

HOWO AERIAL PLATFORM TRUCK

OPERATION MANUAL



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Chapter 1 Overview

Thank you for purchasing and using the aerial work platform produced by our company

Our HOWO aerial work platform trucks adopt a telescopic working arm structure. The working device is hydraulically driven. The turntable can rotate continuously at $\pm 360^\circ$, and the working platform can rotate at $\pm 122^\circ$.

This manual will guide and assist you in the daily use and maintenance of the purchased aerial work platform. Before using the work platform, the operator must be trained by our company and carefully read this user manual to master all the performance and usage and maintenance methods of the work platform. Untrained personnel are not allowed to operate this aerial work platform.

Before shipment, the aerial work platform you purchased has been carefully debugged to ensure that the machine is in the best condition. To maintain this condition and ensure normal operation, please carry out regular maintenance as stipulated in this manual.

Please keep this "User Manual" on the operation vehicle at all times. So that you can refer to it in time when needed. For more detailed information about this aerial work platform, or if you have any questions about it during use, or need any other assistance, please contact our company in a timely manner.

Attention!!

1. Untrained personnel are prohibited from operating this aerial work platform.
2. When operating, the operator must use the indication signs and warning signs on the machine in combination. If the signs are damaged or fall off, they should be repaired or reinstalled in time.
3. To ensure the overall performance of the vehicle, it is essential to use original spare parts. When ordering spare parts, please accurately provide the model, serial number of the machine and relevant information about the required spare parts.



Chapter 2: Things to Read Before Operation

This chapter describes the matters to be read before the assignment and the matters that must be followed. Please be sure to read the content of the article before doing the assignment.

Section 1 Regular Inspection

Before starting work, please conduct a pre-work inspection (refer to the inspection before work in Chapter 8). Conduct a regular self-inspection once a month (monthly inspection and annual inspection), record the results, and keep the records for three years.

Section 2 Precautions during Driving

When driving this vehicle, the working arm, working bucket and outriggers must be retracted before driving. All control levers must be turned back to the middle position.

After confirming that all the above-mentioned institutions have retrieved them, the operation can be carried out.

Danger!!

When driving without retracting the working arm, working bucket, outriggers, etc., it is extremely dangerous as the vehicle's size and plane will change, and it also violates the road traffic law. Do not drive when there are passengers in the work hopper.

Danger!!

It is very dangerous to drive under the condition that there are passengers in the work hopper.

All tools and other items within the working radius should be removed

Make sure to empty all the tools and other items in the work hopper!

Danger!!

When there are tools or other heavy objects in the working bucket, the vibration during driving will damage the working arm and the working bucket device.

Please confirm whether the power take-off is disconnected.

When driving with the power take-off connected, as the hydraulic generating device is in operation, the working arm and other parts may move, which is very dangerous. At the same time, it may also cause damage to the hydraulic device.

This work vehicle, equipped with a high-altitude operation device, is heavier than ordinary vehicles and has a higher center of gravity. It is prone to rollover accidents when braking suddenly or making sharp turns. Therefore, special attention should be paid to safe driving.

Attention!!

Driving with insufficient tire pressure can cause deterioration in driving stability, please make sure to keep the tire pressure within the specified range. When replacing tires, sure to use the specified size.

When driving on long downhill roads and in rainy weather, due to the reduced braking force and increased braking distance, extra care is required when decating.

When driving on frozen or snow-covered roads, which are particularly prone to slipping, avoid sudden braking and driving too fast, maintain a sufficient following distance, and drive.

When driving on roads with height restrictions, be sure to pay attention to the height limit signs, and do not allow the bucket to touch any buildings



Suggestion!!

When driving on soft roads, wooden Bridges and roads with weight restrictions, make sure they are passable before driving. Apart from the toolbox, there is no additional loading space in this vehicle. No tools or other items shall be loaded in other parts.

Warning !!

Vibration during driving can cause tools and other items to fall. If they come into contact with heat-generating parts such as the exhaust pipe and engine, they can easily catch fire, posing a fire hazard to the vehicle.

When placing tools and other items in the additional toolbox and loading space, please pay attention to the following matters

To ensure balanced loading: Secure it well to prevent it from scattering due to vibration during transportation. Do not overload: Before driving, make sure the tool box door is closed and locked.

Attention!!

If the door of the toolbox is not fully closed, it will be shaken open while driving, and tools and other items will fall, which is very dangerous. This vehicle is equipped with a high-altitude operation device, which makes the rear view poor. When reversing, a dedicated person should be assigned to guide and drive according to their instructions. When the hydraulic oil or lubricating oil of the aerial work platform device drips onto the front windshield, wipe it clean with cotton yarn and remove the oil with a cleaning agent.

Danger!!

The front windshield is covered with oil stains. When driving in the rain, the visibility ahead deteriorates, which is extremely dangerous.

Section 3 Precautions Before Homework

Dress correctly so that your clothes do not get caught by protruding parts.



Danger!!

When working near live conductors, the prescribed insulating protective equipment must be used. Damaged insulating gloves and insulating covers pose an electric shock hazard and must not be used at all. Please do not overwork or drive after drinking alcohol.

Attention!!

Please pay attention to maintenance and management, and enhance safe operation.

Please first determine the operation commander and carry out the operation under his/her command.

Please abide by the prohibitions, precautions, operation sequence and other regulations in the work to carry out safe operations. Please do not do your homework when the weather is bad.

Danger!!

Do not use this vehicle when the wind speed exceeds 10 meters per second or when there is lightning.

Suggestion!!

Bad weather standard

Strong wind.....The average wind speed over 10 minutes is above 10 meters per second.

Heavy rain.A single rainfall of over 50mm;

Snow..... A single snowfall of more than 25mm;

Even if the actual situation is below the above standards, please follow the instructions of the operation instructor.

When conducting night operations, please ensure the brightness of the operation site, especially the parts of the operating devices, to prevent misoperation. The brightness should be ensured. Do not use this vehicle near the power lines.

Danger!!

This vehicle is not an insulated type. Do not approach or touch wires, etc.

Please keep a safe distance from the power distribution lines.

Safe distance from power transmission and distribution lines

Grid voltage	Safe interval distance
0-600V	More than 1000mm
600-7000V	More than 1200mm
7000-60000V	More than 2000mm
When the voltage exceeds 60,000V	Add 10,000v200mm for each area

If people on the ground come into contact with vehicles during operations, there is a possibility of electric shock accidents. Please never touch the vehicle. The operating temperature range for the work vehicle is -25°C to 40°C. It is not allowed to operate at temperatures outside this range.

When the ground is soft and insufficient to support the outriggers, support materials (such as thick wooden boards) must be added under the outriggers to increase the support area and reduce the pressure. The outriggers should be placed at the center of the support. After the outriggers of the operation vehicle are lifted on the ground, the wheels should be no less than 20mm above the ground.

Section 4 Precautions for Working at Heights

When performing operations, try to extend the horizontal outriggers to the maximum width to support the vehicle body.

When setting up the horizontal outriggers, be careful not to support the vertical outriggers onto the manhole covers of the side channels.

Danger!!

When the cover plate of the roadside trench breaks, it may cause the vehicle to tip over, which is extremely dangerous.

To use a safety helmet, make sure the hook of the safety belt is securely fastened to the hook.

No one is allowed to stand under the boom or the working bucket.

When the working hopper is made of fiberglass reinforced plastic, do not bring flames or chemicals close to it.

Attention!!

The working bucket is flammable.

When performing operations such as gas cutting and welding, protective measures should be taken to prevent debris from damaging the hydraulic hoses and the piston rods of the cylinders to avoid damaging the vehicles.

Danger!!

Welding sparks and other substances entering the vehicle body can easily cause vehicle fires. Do not operate the joystick rapidly.

When the rapid control lever is activated, the operator may be thrown out of the work bucket.

When operating in the opposite direction, first move the joystick to the middle position, stop the movement, and then proceed with the operation. Be careful not to throw anything down from the work bucket.

Danger!!

It is extremely dangerous if something thrown down hits pedestrians or vehicles.

The following behaviors violate normal usage requirements and are extremely dangerous. They must not be adopted under any circumstances.

(1) Do not lean out of the working bucket.

Danger!!

There is a danger of falling out of the working basket, so it is not allowed to stand on the handrail or step board for work. The two should be firmly stepped on the bottom surface of the working basket, and the work should be carried out in a stable posture.

(2) Do not use ladders, pladders, etc. for work.

(3) Do not climb from the working basket to other buildings.

(4) Do not install hooks and slings on working arm or working basket to lift items.

(5) It is strictly forbidden to overload the working basket with equipment.

(6) It is not allowed to load heavy such as steel with the working basket and operate the working arm to try to lift heavy objects.

Danger!!

This will overload the work basket and could also cause the steel to slide out, which is very dangerous.

Section 5 Absolute Prohibitions

Danger!!

The following operations are strictly prohibited. If any of them has been done, please contact the nearest company maintenance point immediately for inspection. If not inspected and to use, it will damage the balance position of the working bucket, resulting in a major accident of the working bucket overturning.

It is strictly forbidden to use lifting or oping to lift the building structure, or to use slewing to attempt to move the building structure laterally.

Do not hit the working bucket against the building when operating the boom driving the whole vehicle.

When working indoors, do not allow the working bucket to reach the roof.

Section 6 Precautions for Work in Winter and Cold Climates

Danger!!

When working outdoors in the winter with low temperatures and snowy weather, it is important to pay attention to the following matters, otherwise it could lead to a major.

Attention!!

(1) Sweep away the snow on the vehicle before starting the job.

If the foot switch is equipped, the snow around foot switch must be swept away, the foot switch will not switch when there is snow under it, the enable key on the handle has the same function as the foot switch, make the enable key is not stuck before using it.

(2) Before working, the idle operation should be performed through the lower operation to warm up the hydraulic oil.

Sometimes, the oil temperature is too low, the working bucket balance device may not work properly. In this case, replace the hydraulic oil for winter. Due to the low temperature, the sliding of each operating lever contract, and the switches, levers, etc., will be heavier than usual, but there is no problem in performance. Before working, move the lever confirm that the lever can return to the middle position. For the same reason, sometimes the boom makes a "puff" or "crack" sound when lifting and lowering. After preheating operation, the oil temperature and the temperature of the hydraulic parts rise, and this sound will no longer occur.

(3) When the staff get on and off the bucket, it is very easy to slip on the walkway of the vehicle frame platform, the ladder for getting on the vehicle, etc., so be particularly careful.

(4) After working on a snowy day, before retracting the working arm, clear the snow from the limit switch position of the working arm bracket and then retract the working arm. If the snow is not cleared and the working arm is retracted, it can cause freezing, resulting in the safety device malfunctioning, is very dangerous.

(5) When driving on a snowy road surface, the snow on the tire guard should be cleared in time.

Danger!!

When driving on snow-covered roads, the steering of the steering wheel may be limited and very dangerous.

(6) When it snows, order to prevent the freezing of various mechanical operating devices, protective covers should be added to each operating device.

(7) When the working environment temperature is lower than -18, replace hydraulic oil, cylinders, hydraulic valves, and hydraulic locks with parts that need to be replaced with cold-resistant seals, and use 46# anti-wear hydraulic in summer and 32# anti-wear hydraulic oil in winter.

(8) Replace the shell with Shell Spirax S6AXME75W-9 (with a temperature range of -40°C~ 65°C), otherwise it will lead to dangerous phenomena such as the working bucket not being leveled or structural parts damaged.

Section 7 Other Matters to Note

When using flammable materials (fuels, oils), keep away from fire sources. It is strictly forbidden for users to modify vehicles on their own.

Warning!!

Vehicles cannot be modified by decree.

Chapter 3 Matters to be Noted When Parking a Vehicle

This chapter describes the matters needing attention when the working vehicle is parked at the working position.

Section 1 Parking of vehicles at the working position

(1) Park the vehicle as close to the work object as possible on a level and firm surface.

Warning!!

When working, the vertical support foot pad must be laid flat so that the vertical support leg firmly supports the vehicle.

Danger!!

Do not operate on uneven surfaces where the support leg cannot make reliable contact with the ground.



It is not allowed to operate on the frozen road surface. When the ice cracks or thaws, it may cause the vehicle to tilt and fall, which is dangerous, and in addition, the lateral sliding will also cause the risk of collision with other vehicles.

(2) The handbrake must be pulled up, and the wheel be padded with a triangular block.

Attention!!

The wheels with exhaust braking device must be switched to the off position of exhaust braking switch. If the operation is carried out with the exhaust braking device in the state, there will be phenomena such as the engine speed can not rise or the exhaust pipe emits black smoke.

Confirm that there is no dead grass or other flammable under and around the vehicle before parking the vehicle.

(3) Parking vehicles shall not obstruct the passage of others and other vehicles, and personnel unrelated to the work shall not enter the operation area.

Attention!!

To set the detour sign, take measures to prevent accidents for pedestrians and passing vehicles.

(4)After the vertical leg is placed on the ground, confirm the following:

Whether the wheels have completely left the ground:

Whether the body is level using this level.

Danger!!

The vehicle may overturn when the tires are still in contact with the ground.

Section 2 Precautions for placing the vertical strut pad

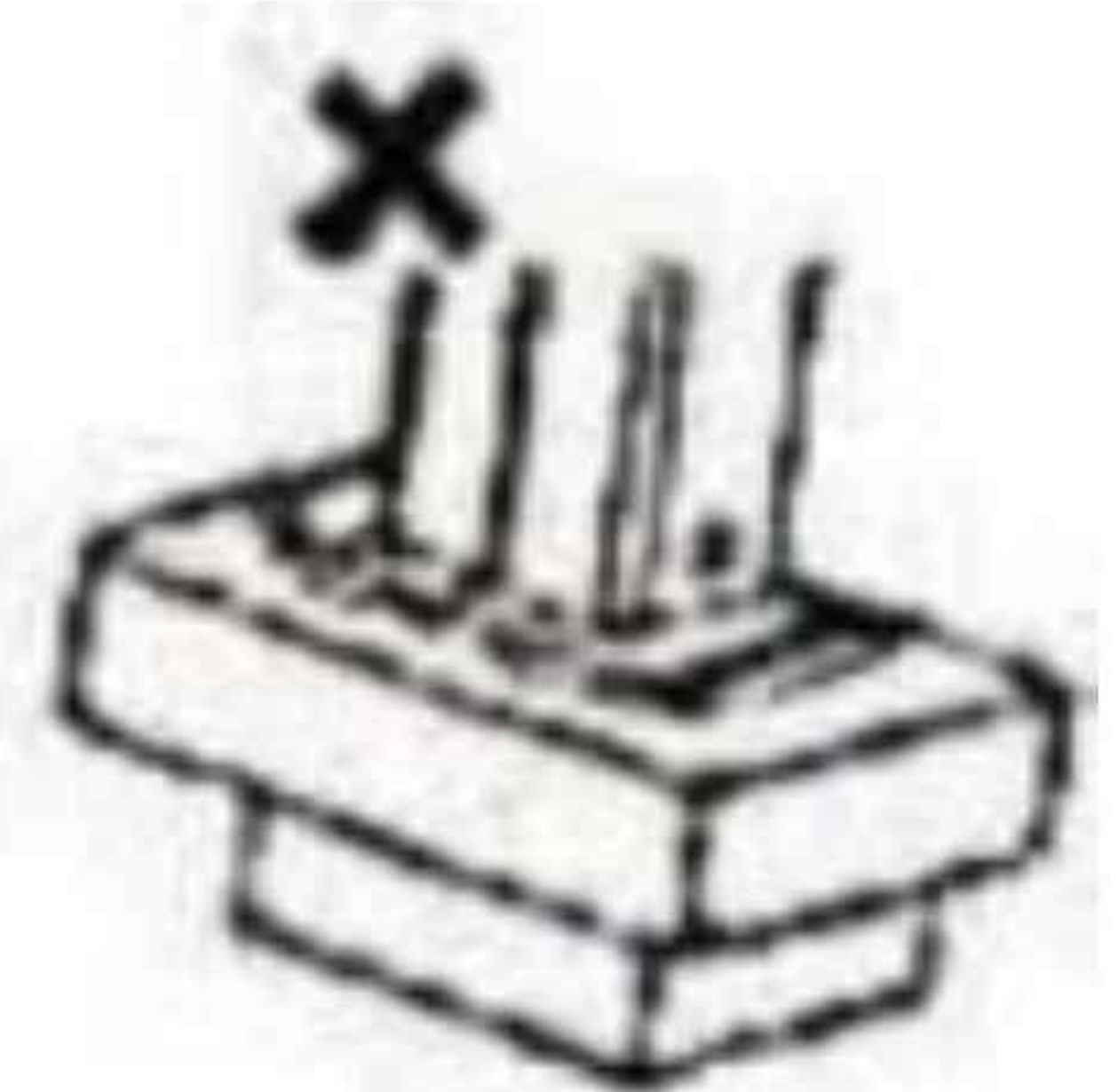
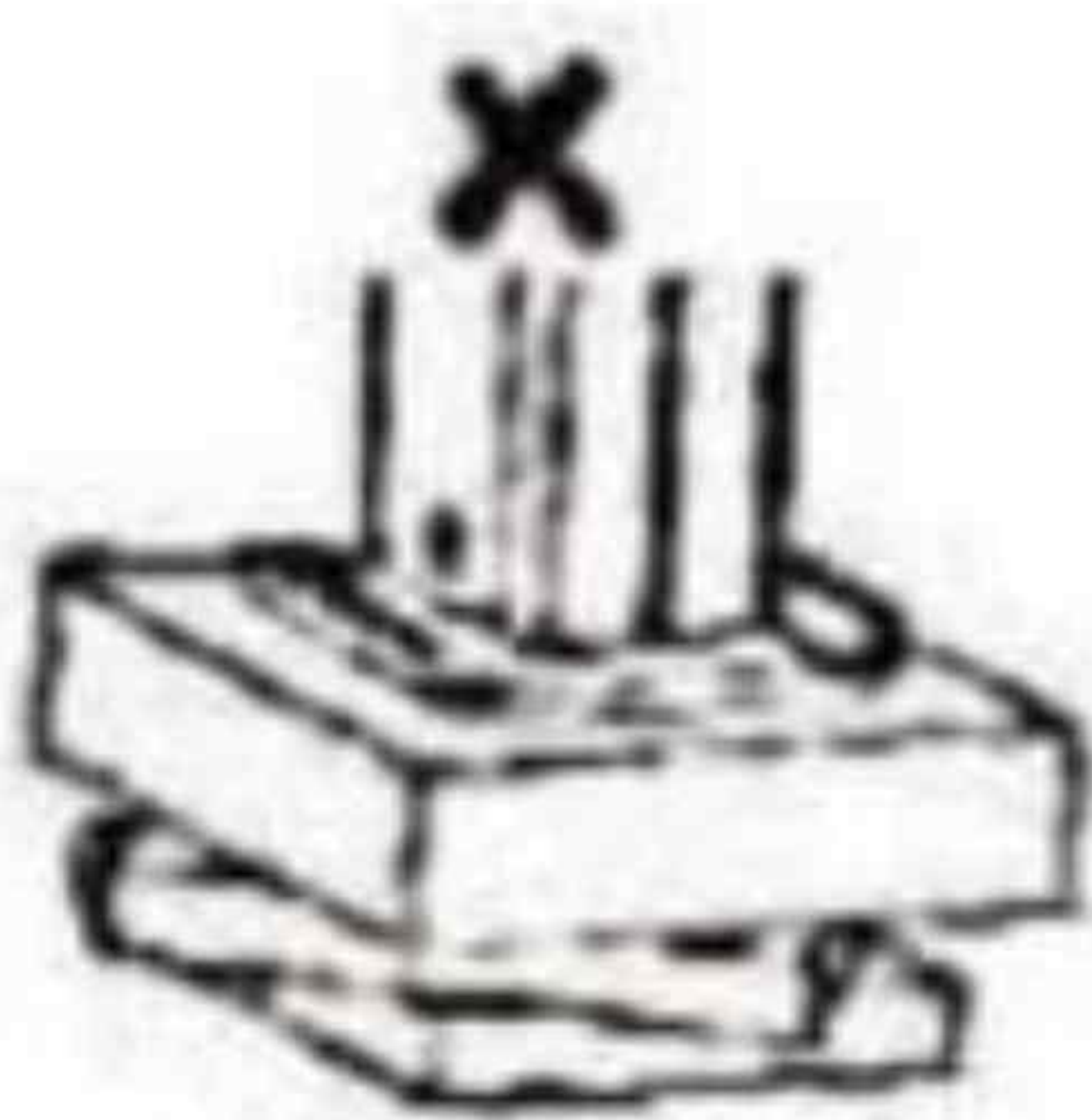
1. The foot pad should be placed in the center of the foot.

Danger!!

The support foot pad and support leg must not be set on the manhole cover, as damage to the manhole cover could cause the vehicle to overturn, is very dangerous.

2. Method of placing the vertical support foot pad

The method of placing the vertical support foot pad is shown in the figure



Danger!!

The vertical foot pad is unstable, and the vertical foot pad may slip out during operation, causing an overturn accident, which is very dangerous. When the foot needs to be overlapped for use, it should not exceed 2 pieces, and the thickness of the pad should not exceed 200mm.

Section 3 Method of parking a vehicle on a slope

The maximum road surface gradient at which a vehicle can be parked is within about 6° in the direction of the front and rear of the vehicle

Danger!!

Do not park for work on a road surface with a slope of more than 6°. Vehicles are prone to skid and overturn, and is a risk of overturning.

Regardless of the degree of slope of the road surface, the vehicle must be parked horizontally in the front-rear direction.

Method of parking the vehicle

(1) The vehicle must be parked with the front end tipped up, and it must be confirmed that the vehicle has applied the parking brake. (2) Place a triangular block under all wheels on the downhill side.

Attention!!

Triangular blocks or larger triangular blocks can be used, and the triangular block must be in contact with the tire.

2. Set the vertical support leg

1) Set the vertical support leg, and it must be set in the order of setting the front support leg first and then the rear support leg.

Danger!!

If the rear wheels, on which the parking brake is applied, lift off the ground before the front wheels when starting to jack up. There is a risk of wheels slipping and overturning.

Attention!!

Confirm that the vertical support legs are located at the center of the support foot pad.

During the placement of the vertical support legs, care must be taken to allow the vehicle to tilt significantly to the left or right.

(1) Regardless of the degree of inclination of the road surface, the vehicle must be set up so the tires are completely clear of the ground and are leveled front to back and side to side.

Danger!!

Even if the vehicle cannot be leveled, the vehicle's tilt angle must never exceed 3° . If the vehicle's tilt angle exceeds 3° , the working vehicle may cause a rollover.

When the vehicle cannot be leveled and the work is carried out within a tilt angle of 3° , the range of the boom must be limited to within 45° to the left and right of the vehicle's rear (the uphill side).

Suggestion!!

Use a level to confirm that the vehicle is parked horizontally.

(2) Retraction of the vertical support leg

When retracting the vertical support leg, the sequence of retracting the leg first, then extending it, and finally retracting the front support leg.

Danger!!

If the front wheels are lifted first, the rear wheels, which are subject to the handbrake, will touch the ground after the front wheels, and there is a risk of the vehicle slipping.

Attention!!

The support legs should be retracted simultaneously from left to right, and care should be taken not to cause the vehicle to tilt significantly to the left or right.

Section 4 Methods for parking vehicles on frozen or snow-covered roads

1. Precautions to be observed when parking the vehicle

(1) When parking the vehicle on a snow-covered road, it is very to place the outriggers without first confirming the road surface conditions, as the snow covers the road surface. The snow must be cleared first to confirm the road conditions, and antiskid measures must be taken before placing the outriggers.

(2) When parking on a frozen road, if there are any inclines or unevenness on the road, the vehicle body is prone to sliding, which is very dangerous. This is the same as the placement of outriggers on an inclined road surface. The sequence should be to the front outriggers first, then the rear outriggers, and secure the front and rear outriggers separately, with the securing starting with the front outriggers.

(3) If you are working after a snowfall, for safety, you must first clear the snow from the following areas, confirm whether normal work can be performed, and then the work. Also, the snow on the moving parts may fall off during movement, so it must be cleared before performing the work. Sensor locations, various switches on the work support, etc. Safety device locations. The roof step, the platform of the body.

Attention!!

When applying impact force to the vertical outrigger base, it can cause the cylinder to break and damage the vehicle, so it is not allowed to knock hard.

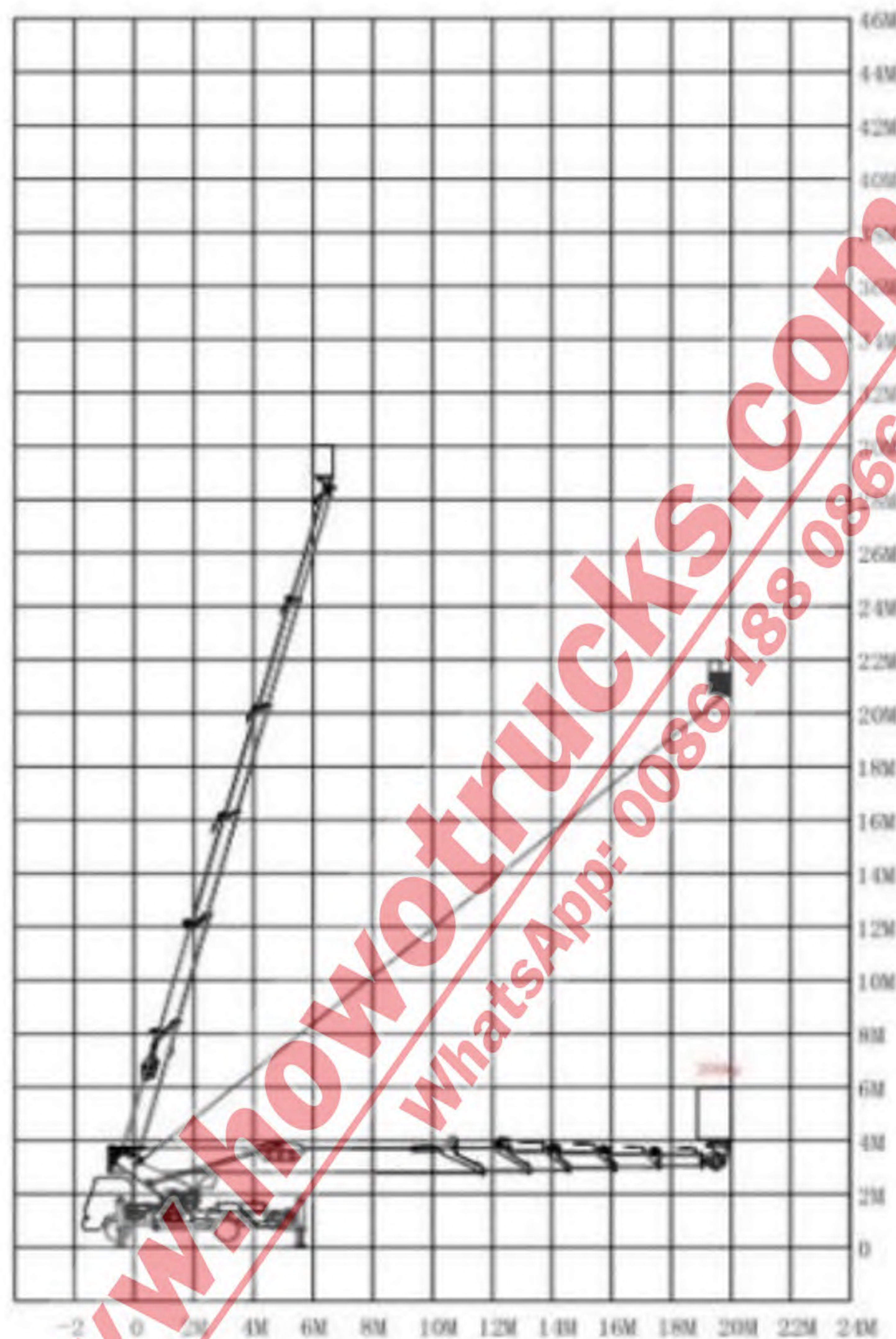
Section 5 Reading the Diagram of the Scope of Work

The figure depicting the working range of this work vehicle is described. Please understand the working range diagram before performing the work.

The working range diagram is a of the range of motion that this work vehicle can perform, with the ordinate representing "working ground height" and the abscissa representing "working radius."

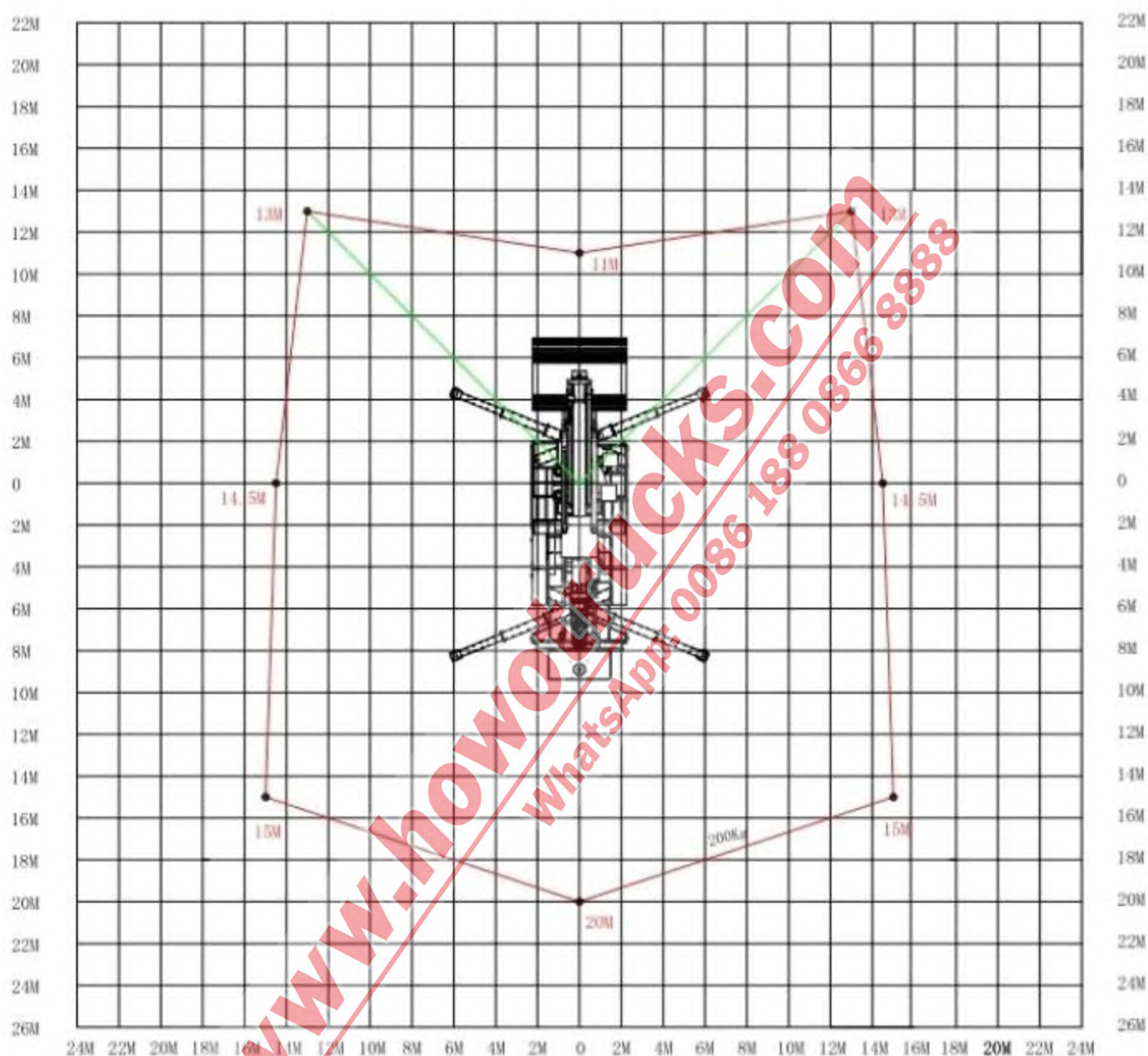
额载200kg

GKS30 作业范围图

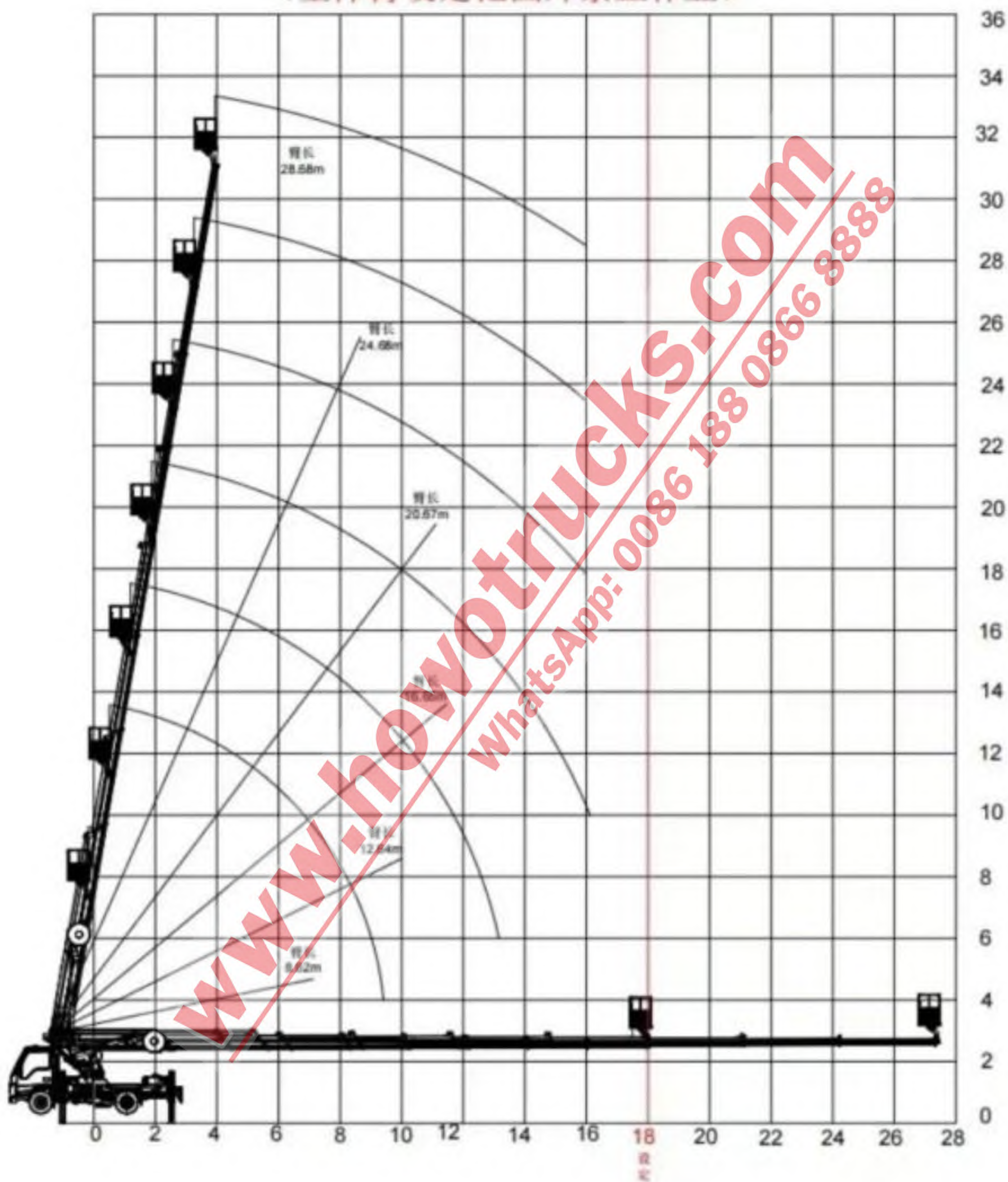


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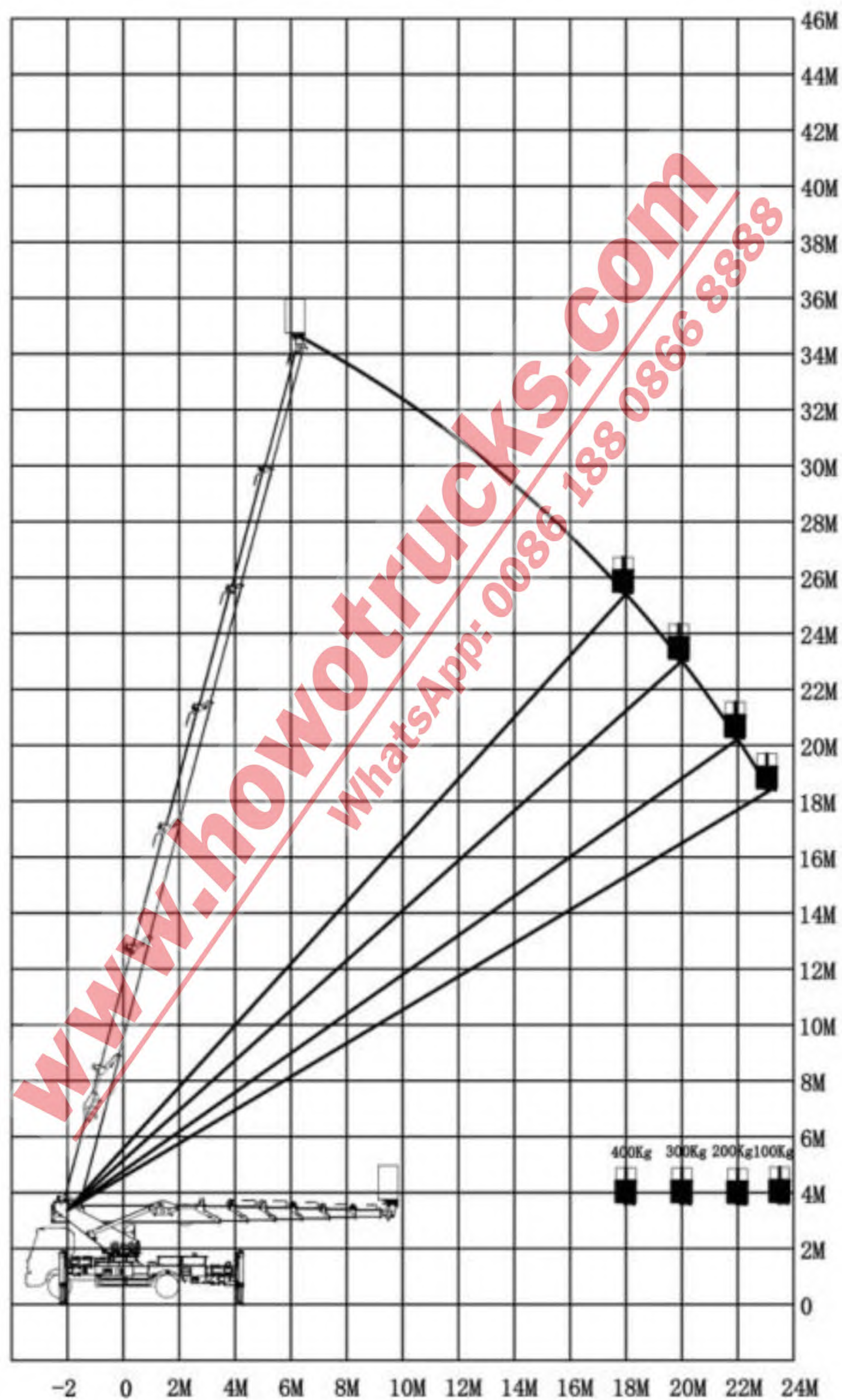
GKS30 作业范围图



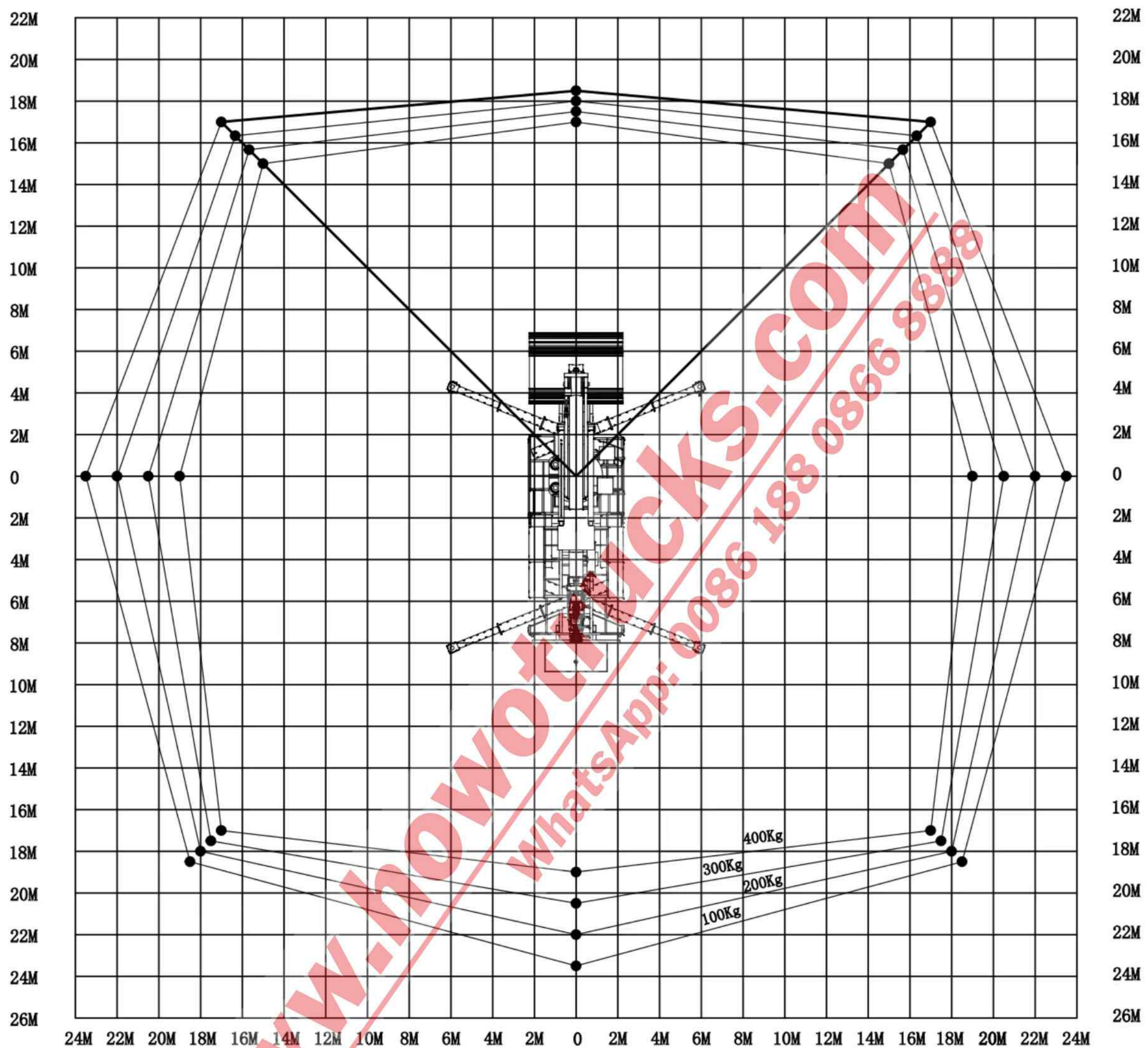
GKS33T(臂长-幅度) 工作高度曲线图
 (全伸臂设定范围外禁止作业)



GKS36 作业范围图



GKS36 作业范围图



Note:

1. The working range diagram does not take into account the bending of the working arm.
2. The working range diagram represents the working when it is distributed vertically from the vehicle's center of gravity.
3. The horizontal outrigger extension is the horizontal outrigger extension detected in the side direction of vehicle, operating within the quantity curve, and the working range changes continuously.

Chapter 4 Structure of Aerial Work Platform

1 High-altitude operation bucket

Using mechanical self-balancing structure to maintain documentability throughout the full height range

1 高空作业斗
采用机械自平衡结构在全高度范围始终保持文档性



2 Angle sensor
Real-time monitoring of the length and angle of the boom;
2 角度传感器
实时监测大臂的长度以及角度



3 Hydraulic winch
Depending on the different rise, the angle to transmit hydraulic oil to the corresponding part
3 液压绞盘
根据不同的上升，角度使液压油传送到响应的部位



4 Main arm cylinder
Main control the lifting of the boom up and down
4 主臂油缸
主要控制大臂上下举升



5 Main boom head
Main boom head, adjust the balance of the boom.
5 大臂主头
大臂主头，调节大臂平衡。



6 rotating disk
Control the basket rotation
6 旋转盘
控制吊篮旋转



7 安全警示灯
对周围进行安全警示作用

Safetywarning light
Serve as a safety warning to the surroundings;

8 液压支腿
稳固车身，使作业更加安全



8 Hydraulic outrigger
Stabilize the body to make the operation safer

9 支腿操作平台
可操作支腿垂直及水平伸展动作，跨越大，适应性强。



9 Jack-up platform
Operable leg vertical and horizontal extension motion, large span, adaptable.

10 操作平台
控制伸缩臂完成一系列操作



10 JOperation platform
Control the telescopic arm to complete a series of operations

12 伸缩臂
各节臂以相同的相对速度进行伸缩



11 大回转
立柱精加工间隙更小，回转锁紧锁螺丝，采用防腐技术



11 Big turn
The column is more precisely machined with a smaller gap, the rotary locking screw is tightened, and anti-corrosion technology is us

Chapter 5 Operation Methods

Section 1 Starting the Engine and the Power Take-Off(PTO)

1. Park the vehicle and chock the wheels;
2. Ensure that the gear lever is in neutral and the power take-off control lever is in “off” position;

Warning!!

The gear lever must be in neutral. Starting the engine other than in neutral will cause the vehicle to move and is very dangerous;

3. Depress clutch pedal fully;
4. Start the engine;
5. Holding the clutch pedal down, move the gear lever to the required gear or position the switch

Attention!!

Whether the control lever or switch is used depends on the car chassis manufacturer, and the shape and operation method are the same, for details, please refer to chassis operating instructions. Before operating the power take-off, please make sure that all control levers or switches are in the off position.

6. Slowly release the clutch
7. As a result of the above operation, the oil pressure starts to be generated. And turn on the power of the operating part;
8. In winter, please heat for about 5 minutes with the engine running.

Attention!!

When the power take-off is in switch operation mode, start the engine by depressing the clutch pedal.

Depending on the undercarriage used, power take-off should remain in the disengaged position with the engine stopped.

After finishing the operation, turn the power take-off off (OFF) in the opposite.

Sometimes, when the power take-off is shifted from the engaged position (ON) to the disengaged position (OFF) and is returned to the engaged position (ON) within a short time (less than 2 seconds), the engine can stop. If the power take-off is returned to the engaged position (ON), the interval be more than 3 seconds.

Section 2 Operation of the outriggers

Reference should also be made to "Chapter 2 Notes on Vehicle Parking"

1. Operation of the leveling legs

(1) Please pull the lever to the direction of the leveling operation to be performed among the four changeover levers to the "level" position.

(2) Then, pull the main control lever the "extend" position, and the leveling state will extend outward.

Attention!!

Please make sure that there is no person or object in the direction of the outstretched horizontal strut before extending it.

The handle of the water levelut should be extended to the maximum extent as much as possible, and then all the control levers should be returned to the middle position.

Attention!!

Please place the foot pad in the correct position of the horizontal outrigger, and refer to the precautions for placing the foot pad.

2. Operation of vertical outrigger.

(1) Please pull the four conversion control levers to the "vertical outrigger operation" side.

(2) Operate the main control lever the "extend" side, and the vertical outrigger will extend.

Attention!!

Please confirm that there is no foreign matter between the vertical outrigger and the outrigger foot plate before extending the vertical outrigger, especially when is standing next to the vertical outrigger, there is a risk of foot entrapment, so it is necessary to prohibit personnel from approaching the vertical outrigger.

(3) When the vertical outrigger is extended, please confirm the following:

If the placement of the vertical outrigger is unreliable, it can cause the vehicle to tip over, so it is necessary to correct it.

(4) Please return all control levers to the middle position and close the outrigger control box cover

Attention!!

To prevent accidents, be sure to close the cabinet cover properly.

During the cold winter season, there may be cases where the leveling legs are frozen cannot be extended. In such cases, extend all the vertical legs first to place the legs on the ground, and then retract the vertical legs. The leveling leg operation can be performed.

Danger!!

It is absolutely forbidden to extend the working arm by tying the horizontal outrigger to a building or by loading heavy weights on the horizontal outrigger as this will cause the vehicle to overturn and will result in a serious accident with the working arm being twisted off.

Please note that it is not permitted to connect the conversion lever to the vertical outrigger side position in order to operate the extension of the horizontal outrigger. This would cause the horizontal outrigger to bulge or the vertical outrigger to contract, which is very dangerous.

3. Method of retraction

The sequence of operation for the retraction of the outriggers is the reverse of the sequence extension, i.e. the vertical outriggers are retracted first, followed by the horizontal sliding outriggers. The individual control levers must then be returned to the position.

Attention!!

Before retracting the outrigger, make sure that no one is standing or lying on the outrigger and be careful not to pinch hands. Be sure fully retract the working arm to the original position before retracting the outrigger.

4. The control panel of the off-board operation box is shown in the figure:



Emergency stop button: For system protection in an emergency, when the button is pressed, all electro-hydraulic actions are stopped.

Hydraulic gauge: For indicating the working pressure of the system.

Power switch: For controlling the total power supply of the system.

Section 3 upper operation

Danger!!

When performing upper operations, a safety helmet and safety belt must be worn, and the safety belt's suspension structure must be reliably hung on the safety hanger, please do not hang it on the switch box or control lever.

Warning!!

Please stand steady on the work platform base to work. If you extend your body outside the work platform, it will make your feet leave the work platform base, which will cause an unstable body position and lead to a fall hazard.

Attention!!

Before operating, be sure to check whether the working bucket is in a horizontal state. If the working bucket is tilted, refer to "Chapter 7 Method Adjusting the Tilt of the Working Bucket" and adjust the working bucket to a horizontal position.

When going up and down the working bucket with the working arm retracted the original position, be sure to go up and down through the following procedure. If you go up and down the working bucket by other means than the following, it is easy to a danger of falling from the vehicle.

When going up and down from parts without anti-slip measures, slipping is easy and dangerous (especially when the vehicle body is wet.) the anti-slip boards are covered with ice, they will not work, so the ice should be removed before going up and down.

To prevent slipping in the work bucket operation, the work bucket should be cleaned, tidied up, and wiped clean of standing water and oil, and the surrounding conditions should be confirmed before operation.

Be especially when operating the rotation of the work bucket, and confirm that there is no obstacle at the rotation point before operation, and also be careful not to get your hand, which is holding work bucket handle, caught in the gap between the work bucket and the surrounding buildings.

Do not place small items on the control console of the operating lever, as they may fall the operating lever and cause a misoperation.

After the work bucket has entered the work range limit area, the operating lever must not be manipulated intentionally towards the dangerous side.

foot switch, which controls the key!

With the exception of the operation to stop the action, all operations of the upper operating device can only be operated by stepping on the foot on the work bucket surface or by pressing the enable key.

Attention!!

Except for the models without foot switch.

The foot shall be kept off the foot switch when in the working bucket or when the operation is stopped. Never bind the foot switch in place with a rope so as to be fixed and depressed, as this is very dangerous and may cause an accident.

For the models without foot switch and enable key, i.e. without double-action protection, the operator must not touch any key with tools or parts of the body to avoid accidents. In order to avoid dust or other foreign matters falling on the operating panel, the cover of the operating box shall be closed during operation so as to avoid the misoperation of the various actions and possible damage to the parts.

Working bucket (remote control) operating panel:



Serial number ①: Luffing operation handle of the boom.

Serial number ②: Extending and retracting operation handle of the boom.

Serial number ③: Rotation operation handle of the slewing platform.

Serial number ④: Rotation operation handle of the platform.

Serial number ⑤: Engine start and stop switch, used for remote starting and stopping control of the engine. When the switch is continuously pushed to the upper position for 2 seconds, the engine starts. When the switch is continuously pushed to the lower position for 2 seconds, the engine is turned off. Throttle acceleration switch. Press this switch. The rotation speed of the machine increases, and the boom action correspondingly speeds up.

Serial number ⑥: Alert horn switch, used for sound warning before the action of the upper vehicle. Throttle acceleration switch. Press this switch. The rotation speed of the machine increases, and the boom action correspondingly speeds up.

Serial number ⑦: Fast and slow gear.

Serial number ⑧: This function switch should be used for retracting the vehicle in case of emergency, and should be operated when the vehicle chassis fails, which can safely return the personnel to the ground. Please operate this switch with caution.

Serial number ⑨: When pushed up, push ④ at the same time to flip the basket up and down. When pushed down, it is a forced switch. When the system is limited due to alarm, press this switch to cancel the limitation.

Serial number ⑩: When this switch is pressed in an emergency, it can turn off the power of the remote control and all actions and power. When starting, press this button in the direction of the arrow.

Danger!!

Confirm that there are no objects colliding with the rotating body before performing the rotational operation.

Attention!!

The vehicle is in a tilted state for the turning action, and sometimes there is a phenomenon that it cannot be smoothly turned back. All must be parked horizontally.

When the hydraulic oil temperature is high, if the working arm is kept in an extended or lifted state, there will be a slight retraction or descent the working arm. This is because the volume of the hydraulic oil changes with the temperature, which is not a fault.

When the extension amount and lifting angle of the working arm both in the maximum state, if the temperature of the hydraulic oil drops by 10 °C, the working arm will retract about 30 mm, but this value with the extension amount, lifting angle and lubrication state of the working arm.

If you want to prevent the retraction of the working arm, you can take the following measures

- ① Do not operate the extension and lifting of the working arm when the hydraulic oil is at high temperature.
- ② After an appropriate interval, the extension and lifting of the working shall be operated again.

3. Working bucket safety limit function

The high-altitude working vehicle is equipped with a safety limit device for the turning limit of the working bucket which has the function of alarm and automatic stop of the turning action at the limit position of collision.

When the automatic stop occurs, please pay attention to observe and confirm, and the working bucket in the opposite direction of rotation. The operation in the direction of approach is not moving. Forcibly operating the rotation of the working bucket at this time will the motor to burn out or the structural parts to be damaged.

Attention!!

Since the safety limit device of the working arm is installed to be independent of the position of the working bucket swing and the extension of the horizontal outrig, it can be effective at any position, and it often stops before the limit position. Other avoidance operations, lifting "rise" and extending "extend" can still maintain normal operation

3. No. ⑩: Emergency stop button

When this switch is pressed, the engine will stop running, causing all actions to stop. The following situations can be referred for operation.

- (1) When the operator on the working bucket needs to stop the movement of the working arm to avoid dangerous situations.
- (2) When the operation control out of control.

To restore to the state of motion, please release the emergency stop switch.

Attention!!

If the working arm still slowly descends after the emergency stop switch is turned off, it could be due to the cylinder self-igniting and descending. this case, unlock the emergency stop switch and move the control lever in the opposite direction of the working arm's motion to avoid the danger, quickly retract the working arm, stop the operation.

When abnormal motion occurs and the motion stops, the operation should be interrupted. Contact the nearest designated maintenance point of our company immediately for inspection and handling.

Suggestion!!

When the working bucket is positioned at the working position, to avoid accidental operation, press the kill switch when the upper control lever is not in use, which can noise and save fuel.

Attention!!

The switch cannot control the chassis key switch. If the engine key switch is in the on position, the switch of the air conditioner, radio, etc. the chassis is also in the on position, it will consume the battery on the chassis. Therefore, please cut off the switch of the air conditioner, radio, etc. on the, and if the engine is stopped for a long time, please put the key switch of the engine in the cut off (OFF).

Danger!!

When the switch is turned off, the long-term opening of the air conditioning or radio switch will cause the battery under the chassis to discharge, resulting in no of the upper assembly.

Section 4 Middle Operation

Attention!!

The lower operation is mainly used for the adjustment of the working bucket and for inspection before starting work and as a handle for equipment. When performing the lower operation please sit on the turntable seat. Be careful to brace the handrail when operating to prevent falling from the platform.

The hydraulic handle controls the boom extension/retraction, boom lift/lower, the slewing forward/reverse, and the working bucket slewing is electrically controlled.

1. The turntable operating panel is shown in the figure:



No. ①: Engine ignition switch. Used for remote starting and stopping control of the engine. When the switch is continuously pushed to upper position for 2 seconds, the engine starts. When the switch is continuously pushed to the lower position for 2 seconds, the engine is turned off.

No. : Throttle acceleration switch. When this switch is actuated, the engine speed increases and the boom action correspondingly speeds up.

No. ③: Alert horn. Used for audio warning before the upper vehicle action.

No. ④: Panel indicator light. When the light is on, it is used for panel illumination at night or low light conditions.

No. ⑤: This function switch should be used for retracting the vehicle in case of emergency. When the vehicle chassis experiences a fault, operate this to safely return personnel to the ground. Please use this switch with caution.

No. ⑥: Display screen power switch and remote control signal connection.

No. ⑦ Lift basket rotation.

No. ⑧: In an emergency, press this button. After the emergency, rotate the button in the direction of the arrow.

2. switch before starting work.

3. The same operation method and precautions as the upper sign are the same.

4. Lower priority operation.

5. Operation of the hydraulic handle on the slewing mechanism.

When using the hydraulic handle handle for operation, any electrical limit device does not work, so this handle is only used for emergency when the electric fails to return the boom to its original state.

Attention!!

Please contact the nearest designated maintenance point of our company immediately for inspection and treatment in case of any abnormality.

Section 5 Operation of the emergency pump

When the main power source (engine or main oil pump) fails during the operation of the high-altitude work vehicle, the emergency pump switch can be on to start the emergency pump as a power source in order for the workers to land safely and in time.

After the main power source fails and the emergency pump is used instead the fault should be identified and eliminated. It is not allowed to continue to use the emergency pump repeatedly without knowing the cause, in order to avoid damaging the work device and the emergency.

Chapter 6 Daily Maintenance of Working Bucket

This chapter describes the maintenance and adjustment of the working bucket.

1. Method of adjusting the inclination of the working bucket

Check before starting work, if the working bucket is inclined (more than 3° front and rear), please adjust it according to the following points.

Attention!!

(1) Park the vehicle on a level, solid surface and move the working arm to a position where it is easy to adjust.

Danger!!

Adjustment must not be made when there are people or objects in the working bucket.

Adjustment must be made by means of the lower operating device

(2) Open the turntable control box and make the adjustment with the "Balance cylinder extend/retract" hydraulic lever.

Suggestion!!

When the working arm is fully retracted, the speed of the "retract" operation is sometimes slow. At this time, pull back adjustment handle, extend the working arm about 1 meter, and then adjust. The speed will increase,

(3) Repeat the lifting and extending operations multiple times within the full range to confirm that the working bucket has been adjusted to a balanced state.

(4) After the working bucket is in a horizontal state, switch the direction control lever back to original position. And confirm that all hydraulic levers are in the center position.

2. The exhaust method of the working bucket balance device

If the working bucket tilts soon after the working bucket tilt adjustment, it should be considered that air has entered the hydraulic system of the working bucket balance device. At this time, the air in the working bucket device should be excluded according to the following steps.

(1) Operate according to the (1). (2) items in "Adjustment method of working bucket".

(2) Use the "Balance cylinder extend/retract" hydraulic handle to tilt the working bucket forward and backward to the maximum amplitude, and repeat the operation to 4 times.

(3) Repeat the lifting and extending operations multiple times within the full travel range to confirm that the working bucket has been adjusted to a balanced state.

(4) After the working bucket is in a horizontal state, switch the direction control lever back to its original position. And confirm that all hydraulic levers are in the center position

Chapter 7 Checking before operation

This chapter describes the inspection procedures to be followed before the start of work.

Danger!!

Under the working arm and working bucket for maintenance, the unexpected fall of the working arm and working bucket is very dangerous, so it is necessary to use safetyuts, safety pads and other pads to prevent the unexpected fall of the working arm and working bucket during maintenance under the working arm and working bucket.

1. Status during pre- inspection.
2. Pre-job inspection shall be carried out in the following state.

Extend the horizontal outrigger to the minimum (MIN) area, and extend vertical outrigger to the maximum amplitude (i.e., full pipe state).

Attention!!

If there is any abnormality during pre-operation inspection, do not perform the operation. Go to the nearest maintenance point designated by our company for maintenance in a timely manner.

3. Pre-operation inspection:

a) Walk around the vehicle and confirm visually if there is any oil leakage and damage to signs, vehicle body, and connectors at each calibration point, and check if the level gauge is within the limit range.

Attention!!

Damaged and soiled signs prevent their proper use. Please clean or replace them in time.

b) After starting the engine, build up the oil pressure operate the outriggers. Check for leakage of the cylinder during storage.

Attention!!

After switching the power take-off, confirm whether the transmission shaft is abnormal.

In case the vertical support leg extends and shows a natural retraction phenomenon, make a timely repair.

c) Temporarily retract the vertical support leg and drive the vehicle to a spacious place.

Attention!!

The power take-off must be disengaged when moving the vehicle.

- d) Confirm the hydraulic oil quantity.
- e) Extend the horizontal outriggers in sequence.
- f) Place the vehicle in the following state:

- ① The horizontal outriggers are extended to the minimum (MIN) region and the vertical outriggers are placed (to place the vehicle in a horizontal position);
- ② The working bucket is in the retracted state and swung to the left as far as possible; The throttle is at low speed;

Warning!!

It is absolutely forbidden to carry out inspection work with people or objects in the working bucket. If there is a load in the working bucket, it will impossible to carry out a correct inspection.

- g) Confirm that all the operating levers in the lower control box are in the centre position, i.e. the closed.
- h) Confirm that the operation range limit operation indicator light of the lower operating device is off, and operate the working arm to the central position in front of the vehicle the lower operation.
- ① Raise the arm body to 76° according to the operation range diagram.
- ② Operate with the hydraulic lever according to the operation range, and check for any abnormality.
- ③ Operate with the remote control electric control lever according to the operation range diagram, and check for any abnormality

Danger!!

If there is any abnormality during the inspection, do not use it as it is, immediately stop the operation, and have it repaired at nearest designated maintenance point of our company. Continued use may cause serious accidents such as rollover.

- ④ Enter the work bucket and fasten the safety belt. Operate action of the upper device control handle, and confirm that there is no abnormality in each action. This action is for fine movement, and only the remote control can be used operate the work bucket of this model.
- ⑤ Confirm whether the standby power system can meet the requirements. Operate the standby power system to detect any abnormalities in the actions. The standby power system is only used for vehicle recovery.
- ⑥ Retract the work arm.
- ⑦ Retract the outrigger
- ⑧ Close the operation device cover.
- ⑨ Turn off the vehicle's engine, walk around the vehicle, and visually inspect for any oil leaks.
- ⑩ The inspection is complete, record the inspection results

Chapter 8 Custody Precautions

This chapter describes the precautions to be observed during vehicle maintenance.

1. Wash and sweep all parts

Do not use high-pressure washing, and prevent in winter.

2. Refer to the lubrication diagram to add oil to each part.

Completely open the movable outrigger, and apply a layer of oil evenly on the surface of the movable outrigger with a brush.

3. Store the vehicle in a dry indoor space. If it is stored outdoors due to circumstances, choose a flat surface to park and cover it with a tarp.

4. To protect the chassis's spring steel plates, it is necessary to support the vertical outriggers during maintenance.

Attention!!

When the vehicle is stored indoors with a low ceiling, care should be taken to avoid the working basket and the jib colliding with the ceiling when the support legs are extended.

If the ground is soft or uneven, use wooden pads under the outriggers to adjust, and wedge blocks under the wheels.

5. For-term storage, the following work is required:

- (1) Apply sufficient anti-rust oil to the piston rod of the fuel tank,
- (2) Start the once a month for operation confirmation to prevent the oil film from breaking in the lubricated parts.

Attention!!

Before confirming the action, wipe off the rust-proof oil on the piston rod of the oil cylinder.

Chapter 9 Maintenance

This chapter describes the content of regular maintenance, which can extend the service life of the vehicle.

Section 1 Lubricating oil supply and replacement cycle

1.

1. Lubricating oil supply position.



2. Hydraulic tank and slewing gear oil

The hydraulic tank and slewing gear oil must be changed after 1200 hours or twelve months after first use change after 100 hours or one month).

Serial number	Lubrication point	Lubrication point Number	Lubrication cycle	Lubrication method	Lubricating oil; types	Serial number	Lubrication point	Lubrication point Number	Lubrication cycle	Lubrication method.	Lubricating oil; types
1	Horizontal cylinder					5	Winch				
2	Balancing cylinder					6	Basket motor				
3	Lifting cylinder					7	Balancing cylinder				
4	Rotation					8	Lifting cylinder				

Section 2 Recommended Fats and Oils Directory

Hydraulic oil used working ambient temperature (°C)		Gear oil	Gear oil	
			Ordinary	Advanced
-18~40	L-HM(CY) High-Altitude Work Vehicle Specialized Hydraulic Oil (Standard Equipment) Material: 82253816	90# industrial gear oil		
-35~40	Xa130 hydraulic oil; Material: 822538216			

Note: When the equipment operates below the lowest suitable ambient temperature, it is necessary to let the pump run idle with hydraulic oil for 15 minutes after car chassis is running normally, before it can work with load, to avoid overloading and damaging the oil pump. When the ambient temperature is higher than 50°C, the efficiency of the equipment is reduced, accelerating the damage of sealing elements and electrical components. Do not use the equipment in an environment where the ambient temperature is higher than 50°C The joint chain part shall be properly supplied with machine oil.

Section 3 Refilling and Replacing Hydraulic Oil Attention!!

Hydraulic oil replenishment and replacement operations shall be performed on a flat and solid surface with the vehicle retracted.

. Hydraulic oil

1.1 Hydraulic oil replenishment

The oil used for replenishment must be consistent with the original hydraulic oil brand and grade used by the vehicle. filling, pay attention to the liquid level gauge and fill up to the highest mark indicated. If the oil level exceeds the mark , it is easy for the oil to overflow from the filter during driving.

1.2 Hydraulic oil replacement

Hydraulic oil replacement is relatively complex and requires multiple people to cooperate. It is recommended to call the service engineer to handle it on-site. The amount of oil needed for replacement is about 140L, as there is a significant difference in the level of operation of equipment.

- (1) Retract the working device to a safe position supported by the machinery, disassemble the luffing and telescopic balance valves, drain the waste from the corresponding cylinders and then restore the installation, disassemble the outrigger hydraulic locks, drain the waste oil and then restore the installation, disassemble all the working of the multi-valve on the upper vehicle and the multi-valve on the lower vehicle, drain the waste oil and then restore the installation.
- (2) Prepare safe and reliable mechanical lifting device, hang the protective work bucket, dismantle the lifting cylinder and then disassemble the balance valve to drain the waste oil from the cylinder and pipeline then restore the installation. Dismantle the lower lifting cylinder to drain the waste oil, disassemble the lower lifting balance valve working pipeline to drain the waste oil and then the installation.
- (3) Unscrew the oil drain plug at the bottom of the oil tank and drain the hydraulic oil.
- (4) Clean the inside of the tank and install the oil drain hole plug.
- (5) Add new hydraulic oil.
- (6) Unscrew the return oil hose at the return oil filter, connect the return oil hose to the waste oil drum, extend and retract each leg and boom cylinder once, stop the machine (or release the clutch) to add oil during the operation, ensure that the hydraulic oil tank level is above the minimum working level mark, and restore the return oil hose installation after the operation is completed.
- (7) Disassemble all working pipelines of the upper and lower multi-way valves, drain the waste oil and then restore the installation, start the working device, and check again whether the oil tank level meets the standard. If it is insufficient, please add oil in time.

1.3 Drain water

Loosen the drain plug of the oil hole moderately, drain the hydraulic water at the bottom, and fill up the oil.

2. Filter

Replace the suction filter element, high-pressure filter element, and return oil filter element every 800 working hours.

Section 4 Hydraulic Hose

If there are cracks, damage, or oil leakage problems with the hydraulic hose, it must be stopped immediately and contacted with the nearest designated maintenance point of our. When ordering spare parts, please also notify the following items.

1. Installation location;
2. Hydraulic hose length: length between the two ends of the hose;
3. The type of hydraulic hose fitting;
4. The diameter of the hydraulic hose marked on the outer surface;
5. The type of protective sleeve

Section 5 Daily Maintenance Content

1. Check for damage to the hydraulic hose and for any signs of oil leakage. If there is any damage or leakage, it be addressed. If the hydraulic oil level drops below the minimum fill level due to leakage, etc., please promptly refill the hydraulic oil.

2. Keep the working vehicle and ensure that there is no oil or mud on the walkway plate, work platform, or steps.

Note: When cleaning, do not spray water directly at electrical components or electrical.

3. Check all signs on the working vehicle, replace and repair all damaged signs. It is dangerous to use a working vehicle without operation signs.

4. Check whether fluid level of the chassis brake fluid and coolant reservoir has reached the specified fluid level mark. If the fluid level is below the scale line, add the recommended hydraulic brake fluid.

5. The general service life of chassis brake fluid and coolant is 2 years, and they need to be replaced in time. If there is any inconsistency between this manual the chassis manual, the chassis manual shall prevail.

6. Precautions: When a significant unexpected collision occurs to the working vehicle, a comprehensive inspection of the superstructure and chassis required to ensure that all parts are intact before continuing to use.

7. Service life: After the working vehicle has been used for 6 years, a professional inspection and evaluation the entire vehicle should be conducted every year. Adjust to the best condition for use. After 10 years of use, the working vehicle should be scrapped together with the chassis

The tension of the telescopic arm cable and hose should be checked every six months to prevent damage from over-loosening or over-tightening. The cable should be such that when the telescopic arm is fully extended, looking forward from the end of the arm, the sag should not exceed 40mm. Over-tight will cause damage to the cable and hose, and over-loosening will cause wear and tear damage.

Chapter 10 Emergency Countermeasures for Problems

This chapter describes items to be checked when the vehicle cannot operate normally.

Condition		Confirm the project
Upper operating device	The upper operating device cannot perform various operations	Please confirm whether the "Lower Priority" switch of the lower operating device is turned on: Please confirm whether all vertical outriggers are grounded
	The work arm is placed in an extended state with a slight contraction over time	When the hydraulic oil temperature is high, the working arm will have a slight contraction phenomenon when it is extended and placed, which is not an abnormal phenomenon
	Tilting of the working basket occurs during the lifting or telescoping operation	Please confirm whether the balance valve of the balance cylinder is damaged. The boom shall be leveled at each part of the lifting and telescoping
	The working bucket cannot be slewed left and right	In extreme position.
Others	Abnormal movements	Please confirm whether the battery voltage is normal. Please confirm whether the charger is working normally.

In order to protect the environment in which we live, please properly handle the waste generated during the use and maintenance of this product. During the use maintenance and repair of the product, waste should be collected, stored and disposed of in a classified manner.

The collection containers for general solid waste (waste paper, waste metal) are custom-made trash cans, etc., which are handed over to recycling companies for recycling.

Hazardous waste:

- ① Waste oil: collect the oil from the equipment, replace the oil and various waste oils into a special waste oil bucket with a collection

small bucket, and paste a "hazardous waste" label on the. When collecting, avoid leakage as much as possible, and hand it over to a qualified recycling unit for recycling.

② Battery: Send the replaced battery to the hazardous waste stacking for preservation, and make a "hazardous waste" label, hand it over to a qualified recycling unit for recycling.

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