SHANMON

3007J Telehandler

Operation and Maintenance Manual

Shandong Weimeng Machinery Technology Co., Ltd

www.shanmonglobal.com

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Preface

Most accidents that occur during machine operation, maintenance and repair are caused by failure to follow basic safety regulations or precautions.

Operators must be fully aware of potential hazards, including personal factors that may affect safety, ad remain vigilant. They should receive necessary training to learn the skills and tools required for correct operation. Improper operation, maintenance or repair of the machine may result in danger or even personal injury!

This manual is an important part of the machine and provides you with useful information on the machine's components and their operation, safety, service, maintenance, troubleshooting, and technical specifications. This manual can help you operate the machine smoothly, safely, and efficiently.

Before using, maintaining and repairing the machine, please read and fully understand the contents of this manual, especially the information about safety precautions. Please operate the machine strictly in accordance with this manual.

The operator of the machine must keep this manual within his/her reach, and the service personnel of this machine must also be familiar with and understand the contents of this manual.

Safety precautions and safety warnings are provided in this manual and on the product. Ignoring these safety warnings could result in personal injury or death to yourself or others.

Safety precaution warning signs

	This safety warning sign shows you very important information about safety! When you see a sign in this manual, please read the item next to the sign and strictly follow it, and tell others. Failure to follow safety warnings can result in serious injury and death.
Safety warning signs	**Explain**
Danger	**If you do not pay attention to any hazardous risks, death or serious injury may occur.**
warn	**If you do not pay attention to any hazardous risks, death or serious injury may occur.**
cautious	**If you do not pay attention to any hazardous risks, personal injury or equipment damage may occur.**

If this manual is lost or dirty, please request a new manual from Shandong Wei meng Engineering Machinery

Co., Ltd. or its authorized dealer. If you resell the machine to someone else, please give this machine to the new machine user.

Manufacturer's declaration

- Only trained and authorized personnel may operate and service this equipment.
- Operators and related personnel must wear necessary safety protection and take necessary safety measures.
- Do not, under any circumstances, perform any operations prohibited in this manual.
- The manufacturer cannot predict all potentially hazardous working environments and operations that may cause danger. If you perform operations not mentioned in this manual, make sure that this operation will not cause damage to the operator, other people and this equipment. If you cannot ensure the safety of such operations, stop working and consult Shandong Wei meng Engineering Machinery Co., Ltd. or its authorized agent.
- The manufacturer is not responsible for any personal injury, death, or damage caused by use of this equipment beyond the limits specified in the equipment 's intended use and operating instructions.
- Use accessories approved by our company or our designated dealers. Use of unauthorized accessories may cause safety problems and affect the normal operation and service life of the machine. Shandong Wei meng Engineering Machinery Co., Ltd. does not assume any responsibility for damage, accidents and machine failures caused by the use of unauthorized accessories.
- Unauthorized reconfiguration of the machine may be dangerous. The manufacturer will not be held liable for damage caused by unauthorized reconfiguration.
- Some details shown or some optional components listed in the pictures or diagrams of this manual may differ from your machine. Other components not relevant to the description may have been removed from the pictures or diagrams to facilitate the description;
- This manual may not include changes made to the machine due to improvements and upgrades in product design. This may cause this manual to be inconsistent with the purchased machine and affect the maintenance of the machine. Read and study this manual carefully and compare it with the machine;

For more information about the machine or if you have any questions about this manual, please consult our company or the machine dealer.

Warning!	Before driving on public roads, please check whether the machine complies with the road driving requirements of local laws and regulations, and obtain road driving permit from the relevant management department.

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1. Security

1.1. Safety signs and their locations

Some safety signs are pasted on the product. Please read all safety matters and follow them. The safety signs are displayed as shown in the figure. Take good care of these safety signs and replace damaged and missing safety signs in time. If a component with a safety sign must be replaced, please paste a new safety sign on the new component. Wash the dirty signs with clothes and foam. It is not allowed to use gasoline to wash the dirty signs.

1.1.1 Sketch of the location for pasting safety signs

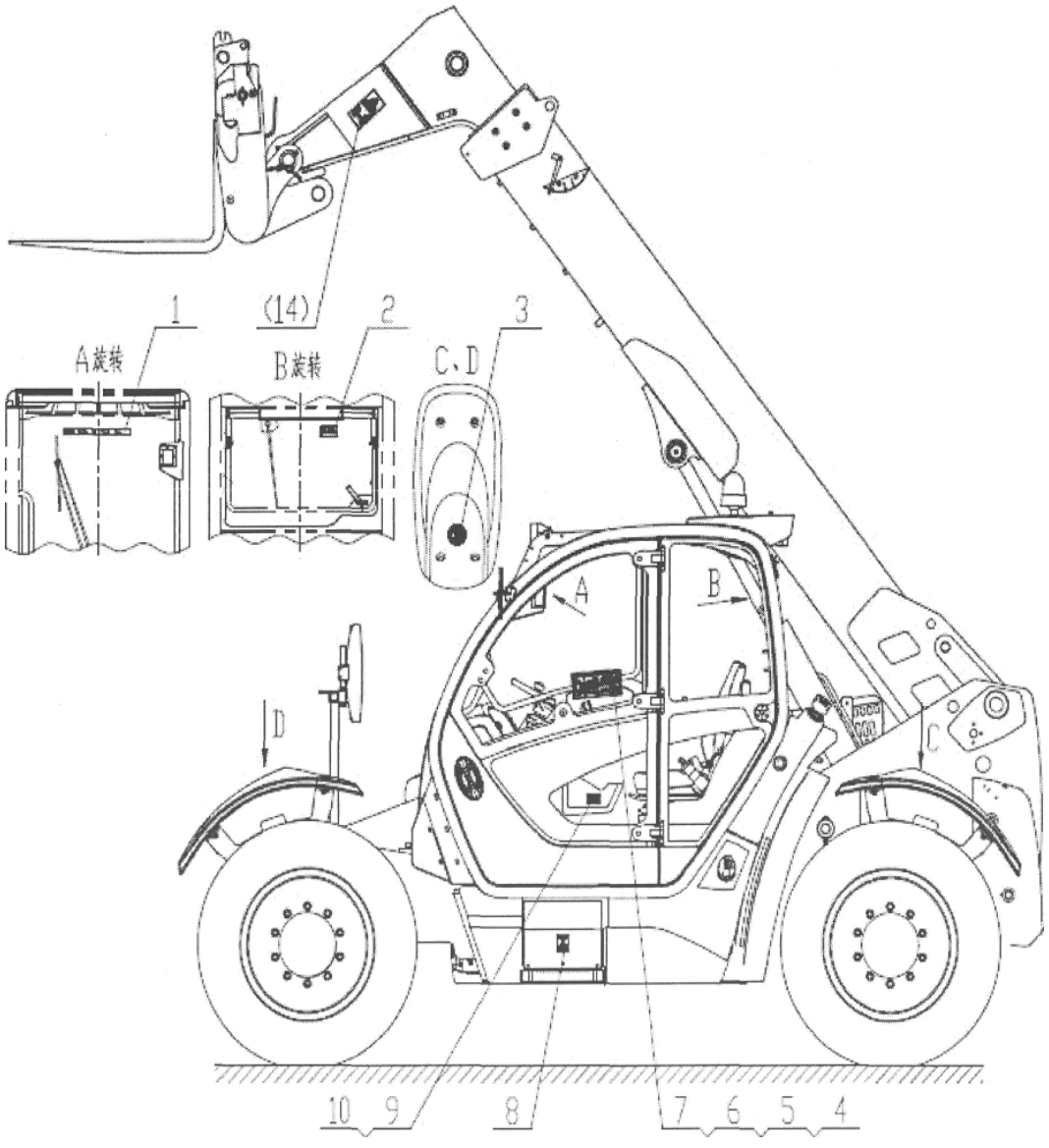


Figure 1-1 Schematic diagram of safety sign pasting

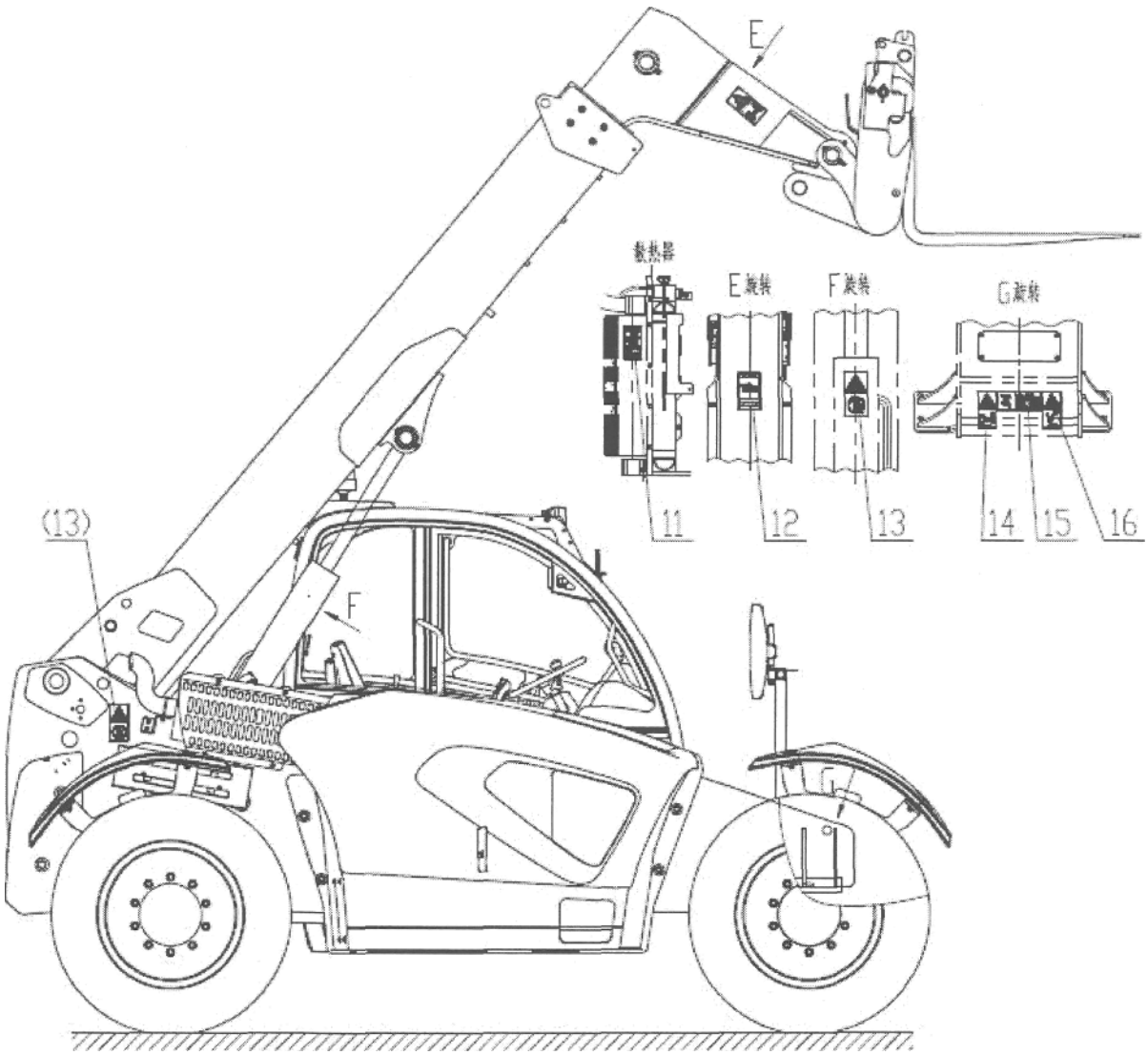


Figure 1-2 Schematic diagram of the safety sign affixed position

The tag declaration is as follows:

l-Observe the energy curve (Figure 1-3)

2-Pay attention to your hands (Figure 1-4)

3-No trampling (Figure 1-5)

4-Electric shock hazard safety sign (Figure 1-6)

5-Prevent rolling (Figure 1-7)

6-Fasten your seat belts (Figure 1-8)

7- Read the manual (Figure 1-9)

8- Main power switch (Figure 1-10)

9-Limitation Warning (Figure l-11)

l0-Prevent door collision (Figure 1-12)

11-Please note that the fan may hit your hands (Figure 1-13)

12-No one is allowed to stand on the attachment (Figure 1-14)

13-Do not touch hot surfaces (Figure 1-15)

14-Safety distance identification (Figure 1-16)

15-Placement and movement support (Figure l-17)

16- Boom cylinder lock (Figure 1-18)

1.1.2 Safety Signage Description

Figure 1-3 Watch for power linesFigure 1-4 MIND YOUR HANDS!

WARNING: Before operating the machine, watch for power lines to avoid unreasonable operation.

WARNING: When opening or closing doors and windows, please pay attention.

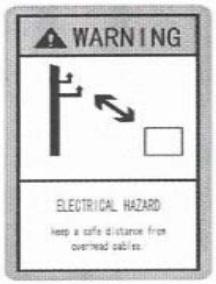
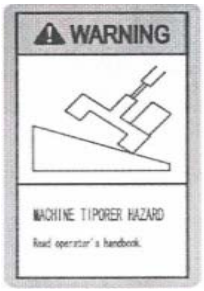


Figure 1-5 No tramplingFigure 1-6 Electric shock hazard safety sign warning

WARNING: Keep away from fragile structures. **WARNING:** Keep safe from dangerous objects such as fenders, power supplies, etc.



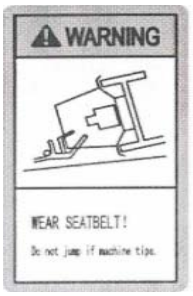


Figure 1-7 Preventing rolloverFigure 1-8 Fasten your seat belt

WARNING: Read the instructions to prevent the machine from tipping over. **WARNING:** If the machine rollsover, do not jump out and fasten your seat belts.

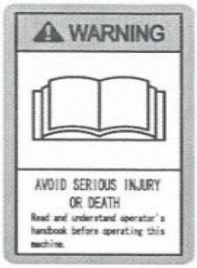


Figure 1-9 Reading Manual

Figure 1-10 Main switch

WARNING: Please read and understand the instruction manual carefully before useto prevent

serious casualties.

WARNING: This is the main power switch logo.Display system voltage is 24.

Figure 1-11 Limitation

WARNING: Pay attention to the words hangingon the door.

Figure 1-12 Preventing door collision

WARNING: If it is windy, please pay attention to the door to prevent collision.

Figure 1-13 Be careful that the fan may hit your hands

WARNING: No touching before machine shut down to prevent from cutting danger of fan rotation.

Figure 1-14 Do not stand on the accessories

WARNING: Do not stand or ride on forks or any attachment.

Figure 1-15 Do not touch hot surfaces

WARNING: Do not touch the heating surfaces such as muffler, shutter lamp, machine tool, etc. after operating for a period of time.

Figure 1-16 Safe distance identification

WARNING: Please keep a safe distance from the boom.

Figure1-17Placement and movement support

Warning: Before and after using the safety bar, please install and remove it according to the markings.

Figure 1-18 Locking the boom cylinder

Warning: When stopping the machine for maintenance, be sure to turn off the boom lifting oil.

1.1.3 Fire Extinguishment

- A fire extinguisher should be provided on the machine as an extra safety precaution.
- Be familiar with the use of fire extinguishers, inspect and maintain them regularly, and follow the recommendations in the instruction manual.
- The machine has a mounting bracket for a 4kg fire extinguisher on the cab floor behind the left seat. The fire extinguisher is an optional part that users can use by themselves or purchase from our spare parts center.

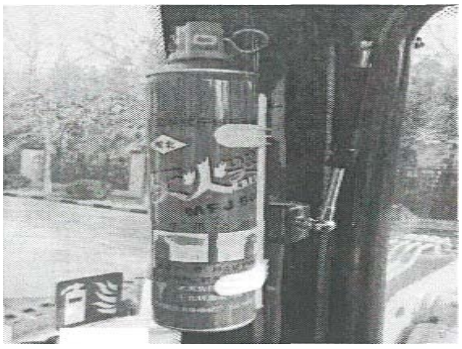


Figure 1-19 Fire extinguisher bracket position

1.2. General safety information

1.2.1 Safety Rules

Please read carefully and be familiar with all safety precautions, otherwise a series of injury accidents may occur.

These safety notices point out potential hazards and how to avoid them. If you do not fully understand their

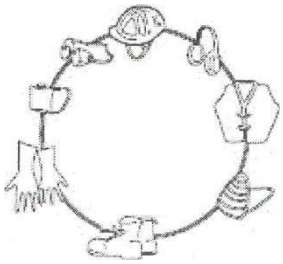
meaning, consult Witman or its dealer.

For safety purposes, it is not enough to simply heed these precautions. When operating a machine, you must always consider what kind of hazard may occur and how to avoid it.

- Only trained personnel can operate and maintain the machine.
- Do not operate if you feel unwell or have taken medication or alcohol. Operating in poor health may injure others or yourself.
- When you work with others, make sure they understand the language of signs.

1.2.2 Safety Rules

- Please wear safety protection equipment during operation or maintenance.
- When operating or maintaining, please wear a hard hat, safety glasses, safety shoes, a glittering coat, a veil, ear plugs and gloves made of hard materials. When scattering metal shavings or cleaning the air filter before the shavings with a hammer or compressed air, please wear safety glasses, a hard hat and thick gloves. (Figure 1-20)



- Improper clothing may cause injury.

Figure 1-20

- Do not wear loose clothing, as loose clothing can easily become entangled in control levers or moving parts, causing injury or death.
- Do not wear greasy clothing as this may cause burns.
- Wear goggles or masks in workplaces with liquefied natural gas. It is recommended to wear cotton protective clothing and heat-insulating gloves that are easy to take off. Wear long pants that cover the opening of the upper, and do not roll up the trouser legs. There should be no nails on the soles of the shoes to prevent the body from being injured by the spilled liquid.
- Check whether the safety protection device is functioning properly before use.

1.2.3 Fire prevention

Telescopic forklifts are flammable substances. Therefore, if sparks are close to the machine, it is very dangerous. Therefore, we must pay attention to the following points:

- Keep fuel and lubricants away from ignition sources.
- Tighten all caps on the fuel tank.
- Use marked containers to hold flammable liquids and place them in a fixed place. No unauthorized personnel are allowed to use them.
- Move combustible materials away from the surface and ensure that there are no greasy cloths or combustibles on the surface.
- Do not weld or cut pipes that contain flammable fluids. Before welding or cutting pipes, clean them with non-flammable fluids.
- When operating, keep the machine's exhaust away from combustible materials such as dead grass or waste paper.
- Choose a parking spot carefully and keep hot parts away from combustible materials.
- Prevent pipes and hoses from leaking. Replace damaged pipes and hoses. Use repaired or cleaned pipes and hoses.
- Clean and tighten all electrode connectors. Check wires daily for loose and worn wires. Tighten loose power cords and repair or replace worn wires before the machine is started.
- There will be explosive gas near the battery. Therefore, do not have any sparks near the battery. Please strictly follow the product manual to care, maintain and use the battery;
- Do not charge a frozen battery to prevent explosion.

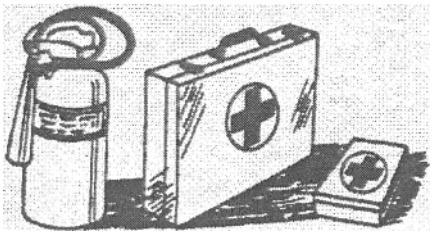
- Do not operate the machine near open flames.
- Do not use the machine in an enclosed space where flammable substances, flammable vapors, or dust are present.
- Do not use open flames (matches, lighters, etc.) to inspect the machine when it is out of sight. (Figure 1-21)

Figure 1-21

1.2.4 Fire extinguisher and first aid kit

If an injury or fire accident occurs, please take measures according to the following items:

- You must have a fire extinguisher and know how to use it.



- Check the fire extinguisher regularly. Keep it in the cab.
- Check and maintain the fire extinguisher regularly. Follow the recommended operating instructions on the instruction panel.
- A first aid kit must be prepared at the work site. Check it regularly and add some medicine if necessary. (Figure 1-22)

Figure 1-22

- Prepare telephone numbers for emergency contacts (such as doctors, emergency centers, and fire stations). Post contact numbers in designated areas and make sure all personnel know these numbers and contact information.
- Know what to do in the event of a fire or injury.

1.2.5 Fire safety

If you find your machine on fire, the safety of you and others on site is paramount. The following actions can be taken as long as they do not put you or others in danger. Assess the risk of personal injury at all times and keep a safe distance from the machine when you feel danger.

- If you are unable to perform any operations, turn off the machine before leaving.
- Keep the machine away from flammable objects such as gas stations, buildings, garbage dumps, mulch and woods;
- Lower all implements and shut off the engine as soon as possible. If the engine is still running, it will continue to cause a fire. Damage to any hose connected to the engine or pump can cause a fire.
- If possible, turn the battery circuit breaker to the OFF (O) position. Turning the battery off will eliminate the ignition source in the event of an electrical short. If wires are damaged by fire and cause a short circuit, turning the battery off will eliminate the secondary ignition source.

- Alert emergency personnel to the fire and your address.
- Use the onboard firefighting equipment in accordance with the following procedures:

  (1) Pull out the safety pin;

  (2) Aim the nozzle of the fire discriminator at the root of the flame;

  (3) Press the handle to release the fire extinguishing agent;

  (4) Use a fire extinguisher to sweep from one side of the flame root to the other until the fire is out.
- If a fire gets out of control, be aware of the following hazards:

  (1) The tires of the tires are at risk of explosion when burning;

  (2) the explosion may throw hot blast fragments and debris to great distances;

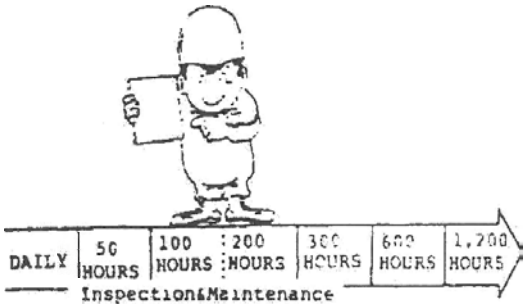
  (3) Fuel tanks, accumulators, hoses, and hose fittings may explode in a fire and spread fuel and explosion debris over a very large area;

  (4) Remember that almost all parts in the machine are flammable, including coolant and hydraulic oil. Plastics, rubber, fabrics, and resins in glass mats are also flammable.

1.3 Safe Operation

1.3.1 Familiarize yourself with your machine

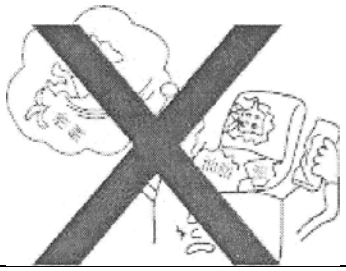
A. Get familiar with your machine



- Only authorized technicians can operate and maintain it.
- Observe all safety regulations and precautions when operating or maintaining the machine.
- Remember that rain, snow, ice, gravel and soft roads can change the machine's ability to operate.
- Read the operator's manual, study the structure, maintenance and operation, and become familiar with the buttons, handles and instruments. (Figure 1-23)

Figure 1-23

- When installing and using accessories, please read the instructions related to the accessories.



⚠警告	Do not use accessories that are not authorized by our company or its agents. Unauthorized accessories may cause danger and disrupt normal operation. Our company is not responsible for accidents caused by unauthorized use of accessories.

- Please understand all regulations regarding operation and all signals used during work. If there is some grease on the operating area, please wipe it off carefully as it will cause slipperiness. (Figure 1-24)

Figure 1-24

- Before and after the machine is operated, please check each system. Check whether all safety protection methods are in a safe state. Check whether all tires are worn and whether their air pressure is normal. If you ignore oil leakage, water leakage, deformation, looseness and abnormal noise, malfunctions and accidents will occur. Therefore, please check the loading procedures frequently.

B. Prevent crushing or cutting injuries

- No part of your body should enter the working area of moving parts. As the work equipment moves, the space in the linkage increases or decreases, and approaching this area may cause injury. If it is necessary to enter the

space between parts, stop the engine and lock the work equipment.

- When you must work under the machine, support it reliably and firmly. Do not rely on the cylinder for support. If the control equipment moves or the pipe leaks oil, the attachment may fall.
- Do not adjust anything while the engine is running.
- Keep away from all rotating and working parts. (Figure 1-25)

Figure 1-25

- Ensure that no debris is present in the fan layers. The rotating layers of the fan can eject or break debris present in the fan.

- Checking the engine while it is running is dangerous. Avoid doing so.

1.3.2 Secure Boot

A. Driver's clothing

The driver should choose the necessary personal protective equipment according to the operation needs. For

example, the driver should wear a safety helmet, work clothes with retracted sleeves and leg openings, safety shoes, safety goggles, gloves and masks. (Figure 1-26)

Figure 1-26

B. Before starting any operation, investigate the surroundings of the workplace. (Figure 1-27)

Figure 1-27

- Before starting any operation, investigate the ventilation conditions in the workplace. Be alert to any abnormal conditions that could lead to dangerous accidents.
- Be familiar with the terrain and ground conditions of the workplace and choose the safest working methods.
- Make the ground of the workplace firm and level before starting the operation. If the workplace is sandy, sprinkle some water on the ground before working.
- When working on a public road, assign a man to act as traffic warden or set up a fence around the work site and put up some notices showing “No Entry”.
- Before entering a room, ensure good and effective ventilation to avoid poison caused by exhaust fumes.
- Some water pipes, gas pipes and cables may be buried underground. Please pay attention to the location of

burrs to avoid damaging these pipes.

- Before working in shallow water or passing a sand bank, check the bottom and water depth and stream speed. Prevent the drive axle from coming into contact with water. Clean and check the lubrication holes after work.

C. Inspection before starting the telescopic forklift

Check before each daily work and insist on daily maintenance. Take abnormal situations seriously, repair the fault immediately and report it to the management.

- Check the machine for oil leakage, fluid leakage, loose bolts, abnormal sounds, missing parts, etc.
- Clean cab windows and clean all lights for good visibility.
- For a good view, turn the rearview mirror to an appropriate angle. Replace damaged rearview mirror glass.
- Ensure the machine’s lighting system is functioning properly and the work site is adequately lit.
- Clear all obstructions in the machine's path. Be careful of hazards such as high-voltage power lines and ditches.

D. Get on and off the bus

- Inspect ladders and handrails before and after entering or exiting a vehicle. Wipe away any oil, lubricants, and mud from ladders or handrails.
- Do not jump on or off the front. Never get on or off the vehicle while it is moving. (Figure 1-28)

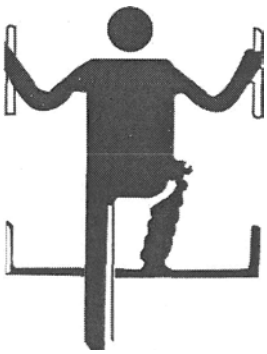


Figure 1-28

- When getting on or off, face forward, hold onto the handrails and step onto the ladder to ensure your body is stable.
- Do not hold any control levers when entering or exiting the vehicle.
- Do not exit or exit the vehicle from the rear steps or tires.
- Do not get on or off the vehicle while carrying tools or other materials. Use ropes to lift tools or other materials.

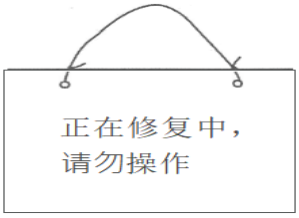
E.When the operator leaves his seat

- Lift the operator forward of the seat and be sure to pull the pilot lock lever down onto the mobile working device to prevent accidents caused by accidental touch.
- Before leaving the machine, make sure the parking brake is pulled to the brake position, move all levers to the neutral position, stop the engine, and always keep the key with you.

	Do not place parts and tools around the operating elements in the cab! This is because vibrations may be generated during operation and operation, and these things may damage the operating elements or switches ; or may cause the pedal to malfunction or move and cause an accident.

F.When starting the telescopic forklift

- Before boarding the telescopic handler, make sure no one is staying in or around it. Ask unauthorized persons



to keep their distance from the loader and then start the loading procedure.

- If the control lever is stuck with the Do Not Operate option displayed, do not start the engine.
- First, sit in the seat and adjust it until you are comfortable. Fasten your seat belt.
- Honk the horn to remind people around you to leave. (Figure 1-29)

Figure 1-29

- Start the engine according to the operator's manual.
- The engine should only be started when the operator remains in the cab. It is prohibited to start the engine by taking a shortcut with the starter motor, this operation will not only damage the electrical system but also is a dangerous job.
- Before using ether to cool the starter, please refer to the operator's manual in advance. Be cautious because ether is a flammable material.
- When a plug-type preheater is installed on the engine, ether must not be used.

G.Check the telescopic forklift after starting

After starting the machine and before working, check the loader according to the following items.

- If there is an abnormal sound or vibration when the engine is running, it means that the machine is malfunctioning.

- Please resolve the issue and report it to management.
- Check engine speed control in neutral condition.
- Check the operation of all gauges, instruments and warning lights to ensure they are functioning properly and within adjustment range.
- Make sure the parking brake is released.
- Try to operate all levers and make sure they are flexible.
- Try the gearshift lever to feel whether it is in the correct gear.
- Check the brake pedal and accelerator pedal, and check whether the steering is sensitive at low speed.
- Make sure the reversing alarm is functioning properly.

1.3.3 Safe driving

A. Ensure the safety of yourself and others

- Maintain correct operating habits to ensure safety.
- Honk the horn before starting the machine and step on the accelerator after confirming that everything is normal.
- Make sure there are no people or obstacles nearby.
- Do not extend your arms or legs out of the cab, as this could result in injury. Do not place your arms or feet on the operating equipment.
- Give your full attention to the operation, as a momentary distraction can lead to tragedy. Be aware of those around you and sound the horn to alert them.
- Do not drive with doors and windows open, but fixed doors and windows are not subject to this regulation.
- No passengers can be transported, so hitchhiking is not allowed.
- Using the bucket to carry people or as a working platform is extremely dangerous.

B.Highway driving

- Working equipment located in the front may obstruct the operator's view. When the bucket is fully loaded, the weight is concentrated on the two front wheels, so stability should be considered when driving on the road.
- Fog, soot and sand can obstruct the operator's vision.
- Survey the work site in advance, observe road conditions, and be alert for obstacles, mud, snow, and holes.
- When driving on public roads, please obey traffic rules, do not cause traffic jams, and pass intersections quickly.

- When driving on public roads, drive courteously and keep a distance from other vehicles.
- Before driving on a highway or public road, please refer to the operator's manual in advance and follow local traffic regulations. Do not cause traffic jams and drive quickly through intersections.
- Understand all operating procedures and signals. Operators must know the meaning and signs of each signal at first glance.

WARNING	Emergency braking may result in personal injury! Switching between forward and reverse gears at high speeds is extremely dangerous!

C. Full load

- Do not lift the rated load for transportation, as it is very dangerous. In the case of rated load transportation, the appropriate speed should be selected and the front fork arm should be lowered to the maximum rearward position so that it runs at an appropriate height above the ground (the upper surface of the fork is 300mm from the ground). This can lower the center of gravity and ensure the stability of the vehicle.
- The stability of the vehicle. The load will not exceed the limit of the rated load. Avoid overloading. The company shall not be responsible for personal injury or machine damage caused by overloading.
- Avoid hasty driving, emergency braking, sharp turns and bypassing when transporting cargo. It is dangerous to operate the working equipment carelessly. Impetuous movements of the working device may throw the load or overturn the machine.

D. No speeding

- Be familiar with performance and choose the appropriate speed according to the actual situation. Determine the most appropriate route and working method and let the people who cooperate know this.
- Drive slowly and keep it under control.
- When driving on bumpy roads or slopes, fast driving, sharp turns, or emergency braking are prohibited.
- When driving on uneven terrain or messy roads, it is difficult to control the steering wheel, so be extra careful to prevent overturning.
- Run the engine smoothly and do not rev it at high speed.

E. Maintain good visibility

- When visibility is limited, reduce speed. Honk the horn to alert those around you and avoid rough maneuvers.
- Bad weather, such as blowing sand, dense fog and heavy rain, can reduce or disable visibility, so reduce speed and sound the horn.

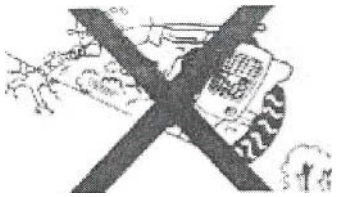
- When loading large cargo, please pay attention to lifting, moving and shifting. Make sure no one enters the working area and a guide is required.
- Distance and terrain can be misleading at night, so maintain appropriate lighting and speed.
- Turn on the headlights and overhead lights when working at night.

F.Obstacles

- When passing through places with many obstacles such as roofs and porches of buildings, do not let the machine collide with these obstacles.
- Reduce speed when driving or turning in confined areas. Make sure there are no obstacles around you.
- When road conditions are bad, operate the machine carefully to avoid loss of stability.

G. When working in hazardous situations

- Don’t work alone in dangerous places. Investigate road conditions, bridge strength, and site topography in advance.
- When driving on swamps and lose ground, pay attention to wheel sink and braking performance.
- In shallow water and swampy areas, do not allow the bottom of the drive axle to come into contact with water.
- Avoid being too close to overhangs and deep trenches. There is a danger that the weight and vibration of the machine will cause the soil to collapse and the machine may fall or overturn.
- When working in hazardous locations with risk of falling rocks or overturning, activate protective equipment (FOPS & ROPS).
- When working continuously on rainy days, the working status may be changed due to rain, so please be extra careful. Please be extra careful when working in places where earthquakes or explosions occur.
- When working on snow, reduce the load and be careful of slipping.



- Driving sideways or turning on a slope is extremely dangerous, do not attempt this maneuver.

H. Driving on a slope

- Do not turn on a slope. Turns should only be made on flat ground. Reduce speed and turn angles when working on hilltops, banks and slopes. (Figure 1-30)

Figure I-30

- Consider walking uphill or downhill rather than walking through alleys or sidewalks.
- Select the appropriate speed gear before going downhill and do not change speeds during the downhill process.
- When driving on a slope, the center of gravity of the machine will be concentrated on the front or rear wheels, so please be careful and avoid emergency braking.
- When driving on a slope, river bank or hillside, keep the bucket close to the ground and keep it 20-30 cm away from the ground. If an emergency occurs, lower the bucket to the ground to help stop it and prevent it from overturning.
- When driving on a slope with a full load

  (1) Use 1st gear

  (2) Keep moving forward and keep moving backward when going downhill.

  (3) Don’t turn
- If you need to brake when going downhill, press the brake pedal without cutting off the power. Do not put the shift lever in the high-speed position. When the vehicle speed exceeds the rated speed, press the brake pedal to reduce the speed.
- If the engine stalls while driving on a slope, fully depress the brake pedal and lower the bucket to gravity, then apply the brake to secure it.
- If the grade of the slope is less than 15°, repeat the above steps and put the operating lever in the neutral

position, then start the engine again.

I. Pay attention when turning.

To prevent accidents, the following rules must be observed before moving the machine and working even if it is equipped with a reversing alarm and a rearview mirror.

- Honk the horn to alert people around you.
- Make sure no one is around. Especially the area behind (this area is not visible to the driver when he comes.

(Figure 1-31)

Figure 1-31

- When operating in hazardous locations or areas with poor visibility, some individuals should be designated to direct the transport.

- No one is allowed to enter the driving area and turnover area without permission.
- Do not change direction while driving at high speed.

1.3.4 Security

A. Maintain good operating habits

WARNING	Overload operation is very dangerous and may cause accidents to the machine or individuals!

- During operation, the operator must sit in the seat and wear a seat belt.It should always be under control. (Figure 1-32)

Figure 1-32

- The operation to be processed must be correct.
- If a malfunction occurs, repair it immediately and listen to the abnormal sound to distinguish the cause of the malfunction. Do not repair a working part.
- The weight of the front fork is prohibited from exceeding the corresponding angle of the energy curve and specifying the load value within the arm extension length area. Overload operation is very dangerous and may cause the rear wheel to leave the ground or even cause the machine to flip. Therefore, please confirm the loading weight in advance to avoid overloading. The company does not assume any responsibility for mechanical or personal injury caused by overload operation.
- Sprinting at high speed is tantamount to suicide. Sprinting will not only damage the machine, but also injure the operator. Do not attempt to do this.
- Should be aligned vertically with the stockpile to be loaded. If the stockpile is approached from an angle, it may be unbalanced.

- Before starting any operation, please check the surrounding conditions in advance.
- Check ground conditions before passing through a tunnel or bridge.
- When working in windy weather, operate with the wind in your direction.

•Be careful when you have to lift a load to the highest position. Lifting a load to a high position is dangerous because it can unbalance the machine, so move slowly and pay attention when tilting the bucket forward.

- When the truck is mated with the machine, avoid collision between the bucket and the truck. Do not stand under the bucket or place the bucket on top of the truck compartment.
- Stop working when visibility is reduced by smoke, fog, and flying dust. If the workplace is dark, prepare lighting equipment.
- When working at night, please pay attention to the following.

a. Make sure you have adequate lighting equipment.

b. Ensure that all work lights are functioning properly.

c. At night it is easy to get a wrong impression of the distance and height of objects.

d. When working at night, please stop the vehicle frequently to check and observe the surrounding conditions.

- Before crossing a bridge or other structure, make sure it is strong enough to support the machine.
- The telehandler is a special purpose machine. Do not use the bucket or any part of the work equipment to scrape, move or push something

B. Pay attention to your surroundings

- No unauthorized personnel should be allowed to enter the working area. Since the working mechanism moves up and down, it also moves, so it is forbidden to enter the working area. If the machine cannot work, please secure the working equipment firmly first.
- When working near cliffs or places prone to collapse, please operate in the safest way and assign a guide to provide assistance. (Figure 1-33)

Figure 1-33

- When dumping soil or stones from a higher place, the safety of the dumping site should be considered.
- When material is close to a cliff or near the top of a slope, the machine's speed will suddenly increase as the load is dumped, so remember to slow down.
- When leveeing or pushing and dumping near a cliff, you should make one pile and then use the second pile to push the first.

C. Ensure ventilation before indoor operation

- If you have to do something in a closed room or a poorly ventilated area, you must open the windows for ventilation. If opening the windows still does not provide adequate ventilation, you will need to turn on a fan.
- Before working in a closed room, prepare several fire extinguishers and remember their location and how to use them.

D. Stay away from dangerous places

- Fire can easily ignite if the air released by the muffler is sprayed onto combustible materials or the exhaust is close to them. Therefore, special charges must be paid when you are close to combustible or dangerous materials such as oil, cotton, paper, withered grass or chemicals.

E. Stay away from high voltage lines

- Do not allow the machine to come into contact with high-voltage wires. Even being close to high-voltage wires can cause electric shock. Keep a safe distance from high-voltage wires according to the table below.

Table 1-1

	Voltage	**Minimum safety distance**	
Low Voltage	100~200V	2m	7 feet
High Pressure	6.600V	2m	7 feet
	22.000V	3m	10 feet
	66.000V	4m	14 feet
	1 54.000V	5m	17 feet
	187.000V	6m	20 feet
	275.000V	7m	23 feet
	500.000V	11m	36 feet

Do the following to prevent accidents:

- If the risk of contact with electrical cables is significant, consult your local electrical department before

working.

- Wear rubber shoes and rubber gloves. Place a rubber mat on the operator's seat. Prevent any part of your body from coming into contact with the metal chassis.
- Assign a guide to alert you when you are near cables.
- The operator should not leave the cab if the working equipment comes into contact with the cables.
- When driving near high voltage lines, do not allow anyone to approach.
- Learn the voltage of high-voltage lines from the electrical department before working.

1.3.5 Safe parking

- Choose a place that is as flat as possible to park and lower the work equipment to the ground.
- Do not park on a slope. If parking on a slope is unavoidable, the slope should not exceed 1/5, and the wheels should be secured with wedges, then the working device should be lowered to the ground.
- If you have trouble or must park in a busy traffic area, set up fences, signal signs or warning poles around it. Take some measures to make it clearly visible to other vehicles. But fences and signal signs should not block traffic.
- Before stopping, dump all loads, lower the working equipment to the ground and lock all operating levers, pull up the handbrake and put it in the brake position. Lock all equipment and remove the key. When getting off, please face the machine when getting off and keep your body stable. It is prohibited to jump from the front.
- Do not climb on the machine while it is running.
- In extremely hot weather with temperatures reaching over 30℃, the engine is prone to overheating, so the parking space must be in a shaded area.
- To extend the service life of the engine, run the engine at low speed for 5 minutes at the end of each day. Stop the engine after the water temperature has cooled down.
- When the vehicle is parked for a long time, place the cathode switch of the power supply in the "O" position to shut down the power of the entire vehicle and prevent the battery from running low.

1.3.6 Cold Weather Precautions

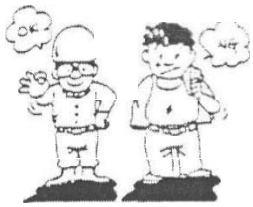
- After work, please clear the ice, snow, water or mud from the wires, sockets, switches and sensors or their surfaces. If you do not clear these, it will be frozen and make your machine unable to work in the next operation.
- Preheat completely before working. If it is not fully preheated, it will react slowly and may cause accidents.

- Operate each operating lever to circulate the hydraulic oil in the hydraulic system and heat it up so that it can work properly.
- Do not charge the battery if the battery's electrolyte is frozen. Do not use other power sources to start the engine as this performance is dangerous as it can ignite the battery.
- When charging or starting the engine using other power sources, make sure the electrolyte is thawed and check it for leaks before starting.

1.4. General principles of maintenance

1.4.1 Warning Labels

- Starting the engine or operating the joysticks while the operator is maintaining the machine or refueling could result in serious injury or death to the operator.
- Post warning labels on the joysticks in the cab to indicate that service and maintenance are being performed on the machine. Post warning labels around the machine if necessary.

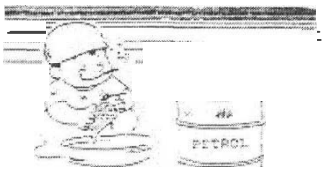


1.4.2 General maintenance requirements

- Operators and service personnel should be trained and obtain relevant professional certification. Personnel not related to inspection and maintenance are not allowed to enter the work area. You can designate someone to guard the work area.
- You should perform repairs according to this manual. If you do not know how to repair, you should ask the manufacturer for help.
- Maintenance procedures should be programmed in advance. When repairs or parts are to be disassembled, a service foreman is assigned to be responsible for the on-site service work and perform the service work in full accordance with the programmed sequence.
- Operators should wear safety helmets, protective clothing, wrist straps and trouser legs. Sometimes, depending

on the scope of maintenance work, they should also wear safety glasses, gloves and masks. (Figure 1-34)

Figure 1-34



- Please use appropriate tools and do not use damaged and inferior tools.
- To avoid accidents, you should always lower all working equipment. When repairing, stop the engine, engage the parking brake and place chocks under the wheels.
- Pay attention to the decals. The most important points are on the decals and must be followed strictly. If the decals are peeling or contaminated, you must apply new decals or clean them.
- Before repairing, you should post a warning "No Operation" or other similar signs in the cab to remind others not to touch any handles in the cab. If you do not do this, it will be very dangerous for the service personnel and yourself.
- Appoint a supervisor to assemble or disassemble the attachments.
- Fuel and petroleum are hazardous. Fuel, oil, grease and linoleum should not be exposed to

Any fire and flame.

- Smoking is prohibited during refueling and inspection work (Figure 1-35)

Figure 1-35

- Put the removed parts in a safe place and make sure they don’t disappear. Make railings next to the work area and hang signs to prohibit anyone from approaching.
- No unrelated persons are allowed to enter the work area.
- Keep the work area clean and organized. Do not allow oil and grease to spread throughout the work area. Avoid fires and slips.
- Put the operating lever in neutral position and lock it using the locking system.
- Do not modify the machine in the field. Do not modify the machine in the field in a way that would affect the function, safety and strength of the machine or its bucket.
- Have a fire extinguisher ready before working in a building and be familiar with its location and how to use it

1.4.3 Maintenance of the machine

A. Cleaning

- Clean the machine before any repair and maintenance to prevent dust from entering the machine.

Figure 1-36

- If the machine is dirty when repairs and maintenance are being performed, it will not be easy to detect problems and there may be a risk of dirt splashing into the eyes, or there may be a risk of slipping or sliding due to greasy dirt on the machine, causing injury. (Figure 1-36)
- When cleaning the machine, use a non -flammable cleaning additive.
- When cleaning the inside of the machine, the control handle should be locked by the locking device to prevent the working mechanism from moving. And activate the brake system.
- When cleaning the machine, please wear non-slip shoes to avoid slipping on wet floors. When using high-pressure water to clean the machine, please wear protective clothing.
- Do not splash water directly onto electrical components (e.g. sensors, sockets and plugs). If water enters the electrical system, it may cause malfunction.
- When cleaning the filter element with compressed air, please wear protective clothing and safety glasses. Figure 1-37)

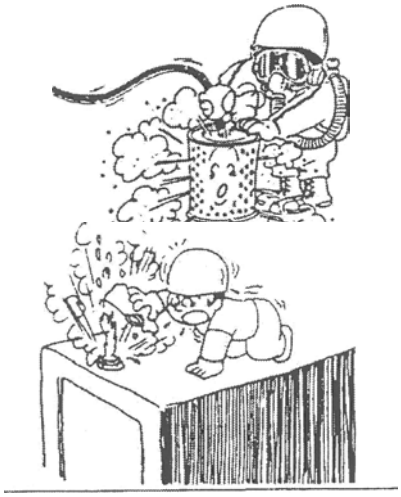


Figure 1-37

B. Support for working mechanisms

- Put the operating lever in neutral position and lock it using the locking system.

C. Lighting

- When checking the fuel, lubricant, electrolyte or window cleaner of the battery, you need to use an

explosion-proof illuminator. Otherwise, there is a risk of explosion.

- If the operator works in a dark place without lighting, there is a risk of injury. So, lighting should be provided.
- Do not use lighters or fire to ignite even in the dark. There is a risk of fire. When the gas discharged from the battery meets the fire, an explosion may occur.
- When using the machine as a lighting power source, please operate it according to the instructions in this manual.

D. Working in a closed space

- Engine exhaust gases are poisonous. If you must work in a closed room, you must use ventilation. If you do not already have ventilation, open the doors and windows.

E. Working under the machine

- Park the machine on smooth ground and place all working mechanisms on the ground before working.
- Chock the wheels.
- It is very dangerous to work with only the support of the work organization.
- Never work with a poor support. (Figure 1-38)

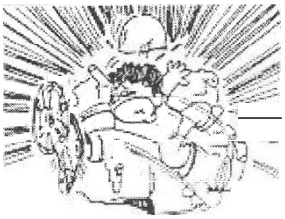
Figure 1-38

F.Working on top of the machine

- When performing maintenance on top of the machine, ensure that the footing is clean and free of obstructions and follow the instructions below to prevent a fall.

1. No lubricants and greases are spilled on the machine.
2. Don't leave tools lying around.
3. Watch your step when walking on the machine.

- Do not jump directly from the machine. When getting on or off the machine, face the machine and use the ladder and handrails.
- Use protective gear in special situations.
- The top of the hood is smooth and slick so do not allow anyone to stand on it.



- Standing on top of a tire is dangerous, so never stand on it.
- When cleaning the front glass of the cab, stand on the front fender.

G. Repair the machine while it is running

- To avoid injury and accidents, do not perform maintenance work on a running engine. If maintenance must be performed while the engine is running, follow the instructions below:
- Appoint someone to sit in the driver's seat and be ready to stop the engine
- Do not touch the exhaust pipe or high-temperature parts such as elbows, mufflers, etc. to avoid burns.
- When working near rotating parts, there is a risk of being sucked into the rotating parts, so special attention should be paid.
- Do not touch any control handles. If you need to operate a control handle, first alert others and ask them to leave.
- Never touch the rotating blades or fan belt of the fan as it is very dangerous (Figure 1-39)
- Don’t adjust what you don’t understand.

Figure 1-39

H. Do not drop anything into the machine

- When opening the cover or oil filling hole for maintenance, be careful not to drop anything into the machine. If anything falls into the machine, it may cause the machine to malfunction and you must take it out.
- When maintaining the machine, unnecessary tools and parts should not be kept in your pocket.

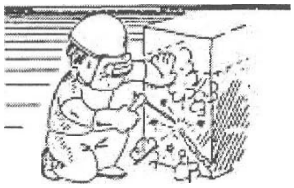
I. Heavy objects

- When using a hammer, wear protective glasses, a safety helmet and protective clothing. And a copper washer is needed between the hammer and the part to be hit.
- If you use a hammer to hit hard parts such as pins or bearings, there is a risk of splashing into your eyes, so special care should be taken.
- Handle tools and heavy objects with care to avoid dropping them.

J. Welding repair

- Welding must be done by skilled workers in a place with proper equipment.

- Welding may generate gas, fire or electric shock. Therefore, unqualified personnel are not allowed to operate.
- Battery terminals should be disconnected to prevent battery explosion.



- Disconnect the clip connection of the transmission computer control panel (placed in the control box on the right side of the driver's seat in the cab) to prevent the panel from being burned during welding; after the repair is completed, please correctly plug back the clip connector of the control panel as required, otherwise the machine will not operate.
- Make sure to unplug all connectors from the engine ECU to prevent high current from damaging the circuit board. Cover the ECU slot with a sheath to prevent the ingress of particles and welding sparks. Do not touch the ECU pins with your hands.
- Remove paint from welding areas to prevent the generation of harmful gases.
- Welding on or near hydraulic equipment or pipes may produce flammable vapors and sparks, which may cause fire, so welding is prohibited in the above places.
- Low-frequency sparks caused by welding fall directly on rubber hoses, wires or pressure pipes, which may burst suddenly and the insulation cover of the wires may be damaged, so please use mud guards to protect these pipes.
- When welding near a tire, special care should be taken as it may explode.
- Wear protective clothing when welding.
- The ventilation of the welding site should be adequately prepared. (Figure 1-40)

Figure 1-40

- Clean up all flammable materials and provide fire extinguishers on site.
- Do not make any renovations that may affect performance,
- Strength and safety of machines and operating devices.

K. Matters needing attention when refueling or changing oil

- The oil must be clean and free from contamination.
- The injectors and related parts must be clean to prevent water or dirt from entering the engine oil.
- When checking the oil level, keep the machine level.

- When using oils of different viscosities and brands at different ambient temperatures, please follow the relevant instructions.
- Different types of oil cannot be mixed or substituted together
- During oil change, the corresponding filter must be replaced.
- After filling the oil, check the system for oil leaks.

WARNING	**Signs of burns when checking or changing the oil.**

L. What employees cannot do

Please follow the instructions below to prevent contamination.

- Do not pour drained oil into rivers and sewer networks.
- Drained oil must be placed in a container and not poured directly on the ground.
- Please comply with relevant laws and regulations when handling hazardous and toxic substances, such as lubricants, fuels, coolants, batteries, etc.

1.4.4 Maintenance and precautions of components

A.Cooling system

- When you have just completed the work, the hydraulic oil temperature, the oil and water temperature in the engine and radiator are high and still under pressure. At this time, any attempt to open the tank, radiator, drain the oil or water, or change the filter may cause serious burns. Wait until the temperature drops before following the required procedures.
- To prevent hot oil from splashing, shut off the engine, allow the oil to cool, and slowly open the fuel tank cap to release pressure.
- When checking if the oil temperature has cooled, place your hand close to the front of the water radiator and check the air temperature. But be careful not to touch the radiator.
- When the machine is still hot, do not touch the engine body or muffler, exhaust tail pipe and relay to avoid burns. (Figure 1-41)

Figure 1-41

- Do not remove the engine oil temperature sensor, water temperature sensor, inverter sensor and air conditioning pipe to avoid scaling.
- The cooling system contains alkaline substances, so be careful not to let the cooling system come into contact with your skin and eyes.
- When you need to disassemble the air conditioner pipe, be careful not to expose the pipe to fire and flame. Otherwise, it will cause harm due to toxic gas.

B. Hydraulic system

- Before performing any inspection or service on the hydraulic system, securely lock out the hydraulic cylinders and other hydraulic devices. Allow the hydraulic fluid to cool, then release all pressure from the hydraulic system.
- Do not bend or hit the high-pressure pipes. Never install abnormal or damaged pipes or hoses on the machine.
- Please check all tubes and hoses carefully and tighten all connection fittings as necessary. When checking for any leaks, use a clean plate or cardboard for such inspections instead of checking with your hands, as the pressure of the fluid from the leak point can cause serious health damage, even if the leak point is small, like a pinhole, the leak pressure can pierce your skin. If oil splashes on your skin, seek the help of a surgeon within a few hours. Replace it if you find the following:

    1. Accessories are damaged or leaking.
    2. The outer coating is worn or cracked, and the reinforcement wire is exposed.
    3. The tube will bulge at certain specific locations.
    4. Visibly twisted or deformed due to pressure.
    5. Strengthen the wire extension.
    6. Wrong connection

- Ensure all pipe clamps, protection and insulation panels are properly installed to prevent impact and interference with other components.
- When replacing coolant, engine oil, transmission oil and oil filter, please use appropriate containers to hold these fluids. Waste fluid disposal should comply with local regulations on environmental protection.

C. Steering device

- If you feel it is difficult to turn, do not turn the steering wheel roughly, stop and check. You can resume operation after eliminating the fault.
- Do not turn the steering wheel when the engine is running.

- Let the steering wheel change with the changing terrain.

D. Electrical system

- Only qualified technicians should service the electrical system.
- When adjusting external power, please connect the ground cable last to avoid sparks around the battery and cause an explosion. Please note that the ground cable goes from the regulator end to the starter end.
- Adjust the starter key before servicing the electrical system.
- Before pairing the electrical system, remove the negative (-) terminal of the battery to prevent current flow. (Figure 1-42)

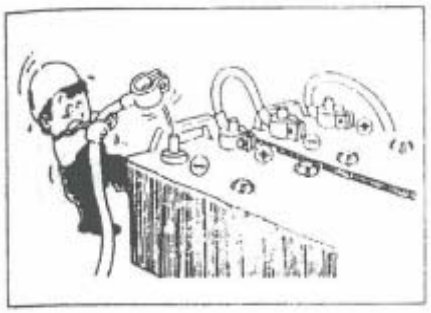
Figure 1-42

D. Battery

- The battery is maintenance-free. (Figure 1-43)

Figure 1-43

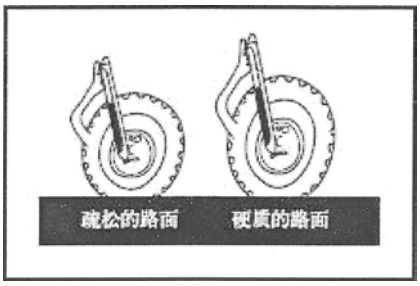
- Before working on the battery, remember to stop the engine.
- Battery electrolyte contains sulfuric acid, which can generate hydrogen gas, so improper handling of the battery can cause serious injury and fire risk, so the following points are obeyed:



1. Do not place a lit cigarette or flame near the battery.
2. When you must touch the battery during operation, you should wear safety glasses and rubber gloves.
3. If the electrolyte splashes onto your clothes or skin, please rinse immediately with plenty of fresh water.

4. If the battery electrolyte splashes into the eyes, it will cause blindness. In this case, rinse the eyes with plenty of fresh water and go to the hospital immediately.

5. If you accidentally drink electrolytes, then you must drink plenty of water, fresh eggs or vegetable oil, and



get help from a doctor or go to the hospital immediately

6. Contact with metal rods (e.g. tools), which may cause a short circuit between the positive (+) and negative (-) terminals of the battery.

7. When installing the battery, please secure the positive terminal (+) first.

8. When removing the battery, please disconnect the negative terminal (-) first.

9. When cleaning the battery surface, please wipe it with a piece of cloth. Never use organic solvents such as petroleum and cleaning solvents.

F. Disposal of waste batteries

When the battery cannot be used due to aging of the electrode, please do not discard it carelessly or pour the acid anywhere, otherwise it may hurt yourself or the people or animals around you and pollute the environment. Used batteries should be sent to the waste recycling department for disposal.

F. Tires

- If a tire explodes, the explosion itself can throw the wheel, tire, drive axle, and other components 500 inches or more away from the machine. The explosion and its components can cause damage to the server and health hazards, so tire pressure must be maintained within the normal pressure range. Never inflate a tire outside the rated pressure range. (Figure 1-44)

Figure 1-44

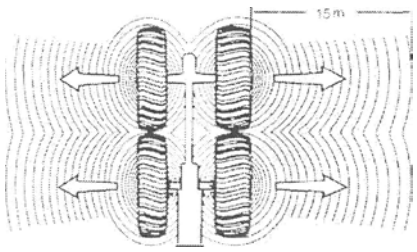
- During driving, the high speed of the machine will cause the tires to generate a certain degree of pressure, which is normal, so do not try to reduce the tire pressure. What you should do is reduce the speed of the machine or stop the machine to let the tires cool down. However, if the machine continues to move at a very high speed, it will cause the tires to overheat, which will cause the tires to explode, so be careful.

WARNING	**Check the wheel's lockring to see if it has fallen off. Keep an eye on it during inflation.**

- Stay as far away from the tire as possible when adjusting tire pressure. You should always stand behind the tire.
- It is forbidden to inflate tires with flammable gases. Dry nitrogen is recommended. If the tire is already filled with air, you can also use nitrogen for pressure regulation, which can be fully mixed with air. Inflating tires with nitrogen can reduce the risk of tire explosion because nitrogen does not help combustion, prevents rubber oxidation and deterioration, and avoids rust on the wheel hub.
- To avoid over-inflation of tires, it is necessary to use operating tools to fill tires with nitrogen and receive relevant training on how to use such tools.
- Do not approach the heated tire and keep a minimum distance of at least 15m. (As shown in Figure 1-45) Stand away from the shaded area.

Figure 1-45

- Check the tires and wheels. Do not manipulate the pressure when the tire pressure is very low. Also check for cracks or deformations in the tires.
- Mounting screws and bolts on the wheels to see if they are securely fastened as the manufacturer intended.
- When checking the wheels, do not touch the steering wheel, including the front and rear wheels. Such inspections should be performed from the side of the wheel. When you need to remove one of the wheels, the other wheels should be blocked with chocks.
- Special care should be taken when welding near the wheel, as the tire wheel may cause an explosion. Repairing tires and wheels is a dangerous job. Inspection and maintenance of tires and wheels can be performed by trained and competent personnel with the help of appropriate tools and correct procedures.
- When replacing tires, make sure you are using the correct tire. All tires should be identical in specification and texture.



2. Operation

The descriptions in this section are provided for reference by new operators and verification by experienced operators only.

This section contains descriptions of instruments, switches, machine controls, attachment controls, transport, and towing information.

This section contains diagrams to guide the operator through the correct procedures for checking, starting, operating, and stopping the machine. The operating skills described in this manual are basic operating skills. As the operator becomes more familiar with the machine and its functions, the operating skills and techniques will improve accordingly.

Before starting the machine, sit in the operator's seat and familiarize yourself with the cab layout. Refer to the manual to understand the various operating levels, switches, gauges, buttons and pedals. Don't guess. If you have any questions, consult your Vermeer dealer.

The operator should always be aware of conditions inside and outside the cab. Safe operation of the machine is of utmost importance.

If you are already familiar with operating levels, switches, gauges, etc., and are ready to practice using them, drive the machine into a large open space, away from people, and try to get a feel for the machine and its operating controls.

Finally, do not rush to complete the manual study, make sure you fully understand the contents of the operator manual. Pay attention to work safely and efficiently.

2.1 Component names and decals

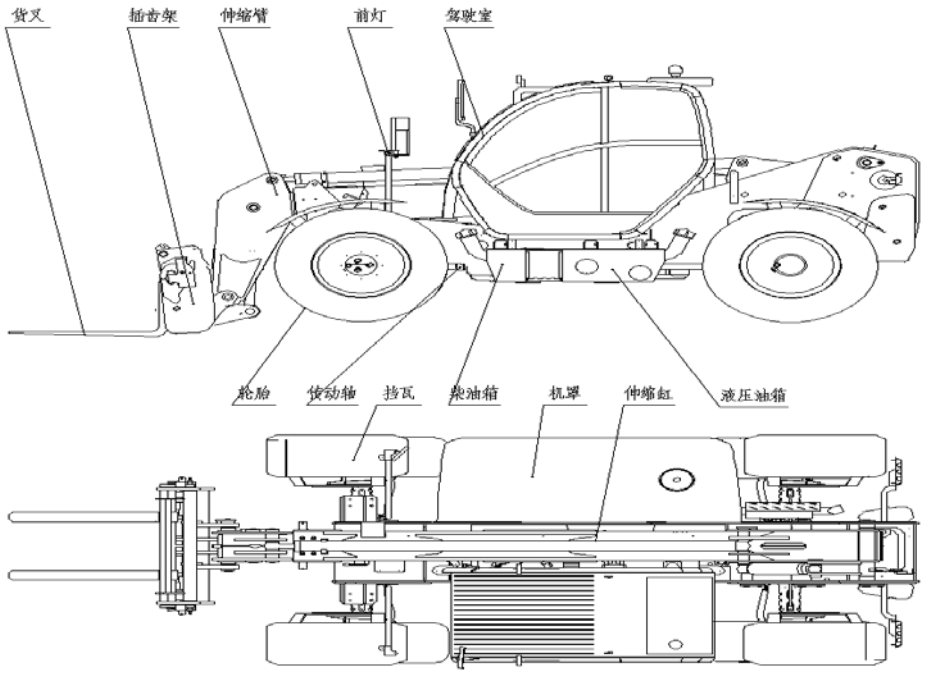


Figure 2-1 Overall diagram and component names

2.2. Before entering the cab

Regardless of how long you have been away from the machine, complete the following inspection items when you return to the machine. It is recommended that you stop the machine occasionally during long-term operation and complete the inspection items again.

All inspection items are related to the machine's working ability, and some are related to your safety. Please ask your service engineer to personally check and correct all problems.

WARNING	It is very dangerous to walk or operate under a raised boom. A boom falling off or the boom dropping due to human negligence may crush you. Before these inspection items, make sure the boom is fully lowered. If you are not familiar with the machine, ask an experienced operator to help you lower the boom. If no one can help you, study the manual until you know how to lower the boom. Of course, before these inspection items, make sure the parking brake has been applied.

Inspection and cleaning

- Clean windows, lights and mirrors.
- Clean away dust and debris, especially around the connecting rods, hinge pins and radiator.
- Keep the cab footpaths and handrails clean and dry.

- Clean all safety labels. If missing or illegible, replace with new ones immediately.

A. Check for damage

- Inspect the machine regularly for damage or missing parts.
- Make sure all hinge pins are securely in place.
- Check windows for cracks and damage. Glass chips and shards are barely visible.
- Check for leaks of engine oil, fuel and coolant under this machine.

WARNING	A blown tire on your machine could cause injury or even death. Do not use damaged or improperly inflated tires or operate a very old machine.

B. Make sure the tires are properly inflated.

Check the rubber for cuts and punctures from sharp objects. Do not operate the machine on aged tires.

WARNING	If the fuel cap and filler neck are fitted with locks, relock them to prevent theft or another fate.

C. Make sure all fuel filler caps are installed correctly.

D. Panel interfaces are sealed and safe.

2.3 Entering and leaving the cab

WARNING	To enter or exit the cab or operator's seat , you must use the steps and handrails provided. When entering or exiting, always face the machine. Make sure the steps, handrails and boots are clean and not slippery. Do not jump from the machine or use levers as handrails.

Before entering or leaving the cab, make sure the machine has come to a complete stop and is securely parked. Always maintain three-point contact with the handrails and ladder feet. Do not use the steering wheel as a handrail as shown in the figure2-2.

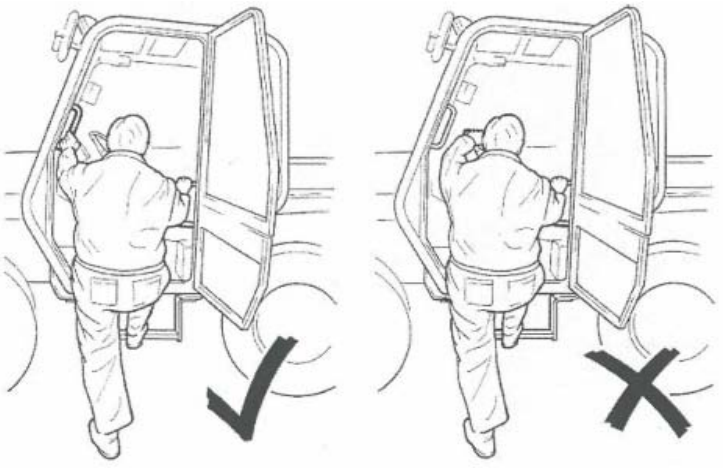


Figure 2-2 Schematic diagram of boarding

2.4 Doors and Windows

2.4.1 Opening and closing doors

- To open the door from the outside, first unlock it using the key, then pull handle A.
- Close the door and pull it hard, it will lock automatically.
- To open the door from the inside, simply use handle B.

WARNING	Do not drive your vehicle with the doors unlocked.

2.4.2 Opening and closing the rear window

- To open the window, turn handle A as figure 2-3 shown below.

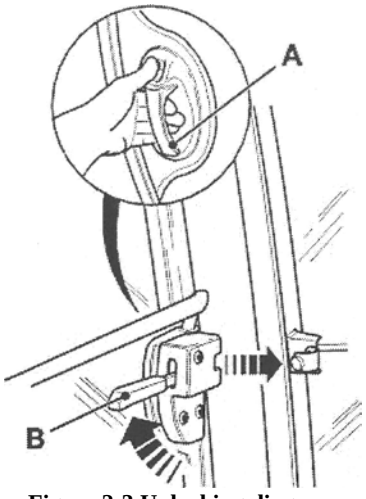


Figure 2-3 Unlocking diagram

- Window, please turn handle A in the opposite direction until the lock is in place.

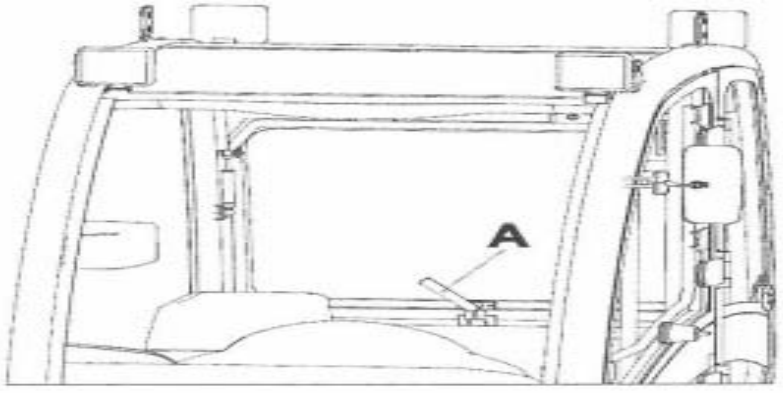


Figure 2-4 Schematic diagram of the rear window opened and closed

2.4.3 Emergency Exit

WARNING	In an emergency, do not place anything on the rear window of the cab as it is the emergency exit.

In an emergency, the rear window can be opened quickly and fully opened by following the procedure below:

Turn the handle to fully open the window.

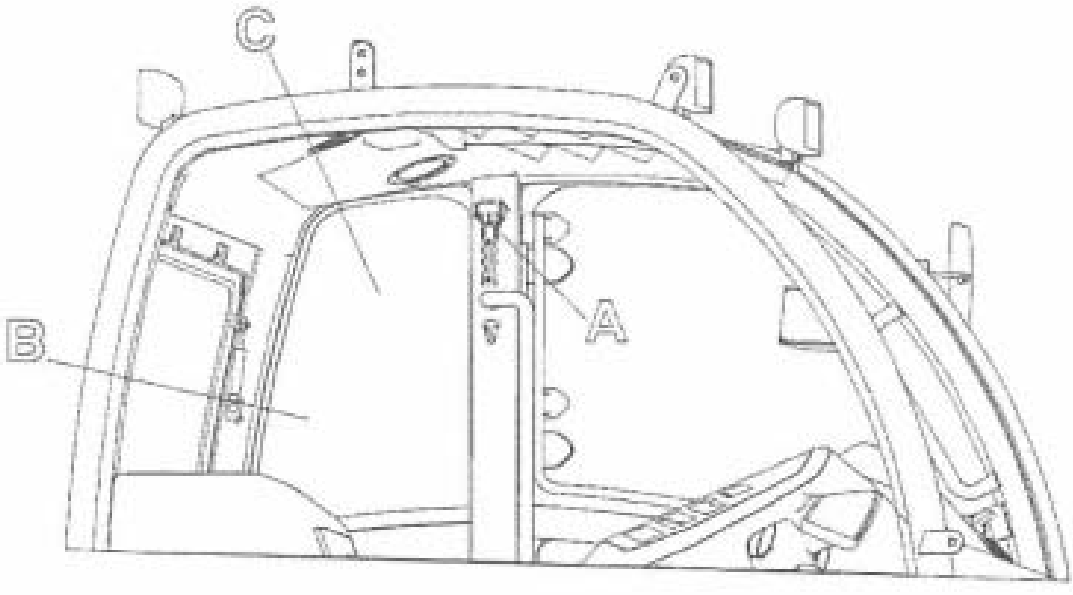


Figure 2-5 is the emergency exit diagram

If the machine is equipped with a breaker a, the side windows B and C can be used as emergency exits

In an emergency:

a. Take out the breaker A;

b. Hit the side glass B or C at the corner, it will be smashed under the impact.

2.5 Seat adjustment and use

WARNING	Do not adjust the seat while the machine is running.
	The seat can only be adjusted when the operator is already sitting in the seat.

The seat can be adjusted to meet your comfort needs. The properly adjusted seat can reduce the operator's fatigue for comfortable operation and control. During driving the machine, the seat can be adjusted by tilting the seat back and you return to fully lowering the footrest.

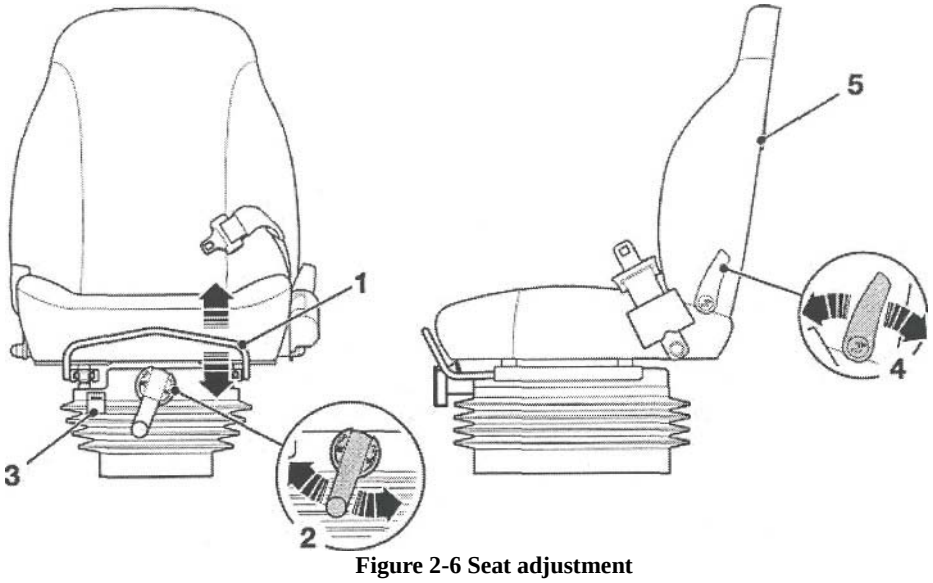


Figure 2-6 Seat adjustment

1. Horizontal adjustment	2. Vertical adjustment	3. Sitting height indicator . Refer to vertical adjustment.
4. Backrest angle adjustment	5. Document Bag	

2.6 Seat belts

2.6.1 Retractable seat belt

WARNING	Failure to wear a seat belt could result in you being thrown or thrown from the machine or crushed. Make sure you wear your seat belt while the machine is in operation. Make sure you wear your seat belt before starting the machine.

A. Fasten your seat belts

a. Sit in the seat correctly and fasten the seat belt according to the instructions.

b. Insert tab “a” into buckle “b” until the buckle is secure. Make sure the seat belt is not tangled and is fastened tightly, around your upper hips and not your stomach.

WARNING	If the seat belt locks before the tab locks into the buckle, fully retract the seat belt and try again. If the seat belt is pulled suddenly or the machine tilts suddenly, the inertia device may be locked. In this case, gently and slowly pull out from the retractor .
	If the seat belt is damaged or worn, or if the machine has just been in an accident, please replace it with a new one in time. Replace it at least every 3 years.

B. Check the normal working condition of seat belts

a. Secure it correctly on the seat and fasten the seat belt according to the instructions.

b. Hold the middle part of the seat belt in the picture and pull hard to lock the seat belt.

WARNING	If the seat belt fails to lock when checking for proper operation, do not drive the machine. Repair the seat belt or replace it with a new one.

C. Unbuckle your seat belt

WARNING	Unfasten the seat belt after the engine stops.

a. Press button “C” and pull buckle “A” out of buckle “B”.

b. Release the seat belt from the buckle.

2.6.2. Static safety belt

WARNING	Failure to wear a seat belt could result in you being thrown or thrown from the machine or being run over. Always wear a seat belt during operation. Always wear a seat belt before starting the machine
WARNING	If the seat belt is damaged or worn, or if the machine has just been involved in an accident, please replace it with a new one in time. Replace it at least every 3 years.

A. Fasten your seat belts

WARNING	If the seat belt fails to lock during the function check, do not drive the machine. Repair the seat belt or replace it with a new one.

a. Sit in your seat correctly.

b. Snap tab “a” onto tab “b” until it is locked. Make sure the belt is not tangled and is tied around your hips, not your stomach.

B. Unbuckle your seat belt

Press button “C” and pull tab “A” out of buckle “B”.

WARNING	Unfasten the seat belt after the engine stops.

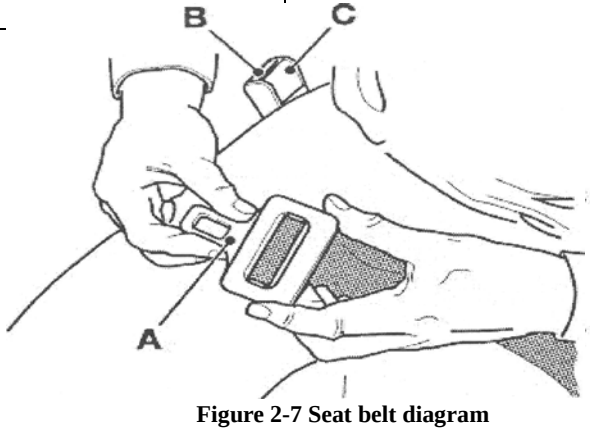


Figure 2-7 Seat belt diagram

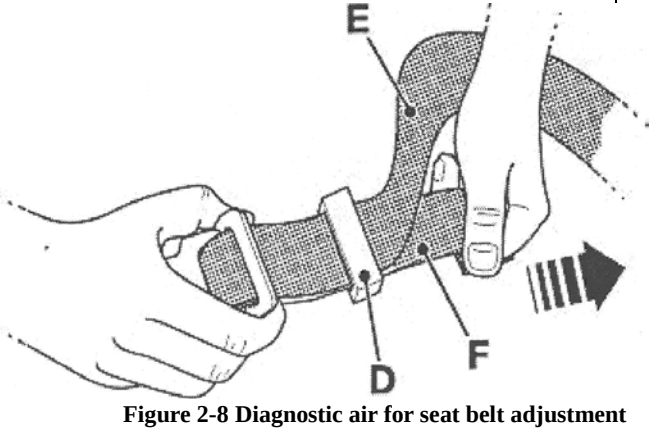


Figure 2-8 Diagnostic air for seat belt adjustment

C. Adjusting seat belts

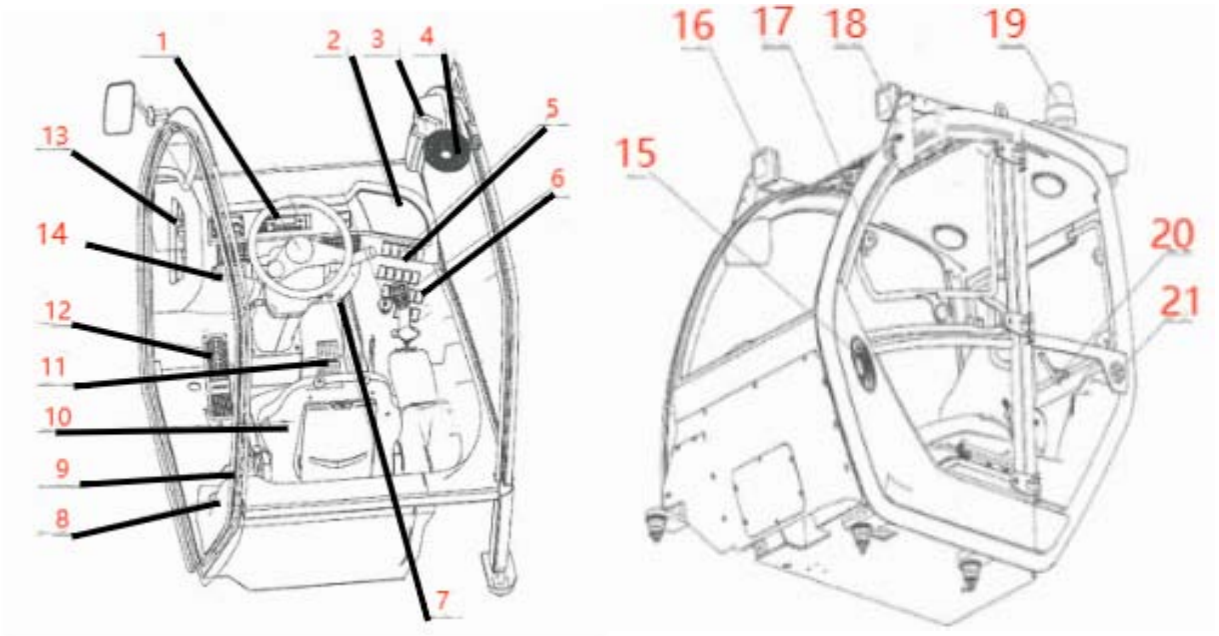
a. Adjust the belt to ensure it is across your upper hips and not your abdomen. Adjustment Tab “A”

b. Depending on the desired distance, pull down the toggle switch on the belt.

c. To increase the length of the belt, pull on end “E” until the proper length is reached.

d. To reduce the length of the belt, pull on end “F” until the proper length is reached.

2.7 Cab Instruments and Operating Equipment



2.7.1 Cab interior layout

Figure 2-9 Cab layout

Figure 2-10 Rocker switch

(The numbers in the figure are the same as those inFiguret 2-9)

1. Speaker button	2. Instrument cluster	3. Load limiter display screen	4. Fans
5. Rocker switch	6. Operating handle	7. Key switch	8. Flame-out pull wire
9. Handbrake	10. Seat	11. Accelerator pedal	12. Brake pedal
1 3 .Electric control box	14. Speed Shifter	15. Door lock	16. Work Light
17.Fix the lock	18. Rearview mirror	19. Rotating warning light	20. Rear window switch
21. Upper door and window fixing button	22. Turn signal switch	23. Wiper switch	24. Front and rear working light switches
25. Cab lights	26. Boom work light	27. Spray switch	28. Rotary warning switch
2 9. Forced switch	30. Air conditioning gear switch	31. Cold and warm air switch	32. Walking mode switch

33.Force the rear axle proximity switch to turn on	34. Radio		

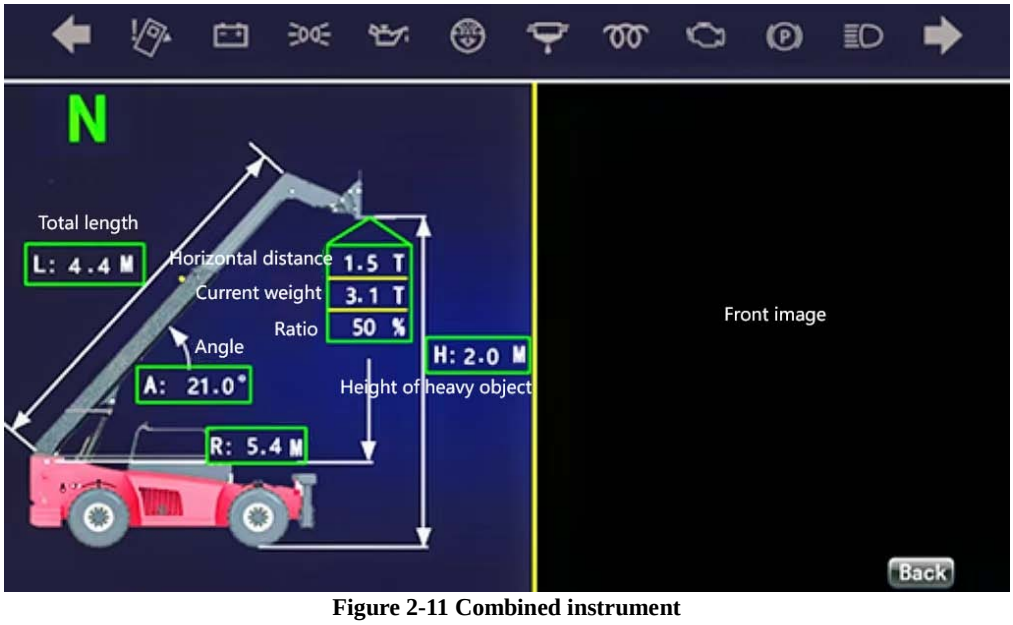


Figure 2-11 Combined instrument

2.7.2 Functional description of cab instruments and operating devices

2.7.2.1. Functional description of cab instruments and operating devices

Table 2-1

(Number. Figures 2-9 and 2-10 are the same)

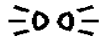
Number	name		Actions and functions	Narration
1	Horn button		Honk the horn.	
2	Instrument cluster (Figure 2-11)	Indicator light area	Displays turn signals, high beam and parking brake	
		8-inch high-definition LCD display	Display voltage, gear position, running time, fuel level, Oil pressure and other machine status and alarm information	
		Stepping Indication engine area	Display engine speed, water temperature, Gears, front and rear axle center lights, etc.	
		Warning light area	Display alarm information	
		Key Areas	Control Display	
3	Load limiter display		Overload alarm display	

5	Rocker switch block	High and low speed selection switch, windshield wiper switch, work light switch, rotating alarm light, etc.	
6	Joystick	Controls boom luffing and telescopic bucket backward tilt, bucket tipping and multi-function switch	
7	Key switch	Control vehicle power, engine start and shutdown. After inserting the key, turn it clockwise to gear I to power the vehicle and then turn it clockwise again to start the engine; when the engine is in the starting state, turn it counterclockwise to the stall indication gear position, at this position, pull out the key.	
8	Flame-out pull switch	Control machine shutdown	
9	Handbrake	Controlled parking	
10	seat	operating position for operators	
11	Accelerator pedal	Controls engine fuel supply and speed	
12	Brake pedal	Depress the pedal for a slight movement, then brake	
13	Speed Shifter	It controls the gear position and forward and reverse movement of the vehicle	
14	Electric central control box	It integrates the fuses and relays of the whole vehicle and controls the whole vehicle	
15	Door locks	Lock the cab door	
16	Work Light	Work Lights	
17	Fixed lock	Fixed door glass and door frame	
18	rearview mirror	Observe the rear of the vehicle	
19	Rotating warning light	Play a safety warning role	
20	Rear window switch	Control rear window lock	
21	Upper door and window fixing button	Open and secure the door glass	
22	Turn signal switch water spray	Storing water spray for windshield wipers	

	switch		
23	Wiper switch	Control the rotating warning light Control the wiper	
24	Front and rear working light switch	Control the operation of the front and rear lights	
25	Cab lights	Control cab working lights	
26	Boom work light	Control arm indicator light	
27	Spray switch	Storing water spray for windshield wipers	
28	Rotary warning light switch	Control turn signal lights	
29	Force switch	Eliminate the movement restriction of forklift truck due to pressure overload	
30	Air conditioning gear switch	Control the air conditioner blowing position	
31	Cool and warm air switch	Control the air conditioning	
32	Walking mode switch	Switch the vehicle's travel mode to four-wheel, two-wheel, crab type	
33	the rear axle proximity switch to turn on	In two-wheel mode, the rear axle is forced to release the state of no induction	
34	radio	Radio switch	

Table 2-2 Signal indicator light description (status when powered on) and the button on the co-progressive instrument (Figure 2-11)

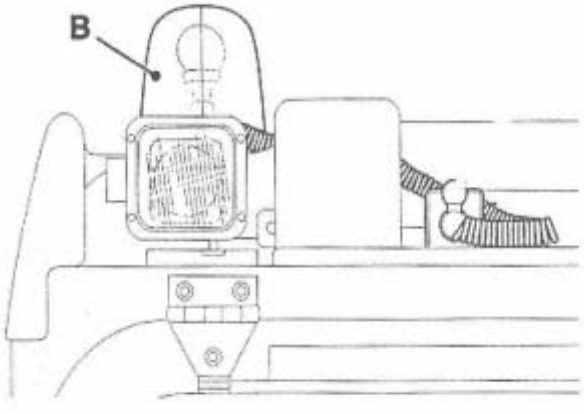
Number	**name**	**Symbolism**	**color**	**Attention** (light on, action taken)
1	Left turn signal		green	Move the turn signal switch to left.
2	Dump		red	Dumping alarm
3	Charging indicator		red	Normal state: When the vehicle is powered on, the light goes out and the engine starts. If the light does not go out after the engine starts, the engine should be tracked door inspection

4	Width indicator		green	Open when driving with limited visibility
5	Oil pressure indicator light		red	Oil pressure alarm
6	Air filter clogged		red	When the air filter is clogged, the light comes on. In this case, turn off the engine and check
7	Oil-water separation		red	Abnormal oil-water separation
8	Preheat			Preheat alarm
9	Engine check light		red	Engine failure
10	Parking brake		red	When the parking brake switch is pressed, the indicator light comes on, indicating that the vehicle is in braking state.
11	High beam		red	Select beam when lighting switch is turned or high level
12	Right turn signal		green	Move the turn signal switch to right
13	Engine coolant temperature		red	The indicator light comes on when the coolant temperature is above 105'C. In this case, the engine should be stopped for cooling and inspection.
14	Oil temperature		red	When the transmission oil temperature exceeds 120'C, the light comes on. In this case, the vehicle should be stopped for cooling and inspection
15	Oil volume		red	Engine fuel shortage
16	Two-wheeled walking		green	If it is two-wheeled, the indicator light comes on.
17	Four-wheel travel		green	If it is four-wheel travel, the indicator light will be on.

18	Crab-style walking		green	If it is walking in crab mode , the indicator light will be on.
19	Torque converter pressure		red	Check the torque converter status
20	Brake pressure alarm		red	The light comes on when the brake pressure is low. Check
21	Go ahead indicator		green	If it is in forward gear, the indicator light comes on.
22	Back indicator light		green	If the vehicle is in reverse gear, the indicator light comes on.
23	Neutral indicator light		green	If it is in neutral, the indicator light comes on.

2.7.2.2. Rotating warning light

IMPORTANT NOTICE: It is recommended that the flashing warning lights be used when the machine is operated on public roads. In some areas, it is illegal to operate the machine without the warning lights.



Please comply with local traffic laws.

The magnetic base of warning light B is mounted on the roof of the cab.

Figure 2-12 Rotating warning light

2.8 Drive control and switch

2.8.1 Drive Control

2.8.1.1.Steering wheel

Turn the steering wheel in the desired steering direction. Note that the machine is in four-wheel drive mode.

2.8.1.2. Tilt adjustment

After sitting in the seat correctly, adjust the angle of the steering column to the most suitable position. Turn the lever “A” counterclockwise to loosen the steering column. Pull or push the steering wheel to the appropriate position. Turn the lever “A” clockwise to tighten the steering column.

WARNING	Check to make sure the steering column is securely in place. Do not adjust the steering column while driving.

NOTE: Depending on the model, the wheel column adjustment handle may be located on the left or right side of the operating column.

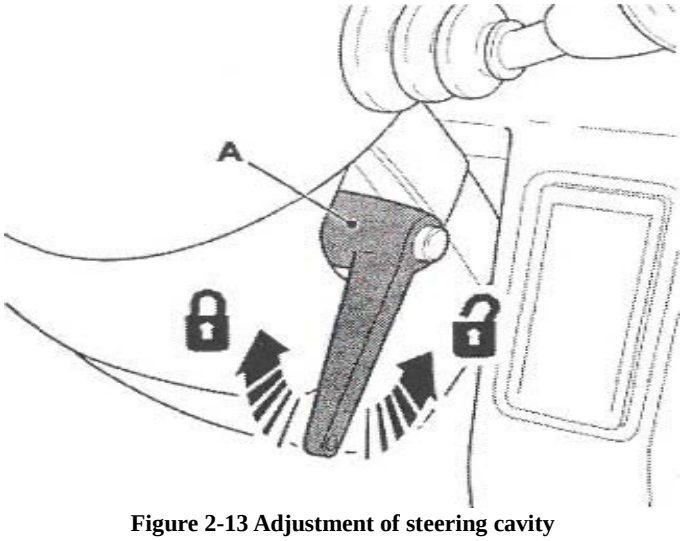


Figure 2-13 Adjustment of steering cavity

2.8.1.3. Accelerator pedal

Depress the pedal to increase engine speed and release to enable the pedal to return and reduce engine speed. Do not depress the pedal when the engine is idling.

2.8.1.4 Brake pedal

Immediately after depressing the brake pedal, control the vehicle's fine movements and continue to

decelerate or stop. When driving downhill, use the brake pedal to prevent the machine from speeding.

The brake lights will illuminate when the brake pedal is depressed. Do not operate the machine unless both brake lights are functioning properly.

2.8.2 Switch

2.8.2.1. Control lighting and alarm indicators

Control left and right turn signals	Parking brake control	Function
open	Press the switch Switch to A	The right turn signal lights up at the front and rear of the vehicle
close	Press the switch Switch to B	at the front and rear of the cab went out.
open	Press the switch Switch to C	The left turn signal lights up in front and behind the vehicle

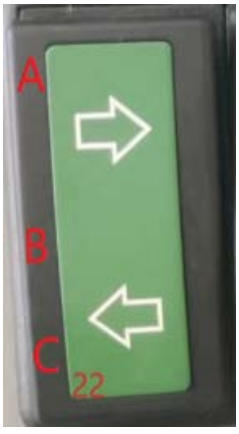


Figure 2-14 F headlights

Windshield wipers	Parking brake control	Function
close	Press the switch Switch to A	Windshield wipers not working properly
open	Press the switch Switch to B	Windshield wiper operating position

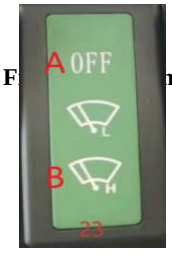


Figure 2- itch

Control cab lights	Parking brake control	Function
close	Press the switch Switch Down A	at the front and rear of the cab went out.
open	Press the switch Switch down B	The four lights at the front and rear of the cab light up.

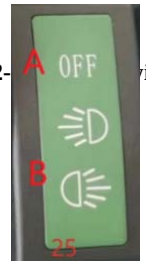


Figure 2-1 6 Cab front and rear light switches

Control vehicle headlights	Parking brake control	Function
open	Press the switch Switch to A	Headlight high beam
close	Press the switch Switch to B	close
open	Press the switch Switch to C	Headlight low beam

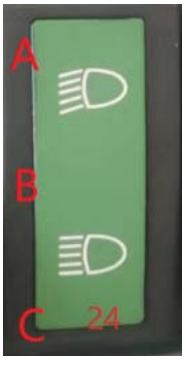
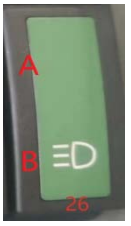
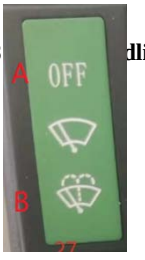


Figure 2-1 7 Vehicle headlight switch



Big arm lamp	Parking brake control	Function
close	Press the switch Switch to A	Big arm light off
open	Press the switch Switch to B	Big arm light on

Figure 2-1 8 dlight switch



Water spray	Parking brake control	Function
close	Press the switch Switch to A	Water spray motor off
open	Press the switch Switch to B	Water jet motor working

Figure 2-1 9 ght switch

Rotating warning light	Parking brake control	Function
close	Press the switch Switch to A	The rotating warning light above the cab is turned off
open	Press the switch Switch to B	The rotating alarm on the cab flashes

Figure 2-20 Rotat ght switch

Mandatory Action	Parking brake control	Function
close	Press the switch Switch to A	
open	Press the switch Switch to B	Long press to force the arm to move

Figure 2-21 Windshield wiper switch

WARNING	Dirt deposits on the radiator reduce the cooling effect of the radiator and cause damage to the engine and hydraulic system! Check and clean the radiator every day. If the working environment is very dusty or dirty, always clean it more frequently. Do not clean in closed spaces. With the engine running, press the rocker switch to position "B". After the transition time, the fan changes its direction of rotation and the fan starts cleaning to remove the dirty dust and sand. After about 5

	seconds, the fan automatically switches to forward rotation.

2.8.2.2. Air conditioning and heater control

Cooling: When the engine drain switch is in the off state, turn on the switch on the right side of the air conditioning control panel and rotate it clockwise to increase the cooling effect; the switch on the left side of the panel controls the air volume, and rotate it clockwise to increase the air volume.

Heating: Turn on the engine drain switch, use the switch on the left side of the panel to control the air volume, turn clockwise to increase the air volume.

Figure 2-22 Air conditioning control panel

2.8.3 Battery circuit double tube

The battery disconnect switch is located under the cab:

I---ON. To energize the electrical system, the circuit breaker must be switched to the "ON" position before starting the engine.

O---OFF. To shut down the electrical system, turn the pointer of the circuit breaker counterclockwise to the "OFF" position.

The battery circuit breaker performs a different function than the engine's starting switch. To cut off power to the entire electrical system, switch the battery circuit breaker to the "OFF" position. If the starting key switch is turned off, the battery is still connected to the electrical system. Switch the battery circuit breaker to the "OFF" position when maintaining and repairing the electrical system or other machine components.

WARNING	Do not turn the battery circuit breaker to the "OFF" position when the engine is running. Otherwise, it will cause serious damage to the electrical system.

2.9 Operation Level

2.9.1 Introduction

WARNING	Controlling the machine from the outside could result in the death of others inside or yourself. Operate the machine only when properly seated in the cab.
WARNING	Machine boom/driving Operating the boom while driving may result in an accident and loss of complete control of the machine. Therefore, it is absolutely prohibited while driving.
WARNING	Overhead Power Cables If your machine or accessories are too close to power lines, electric shock may occur. Before starting work, observe whether there are power lines in the work area. If so, contact your local power supplier and ask what safety measures should be taken. Also, understand the requirements of local laws and regulations for working near power cables. After you understand the safety measures to be taken at the work site and understand the laws and regulations, make sure to comply with them.
WARNING	Before raising the boom, make sure it is clear of obstructions. Maintain a safe distance from all power lines. Contact your local power company for safety procedures.
WARNING	The functions of the levers/switches vary from machine to machine. The nearby label indicates the function of the lever/switch. Before operating, check the label to determine which operation to select.
WARNING	Release the boom operating lever as soon as the boom is fully raised. Holding the lever in the raised position will cause the attachment to lag slowly.

The operating lever is equipped with a spring that automatically returns it to the center position. The action of the corresponding hydraulic cylinder depends on the distance the operating lever has been moved. The greater the movement, the faster the hydraulic cylinder acts.

The cylinder will remain in position until the lever or switch is operated.

2.9.1.1. Telescopic arm reset

If the hydraulic cylinders are not fully retracted regularly, the three-section boom will move out of phase. Retracting the boom should be completed at least once a day.

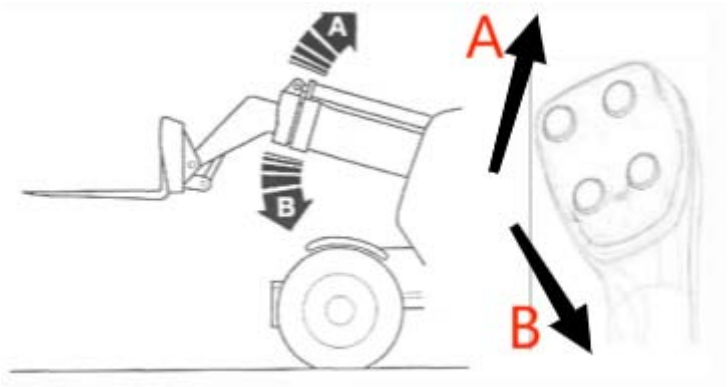
Figure 2-23 Reset adjustment

To reset the boom, hold the joystick in the RETRACT position with the engine at maximum speed until the boom is fully retracted.

2.9.2 Boom Control

2.9.2.1. Single lever control

Figure 2-24 Boom ups and downs



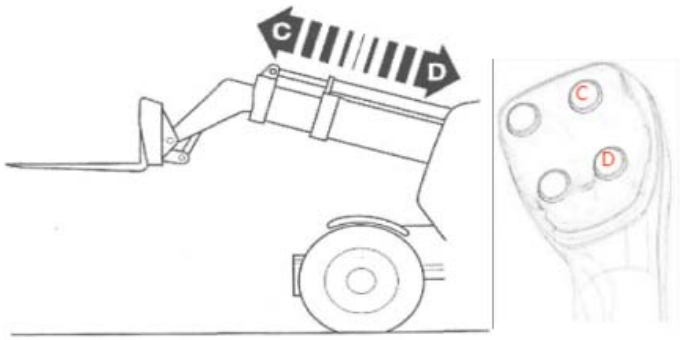
Boom raise/descend:

A Raise

B Descend

WARNING	Release the boom operating lever as soon as the boom is fully raised. Holding the lever in the raised position will cause the attachment to lag slowly.

Figure 2-25 Boom extension and retraction attachment forward/backward reversal

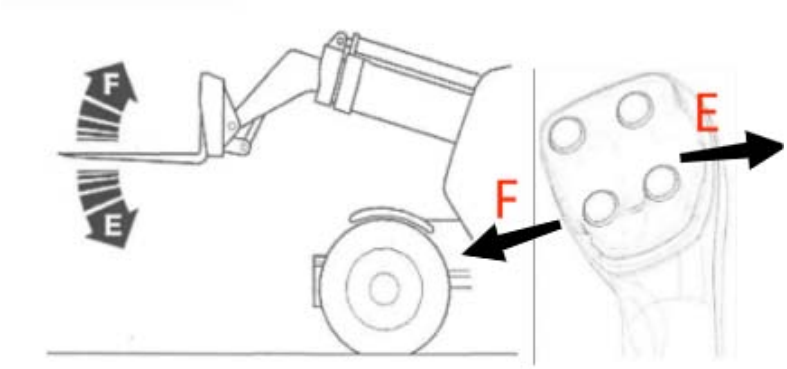


Boom extend/retract:

C Extend

D Retract

Figure 2-26 Bucket tilting backwards and dumping



Bucket raise/descend:

E Raise

F Descend

2.10 Load diagram and boom indicator

The safe working load (SWL) of the machine depends on the extended boom length and the lift angle.

WARNING	The load diagram shown in the illustration is only an example. Do not use it to find the load limits of the machine. Observe the load diagram inside the cab of the machine before lifting or placing a load.

Before operating the machine, it is important to check that the machine is equipped with a force limiter and a boom angle indicator.

The load diagram is described below:

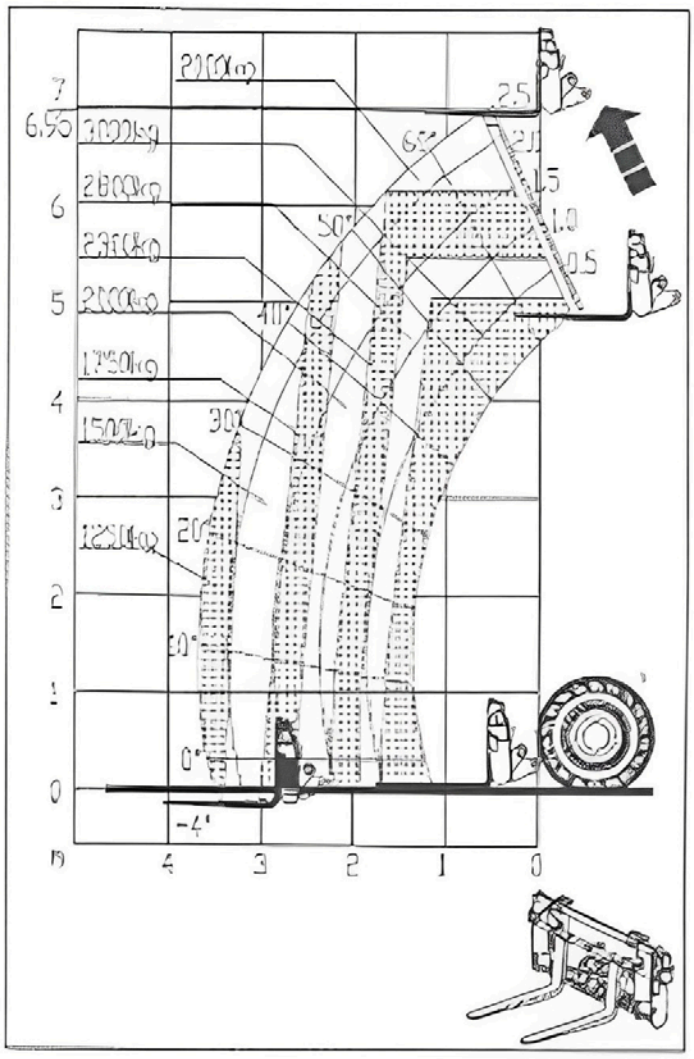
2.10.1 Introduction to load diagrams

The safe working load for different arm lengths is depicted in the load diagram in the cab.

The load diagram describes how long and how high the boom can be extended, provided the safe working load is not exceeded. Each model has a load diagram for standard forks and an additional load diagram for outrigger or frame leveling (swinging) operations. There may be additional load diagrams for operations when the boom is equipped with different attachments or attachments.

The load diagrams in this manual are for reference only. Always observe the load diagram inside the machine cab before lifting or placing a load.

Check the applicability of the relevant load diagram for the irregular attachment or accessory. Where appropriate, the load diagram describes the part number “A” of the relevant attachment or accessory. If you are



unsure of the correct load diagram to use, contact your dealer for assistance. If damaged or missing, replace as soon

WARNING	The limits on the load chart are based on the condition that the machine is level and stationary. Do not raise or extend the boom while the machine is in motion. Before driving under load, fully retract the boom and lower the boom as low as possible.

as possible.

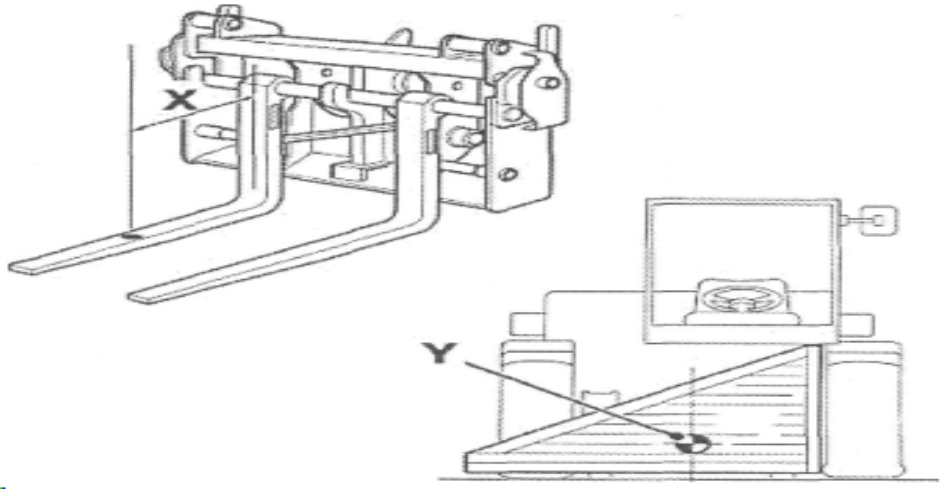
Figure 2-27 Load diagram

2.10.2 Use of load diagram

1.Determine the attachments equipped on the machine boom, then flip to select the load diagram in the cab.

2. When hanging heavy objects, you should first find out the weight of the heavy objects and ensure that

WARNI	nd. Is it really



thedistance from the center of the load to the vertical plane of the fork is no more than 500mm.

Figure 2-28 Load center of gravity

3.Once you know the weight of your load, look up the load chart to find the adjacent colored area for the nextlargest load.

For example, in the example load chart shown, if your load is 1600kg, find the 1750kg area, which is the maximum load area for your load. In this area, the left boundary “B” and top boundary “C” represent the stability load line for the machine under load. Do not operate beyond these boundaries when lifting and extending the boom.

Once the load weight is known, look up the load map to find the adjacent color area for the next largest load. For example, in the load diagram example shown, if your load is 1600kg, find the 1750kg area, which is the maximum load area of your load.

In this area, the left boundary B and the top boundary C represent the stability load line of the machine under

load. Do not operate beyond these boundaries when raising and extending the boom.

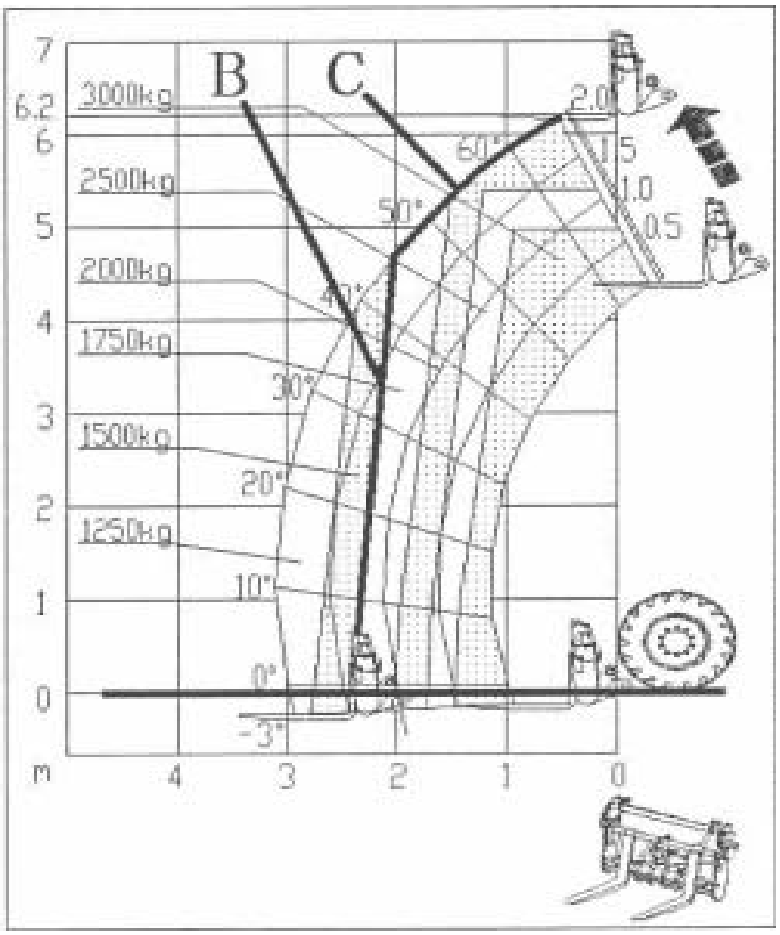
4. After the forks are engaged with the load and before lifting, observe the readings of the angle gauge and boom length indicator. Find the same readings on the load chart.

In the graph you can see lines that follow the readings for boom angle and boom length in the colored areas. Find the intersection point between the reading lines. If this point is in or to the right of the maximum load zone, the load is within safe limits.

If the point is above or to the left of this area, do not attempt to lift the load and retract the forks. Stow the boom and try again. Even with the boom fully retracted, the boom angle and extension readings may still exceed your maximum load range. Therefore, do not attempt to lift the load again.

5. When the forks are loaded, retract the boom before raising or lowering it. This will reduce the risk of boom instability. When moving the boom, observe the readings of the angle gauge and the boom extension indicator. Keep the readings within the load limit.

Note: When using a high load (such as scaffolding), clear the use before fully retracting



6. Before placing your load, use the load diagram to determine how far the machine needs to be from the load

location. The load must be placed no further to the left of your load area.

Figure 2-29 Load diagram

7. When the machine is loaded with heavy objects and moved down from a height, be sure to fully retract the second telescopic arm before it falls, otherwise there will be a risk of overturning.△

2.11 Before starting the engine

WARNING	If working in a high or low temperature environment, read the operating manual for working in a high or low temperature environment. If the fuel tank or any other system is empty or low on fuel, make sure to add enough fuel before restarting the engine.

1. When the machine finally stops, apply the parking brake. If not already in use, apply the parking brake now

WARNING	Before lowering the attachment to the ground, make sure the machine and all nearby persons are clear of the danger zone. Persons on or near the machine could be crushed by the attachment or fall off the machine.

2. The accessory should bottom out before the engine stops. If it does not bottom out, restart the engine and bottom out the accessory. Then stop the engine and proceed to step 3.

3. For the safety of you and others and the service life of the machine, please conduct a thorough inspection before starting the engine.

4. If the machine is driven outdoors and a thorough inspection is not completed, refer to the Before Entering the Cab section. Of course, the detailed daily inspections specified in the maintenance schedule should be completed.

5.Remove dirt and waste from the cab, especially from the pedals and operating shafts.

WARNING	Keep the machine control parts clean and dry. Slipping of hands or feet may cause the machine to lose control.

a. Wipe off the oil and mud on the steering heel and operating lever.

b. Keep your hands and shoes clean and dry.

c. Throw away all unsafe items in the cab, such as lunch boxes and tools.

d. Check the damage status of the ROPS/FOPS structure. Always contact and consult your dealer to repair any damage. Make sure all bolts are properly installed and properly reinforced.

e. If necessary, check whether the bolts around the cab are loose or missing, and repair them in time.

WARNING	If the seat belt is damaged or severely worn or the machine has an accident, please replace it with a new one in time. Replace the seat belt every three years.

f. Check the damage and wear of the seat belts and their equipment.

g. Check the following items in time: Lights, hazard lights, horn, indicators, all switches, turn indicators, hazard warning lights and windshield washers and wipers (if equipped).

A. Adjust the seat so that you can drive the machine comfortably. You can lean back in the seat to fully depress the brake pedal. Refer to the Seat Controls section.

B. Adjust the driving device so that you can operate the steering wheel and joystick comfortably.

C. Properly setting up the rearview mirror can provide you with a good view in the cab.

D. Fasten your seat belts. Refer to the Seat Belts section.

2.12 Engine start

1. Before starting the machine, please read and follow the operation and maintenance manual carefully.

2. Before starting the engine, make sure to apply the entire machine's brakes.

3.Before starting the machine, make sure the battery fuse is installed and in use. Refer to the operation section Battery.

4. The engine can only be started when the parking brake is applied.

WARNING	If the engine will not start, do not run the starter motor for more than 10 seconds. If the engine is ignited, but does not start completely, do not run the starter motor for more than 40 seconds. Wait for an interval of at least 2 minutes between two consecutive starts.

5. After the engine starts, release the engine key. The key will automatically return to its original position.

WARNING	Do not use ether or other fluids to aid cold starting. Use of such fluids could result in explosion and injury or damage to the engine.

6. Release the accelerator pedal slightly to reduce the engine speed.

7. After the engine is started, check that all warning lights are off. Do not accelerate the engine until the low oil pressure indicator light goes out. Accelerating the engine early may damage the turbine unit due to insufficient lubrication. Check if the audible alarm sounds.

WARNING	If any warning light comes on while the engine is running, stop the engine as soon as possible and inspect it to ensure safety.
WARNING	This is a normal symptom of relatively high engine noise in cold conditions. By adjusting the injectors to meet the requirements, non-noise can be achieved.

8. Turn on the hydraulic system to ensure the normal operation of each system and to help warm up the hydraulic system. Do not operate any attachments until the hydraulic oil reaches normal temperature.

This operation has three stages:

If the boom does not extend normally, check whether the hydraulic cylinder is retracted normally. Before starting the machine, carefully check the boom on the stage and check the resetting of the telescopic arm in detail.

WARNING	A new engine does not require a run-in. The engine should run quickly and noiselessly for a while. Once the engine is running, accelerated oil consumption may occur due to the piston and cylinder bore. Under no circumstances should the machine be left idle for a long period of time (e.g. warm-up time under no-load conditions).

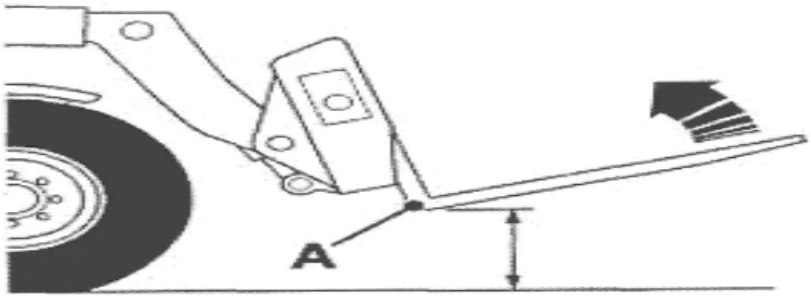
2.13 Machine driving preparation

When driving outdoors or in parking lots, obey local traffic safety laws and regulations. Driving necessity and regional driving certificates will provide you with advice and help solve your problems when you encounter any troubles, but they do not necessarily apply to the law.

When driving on roads and in parking lots, make sure you and the machine comply with local regulations.

2.13.1 Driving preparation

WARNING	The machine headlights are designed for on-site use. In the event that there are no lights on the road, you may violate local regulations.

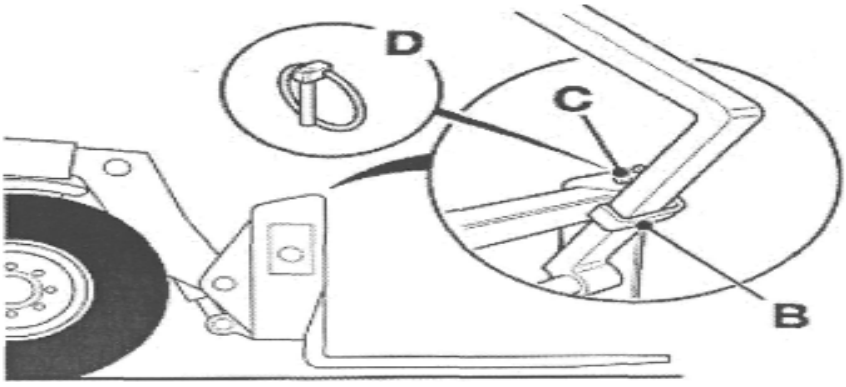


WARNING	When driving on public roads, always comply with all relevant local laws and regulations.

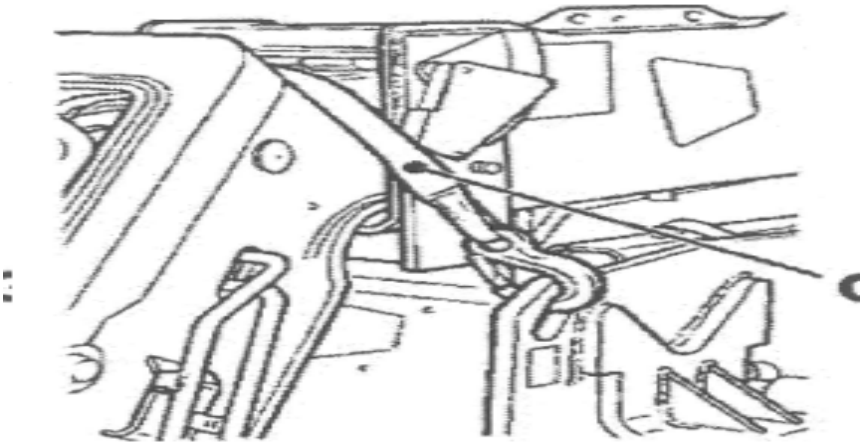
1. Fully retract the boom. Fully lower the boom and then slowly raise it. Tilt the connecting bracket backward until the root point A is 300mm (12 inches) off the ground.

Number 2- 30 fork indent

WARNING	The forks are really heavy. Be careful to separate and fold the forks.



WARNING	Some countries require the forks to be folded when the machine is driven on public roads.



You can use baffle B (if needed), and for safety reasons, you can also use stop pin C and locking pin D.

Figure 2-31 Front fork fixation

When the boom is in the moving position, install the ropes on the lifting points on the boom and the frame

Figure 2-32 Boom Fixing

2. If other optional accessories are installed, make sure that the safety requirements of the optional accessories are met.

If the machine is coupled to a bucket, the bucket tooth guard must be installed.

Figure 2-33 Gear protection plate installation

WARNING	Do not drive fully loaded on public roads.

1. Adjust the four-wheel straight alignment and select the two-wheel steering mode. Do not select crab steering or four-wheel steering when driving on public roads. Lock the steering mode selector lever.

2. Some areas require the law to turn on the hazard lights when driving on public roads. Check and make sure the lights on all circuits are working properly.

3. If it is a trailer, please check

a. Mechanical traction failure options

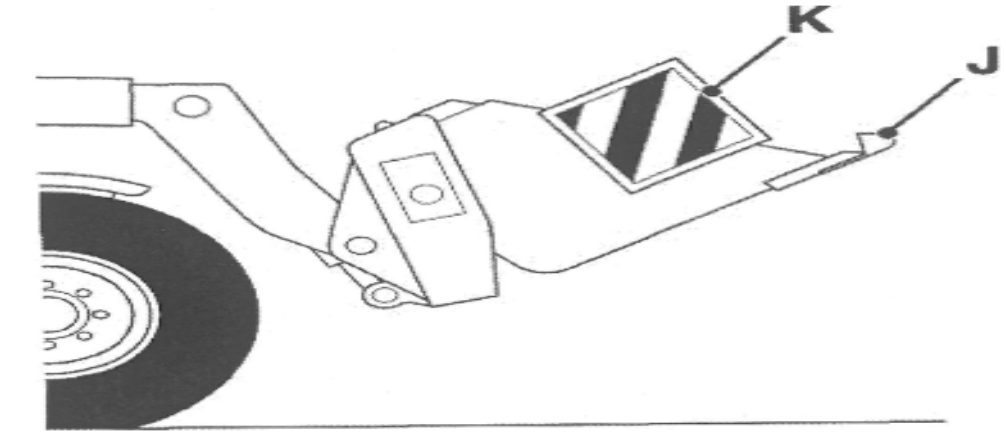
b. Hydraulic traction failure option

2.14 Movement of the machine

2.14.1 Operational Practice

WARNING	**Hills** Operating a machine on a hill is hazardous unless proper precautions are taken. Ground conditions may change or be damaged by rain, snow, or ice. Carefully inspect the work area and operate the machine in first gear on hills. Keep all attachments close to the ground during operation. Do not roll down a slope without the engine running or the transmission in neutral.

1. Always control the machine while it is in motion. Always be alert for obstacles and possible hazards.



WARNING	Do not leave the machine while it is moving.

2. Do not use the pedals as footrests.

3. Do not shift into neutral when driving downhill, as the machine cannot be fully controlled and slipping may damage the machine's transmission.

WARNING	**Slopes** Under loaded conditions, drive forward to go up a slope and backward to go down a slope. Under unloaded conditions, drive backward to go up a slope and forward to go down a slope.

4. Do not turn on or over a slope.

5. Select the necessary gear before going downhill. To go downhill, use the same gear as when going uphill. Do not change gears on a slope.

6. Under load, select first gear to drive down the slope.

7. Use the brakes when traveling downhill to prevent the machine from changing speed and sliding downhill. If stuck in mud, shift gears and align the front wheels forward.

8. Pay special attention when driving. Make sure your vision is not blocked by the rearview mirror. Make sure the road is clear before turning, and make sure the alarm function is working so that everyone nearby can hear it clearly.

WARNING	To adapt to different operating environments, the machine is equipped with various steering alarm devices. The types of alarms are probably controlled by some local laws and regulations, and the alarms are only applicable to some specific areas. Please use the reversing alarm correctly.
WARNING	If the machine starts to roll and you try to get out of the cab, you may be crushed by the machine. Do not try to jump out of the cab when the machine starts to roll. Please stay in the cab and fasten your seat belt.

2.14.2 Operation process

After the machine is preheated and the parking brake test is completed, operate according to the following knowledge.

WARNING	The locations of switches and levers are provided in this manual.

1. Check your seats and seat belts:

a. Make sure the seat belt is fastened correctly.

b. Make sure the seat is adjusted correctly.

2. Select a desired driving mode.

WARNING	Keep in mind that the driving mode may temporarily remain in the previous mode and revert to the current mode until the rear wheels align forward.
WARNING	During four-wheel steering, the rear seat of the machine will swing outward. Please check carefully before steering.

3. Start gear selection. Select a desired gear switch.

WARNING	Operating the shift lever while driving could result in serious injury or death to you or others because the machine could move suddenly without warning. Follow the recommended operating procedures to perform this operation correctly.
WARNING	**Power Transmission** Do not suddenly shift from high to low gear while the machine is running. Rapid deceleration of the machine can cause serious injury or even death. When a lower gear is selected, the engine speed may decrease depending on the gear shift.

4. Select forward gear or turn or leave.

WARNING	**Reversing** Reversing at high speeds can cause accidents. Do not reverse at full throttle and in top gear. Always drive safely according to the working environment.

a. Check and make sure the boom is in the moving position.

b. Depress the brake pedal.

c. While the brake is on, operate the gear lever to select forward or reverse.

WARNING	When the parking brake is applied, if the shift lever is shifted to forward or reverse, a warning light will appear indicating that the parking brake is applied.

d. Release the parking brake.

e. Release the parking brake, and after ensuring safety, release the brake pedal and step on the accelerator pedal to move the machine slowly.

WARNING	**Engine/Steering Failure** If an engine or steering malfunction occurs, stop the machine as soon as possible. Do not operate further until the problem is corrected.

f. Drive the machine slowly while checking the steering and brakes. Do not operate the machine when the

machine's controls or brakes are not functioning, even if you have not confirmed or suspected a malfunction.

2.15 Braking and Parking

WARNING	**Parking** An improperly parked machine may move without the operator. Follow the instructions in this manual to properly park the machine.

1. Park the machine on dry, level ground without any danger or threat.

WARNING	The parking brake should not be used to slow down the vehicle except in emergency situations. Doing so will reduce the braking efficiency of the parking brake.

2. Slightly release the accelerator pedal and press the brake pedal to successfully stop the machine. Press the brake pedal until the machine comes to a complete stop (steps 3 and 4).

3. Press and hold the parking brake and make sure the parking lights come on. Release the brake pedal.

WARNING	Do not leave the machine alone during installation.

4. Shift the shift lever to neutral. Make sure the lever is in place and the brake indicator light is off.

WARNING	Before lowering the attachment to the ground, make sure the machine and all nearby persons are clear of the danger zone. Persons on or near the machine could be crushed by the attachment or fall from the front of the machine.

5. Retract and lower the boom and level the forks close to the ground.

WARNING	Do not leave the machine with the boom fully raised and extended, as this can cause hydraulic fluid to seep through one hydraulic recharge valve and cause the boom to partially phase out, resulting in damage to the boom piping system during boom retraction.

6. Before leaving the machine, make sure all switch devices are off. Leave the hazard lights and side lights on if necessary. Remove the key.

7. Use the handrail and foot ladder to leave the machine. Close and lock the windows and doors. Make sure all filler caps are locked.

WARNING	Make sure to use the handrails and foot ladders provided when entering or exiting the cab or cab shed. Face the machine when entering or exiting the machine. Make sure the foot ladders, handrails and shoe soles are dry and clean. Do not jump from the machine. Use the handrails and not any of the machine's operating levers to enter or exit the machine.

8. When the machine is not used for a long time after a cycle, if lighting is not required, please take away the

battery or equip it with a battery isolator.

2.15.1. Service brakes

Before starting the vehicle, check whether the brake pipe is leaking. After starting or at low speed, step on the brake pedal to check whether the machine has a unilateral braking phenomenon. If not, it means that the braking function is normal.

WARNING	Check the brake pipe regularly for leaks. In case of leakage, tighten the hose in time or replace the damaged hose.

2.15.2. Parking brake

Before driving; put down the handbrake and release the parking brake. When parking, pull up the handbrake. The handbrake starts to work and ensure that the machine does not move

WARNING	For machines that have been idling for a long time, you need to start the engine for 5 minutes and then turn on the parking brake switch to release the parking brake.

2.16 Machine Operating Instructions

2.16.1 Introduction

This section can tell you methods and techniques for operating the machine safely and efficiently.

Your machine can be applied in various conditions. Therefore, in any case, the driver must determine the operating manual and working conditions according to the actual situation to meet the relevant laws and regulations.

We provide the most useful information in good faith. The Company accepts suggestions, opinions, statements, views, explicit conclusions and unfounded opinions in a responsible manner and will give equal weight to such suggestions, opinions, statements, views and unfounded opinions.

Before you safely drive a machine, make sure you have been adequately trained and believe you are capable of operating it. Carefulness, training, and experience are the magic keys to safe and efficient operation. Inexperience or carelessness can make your driving dangerous. Do not threaten your life or the lives of others by driving irresponsibly.

WARNING	Factors that affect machine stability include drive method, load type, boom elevation and reach, ground conditions, and wind speed and direction. It is the operator's responsibility to assess wind direction, speed, and load size before operating. Before operating, assess the terrain, ground roughness (remember, wet and dry ground have different roughness), and ground hardness. Read and understand the load tables in this manual and the boom manual before starting operation. Make sure you can properly control the machine before actual operation. Test with a load of standard weight. Do not use any unknown load unless you can safely and confidently handle a load of standard weight.

Read and understand this section. Use the load diagram and boom indicator lights before operating. Practice until you understand the operation correctly.

First practice the operation of flat loads, and then operate complex loads after you can operate the flat loads safely and skillfully.

Machines covered by this part are equipped with standard fork attachments. For operation of other attachments, please refer to the Optional Attachments section.

Before using any attachment, please consider the possible safety impact of the attachment. When equipped with an attachment, the center of gravity or overall size of the machine may be different, which may affect the stability of the machine. Therefore, please pay attention to the safety of ground operation and the safe distance from power lines.

Pay attention to the maximum wading depth of the machine. If the water is too deep, water will enter the engine, axles and cooling fan, damaging the machine.

Before starting any operation not covered in this manual, you should give due consideration to the operating rules. You can contact your WITTMANN dealer, who will be happy to assist you.

Read the Safety Handling section in the preface and the following information:

2.16.2 Safety Rules

2.16.2.1. Clothing and safety equipment

Do not wear loose clothing or jewelry when in the control or motion device part of the machine. Wear protective clothing and labor protection equipment according to working conditions or local laws and regulations or the requirements of the owner.

2.16.2.2. Load forking and processing

Make sure you place the load where you can drive it safely.

Be clear about the direction and stay calm while driving. If the load is too large to block your vision, designate someone to help guide you.

Pay special attention to the levelness of the ground while driving. Refer to Partial Machine Operation on Slopes (Operating Instructions).

The load must not be stacked higher than the forks.

Driving speed should be determined by driving conditions. Drive at low speeds on wet, slippery or loose surfaces. Drive carefully on bumpy roads as it may jolt the load.

2.16.3 Risk Assessment

It is the operator's responsibility to prepare appropriate operating procedures for safe operation of the machine, taking into account the specific operating environment and working conditions.

Carrying out a correct risk assessment and ensuring effective safety protection measures are in place are important to getting the job done.

If you are unsure how to proceed, please contact your dealer and they will be happy to assist you. When conducting a risk assessment, you need to consider the following factors. Sometimes other factors are also considered.

WARNING	Proper risk assessment comes from good training and experience. Never lose sight of your life or others.

2.16.3.1. Basics

In the loading/unloading area, the working area should be large enough to accommodate the machine body and outriggers (if equipped). There is no need to operate the machine in a confined space.

The work area should be rigid enough to support the machine and load without significant deformation. Ideally, the work area should accommodate two machines and have a slope no steeper than 2.5% (1:40).

When the machine is working in a loading/unloading environment that may not have special handling, the operator may be able to handle it with good training and rick experience. If equipped, the lateral adjuster can increase the working ability of the machine.

The path should be firm and reliable, with a slope no steeper than:

1. Maximum uphill slope: 15% (1in7)

2. Maximum downhill slope: 15% (1in7),

3. Maximum transverse slope: 15% (1in7)

These data can only be used for the normal driving mode of the machine, that is, with the boom retracted, the root of the front forks more than 500 inches (20 inches) from the ground, and the machine is not over speeding. It is necessary to limit the load of certain shapes, especially on lateral slopes.

2.16.3.2. Personnel

Among the personnel involved in this operation, who is better trained? Who is more experienced? Who is more qualified to carry out this operation?

Are they well rested? Driving while sick or tired can be very dangerous.

Is supervision necessary? Is the supervisor well-trained and experienced?

Does the driver need an assistant or other assistance?

2.16.3.3. Machine

Is working condition well?

Has the fault report been corrected?

Daily inspection completed?

Do the tires have adequate pressure to complete the operation? Are they in good condition? Is there enough fuel?

2.16.3.4. Loading

How heavy is it? Is it within the load capacity?

How big is it? Larger surface areas are affected by wind speed.

Is it a form load? Where is its center of gravity? An unbalanced load is difficult to handle.

Is it smooth and easy to slide on? If so, can you pick it up with a fork?

2.16.3.5. Loading and unloading area

Is it horizontal? If its gradient exceeds 2.5% (1:40), it should be considered carefully.

Is there more than one direction to access the load? If possible, avoid going over any slopes.

Is the ground firm and can it support the weight of the fully loaded machine?

Is the surface really rough? Would it be harmful to the machine, especially to the tires in an emergency? Are there any obstacles or dangerous objects nearby? Such as debris, large potholes, power lines, etc.

Is there enough operating space? Are there any other vehicles or people visiting while the machine is working?

2.16.3.6. Crossing Paths

Is the surface firm and does it provide adequate traction and stopping power?

How steep is the slope (uphill/downhill/side slope)? Going over a slope can be really dangerous.

Can I take a detour?

2.16.3.7. Weather

How strong is the wind? Strong winds can be detrimental to the stability of a loaded machine, especially if the load has a large surface area.

Is it raining? Surface and slippery roads affect the machine's traction, steering, and braking differently.

2.16.4 Security Warning

WARNING	It is prohibited to lift anyone high in the air or stand on unprotected forks without permission. Violations may result in serious injury or even death of a person.
WARNING	Carefully inspect the job site before starting the machine for operation. Stacked equipment near the jobsite can collapse if struck by the machine, which could cause injury or even death to you. Check for hazards that could cause the machine to go out of control (including pits, debris, logs, and steel blocks).
WARNING 告	Driving the machine too fast or with too high a load may cause the machine to roll over. Keep the load close to the ground while the machine is being driven. Do not drive the machine too fast under load conditions. Drive carefully on bumpy roads. Do not operate the moving arm/attachment while the machine is in motion.
WARNING	High slopes and earth trenches may collapse. Parking or driving the machine near high slopes or earth trenches may be dangerous.

WARNING	Leaving the machine unattended in a public place can be dangerous. In public places, if the ambient visibility is reduced, set up safety railings at the workplace to keep people away. Maintain the correct pressure in the tyres to prevent lateral instability of the machine. Check tyres daily for signs of damage, cuts and puncture objects. These inspections may result in a loss of pressure in the tyres.

WARNING	Make sure you know the weight of the load before lifting it. Check the stability of the machine first, even if the load is only lifted by a few centimetres. If the machine feels unstable, lower the load immediately. When lifting or extending the arm, if the machine feels unstable, lower and retract the arm. The load must not exceed the value indicated on the load chart (see the load chart and arm
WARNING	During loading and unloading, if the floor is not firm, the machine may roll over and cause serious injury or even death to you. Before loading or unloading, make sure the ground is level. Whenever possible, do not carry loads on non-solid
WARNING	If your machine or accessory is too close to a power cord, electrical shock may result. Before starting work, observe the work area for the presence of power lines. If so, contact your local power supplier and ask what safety measures should be taken. Also, know the local laws and regulations regarding
WARNING	If the spacing between the forks is not correct, the load may drop. Always place the forks correctly with respect to the load. Before lifting, make sure that the forks are under the load .
WARNING	The load on a single fork goes down. Lifting loads through a single fork is prolific.
WARNING	It is forbidden to unload the load on the forks by stopping the machine suddenly. Follow the unloading procedure specified in the operator's manual.
WARNING	Do not exceed the load rating of the forks. The forks may break, resulting in loss of load or possible damage.
WARNING	Maintain the correct pressure in the tyres to prevent lateral instability. Check the tyres daily for signs of damage, cuts and puncture objects. These inspections may endanger the loss of pressure in the tyres .

2.16.5 Fork load rating

WARNING	Do not exceed the load rating of the forks. The forks may break, resulting in loss of load or possible damage.

Forks must be used in pairs.

The maximum load capacity is described in the performance section (Technical Specifications) of the machine. The load capacity of the machine's forks must be equal to or greater than the machine's maximum load capacity.

WARNING	All lifting equipment, including forks and their equipment, should be regularly inspected and tested by qualified personnel to ensure their performance.

Some countries may require inspections at least every six months or one year. To ensure safety, please follow local laws and regulations.

If you have any questions, please consult your local dealer for further information.

2.16.6 Periodic load

WARNING	Load and unload on firm, level ground. Be careful of possible hazards, especially during steering and reversing.
WARNING	Before lifting or carrying a load, make sure you are braking the load. Never exceed the safe working load of the machine. Do not exceed the lifting angle and ultimate extension length indicated on the load diagram in the cab. Observe and use the load diagram and boom indicator (in the Operation section).
WARNING	If the load is on a high platform, the boom will need to be raised so the machine can fully access the load.

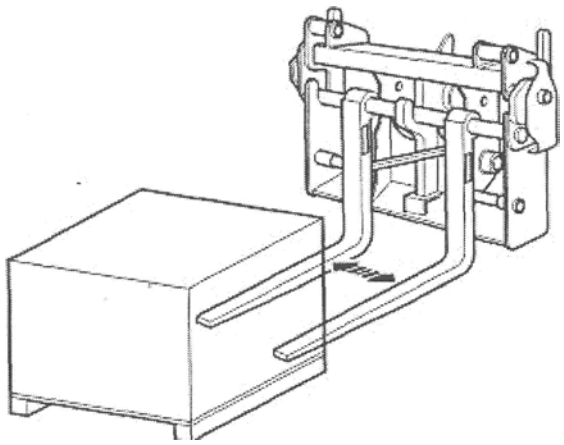


Figure 2-3 4 Loading diagram

2.16.6.1. Loading

1. The separation distance of the fork mechanism depends on the size of the load.

2. Place the front fork in a horizontal position and fully retract the boom.

3. When approaching the load slowly, keep the four tires forward and do not form any angles. Stop the machine and keep enough space to prevent the boom from spilling. And shift the transmission to neutral.

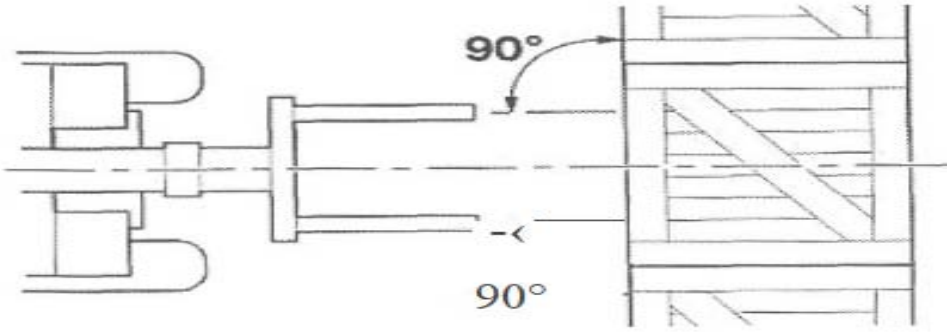


Figure 2-3 5 Loading diagram

Caution	If the load is on a high platform, the boom will need to be raised so the machine can fully access the load.

4. Extend the boom or move the machine to insert the forks into the load. Stop the attachment from making contact with the load. Check the boom's extended length/lift angle and make sure they are within limits.

Warning	If the machine begins to become unstable when you initially lift a load, lower the load immediately.

5. Gently lift the load, tilt back, fully retract, and lower the boom to the travel position.

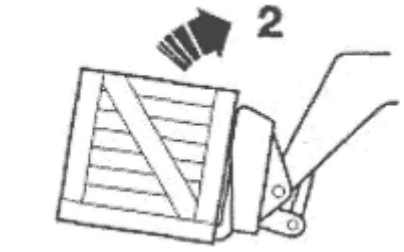


Figure 2-3 6 loading diagram

6. Slowly drive the machine to the unloading position.

2.16.6.2. Uninstall

Warning	Before lifting or carrying a load, make sure you are braking the load. Never exceed the safe working load of the machine. Do not exceed the lifting angle and ultimate extension length indicated on the load diagram in the cab. Observe and use the load diagram and boom indicator (in the Operation section).

Caution	Load and unload on firm, level ground. Be aware of possible hazards, especially when turning and reversing.

1. Slowly approach the center of the unloading area, keeping all four tires forward and not at any angle. Make sure not to exceed the load limit indicated in the load chart.

2. Shift the transmission to neutral position.

3. Position the load slightly higher than you want it to be. When stacking box loads, make sure the loads are stacked straight and vertically. For better stability, stagger the top load rows.

4. Lower the load to the desired location and make sure the load is level.

5. Carefully remove the forks. Depending on the height of the load, it may be necessary to raise or lower the boom while removing the forks.

6. After pulling, the forks pull the load away, fully retract the boom and lower the boom to the travel position.

2.16.7 Irregular Load

important

Important	When handling irregular loads, use extreme caution when operating the boom and attachments.

1. Find the center of gravity of the load. For a properly packaged load, the center of gravity may be marked on the box.

2. Position the machine correctly to ensure that the center of gravity of the load is symmetrically between the two forks.

3. Fork/place the load depending on the type of load. For regular loads, follow the procedure for regular loads. For irregular loads, appropriate chains may be required to ensure the load is safely placed on the forks. Stop the engine before allowing anyone to approach the forks.

Caution	If you are unable to find the center of gravity of the load, follow these steps: Try loading the load in different positions until you feel the load is stable on the forks. When attempting to load the load, only lift the load a few centimeters.

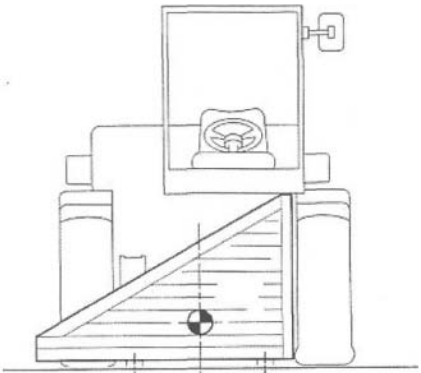


Figure 2-3 7- center-of-gravity diagram

2.16.8 Processing Package Load

Only handle package loads after you fully understand how to handle regular loads. The procedure is the same. However, note the following:

2.16.8.1. Promotion

1. Lower the boom and tilt the forks as far as possible.

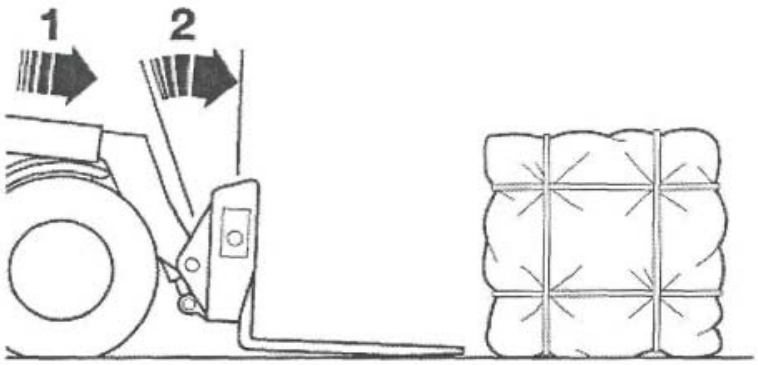


Figure 2-3 Schematic diagram of 8- fork loading

2. Extend the boom, lift slightly, and fork into the load. Then, tilt the front forks back and put the boom into the travel position.

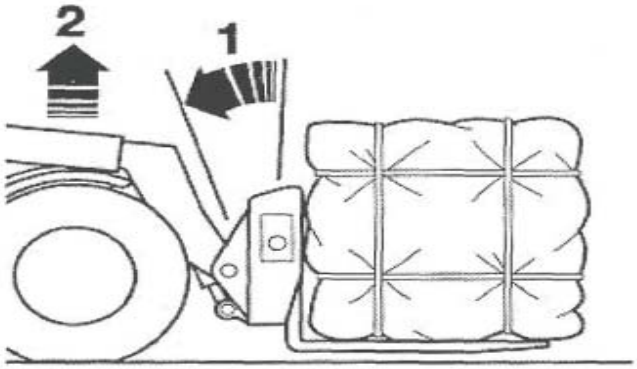


Figure 2-3 Schematic diagram of 9- fork loading bag

2.16.8.2. Placement

1. Position the boom correctly and position the package slightly higher than where the package needs to be. Lower the boom and gently tilt the forks forward so that the front edge of the package is lowered to the ground.

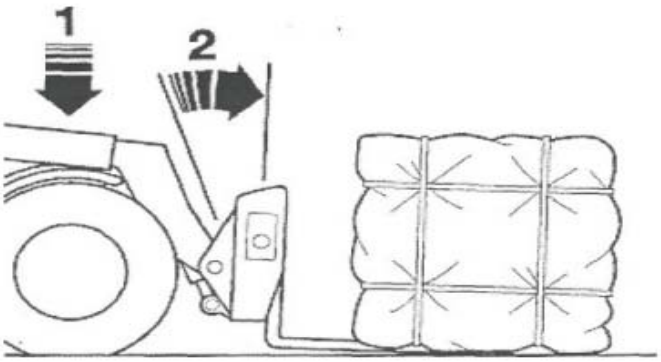


Figure 2- 40 Package location

1. Retract the boom and pull the forks out from under the package. Once clear of the package, return the boom and forks to the road-worthy position.

Warning	The package may fall off the forks. In this case, stop the engine before allowing anyone to approach the forks.

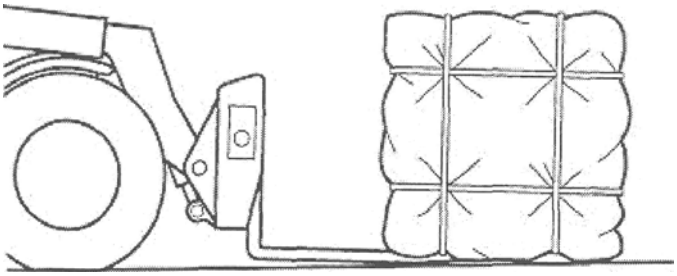


Figure 2-4 1 Package placement diagram

2.16.9 Bucket Operation

Caution	Load and unload on firm, level ground. Be aware of possible hazards, especially when turning and reversing.
Warning	Do not load with the bucket with the boom extended, or severe damage to the boom may occur.
Warning	Before lifting or carrying a load, make sure you are braking the load. Never exceed the safe working load of the machine. Do not exceed the lifting angle and ultimate extension length indicated on the load diagram in the cab. Observe and use the load diagram and boom indicator (in the Operation section).

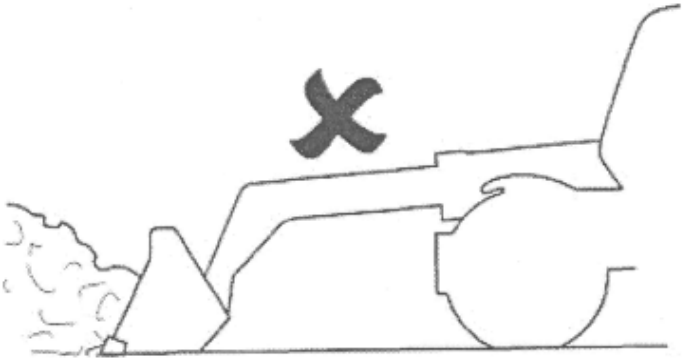


Figure 2-4 2 Bucket usage diagram

Your machine may be equipped with a variety of attachments, including buckets. See Attachments. The following paragraphs will take you through some of the relevant precautions. These precautions may not be complete and are not a substitute for proper training. Make sure you are trained before operating any other attachments.

As you dig the bucket into the material, lift the bucket and tilt it back to sweep the material upward and fill the bucket with material. **(This machine is equipped with a bucket only for ordinary soft materials, such as loose sand, grain, etc.)**

Warning	When handling loads on high piles or embankments, remove all overhangs. Watch out for falling objects. The sudden fall of protruding material could bury you and your machine.

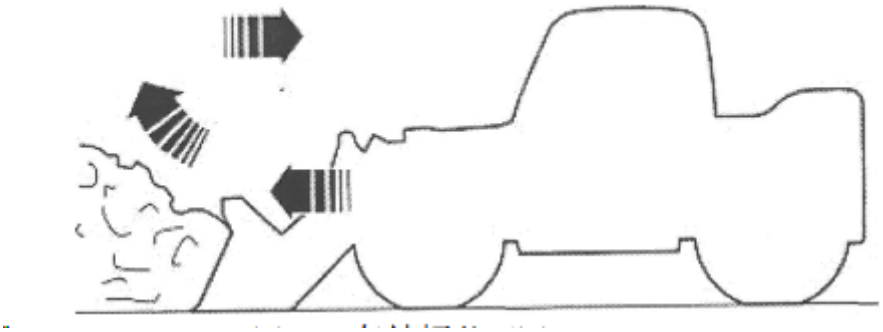


Figure 2-4 3 bucket usage diagram

Tilt the bucket back during load movement to prevent leakage.

When loading a pile of soft material, start at the bottom of the material and work from the front as shown in the figure, sliding the bucket horizontally onto the ground and sliding the pile toward the material.

When loading compact material, start at the top and work your way down.

To remove material from a stockpile, start about one bucket height above the bottom. Once the height of the stockpile is reduced, load from the bottom of the pile.

2.16.9.1. Loading onto trucks

Park the truck approximately 45° from the material pile as shown. This saves unnecessary movement. Ensure there is enough room to raise the bucket to dump height without slowing the machine down during travel.

Keep your position upwind to keep you and your machine out of the dust. Drive the machine as close to the truck as possible before dumping.

If the truck bed is about the same width as the bucket, dump the load into the center of the truck. If the truck bed is two or more inches longer than the bucket width, dump the load into the front of the truck.

Do not dump the load by sudden movements. Tilt the bucket forward gradually until the material dumps completely. Rock the bucket by operating the operating lever back and forth to shake off stuck material.

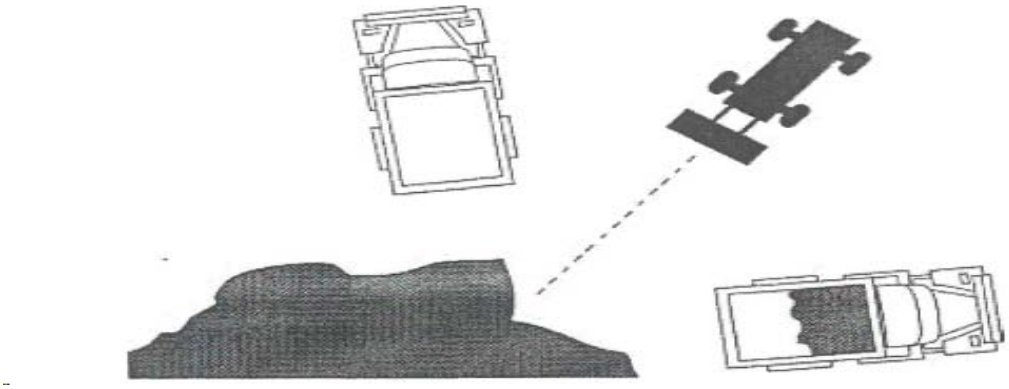


Figure 2-4 4 Loading and unloading truck diagram

Warning	Make sure you have been trained and are familiar with operating the machine on slopes and understand the adverse effects that the slope and the working environment may have on the stability of the machine. Never operate the machine on a slope if you are not aware of these recommended practices in the actual application.

2.16.10 Operating the machine on a slope

When operating a machine on a slope, there are many factors that can adversely affect the stability of the machine and the safety of the machine and operator.

It is indeed inappropriate and necessary to carry out a risk assessment of the works to be handled. Please refer to Risk Assessment (Operational Pairs). The operator should comply with all safety procedures specified and supported by the risk assessment.

2.16.10.1. Driving up and down slopes

When driving on a slope, follow the following requirements to ensure maximum traction for the CE: Drive the unloaded machine forward to go down a slope and backward to go up a slope.

Move the machine forward to go up a slope and backward to go down a slope.

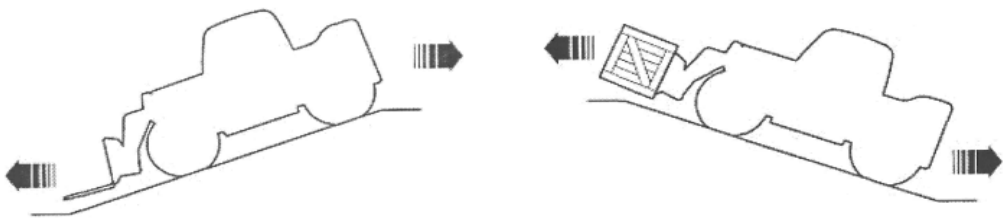


Figure 2-4 5 Uphill and downhill

2.16.10.2. Crossing a slope

Before going over a slope, read and understand the instructions specified in this manual.

Maximum stability is achieved by operating the machine on firm, level ground. Operating the machine on a slope will reduce machine stability.

To negotiate a slope, fully retract the boom and drive slowly at walking pace.

Do not lift the attachment too high unless it is absolutely necessary. When the load is on the forks, the lowest point of the load is usually no more than 500 mm (20 inches) above the ground, as shown in Figure A. Some loads may be suspended below the forks, as shown in Figure B. In this case, please carry out a risk assessment before suddenly raising the attachment to achieve ground clearance.

Remember! Be careful! Be cautious! Taking unnecessary risks may endanger your safety and the safety of others.

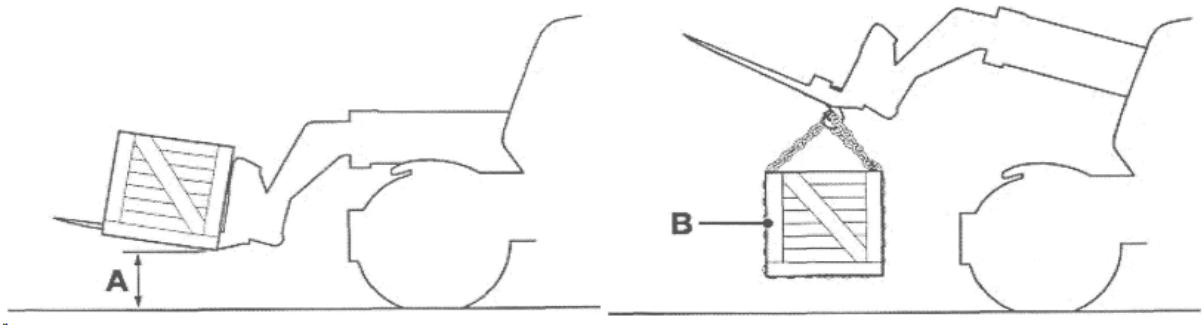


Figure 2-4 6 Passing the slope

2.16.10.3. Lifting operations on slopes

Warning	Lifting operations on slopes can be dangerous. Failure to understand and follow the instructions in this section could render the machine laterally unstable or even cause it to overturn. This could result in serious injury or death to you or others. Be sure to fully understand and follow the guidelines specified in this manual.

Do not perform lifting operations on a slope unless the machine is level across its width (i.e., lateral leveling of the machine).

Warning	Before any lifting operation, stop the machine and apply the parking brake.

2.16.10.4. Lateral stability

To work on a slope, before any lifting operation, make sure you have considered all factors that may affect the stability of the machine. Ensure the lateral stability of the machine in the width direction.

Indicator light A can be used to check the leveling of the machine.

To ensure maximum stability, it is recommended that the machine be operated on as firm and level ground as possible.

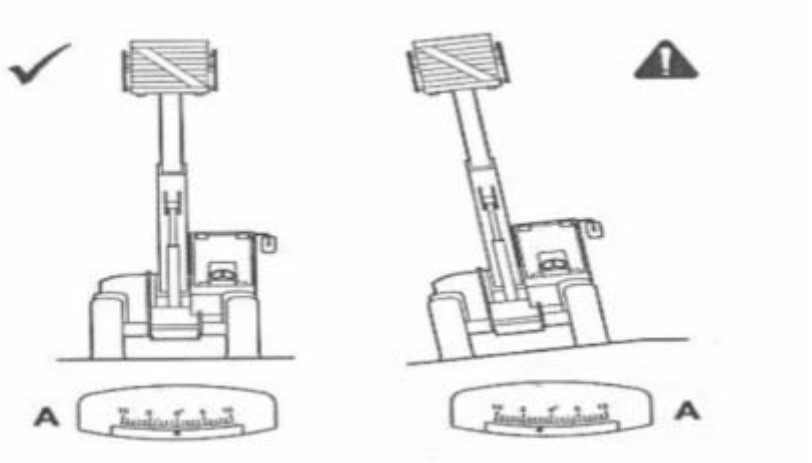


Figure 2-4 7 Slope lifting

Important	If the machine cannot be levelled across its width, ensure you carry out a risk assessment before attempting any lifting operation. Refer to Risk Assessment (Operation Section).

2.17 Operation at low and high temperatures

2.17.1 Low temperature

Take the following precautions in low temperatures to facilitate starting the machine and avoid possible damage.

1. Use engine oil of correct viscosity.
2. If possible, use diesel fuel with a lower number.
3. Apply coolant mixture.
4. Keep the battery fully charged.

5. Fill up the fuel tank after each construction period to avoid condensation on the tank wall.

6. Protect the machine during misuse. Park the machine in a room or cover it with a waterproof canvas.

7. Install the cold starter. It is possible to apply this additional cold start aid at very low temperatures, -18'C (0°F) or reduced temperatures such as fuel oil and coolant heaters. Please consult your company dealer for further advice.

Important	Do not start the engine with the 24V voltage formed by connecting two batteries in series, otherwise the induction multi-tube heater and starter motor will be burned out.

8. Before starting the engine, first clear the snow off the engine components, otherwise the snow may enter the air filter.

2.17.2. High temperature

Take the following precautions in high temperatures to avoid possible engine damage.

Use oil of the correct viscosity.

2. Apply the correct coolant mixture.

3. Check the cooling system regularly, keep the coolant level at the proper level, and ensure that the coolant does not leak.

4. Keep the radiator/oil cooler clean, remove dust and debris from the radiator/oil cooler and the engine regularly.

5. Check the engine fan belt regularly.

6. Check the exhaust holes to make sure that there is no obstruction in the air inlet or outlet of the engine components.

7. Check the engine pre-filter regularly (if installed).

8. Check the battery electrolyte level.

2.18 Mechanical traction hook

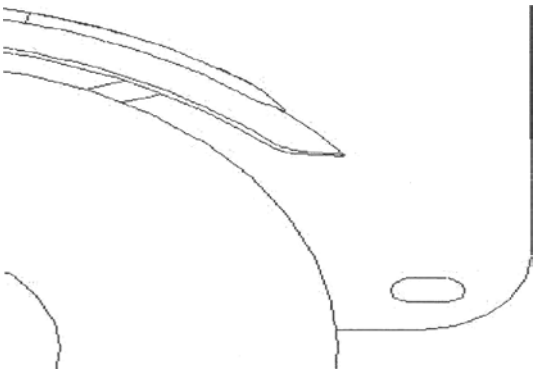


Figure 2-4 8 traction hook

Your machine may be equipped with a towing hook. Before towing the machine, make sure you comply with the relevant laws and regulations.

Make sure the towing hook of the towing vehicle is suitable for your machine and keep enough distance between them to avoid any collision or entanglement.

Warning	Check the towing hook and towing vehicle eye for wear before each operation. Any poor connection, worn hook or eye can result in loss of the harness and injury to you and others.

During towing, the machine must be unloaded (without ballast) and using two-wheel drive. Use the following procedure to operate the hitch.

Warning	Do not exceed the specified towing vehicle or hitch total weight limits or the machine will become unstable.

1. Check the weight and tire pressure of the tractor. Its maximum towing capacity depends on the type of brake system installed. Calibrate the tire pressure according to the requirements shown on the odometer in the cab.
2. Apply the parking brake.
3. Adjust the rearview mirror to achieve the best visual effect in the hook and tow area.

Warning	When the machine approaches the tractor, make sure there is no one between the machine and the tractor.

The steps for attaching it to the towing vehicle and attaching the towing vehicle to the hitch should be based on the model of towing vehicle, regardless of whether the following procedures are followed:

a. Before the machine approaches the tractor, first check and confirm whether the tractor and its hook are located

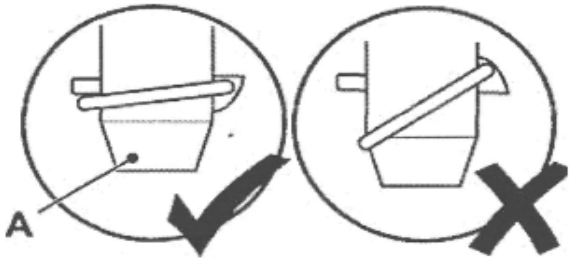
in a convenient position for connection.

b. If there is an assistant, the assistant must stand near the machine before connecting the hook and the machine together.

c. If the machine fails to stop itself and the assistant cannot approach the tractor or machine, apply the parking brake and turn the engine switch to the OFF position.

Warning	Before driving away, make sure the towing vehicle hitch is properly connected and locked

d. If the towing vehicle is connected and pin A is in the correct secure position, the operator must not start the engine until the assistant is clear of the machine.



Picture 2-4 9- needle stop lock

Warning	Do not use the rear attachment for towing and braking purposes. If the towing vehicle brake valve is not installed regardless of the towing vehicle braking requirements, please contact the company dealer first.

4. For the operation of accessories, such as the tilting of the tractor, please operate H/J according to the installed machine tool and the required action.

5. To avoid contamination of the hydraulic system, level the tractor before disconnecting the hydraulic working equipment and draining the hydraulic cylinder oil of the tractor.

6. When towing on the highway, select two-wheel drive. Check and confirm that the indicator light shows two-wheel drive

Warning	Before driving away, make sure the hitch is connected and locked.

2.19 Vehicle Transfer

When transferring, take the following precautions to prevent possible damage to the tire and injury to personnel.

1. The driving speed shall not exceed 30km/h and the vehicle shall be in an empty or low-load state.

2. Stop for 15 minutes every 45 minutes of driving to cool the tires, ensure normal operation of the tires, and maximize the life of the tires.

3. When the vehicle stops during the transfer process, keep the driver away from the tires to ensure the driver's life safety.

4. Check the tires for damage before starting the vehicle again. If any damage is found, stop the vehicle immediately for inspection and repair, and continue driving after replacing the tires.

Warning	Continuous high-speed driving of the vehicle can cause the tires to overheat and become damaged, causing injury to you and others.

2.20 Reset the steering system

2.20.1 It is limited to four-wheel steering machines only.

Warning	If the steering system is not reset at least once a day, it may cause it to lose steering effectiveness.

The steering system must be reset:

1. At least once a day.

2. If it is difficult to control

3. Driving more than 15 miles (24 kilometers) (two-wheel steering)

4. If both wheel turn indicators flash (approximately four times per second) follow these steps to reset the steering system:

With two-wheel steering selected, the turn indicators still indicate four-wheel steering.

1. Since the sensor on the drive axle stops the switching of the steering before the rear wheels are misaligned or out of their normal position, the turn indicator is inconsistent and the switch remains on for a while.

2. Operate the machine until its rear wheels are aligned.

3. After converting the rear wheel alignment to two-wheel steering, the indicator light shows two-wheel steering.

4. Select four-wheel steering again.

5. The front and rear wheels are now at the same stage.

2.21 Transferring a Faulty Machine

Faulty machine transfer Try to repair the machine in place. If this is not possible, use a lifting device to lift the

machine onto a transport vehicle and then send it to the repair location.

Warning	It is forbidden to pull the machine, otherwise the relevant parts of the machine will be damaged.

2.22 Machine Transportation

Warning	The transport contractor and driver are responsible for safe transport. Any machine, tool or part may move during transport and therefore needs to be fully secured.

Caution	Before transporting your machine, you must comply with all regulations and laws of the areas you will be transporting through.

Ensure the suitability of the transport vehicle.

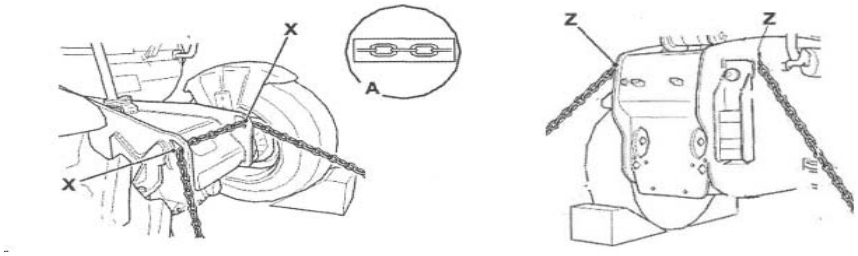


Figure 2-50 transport aircraft

Warning	Before moving the machine on a trailer, first check the trailer and slope and make sure there is no oil, grease or snow present. Clean oil, grease and snow from the machine's tires. Make sure there is nothing on the slope that could collide with the machine. Observe the machine's minimum ground clearance in the Fixed Dimensions in the Performance section.

1. Place obstacles under the front or rear wheels.
2. Move the machine on a trailer.

a. Ensure the correct or safe position of the hydraulic cylinder.

b. Adjust the boom.

c. Move the machine on the trailer carefully.

d. Apply the parking brake and put the drive in neutral.

e. Lower the machine onto the trailer.

f. Raise the supporting leg to a safe position.

g. Check that the total height is within the specified range. Adjust if necessary.

h. Turn off the engine and remove the key.

i. Lock the cab.

j. Keep the exhaust chimney tightly covered.

3. Place blockages under the four front and rear wheels of the machine. Secure the machine and trailer with chains.

4. Measure the height of the machine off the ground. Make sure the tow truck driver knows the clearance height before driving off.

2.23 Machine lifting

When lifting the machine, follow these steps:

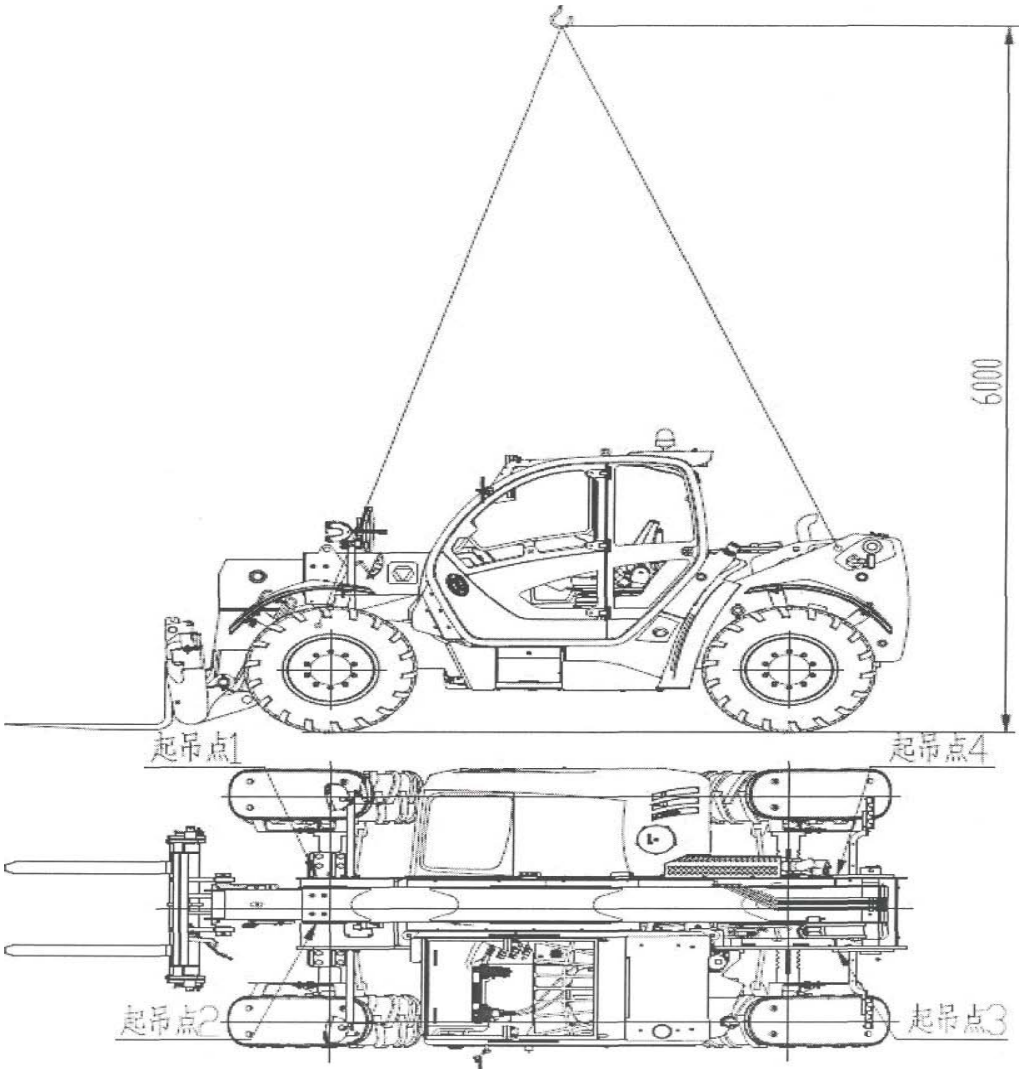
1. Retract the boom and lower it to the ground.
2. Remove all accessories.
3. Turn off the engine, remove the key, close the window, leave the cab, and close the door.
4. Remove all equipment outside the machine.

Warning	You can get hurt if you use the wrong lifting equipment. Make sure your lifting equipment is in good condition. Make sure your lifting tools comply with local regulations and are suitable for the lifting job, and that your lifting equipment is up to the job.

5. Confirm the weight of the unloaded machine and observe its fixing indicators.
6. Connect to lifting equipment in raised position.
7. Lift the machine. Avoid damaging the machine with the spreader bars if the lifting equipment bears down on the machine.
8. Check whether the lifting point is above the center of gravity of the machine and observe its fixing indicators.

Danger	Do not stand under a lifted load during the lowering operation. Keep a distance and stand to one side until the load is safely lowered. Make sure no one is in the area while lowering the load. If you do not follow these regulations, you and others could be seriously injured or even killed.

Warning	Any miscommunication can lead to accidents. Let those around you guide you on what to do. If you work with other people, make sure all applied gestures are understood by all. The workspace is noisy, so verbal commands cannot be relied upon.



Lifting point 1 Figure 2-5 1 Lifting the machine

2.24 Storage

The storage period of the machine includes short-term storage and long-term storage. For short-term storage, the storage period should not exceed two months. More than two months must be regarded as long-term storage. If the wheeled machine needs to be stored for a long time, please take the following measures.

2.24.1 Before storage

Clean every part of the machine, remove corrosive substances, dry the machine and store it in a dry warehouse.

- Park the machine on firm, level ground (preferably under a shed). Make sure the machine is not parked in a difficult-to-access position so that it can be pulled out when stored later (in case the machine is parked and cannot be started).

Before storage, fill the tank with oil, add lubricating oil, and replace the hydraulic oil. Check the level of all oils and refill if necessary.

- Check coolant level and condition. Refill if necessary.
- Stop the engine, retract the hydraulic cylinders, and lower the attachment to the ground. Open the hydraulic tank's filler cap and operate the control lever to release the residual pressure from the hydraulic pipes.

The exposed parts (such as piston rods and pins, etc.) should be coated with anti-rust grease. When stored for a long time, the surface of the machine should be waxed for rust prevention.

2.24.2 Short-term storage

- Drive the machine once a week while operating the working equipment to keep the machine in ready condition.

2.24.3 Long-term storage

The battery must be removed. Although the machine is stored indoors, if it is too hot or too humid, the battery must be removed to store it in a better place and charged once a week.

Parts that are easily penetrated by moisture (such as ventilation devices and air filters) should be covered with clothing.

The tire inflation pressure must be standard. Check the tire for wear and damage.

In order to release the heavy load on the tire, it is best to jack up the machine to make it float. If you cannot do

without jacking up, you must check the inflation of the tires every two weeks to ensure the tire pressure.

Restore the machine to working order every week. Start the engine and let it warm up, then move the machine back and forth a little.

If you think it is necessary to activate the working device, clean the grease on the cylinder rod before doing so. After trying, apply grease to the cylinder rod again.

2.24.4 After extended storage time

- Remove all protective coverings.

- Clean anti-grease from exposed parts.
- Drain the engine oil, transmission and transaxle, then clean and re-filter them with new oil .
- Drain debris and water from hydraulic tank and oil reservoir.
- Charge the battery again and connect it to the wires.
- Adjust tire inflation pressure according to road conditions.
- Inspect the machine for worn or damaged parts. Replace if necessary.
- Follow the inspection procedure before operation.
- Preheat the engine.

2.24.5 Storage of tires

- As a general rule, tires must be stored in a warehouse. No one may enter the warehouse without prior approval. If tires must be stored outdoors, set up a protective fence around the storage area. Display "No Entry".
- Store tires in a dry and clean place. Moisture will accelerate the oxidation of tires, and oil or contaminated dirt will corrode tires faster. When storing tires, consider shielding and heat insulation as much as possible to avoid drafts. Stored tires should be covered with canvas, plastic or other coverings. Improper tire storage will seriously affect its quality and service life.
- Place the tire vertically on flat ground and secure it with wedges (Figure 2-52) to prevent it from falling if touched by an unwary person. If the tire is placed on the ground on its side, it may be flattened, resulting in a reduction in its quality. Stored tires should be turned over once a month. (Turn 90°)

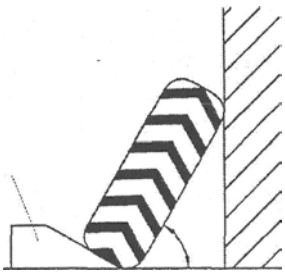


Figure 2-5 2

Warning	If a wheel tire falls off, move away from the front, as the tire of the construction machinery is very heavy and any attempt to hold it with your hands will result in serious injury.

3. Maintenance

3.1 Introduction

Caution	Please read and understand these operating instructions carefully so that you can properly maintain this machine. Proper maintenance is very important to ensure the safety of the machine and extend its service life.

To achieve optimal performance, the machine is designed and manufactured to work comfortably in all complex operating conditions and environments and to save energy in its operation. Before shipping, the machine must be checked at the factory and at the dealer's shop to ensure that the most suitable condition is achieved in your hands. To maintain this condition, it is important to have the machine regularly maintained by an approved dealer in accordance with the requirements specified in this manual.

Full details of required maintenance items are given in this section to keep your machine at peak efficiency.

The details of maintenance will be described in the following pages. Many necessary maintenance checks can only be performed by trained professionals. Only by using the necessary special tools and testers can they complete the maintenance work completely, safely, correctly and efficiently.

Any maintenance log or note list can include maintenance records to better plan for your maintenance needs. These records should include the date, signature, and your issuer stamp for each maintenance period.

Remember that if its maintenance is reasonable and correct, it will not only increase the stability of the machine, but also increase its price during resale.

The company and the dealer hope that you will be satisfied with your new machine. If you encounter any problems, you can contact the dealer's maintenance point and they will provide you with timely assistance.

After setting up the machine, you need to report the relevant maintenance name when contacting your machine

To ensure your maximum satisfaction, please let them know:

1. Your name, address and telephone number.
2. Model and serial number of your machine
3. Purchase date and business hours.
4. Problem characteristics.

Please reiterate that only our dealers can obtain rich and practical resources from the company and provide a variety of resources, including guarantee certificates, repair prices, safety inspections required for legality and weight testing.

Service/Maintenance Agreement

To give you better planning and control over the price of your machine's repairs, we strongly recommend that you take advantage of a distributor, so you can make the appropriate adjustments based on your machine's operating condition and schedule.

Machine maintenance and inspection (100 hours)

In order to ensure the performance of the machine at a later stage, it is very necessary for the issuer to carry out preliminary maintenance and inspection of the machine within one month of purchase or 100 operating hours (whichever comes first). The issuer should be informed so that they can make necessary arrangements.

Regular inspection and testing

Only professional maintenance personnel can fully meet the inspection requirements and meet the test parameters legally required by the UK Health and Safety Administration. At the same time, they can provide annual inspection services according to the insurance company's policy.

Only our people can pass these necessary tests and inspections and achieve the definition of "qualified person". It proves that only experienced modern engineers trained in our factory can provide data and material support to customers.

Replacement Parts

We recommend that you only use genuine parts from our company. The parts manual can help you identify the parts and make it easier for you to purchase from our distributors.

The processor needs to know the correct machine model or some serial number.

3.2 Health and Safety

3.2.1 Oil

introduce

It is very important to read and understand these data and related publications. Have all colleagues who work with greases read them as well.

health

The proper use of lubricant does not pose any risk to your health. However, any excessive or prolonged skin contact can deplete the skin's natural oils, which can lead to dry or sore skin.

This is more likely to be the case with low viscosity oils, so special care needs to be taken when disposing of waste oils, which may be diluted with fuel contaminants.

Always maintain good protection and personal hygiene when handling oil. For more preventive measures, we recommend that you read the relevant publications issued by your local health authorities and follow the points below.

storage

Do not store oils and greases where children can reach them.

Do not put grease into any unlabeled, opened or unsealed container.

Waste Disposal

Caution	It is illegal to contaminate drains, sewers or roads. Clean up all spilled liquids or grease. Used liquids or grease, filters and contaminated materials should be disposed of in accordance with local regulations. Use an approved waste disposal station。

All waste must be disposed of in accordance with relevant regulations.

Used oil should be collected and disposed of in accordance with any local regulations. Never allow used oil to be poured into drains, sewers or onto the road.

transportation

New oil

Other than normal care and sanitation practices, no special precautions are required for handling or using new oil.

Waste oil

Used engine grease contains harmful contaminants.

The following precautions can help protect your health when handling used motor oil:

1. Avoid prolonged, large-area or repeated contact of the skin with used oil.

2. Apply a barrier cream before handling used oil. Please note the following when removing motor oil from your skin:

a. Clean skin thoroughly with soap and water.

b. Use a special brush.

c. Apply special liquid soap.

d. Do not use gasoline, diesel or kerosene for cleaning.

3. Avoid skin contact with wet clothing.

4. Do not store oily fabric waste in your pockets.

5. Reapply after washing soiled clothing.

6. Discard oil-soaked shoes.

First aid oil

Eye

If your eyes accidentally come into contact with it, please clean them with clean water for 15 minutes. If your eyes still hurt, please seek medical attention.

swallow

If the oil is swallowed, do not induce vomiting and get medical advice immediately.

skin

If large amounts of oil come into contact with skin, wash immediately with soap and water.

Apply sand or locally approved granules for absorption. Transfer accumulated sand or granules to a chemical disposal station.

Fire

Caution	Do not use water on oil fires, as this will spread the fire faster because oil floats on water. Oil or grease can burn. Use carbon dioxide, dry powder or foam to extinguish the fire. Any firefighter should use a self-contained breathing apparatus.。

3.2.2 Battery

Caution	Batteries can release explosive gases. Do not smoke while handling or operating with batteries. Avoid any sparks or flames from batteries. Battery electrolyte contains sulfuric acid. If your skin or eyes come into contact with it, it will burn you. Please wear safety glasses and handle batteries carefully to avoid leakage. Any metal objects (watches, finger rings, zippers, etc.) should be kept away from the electrode tips of the battery. These objects may cause its electrodes to short-circuit and burn. Disconnect or reconnect the battery after turning all switches in the cab to the off position. If you disconnect the battery, disconnect its ground electrode (-) first. Charge the battery in a well-ventilated area away from the machine. Before connecting or disconnecting the battery, turn off its charging circuit first. After installing the battery on the machine, wait 5 minutes before reconnecting it. Connect its positive terminal (+) first to prevent reconnection.

What to do when you are injured by electrolytes

If it is electrolytes, give first aid as follows:

Splash in eyes

Immediately flush eyes with water for 15 minutes and seek medical attention.

Swallow

Do not be tempted to vocalize. Take lots of water or milk and drink magnesia in milk, beaten eggs or vegetable oil. Seek medical treatment.

Splash on skin

Clean with clean water, take off clothes soaked with electrolytes, cover the wound with sterile clothes, and then seek medical treatment.

Warning signs

The following warning symbols may be seen on the battery:

Keep away from children

Figure 3-1

Keep away from children

Figure 3-2

Explosive gas

Figure 3-3

No smoking, open flames or sparks

Figure 3-4

Safety glasses

Figure 3-5

Pay attention to the operating instructions

Figure 3-6

Caution	Do not disconnect the battery while the engine is running as this may damage the circuit.
Caution	Before connecting or disconnecting any electrical components, you need to understand electronic circuits. Careless connections may cause personal injury or bodily harm.
Danger	Battery electrolyte is toxic and corrosive. Do not breathe the gas emitted by the battery, keep it away from your clothes, skin, mouth, eyes, etc. Wear safety glasses.

Caution	Store damaged, exhausted batteries or burnt residues and leaked materials in closed acid containers and dispose of them in accordance with local waste environmental regulations.

Warning	Batteries release explosive gases, so keep away from open flames or sparks. Do not smoke near batteries. When batteries are used or charged in an enclosed area, provide adequate ventilation. Do not check the charging condition of the battery by shorting the

3.3 Maintenance plan

3.3.1 Introduction

It is very dangerous for the operator or his surrounding workers to maintain a damaged machine. Please ensure that the regular maintenance and lubrication of the machine are noted in the maintenance details to ensure the safe and efficient operation of the machine.

Warning	Repairs must be performed by qualified personnel with professional tools. After confirming that the machine is safe, remind you to repair it. The machine should be parked on a solid, level surface. To prevent anyone from starting the machine, remove its starter key. Disconnect the battery or block the tires before working under the machine. If you do not take these measures, you may be injured or even killed.

In addition to daily work, perform maintenance in detail taking into account the machine's operating hours. Evaluate the correct maintenance interval based on the chronograph readings and perform regular inspections. Do not use a machine that requires maintenance. If any problems are found during regular maintenance inspections, correct them immediately.

Equivalent names for working time (hours):

Every 10 hours = every day

Every 50 hours = every week

Every 500 hours = every six months

Every 1000 hours = every year

Every 2000 hours - every two years

Every 6,000 hours = every six years

Caution	Maintenance is performed at hourly or calendar intervals, whichever comes first.

3.3.2 Check engine maintenance points and fluid levels before starting

Table 3-I

	operate	10	50	100	500	1000	2000	6000
engine								
Coolant quality and level	examine	□	□	□	□	□		
Cooling system	Draining and filling						□	□
Oil level	examine	□	□					
Oil and Filters	replace				□	□	□	□
Air filter valve	clean				□	□	□	□
Air filter internal components	replace						□	□
Air filter external element	replace				□	□	□	□
Pre-filter (if installed)	examine		□					
Water separator and fuel filter	drain		□	□	□	□	□	□
Oil-water separator	replace				□	□	□	□
Fuel Filter	replace					□	□	□
Front engine mounting strap	examine				□	□	□	□
Front engine mounting strap	replace							□
Bolts to secure the engine	examine			□	□	□	□	□
All pipelines	examine			□	□	□	□	□
heat sink	clean				□	□	□	□
Exhaust filter	clean						□	□
Valve clearance	Check and adjust						□	□
Oil port and oil gauge seals	replace						□	□

Rocker cover and fuel injection seals	replace						□	□
High pressure oil pipe	Double check							□
Axle steering								
Reliable drive connection	examine			□				
Transmission oil level	examine	□	□	□	□			
Transmission oil	examine					□	□	□
Transmission oil filter	replace			□	□	□	□	□
Reliable shaft connection	replace				□			
Axle oil level	examine		□	□				
Axle oil	replace				□	□	□	□
Wheel hub oil level	examine			□				
Hub oil (no oil pressure)	replace					□	□	□
Wheel hub oil (with hydraulic brake)	replace			□	□	□	□	□
Shaft ventilation holes	examine			□	□	□	□	□
Trunnion bearings	Check/Adjust			□	□	□	□	□
Steering position limiter (if installed)	Safety			□	□	□	□	□
Front wheel hub bearing	examine			□	□	□	□	□
Safety of tire nuts	examine	□	□	□	□	□	□	□
Tire pressure/fill port	examine	□	□	□	□	□	□	□
Front wheel position	examine	□	□	□	□	□	□	□
Drive shafts and universal joints	Safety and lubrication			□	□	□	□	□

Axle Pivots and Links	lubricating		□	□	□	□	□	□
Hydraulic oil								
Oil level	examine		□	□	□	□		
Oil	Sampling, replacement						□	□
Oil Filter	replace			□	□	□	□	□
Suction filter	clean						□	□
Auxiliary filter (if installed)	replace			□	□	□	□	□
brake								
Brake system fluid level	examine	□	□	□	□	□		
Brake fluid	replace						□	□
Brake pedal	examine					□	□	□
Electrical appliances								
Cable sheath/line connection	examine			□	□	□	□	□
Battery wiring and fastening	examine			□	□	□	□	□
Body and cab								
All hinge pins and bushings	lubricating		□	□	□	□	□	□
Telescopic cylinder piston rod pin	lubricating					□	□	□
All other pins	lubricating		□	□	□	□	□	□
Fire extinguisher (if installed)	examine	□	□		□	□	□	□
Reflector	examine	□	□		□	□	□	□
ROPS/FOPS structure	examine	□	□	□	□	□	□	□
Doors and hinges	lubricating			□	□	□	□	□

Joystick connection	lubricating			□	□	□	□	□
Water hyacinth horizontal	examine	□	□	□	□	□	□	□
Heated cab air freshener (if installed)	replace				□	□	□	□
Cabin heating recirculation filter (if installed)	replace				□	□	□	□
Boom slider slide	examine				□	□	□	□
Inner arm hose	lubricating				□	□	□	□
Boom slider clearance	Check/Adjust				□	□	□	□
Boom slider condition and safety (replace if necessary)	Check/Adjust			□	□	□	□	□
Accessories								
Accessory lock pin	lubricating		□		□	□	□	□
Hydraulic towing hook inner leg (if Installed	examine				□	□	□	□
Hydraulic towing hitch pin (installed)	lubricating				□	□	□	□
Registration/Authentication								
Safe Working Load Signs and Flipcharts	renew	□	□	□	□	□	□	□

1) If the machine works in a harsh environment, replace the oil and filter every 250 hours.

2) If the fuel contains high levels of sulfur, it will affect the oil maintenance interval. For more information, please observe the fuel system.

3) If it is frequently operated in a dusty environment, more frequent maintenance is required

4) If the engine is difficult to start or its performance deteriorates, the filter will be replaced.

5) This work should be performed by professionals.

6) After the maintenance of a large drive, the temperature of the new oil should be close to its normal operating temperature, at which time the oil should be renewed so that the dirt that entered during the maintenance can be taken away. If there is still dirt in the oil, the oil and filter should be replaced again after the next 100 hours.

7) After repair, the temperature of the new oil should be close to its operating temperature and should be replaced again to remove the dirt that entered during the repair process. In order to remove any impurities, use new oil again after 100 hours of operation. It will become especially important if new brake pads are installed.

8) Axles and drive shafts are lubricated with high-performance grease before leaving the factory. If standard grease is used during maintenance, the lubrication time should be shortened to 50-hour intervals, and a professional maintenance personnel should be contacted for further advice.

9) If the machine is operated under severe conditions, check the arm gasket for wear every 250 hours.

3.4 Recommended lubricants and engine oils

3.4.1 Recommended lubricants and engine oils

Table 3-2

<table>
<tr><th>category</th><th>Name and Designation</th><th>Fuel quantity</th><th>Refueling parts</th><th>notes</th></tr>
<tr><td rowspan="4">fuel</td><td>0# Light diesel</td><td rowspan="4">123L</td><td rowspan="4">tank</td><td>summer</td></tr>
<tr><td>10# Light diesel</td><td>summer</td></tr>
<tr><td>-10# light diesel</td><td>winter</td></tr>
<tr><td>- 35# light diesel</td><td>winter</td></tr>
<tr><td>Engine Oil</td><td>CH-415W/40 Heavy Duty Diesel</td><td>9L</td><td>Oil sump</td><td></td></tr>
<tr><td rowspan="2">Hydraulic oil</td><td rowspan="2">L-HML46 High Pressure Anti-wear hydraulic oil</td><td>First filling: 255L</td><td rowspan="2">Hydraulic oil tank</td><td rowspan="2"></td></tr>
<tr><td>Hydraulic tank capacity: 1 83 L</td></tr>
<tr><td rowspan="2">Gear Oil</td><td rowspan="2">80W / 90GL -5</td><td>12L</td><td>Front axle</td><td rowspan="2">Summer and Winter</td></tr>
<tr><td>12L</td><td>Rear axle</td></tr>
</table>

lubricating oil	2# Extreme Pressure Lithium Grease	6 kg	Working device pins, boom support and slide contact parts, hinge pins on the frame, drive shaft cross shafts and splines, engine fan and pump connections .	
antifreeze	-45# engine antifreeze	About 25L	Cooling system	

notes:

* The above is for reference only. Please select specific engine oil products according to the use and maintenance manuals of the engine, gearbox, and drive axle. In principle, replace low-grade oil tanks with higher-grade oil.

* In special cases, select oil according to local temperature and environment or consult the factory.

1. Do not use any ordinary motor oil.

2. It is forbidden to use oil obtained by friction.

3. The machine must be applied correctly so the oil can soak into the brakes and the limited oil can flow to different areas.

4. Don't use any common double-strength liquids.

5. The capacity of the oil tank is limited, and the total capacity of the hydraulic system is determined by the equipment used. Keep all cylinders filled with oil and observe the oil level when refueling.

6. It is recommended to use special grease. When using special grease, the total operating time is 50 hours, and the machine must be lubricated every 10 hours. The total operating time is 500 hours, and the machine must be lubricated every 50 hours.

7. Includes additives for optimal performance.

3.4.2 Applicable air temperature for different oil grades

Table 3-3

type	Oil grade	Applicable temperatureAir ('C)	notes
	10# Light diesel	≥ 12	

fuel	5# Light diesel	≥ 8	GB2 52
	0# Light diesel	≥4	
	-10# light diesel	≥ -5	
	-20# light diesel	≥ -14	
	-35# light diesel	≥ -29	
Engine Oil	Viscosity grade 15W/40 heavy diesel	-20~+40	GB11122
	Viscosity grade 10W/40 heavy duty diesel	-25~+40	
	Viscosity grade 5W/40 heavy duty diesel	-30~+40	
	Viscosity grade 10W/30 heavy duty diesel	-25~+30	
	Viscosity grade 5W/30 heavy duty diesel	-30~+30	

3.4.3 Coolant mixture

Check the coolant concentration at least once a year before the weather turns cold.

Replace the coolant at intervals according to the machine maintenance instructions

Warning	Antifreeze can cause personal injury, follow the manufacturer's instructions when changing coolant.

Dilute the antifreeze before operation, use fresh water with a pH value not greater than 8.5, if not available, use ionized water. For more information on water hardness, please contact your local water supplier

The right antifreeze will prevent your engine from freezing in the winter and provide year-round corrosion protection. Renew your antifreeze every two years. Even when antifreeze is not needed, you must use 50% antifreeze. This provides corrosion protection and raises the coolant's temperature to boiling point.

It should be noted that failure to use a corrosion inhibitor may cause serious damage to the cooling system.

3.5 Cleaning the Machine

3.5.1 Introduction

Use water or steam to clean the machine, do not allow dirt, debris, etc. to loom. Before cleaning, remove the following parts:

1. When the equipment is dislocated, it must be cleaned as the main work, or an operation, to clean the engine and the entire machine, and the surrounding fuel system must also be cleaned.

2. After cleaning is completed, the machine is away from the cleaning area, flushing or things removed from the machine.

IMPORTANT: When components are removed, they are exposed to dirt and debris. Cover all openings before continuing cleaning and remove any dirt.

Detergent

Avoid using highly concentrated detergents - always dilute detergent according to the manufacturer's recommendations, otherwise it can cause paint damage.

Refers to disposing of dirt on the machine in accordance with local regulations.

Antifreeze can cause personal injury; follow the manufacturer's instructions when handling antifreeze.

Caution	Do not use water or steam cleaning inside the cab. Water or steam can damage the plug-in unit computer, rendering the loom inoperable. Use a brush or damp cloth to remove dust.

Caution	The engine and components can be damaged by a high pressure cleaning system, so special precautions must be taken if the engine is to be cleaned with a high pressure cleaning system. Make sure the alternator, starter motor, and all electrical components are shielded and do not clean them directly with a high pressure cleaning system.

Pressure Washing and Steam Cleaning

IMPORTANT: Do not aim the spray gun at bearings, oil pads and electrical components related to power, such as the engine control unit, alternator and injectors.

Using a low-pressure water gun, use a foam brush to remove caked-on dirt and grime.

Note: The machine needs to be relubricated after each pressure cleaning or steam cleaning.

3.5.2 Before cleaning

1. Park the machine on solid, flat ground, apply the handbrake, set the drive in the space, lower the equipment to

the ground, and stop the engine.

IMPORTANT: Stop the engine and wait at least one hour for the engine to cool. Do not attempt to clean engine components while the engine is running.

2. Make sure all electrical systems are disconnected.

3. Make sure all electrical connections are properly connected.

3.5.3. Washing machine

Warning	To avoid burns, wear protective gloves when handling hot weather. To protect your eyes, wear goggles when using a wire brush to clean components.

Warning	Combustible particles suspended in the air that could cause a fire, such as grass, wood chips, etc., must not be allowed to accumulate on engine parts or support shaft guards. Check this area frequently and clean it at the end of each work shift, or more frequently if necessary. When the hood is opened, keep the top free of debris.

Special attention should be paid to:

Do not clean engine parts while the engine is running. Stop the engine and wait at least one hour for the engine to cool down.

1. Disconnect the battery.

2. Do not clean directly on the fuel injector nozzle.

3. Do not clean any of the following components:

a. Fuel injection pump.

b.Cold start device.

c. Electric closing solenoid valve

d.Electrical connector

e. Make sure the alternator, starter motor and all electrical components are protected rather than being cleaned directly with a high-pressure cleaning system.

3.6 Check for damage

1. Check whether the steel structure is damaged and note whether the paint is damaged for the next maintenance.

2. Check that all pins are in the correct position and that they are securely fastened to the positioning elements.

3. Make sure all parts and digging hands are not broken and are firm and reliable.

4. Check for broken windows and cracked glass.
5. Check the damage and safety of the shovel teeth.
6. Check whether the indicator light is damaged.
7. Check the tire for damage and any sharp objects that could cause punctures.
8. Check that the safety signs are in the correct position and are not damaged.

3.7 Lubrication points and circulation

In order to ensure the high efficiency of the machine's work, the machine must be lubricated regularly. Regular lubrication can extend the working life of the loom.

The machine must be lubricated after pressure washing and steam cleaning.

Warning	You need to be close to the machine to perform these tasks. Minimize arm movement, pull out the starter key, and disconnect the battery. This prevents the engine from starting unexpectedly. Make sure the parking brake is engaged. If it is necessary to get under the machine, stop all four wheels first.

Warning	Arm safety bar A raised arm may fall suddenly and cause serious injury. Before working under a raised arm, properly install the lift arm safety bar. Refer to the Maintenance section Arm Safety Bar.

It must be done with an injection gun. A two-stroke injection gun is generally effective. When new grease overflows from the joint, lubrication should be stopped.

Each lubrication point is numbered in the diagram below. Report each number as you lubricate. Re-secure the dust cover after lubrication is complete.

Caution	Some optional tools may require more frequent lubrication. See Optional Tool Options.

When using special grease, it is necessary to lubricate it every 10 hours and run for 50 hours.

When using special grease, it is necessary to lubricate it every 50 hours and run for 500 hours.

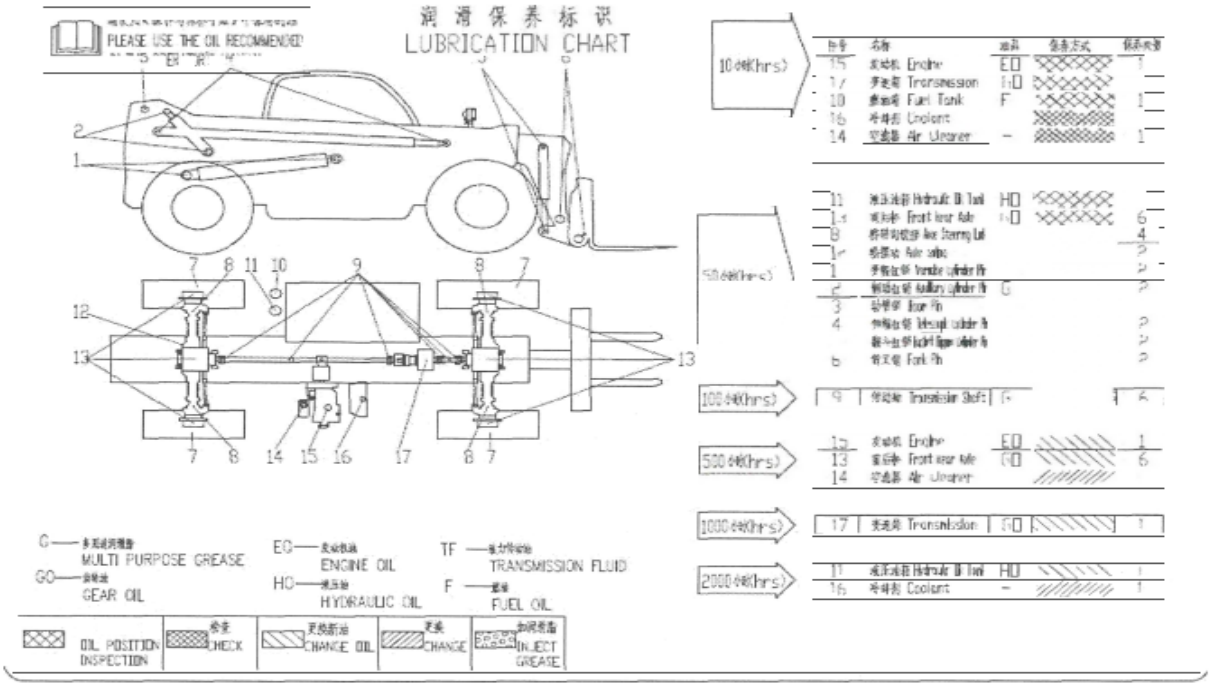


Figure 3-7

3.8 Check and add oil

3.8.1 Notes on Oil

- Be careful of fire as fuel, lubricating oil, hydraulic oil and antifreeze can be ignited by open flames.
- No fire is allowed in oil areas.
- Places where fuel, lubricating oil, hydraulic oil and antifreeze are added or stored should be well ventilated.
- Caps of containers containing all fuel oil, lubricating oil, hydraulic oil and antifreeze solutions must be tightened.
- Fuel, torque converter oil, hydraulic oil and various lubricants must be pure and meet the specified quality requirements.
- Refueling tools, containers and refueling holes should be wiped to prevent water contaminants from entering the oil.
- When adding fuel or lubricating oil, the engine should be stopped.
- Spilled fuel, lubricating oil, hydraulic oil and antifreeze should be wiped up immediately.
- Oils of different viscosities should be sampled at different ambient temperatures; please use the oil strictly in accordance with the above oil trademarks.

• When replacing parts, liquids should be packaged in appropriate containers, such as coolant, engine oil, transmission oil and filters.

• Wastewater treatment should comply with local environmental protection laws and regulations.

• Check for oil leaks after refueling and changing the engine oil.

• Unless otherwise specified, when checking the oil level and changing the oil, the machine should be parked on level ground; the bucket should be placed flat on the FIOOR and the engine should be stopped.

• The oil may be at high temperatures; therefore, operators should wear protective equipment and exercise caution when draining debris and changing oil to protect the operator from injury.

3.8.2 Hydraulic oil

3.8.2.1 Change engine oil

• Clean materials from work equipment.

• Retract all working equipment and shut off the engine.

• Unscrew the drain plug at the bottom of the oil tank and drain the waste oil.

• Add 100L of hydraulic oil through the oiling filter.

• Start the engine and operate at idle speed , and slowly perform the following operations: boom lift – boom retract – second boom extend – second boom retract, then turn and shut down the engine.

• Unscrew the drain plug at the bottom of the oil tank and drain the waste oil.

• Add 100L of hydraulic oil through the oil filler filter until the oil pointer reaches the center

• Start the engine and operate at idle speed , and slowly perform the following operations 2 and 3 times: boom lift - boom retract - secondary boom extend - secondary boom retract. Then, keep the engine at idle speed for 5 minutes to discharge the air in the system.

• Put the bucket flat on the floor and turn off the engine; and check the hydraulic oil level and refill the oil to the specified position again.

Notice	When replacing the hydraulic oil, the machine should be operated in accordance with relevant safety regulations; and pay attention to safety. In addition, the hydraulic oil cannot be filled by disassembling the breather.

3.8.2.3 Cleaning up debris

• Check and drain the accumulated water and sediment at the bottom of the oil tank every 100 hours; and when

the whole machine is stopped for 2 hours, drain the accumulated water and sediment from the drain plug at the bottom.

3.9 Fuel supply system

3.9.1 Fuel supply system

3.9.1.1 Low-pressure fuel pipeline

The fuel comes from the fuel tank 1 and enters the diesel filter 5 through the diesel pump 3. After filtering, the fuel enters the fuel pump 7 through the injection pump, of which a small part enters the high-pressure fuel pipeline, that is, the high-pressure fuel pipeline -injector-cylinder for combustion, and the remaining part enters the cylinder oil chamber through the fuel pump to form a low-pressure fuel pipeline with a pressure of 5pa.

The stability of the pressure in the low-pressure fuel line is crucial to the power output of the engine. In the case of insufficient engine power, first measure the pressure of the low-pressure fuel line controlled by the pressure control valve 10. The leakage or cavitation of the injector is mainly due to the low-pressure fuel line. Therefore, ensure timely replacement and cleaning of the diesel filter.

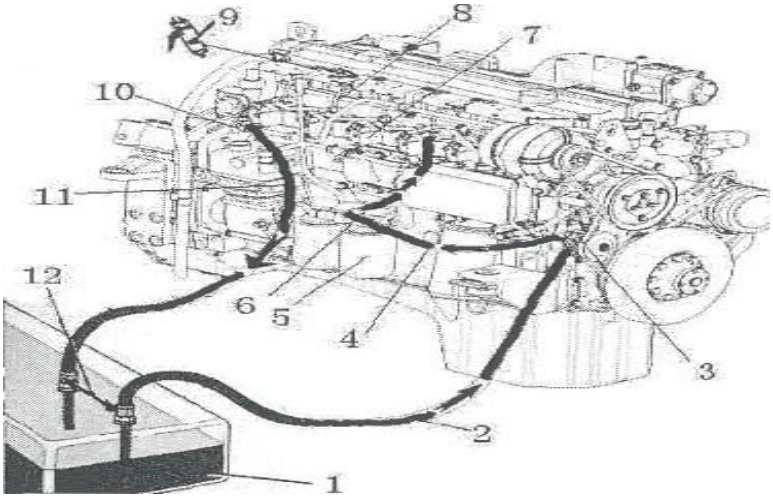


Figure 3- 8 Fuel supply system

1 Fuel tank 2 Fuel pipe (connected to the oil circuit and the oil pump) 3 Fuel delivery pump 4 Fuel pipe (connected to the diesel filter)

5Diesel filter 6Oil pipe (connected to injection pump) 7Fuel injection pump 8Oil circuit (connected to injector)

9 Injection nozzle 10 Oil return pipe of pressure control valve 11 Oil return line in oil cabinet 12 Maximum distance

3.9.1.2 High-pressure fuel pipeline

The fuel in the low-pressure oil chamber reaches the injector from the injection pump 7 through the short high-pressure pipe 8. When the pressure reaches 220Bar, the injector 9 opens and injects the fuel into the combustion chamber.

3.9.1.3 Fuel circuit

Since the fuel supply of the oil pump is 10 times the fuel output of the injection pump, a large amount of excess fuel flows back to the diesel tank through the pressure control valve return pipe 10 and the return pipe 11. A small amount of diesel leaking from the injector gap also returns to the diesel tank through the return pipe, thereby cooling the combustion. In addition, a large amount of reflux fuel is used to completely exhaust the air from the oil pipe, which has an automatic exhaust function.

3.9.2 Diesel refueling

Select diesel for summer and winter use according to the atmospheric temperature. If necessary, install a diesel coarse filter.

Caution	Do not add diesel while the engine is running. When refueling, use a funnel to prevent diesel from splashing outside.

Diesel fuel quality

Use diesel fuel with sulfur content below 0.5%. If the sulfur content is higher, please shorten the oil change interval. The approved diesel fuel specifications are as follows:

- GB/T19147 Diesel fuel for vehicles
- DINA590
- BS2569 (1988): A1 and A2
- ASTM D975-88: ID and 2-D

Emission standards set by regulatory agencies are based on r

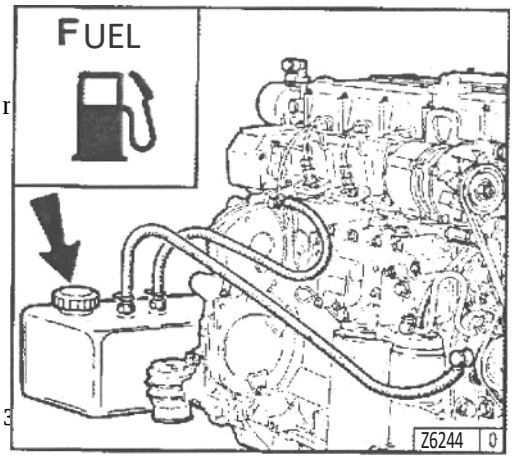


Figure 3

Winter Diesel

When the temperature is low, wax will separate out, causing problems such as clogging, malfunctions, etc. in the diesel system. When the temperature is below 0'C, use winter diesel. Ordinary gas stations supply diesel before the arrival of winter (temperature below -20°C). When the temperature is below -20°C, add kerosene to diesel. See the figure below for the mixing method. When the temperature is below -44°C, use special diesel such as summer diesel. If used below 0'C, add up to 60% kerosene. In most cases, the fluidity of diesel fuel can be increased by adding fluidity enhancing fuels.

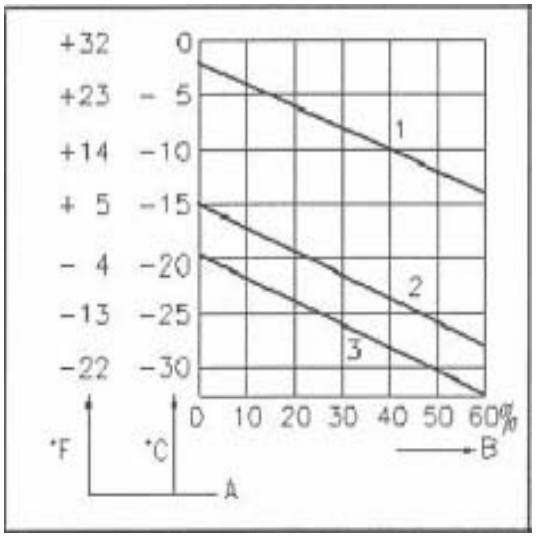


Figure 3-10

Diagram: 1 Summer diesel, 2 Winter diesel, 3 Super diesel fuel, An External ambient temperature B Kerosene immersion ratio

Caution	Add kerosene first, then diesel, diesel can only be mixed in the pipe

Caution	It is strictly forbidden to mix gasoline (standard or premium) with diesel.

3.8.2.1 Check the oil level

If the dashboard LED display is equipped with a fuel gauge, turn on the power key switch.

The fuel pointer should remain at

Figure 3-11 Fuel gauge on the fuel table

3.8.2.2 Discharge of debris

- Drain water and debris accumulated in the oil tank from the oil drain at the bottom.
- Remove the filler cap of the diesel tank, remove and clean the filter element.

3.9.3 Maintenance and care of the fuel system

1. Clean and replace the single-stage diesel filter
2 Single-stage diesel filter drain and exhaust
3. Replace the diesel filter

Caution	When working behind diesel equipment, open flames and smoking are prohibited. Dispose of waste oil properly!

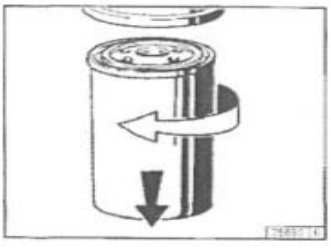
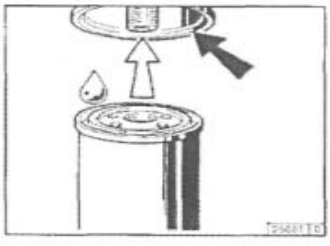
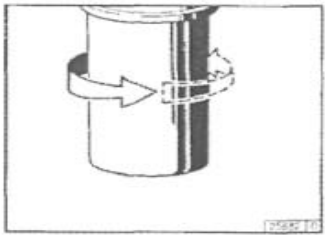




Figure 3-12

• Tighten the diesel filter • Clean the filter base seal • Finally tighten it halfway

• Remove the filter element with a suitable tool • Rubber seal surface of the new oil filter element • Loosen the fuel line

• Use a container to hold the leaked fuel and apply a small amount of engine oil or diesel. • Check for leaks. (Diesel fuel system

Diesel • Tighten the filter element by hand until it engages with the gasket and no air is discharged)

Warning: Smoking and lighting a fire are strictly prohibited! (When replacing the diesel filter, do not put unfiltered

Add diesel to the new diesel filter to prevent diesel from

Dirt in the oil blocks the nozzle)

Warning	Do not allow dirt to enter the fuel system. Before removing the connections of any part of the fuel system, clean the connections thoroughly. If parts are removed, such as fuel pipes, always use protective caps and plugs to prevent dirt from entering. Failure to follow these instructions will allow dirt to enter the fuel system. Dirt in the fuel system can severely damage the fuel injection equipment and lead to huge repair costs.

3.10 Lubrication system

3.10.1 Lubricant quality

3.10.1.1 Classification

Lubricating oils are classified according to performance and quality grades. Generally, API classification grades or ACEA classification grades or GB11122 diesel engine oils are used. According to API engine oil standards: Supercharged engines: CF-4, CG-4, CH-4, C1-4
According to ACEA engine oil standards: Turbocharged engines: E2-96, E3-96, E4-99

3.10.1.2 Viscosity

The viscosity of the lubricating oil depends on the temperature, so the SAE grade should be selected according to the local ambient temperature where the engine is used. If the oil viscosity table on the lower side is used as the selection standard, the engine will be in the best working condition.
If the ambient temperature temporarily drops below the lower temperature limit of the selected SAE grade lubricant, it may affect the cold start of the engine, but will not cause engine damage.
To minimize wear, do not operate the engine outside the application range for extended periods of time.
Multi-grade lubricants can be used to change engine lubricants as the seasons change. Using multi-grade lubricants, especially low-friction lubricants, can also reduce fuel consumption.

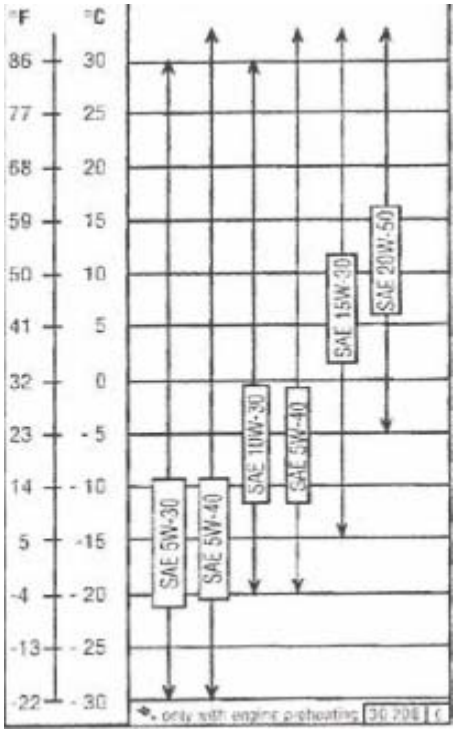


Figure 3-13

3.10.2 Maintenance and care of lubrication system

3.10.2.1 Replacement period

Table 3-4

Oil change cycle	Service Level	Average speed [km / h]	Working hours	Running mileage
Equipment engine	—	—	200	
Vehicle engine	1	25	—	5000
	2	40	—	10000
	3	60	—	15000

Note: When used domestically, the oil change interval should be shortened by half if the operating environment is harsh, the engine oil is dirty, or the oil quality does not meet diesel standards.

If the user fails to change the engine oil according to the manufacturer's regulations, the manufacturer will not be responsible for the warranty!

- First, change the engine oil after 40 working hours or 2000km.
- The oil change interval depends on the usage and quality of the oil.
- Change the engine oil at least once a year if the engine is operated for less than the color listed in the table
- The prerequisites for this table are:

----Diesel sulfur content is less than 0.5%

----If the minimum temperature is -10'C and the sulfur content is between 0.5% and 1%, the oil change interval will be reduced by half.

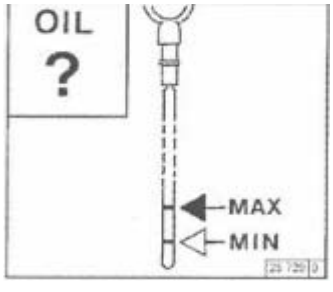
- If the sulfur content is greater than 1%, consult the service department.

Note: When changing the oil, the engine is off! Heat up the engine (oil temperature 80'C)

3.10.2.2 Oil change

a. Check the oil level

- Place the engine and vehicle in a level position.
- Heating the engine
- After 5 minutes stop the engine and check the oil level
- Cool the engine and check the oil level
- Remove the oil gauge
- Remove oil with a lint-free cloth.



- Put the oil gauge in its original place (last) and remove it. **Figure 3-14**
- Check the oil level and, if necessary, add oil to the "Maximum"
- If the oil level is only at "minimum", you must add oil.

Caution	Check the oil level before operation or approximately 15 minutes after the engine has been switched off. The oil level must not fall below the "MIN" mark.

b. Change the engine oil

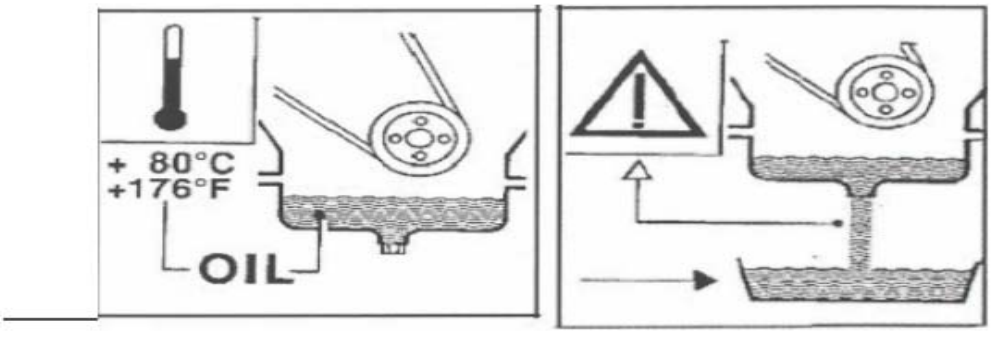


Figure 3-15

- Place the engine and vehicle in a level position.
- Run the engine until the oil temperature reaches 80℃
- Stop the engine
- Place the oil pan under the engine
- Add new oil, oil grade and viscosity.
- Drain the oil
- Replace the drain plug with the added gasket and screw.

3.10.2.3 Replace the oil filter (this step is the same as replacing the diesel filter)

3.11 Cooling System

3.11.1 Function of cooling system

When the engine is running, the parts heat up greatly due to the combustion of fuel and the friction between moving parts. In particular, the temperature of the parts that are in direct contact with the combustion gas is very high. Without proper cooling, the engine will not work properly. The role of the cooling system is to keep the engine working at the most suitable temperature.

The 2012 series engine is a water-cooled engine without cylinder jackets. Water is a heat transfer medium that is then transferred to the air. In other words, a small amount of water is used for continuous recycling to absorb excess heat in the engine water jacket, and then flows to the radiator to disperse the heat. Due to the small temperature difference between the inlet and outlet of the water jacket, the lower part of the cylinder will not be too cold, and the cooling water intensity can be easily adjusted to maintain the normal temperature of the

engine. In addition, hot water can also be used to preheat the engine to facilitate winter starting.

3.11.2 Consequences of engine overcooling or overheating

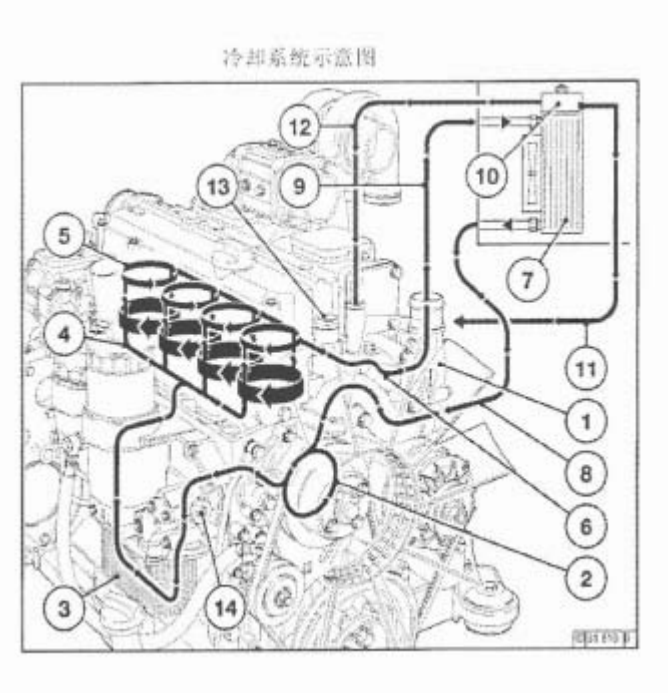
3.11.2.1 Engine overheating

- Reduced charging efficiency, resulting in reduced motor power;
- The increase in the tendency of pre-ignition and detonation disrupts the normal operation of the engine and also subjects the parts to additional shocks, leading to early damage;
- The normal clearance between moving parts is destroyed, causing the parts to be unable to move normally or even damaged;
- Degradation of the mechanical properties of metal materials, resulting in deformation and damage of parts;
- The deterioration of lubrication conditions intensifies the friction and wear of parts and the cooling of the engine. Therefore, it is not enough to rely solely on the parts themselves to dissipate heat. To ensure the normal operation of the engine, it is necessary to force cooling of certain parts, especially those in direct contact with high-temperature gases. However, excessive cooling can also lead to adverse consequences.

3.12.2.2 Engine overcooling

- The combustible mixture (or air) entering the cylinder is too low, causing difficult ignition or slow combustion, resulting in reduced engine power and increased fuel consumption.
- Increased viscosity of lubricating oil leads to poor lubrication, increased wear of parts and increased power consumption;
- The water vapor in the combustion products easily condenses into water and acidic gases to form acidic products, which aggravates the erosion of parts, especially the cylinder wall.
- Erosion of the oil film on the friction surfaces (cylinder walls, pistons, piston rings, etc.) increases the wear of parts and the dilution and low temperature of the lubricating oil caused by the non-vaporization of fuel.

3.11.3 Cooling system diagram



1 Main body
2 Cooling pump
3 Lubricating oil cooler
4 Cylinder cooling
5 Cylinder head cooling
6 Pipe from engine to radiator
7 Radiator
8 Pipe from radiator to engine
9 Air pipe from cylinder head to expansion tank
10 Expansion tank
11 Pipe from radiator to mast cap
12 Coolant compensation pipe
13 Coolant return from heater
14 Coolant supplied to heater

3.11.4 Cooling system maintenance and care

3.11.4.1 Cleaning interval

- The amount of impurities in the cooling system depends on the purpose of the engine;
- Oil or diesel residues increase the risk of impurities forming in the engine. Therefore, be careful when the engine is used in dusty areas;
- For example, situations where a large amount of impurities are likely to form
- A lot of dust on the construction site
- There is a lot of grain and straw around agricultural machinery
- The cleaning interval is determined according to different usage conditions. The following table applies to
- For reference only.

Table 3-8

Inspection and cleaning intervals	
Recommended working hours	Conditions of Use
2000	Generator sets, pumps for ships and enclosed spaces

1000	Road-capable vehicles
500	Forklifts, mobile generators
250	Underground mines used in vehicles, construction machinery, compressors, and construction sites
125	Agricultural machinery and harvesters

3.11.4.2 Cooling system cleaning

- Place a wash basin under the radiator2.
- Remove the radiator cap (see picture).
- Blow out the radiator with compressed air (first blow 3 times, t

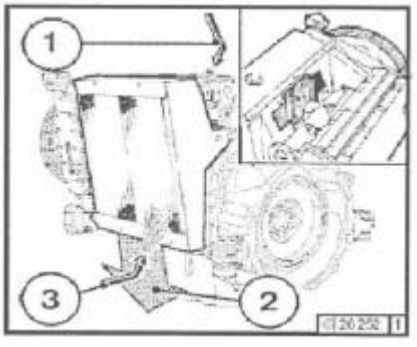


Figure 3-17

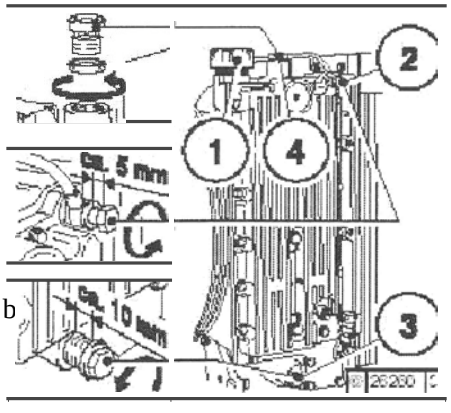
Note: Do not glue the radiator fins!

- Flush the soil with water.
- Spray the cleaner on the radiator and leave it on for 10 minutes
- Rinse with high pressure water, starting with step 3 and then m

Note: Do not flush the generator, cables and electrical components directly!

- Install the radiator cap in place
- Allow the engine to return to normal temperature to allow any remaining water to evaporate.
- The maximum cleaning water pressure is 100 bar.

3.11.7.3 Drainage, filling and exhaust of cooling system



- Put the container into the drain switch3.
- Unscrew the cap 1
- Unscrew the drain switch 3
- Release coolant
- Screw the drain switch 3 onto the fist groove (as shown b
- Loosen screw plug 2
- Loosen the vent screw 4
- Add coolant (if heated, valve must be opened) **Figure 3-18**
- Tighten screw plug 2 (tightening torque 18N.m)
- Tighten the exhaust screw 4 (tightening torque 40N.m)
- Put cover 1 in place
- Check the coolant level after the first run of the cold engine

CAUTION: Use caution when releasing hot coolant

Warning	Do not open the radiator cap when the engine has just stopped or is running. If the hot coolant sprays, it is very dangerous. To open the radiator cap, cover it with a cloth first and open it slowly.
Warning	Do not use corrosive cleaners in the cooling system. Doing so can damage aluminum parts. Coolant is toxic, keep away from children or pets. If not in use, dispose of in accordance with local environmental regulations.

3.12 Care and maintenance of transmission belts

3.12.1 Check the V -ribbed belt

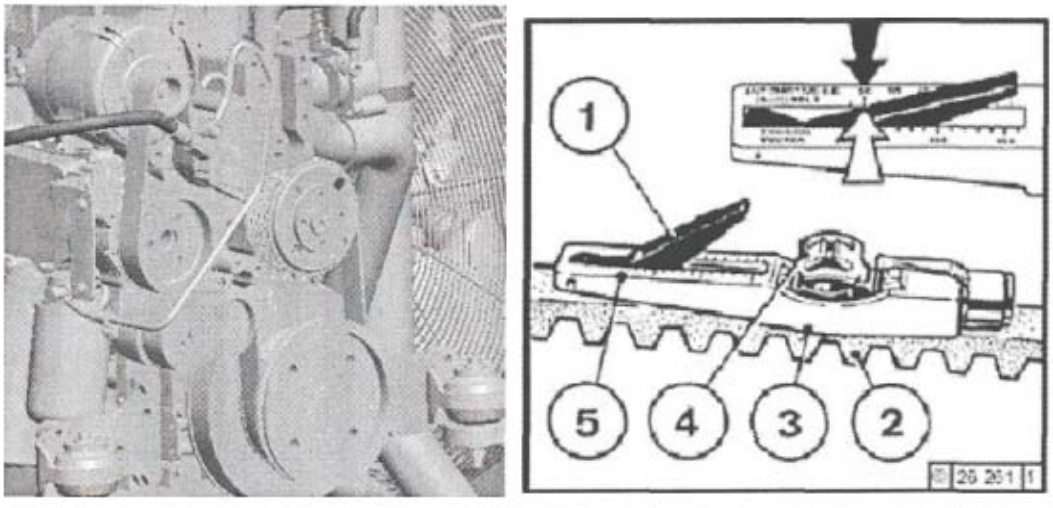


Figure 3-19

Check the entire belt for damage

- Replace damaged belts.
- After installing a new belt, run the engine for 15 minutes and then check the belt tension.
- Check belt tension with a belt tension gauge.

- Install indicator arm 1 into the instrument

- Place the gauge on belt 2 in the middle of the pulley and fix the gauge at the bottom of the gauge on the belt

- Slowly press the black flange 4 at the right angle until the spring locks

- Carefully remove the meter without changing the position of the indicator

——Read the accurate reading of the black indicator light arrn1

- Tighten the belt if necessary and re-measure

Note: The machine must be stopped when checking, tightening or replacing the belt!

3.12.2 Cooling water pump and oil pump belt

Tightening policy:

- Loosen the fastening bolts

- Insert an appropriate square hole wrench into the square hole on the oil pump connecting plate and push the oil pump to the correct tensioning position in the direction of the arrow.
- Tighten the fixing bolts.
- replace:
- Loosen the fastening bolts
- Push the oil pump in the opposite direction of the arrow and loosen the belt.
- Replace and tighten the belt (same operation as above)
- Tighten the fixing bolts.

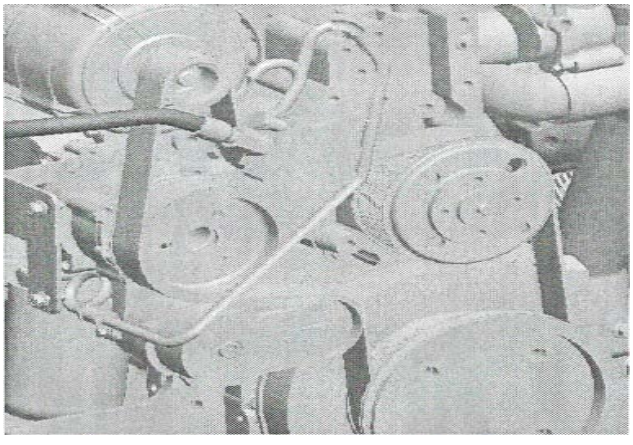


Figure 3-20

3.13 Inspection and maintenance of components

3.13.1 Electrical system

- Only qualified and professional technicians should repair the electrical system.
- When adjusting external power, connect the ground wire last to avoid sparks around the battery and causing an explosion.
- Adjust the starter key before servicing the electrical system.
- Before servicing the electrical system, remove the negative (-) terminal of the battery to prevent current flow. Figure 3-21)
- Circuits and fuses

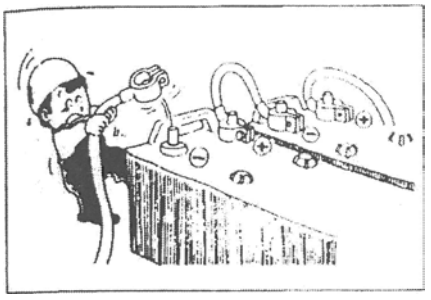


Figure 3-21

▢ Check if the circuit connectors are loose, check if the rubber insulation of the wires is damaged, and check if the fuses are firmly and tightly assembled. If any circuit fails, first check if the fuse of the circuit is burnt out. When replacing the fuse, make sure to find out the cause of the fuse burnout and further check for burnt bulbs and circuit damage.

▢The fuse is located in the cab. When replacing, please pay attention to the capacity (amperes) on the fuse tube and clip.

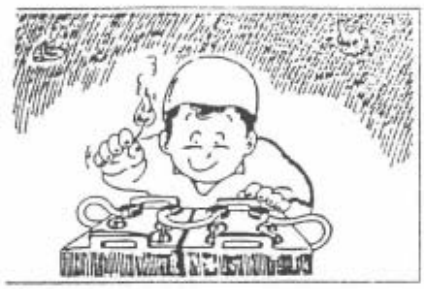
- Lighting and instruments

▢ Check that all light switches are working properly. Thoroughly clean the dirt on the lights.

▢Press the horn button to check whether the horn sounds normally.

The pointer of the instrument should be within the green area in normal state.

3.13.2 Battery Maintenance



- The battery is maintenance free.
- Before working on the battery, remember to stop the engine
- Never place a lit cigarette or flame near the battery. (Figure 3-22) **Figure 3-22**
- Open the battery compartment and inspect the battery surface. Make sure there is no electrolyte leakage, no cracks, no signs of impact and no contamination.
- Check the working status of the battery (there is an indicator light on the battery):

-Green: Indicates that the battery has sufficient power and can be used normally.

-Black: Indicates that the battery needs to be charged.

- White: Indicates that the battery must be discarded as trash and replaced.

- Clean the battery compartment and battery surface.
- Clean the battery terminals.
- Check the tightness of the battery.
- Avoid contact with metal rods (e.g. tools) which may short-circuit the positive (+) and negative (-) terminals of the battery.
- When installing the battery, secure the positive terminal (+) first; when removing the battery, disconnect the negative terminal (-) first.
- When cleaning the top surface of the battery, wipe it with a piece of cloth. Never use petroleum and other organic solvents and cleaning solvents.
- Tighten the top cover of the battery.

3.13.3 Charging

- When charging the battery, there is a risk of battery explosion if the battery is not handled properly. Therefore, the procedure for charging the battery should comply with the required process and instructions and observe the following points.
- Battery charging should be done in a well-ventilated area. Remove its top cover to prevent hydrogen gas from scattering and exploding.
- Set the charging voltage according to the voltage required by the battery to be charged. If the charging voltage

is set incorrectly, it will cause the charger to overheat or catch fire, and may also explode.

- Clamp the positive (+) terminal of the battery to the positive (+) terminal, and connect the negative terminal (-) to the negative (-) terminal. And strengthen their connection.
- If the charge ratio is less than 1/10, fast charging must be performed and set within the rated capacity of the battery. If the charging current is too large, it may cause electrolyte leakage or evaporation, which may cause fire or explosion.

3.13.4 Drive unit

- Disassemble the torque converter, transmission, drive axle main drive, and wheel reducer for inspection after the machine has worked for 2000 hours. During the cleaning process, check whether there is any abnormal "splashing" or "squeaking" sound in the drive system.
- Drive shaft

▢ Check whether the mounting bolts of the connector are loose, check the vibration state of the shaft end, and check whether the spline part is loose.

▢During the disassembly and assembly of the drive shaft, pay attention to the relative position of the universal joints at both ends and ensure that the arrows are aligned during assembly.

- wheel

▢ Check the tire inflation pressure and the wear state of the tire surface. Look for any metal parts embedded in the tire. Check the mounting nuts on the rim. The inspection should be done when the machine is cool. Generally, when the machine is operating on sand, the tire inflation pressure should be a little lower than that of the machine operating on hard ground.

After 2000 hours, check the welds on the rims and inspect the loaded parts. Correct any deformation of the housing that may have occurred.

3.13.5 Tire maintenance

- If a tire explodes, the explosion itself will throw the wheel hub, tire, drive axle and other parts 500m or bait away from the machine. The explosion and its parts will cause server damage and health harm, so the tire pressure must be kept within the normal pressure range. Never inflate the tire outside the rated pressure range.
- High-speed driving will cause the tire pressure to rise to a certain extent, which is normal. Please do not try to reduce the tire pressure. What you should do is to reduce the speed of the machine or stop the machine to let the tire

cool down. However, if the machine continues to move at a very high speed, it will cause the tire to overheat and cause the tire to explode, so pay attention.

Caution	Check if the lock ring is disengaged

- Stay as far away from the tire as possible when adjusting tire pressure. You should always stand behind the tire.
- It is forbidden to inflate tires with flammable gases. It is recommended to use dry nitrogen. If the tire is already filled with air, you can also use nitrogen for pressure adjustment, and nitrogen can be fully mixed with air. Inflating tires with nitrogen can reduce the risk of tire explosion, because nitrogen does not contribute to combustion, but it can prevent rubber oxidation and deterioration, and avoid rust on the wheel hub.
- To avoid overinflation of tires, it is necessary to have the proper tools to inflate tires with nitrogen and to receive training on how to use these tools.
- Check tires and wheels. Do not operate when tire pressure is very low. Also check for cracks or deformations in the tires.
- Check the mounting screws and bolts on the wheel to see if they are securely fastened as per the manufacturer’s requirements.
- When inspecting the wheels, do not touch the front and rear steering wheels. Such inspections should be done from the side of the wheels. When you need to remove one of the wheels, the other wheels should be chocked.

3.13.6 Working device

- After 2000 hours, the natural settlement of the working mechanism should be checked.

When the machine bucket is empty, lift the active arm to the maximum limit. Then stop the engine and make sure that the lowering length of the lifting cylinder should not exceed 15 mm within 15 minutes. If the lowering volume is too large (more than 15mm), check the distribution value and the sealing performance of the lifting cylinder, and measure the system working pressure.

3.13.7 Braking system

- Brake pedal:

The performance of the brake pedal can only be checked when the machine is moving. And find out whether the braking performance only acts on one side.

• Parking brake: Engage the parking brake and check whether it is in the braking state. If the braking performance is poor or abnormal, find out the cause and eliminate it. The friction lining and brake drum must be checked.

3.13.8 Air conditioning

Only a professional technician can repair the air conditioner.

• If you need to inspect and repair any part on the machine, you need to park the machine on level ground with the transmission lever in neutral, the brake system engaged, and keep unnecessary personnel away from the repair site or work area.

• Contact with the freezer may cause injury, so wear goggles and other safety gear to protect your eyes and skin from exposed coolant. Use extreme caution when touching any machine part, especially hot parts or any moving parts.

• The A/C system is always under pressure, whether the engine is running or not, so never attempt to heat the coolant system. If you need to empty the A/C system, wear protective goggles, even if the pressure gauge reads zero. Even with protection, be careful when removing A/C components.

• Smoking, lighting fires and starting fires are strictly prohibited at the air conditioner maintenance site, because the coolant in the air conditioner is approaching the heat source, so inhaling this toxic air can cause serious casualties or even death.

• The air conditioner can be started only after the machine engine is started. After the engine is completely stopped, turn off the air conditioner power to save machine power.

• To operate the air conditioning system smoothly, it is highly recommended to use the “High” setting to obtain the cooling performance.

• If the air conditioner is not used for a long time in spring, autumn or winter, it must be run for 5 minutes at least every two weeks to prevent the air conditioner components from being disturbed due to long-term non-operation.

• If you need to change the coolant in your air conditioner, select and use the appropriate coolant specified in your air conditioner manual. Never try to mix two different coolants on your air conditioner.

• When using air conditioning, keep the cab doors and windows closed.

• When using the air conditioner, try not to always keep the temperature at maximum cooling application, that is, the fan blowing at low speed, otherwise it will cause frost on the evaporator.

- In summer, place the machine in a cool place to avoid direct sunlight.
- Before running the air conditioner for heating, you should first let the engine run for a while.

Only after the engine water rises to 80℃, can the hot water valve be opened and the air conditioning blower be turned on. If the ambient temperature is below 0℃, drain the water in the hose and radiator to prevent the water from freezing, but water with antifreeze in the water is an exception.

maintenance

- Adequate and regular maintenance of the air conditioner is essential to keep it sound, reliable and extend its service life. Therefore, regular maintenance of the air conditioner is very necessary and essential. (See Table 3-9 for details)

Table 3-9

Maintenance Project		Inspection method	Maintenance intervals				
			every day	weekly	per month	Quarterly	each year
Cooling system	Coolant status	Check flow through sight glass.		△			
	pipeline	Inspect the hose for any cracks or signs of damage .				△	
		Check each fitting for leaks.				△	
		Inspect each clip for looseness or damage.			△		
compressor	Cooling oil	use correct brand of oil as stated in the manual) .					△
	belt	Check belt for tension and wear.			△		
	Compressor bracket	Check whether the bracket is secure.			△		

Condenser	Condenser core	Check if it is clean and good.		△			
	Front condenser	Check the front for any foreign objects.				△	
	Condenser bracket	Check if the bracket is loose.		△			
Evaporator	Evaporator bracket	Check if it is damaged or not.			△		
	Circulation inlet air	Check if ventilation is OK.			△		
	Blowing motor	Check whether the motor can work normally.					△
Electrical System	coupling	Check if the coupler is OK or not.				△	
	Electric clutch	Check if it works Appropriately.			△		
	switch	Check if it works Appropriately.			△		

3.13. Others

• After 2000 hours of operation, the entire machine must be visually inspected. Pay attention to damage, deformation, cracks, weld peeling and other defects that may prevent normal operation, especially working equipment and wheels.

• After 2000 hours, check the tightness of each screw and nut on the machine. Tighten them if necessary. Pay special attention to the rim nuts and screws on the suspension parts.

• Check each hose connection, seals of the engine, radiator and transmission system for oil or water leaks. If the leak is difficult to find, stop the engine and clean the parts to be checked, then restart the engine.

3.14 Troubling Incident

3.14.1 Power System

Table 3-10

Fault symptoms	reason	Remedies
After the diesel engine is started, the water temperature indicator indicates that it is higher than the normal working range.	1. The engine piston ring is damaged or stuck 2. Insufficient heat dissipation from the radiator 3. Coolant level is too low 4. The engine water jacket is broken 5. Water temperature gauge failure	1. Replace the piston ring 2. Check and replace the thermostat 3. Check if there is any leak in the engine cooling system 4. Check and replace 5. Replace the water temperature gauge
Oil pressure is too low	1. Incorrect brand of engine oil 2. Engine oil leakage 3. The oil filter is clogged 4. Insufficient oil level 5. Excess Oil 6. Fuel gauge failure	1. Use the right brand 2. Repair the engine 3. Clean or replace 4. Add enough oil 5. Check the oil level and drain the oil 6. Replace the oil meter
Radiator pressure valve spraying steam	1. Insufficient cooling water or leakage 2. Scale and dirt in the cooling system 3. Temperature gauge and thermostat failure	1. Check and replenish cooling water 2. Cleaning and replacement 3. Replacement and repair
Engine will not start	1. Motor failure 2. Manual fuel pump failure 3. Air in a diesel system	1. Repair or replace the motor 2. Disassembly and cleaning 3. Expel the air

	4. Water in the diesel system 5. Diesel pipe is blocked or broken	4. Empty the diesel filter 5. Cleaning and replacement
Diesel engine exhaust is white or pure white	1. Excess oil in the oil pan 2. Substandard fuel	1. Reduce to specified oil volume 2. Change to the specified fuel
Diesel engine exhaust	1. Supercharger failure	1.Flushing booster
The gas is black	1. Advance injection timing 2 .Delayed injection timing 3 .Incorrect diesel brand 4 .Poor oil atomization 5 .Fuel increase 6 .Air filter clogged 7. Exhaust pipe is blocked	1 .Check and adjust 2 .Check and adjust 3 .Using the right diesel 4 .Check and adjust 5 .Check and adjust 6 .Clean the air filter 7 .Cleaning the exhaust pipe

3.14.2 Steering system

Table 3-11

Troublesome symptoms	reason	Remedies
Difficulty turning	1. Temperature is too low 2. Filter blockage 3. The pressure setting of the relief valve is low 4. Engagement of servo components 5. The hydraulic oil has high viscosity	1. Try to operate again after the oil temperature rises. 2. Clean or replace 3. Adjust the relief valve pressure 4. Check and replace 5. Replace with oil of recommended

		viscosity
The machine is turned to the maximum steering limit and the steering wheel can still be turned to the maximum	l. Steering cylinder is damaged 2. Servo damage	1. Replacement 2. Replacement
Turning left and right is slow.	1. Internal leakage of steering pump 2. Filter blockage	1. Repair or Replacement 2. Clean or replace
When the steering resistance is low, the steering is fine, but when the resistance increases from small to large, the steering becomes slow	1. The main oil circuit overflow valve is leaking 2. Steering system low pressure	1. Repair or Replacement 2. Adjustment
No turn	1. Overflow valve leakage 2. Priority valve is damaged 3. Two-way overload valve is damaged 4. The servo pin is broken	1. Repair or Replacement 2. Replacement 3. Repair or Replacement 4. Repair or Replacement
The machine can steer on its own even without any operation .	1. The servo valve gasket is stuck 2. The servo spring is broken	1. Remove foreign matter from the valve 2. Replacement
Steering pump is noisy, steering movement is slow, cylinder piston	1. There is air in the steering oil circuit. 2. The hydraulic oil level is insufficient. 3 .Steering cylinder internal leakage	1. Strengthen the sealing of the pump suction joint 2. Fill the specified volume 3. Replace the seal

Unable to change to 4-wheel steering or crab mode	1. Steering switch solenoid valve is stuck 2. Damage to the steering change solenoid valve 3. The toggle switch or circuit is damaged	1. Repair or Replacement 2. Replacement 3. Repair or Replacement

3.14.3 Working principle of hydraulic system

Table 3-12

Troublesome symptoms	reason	Remedies
Poor or no movement	1. The fuel tank seal is damaged 2. Internal leakage valve with multi-channel conversion 3. Oil leakage 4. Internal leakage of working pump 5. The safety valve setting pressure is low 6. The oil filter or oil suction pipe is blocked 7. The pilot oil source block is damaged	1. Replacement 2. Repair or Replacement 3. Find the leak and repair it 4. Repair or Replacement 5. Adjust to the specified value 6. Clean or replace 7. Follow Transformation
Fall of boom, telescopic arm and forks	1. Damage to the corresponding balancing valve	1. Replacement
noise	l. Low hydraulic oil level 2. Filter blockage 3. Oil pump air inlet or suction pipe	1. Fill to the specified value 2. Clean or replace 3. Find and remove the air
Shaking while working	1. Low hydraulic level 2. Internal leakage of working pump 3. Oil pump air inlet or suction pipe 4. The cylinder piston is loose 5. The opening pressure of the safety valve	1. Fill to the specified position 2. Repair or Replacement 3. Find and remove the air 4. Inspection and repair 5. Repair or Replacement

	is unstable 6. Internal leakage and damage of the working pump	6. Follow and switch
High oil temperature	1. Oil level is too low 2. Dirty or spoiled oil 3. Oil radiator failure 4. Long-term continuous operation or overload operation 5. Internal leakage of oil pump	1. Reach the specified position at most 2. Follow and replace 3. Clean or replace 4. Shutdown to reduce temperature or avoid overload 5. Check or replace
The fork bucket dumps slowly or does not move, and other operations are not allowed.	1. Control wheel is damaged 2. Line damage	1. Replacement 2. Replacement

3.14.4 System braking

Full hydraulic brake **table 3-13**

Troublesome symptoms	reason	Remedies
Insufficient foot brake pressure.	1. The brake valve stem is not in the correct position, the piston rod is stuck, the return spring is invalid or broken 2. Pipeline leaks, resulting in insufficient pressure	1. Repair or replace bake valve. 2. Re-adjust the pipeline
The brake cannot be disengaged.	1. The brake valve stem is in the wrong position, the piston rod is stuck or the return spring is faulty.	1. Repair or replace bake valve. 2. Replace the return spring.

	2. The return spring of the rim brake is not working.	
The handbrake is not powerful enough .	1. Drive axle parking brake spring failure 2. The brake valve leaks, causing the brake pressure oil to be unable to be fully released	1.Re-adjust or replace 2.Re-adjust or replace

4. Product Information

4.1 Purpose

4.1.1 Performance characteristics

This machine is a telescopic forklift with floating fork, four-wheel drive and integral frame as standard configuration. It is widely used in the construction of extensive projects such as airports, ports, docks, shipyards, bio-power plants, mines, farmland water conservancy, building construction, municipal construction, road maintenance, post and telecommunications. It can not only fork load or short-distance transport of bulk soil, sand, gravel, coal, garbag and other packaging materials, but also perform operations such as traction, stacking, stack transfer, etc., making it a multi-purpose and efficient engineering machinery.

The machine can also be equipped with other accessories to complete corresponding specific operations.

4.1.2 Requirements for the working environment

- Ambient temperature: -l0' --40'C
- Wind speed <5 m/s
- Altitude: <1500m

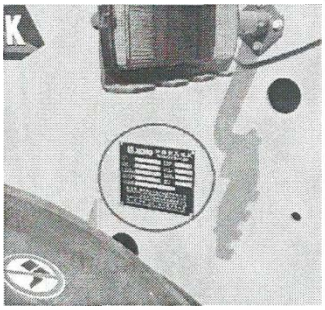
Note: This machine is a common engineering machine, so it cannot be used in flammable, explosive, high-dust or toxic environments.

4.2. Decals and numbers

4.2.1 Product nameplate

It is fixed on the right vertical plate of the front frame to indicate product model, main parameters, product identification number, manufacturing year and manufacturer information. Figure 4-1 and Figure 4-2)

For easy reference, please record the code following “Product Identification Number (PIN)” on this nameplate to the corresponding end point in the preface of this manual.



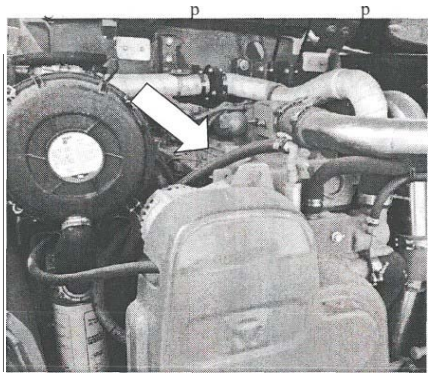


Figure 4-1 **Figure 4-2 Machine nameplate example****Figure 4-3**

4.2.2 Engine nameplate

The LT is fixed to the right side of the engine block to indicate information including engine parameters, emissions and manufacturer. Figure 4-3

4.2.3 Other famous brands

On each major component of the machine, information including product type, manufacturing number and manufacturer code is indicated on nameplates or stampings. 4.3 Machine Dimensions (Standard Configuration)

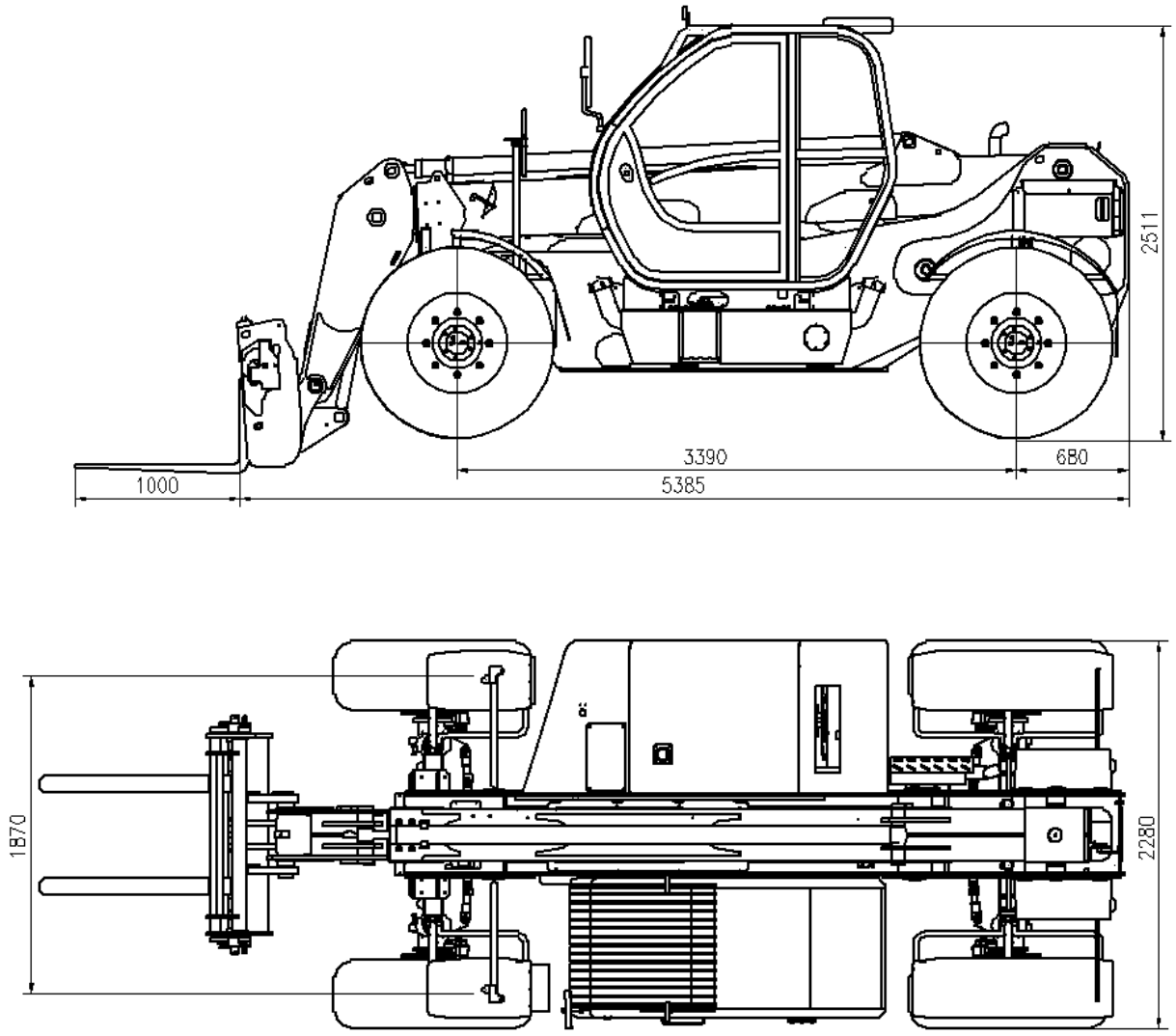


Figure 4-4 Schematic diagram of the overall dimensions of the machine under standard configuration

4.4 Main technical indicators (standard configuration)

4.4.1 Basic parameters

serial number	Parameter name	Parameter Value	notes
1	Rated load kg	3000	
2	Working weight kg	7800	
3	Overall length (basic arm is horizontal, with rear end	5385	

	to fork end) INM		
4	Overall width mm	2280	
5	Overall height (mm)	2511	
6	Wheelbase (mm)	3390	
7	Wheelbase (mm)	1870	
8	Minimum ground clearance mm	417	
9	Load center distance mm	500	
10	Maximum lifting height (to the upper plane of the fork) mm	69 60	
11	Maximum forward reach (horizontal arm, from Load center to tire front EISD) mm	3600	
12	Variable angle (°)	-3 ---- 6 3	11
13	Fork frame angle (horizontal) (°)	-90 --- 18	+1.5
15	Hydraulic system working pressure MPa	Processing equipment 24.4 Steering system 17.2	+1
16	Tire pressure MPa	Front wheel: 0.50 Rear wheel: 0.40	+0.02
17	Engine power/rated speed kW /rpm	75 /2200	