized. Once the machine or site fails or there is a possibility of insecurity, the operator immediately stop the machine.

3. 2 Preparation, inspection and maintenance of the machine before use

3. 2. 1 Summary

The contents of this chapter include the inspection items that must be done before the equipment is put into use.The contents of this part must be carefully read and understood, and the equipment can be put into use only after it is carefully inspected and passed in strict accordance with the inspection items.This will help to ensure the safe operation of the equipment and prolong the service life of the equipment and machine.

The following table contains the regular maintenance items of the equipment in the normal working environment. Please refer to them when carrying out maintenance according to your actual working conditions.Note: if the equipment works under very bad working conditions, the utilization rate of the machine is very high, and the maintenance interval should be shortened appropriately.

3-1 Check the maintenance list

Type	Maintenance interval	Responsible	Reference
Startup inspection	Every day before the device is enabled	User or operator	Operation manual
Delivery inspection	Before sale or before each lease	Owner, delivery person or user	Operation manual
Regular inspection	Before sale or before each lease	Owner, delivery person or user	Operation manual
Annual inspection	One year, no more than 13 months at most	Owner, delivery person or user	Operation manual
Preventive inspection	Follow the maintenance intervals specified in the service manual	Owner, delivery person or user	Operation manual

3. 2. 2 Preparation before use

A new equipment must be inspected before use, including:

(1) Inspect the appearance carefully and find out if there is any damage during transportation.In case of any damage, contact the freight in time.

(2) Then, the inspection shall be carried out item by item according to the items listed in item 3.2.3.

(3) After starting the equipment for the first time, during the whole operation process, carefully check whether each functional action operates smoothly; Whether there is oil leakage in the hydraulic system and fitting; Whether all parts are fixed reliably, etc.

(4) Before the machine is put into use, the management department is responsible for making necessary preparations.During preparation, the machine shall have good operation experience and conduct appearance inspection.The items to be inspected are listed in the daily inspection module (see 3.2.4 for details)

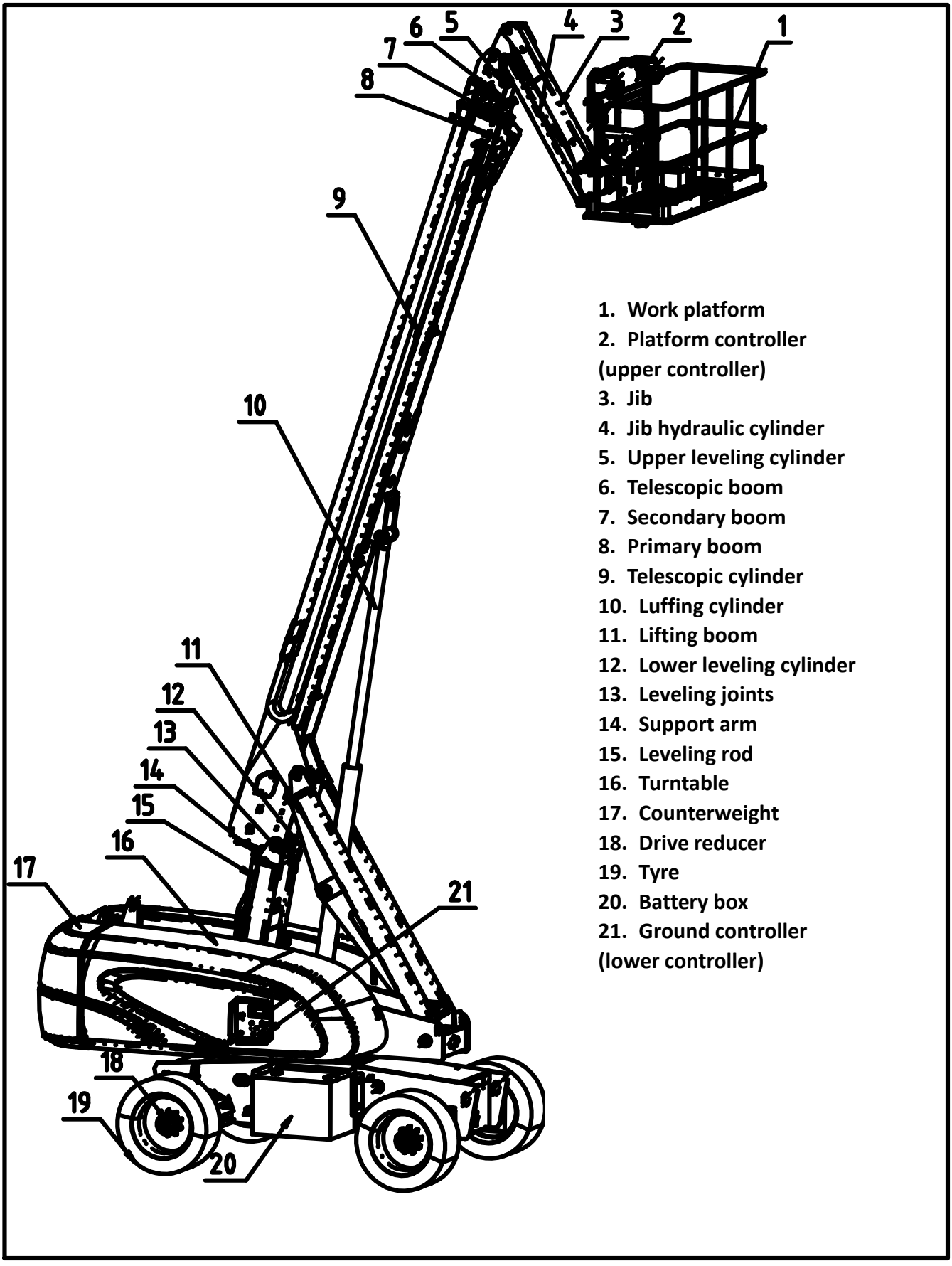
(5) Before using the machine, it should be ensured that the items listed in the delivery, circle inspection and functional inspection have been checked and passed.

3. 2. 3 Delivery inspection and periodic inspection

Notice
The aerial work platform shall be subject to annual inspection, and the annual inspection interval shall not exceed 13 months. The annual inspection shall be conducted by qualified full-time inspectors.

The following inspection item list provides a process for inspecting the system item by item according to the inspection item list, so as to accurately find out whether the equipment has deformation, damage, assembly error and other defects; Under normal operating conditions, the inspection shall be conducted every 3 months or 150 working hours (whichever comes first). If the equipment is used in areas with harsh environment, or the equipment is used more frequently than normal, the maintenance interval shall be appropriately reduced.

The inspection items of this part shall also be implemented for machines in stock or placed in harsh and changeable environment. The same applies to the machine after maintenance.



1. Work platform
2. Platform controller (upper controller)
3. Jib
4. Jib hydraulic cylinder
5. Upper leveling cylinder
6. Telescopic boom
7. Secondary boom
8. Primary boom
9. Telescopic cylinder
10. Luffing cylinder
11. Lifting boom
12. Lower leveling cylinder
13. Leveling joints
14. Support arm
15. Leveling rod
16. Turntable
17. Counterweight
18. Drive reducer
19. Tyre
20. Battery box
21. Ground controller (lower controller)

Chassis

（1）Check the front axle tire and wheel assembly to see if there are loose tire bolts, missing parts, scratches, wear, etc.

（2）Check the steering device assembly to see if any parts are lost and if the steering rod is bent and deformed; Whether the steering cylinder, hydraulic hose and fitting are loose, leaking, etc; Whether the installation angle is appropriate; Whether the pipeline is worn, etc.

（3）Please check whether the drive hub, drive motor, brake, cable and connector are worn and loose. If necessary, please contact professional technicians.

（4）Check the rear axle tire and wheel assembly to see if there are loose tire bolts, missing parts, scratches, wear, etc.

（5）Check the lubricating oil level of the drive reducer. (if you need help, please contact the service personnel)

Notice
The lubricating oil level should be maintained at half the height of the drive reducer housing.

（6）Check the floating oil cylinder and observe whether the oil cylinder joint and pipeline have leakage.

（7）Check hydraulic and electrical components for wear and damage.

（8）Check the battery, observe whether there is damage, whether the wiring terminal is loose, whether the protective cap is complete, whether the battery is fixed firmly, whether it is rusted, and whether the liquid level of electrolyte is appropriate.If the liquid level is insufficient, add distilled water in time.

Turntable

（1）Check the turntable to see if there are parts missing, loose, etc; Check the rotary reducer; Check the hydraulic hose and fitting for looseness and leakage.

（2）Check the rotary reducer and observe whether there are broken teeth and other damage; Whether the lubrication is good and whether the fixing bolts are Looseness, etc; If damaged, please replace with new parts.

（3）Check the hydraulic valve and pipeline to see whether they are firmly fixed and whether there are looseness, leakage, corrosion and other phenomena.

（4）Check the control box and observe whether there is damage, looseness, loss of parts, loose electrical connectors, corrosion, damage of wire insulation, etc.Whether each function button switch is normal. If there is any problem, it should be repaired immediately.

（5）Check the battery, observe whether there is damage, whether the wiring terminal is loose, whether the protective cap is complete, whether the battery is fixed firmly, whether it is rusted, and whether the liquid level of electrolyte is appropriate.If the liquid level is insufficient, add distilled water in time.

（6）Check the machine cover, observe whether there is damage, whether the hinge,

gas spring and other switches are stuck, and whether the connection is firm.

（7）Check the function valve, observe whether the hydraulic hose and fitting are deformed and leaking, and whether the fixing is firm.

（8）Check all connecting shafts and locking pins and observe whether there are looseness, missing parts, etc. If yes, please supplement it in time.

（9）Check all wires and cables for wear, damage, looseness, erosion, etc.

（10）Check the hydraulic oil level. When the boom is in a stored state, the hydraulic oil level in the tank should be within the range of the level gauge on the tank.

（11）Check the hydraulic oil tank and the hydraulic components on the hydraulic oil tank for wear and damage

Lifting boom

（1）Check each boom and rod, and observe whether there is deformation, damage, loss of parts, reliable connection, etc.

（2）Check all connecting shafts and locking pins and observe whether there are looseness, missing parts, etc. If yes, please supplement it in time.

（3）Check all hydraulic hoses, wires and cables for wear, looseness, erosion and leakage, and replace new parts if necessary.

（4）Check the limit switch and observe whether it is rusted and firm, and whether the limit switch is flexible, etc.

（5）Check the lifting boom cylinder and hydraulic hose for damage, leakage and wear, sufficient lubrication and loose pin shaft locking.

（6）Check the lifting boom shaft busing for damage.

（7）Check the telescopic boom for deformation, missing parts and reliable connection.

（8）Check whether the sliding block of the telescopic boom is damaged or lost, and whether the fixing bolt is loose.

（9）Check the telescopic cylinder and observe whether the fixed shaft of the telescopic cylinder is complete and firmly connected; Whether the hydraulic hose and fitting are loose, leaking, etc. Replace with new parts if necessary.

（10）Check the leveling cylinder and observe whether the fixed shaft of the leveling cylinder is complete and firmly connected; Whether the hydraulic hose and fitting are loose, leaking, etc. Replace with new parts if necessary.

（11）Check the jib cylinder and observe whether the fixed shaft of the jib cylinder is complete and firmly connected; Whether the hydraulic pipelines and joints are loose, leaking, etc. Replace with new parts if necessary.

（12）Check whether the connectors of the rotation of the working platform and the electromagnetic coil of the jib are loose or missing, whether the wiring is firm, and whether the insulation layer of the wire is damaged.Replace if necessary.

Working platform

（1）Check the working platform and upper controller, observe whether there is damage, looseness or missing parts, and whether the fastening is firm.
（2）Check the control switch and control handle, observe whether they are loose or missing, and whether they are fixed firmly to ensure that the control handle functions normally.
（3）Check whether the control switch, control handle and electrical connector are connected reliably, whether the connector is rusted, and whether the insulating layer is damaged; Ensure that all control switches function normally.
（4） Check whether the guardrail at the entrance of the working platform is damaged and whether the switch is smooth. Repair as needed.
（5）Check whether the rotation operation of the working platform is normal, whether it is damaged and whether it is fixed firmly; Check whether the hydraulic pipelines and fitting are loose, worn and leaking, and repair or replace them in time if necessary.

Notice
Check all "safety warning", "operating instructions" and other labels to ensure that the handwriting is clear and firmly pasted.

Torque check

Refer to table 3-2. The values in the table are the reference torques of metric bolts
and nuts with different strength levels and diameter specifications. According to different use experience, dry or wet torque values are sometimes given for the reference of the operator during daily inspection or operation.In the repair and maintenance manual, some important parts will give the tightening torque and maintenance inspection interval separately.Tightening according to the values in the tightening torque table during inspection and maintenance can strengthen the safety and reliability of the equipment and improve the performance of the machine.

3-2 Bolt tightening torque

Bolt specification	Metric grade 8.8 bolts and nuts（N.m）	Metric grade 10.9 bolts and nuts（N.m）	Metric grade 12.9 bolts and nuts（N.m）
M4	3	4. 4	5. 1
M5	5. 9	8. 7	10
M6	10	16	18
M8	25	36	43
M10	49	72	84
M12×1. 25	93	135	160
M12×1. 5	89	130	155
M12	86	126	145
M14×1. 5	145	215	255

M14	135	200	236
M16×1.5	226	330	390
M16	210	310	365
M18×1.5	340	485	570
M18	300	430	600
M20×1.5	475	680	790
M20	425	610	710
M22×1.5	630	900	1050
M22	580	820	960
M24×2	800	1150	1350
M24	730	1050	1220
M27×2	1150	1650	1950
M27	1100	1550	1800
M30	1450	2100	2450

Chapter 4 operation and instruction of the machine

4. 1 Summary

This section provides information on machine operation and control.

Notice
The manufacturer cannot directly control the application and operation of the equipment.Users and operators are responsible for observing correct safety specifications.

4. 2 Control and indication description

4. 2. 1 Lower controller (ground control box)

NOTICE:All vehicles have function control buttons. When doing relevant actions, you need to press the function button and corresponding action button at the same time to operate the machine actions, such as luffing, telescopic rotation, jib luffing, manual leveling, platform rotation, etc.


➢ It is forbidden to use the ground controller to operate the machine when there are people in the working platform unless in the emergency treatment state. ➢ When carrying out the machine function test, first operate the machine with the lower controller for test.

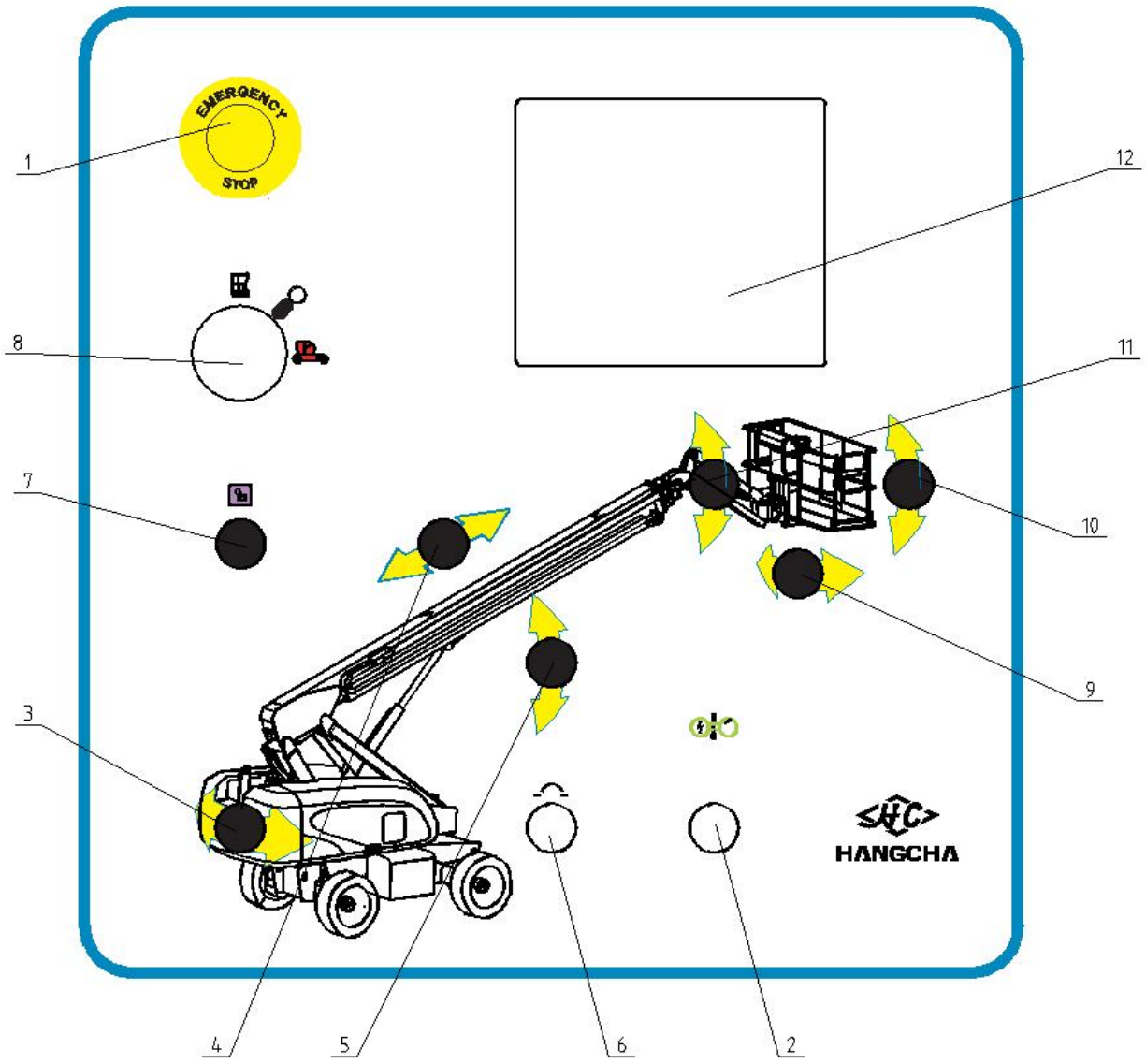
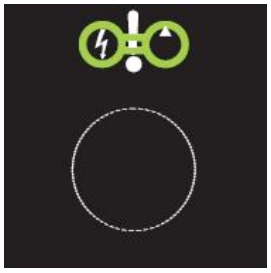
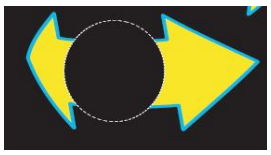
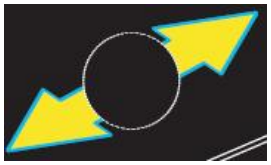
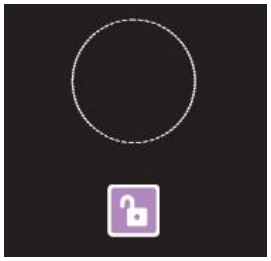
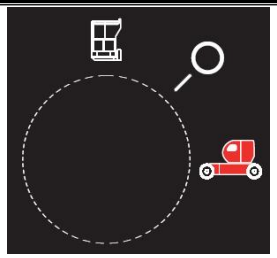
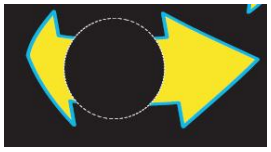
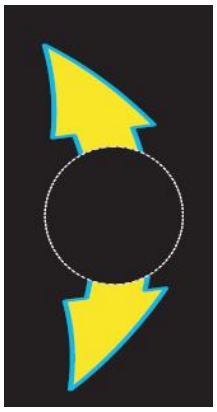
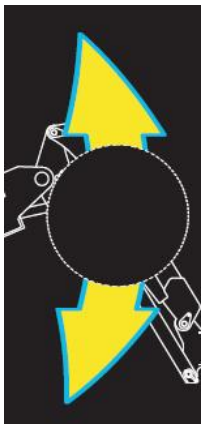


Fig.4-1 Base control panel

NO.	NAME	DESCRIPTION
1	**Emergency stop switch** 	Red two position control switch, used to stop the machine in an emergency: (1)In case of emergency, press the button down to cut off the power supply of the system; (2) Before starting the system, the emergency stop buttons on the lower and upper control panels must be in the pop-up position. Otherwise, the system cannot start. Turn the mushroom head clockwise to release the emergency stop switch.
2	**Emergency switch** 	The emergency switch is a self resetting two position toggle switch used for emergency actions. When the machine is in some fault state or when the main battery is out of charge, the operator can use this switch to perform emergency actions. Move the emergency descent switch upwards and hold it: then select the corresponding function action switch to perform the emergency function action. Attention: The currently supported emergency operations include: main boom luffing downward and main boom retraction (follow the prompts for operation, main boom luffing downward and main boom retraction have a sequential order), flying boom luffing downward, and turntable rotation. When using an emergency pump, do not choose two or more functional actions at the same time to avoid overloading and damage to the emergency pump. Warning: The use of emergency switches is prohibited for routine functional operations. This switch should only be used in the event of an electrical failure of the machine, otherwise it may cause serious accidents and even personal injury.
3	**Turntable control switch** 	A three position toggle switch that automatically resets to the center position in a free state, used to control the left or right rotation of the work fence. Working fence swing range from left to right: ± 90 °
4	**Telescopic control switch**	The main arm telescopic control switch is a self resetting three position toggle switch used to control the telescopic function of telescopic arm.

		Move the lever in the direction of the right arrow and hold it, extending the telescopic arm until it reaches its maximum length. After releasing the lever, the lever automatically resets to the center position. Move the lever in the direction of the left arrow and hold it, and the telescopic arm will retract until it reaches the minimum length. After releasing the lever, it will automatically reset to the center position.
5	**Main boom amplitude control switch** 	The main boom amplitude control switch is a self resetting three position toggle switch used to control the main boom amplitude. (1) Move the lever in the direction of the upward arrow and hold it, and the main arm will rotate upwards until it reaches the maximum angle. After releasing the lever, the lever automatically resets to the center position. (2) Move the lever in the direction of the downward arrow and hold it, and the main arm will lower its amplitude until it reaches the lowest position. After releasing the lever, it will automatically reset to the center position.
6	**current overload protector** 	The current overload protector pops up when the system current is overloaded, cutting off the circuit and protecting the circuit. After troubleshooting, press the current overload protector to reset it.
7	**Enable switch** 	The enable switch is a self resetting two position toggle switch used in conjunction with a functional action switch. Before moving the handle of the function action switch, it is necessary to first move the handle of the function control switch downwards and hold it, then move the corresponding function action switch handle to make the machine move, otherwise the operation will be invalid. After completing the operation, release the lever and the lever will automatically reset to the center position. Reset to the middle position.
8	**Up/Lower Control Switch**	The upper/lower control switch is a three position key control switch used to select whether to use the lower controller or the upper controller for operation: When the key switch is in the middle position, cut off the power supply to the upper/lower controller.

		Rotate the key switch counterclockwise to the left and select the upper control to operate the machine. The lower control does not work. Rotate the key switch clockwise to the right area and select the lower control to operate the machine. The upper control does not work. Attention: (1) After operating the machine, press the emergency stop button on the up/lower controller to put the machine in a shutdown state; (2) After the machine is used, the key should be turned to the center position, then the key should be removed and the machine power should be cut off to prevent unauthorized personnel from accidentally moving it.
9	**Turntable control switch** 	A three position toggle switch that automatically resets to the center position in a free state, used to control the left or right rotation of the work fence. Working fence swing range from left to right: ± 90 °
10	**Platform leveling control switch** 	The platform leveling control switch is a self resetting three position toggle switch. After automatic leveling, if the work platform is tilted, the operator can use this toggle switch to correct the work platform. When the work platform tilts downwards, the lever can be moved along the upward arrow direction and held until the platform is in a horizontal position. After releasing the lever, the lever will automatically reset to the center position. When the work platform tilts upwards, the lever can be moved along the downward arrow direction and held until the platform is in a horizontal position. After releasing the lever, it will automatically reset to the center position. Attention: When the platform tilts, manual leveling and careful correction are required. However, incorrect use of manual leveling can cause workers or goods inside the platform to flip or even fall off the platform. Manual leveling errors on the work platform can cause serious accidents and even death.
11	**Flying arm amplitude control switch**	The flying arm amplitude control switch is a self resetting three position toggle switch used to control the flying arm amplitude. Move the lever in the direction of the upward arrow and hold it, and the flying arm will pitch upwards until it reaches the maximum angle. After releasing the

		lever, the lever automatically resets to the center position. Move the lever in the direction of the downward arrow and hold it, and the flying arm will lower its amplitude until it reaches the lowest position. After releasing the lever, it will automatically reset to the center position.
12	**Display table** 	Multi-function display table for displaying： ● Cumulative working time ● Battery capacity ● Fault code

4.2.2 Upper control panel

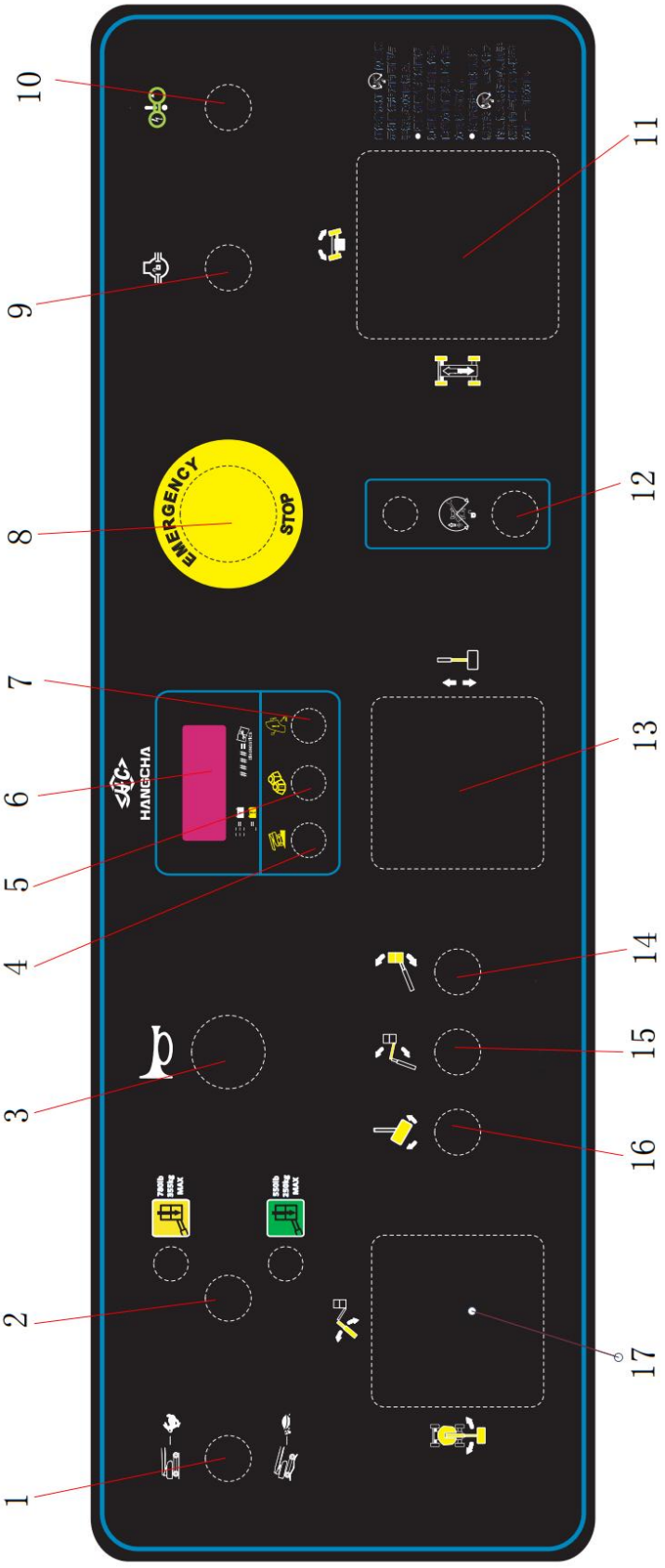
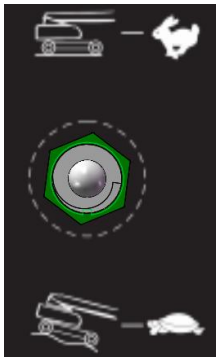
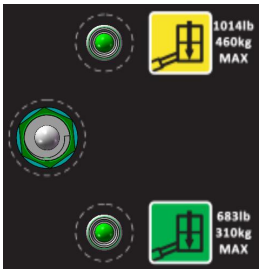
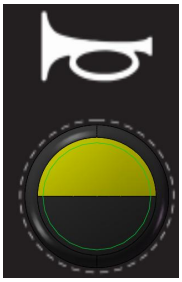
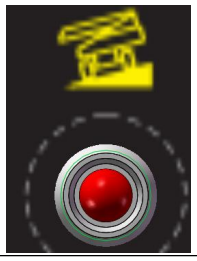
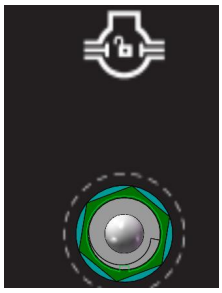
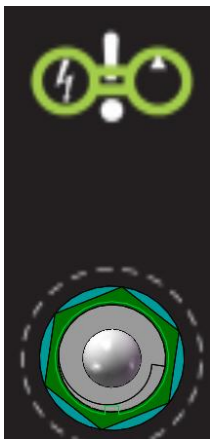


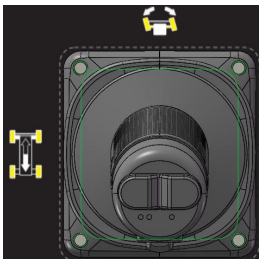
Figure 4-2 Schematic diagram of the upper control panel

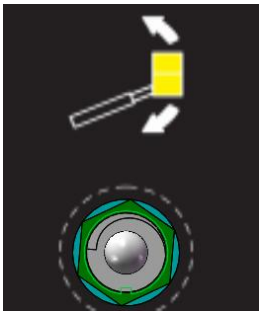
Table 4-2 Introduction to the Upper Control Panel

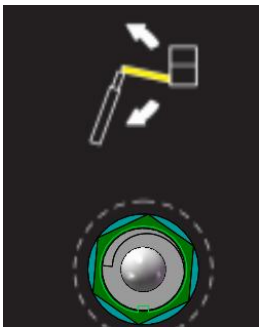
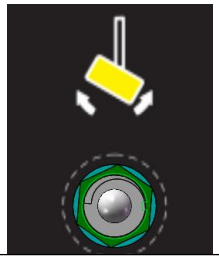
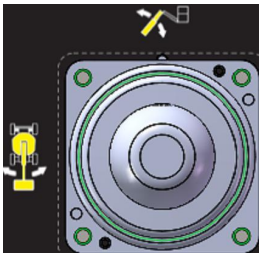
NO.	Name	Description
1	Turtle speed/rabbit speed selection switch 	The turtle/rabbit speed selection switch is a two position toggle switch: When the lever is moved to the lower position, the device is in a turtle speed state; When the lever is moved to the upper position, the device is in a rabbit speed state.
2	Load mode selection switch 	The load mode selection switch is a two position toggle switch, and the indicator light at the corresponding position of the toggle switch lights up green: When the lever is moved to the lower position, the equipment is in light load mode, and the working range of the boom is not limited; When the lever is moved to the upper position, the device is in overload mode, and the working range of the boom is limited.
3	Horn button 	Horn button. When the button is pressed, the horn sounds, and when released, it stops.

4	**Tilt warning indicator light** 	Tilt warning indicator light. Under normal conditions, the indicator light goes off. When the tilt sensor detects that the device is tilted more than 5 ° , the red light will light up.
5	**Overload warning light** 	Overload warning light. Under normal conditions, the indicator light goes off. When the platform's load exceeds the rated load, the red light will light up.
6	**Display table** 	Multi-function display table for displaying： ● Cumulative working time ● Battery capacity ● Fault code
7	**Alarm for exceeding the scope of work** 	Warning lights for exceeding the scope of work. When the position of the work platform exceeds the limited operating range, a red light will light up and an alarm will sound. All actions are restricted and only the main arm can be operated to retract. When the main arm retracts back to the allowable working range, the alarm is cleared and all actions resume normal operation.

8	**Emergency stop switch** 	Red two position control switch ， used to stop the machine in an emergency: (1)In case of emergency, press the button down to cut off the power supply of the system； (2) Before starting the system, the emergency stop buttons on the lower and upper control panels must be in the pop-up position. Otherwise, the system cannot start. Turn the mushroom head clockwise to release the emergency stop switch.
9	**Forced action switch** 	Forced action switch. When the system malfunctions, the forced action switch can be pressed. At this time, the equipment supports downward movement of the main arm amplitude, retraction of the telescopic arm, rotation of the turntable, and downward movement of the flying arm amplitude. Please use the forced action switch with caution!
10	**Emergency switch** 	When the machine is some fault states, the operator can use this switch to perform emergency actions. Move the emergency descent switch upwards and hold it: then select the corresponding function action switch to perform the emergency function action. **Attention:** The currently supported emergency operations include: folding arm amplitude downward, main arm amplitude downward telescopic arm retraction, flying arm amplitude downward, and turntable rotation. When using an emergency pump, do not choose two or more functional actions at the same time to avoid overloading and damage to the emergency pump.

		Warning: The use of emergency switches is prohibited for routine functional operations. This switch should only be used in the event of an electrical failure of the machine, otherwise it may cause serious accidents and even personal injury.
11	**Travel/steering control handle** 	Grasp the enable switch, push the handle forward to move the machine forward, and push the handle backward to move the machine backward. Grasp the enable switch and hold down the left button of the thumb switch above the handle to turn the front wheels of the machine to the left. Hold down the right button of the thumb switch to turn the front wheels of the machine to the right. **Attention:** Walking and turning can be done simultaneously, but it will reduce walking speed.
12	**Forced control switch for walking direction** 	When the tower rotates beyond the restricted angle, the red indicator light flashes to indicate that the equipment's walking direction may be opposite to the direction of the handle's movement, limiting the equipment's walking function. Press the forced control switch for the walking direction and slowly push the walking/turning handle towards the direction consistent with the predetermined movement direction of the machine within 3 seconds.

13	**Main boom telescopic control handle** 	The main boom telescopic control handle is a self resetting proportional control handle used to control the main boom telescopic function. The larger the tilt angle of the handle, the faster the main boom telescopic speed. Move the handle in the direction of the backward arrow and hold it, extending the main boom until it reaches its maximum length. After releasing the lever, the lever automatically resets to the center position. Move the lever in the direction of the forward arrow and hold it, and the main boom will retract until it reaches the minimum length. After releasing the lever, it will automatically reset to the center position.
14	**Platform leveling control switch** 	The platform leveling control switch is a self resetting three position toggle switch. After automatic leveling, if the work platform is tilted, the operator can use this toggle switch to correct the work platform. When the work platform tilts downwards, the lever can be moved along the upward arrow direction and held until the platform is in a horizontal position. After releasing the lever, the lever will automatically reset to the center position. When the work platform tilts upwards, the lever can be moved along the downward arrow direction and held until the platform is in a horizontal position. After releasing the lever, it will automatically reset to the center position. Note: Platform leveling can only be performed in a retracted state.

15	**Flying arm amplitude control switch** 	The flying arm amplitude control switch is a self resetting three position toggle switch used to control the flying arm amplitude. Move the lever in the direction of the upward arrow and hold it, and the flying arm will pitch upwards until it reaches the maximum angle. After releasing the lever, the lever automatically resets to the center position. Move the lever in the direction of the downward arrow and hold it, and the flying arm will lower its amplitude until it reaches the lowest position. After releasing the lever, it will automatically reset to the center position.
16	**Platform swing control switch** 	The platform swing control switch is a self resetting three position toggle switch used to control the platform to swing left or right. Attention: The swing range of the work platform is ± 90 ° .
17	**Main boom amplitude and turntable rotation control switch** 	The main boom telescopic control handle is a self resetting proportional control handle used to control the main boom amplitude and turntable rotation functions. The larger the tilt angle of the handle, the faster the action speed. Move the handle in the forward direction and hold it, and the main arm will rotate upwards until it reaches the highest point. After releasing the handle, it automatically resets to the center position. Move the handle in the left direction and hold it, rotate the turntable clockwise, release the handle, and the handle will automatically reset to the center position.

4.3 Chassis tilt alarm

A chassis tilt sensor is installed on the turntable to detect whether the chassis is level.

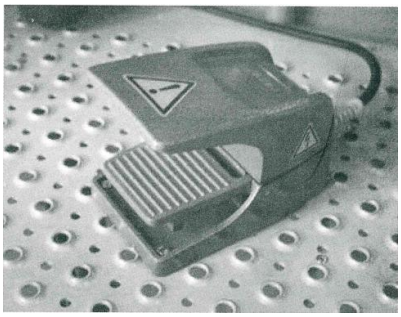
If the sensor detects that the tilt angle of the chassis is more than 5 degrees, the indicator light on the sensor will change from green to red, and the control system will issue an alarm signal. After issuing an alarm signal, the control system will activate a buzzer alarm, and at the same time, the tilt alarm indicator light on the upper control box will light up.

Attention: In the alarm state, the machine's forward, backward, telescopic arm extension, and upward luffing lifting arm upward luffing functions fail.

4.4 Foot safety switch

The foot safety start switch is installed on the bottom plate of the work platform for easy operation.

- When selecting the upper controller to operate the machine, the foot safety start switch must be pressed before executing any operation command, and the action must be selected within 5 seconds to execute the operation.
- If no action is selected within 5 seconds; Or if the interval between the previous action exceeds 5 seconds, the system will automatically return to the initial state and cannot operate the machine. To continue the action, you must release and re press the foot safety switch before proceeding.



Chapter 5 Operating instructions

5. 1 Summary

This equipment is a self-propelled working platform， A platform is equipped at the end of the swing telescopic boom.The platform shaking caused by the lifting boom will not affect the safety of the operators in the platform.The machine can be used to transport workers to work at height.

The upper controller of the equipment is located on the working platform.The operator can use this controller to operate the machine for forward, backward, left and right steering, upward / downward luffing of the lifting boom, rotation of the turntable, left and right rotation and up and down leveling of the platform, expansion and contraction of the telescopic boom and other functional operations.The equipment has a ground controller, which can be used to operate when the platform controller fails.The lower controller can operate the lifting and rotation of the boom, which is used to lower the platform to the ground when the operator on the platform cannot operate in an emergency.The lower controller is used to check the machine function and action before operation.

Operating instructions and warnings are pasted near the two controllers and elsewhere in the machine.Let operators know the operation instructions and warnings and review them regularly, so as to improve their familiarity with machine operation and maintenance.

Safe operation instructions are provided for the operator in the operation and maintenance manual, which comply with national laws and regulations and on-site operation rules of the workplace.Safe operation instructions are very important to operators. According to the instructions in the operation and maintenance manual, the machine should be maintained regularly. If the machine is not maintained regularly or has faults, damage or changes, it should be reported to the machine owner or the person in charge of the operation site or the safety supervisor in time, so that the machine can be repaired in time. These are necessary.

The equipment can not lift heavy objects except for the operation tools required by the operator to operate in the working platform. Operation tools are not allowed to be placed outside the working platform.This machine can not be used as a lift, crane or high-altitude support column, and can not be used to push or pull other objects.

Each functional action of the equipment is realized by the hydraulic pump or hydraulic motor providing power for each hydraulic cylinder.Each hydraulic element is controlled by the hydraulic valve, and the hydraulic valve is controlled by the switch and operating lever, so as to control the movement of each hydraulic component.The speed of each function action controlled by the operating lever can change from zero to maximum, and the speed is determined by the position of the operating lever.The function action controlled by the toggle switch is only startup and shutdown.When operating the machine with the upper control, the foot switch on the platform floor must be pressed before operation.When the foot switch is released, the operation of each function action fails, which also provides an emergency stop method.

The machine is 4x4 and the motor is driving each driving wheel. Each drive wheel is a spring brake brake, electric release. When the drive lever is brought back to the median, the drive wheel automatically applies to the brake.

The platform has dual loads, rated loads is 310kg and 460kg (limited); When the platform is loaded with a load of ≤ 310kg, it can be placed at any position within the working area. When 310kg＜load≤460kg, the platform can only be used within the limited working area.

Machine status description：

Working status: The maximum driving speed of the machine is less than 0.8km/h, and the chassis tilt angle sensor is activated.

In the working state upon meeting any one of the requirements

① Single stage extension of telescopic arm by 1 m.

② Lift the main arm 5 degrees above the horizontal level.

Retracted status/Transportation status: The machine can travel at maximum speed and can climb hills.

5. 2 Operating characteristics and limitations

Machine working capacity

Please confirm before operating the self-propelled telescopic boom aerial work platform:
(1) The machine is located on a flat and solid level ground；
(2) The working load does not exceed the rated load.
(3) The machine is in normal working condition.
(4) Are the tires fastened.
(5) The machine has not been modified without authorization.

Stability

The stability of the machine can be divided into two working conditions: forward stability and backward stability.The forward tilt stability is shown in Figure 5-1, and the backward tilt stability is shown in Figure 5-2.

To prevent the machine from turning forward and backward, do not overload the machine or operate the machine on uneven ground.

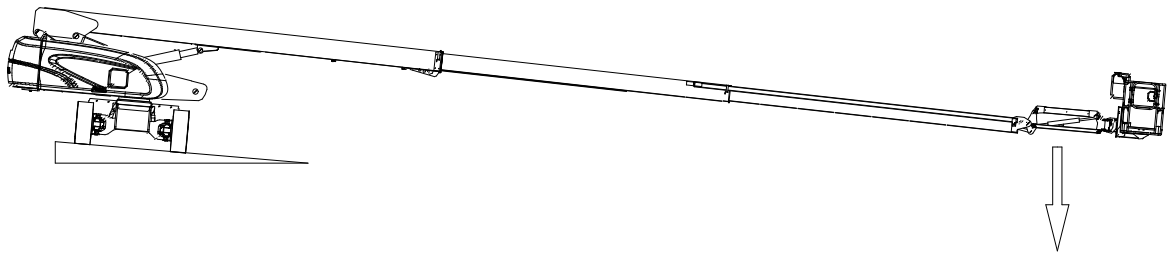


Figure 5-1 Minimum Forward Stability Position

1. The boom is fully extended;
2. The boom is horizontal;
3. Rotate the turntable 90 °;

If the machine is overloaded or working on a surface that exceeds the maximum allowable tilt angle, the machine will tilt in the direction of the arrow shown in the diagram.

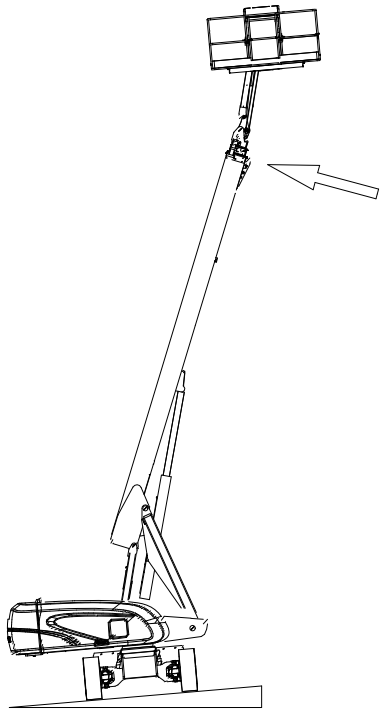


Figure 5-2 Minimum Backward Tilt Stability Position

1. The boom is fully retracted;
2. Maximum boom amplitude;
3. The maximum upward amplitude of the flying arm;
4. Rotate the turntable 90 °;
5. Rotate the platform 90 °;
6. If the machine is overloaded or working on a surface that exceeds the maximum allowable tilt angle, the machine will tilt in the direction of the arrow on the drawing

5. 3 Driving operation

- Unless it is confirmed that the machine is on a flat and solid ground, it is strictly prohibited to drive the machine under the lifting state of the lifting boom; In order to avoid losing control of driving operation or overturning, it is forbidden to drive on an inclined road with a slope exceeding the requirements in the manual.
- Do not operate on a slope more than 5 °;
- When climbing, the driving mode should select climbing mode.When the platform is driving in the lifting state or in reverse, especially when any part of the machine is less than 2m away from the obstacle, drive carefully.
- Keep the telescopic boom between the left and right wheels of the vehicle when driving. If it exceeds the driving area, turn the turntable back to the appropriate position.

Forward and Backward Operation Steps

(1) When the emergency stop switch is open, hold the control handle, hold the front enabling switch of the handle, and push the handle forward from the median to control the forward drive. The farther the handle deviates from the median, the faster it travels.
(2) Hold the joystick, press the front side enabling switch of the handle, and pull the handle backward from the median to control the backward drive. The farther the handle deviates from the median, the faster the retreat speed..

5. 4 Steering Operation

(1) The emergency stop switch is open, hold the handle and press the front enabling switch of the handle; also press the left button of the thumb switch driving the control handle to achieve a left turn.
(2) Hold the joystick and press the front handle enabling switch and press the right side button of the joystick to achieve a right turn.

5. 5 Platform Operation

Platform Leveling Operation

This operation is used for platform leveling and correction during the lifting or lowering process.

The leveling of the working platform of this machine is automatic. When the platform is tilted, manual leveling can be used carefully for correction. If operated improperly or adjusted in the opposite direction, it is possible to cause tools or

personnel inside the work platform to fall. Incorrect operation may cause equipment damage or even personal injury or death

(1) Rotate the up and down control switch to select the up/lower control operation;

(2) Step on the foot switch (during upper control operation), toggle the function control switch handle and hold it (during lower control operation);

(3) Move the lever upwards and hold it, level the platform upwards, release the lever, and the lever will automatically reset to the center position;

(4) Move the lever downwards and hold it, level the platform downwards, release the lever, and the lever will automatically reset to the center position.

Platform swing operation

(1) Rotate the up/down control switch to select the up/down control operation;

(2) Step on the foot switch (during upper control operation), toggle the function control switch handle and hold it (during lower control operation);

(3) Move the lever to the left and hold it, the platform swings to the left, otherwise it swings to the right; Release the lever and the lever will automatically reset to the center position.

5. 6 Turntable rotatory operation

- When the machine is located on an inclined road surface, it is prohibited to operate the machine for rotation and lifting.
- Do not rely solely on whether there is a tilt alarm to determine whether the chassis is level.
- In any case, if the control handle or switch of the work platform panel is released and cannot automatically return to the center position, it must be stopped immediately and handed over to professional maintenance personnel for troubleshooting before operation to avoid causing more equipment damage or even personal injury.
- If the machine does not stop after the control handle or switch is released, quickly release the foot switch and press the emergency stop button to stop.

Upper control operation

1) Step on the foot switch, press and hold the front control button of the handle and hold it;

2) Push the handle to the right to rotate the turntable to the right: Push the handle to the left to rotate the turntable to the left.

Lower control operation

1) Move the function control switch handle and hold it.

2) Turn the rotary control switch and hold it, rotate the turntable in the corresponding direction until it reaches the desired position and then release it.

Attention
Before turning, it is necessary to ensure that there is sufficient space to prevent encountering obstacles during the rotation process. During the rotation, pay attention to observing that there is enough space between the rotating parts and the wall.

5. 7 Main boom operation

Main boom telescopic operation

(1) Rotate the up/down control switch to select the up/lower control operation;

(2) Step on the foot switch (upper control), toggle the function control switch handle and hold (lower control).

(3) Simultaneously move the lever in the corresponding arrow direction and hold it, extend/retract the main arm, release the lever, and the lever will automatically reset to the center position.

Upward luffing operation

If selecting the lower control for upper amplitude operation:

(1) Move the function control switch handle and hold it.

(2) At the same time, move the lever in the direction of the up/down arrow and hold it, and the main arm will shift up/down. After releasing the lever, it will automatically reset to the center position.

If selecting the upper control for upper amplitude operation:

(1) Step on the foot switch, press and hold the telescopic arm amplitude and turntable rotation control handle buttons.

(2) Simultaneously push the handle up/down and hold it, the main arm will swing up/down. The more the deviation of the handle from the center position, the faster the speed of the swing up/down. Release the handle and it will automatically reset to the center position.

5.8 Emergency operation

Attention
When using an emergency pump, do not choose two or more functional actions at the same time to avoid overloading and damage to the emergency pump; The currently supported emergency operations include: lowering the main boom upward luffing, retracting the main boom, lowering the flying boom upward luffing, and turning the turntable

The main function of emergency function is to provide power for emergency action when the machine fails to operate due to electrical faults. Then let professional maintenance technicians to find the cause of the malfunction and troubleshoot it. When emergency operations are required, the following steps can be followed.

Emergency operation procedure:

Upper control operation

(1) Turn the upper and lower control selection switches to the upper control.

(2) The emergency stop switch is in the open state.

(3) Move the auxiliary emergency function switch upwards and hold it.

(4) Press and hold the foot switch.

(5) Select the corresponding function switch for emergency action operation.

(6) Release the emergency pump selection switch handle, function switch handle, and foot switch.

(7) Press the emergency stop switch.

Lower control operation

(1) Turn the upper and lower control selection switches to the lower control.

(2) Turn on the emergency stop switch.

(3) Move the emergency function switch downwards and hold it.

(4) Select the corresponding function switch for functional action operation.

(5) Release the emergency pump selection switch handle and the function switch handle.

(6) Press the emergency stop switch.

The use of emergency function switches is prohibited for conventional amplitude control operations. This switch should only be used in the event of an electrical malfunction of the machine, otherwise it may cause serious accidents and even personnel injury or death.

5.9 Flying boom operation

(1) Rotate the up/down control switch to select the up/lower control operation;
(2) Step on the foot switch (during upper control operation), move the function control switch handle and hold it (during lower control operation);
(3) Move the lever in the direction of the upward arrow and hold it, and the flying arm will pitch upwards until it reaches the maximum angle. Conversely, the flying arm will pitch downwards. After releasing the lever, the lever automatically resets to the center position.

5.10 Swing axle locking function test

(1) Place a 150mm (5.9in) inclined pad directly in front of the left front wheel of the device.
(2) Select the upper control operation and extend the telescopic arm 1.2m to put the equipment in working condition.
(3) The driving device drives the left front tire onto the cushion block.
(4) Slowly operate the turntable to rotate about 90 degrees to the right side of the equipment.
(5) At this time, the driving direction warning light is on, and the corresponding function is operated to make the main arm horizontal and fully extend the telescopic arm.

(6) Auxiliary personnel observe the floating oil cylinder, and the force side floating oil cylinder is not allowed to retract. And retract the arm frame to the stored state.
(7) Turn the "forced control switch for walking direction" to drive the equipment off the cushion block.
(8) Auxiliary personnel check on the bottom to see if the left or right front wheel is still off the ground and remains lifted.
(9) Slowly operate the turntable to return to its initial position (between the two drive wheels). At this time, the floating oil cylinder of the swing axle should be released, allowing the empty left front wheel to fall back to the ground (sometimes it is necessary to walk forward or backward again to allow the empty wheel to fall back to the ground).
(10) Place a 200mm (7.9in) slanted cushion block directly in front of the right front wheel.
(11) The driving device drives the right front wheel onto the cushion block.
(12) Slowly operate the turntable to rotate approximately 90 degrees to the left side of the equipment.
(13)At this point, the driving direction warning light is on, and the "forced control switch for driving direction" is turned on to drive the equipment off the cushion block.
来。
(14) Auxiliary personnel check on the bottom to see if the left or right front wheel is still off the ground and remains lifted.
(15) Slowly operate the turntable to return to its initial position (between the two drive wheels). At this time, the floating oil cylinder of the swing axle should be released, allowing the empty left front wheel to fall back to the ground (sometimes it is necessary to walk forward or backward again to allow the empty wheel to fall back to the ground).
(16) Repeat the above steps to check the left/right front floating cylinder.
(17) If the floating cylinder is working abnormally, the fault should be resolved by qualified maintenance personnel before further operation.

Attention
The locking function test of the swing bridge should be regularly tested, but regardless of whether it has been tested or not, once the system components are replaced or the system status is uncertain, testing should be carried out immediately to avoid accidents.

5.11 Shutdown and Parking

The steps to shut down and park the machine are as follows：

(1) Drive the machine to a properly protected area.

(2) Confirm that the main arm is fully extended to the lowest point and the telescopic arm is fully retracted.

(3) Completely unload the load inside the work platform.

(4) Place the lower control key selection switch in the middle position, press the emergency stop switch, remove the key, and press to turn off the main power switch on the chassis.

(5) If necessary, cover the platform console to protect operation indicator labels, warning labels, and control devices from adverse environmental influences.

5.12 Lifting and bundling

Lifting and bundling Operation

(1) Refer to the label to obtain the total weight of the machine.

(2) Place the boom in a retracted position and confirm that the rotary locking pin of the turntable has been locked.

(3) Remove all moving parts from the machine

(4) Adjust the telescopic appropriately to avoid damage to the machine, while keeping the machine level.

If it is necessary to use a crane for lifting, the lifting device can only be tied to the designed binding hole (with a lifting position label attached).

Attention
The lifting holes are located on both sides of the turntable. The four ropes or chains used for lifting must be corrected to ensure that the machine is in a horizontal position during the lifting process. Ensure that the lifting capacity, loading surface, straps or ropes of the crane are sufficient to support the weight of the equipment. Please check the nameplate to determine the weight setting, otherwise it may cause serious accidents.

Bundling operation

(1) The boom is in a retracted state and it is confirmed that the rotary locking pin of the turntable has been locked.
(2) Cut off all moving parts on the device.
(3) Fix the chassis and platform with appropriate length ropes or chains, using at least 4 ropes or chains at the chassis position and fixed at the four corners of the frame. The platform also needs to be fixed with at least 1 rope.
(4) To protect the arm components and platform weighing sensors, do not apply significant downward tension to the ropes or belts used to secure the platform when downloading platform attachments. A foam layer can be placed under the platform to ensure that the platform is suspended.

Center of gravity	X axis	Y axis
HB280P	1.98m	1.22m
HB250P	1.75m	1.26m
HB230P	2.2m	1m

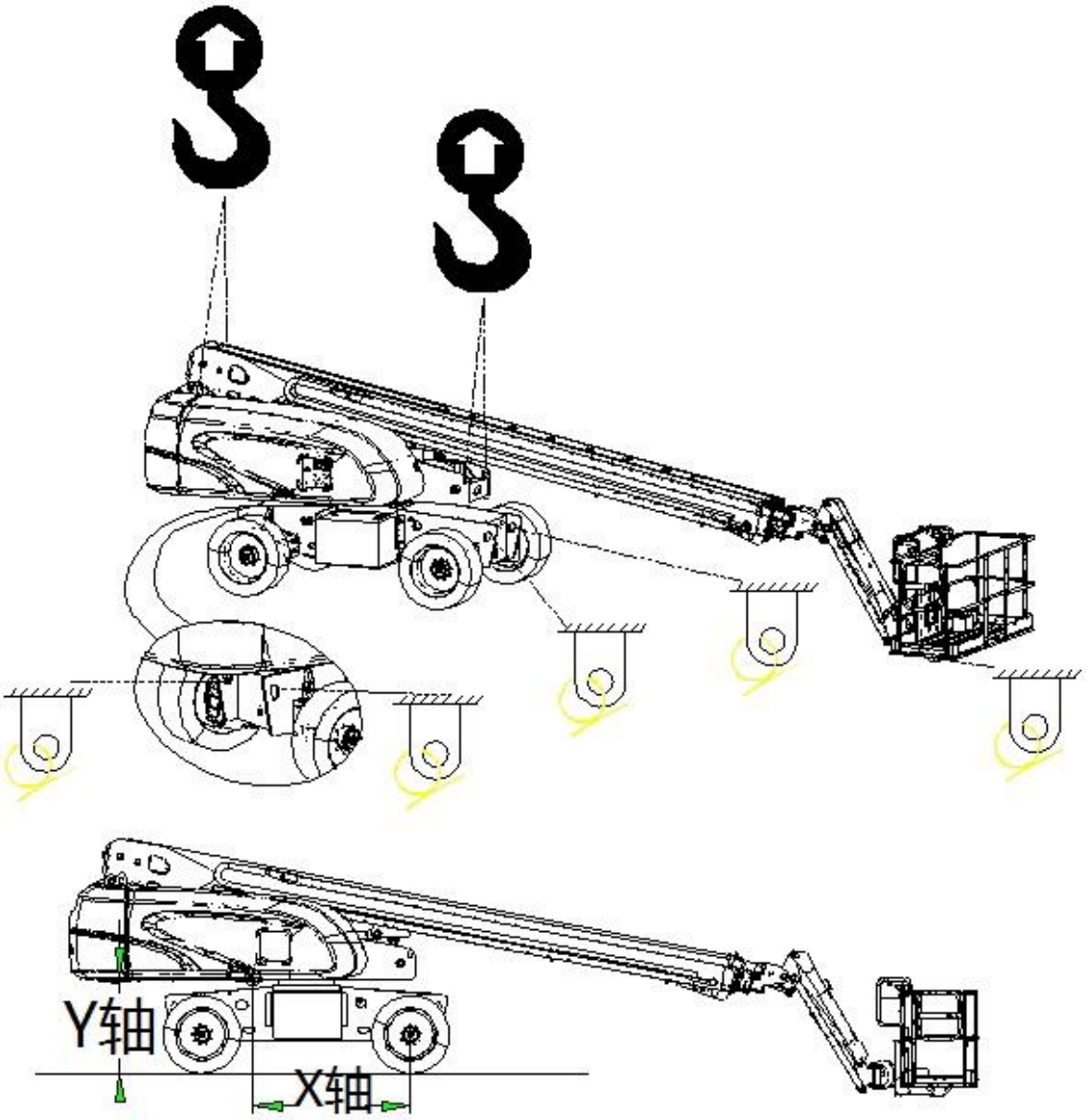


Figure 5-4 Schematic diagram of lifting and bundling

5. 13 Trailer operation

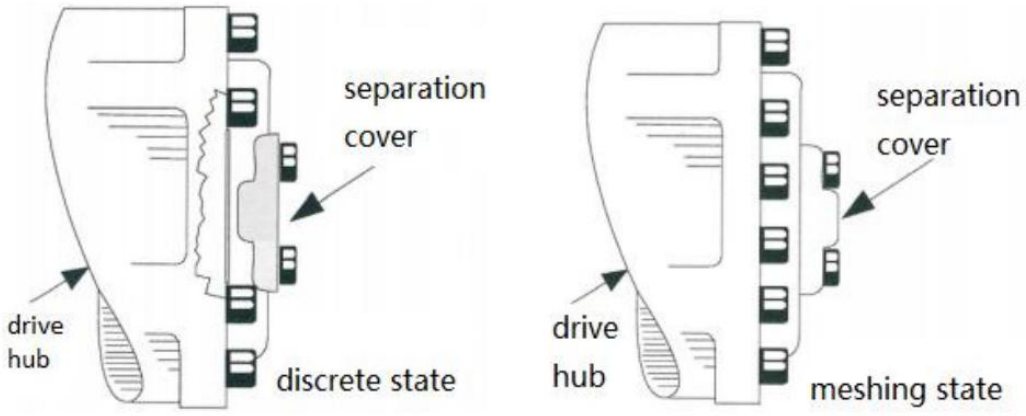
- This machine is not equipped with a trailer brake system, and there is a risk of losing control of the machine. Therefore, the towing vehicle must be able to control the machine at all times.
- High speed towing is prohibited, with a maximum towing speed of 8km/h and a maximum towing slope of 25%. Not following the regulations may result in serious accidents or personal injury or death.

Before towing, complete the following preparations:

(1) The telescopic arm retracts, the main arm is lowered into place, and the turntable rotates to the stored position.

(2) Reverse the separation cover to separate the drive hub.

(3) After the towing operation is completed, restore the separation cover and re engage the drive hub.



Trailing is strictly prohibited during the operation of the motor pump or the rotation of the drive wheel.

Chapter 6 Emergency operation

6. 1 Summary

This chapter provides the rules to be observed and the emergency operation in case of emergency during operation on the machine.The entire operation manual of the machine, including this chapter, shall regularly train all personnel related to the machine or those in contact with the machine.

6. 2 Emergency traction steps

In case of machine failure or power failure, it may be necessary to move the machine. Unless equipped with appropriate equipment, traction is strictly prohibited.The following steps are only for emergency movement to the appropriate maintenance area.

（1）Block the wheels.

（2）Remove the release cover to separate the drive hub.

（3）Connect suitable equipment, remove the wedge and traction the machine.

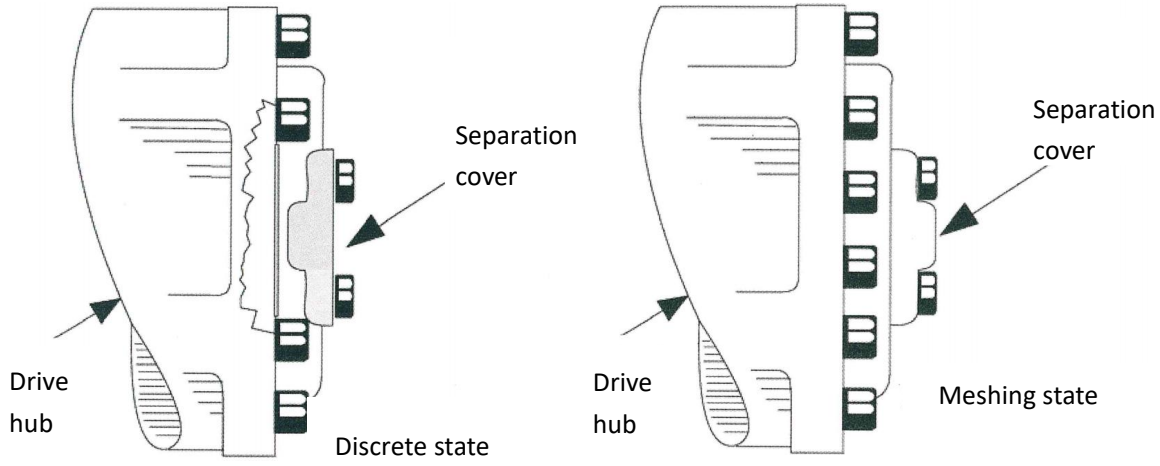
After traction, perform the following steps：

（1）Place the machine on a solid and flat ground.

（2）Chock the wheels.

（3）Remove the release cover and restore the drive hub.

（4）Remove the wedge from under the wheel.



6. 3 Emergency control device and installation position

6. 3. 1 Emergency stop button

（1）There is an emergency stop button on the lower controller panel and the upper controller panel respectively.

Check the emergency stop function before each operation of the machine.If there is any problem, repair it immediately.

(2) In the normal working state, the emergency stop button is in the pop-up position, turn on the power supply of the control system, and the system works normally.In case of emergency, press any emergency button and the machine will stop running Immediately.

6.3.2 Lower controller

The lower controller is located on the left side of the vehicle, and a key selection switch is installed on the lower control panel.The upper control can be switched to the lower control by turning the key switch， The luffing, slewing, telescopic and leveling operations of the main boom are carried out through the lower controller.In actual operation, in case of controller function failure, rescuers or companions can switch to the lower control for operation.

6.3.3 Emergency descent switch

This machine is equipped with two emergency descent switches, located on the left side of the ground control box. This function can only be used when the pump station motor or controller malfunctions. The emergency switch can retract the telescopic arm and lower the amplitude of the main arm. Please refer to chapter 5.8 for the operation steps.

6.4 Emergency operation

6.4.1 Lower control operation

Be familiar with using the lower controller for emergency operation in case of emergency.

The lower control operator must be very familiar with the performance characteristics and parameters of the machine, and be familiar with the functions of various control handles and button switches on the lower controller. Relevant training and actual simulation operation shall be carried out to ensure that they can take treatment calmly and freely in case of emergency.

6.4.2 Emergency treatment when the operator is unable to operate the machine

If the operator in the platform has collapsed or is entangled by ropes, etc., and cannot operate the machine:

（1）Other personnel can only operate the machine through the ground control device as needed.

（2）Other personnel on the platform should continue to operate, and the lifting arm should be slowly lowered by the person on the ground through the emergency descent button.

（3）A forklift crane or other device can be used to transfer people on the platform and to keep the machine stable.

6.4.3 Emergency treatment of work platform or lifting boom stuck at height

If the working platform or main boom is stuck by buildings and equipment at height, stop the machine immediately. Do not attempt to operate the machine through the upper controller or lower controller to get out of danger.First, transfer all personnel and tools of the working platform to a safe place by other means, then lift the restrictions of the working platform by other methods or with the help of other equipment, so that the equipment can move freely, and then operate the machine through the lower controller.

6.4.4 Inspection after machine overhaul

After the overhaul of the machine after the accident, first carefully check whether the various functions of the machine are normal through the lower controller, and then switch to the upper controller for inspection.For safety, the lifting height shall not exceed 3M unless it is confirmed that the damaged parts have been repaired in good condition.

6.5 Accident notification

In order to better understand and protect your machinery and equipment, HANGCHA Group. requires that once an accident occurs during the use of HANGCHA products, regardless of any reason, equipment damage and casualties, please inform HANGCHA Group immediately, Otherwise, if HANGCHA Group is not notified within 48 hours of the accident, HANGCHA Group has the right to think that you have automatically waived the warranty right of the accident machine, and the warranty period will automatically terminate, regardless of the remaining warranty period.
You can inform HANGCHA group by telephone, fax, email, etc.

Chapter 7 Normal maintenance

7. 1 Summary

The purpose of this chapter is to provide the operator with additional information required to correctly operate the box and maintain the machine.The maintenance part of this chapter is only used to assist the operator in daily maintenance ， Not as preventive maintenance and inspection Icon.

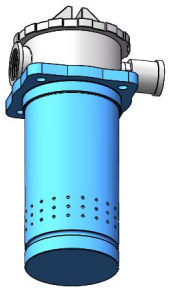
7. 2 Lubrication specification

Notice
Lubrication cycle are based on machine operation under normal conditions. When the equipment operates in multi shift system or in harsh environment, the lubrication frequency shall be increased accordingly.

Lubrication specification

Lubrication device	Capacity	Suggestion
Hydraulic tank	100L	Shell 46#hydraulic oil
Wheel reducer	1. 8L	Shell SPIRAX A80W90
General lubrication Lubrication of body gear bearing bush		High performance lubricant

7. 3 Replace the filter



Name	Replace cycle
High pressure filter	Per 120h or 2years
Return oil filter	First time 50h,per 300h or 6 month

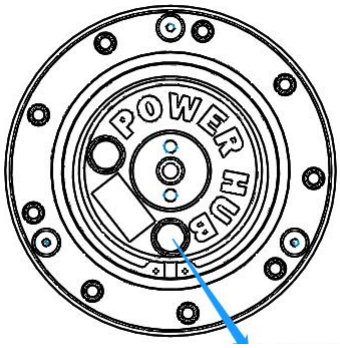
Notice
When replacing any filter, it is recommended to replace all filters on the equipment at the same time.

7. 4 Operator maintenance

7. 4. 1 Reducer

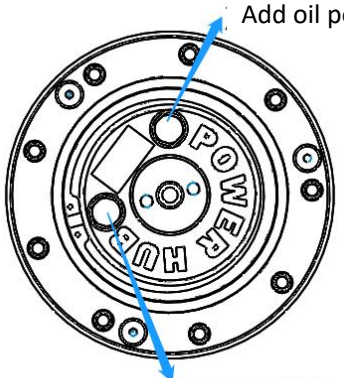
Changing the gear lubricating oil of the reducer is very important for prolonging the service life of the machine and maintaining the good operating performance of the machine. Irregular replacement of the lubricating oil will lead to the decline of the performance of the equipment. If the equipment is still running under insufficient lubrication, it will cause damage to the parts and components.

（1）Park the equipment on level ground.
（2）Confirm the reducer to be maintained and drive the equipment to make any oil filling plug on the reducer at the lowest position.
（3）Unscrew the two oil filling plugs on the reducer and drain the oil.
（4）Drive the equipment so that any oil filling plug on the reducer is in the highest position and the other is in the horizontal position.
（5）Inject lubricating oil into the reducer from the upper oil filling hole until the lower surface of the oil filling hole in the horizontal position is flat.
（6）Apply thread sealant to the oil filler plug, then screw the oil filler plug back to the oil filler hole of the reducer and tighten it.
（7）Repeat the above operation for other reducers.



Oil unloading position

Add oil position



Horizontal observation position

Lubrication of wheel reducer			
Lubrication	Oil filling plug	**capacity**	Each requires 1. 8L
Lubricating oil	Shell SPIRAX A80W90, or other gear lubricants meeting the applicable API classification level GL5.		
Lubrication cycle	Check the oil level once every 100 hours; Every two years		

7. 4. 2 Lubrication of slewing ring and worm gear reducer

The annual lubrication planning of slewing ring and worm gear reducer is very important to maintain the good performance of the machine and prolong the service life of the machine. Running the equipment under insufficient lubrication will cause damage to parts and components.

(1) The device is in a stored state, open the hood.

(2) Align the nozzle of the butter gun with the remote lubrication hose joint of the rotary support.

(3) Inject an appropriate amount of lubricating grease.

Do not grease the slewing bearing too much.
Too much butter will squeeze the sealing ring outside the slewing ring.

(1) Align the nozzle of the grease gun with the meshing point between the rotary reducer and the rotary support gear, and apply an appropriate amount of lubricating grease.

(2) Then rotate the turntable at a certain angle and repeat the above action until the entire rotation support is coated with butter.

(3) Open the oil filling plug of the rotary reducer and check the oil level. The oil level should be level with the plug opening.

(4) Add gear oil from the oil filling port until the oil level is flush with the plug.

(5) Install the oil filling plug and clean the gear oil that has spilled during maintenance.

Lubrication of slewing ring			
Lubrication	1 grease fittings	**capacity**	As needed
Lubricating oil	Multi effect grease	**Lubrication cycle**	3 months or 150 hours of operation
Lubrication of external teeth of slewing ring			
Lubrication	Slewing ring external gear teeth	**capacity**	As needed
Lubricating oil	Open gear grease	**Lubrication cycle**	50 hours or per month
Lubrication of worm gear reducer			
Lubrication	Oil filling plug	**capacity**	As needed
Lubricating oil	Shell SPIRAX A80W90, or other gear lubricants meeting the applicable API classification level GL5.		
Lubrication cycle	Check the oil level once every 100 hours; Every two years		

7. 4. 3 Testing and changing hydraulic oil

The testing and replacement of hydraulic oil is very important to maintain the good performance of the machine and prolong the service life of the machine.Polluted hydraulic oil and filter may cause the machine to run smoothly, and continued operation may cause damage to parts.In the case of poor working environment, the frequency of replacing hydraulic oil should be increased.

Notice

Before changing the hydraulic oil, it is very important to consult the local supplier on how to select the appropriate hydraulic oil specification.If the hydraulic oil has not been replaced within two years, the hydraulic oil shall be tested every quarter. If the test is unqualified, the hydraulic oil shall be replaced in time.

Follow the steps below to replace the hydraulic oil when the device is in a stored state:

（1）Open the hood and close the hydraulic shut-off valve located on the side of the fuel tank.

（2）Remove the drain plug at the bottom of the hydraulic oil tank, drain all hydraulic oil into a suitable container, and install the drain plug after tapping.

Disconnect and plug the suction pipe.

（4）Disconnect and block the return oil pipe.

（5）After removing the hydraulic tank fastening bolts, remove the hydraulic tank from the machine.

(6) After cleaning the inside of the fuel tank with neutral solvent, open the drain plug to drain the solvent.

(7) Replace the oil suction filter screen. (Refer to the replace steps for oil suction filter components).

(8) Replace the return oil filter screen. (Refer to the replace steps for oil suction filter components).

(9) After the hydraulic oil tank has dried, install the cover plate and connect the oil suction and return pipes to the hydraulic oil tank.

(10) Install the playback oil plug.

Before maintaining the hydraulic system, the hydraulic oil must be cooled to room temperature.Inspection and maintenance must be carried out with the equipment turned off. When removing the hose and connector, the O-ring on the hose and connector must be replaced.Slowly disassemble hydraulic components to reduce hydraulic oil pressure. Excessive hydraulic oil pressure may penetrate the skin. If injured, seek medical attention immediately.

Parameter items	Hydraulic oil specifications
Normal temperature area （0℃~40℃ [30℉~104℉]）	L-HM46

Cold areas (-25℃~25℃ [-13℉~77℉])	L-HV32
High temperature areas (＞40℃ [104℉])	L-HM68
Extreme cold areas (＜-30℃[-22℉])	Customized solutions

7.4.4 Replace hydraulic oil filter

Regular replacement of hydraulic oil filter is very important to maintain good performance and prolong the service life of the machine.If the hydraulic filter is polluted or the filter screen is blocked, the operating performance of the machine will decline, and continued use will cause damage to parts and components.When the environmental conditions are too bad, the filter replacement cycle should be shortened.

Replacement steps of oil filter：

1）Clean the area near the hydraulic oil tank cover panel.

2) Use a torque wrench to loosen and remove the bolts on the hydraulic oil tank cover plate, remove the hydraulic oil tank cover plate, and then remove the filter from the oil suction device.

3) Screw in a new filter on the oil suction cup.

4) Replace the fuel tank cover plate and tighten the bolts.

5) Replacement cycle: every two years or 1200 hours of operation. When replacing hydraulic oil, the filter should be cleaned or replaced.

Replacement steps of return oil filter：

1) Clean the area around the filter and remove the filter cover.

2) Pull out the filter element from the filter chamber.

3) Install the new filter element into the filter.

4) Replace the filter cover plate and remove any hydraulic oil splashed out during the replacement of the filter element.

5) Replacement cycle: The filter element should be replaced after the first 50 hours of machine operation, and then every 6 months or 300 hours of machine operation, or when there is a signal indicating the need to replace the filter element.

Replacement steps of high pressure filter：

1) The device is in a bookmarked state, turn off the main power switch.

2) After standing for a while, place a suitable container under the filter to prevent a small amount of dripping.

3) Slowly disassemble the filter cover with a wrench, paying attention to hydraulic oil splashing.

4) Pull out the filter element from the filter chamber and install the new filter element into the filter.

5) Replace the O-ring seal of the filter chamber.

6) Install the filter chamber back and clean the hydraulic oil that overflowed during the replacement process.

7) Replacement cycle: every two years or 1200 hours of operation. When replacing hydraulic oil, the filter should be cleaned or replaced.

7. 4. 5 Battery maintenance

The reaction products of lead-acid batteries are flammable and explosive.In order to avoid casualties caused by explosion, it is forbidden to smoke or keep the battery close to fireworks during battery maintenance.During the maintenance of lead-acid batteries, it is generally necessary to wear eye masks.

1）Open the battery cover plate and find the battery terminal and exhaust cap.

2）Remove the battery cables on the battery terminals one by one, starting from the negative pole.Clean the cable with neutral solution (such as baking soda, water or ammonia) and wire brush.Replace the cable and / or cable clamp bolts as necessary.

3）Clean the battery terminal with a brush and reconnect the cable to the terminal.Coat non-contact surfaces with mineral oil or vaseline.

4）After cleaning the terminal posts of all cable boxes, confirm that all cables are correctly positioned and not clamped.Close the battery cover.

5） Lithium batteries and maintenance free batteries require no maintenance for normal use.

- Do not change any electrical system components unless you are familiar with the electronic control system.
- When checking the battery, it is forbidden to connect the terminal of the battery with metal objects.Otherwise, it will cause short circuit, fire and even explosion.
- Do not charge the frozen battery, otherwise it may cause explosion.
- The lead-acid battery contains sulfuric acid, which will cause certain injury if it is accidentally contacted.Therefore, when working near the lead-acid battery, you need to wear a mask to prevent acid from splashing into your eyes.Once the acid splashes on the eyes, wash them with clean water immediately and seek medical attention in time.At the same time, it is also necessary to wear protective gloves and protective clothing during operation to avoid acid injury to the skin.If acid splashes on the skin, rinse immediately with clean water.
- Before repairing the electrical system, remove the battery wiring.When removing other wiring, first remove the grounding wire.When rewiring, finally connect the grounding wire.

7. 4. 6 Tire and wheel maintenance

Tire damage

For polyurethane foam tires, the company recommends that when the following situations occur, they should be stopped immediately and ready to replace the tire or tire assembly.

- Smooth and uniform cuts with a total length exceeding 75cm (3 inches) appear in the tire ply.
- Cracks or cracks (uneven edges) exceeding 25cm (1 inch) in any direction appear in the tire ply.
- Perforation with a diameter exceeding 2.5cm (1 inch).
- Any damage to the ply of the tire bead.

If the tire is damaged but does not meet the above standards, the tire must be inspected every day to ensure that the damaged part does not exceed the allowable standard.

Tire replacement

HANGCHA group recommends using tires with the same size, brand and level as the original tires of the machine for replacement.Please refer to the parts manual of the corresponding model for the part number of the tire of the specific model.If HANGCHA tires are not used, the replacement tires used shall meet the following characteristics:

- Tier / load rating and size equal to or better than original tires.
- The tread grounding width is equal to or better than the original tire.
- The wheel diameter, width and compensation size are equal to or better than the original tires.
- These applications (including inflation pressure and maximum tire load) are permitted by the tire manufacturer.Without the special approval of Hangcha group, no tire filled or solid tire components should be replaced with pneumatic tyres. When selecting and installing replacement tires, ensure that all tire pressures reach the pressure specified by HANGCHA group.Due to the size difference between different brands of tires, two tires on the same axle should use the same brand.

Wheel replacement

The rims installed on each product model are strictly designed according to the stability requirements such as wheel track, tire pressure and load capacity.Changing the rim width, center position and diameter without the written advice of the factory may lead to unstable and dangerous conditions.

Wheel installation

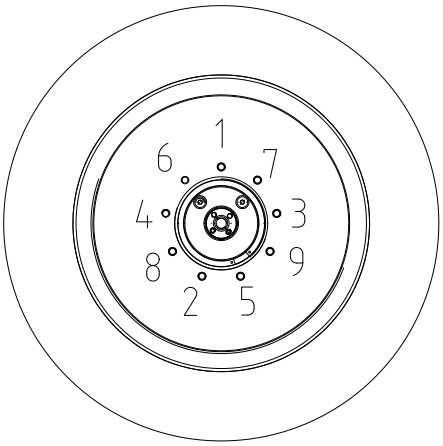
It is extremely important to use and maintain proper wheel mounting torque.
The tire nuts shall be installed and maintained with appropriate torque to prevent wheel loosening, hub bolt damage and wheel disengagement from the axle. Ensure that only matching hub bolts and tire nuts are used.

The tire nuts shall be installed and maintained with appropriate torque to prevent wheel loosening, hub bolt damage and wheel disengagement from the axle. Ensure that only matching hub bolts and tire nuts are used.

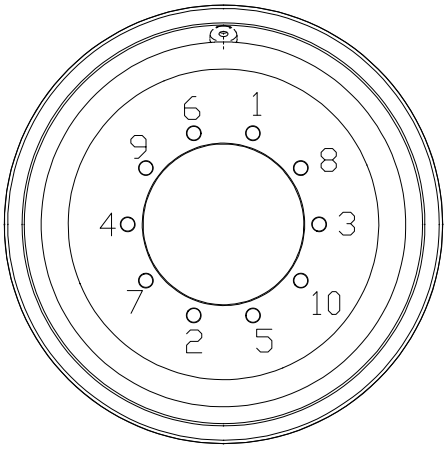
Tighten the tire nuts to the appropriate torque to prevent the wheels from loosening.Tighten the nut with spanner.If you do not have a torque spanner, use a socket spanner to tighten the nut, and then immediately ask the service station or dealer to tighten the nut to the correct torque.Over tightening will cause the hub bolts to break or permanently deform.The correct procedure for fastening the wheel is as follows:

（1）Screw on all nuts by hand to prevent thread damage.Do not use lubricant on threads or nuts.

（2）Tighten the nuts in the following order:



HB250 Wheel



HB280 Wheel

（3）The tightening of nuts shall be carried out in steps. Please refer to the wheel torque table and tighten the nuts in the recommended sequence.

M22X1.5 Nuts 630~670N.m

M16X1.5 Nuts 250~270N.m

Torque application sequence		
First time	Second time	Third time
20%	50%	100%

（4）The wheel nuts shall be tightened after the first 50h operation or after each wheel removal. Check the torque every 3 months or 150 hours of operation.

Chapter 8 Inspection and maintenance record form

Date	Content	Recorder

Maintenance check report					
Product model					
Factory number					
Inspection procedure A					
No.	**Project**	**YES** The machine is in good condition	**NO** Machine damage or failure	**REPAIRED** The machines has been repaired	**Problem description**
A-1	Check each manual				
A-2	Check each label				
A-3	Check for damaged loose or missing parts				
A-4	Check the hydraulic oil level				
A-5	Check hydraulic oil leakage				
A-6	Function check				
A-7	Check the battery level				
A-8	Perform 30 day maintenance				

Maintenance check report					
Inspection procedure B					
No.	**Project**	**YES** The machine in in good condition	**NO** Machine damage or failure	**REPAIRED** The machine has been repaired	**Problem description**
B-1	Check and replace the hydraulic oil tank return filter element				
B-2	Check the rims and tires and their fasteners				
B-3	Check hydraulic oil				
B-4	Replace the high-pressure filter element				
B-5	Check the long angle sensor and travel switch				
B-6	Check the oil level in the drive reducer				
B-7	Check the connecting bolts of the rotary support				
B-8	Remote lubrication rotary support				

B-9	Check the fasteners of the platform swing oil cylinder				
B-10	Check the cylinder offset				
B-11	Floating oil cylinder exhaust and balance valve locking inspection				
B-12	Check the wires				
B-13	Check the battery				
B-14	Test travel speed				
B-15	Check the emergency decent function				
B-16	Check the tilt protection system				

Maintenance inspection report

Inspection procedure C

NO.	Project	YES The machine is in good condition	NO Machine damage or failure	REPAIRED The machine has been repaired	Problem description
C-1	Replace the gear oil in the drive reducer				
C-2	Lubricate the worm wheel and worm gear reducer				
C-3	Change hydraulic oil				
C-4	Replace the hydraulic oil tank suction filter				
C-5	Check the boom slider				

User	
Signature of inspector	
Inspection date	
Inspector post	
Inspector unit	

Operation manual Chapter 8 Inspection and maintenance record form

Explain:

1.The maintenance inspection report shall include a checklist for each type of periodic inspection.

2.Copy the maintenance inspection report for each inspection. The completed form shall be kept for at least 10 years or until the machine is out of use or at the request of the machine owner / company / custodian.

3.Use this form to record the results. After completing each inspection procedure, tick the corresponding box.

4.Record the inspection results. If any inspection result is "no", you must stop using the machine, recheck the machine after maintenance, and tick the mark in the box of "repaired".

Select the appropriate inspection procedure according to the inspection type.