USER MANUAL GA 12 PRO MASTER

OPERATION & MAINTENANCE MANUAL

Original Instruction

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FOREWORD

This manual contains a number of instructions and safety recommendations regarding driving,handling, lubrication, maintenance, inspection and adjustment of the excavator.

The manual is to promote safety maintenance and enhance machine performance.

Keep this manual handy and have all personnel read it periodically.

If you sell the machine, be sure to give this manual to the new owners.

This machine complies with EC directive "2006/42/EEC".

1. Read and understand this manual before operating the machine.

This operator's manual may contain attachments and optional equipment that are not available in your area. Please consult your local LeKing distributor for those items you require.

Improper operation and maintenance of this machine can be hazardous and could result in serious injury or death.

Some actions involved in operation and maintenance of the machine can cause a serious accident,if they are not done in a manner described in this manual.

The procedures and precautions given in this manual apply only to intended uses of the machine.If you use your machine for any unintended uses that are not specifically prohibited, you must be sure that it is safe for you and others. In no event should you or others engage in prohibited uses of actions as described in this manual.

2. Inspect the job site and follow the safety recommendations in the safety hints section before operating the machine.

3. Use genuine LeKing spare parts for the replacement of parts.

We expressly point out that LeKing will not accept any responsibility for defects resulting from non genuine parts or non workmanlike repair.

In such cases LeKing cannot assume liability for any damage.

Continuing improvements in the design of this machine can lead to changes in detail which may not be reflected in this manual. Consult LeKing or your LeKing distributor for the latest available information for your machine or for questions regarding information in this manual.

BEFORE SERVICING THIS MACHINE

It is the responsibility of the owner and all service and maintenance personnel to avoid accidents and serious injury by keeping this machine properly maintained.

It also is the responsibility of the owner and all service and maintenance personnel to avoid accidents and serious injury while servicing the machine.

No one should service or attempt to repair this machine without proper training and supervision.

All service and maintenance personnel should be thoroughly familiar with the procedures and precautions contained in this manual.

All personnel also must be aware of any federal, state, provincial or local laws or regulations covering the use and service of construction equipment.

The procedures in this manual do not supersede any requirements imposed by federal, state,provincial or local laws.

LeKing can not anticipate every possible circumstance or environment in which this machine may be used and serviced.

All personnel must remain alert to potential hazards.

Work within your level of training and skill.

Ask your supervisor if you are uncertain about a particular task. Do not try to do too much too fast.

Use your common sense.

Noise and vibration Declaration

Noise：

Normal working:

LwA=93dB(A), uncertainty =1.5dB(A)
Measured according to ISO 6395:2008;
LpA=84dB (A), uncertainty =1.5dB (A);
Measured inside the cab according to ISO 6396:2008;

Vibration:

The vibration total value to which the hand-arm system is subjected does not exceed 2.5m/s^2; the height root mean square value of weighted acceleration to which the whole body subjected is 6.6m/s^2.

Note: vibration levels are influenced by many different parameters. Many items are listed below:
-Operator training, behavior, mode and stress;
-Job site organization, preparation, environment, weather, and material;
-Machine type, quality of the seat, quality of the suspension system, attachments, and condition of the equipment.

UK DECLARATION OF CONFORMITY

ACCORDING TO THE FOLLOWING UK REGULATIONS

1.1 THE SUPPLY OF MACHINERY (SAFETY) REGULATIONS 2008 (AS AMENDED)

1.2 ELECTROMAGNETIC COMPATIBILITY REGULATIONS 2016 (AS AMENDED)

1.3 THE NOISE EMISSION IN THE ENVIRONMENT BY EQUIPMENT FOR USE OUTDOORS REGULATIONS 2001 (AS AMENDED)

THE UNDERSIGNED, CHANGJIN LIU, REPRESENTING SHANDONG LeKing HEAVY INDUSTRY MACHINERY CO., LTD. / ECONOMIC TECHNOLOGY DEVELOPMENT PARK, LINSHU, SHANDONG, P.R.CHINA, DECLARES THAT THE MACHINE DESCRIBED HEREAFTER:

PRODUCT NAME: HYDRAULIC EXCAVATOR

COMPLY WITH THE RELEVANT PROVISIONS OF REGULATION 2008, PROVIDED THAT IT IS USED AND MAINTAINED IN ACCORDANCE WITH THE GENERAL ACCEPTED CODES OF GOOD PRACTICE AND THE RECOMMENDATIONS OF THE INSTRUCTION MANUAL.

PERSON AUTHORISED TO COMPILE THE TECHNICAL FILE:

LeKing DIGGERS UK AND NI LIMITED

HENALLT FAWR, BRONWYDD ARMS, CARMARTHEN, CARMARTHENSHIRE, SA33 6BB, UNITED KINGDOM

FOR THE MOST SPECIFIC RISKS OF THIS MACHINE, SAFETY AND COMPLIANCE WITH THE ESSENTIAL REQUIREMENTS OF THE REGULATION HAS BEEN BASED ON ELEMENTS OF:

2.1 EN ISO 12100:2010 SAFETY OF MACHINERY - GENERAL PRINCIPLES FOR DESIGN - RISK ASSESSMENT AND RISK REDUCTION

2.2 EN 474-1:2006+A6:2019 EARTH-MOVING MACHINERY - SAFETY - PART 1: GENERAL REQUIREMENTS

2.3 EN 474-5:2006+A3:2013 EARTH-MOVING MACHINERY - SAFETY - PART 5: REQUIREMENTS FOR HYDRAULIC EXCAVATORS

UKCA

DATE: _____

PLACE: _____

STAMP&SIGNATURE _____

TITLE _____

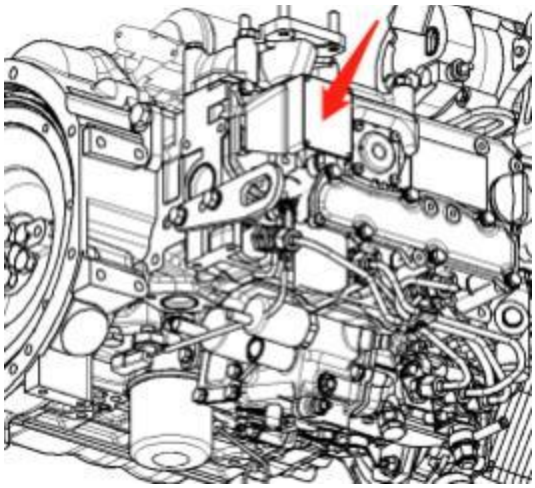
GORILA®

CE

Product Name: CRAWLER EXCAVATOR	
Model:	Engine:
Engine Power: KW	Operating Weight: Kg
Serial No.:	Date:

MADE IN P.R.C

GORILA®



Body and engine identification marks

KV12 EU-Version

Your LeKing dealer is always ready to help so that your excavator offers the best performance. After having carefully read this manual, you will realize that much of the routine maintenance can be done by yourself. Your LeKing dealer is responsible for servicing and the derivery of sopare parts. When ordering spare parts from your LeKing dealer, always mention the serial number of the excavator and the engine.

Note these numbers right away in the supplied lines.

	Excavator	Excavator
Excavator	_____	_____

Engine_____

Dealer's name

(To be filled in through the owner)

1 Safety

1.1 Safety information

1.1.1 Recognize safety label

(a) This is the label of "safety".

(b)When you see this label on the machine or in this manual, you should be aware that it reminds of the risk of injury.

(c)Please follow recommended precautions and safe practices.

1.1.2 Understand signal words

The safety signs on the machine which indicate the degree of harm DANGER, WARNING or CAUTION and the mark is used in conjunction with ⚠ signs on the machine safety signs.

⚠DANGER

DANGER indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury. Safety signage is positioned on the particular hazard nearby.

⚠WARNING

WARNING indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury. Safety signage is set in a particular crisis in the vicinity.

⚠CAUTION

CAUTION indicates a hazard with a low level of risk which, If not avoided, may cause in minor or moderate injury. General precautions listed in the CAUTION safety signs. In the present manual, the IMPORTANT is also used to remind the attention to the safety instructions.

⚠IMPORTANT

To avoid confusion between the machine protection and personal safety instructions, the signal word "important" is used to indicate a situation that may cause damage to the machine.

To do additional description of the individual important information.

1.1.3 Compliance with safety regulations

(a)Read and observe all safety signs carefully, machine and this manual all safety relate dissues in the safety signs marked on the machine and in this manual.

(b) When necessary, installation, maintenance and replacement of safety signs.

(c) If the safety signs or the manual is damaged or lost, by an order like the same method ordering spare parts to the specified sellers and LeKing Heavy for ordering them (Order required specifying the model and serial number of the machine).

(d) Learning to operate and control the machine safely and correctly.

(e) Only trained and qualified personnel can be allowed to operate the machine.

(f) Keeping the machine in a suitable working conditions

(g) Make unauthorized modifications of the machine may be detrimental to its function and (or) security, and affect the life of the machine.

(h) The safety instructions in the "Security" chapter are basic safety instructions of the machine. However, these safety instructions don't involve all the dangerous situations you may encounter. If have any doubt, please contact with you specifies dealer or LeKing service engineer firstly before operating and maintaining of machinery.

1. Understand the safety equipment

(a) Ensure that all guards and cover are in the appropriate location. If the guards and the cover are damaged, please repair them immediately.

(b)Understand the method of using the safety device and use it correctly

(c) Do not remove any safety devices, and to ensure that they remain in good working condition.

2. Keep machine clean

(a) If there is water in the electrical system it could cause the machine failure. Do not use water or the steam to flush electrical system such as sensors, connectors

(b) When checking or maintenance, if the machine with mud or oil, it may result in the risk of slipping, falling and harming eye by dirty things. So please keep the machine clean.

3. Keep cabin in clean

(a)When entering the cabin, be sure to remove dirt and grease under the shoes. The operation of the pedal with the shoes carrying mud or oil, the foot will slip which could cause a serious accident.

(b) Do not leave parts or tools in the cabin.

(c) Do not stick suction pad to the glass. Suction pad play the role of magnifying function, it may cause a fire.

(d) When driving or operating machinery, do not use a mobile phone in the cabin.

(e) Dangerous goods (such as flammable or explosive materials) should not take into the cabin.

4.To leave the seat in a locked condition

(a)Operator stood up from the seat, such as adjust the seat, has to make the work unit is completely lowered to the ground, the

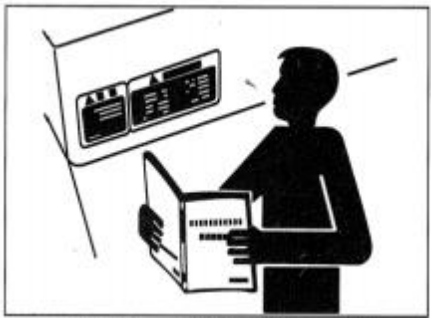
safety lock lever firmly pull into the locked position, and then turn off the engine. If the control joystick is not locked, and accidental touching the joystick, the machine may move suddenly and causing serious injury or damage to the machine.

(b)When leaving the machine, be sure to operating device is fully lowered to the ground,Safety lock lever firmly pull into the locked position, and then closed engine. With a key to lock the device, then remove the key and placed in a predetermined position.

5. Emergency preparedness

Takeprecautionsagainst fire or accident

(a) Prepared and placed first aid kit and fire extinguisher equipment nearby.



(b) Carefully read and understand the instructions attached to the fire extinguisher and correctly use the fire extinguishers

(c) Make the emergency guide measures to deal with fires and accidents.

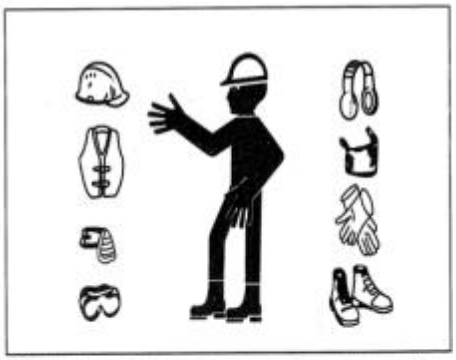
(d) The telephone number of Doctors, ambulance, hospital, and fire department should be sticked by the phone.

6. Wear protective equipment

Wear tight clothing and safety products suitable for work.

You may need the following safety products:

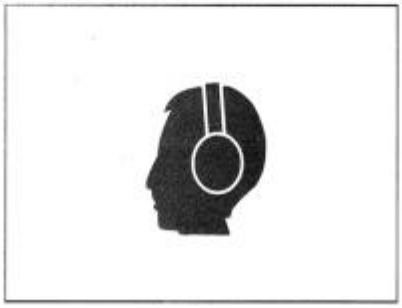
- Hard helmet
- Safety Shoes
- Safety glasses, goggles or face shield
- Heavy duty gloves
- Hearing protection
- Reflective clothing
- Rain gear
- Masks or filtration masks



Always wear work clothes and safety supplies, do not leave things to chance.

Avoid wearing loose clothing, jewelry or other things may be hooked by joystick.

Safe operation of the machine requires the operator to concentrate. Do not listen to the radio or music while operating.



7. Noise protection

(a)Prolonged exposure to loud noise can cause hearing impairment or loss.

(b) Wear suitable hearing protectors, such as ear plugs to avoid harmful or strong unpleasant noise.

(c) Noise of the machine is more than 80dB (A), the operator should wear earplugs or earmuffs.

8. Check machine

(a)To avoid personal injury, every day before starting the machine, check the machine carefully.

(b) In the tour check carefully around the machine, be sure to "check before the start of the inspection" described in the chapter all.

9. Use handrails and ladders

WARNING

Always observe this precaution to ensure safety!

(a) The drop is one of the main causes for personal injury

(b) Up-and-down the machine, always with the pedal and handrails to maintain three points of contact, and machine-oriented.

(c) Do not put any lever, the cabin door handle as a handrail.

(d) Can not jump on/off the machine, and do not get on/off the moving machine.

(e) When using the machine, pay attention to the platform and handrails slippery.

(f) Oil, mud and water in handrails and shoes should be cleaned any time.

10. Adjust the position of the seat

(a) Uncomfortable seat is likely to cause fatigue, leading to operational mistake.

(b) In each exchange machine operator, and should be re-adjust the position of the seat.

(c) When the operator back on seat back, you should be able to step on the pedal to the end, and correct the operation of the joystick. If not, move forward and backward seat, re-adjust.

11. Fasten seat belts

(a) In the case of a rollover accident, the operator may be injured or throwing out of the cabin, or may be pressing down by the machine, then cause serious injury or death.

(b) Before operating the machine, check the seat belts, buckles and solid set pieces carefully. If you find any damage of the seat belts, it should be replaced before operating.

(c)While operating the machine, be sure to sit on the operating chair and fasten your seat belts, in order to minimize the possibilities of accident injuries

(d) Best to replace seat belt per three years, no matter what condition it is.

12. Not-allowed to get on/off the machine at will

(a) Do not jump on/off the machine when it's moving.

(b) If the machine begins to move in the absence of the operator, do not jump on the machine and tried to stop it.

13. Not allowed to sit on the machine at will

Do not allow anyone sitting on a bucket or other attachments, or it may falls and cause serious injury.

14. To ensure a good vision

(a) To ensure safe operation or walking, to check if anyone in the area around the machine or disorders and workplace.

(b) When working in a dark place, turn on work lights and headlights on the machine, if necessary, set the auxiliary lighting in the work area.

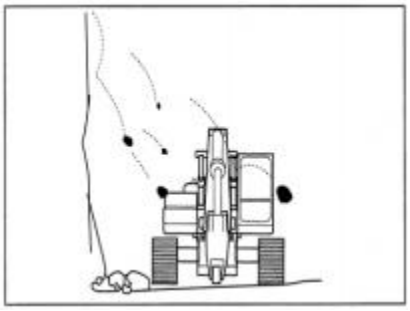
(c) If the vision is not good, as fog, snow, rain or dust, to stop the operation.

15. View the Construction site in advance

(a) When working on the side of ditch or the road shoulder, the machine can turn over; this will cause serious injury or death.

(b) Prior to survey the terrain and ground conditions of the site, in order to prevent the machine to tip over or fall, or even the ground, stockpile or the river bank collapsed.

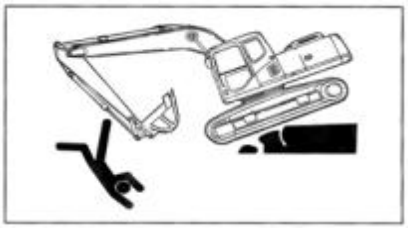
(c) The development of operational plans to use the machine for your job or site.



(d) As required reinforcement the ground, ditch side and road shoulder, to ensure a safe distance between the machine and ditch and road shoulder.

(e) When operating in diagonally or shoulder of the road, according to need to arrange signalman command.

(f) Before starting work local in trust between soft, must be reinforced ground.



(g) Operations on the frozen ground, to be especially vigilant. Because the ambient temperature rise to causes the ground to become soft and slippery.

16. Prevention of falling stones and gravel

(a) Work in the condition where may fall rocks or stone, to ensure that the cabin is equipped with falling object protective net.

(b)Wear a helmet and protective eyewear.

17. Multi-machine operation signaling

In the case of multi-machine operation so that all workers unified signal,

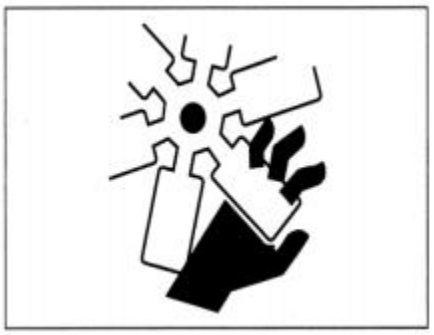
specify a signalman to organize the job,while ensuring that all workers obey the command.

18. Signalman signals and gestures

(a) To set the flag on the shoulder or soft ground. If the **vision** is not good, if necessary, arrange for a signalman command. The operator should pay particular attention to the signs, and obey the command of the signalman.

(b) Only signaled by one signalman.

(c) Before starting work, ensure that all operators are aware of all signals and gestures.



19. Keep away from rotating parts

(a) It maybe results in serious injury if caught in moving parts.

(b) Working next to the rotating member, need to be very careful of hands and legs, clothes, jewelry and hair so that will not rotating member involvement.

20. Prevent parts flying out

The track adjusters grease usually in the high pressure, if not avoided the following precautions may result in serious injury, blindness or death.

(a)Do not remove the grease fitting or valve parts.

(b)Parts could come out of, so the body and face should be away from the valve body.

(c) Walking reducer with pressure.

(d) As part could come out, so the body and face must be away from the air drain plugs, to avoid injury.

(e)Because the gear oil is hot, gradually release air emissions tied to wait for gear oil cooling, the pressure was released.

21. Prevent falling objects, flying objects and invader

(a)Falling objects, flying objects and invader hit or enter the driving cabin dangerous workplaces, depending on the operating conditions; security mounted the necessary shield to protect operating personnel.

(b) When the removal or crushing operation, to install the front shield, and posted the front glass transparent cellophane.

(c) When the risk of falling rock mine or quarry operations, to install FOPS (Falling Object Protective Structure) and the front shield and posted in the glass transparent cellophane.

(d) Above described is for typical conditions, according to the site operation, you may need to install other guard. When any part of the protection structure, like ROPS, FOPS, and TOPS (rollover protection

structure), and so on appear the plastic deformation or fracture (for example, subject to due to roll, Falling Object shocks or tipping) , please contact with LeKing Heavy Industry dealer in a timely manner, the protective structure has to be replaced according to manufacturer's specifications.

22. To prevent burns

(a) The discharge of the high temperature liquid:

☞ Machine operation, the cooling water of the engine is hot and pressure. If the skin is exposed to a spill or spray of hot water or steam will cause serious burns.

☞ When the engine is hot, do not open the radiator Cover, and first slowly rotate the lid to be fully released off the pressure, then remove the cover and release the pressure.

☞ Hydraulic tank is pressurized to ensure release the pressure before the lid is removed.

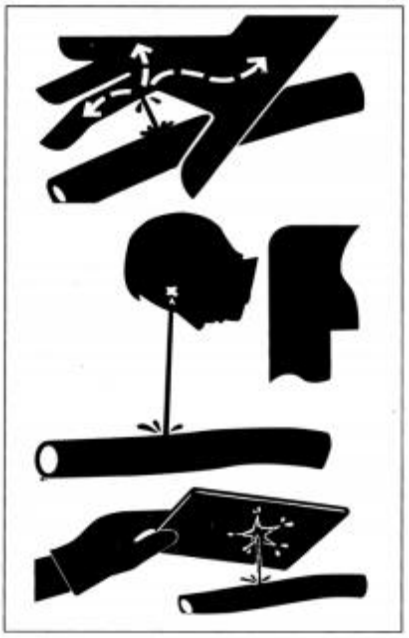
(b) High-temperature liquid and surface:

In operation, the engine oil, gear oil and hydraulic oil will become hot. Engines, hoses, tubing, and its parts become hot. It should wait until oil and component cooling only after inspection or maintenance work.

23. Prevent falling

(a) Storage of accessories, such as a bucket, May topple over, resulting in serious injury or death.

(b) Safely store accessories and machinery to prevent falling.Children and other non-essential personnel should stay away from the storage area.



24. Be careful high-pressure liquid

(a) Pressure injection diesel oil, hydraulic oil, liquid penetrate the skin or injected into the eye, resulting in serious injury, blindness or death. Therefore, before demolition hydraulic or other pipeline must release the pressure in order to avoid these dangers.

(b) Tighten all the links before increase the pressure.

(c) With cardboard to find if it is leak, pay attention to protect your hands and body free from exposure to the high-pressure liquid. Wear a face shield or goggles to protect the eyes.

(d) If an accident occurs, immediately accepted professional surgeon treatment. Any liquid in to the skin must be surgical remove in several hours; otherwise it will lead to gangrene.

25. Prevent fire

(a) Check the oil spills

- Fuel oil, hydraulic oil and grease leaks may cause fire disaster.
- Check whether the holder is missing or loose, the hose is twisted Knot, or hose, piping friction between oil cooling is damaged, and oil cooler flange bolts are Relaxation, in order to avoid oil spills.
- The tightening, repair or replace any missing, relaxation or damage the holder, piping, hoses, oil cooler and its law blue bolt.
- Do not bend or strike high pressure lines.
- Do not install bent or damaged pipe, tube or hose.

(b) Check the short circuit

- A short circuit will cause a fire.
- Clean and tighten all circuit connections.
- In each shift before or after 8-10 hours of operation, check the cable and wire is loose, kink, hard or cracked.
- Before each shift, or 8-10 hours after the operation, then check stud end cap is lost or damaged.
- Do not operate the machine if cables or wires relaxed and kinked.

(c) Clear combustibles

- Spilled fuel and hydraulic oil, garbage, grease, broken debris and other combustible materials may cause a fire. Check and clean machine every day, promptly remove spilled or accumulation of combustible material, to prevent fire.

(d) Check the key switch

Fire if not stop the machine, it will increase the fire situation is not conducive to the fire. Daily before operating the machine must to check the function of the key switch, to start the engine, in order to idle speed no-load operation, the key switch to OFF position, and confirm whether the engine is came to a halt or not.

(e) To prevent lighting equipment cause an explosion

- When checking the fuel, oil, battery electrolyte, windows Washing-up liquid coolant, to use explosion prooflighting equipment. If not use this kind of lighting equipment, the explosion caused serious injury.
- When the power of the machine used for lighting, to comply with the prescribed instructions.

(f) Check the heat shield

- Shrouds damage or loss may cause a fire.
- If any abnormalities are found, make sure before operating the machines Repair or coupled with new heat shield.

26. Measures in the event of fire

(a)If the fire breaks out, evacuated machines as the following:

- If time permits, switch the key to the OFF (off) Position, stop the engine.
- If time permits, use of fire extinguishers,

(b)In case of emergency, if not open cabin, take the hammer and break the rear or side glass, to escape from the cabin.

27. Avoid heating near the hydraulic lines

Flammable spray will been burned in the vicinity of the pressure tube heating, which will lead to you and others next to you severely burned.

- Do not welding, soldering or gas welding nearby the hydraulic pipe or other flammable materials.
- When Burning over directly combustion area, the hydraulic pipe may be cut off at any time. The machine should be install temporary jacket to protect hoses or other materials while welding, soldering and other operations.

28. Avoid heating pipes where there are flammable liquids.

(a) Do not welding or gas cutting pipes or hoses where contain flammable liquid.

(b) Before welding or gas cutting pipes, completely cleared flammable liquid with non-combustible solvent.

29. Remove the paint before welding or heating

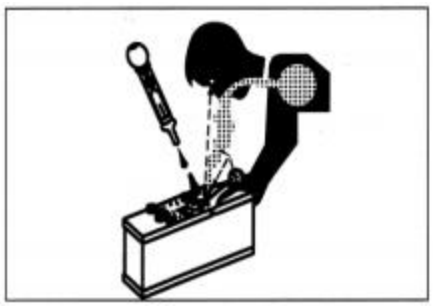
(a) Paint may produce harmful gases in welding, soldering, or using the gas torch; inhalation of these gases can cause nausea.

(b) Prevent to producing potential toxic gases and dust.

(c) Removal paint in outdoors or in a well-ventilated place.Correct disposing of the paint or solvent to protect the environment.

(d) Remove the paint where need to weld or heat:

- Wear respirator to prevent inhalation of dust, if using sandpaper and grinding wheels to remove the paint.
- Using Soap liquid to remove the paint or varnish removers before welding if you use solvent or varnish removers to remove the paint. Clear the solvent or paint remover's containers and other flammable materials in the working area. Waiting at least 15 minutes before heating or welding for dispersed the volatile gas.



30. Prevent battery exploding

（a）Battery gas could explode.

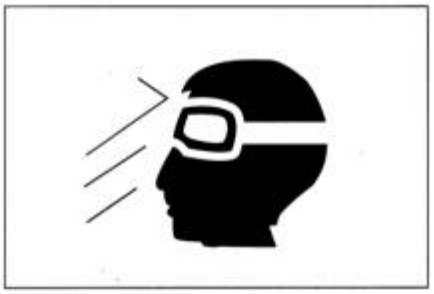
- Avoid sparks, lighted matches and flame close to the top of the storagebattery.
- Using a voltmeter or aerometer to checkup the battery

power, not use the method of placing a metal contact the electrode.

- Do not charging to the frozen battery, otherwise it would cause explosion. The battery should be warmed to 16℃.

(b)Electrolyte of battery is poisonous.If the battery were exploded, battery electrolyte is splashed into the eyes which could lead to blindness.

(c) Be sure to wear goggles when checking the specific gravity of electrolyte.



WARNING

If the Sulfuric acid were spilled on the body accidentally, should process as follows:

- First, flushing skin with water.
- Then, using soda or lime to neutralize the acidity.
- Addition, rinsing with water for 10-15 minutes and seek medical advice immediately.

31. Ventilating of the closed area

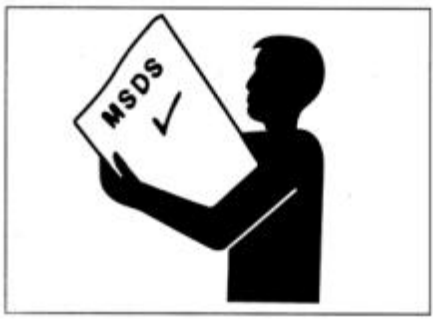
If must start the engine in a closed area, or disposing of fuel,cleaning oil or paint, be sure open the door and windows to adequate ventilation to prevent gas poisoning。

32. To prevention the risk of asbestos dust

(a) If inhaled asbestos dust in the air were caused lung cancer. When engaged in demolition work in the workplace or treatment of industrial waste, it has the dangers of asbestos inhalation. Be sure to observe the following rules

- When cleaning, water sprays dust suppression, do not use compressed air to clean.
- If there are asbestos dust in the air, must be in the limelight position to operate the machine, all personnel should use qualified dust masks.
- Other people should not be close to the machine when working.
- To comply with regulations, rules and environmental standards in the workplace.

(b)This machine does not use asbestos, but counterfeit parts may contain asbestos, so be sure to use LeKing spare parts.



33. Safety handling the chemicals

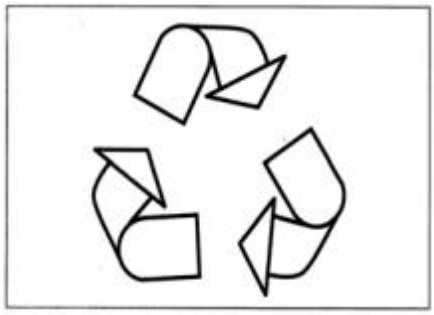
Direct contact with harmful chemicals on the human body can cause serious injury. The chemicals used in the present machine, such as

lubricants, coolants, paints, and a binder, may be harmful.

- Material Safety Data Sheet provides the details of the chemicals on the human body and health hazards, safety procedures and emergency measures.
- Before using the hazardous chemicals should be verified with the data table, so will be able to really understand the danger, and know how to conduct security operations, and then work in accordance with the procedures using the recommended tools.
- Chemicals Safety Data Sheets (MSDS)which used in machine should be obtained from the local dealer and the service division of LeKing。

34.Proper waste disposal

(a)Disposing the waste improperly may harm to the environment and ecological .The potentially hazardous waste in LeKing heavy equipment, including hydraulic oil, fuel, coolant, refrigerant, filters, and batteries and other items.



- In the discharge of liquid, should be use leak-proof containers.Do not use food or beverage containers, because it may lead to accidental ingestion.
- Do not pour the waste into the ground, sewers, or poured into any water source.
- Refrigerant leak into the air can destroy the Earth's atmosphere. Government regulations require a certified air conditioning service center to recovery and recycling of refrigerant.

(b) Inquire local environmental, recycling center or your dealer about the correct ways of how to recovery or disposal of waste.

35.Installed accessories

(a)When installing the optional accessories, exist security or legal constraints, so please contact with LeKing dealer in advance.

(b)LeKing is not responsible for the injury caused by using of unauthorized accessories or parts.

(c) When installing and using the optional accessories should read the accessories manual or manual attachment.

36. Attachment combination

(a)Different types or combinations of the working apparatus may cause the risk of collision the driver's cabin or other components of the machine.

(b) Before using unfamiliar working device, please check whether there is the risk of interfering with each other, and work carefully.

37.Unauthorized modification

(a) Before modification you should have to contact with LeKing dealer.Any modification without approval of LeKing will cause dangerous.

(b) In the case of without the approval of the LeKing, for any harm caused as a result of the modification,accident or product failure,LeKing assumes no liability whatsoever.

1.2 Safety operation of the machine

CAUTION

- The machine is not intended for use in unhealthy enviroments, e.g. contaminated areas.
- The machine is not intended for operation with a hydraulic- or demolition-hammer.
- Operating the machine, the operator should wear earplugs or earmuffs.

Hydraulic excavator CT12 is suitable for I-IV soil excavation and loading operations. In the mechanized construction of industrial and civil construction, transportation, road construction, water resources and electric engineering, farmland transformation, it can be widely used for excavation pit channel, backfill pavement, earth mining, digging build sub grade, stripping, mining and so on.

1.2.1. Before starting the engine

1. The check before starting the engine

- Wipe away the dust on the surface of the window glass, to ensure a good vision.
- Clean the headlights and work lights well, and check whether they are normal.
- Check the coolant level, fuel level and engine oil sump oil level.
- Check the air filters if it is blocked, and check the wires for damage.
- The seat adjusted to the easy operation, and checks the seat belt or the retaining clips damage or not.
- Check that the instrument is working properly, check the light and the angle of the lights and check the control lever is all in the middle position.
- Adjust the rear view mirror, so that you can clearly see from the seat and the back of the machine.
- Make sure there are nobody and barrier around the machine.

2.Safety regulation for starting the engine

(a) When starting the engine, honking for warning.

(b) Only allows the driver to start or operate machine.

(c) In addition to the operator, does not allow anyone on the machine.

(d) Not allowed to start the engine by the way of which cause the starter motor short circuit, doing so is not only dangerous, but also cause damage to the equipment.

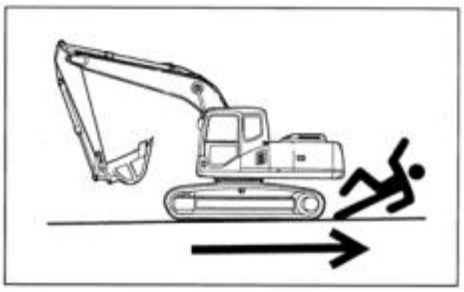
3. Starting engine in cold weather

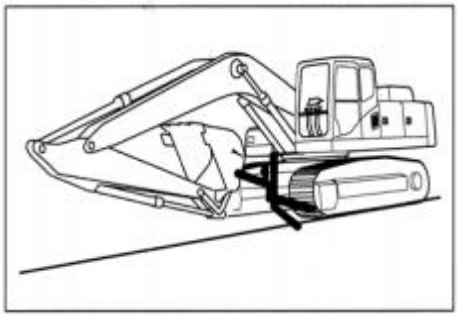
(a) To complete warm-up operation. If the machine before operating the joystick does not warm up thoroughly, there will be unresponsive, resulting in accidents.

(b) If the battery electrolyte is frozen, not to charge the battery or use a different power to start the engine, otherwise the battery will be the risk of fire.

(c) Charging or with different power before starting the engine, make the battery electrolyte melt, before starting to check the battery electrolyte freezing and disclosure.

4. Safety removes and operate machine





(a)Surrounding personnel are likely to be knocked down

- Especially careful not to knock down around the staff, before moving, rotating or operating machinery, recognized around the location.
- Always keep walking alarm horn (option) in working condition. When the machine begins to move, they can warn around personnel.
- Walking in the narrow area, rotary or operating machinery arrangement signalman command, before you start the machine, to coordinate the meaning of the gesture signal. The signalman was the only, and shall not at the same time more than two signal officer commanding.

(b) Sitting in the operating chair

- Only start the engine in the operating chair
- Never stand in the track above the ground to start the engine.
- Before starting the engine, confirm that all the joystick in the middle position.

⚠WARNING

The incorrect engine start procedure will cause the machine out of control, could result in serious injury or death.

⚠CAUTION

The safety lever only in the locked position to start the engine, you can not start the engine in the unlocked position.

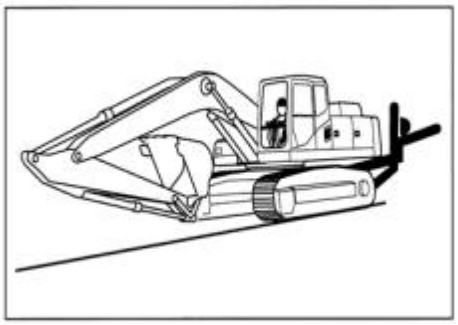
(c) Jump start

- Battery gas may explode and cause serious Casualties.
- If you must jump start the engine machine, be sure to comply with the "operating the engine in the chapter.

this requirements need two people to carry.

- Never use a frozen battery.
- Failure to observe proper jump start step will result battery

explosion or loss of control of the machine.



(d) To avoid machine equipped with crew

- Only allow the operator on the machine, do not allow other multiply member.
- The crew will also block the vision of the operator, resulting the unsafety of the operation.

WARNING

The crew on the machine is vulnerable to injuries, for example, hit by foreign objects or thrown from the machine.

CAUTION

The decorative Vice seat in the cabin allows equipped with a ride staff.

1.2.2 After starting the engine

1. After starting the engine check

(a) When doing inspection, moves the machine to a wide area without any obstacle, and slowly operates the machine, does not allow anyone close to the machine.

Who operate close to the machine?

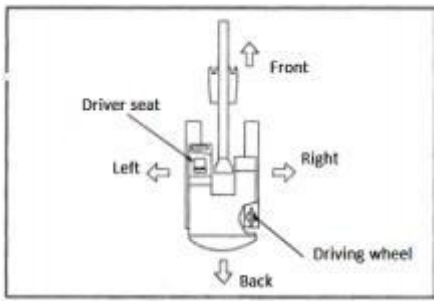
(b) Be sure to fasten your seat belt.

(c) Inspect the operation of instruments and equipment is functioning properly, and check the bucket, stick, boom, travel system, rotary system. And the steering system is operating correctly.

(d) Check the machine's sound, vibration, heat, smell or instrument whether there is abnormal, check the oil or fuel leaks.

(e) If any abnormality is found, to be repaired immediately.

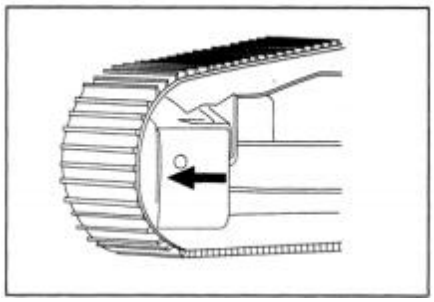
(f) To be maintenance, switch the safe operation lever to the LOCK position and suspension overhaul signage.



2. Machine direction

In the present specification, front, rear, left and right refer to the cabin when facing the front,and the drive wheels in the rear of the machine, when the traveling direction as seen from the cabin.

3. Confirm the direction of travel of the machine



(a) Before driving the machine to confirm the position of the lower part of the vehicle body and operation

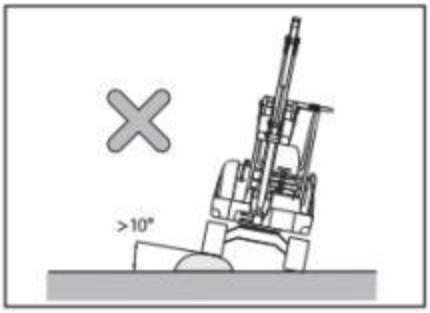
Personnel relations:

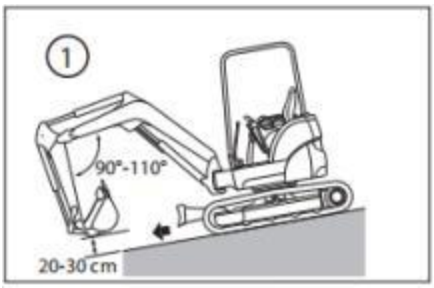
- If the motor running beneath the cabin, when forward brake pedal / lever, the machine will move backward.
- When the guide wheel is located under the cabin, to move forward the brake pedal/ lever, the machine will move forward.

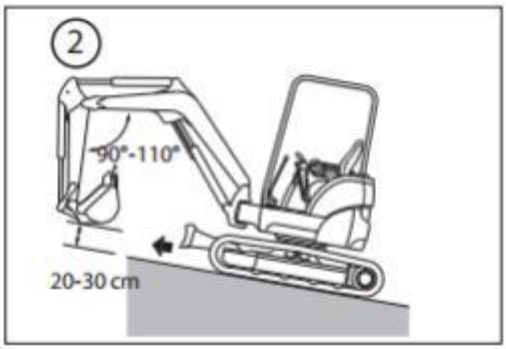
(b) In the lower portion of the vehicle body inner side of the machine, paste with directions card. When the operator move forward the pedal / lever, the head pointing ways of the signs arrows is the actual direction of travel of the machine.

WARNING

Walking pedal / lever mishandling can cause serious injury or death.







4. Walking safety rules

(a)When using the machine, in order to prevent the stall due to an overload stall and to avoid the loss of working device, do not exceed the most of the machine allowable load or performance.

(b) when walking on flat ground, to recover the working device and keep the ground height of 40-50 cm (16-20 in).

(c) when walking on rough ground, walking to idle, and does not to swerve, otherwise the machine will have to overturn. When the working device hit the ground, the machine out of balance, or would bad machines or structure.

(d)When walking over rough terrain or on steep slopes, if the machine is installed down speeding device, switch off(take off) the automatically downshift. If the automatic deceleration switch is turned on, the engine speed will mention high, walking speed suddenly accelerated.

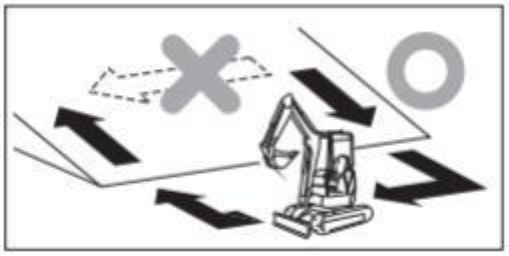
(e) As far as possible, avoid walking on obstacles, if the machine had to walk on the obstacles, to make the device close to the ground and low-speed walking. Do not cause the machine to violent tendencies walking on the side of the obstacle.

(f) When walking or operation, must be with people, buildings, or other machines to maintain a safe distance to avoid contact with them.

(g) When passing on from bridges or buildings, to first check whether the structural strength sufficient to support the weight of the machine.

(h) When walking on the road, first of all the relevant authorities

to check and follow their guidance.



(i) When in the tunnel, bridge, wire or other highly limited operation to slow the operation, and to pay special attention not to let the working device to come into contact with any thing.

5. Driving machine safely

(a) Before moving the machine, make sure the direction of travel and how to move step board or joystick.

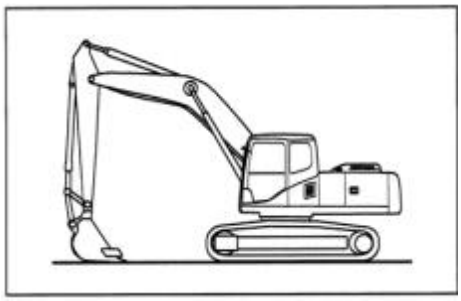
(b) Pressing the front portion of the pedal walking or forward implementation of walking poles, so that the machine

Move towards the guide wheel. (On the right track operation,With reference to the pedal, the operating lever to the part of the driving machine)

(c) Walking in the slope may cause the machine to slip or tip over, resulting in serious injury or death.

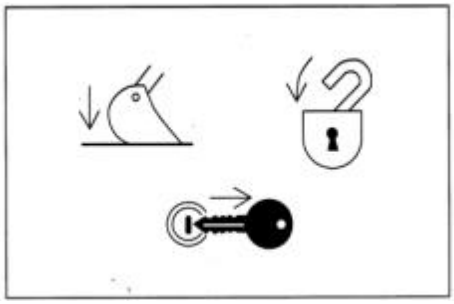
(d) The slope walking, keep away from the ground to make the working device 20-30cm (8-12in). In case of emergency, you can quickly drops the work apparatus on the ground in order to help anchor the machine.

(e) When walking uphill,transferred the the cabin facing the uphill direction.When walking downhill,transferred the the cabin facing the downhill direction..



(f) When walking, be sure to check the hardness of the ground in front of the machine.

(g) when walking on steep slopes, Stretch the working device in front ,in order to improve balance, keep the distance from working device to the ground 20-30cm(8-12in) and low-speed traffic.



(h) when going downhill,reduce the engine speed, keep the travel lever maintained at a position close to the "median", and walking at a low speed.

(j) Do not turn on slopes or across the slope. Be sure the next to a flat place to change the location of the machine, and then on the ramp slope.

(k) To the low-speed walking on the grass, leaves or wet steel,The machines also have a risk of slipping, even in the case of a small slope.

(l) If the engine is turn off when the machine is walking on the ramp, move the joystick to the "median",and then restart the engine.

Notes on slopes

WARNING

Risk of serious injury!
The wrong operation may result in serious injury.

Never attempt to go up or down a slope with a gradient greater than 30 ° , and never attempt to cross a slope with a gradient greater than 15 ° .

Be sure to fasten your seat belt.

Don't try to turn on the slope. The machine may slip or tip over. You can turn only on very gentle, solid slopes.

Try to avoid crossing slopes where the machine may slip or tip over.

Avoid turning onto the ramp. Never try to turn onto the ramp. The machine may tip over. If you must turn downhill, carefully operate the loading and arm at low speed.

If the engine stalls on a ramp, immediately lower the bucket to the ground, return the levers to neutral position, and restart the engine.

Be sure to warm up the machine fully before going up the steep slope. If the hydraulic oil is not sufficiently preheated, it may not give full play to the performance of the machine.

The machine has the potential to tip over on rough terrain or slopes. To prevent rollover accidents, when operating on uneven ground or slopes:

- Slow down the engine.
- Choose low-speed walking mode.
- Operate the machine slowly and pay attention to the movement of the machine.
- Never attempt to walk on a slope with a bucket loaded with material or with a suspended object.
- When the slope angle exceeds 25 degrees, will cause the engine lubrication insufficient.

6. To prevent the machine out of control causing injury

(a) when the machine should parked on the level of the ground as much as possible

(b) Do not park the machine on slopes.

(c) The bucket and other tools are lowered to the ground.

(d) The throttle control knob gear down to 1st gear.

(e) In the low-speed no-load operation of the engine 5 minutes, allowing the engine to cool.

(f) Stop the engine, remove the key from the key switch.

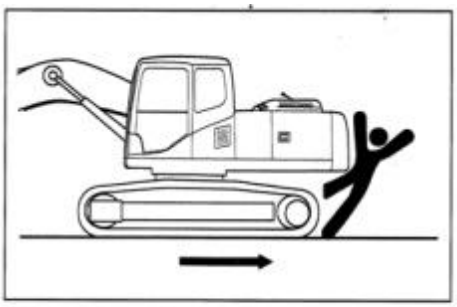
(g) Before flameout, the safety lever should be turned to the vertical direction to prevent the safety accident caused by misoperation.

WARNING

If you attempt to climb or block mobile machines, it is possible the occurrence of serious injury or death.

7.Prevent reversing and rotary injuries

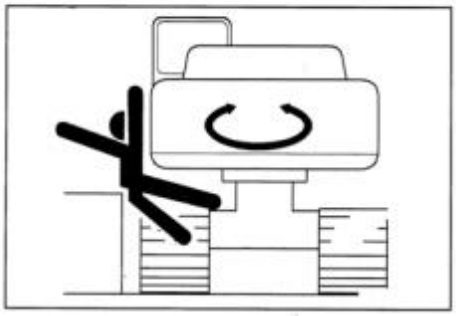
In order to prevent reverse rotation of an accident:



(a) Before reversing and rotary look around,recognized no one around the machine.

(b) Keep walking alarm device (option) in working condition.

(c) Always be alert if anybody into the work area, before moving the machine ,warning others horn or other signal.



(d) In reverse, if your vision is blocked, to arrange the signalman Command, and to always keep the signalman in the field of vision.

(e) In the working condition of need signalman ,using the local regulations potential signal.

(f) Only if the signal and operators, who clearly understand the signal,and then move the machine.

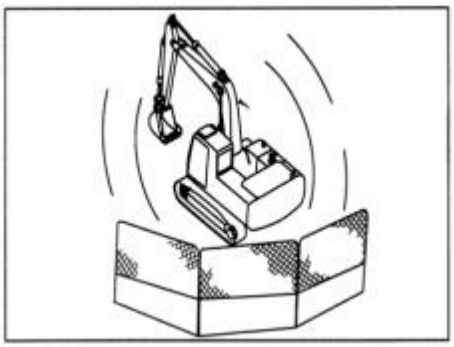
(g) Understand all the meaning of banner used in the work, signals and marked, and confirm who fat signal.

(h) Remain intact windows, mirrors and lights is clean and undamaged.

(i) Dust, rain, fog will reduce visibility. When the visibility is down, slow down, and the use of appropriate lighting.

WARNING

Reversing or turning on the machine, if someone in the vicinity of the machine, will be hit by a machine or overwhelming, resulting in serious injury or death.

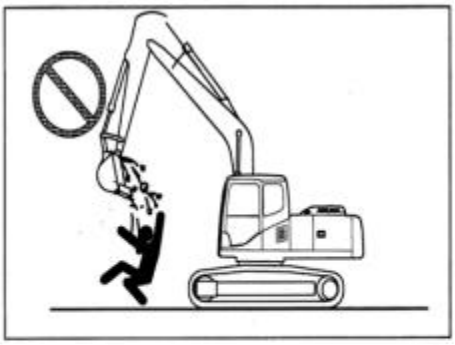


8. Prevent access to the work area

People are likely to be knocked down,even injured when doing rotating .

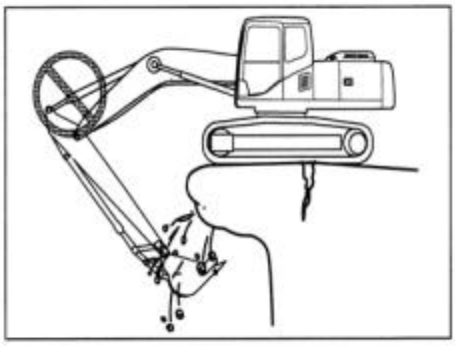
(a) All people must be away from working area.

(b) Before operating the machine, Set a good fence beside the rear of the bucket radius and back, in order to prevent personal injury or damage to the machine.



9. Do not put the bucket towards any person

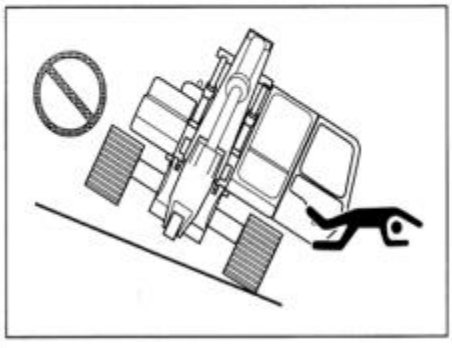
Bucket lifting, moving or rotating absolutely can not go through any person or the top of the truck cabin.If the fall of the material in the bucket or bucket collision may result in serious personal injury or damage to the machine.



10. Prevent emptied

(a)In order to ensure that to evacuate from foundation collapsed, make sure the travel motor is in the back,the vehicle body is placed perpendicular to the gutter machine.

(b) In the foundation began to collapse and the machine could not withdraw, do not panic, at this time, and lower the working device is generally fixed machine.



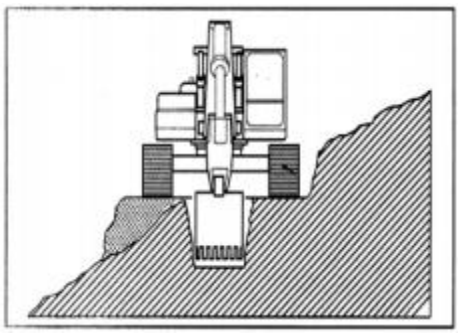
(c) Excavation work to avoid the hollowing out of the soil of the bottom of the machine.

11. Prevent roll-over

(a) Do not try to jump out of the machine being dumped, otherwise it will cause serious or fatal crush.

(b)Dumping speed of the machine faster than the speed you jump out, do not leave things to chance.

(c) Be sure to wear seatbelts.

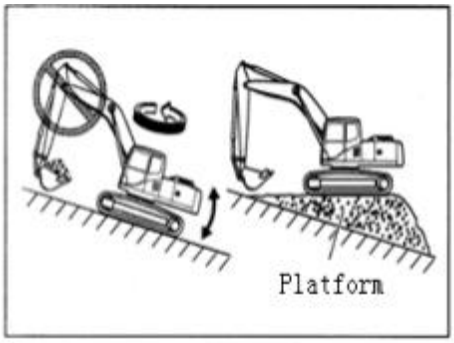


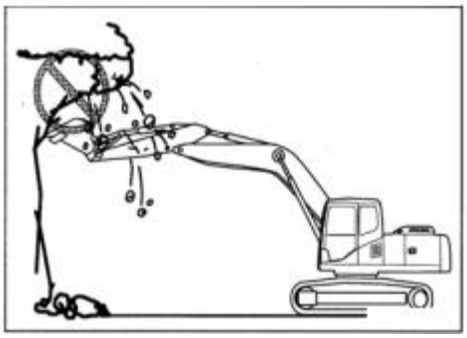
(d)Operation on the slope, there is the risk of roll-over could result in serious injury or death.

In order to prevent roll-over:

(e) Operation of the slope with caution.

- Smooth machine operation area.
- The bucket lowered to the ground and close to the machine.
- Slowing down the speed of operation, and prevent the roll-over or skidding.
- Avoid changing the direction of the slope walking.
- If the slope across the inevitable, never crossing slope greater than 15 degrees above the slope.
- Slow down the rotation speed of rotation of the load, depending on the circumstances.

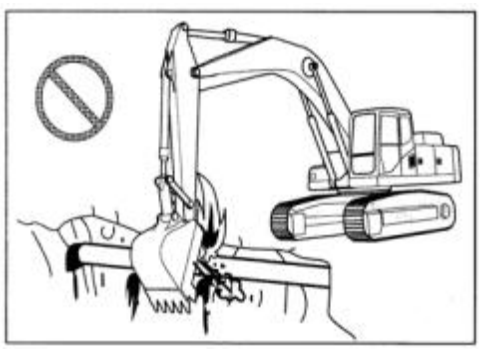




(f) Operating in the frozen ground to be careful ,because the temperature rise will cause the ground to soften the ground unsteady gait.

12. To prevent collapse

From the lower part of the excavation may cause the edge of collapse or landslide, resulting in serious injury or death.



13. Beware of underground facilities

Underground cables or gas pipes are accidentally cut may cause an explosion, fire, leading to the occurrence of serious injury or death.

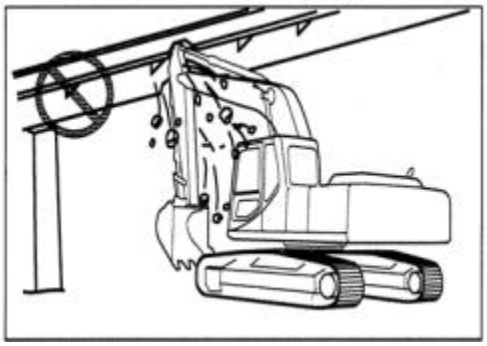
(a) Prior to excavation, check cable, gas and water pipes position marked, or to confirm its position.

(b) Keep certain distance with cables, gas pipes and water pipes .

(c) If cut fiber-optic cable due to an accident, do not pay attention to the end of the cable. Otherwise, the eyes may cause severe

damage.

(d) If the Mining Hotline instructions in your area, please contact; or direct contact with the local utility company, so that they clear all underground cables, pipes.

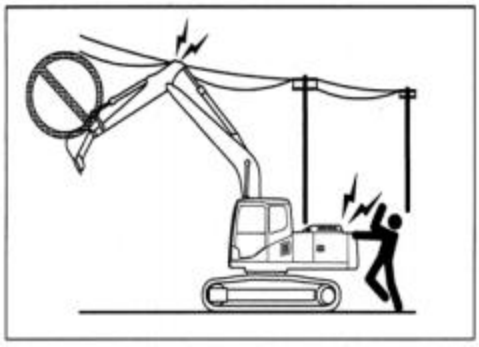


14.Beware of overhead bridges and other facilities

If the operating units of the machine or other parts of the elevated hit the bridge,

Machines and overhead material will be damaged and may cause injury, be sure to be careful.

15. To avoid the transmission line

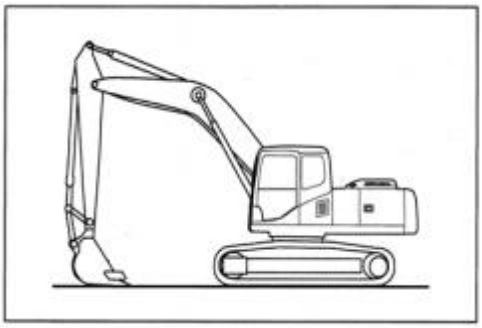


(a) If the machine or device does not keep a safe distance with cable, may cause casualties and accidents.

(b) when operating near the wire , avoid any part of the machine move to the place of the wire length over to 3 m plus 2 times the length of the line insulator distance.

(c) Verify and comply with all applicabinle local laws and regulations .

(d) Wetlands will increase the range of possible electric shock. Should be allowed other persons around away from the work area.



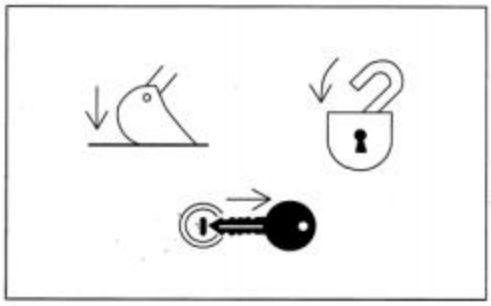
16. Secure parking machines

In order to prevent accidents:

(a) The machine is parked on a level surface.

(b) The bucket lowered to the ground.

(c) The throttle control knob gear down to 1st gear.



（d) To the low-speed no-load operation of the engine 5 minutes.

(e) Switch the key to OFF (off), stop the engine. After the engine is stopped, turn the key switch to “on” position, put safety lever at UNLOCK position, shaking each joystick to escape residual

pressure in the hydraulic circuit and pneumatic circuit.

(f) Remove the key from the key switch.

(g) The safety lever pulled at Lock (locked) position.

(h) Lock all access doors andbox room.

17. Handing fuel- to prevent fires

(a) Handing fuel safely, because it is highly flammable.If fuel is ignited, it will explode and (or) fire, resulting in

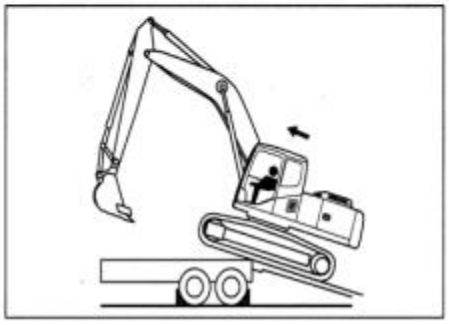
Personal injury or death.

(b)When filling fuel oil,make sure no smoking or fire around.

(c) Before refueling, be sure to stop the engine.

(d) Add fuel outdoors.

(e) All of the fuel and most of the grease agents and some coolant are all flammable..



(f) Flammable liquids stored in a place away from the risk of fire.

(g) Do not incinerate or puncture the pressure vessel.

(h) Do not store oily rags, they can be lit fire spontaneously to burn.

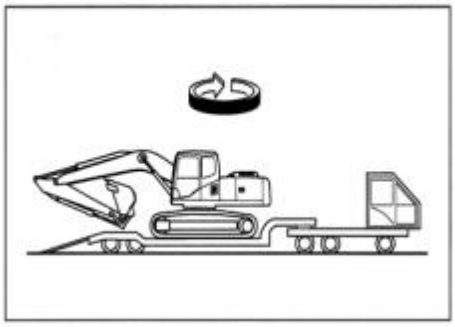
18. Safety transport

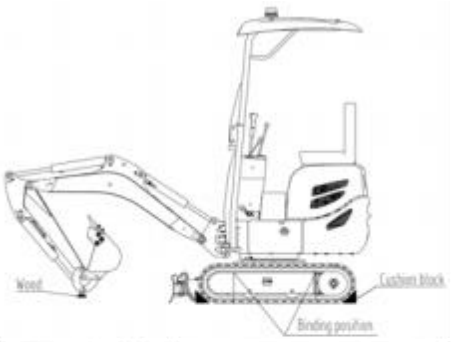
(a) In the truck or trailer plate loading and unloading machine, the machine will be overturn.

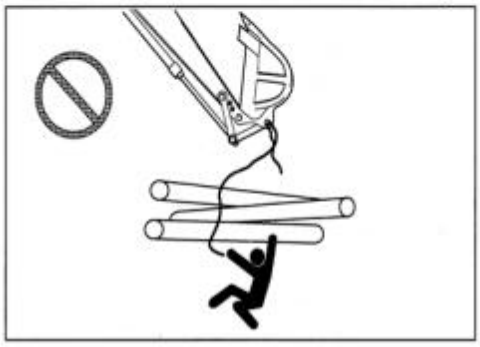
- When moving machine from road transport, be sure to comply with local regulations.
- Provide for the transportation of the machine to the truck or trailer.

(b) Loading and unloading the machine, please note the following:

- Select a firm level ground.
- Be sure to use the loading dock or slope.
- When loading or unloading machinery, there must be a signalman.
- Loading and unloading machine, you must turn off the auto-idle switch to avoid the operating lever accidental operation and cause a sudden increase in speed.
- Switch to select slow walking. Fast walking ,speed will automatically increase.
- If you need to turn the machine, you should be directed back to the ground or car plate, then onto the slope correction direction.
- In addition to the travel lever onto or driving under the slope, do not operate any other joystick.
- The top of the slope and flat relative to the Survey Office was convex, care should be taken to passing.
- Rotary car to prevent injuries may cause the machine to tip over.
- Keep the arm pulling and slowly turn the car in order to get the best stability.
- Chain or rope to hold the machine frame. For more information, see the "Transport" chapter.







19. Prohibition the lifting

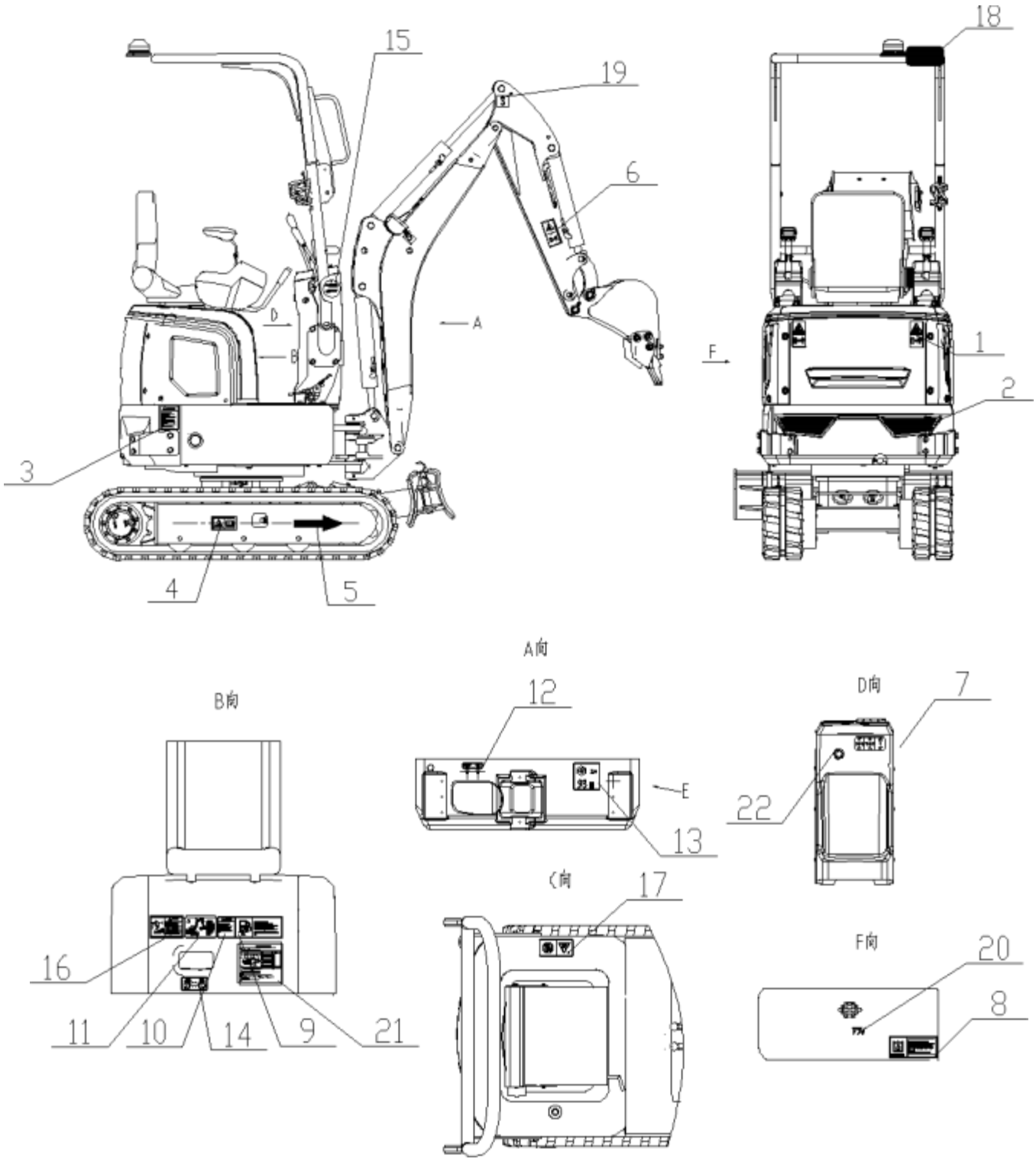
Hanging objects falling around may be hit by falling objects or suppress, resulting in serious injury or death. In order to prevent accidents, in any case, prohibition lifting.

Prohibit hanging grasping logs, etc.

WARNING

Prohibit hanging grasping logs, etc.

1.3 The position of the safety labels



There are warning labels on the machine. This chapter will explain detail of the positions and meanings of the labels. You should know the warning labels very well.

Keep labels clean. If the labels are lost or damaged you should change new labels.

Change the damaged or lost labels. If there is a need to change parts with labels, then you should add the safety labels on them after change these labels.

1.Warning!

Do not stay in the working range of the excavator, otherwise there is a risk of being rolled.

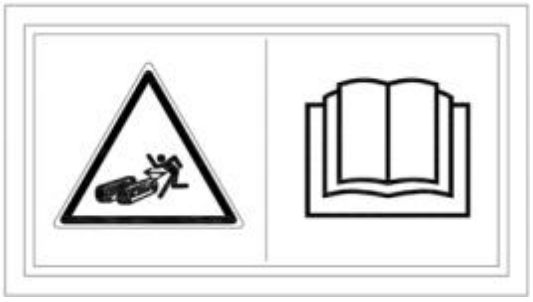
2. Counterweight warning

Put a red eye-catching warning label on the counterweight behind the machine, and do not approach the machine

3. Battery maintenance signs

4. Prevent parts from flying out (high pressure warning)

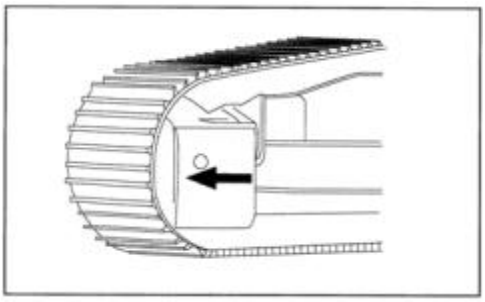
Please read the manual carefully before operation.



5. Excavator forward direction

Warning: when the excavator travel control lever (pedal) is operated forward

It is the actual forward direction of the excavator.

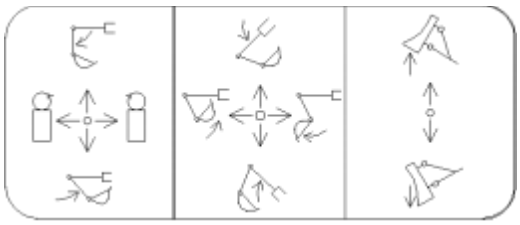


6. Warning! Working range of excavator

Keep a distance from the excavator operation area! Otherwise there is a risk of being bruised

7. Operation Identification

Indicates the function of the user's joystick and the control action identification

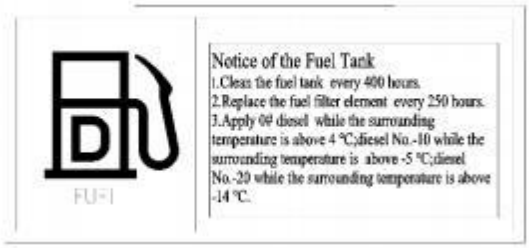


8. **Hydraulic oil tank sign**

Warn the user of the grade and maintenance cycle of hydraulic oil

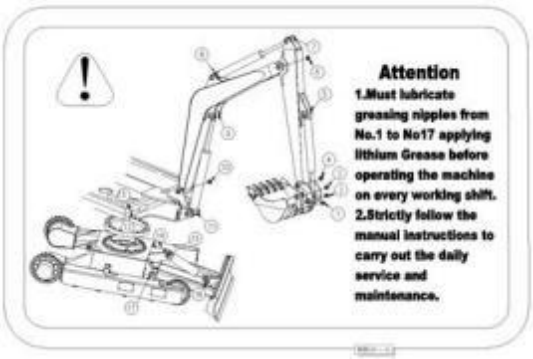
9. Diesel tank marking

Warn users of the time to fill different brands of high-quality diesel at different ambient temperatures, and to replace the filter element and clean the oil tank!

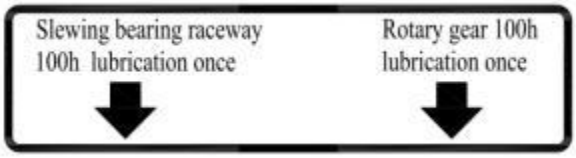


10 . Leave seat warning sign

11. Machine lubrication and maintenance signs

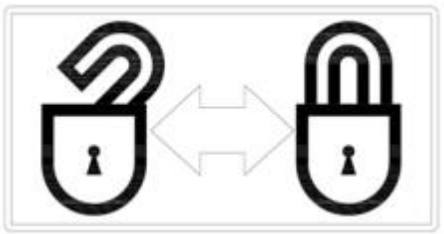


12. Lubrication sign



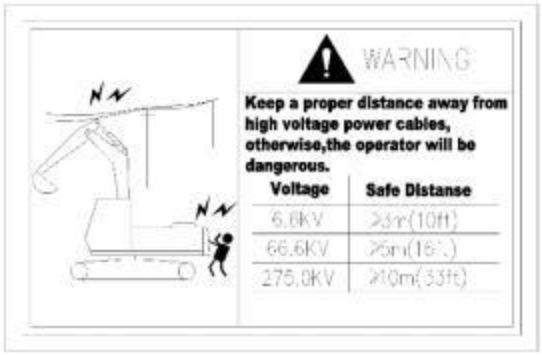
13. Noise identification

14. Safety lever "lock, open" sign

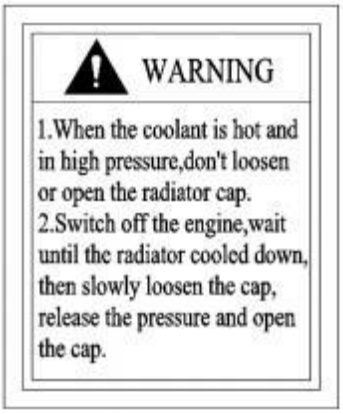


15. Warning labels-Using when checking and maintaining.

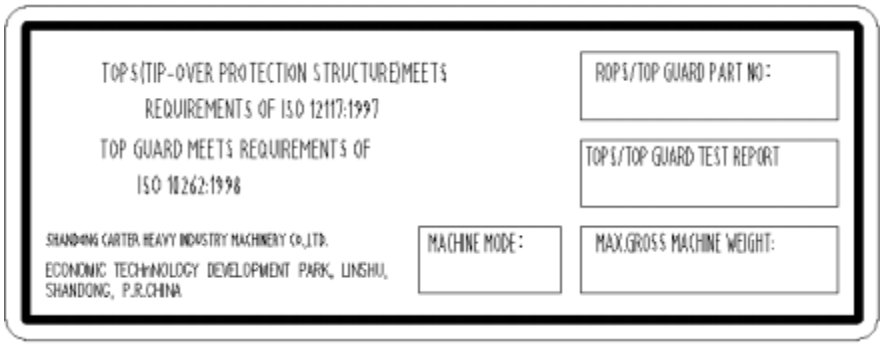
16. **High voltage line warning sign**



17. Warning to prevent high temperature scald.

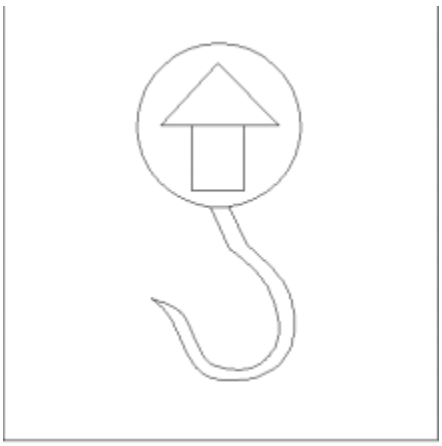


18. TOPS/ROPS certification



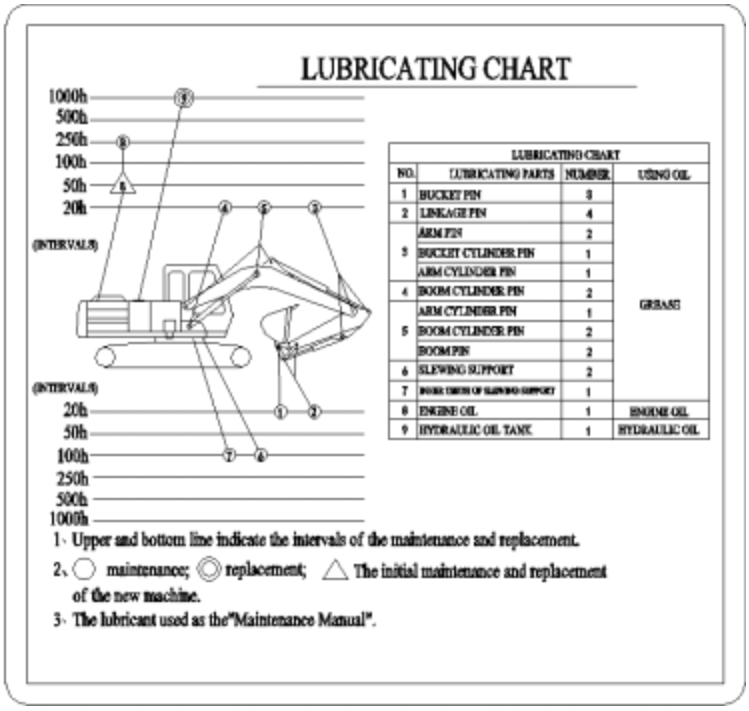
19. Lifting sign

Indicates the point identification of the lifting position



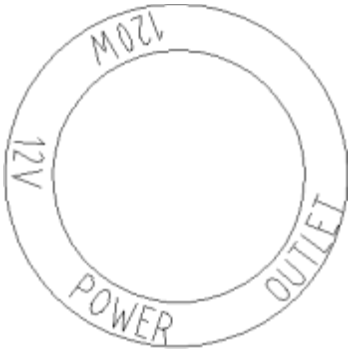
20. Suffix Engine model decal-V74（(for YANMAR 3TNV74F Engine)）

21. Lubrication cycle table



LUBRICATING CHART			
NO.	LUBRICATING PARTS	NUMBER	USING OIL
1	BUCKET PIN	3	GREASE
2	LINKAGE PIN	4	
3	ARM PIN	2	
	BUCKET CYLINDER PIN	1	
	ARM CYLINDER PIN	1	
4	BOOM CYLINDER PIN	2	
5	ARM CYLINDER PIN	1	
	BOOM CYLINDER PIN	2	
	BOOM PIN	2	
6	SLEWING SUPPORT	2	
7	[illegible]	1	
8	ENGINE OIL	1	ENGINE OIL
9	HYDRAULIC OIL TANK	1	HYDRAULIC OIL

22. Cigarette lighter logo



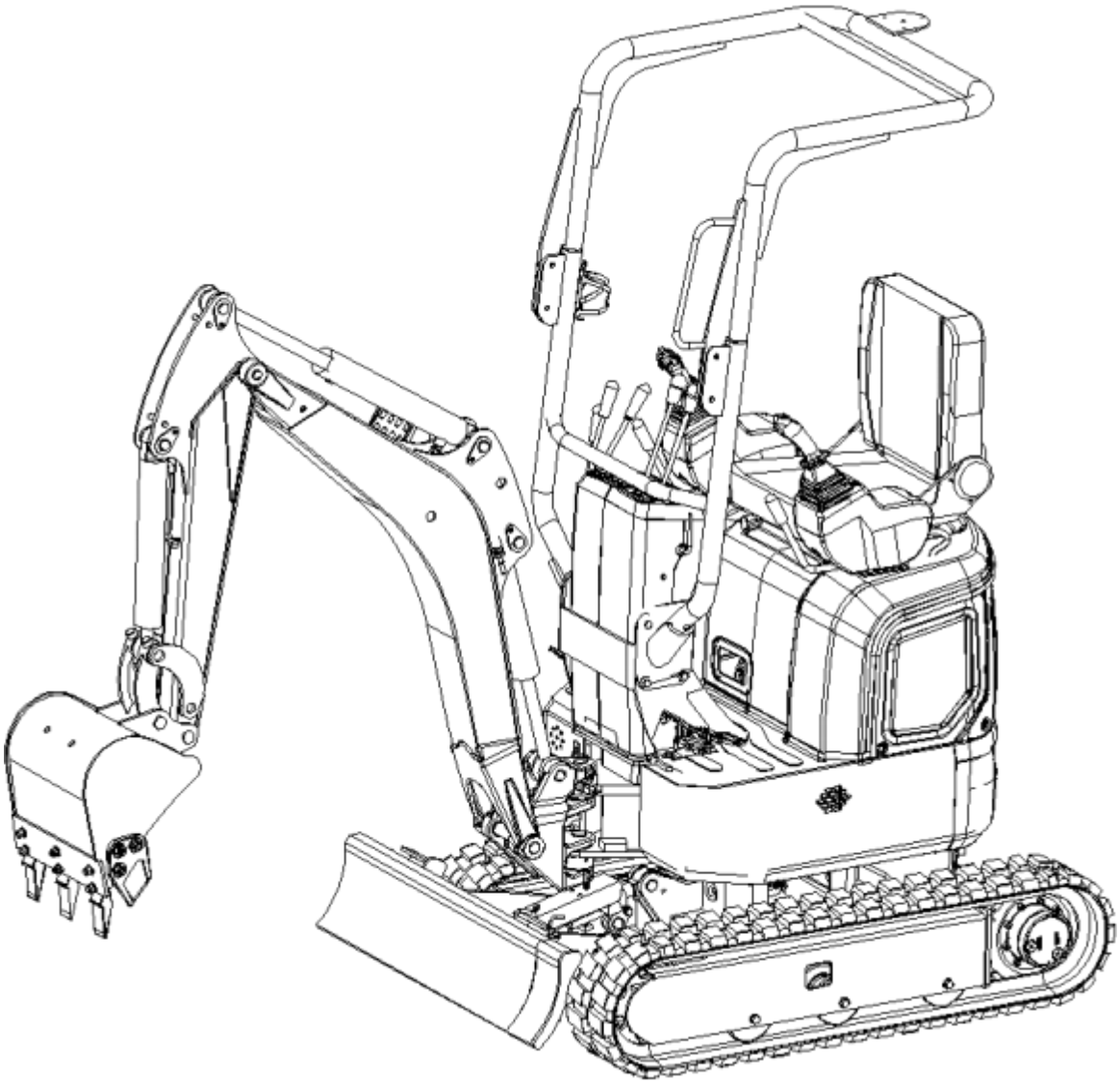
23. Slope warning sign

2 Usage Features and Performance Parameters of LeKing 1.2T Excavators

2.1 Usage and features

LeKing 1.2T Excavators are provided with excavating, crushing, ditch cleaning, drilling and bulldozing, with their attachments quick hitched and thus its utilization up greatly. In addition, they are easy to operate and transport and flexible to work at narrow site.

Picture Ⅰ LeKing 1.2T Ultra-compact size, minimum back swing radius Excavators, hydraulic type with single bucket（The picture is KV12 model Pilot handle controll model）

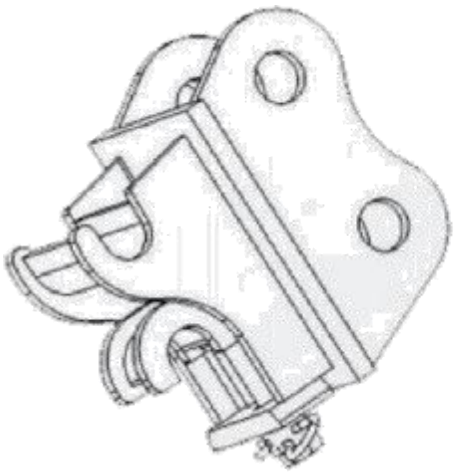


This type of excavators are mainly applied to: farming, landscaping, ditching and fertilization in garden, vegetable greenhouse, agricultural transformation, indoor demolition, small earthwork, civil engineering, road recovery, basement and indoor construction, concrete breaking, burying of cable, laying of water supply line,

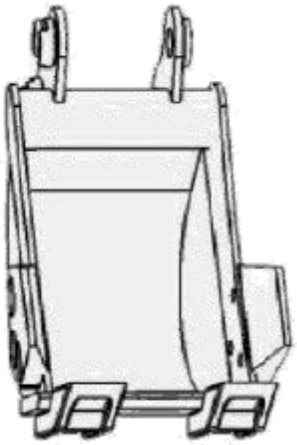
garden cultivation, desilting and others.

The excavator are equipped diesel engines, domestic main pumps and rotary motors, traveling motor, featuring comprehensive guarantee, durability and flexibility.

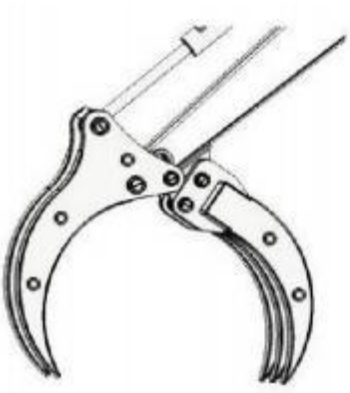
Excavators are able to equipped with multiple work equipments, such as quick hitch, log grab, ripper, leveling bucket, auger and narrow bucket, as well as optional roof, radiator and others, so as to meet your needing.



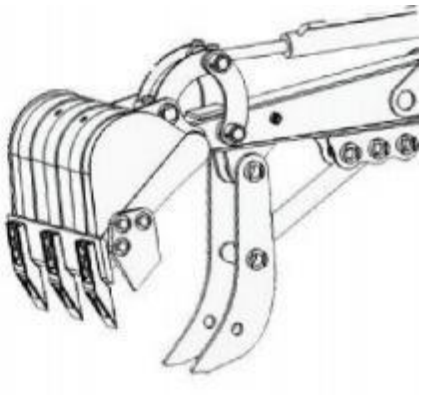
Quick hitch



Narrow bucket



Log grab



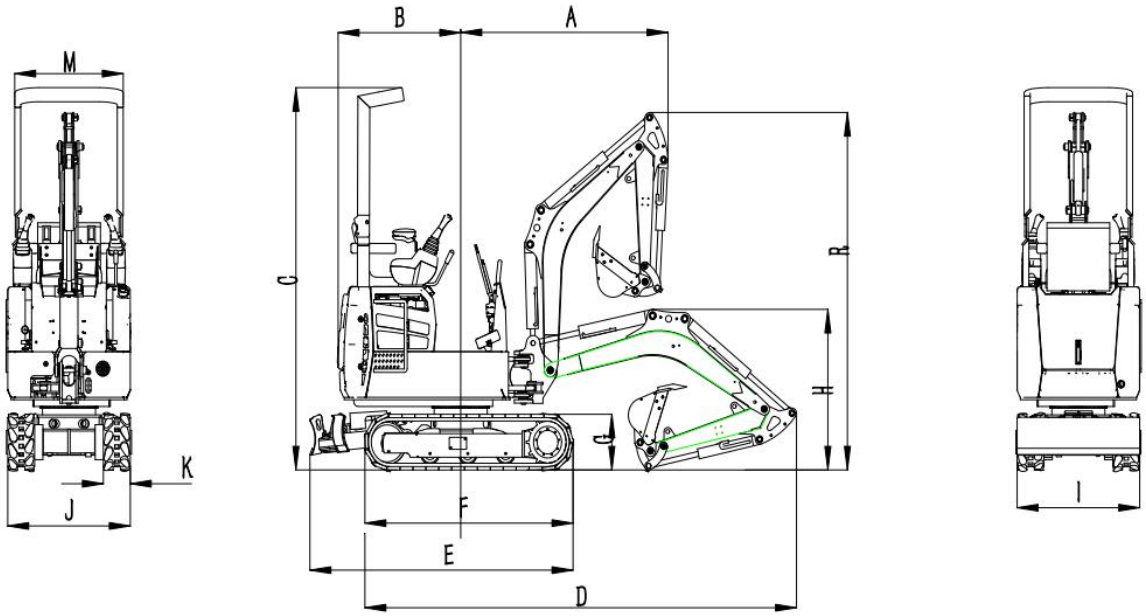
Mechanical thumb

Auger

Ripper

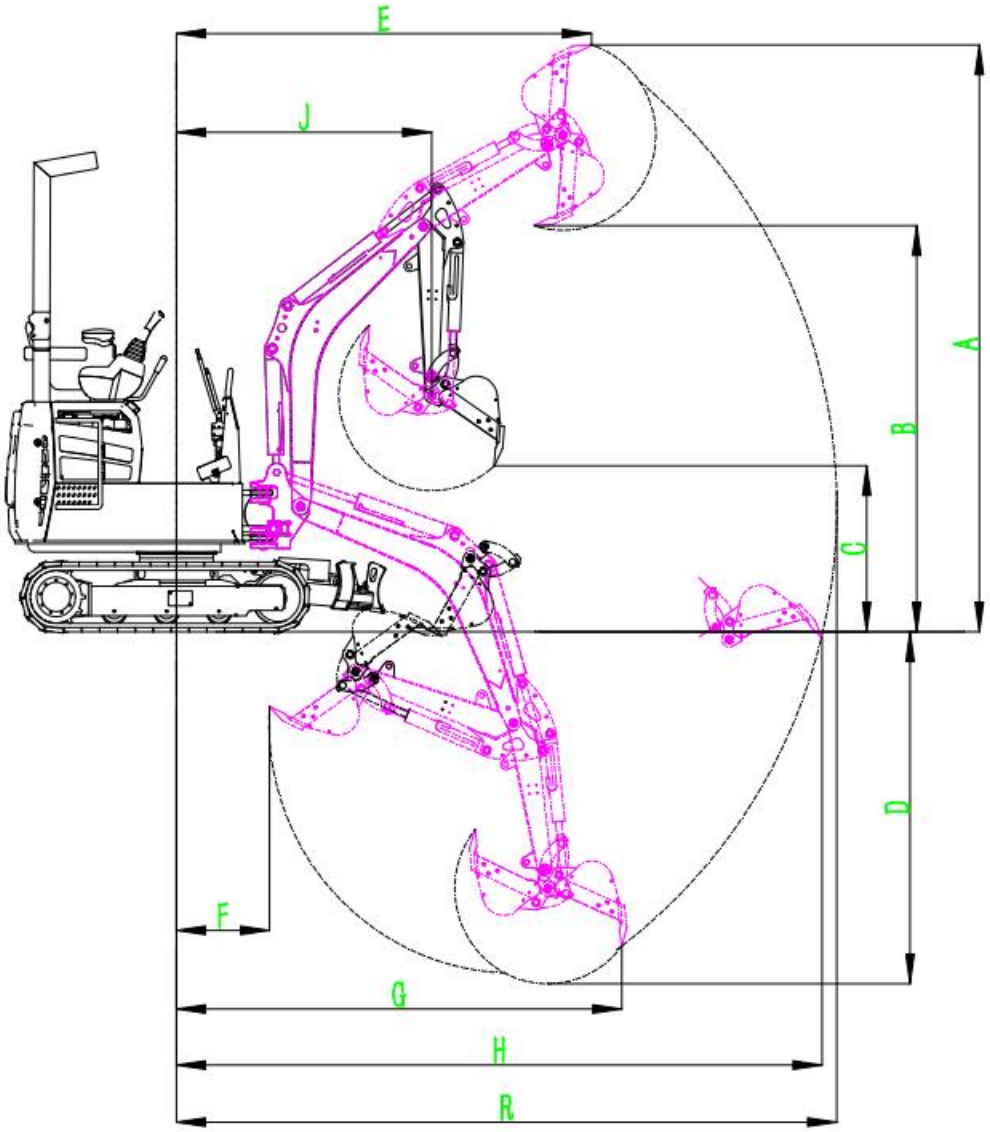
Rak

2.2 Main performance parameters



Appearance parameters

Overall dimensions	**KV10/KV12**
	Unit:mm
A Wheel track	1062
B Overall length of track	1404
C The counterweight ground clearance	324
D Tail turning radius	546
E Chassis width(scalable)	820/1020
F Crawler width	180
G Crawler height	324
H Transportation length	3058
I Overall height（Driving shed top）	2323
Deflection angle left °/ right °	50°/40°
Gradeability	18



Working parameters

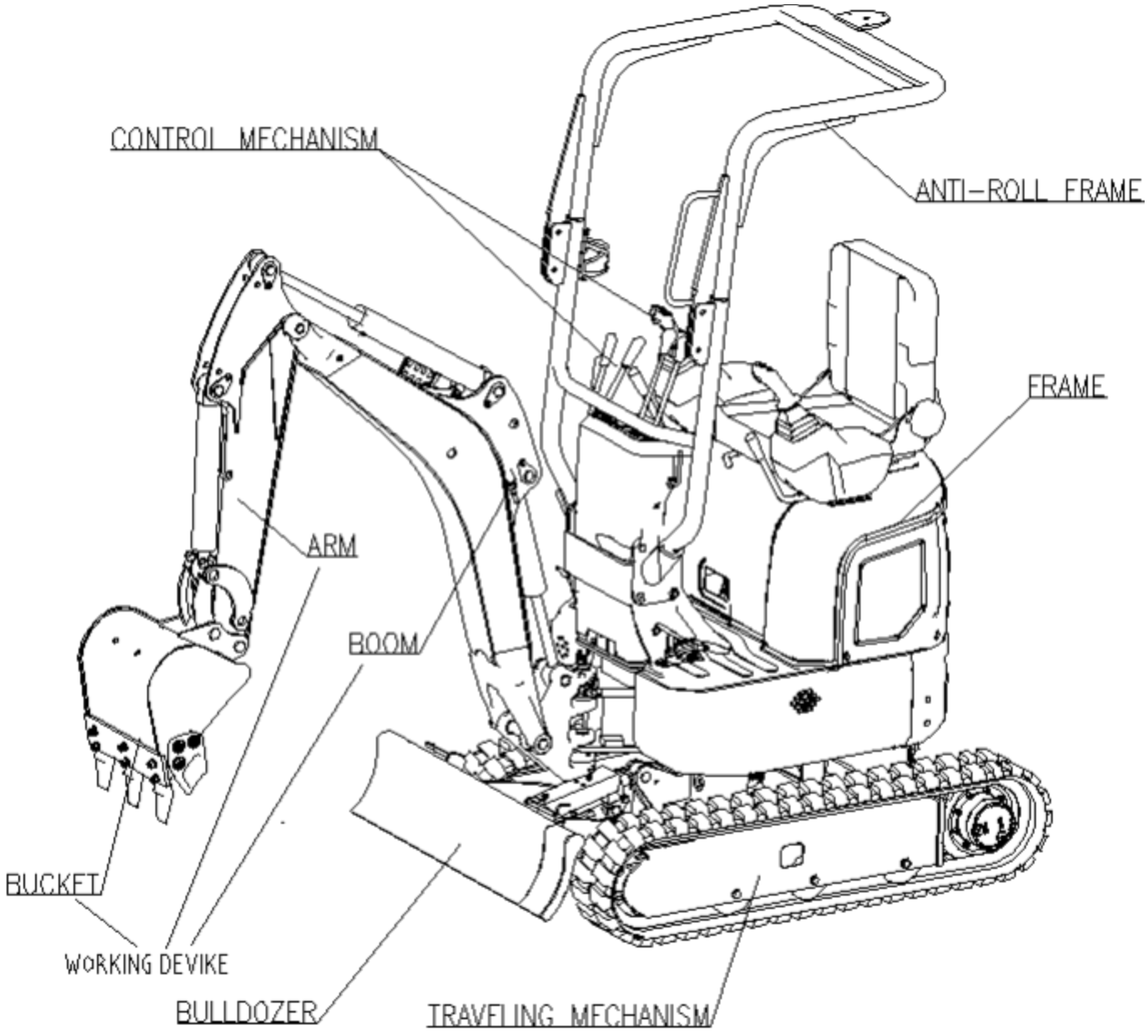
Overall dimensions	**n12.C**
	Unit:mm
A Max. digging radius on ground	3494
B Max. digging depth	1830
C Max. digging height	3062
D Max. unloading height	2074
E Max. vertical digging depth	1613
F Min. swing radius	1665
G Maximum lifting height of bulldozer blade	184
H Max. digging depth of dozer blade	276

Overall dimensions	KV10	KV12
	Koop/kubota z482	kubota z482
Operating mass（kg）	1200	
Standard bucket capacity（m^3）	0.03	
Rated power(kw /r/min)	7/3000	8.5/2400
Travel speed (km/h)	1.5/3.5	
Swing speed (r/min)	11.5	12
Arm digging force（KN）	6	6
Bucket digging force (KN)	10	10

3 Basic Structures and Work Principle of LeKing 1.2T Excavators

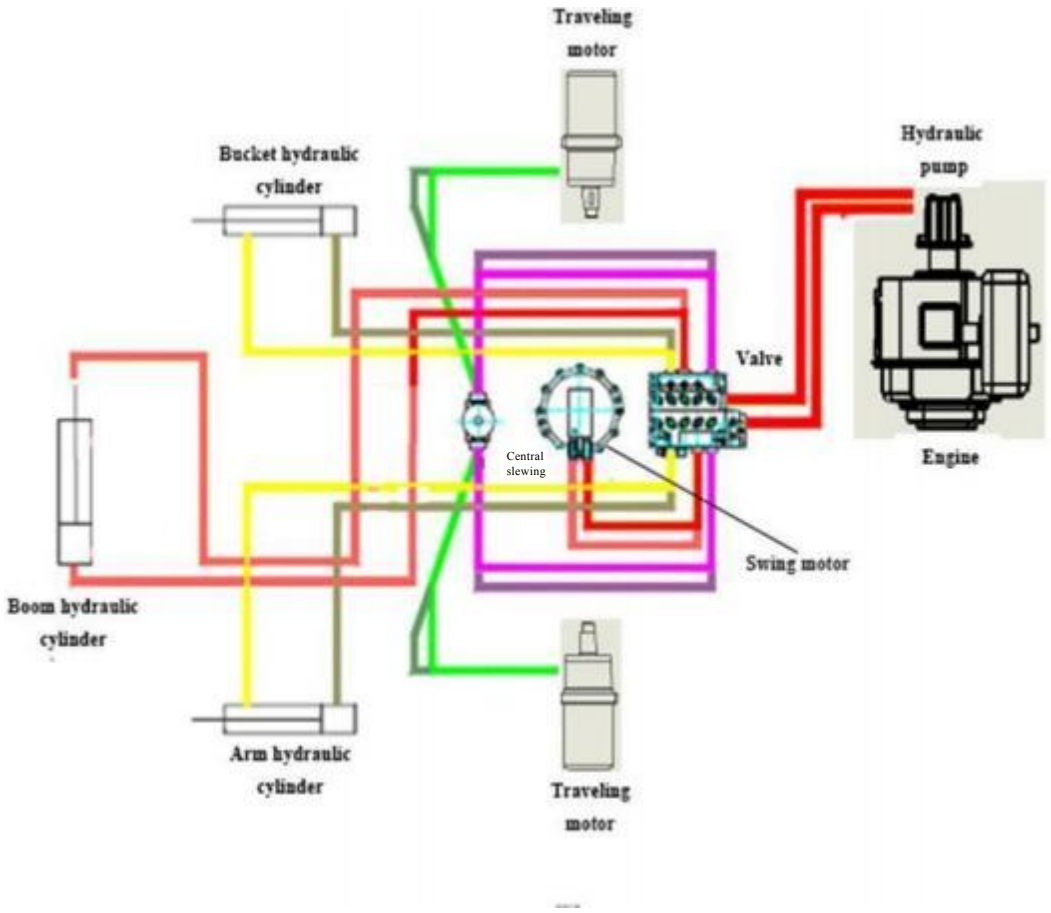
3.1 Overview on LeKing 1.2T excavators

LeKing 1.2T excavator is composed of power train, work equipment, swing mechanism, control mechanism, drive system, traveling mechanism and auxiliary equipment, as shown in fig. 1-1. Mounted on the rotary table are the regular full- swing type hydraulic excavators, main components of drive system, swing mechanism and auxiliary devices, which are referred to as upper rotary. Therefore, a LeKing 1.2T excavator is divided into work equipment, upper rotary and traveling mechanism.（Picture for the 1.2T model pilot operating model）



3.2 Work principle of excavators

Diesel engine changes the chemical energy of diesel into mechanical energy that is then altered with hydraulic gear pump to hydraulic energy that is distributed to each actuating element (such as hydraulic cylinder, swing motor and traveling motor). After that, each actuating element transform the hydraulic energy back to mechanical energy, driving the work equipment and running the complete machine.



Movement and power transmission route of excavator shown below:

1. Traveling power route: diesel engine —— coupler —— hydraulic pump (mechanical energy changed to hydraulic energy) —— distributor valve —— central swing joint —— traveling motor (hydraulic energy changed to mechanical energy)—— sprocket —— rubber crawler—— starting of traveling
2. Swing power route: diesel engine —— coupler —— hydraulic pump (mechanical energy changed to hydraulic energy) —— distributor valve—— swing motor (hydraulic energy changed to mechanical energy)
3. —— slewing bearing —— realizing of wing
4. Boom power route: diesel engine —— coupler —— hydraulic pump (mechanical energy changed to hydraulic energy) —— distributor valve —— boom cylinder (hydraulic energy changed to mechanical energy)——boom movement
5. Arm power route: diesel engine —— coupler —— hydraulic pump (mechanical energy changed to hydraulic energy) —— distributor valve —— arm cylinder (hydraulic energy changed to mechanical energy) —— arm movement
6. Bucket power route: diesel engine ——coupler —— hydraulic pump (mechanical energy changed to hydraulic energy) —— distributor valve —— bucket cylinder (hydraulic energy changed to mechanical energy) —— bucket movement

3.3 Basic structure of LeKing 1.2T excavators mechanical system

3.3.1 Power system

LeKing 1.2T excavator is equipped with three cylinder water-cooled diesel engine.

3.3.2 Drive system

LeKing 1.2T excavator's drive system could transfer the output power from diesel engine through the hydraulic system to work equipment, swing mechanism and traveling mechanism.

3.3.3 Swing mechanism

Swing mechanism could turn the work equipment and upper rotary leftwards and rightwards, so as to do the excavating and the unloading. LeKing 1.2T excavator's swing mechanism has to fix the rotary table onto frame and has it swing flexibly, without any inclining risk. Therefore, LeKing 1.2T excavator is equipped with a slewing support (supports) and a slewing drive (power of turntable slewing), which are called by a joint name as swing mechanism.

a. Slewing support

LeKing 1.2T excavator has its rotary table supported with a rolling bearing, realizing the swinging of upper rotary.

b. Rotary drive

LeKing 1.2T excavator adopts the direct drive type. Namely, the output shaft of low-speed high-torque hydraulic motor is mounted with a driving pinion which meshes with the slewing gear ring.

3.3.4 Traveling mechanism

Traveling mechanism supports the complete weight of excavator and drives it to run.

LeKing 1.2T excavator has the crawler traveling mechanism similar to other crawlers, with one hydraulic motor driving one track. This excavator adopts low-speed high-torque motor. When two hydraulic motors run in the same direction, this machine goes straightly forward; when one motor is supplied with oil and the other is braked, excavator steers around the braked track; when two motors runs reversely, excavator rotates in situ.

Each part of traveling mechanism is mounted on integral traveling frame. The pressure oil from hydraulic pump goes through the multi-way directional valve and the central swing joint into the hydraulic traveling motor that changes the pressure energy into output torque that then goes to sprocket, driving excavator to run.

LeKing 1.2T excavator's sprockets are of integral castings and able to correctly engage with track, featuring balance drive. Sprockets located at rear part of excavator, shortening the tension er part and relieving the track abrasion, wear and power consumption. Each track is equipped with a tension er, adjusting the track tension and reducing the track vibration noise, abrasion, wear and power loss.

a. Work equipment

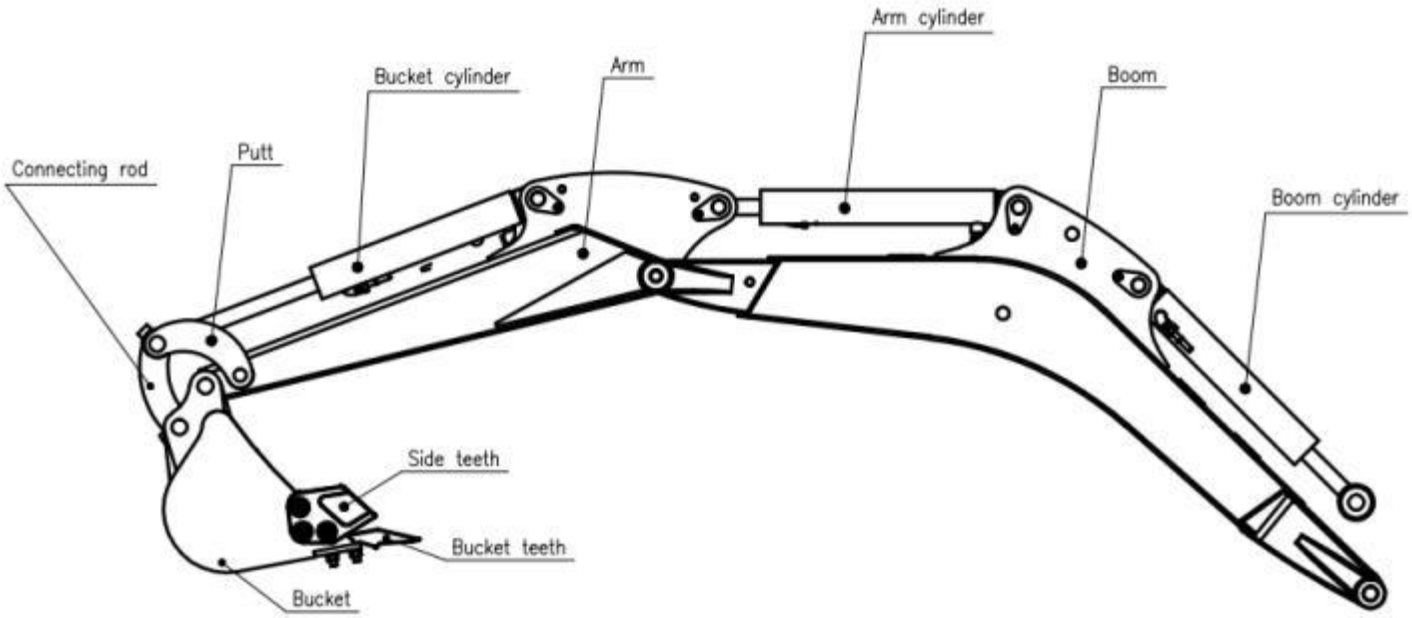
The hydraulic excavator could have multiple work equipment, up to dozens of varieties, with backhoe and ripper most popular.

LeKing 1.2T excavator has the boom, arm and bucket articulated with each other, as shown in figure and swing around their articulated points respectively with aid of the hydraulic cylinder, finishing the excavating, lifting and unloading.

b. Boom

As the main component of backhoe work equipment, the integrated skewed boom is adopted on LeKing 1.2T excavator.

Being of the most popular type at present, skewed boom could allow excavator to dip deeper and to lower the unloading depth, satisfying the backhoe requirements.



c. Bucket

1.Basic requirements

1) The longitudinal profile of bucket meets the law of motion of various materials inside of bucket, facilitating the material flow and minimizing the loading resistance and thus fulfilling thebucket.

2) Bucket teeth are mounted to increase the linear specific pressure of bucket onto material, with unit cutting resistance relatively low and easing to cut in and break soil. In addition, the teeth are resistant to wear and easy to replace.

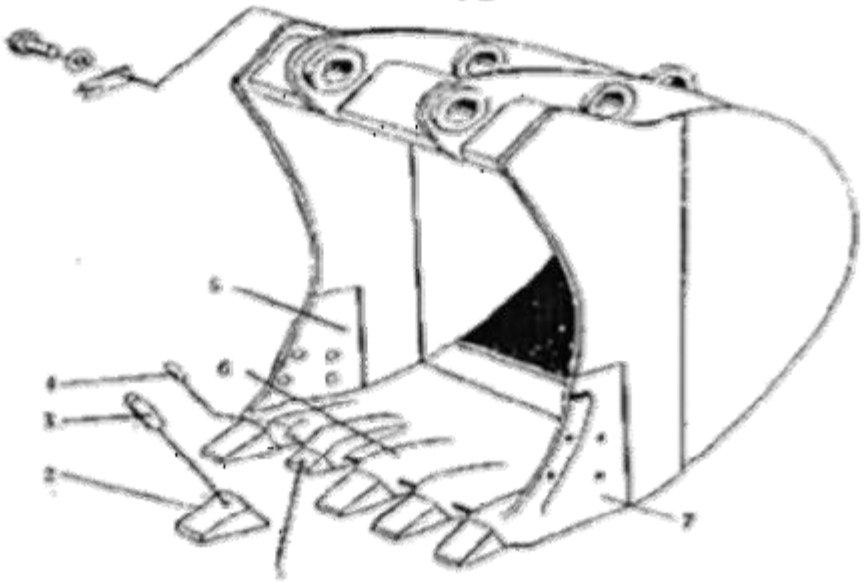
3) The load is easy to get off, shortening the unloading time and increasing the effective capacity of bucket.

2. Structure

Bucket shape and size for backhoe are highly related to work objects. In order to meet various excavation, one excavator could be equipped with multiple types of buckets, with backhoe most popular. Bucket teeth could be mounted with rubber pins and bolts

Connection between bucket and hydraulic cylinder is of linkage mechanism, with bucket directly articulated with hydraulic cylinder, which drops the rotation angle of bucket but enables the work torque to change greatly.

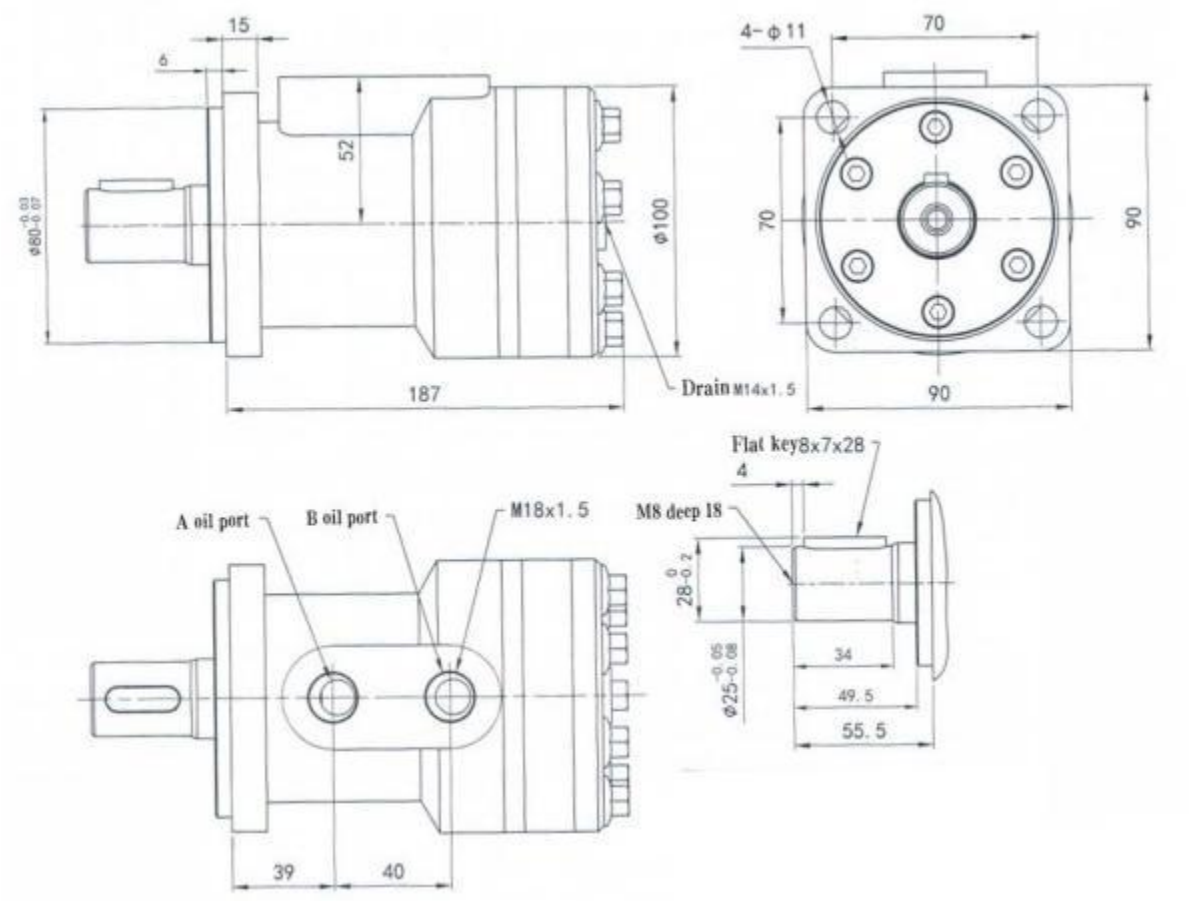
Bucket type



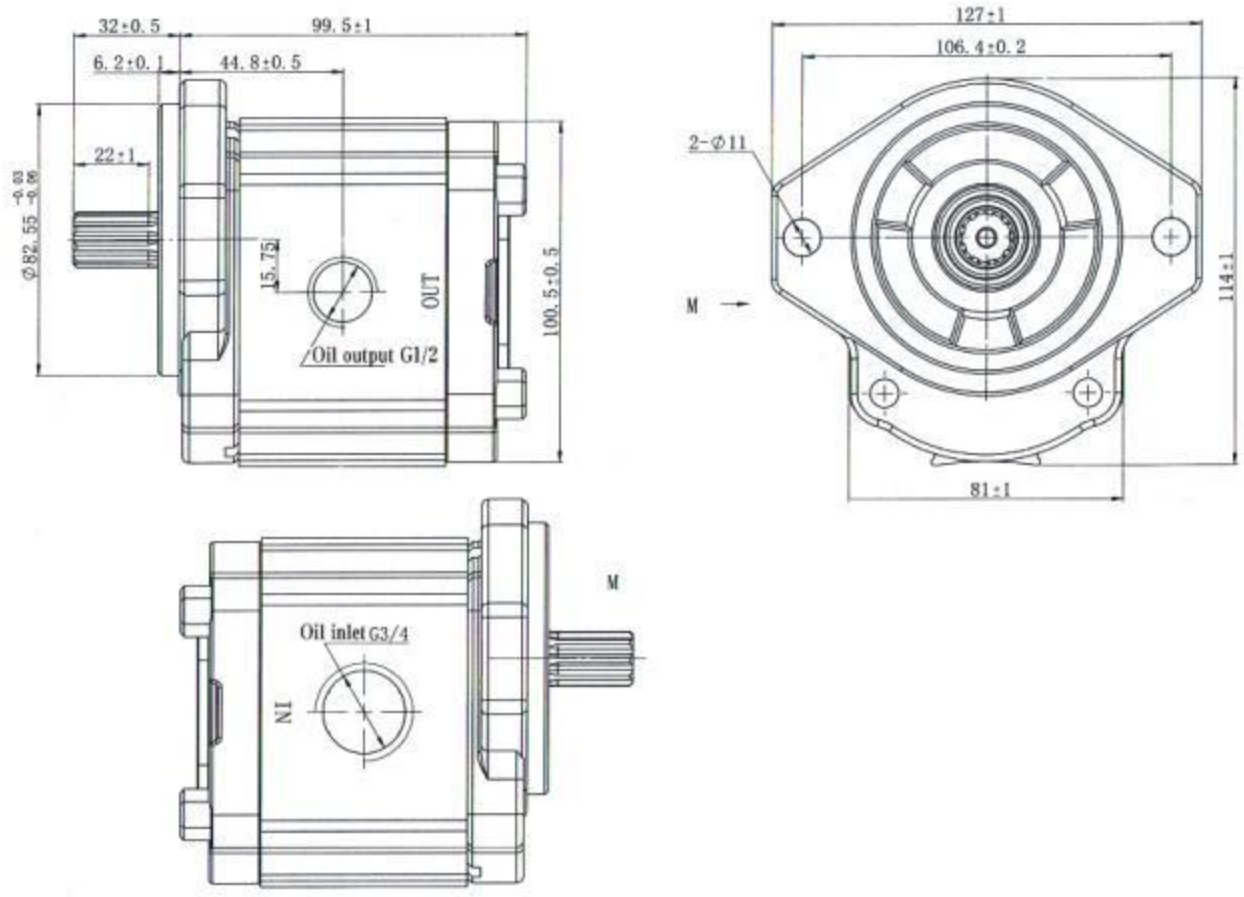
Bucket structure

3.4 Hydraulic system structure of LeKing 1.2T excavators

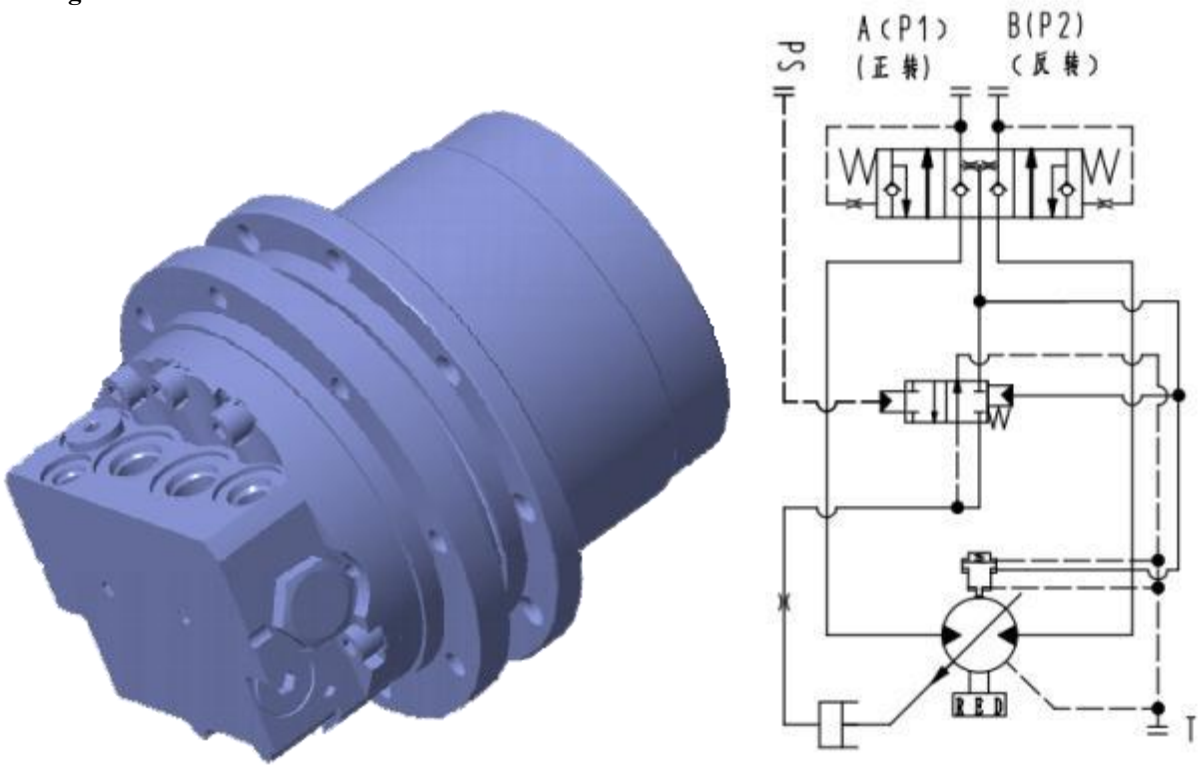
I. Rotary motor



II. Main pump


32±0.5
99.5±1
6.2±0.1
44.8±0.5
22±1
Φ82.55 -0.03 -0.06
15.75
OUT
Oil output G1/2
100.5±0.5
127±1
106.4±0.2
2-Φ11
M
114±1
81±1
M
Oil inlet G3/4
N1

Ⅲ.Traveling motor

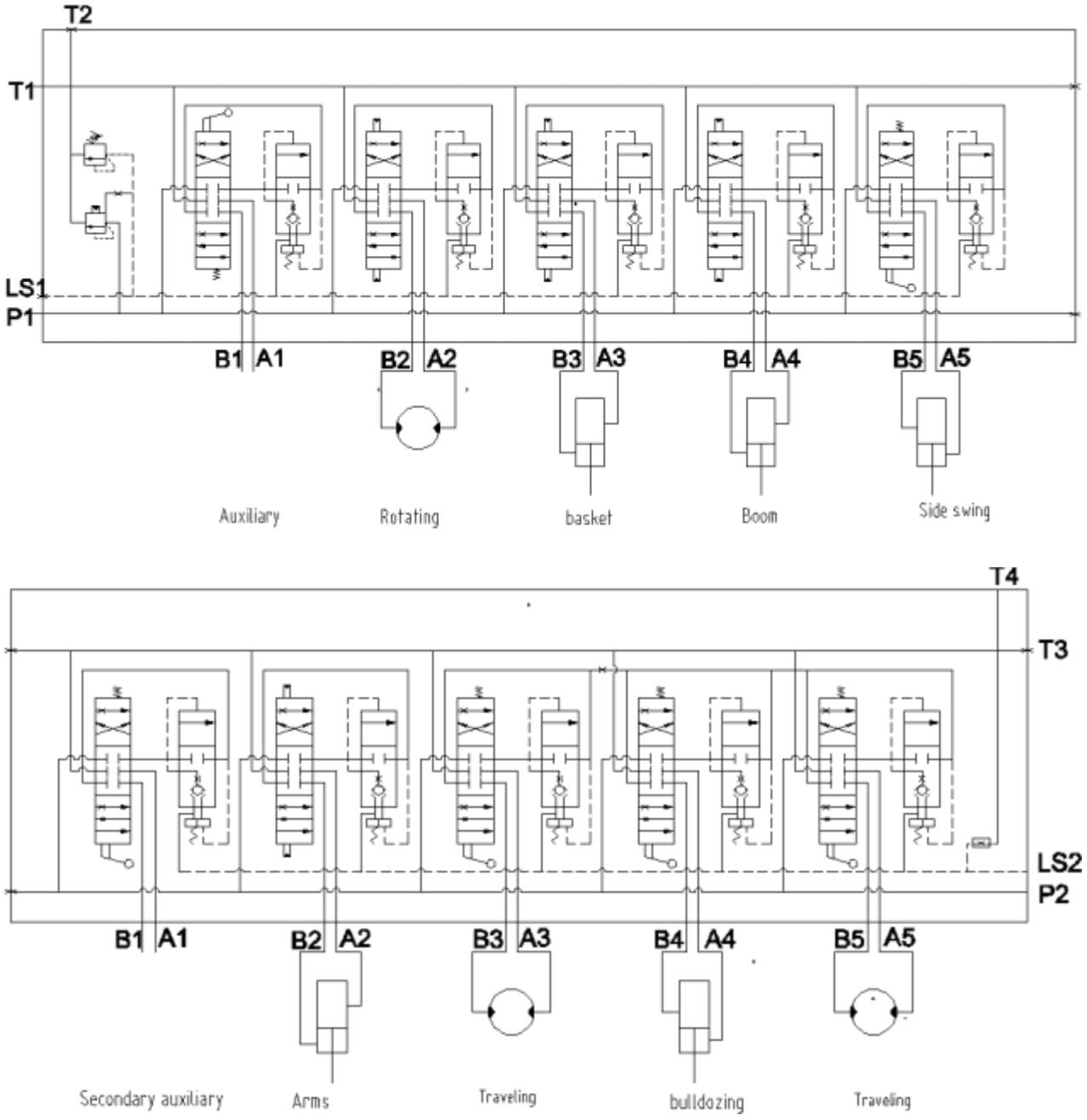


Picture Two-speed motor and Hydraulic schematic diagram

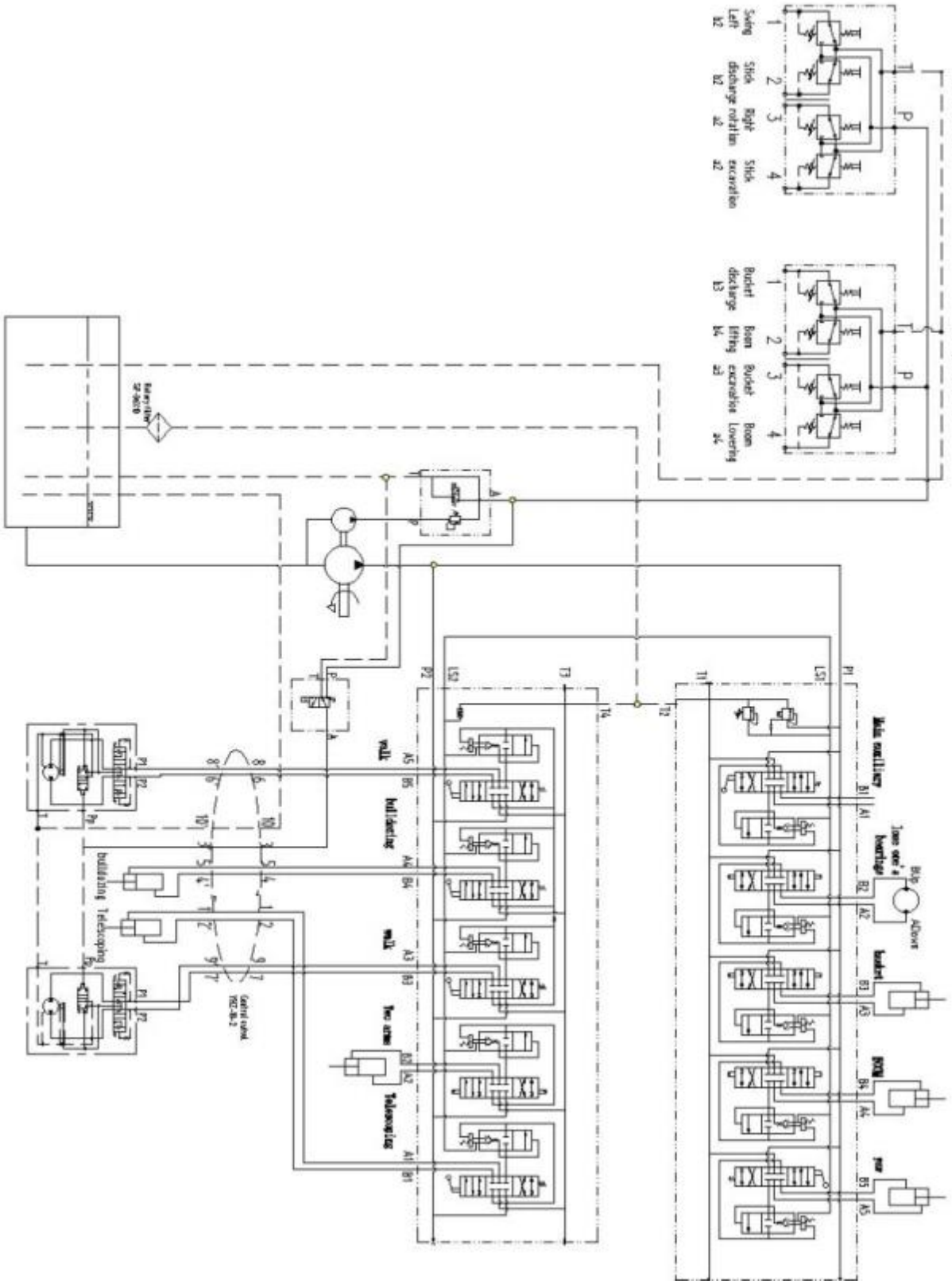
Motor Head	Max. input flow（L/min）	18.4
	Motor displacement (ml/r)	8/15.4
	Max. work pressure (Mpa)	22
	Control oil pressure (Mpa)	2-7
	Optimum working viscosity (mm2/S)	16-25
	Max. output torque (N.m)	53.9
	Theoretical output speed (rpm)	2300/1194.8
	Brake torque (N.m)	30
Reducer	Deceleration ratio	1/25.26
	Max. output torque (N.m)	1362.8
	Theoretical output speed (rpm)	91/47.3
	Total displacement (ml/r)	202/389

3.5 Hydraulic schematic diagram

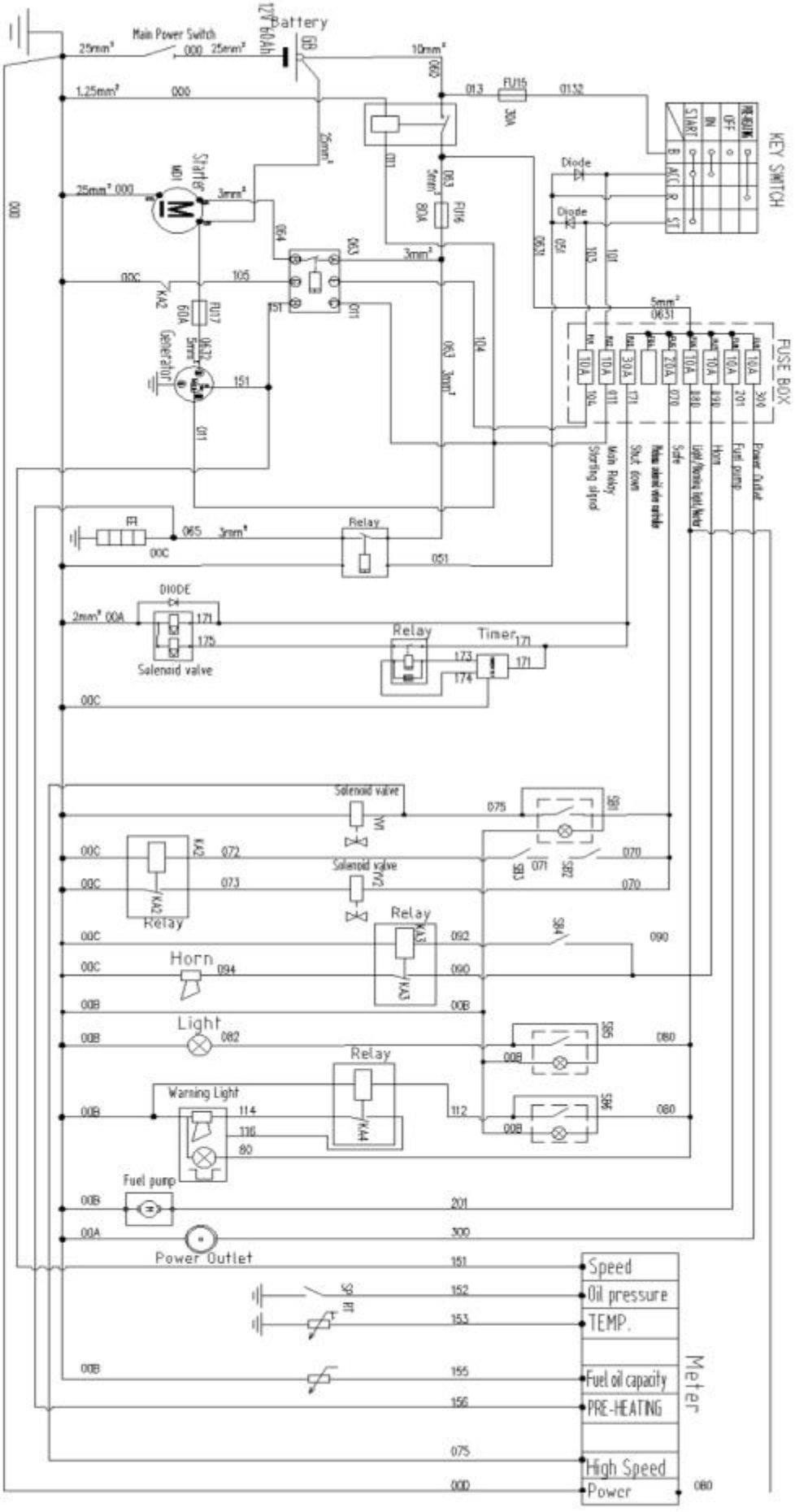
3.5.1 Main valve function diagram（**Figure 1.2 T tailless pilot operated main valve CT12BU/CT12B4U**）



3.5.2 Hydraulic schematic diagram



3.6 Electrical system diagram



4 Service Technologies of LeKing 1.2T Excavators

Being of high temperature and pressure, the LeKing 1.2T excavator could have the hydraulic oil temperature as high as 85℃, the engine silencer temperature as high as 700℃ and pressure as high as 18MPa. Therefore, the operators should be specially trained to obtain the proper certificates and to be familiar with the contents in this manual before the operations. In addition, maintenance and repair of excavator should be strictly in line with regulations to avoid any accident.

4.1 Basic construction knowledge

There are four basic movements: bucket rotation, arm stretching / backing, boom lifting / lowering and turntable swinging.

In general, pulling/pushing of hydraulic cylinder and rotation of hydraulic motor is controlled with three-way axial slide valve through the oil-flow direction and the work speed is controlled by operator or auxiliary devices according to the quantitative system and the valve openness.

1.1 Basic requirements on control system

Basic requirements on control system include:

1) Control system should be centralized in the driving area of upper rotary and satisfy the man-machine requirements. For example, controllers and driver seat should be designed according to 160-180 cm for males and 150-170 cm for females.

2) Startup and stop should be steady, with its speed and strength in control. At the same time, the combine actions should be also in control.

3) Easy, handy and visual operations In general, the operational force on handle does not exceed 40～60 N and handle travel does not exceed 17cm.

4) Control mechanism should minimize the deformation of its lever, as well as the inside clearance and the idle travel.

5) Ensure the operational performance does not change in -40～50℃.

4.2 Preparation for work

1.Inspection before startup

In order to prolong its service span, check the following before startup:

①. Check if there is dirt around or below machine, bolts loosened, any oil leaked and if any part damaged or worn.

②. Check if all switches, lamps and fuse box could work normally.

③. Check if the work equipment and hydraulic parts could work normally.

④. Check if all engine oil levels and fuel level are proper.

The above should be checked normal; otherwise engine cannot be started up until they are checked normal after troubleshooting.

2. Maintenance before startup

Before startup each shift, it is needed to grease the work equipment and the slewing bearing.

3. Preheating of machine on cold days

If it is cold, engine is difficult to start up, fuel may be frozen and hydraulic oil may increase its viscosity. Therefore, selection of fuel should be dependent on environment temperature.

When hydraulic oil is less than 25℃, it is needed to preheat the machine before any work; otherwise machine may not respond or react very quickly, leading to severe accident.

Therefore it is needed to preheat machine if it is cold:

①. Adjust the manual accelerator to have engine run at medium speed, and then slowly move bucket forth and back for 5min.

Caution: do not operate other actuators than the bucket.

②. Adjust the manual accelerator to have engine run at high speed, and then move the boom, the arm and the bucket for 5-10min.

Caution: operations are merely limited on boom, arm and bucket, instead of any slewing or traveling.

③. Each complete action of excavator should be carried out for a few times, completing the preheating and ready to work.

4.3 Operational essentials

1. Traveling

Use the traveling handles.

(1) Straight

Forwards or backward move the handle, running the machine forwards or backwards.

(2) Steering

A. Left turn in situ: backward shift the left handle and meanwhile forward push the right handle.

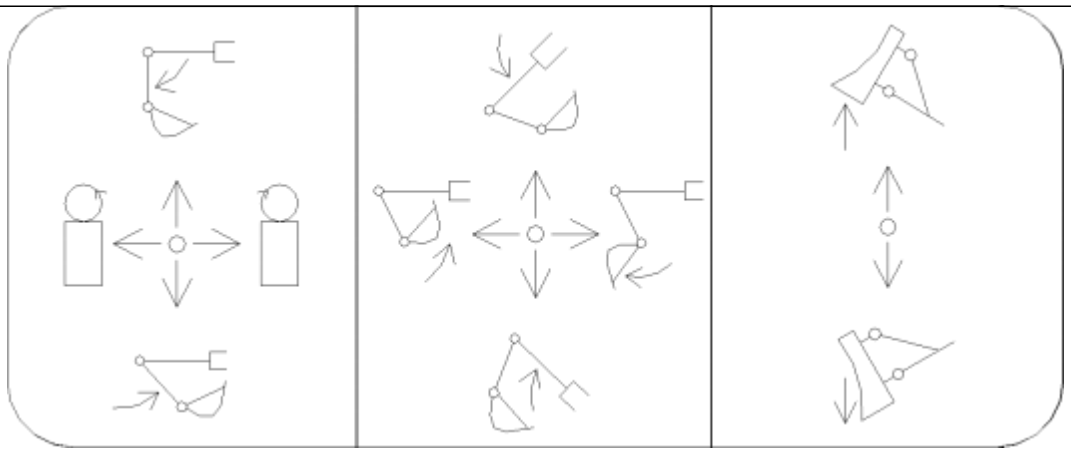
b. Right turn in situ: backward shift right handle and meanwhile forward push the left handle.

c. Left turn with left track as axis: forward move the right handle

d. Right turn with right track as axis: forward move the left handle

2. Excavation

2.1 The excavator slewing and the work equipment are respectively controlled with two handles, with positions shown below:



2.2 Basic excavation

2.2.1 Before excavation, the arm cylinder should have angle with the arm as 90°, bucket with ground to be excavated as 30°. Only in such case, can each cylinder have the max. excavating force. It is suitable for relatively hard soil, so as to decrease the excavating resistance.

2.2.2 To excavate any soft soil, bucket should be angled with the soil to be 60°, increasing the work efficiency.

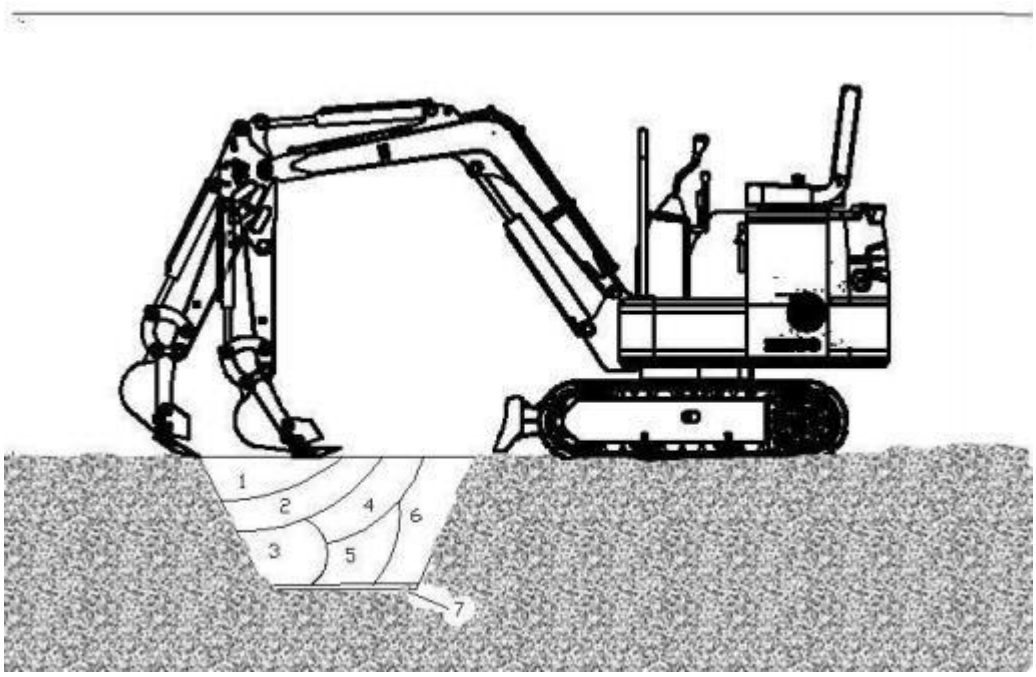
2.3 Lower excavation

Keep the angle between bucket base and the bevel at 30°, and retract the arm to start work.

2.4 Upper excavation

Keep the bucket blade vertical to the ground, and retract the arm to start work.

2.5 Ditching is carried out in 7 steps, as shown in figure.



4.4 Operational Precautions

4.4.1 Safety Button operation

Optional:May increase according to the customer request

Push button switch

1. Before starting the engine, it is necessary to put the warping O of SAFE button in Figure 1 in a press state, otherwise the engine cannot be started to prevent safety accidents caused by misstart.

2. After starting, the whole machine is in a no-action state before working. The warping I of SAFE button in Figure 1 should be pressed and the vehicle can work. Before extinguishing, the warping O of the SAFE button in Figure 1 should be pressed to prevent safety accidents caused by misaction.

Safety control lever:

1.Before starting the engine, it is necessary to turn the safety control lever to the vertical direction, otherwise the engine cannot be started, to prevent the safety accidents caused by the misstart.

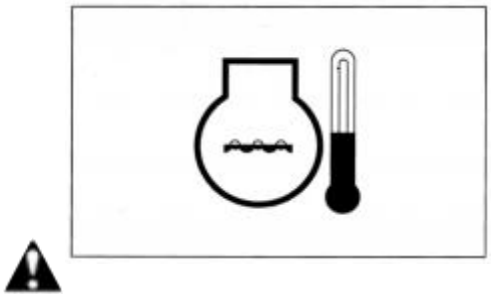
2.After starting, the whole machine is in a no-action state before working. The safety lever needs to be turned to the horizontal direction, and the whole vehicle can work. Before flameout, it is necessary to turn the safety lever to the vertical direction to prevent safety accidents caused by misaction.

Safety control lever

Schematic diagram of mechanical control instrument:

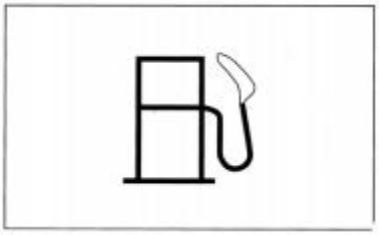
1. Cooling water thermometer

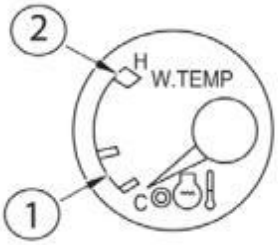
Monitor the engine cooling water temperature, and zone 1 indicates the normal water temperature. When the temperature reaches zone 2 and 102 ℃, the lamp is on and accompanied by a buzzer.

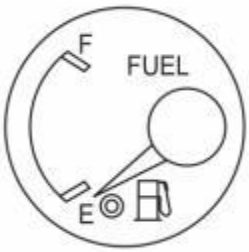


2. Fuel gauge

Add fuel before the fuel indicator enters the red zone

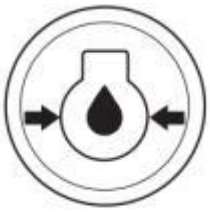






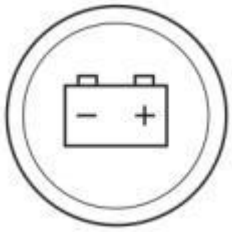
3. Engine oil pressure alarm indication

Monitor the engine oil temperature. If the engine oil pressure is lower than the normal level, the alarm light will be on and the buzzer will sound. At this point, stop the engine and check.

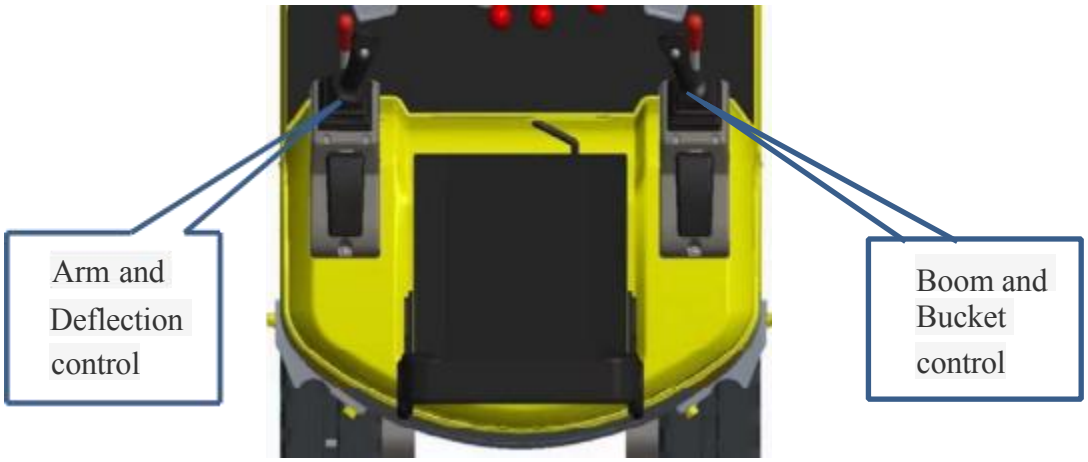


4. Charging alarm indicator

If the battery is not properly charged, the warning lamp will flash. Please check the battery charging circuit.



4.4.2 Safety Button operation



4.4.3 Prohibitions and precautions for hydraulic excavators

1. Avoid the landsliding and the stone falling.
2. Avoid any striking of work equipment.
3. Avoid the bucket from colliding with other vehicle body, the loaded bucket crossing over other vehicle cab or persons.
4. Avoid the excavator from sinking into soft ground or wetland.
5. In traveling, avoid any large obstacles such as large stone.
6. It is prohibited to work with water depth exceeding the allowable limit.
7. While unloaded or loaded, the large stones should be handled carefully not to fall down.
8. On cold days, park the machine on solid ground to avoid the track being frozen. Remove any scrap away from track and its frame. If track is iced onto ground, use boom to lift track and carefully move the machine, so as not to damage the sprocket and the track.
9. Before movement of machine, make sure the traveling direction is consistent with its handle. When traveling motor is at rear part, forward push the traveling handle, to drive machine forwards.
10. For long - distance traveling, please rest for 5min every running for 20min, so as not to damage the traveling motor.
11. Never try to cross over a slope of more than 15 degree, so as to avoid the machine from overturning.
12. Avoid any accidents occurring during machine reversing or slewing.
13. In work, do not completely dig the soil out of bottom of machine.
14. Avoid any collapse: never run on high dam or slope, which otherwise may have the machine collapsed or sliding away, leading to severe accident.
15. Be careful of underground facilities: unexpected cutoff the underground cables or gas pipe may lead to explosion, fire or even personal casualty.
16. Be careful of overhead facilities such as bridge: if work equipment or other parts collides with over-bridge or others, it may result in personal injury; care must be taken to prevent the boom or the arm from colliding with any elevated item.
17. Keep safe distance from overhead power line: in work around power line, do not have any part of machine or any load move to 3m timed by 2 of away from the power insulation. Verify and abide by the local related laws and rules. Wetland may have the range of electric shock enlarged. Therefore, the irrelative should be kept away from work area.

5 Maintenance of LeKing 1.2T Excavators

5.1 Safty precautions for servicing, disassembly and reassembly

Safty precautions for servicing

Most accidents during servicing arise from carelessness. Please remember that safty involves both the welfare of the employees and improved work efficiency.

Safty precautions for Disassembly and reassembly

Machines must be diassembled and assembled efficiently and safely.

It is very important to thoroughly understand the construction and function of the machine, to make all appropriate preparations, and start operations according to the specified working procedures.

5.1.1 Safty measures before starting work

1. Work clothes

1). Wear specified work cap and clothed. (Under no circumstances may workers wear undershirts only.)

Cuffs must be kept buttoned, and any tears must be mended.)

2). Wear safety shoes.

3).Do not wear cotton gloves when working on the internal section of engine, reduction gears or hydrauricunits for repair or others, or when using a hammer. Wear leather gloves, however, when hoisting wires.

2.Inspecting equipment and tools

1). Prepare equipment (cranes, fork lifts, tool, etc.) required for servicing and inspect for any problems before starting work.

2). Hammer heads (metal parts) must be firmly secured to their handles.

3) .Check hosting tools (wire ropes, hoisting chains, etc.) before use.

3.Keep workshop in order

1). Secure appropriate space needed for disassembly to the job.

2).Secure a clean, safe place for arranging dis- assembled parts.

3).Store volatile substances (gasoline, light oil, thinner, oily articles, etc.) in appropriate con- tainers at selected locations to prevent fire hazards.

5.1.2 Safty measures during work

1. Protectors

- Wear goggles when using chisels for chip- ping.
- Use appropriate protectors during welding.
- Wear a helmet when working with a crane or at elevated locations.

2. Team work

- When working with two or more people, divide the work and maintain close communication.
- Clean work must be carried out using predetermined signals.

3. Disassembly and assembly

- Do not wear gloves when using hammers.
- Use rods of the specified soft material for removing pins. Do not use a hammer as a pad.
- Do not place fingers in holes when centering.
- Heavy parts must be adequately supported before removing bolts.

4. Cranes

- In principle, use a crane for objects heavier than 44lb (20kg).
- Crane operation and hoisting must be per- formed only by qualified personal.
- Pay careful attention to the center of gravity when hoisting, and do not stand under the lifted objects.

5. Others

- To work under a jacked-up carrier, be sure to place wood pieces under it.
- When charging batteris, make sure there are no open flames in the immediate vicinity.
- All electric tools must be grounded.
- Before welding the machine, remove the battery.
- When removing the battery, be sure to dis- connect negative (-) cord first.
- When mounting the battery, be sure tp connect the positive (+) cord first.

5.1.3 Preparation for disassembly

1. Cleaning

Remove mud and dirt from the body before disassembly.

2. Acceptance inspection

The machine must be checked before it is disassembled to record existing conditions, such as those listed below.

Model, serial number, and hourmeter reading

- Reason for repair and repair history
- Element stains
- Fuel and oil condition
- Parts damage *(Take photographs if nessesary.)

3. Equipment and tools

prepare equipment, tools, cranes and parts storage racks as required.

- Precautions for disassembly and reassembly

4. Disassembly

- Follow the specified disassembly procedures.
- Make alignment marks to insure correct reassembly.
- Arrange disassembled parts in an orderly way, and attach identification tags or put marks if needed.

5. Reassembly

- Clean all parts before assembly. Repair any scratches or dents. Take special precautions against dirt and dust.
- Parts with rust-preventive coatings must be assembles only after removing the corting.
- Separated parts must be correctly reassembled using alignment marks.
- As a rule, use a press to reassembled bearings, bushing and oil seals. Use pads when using a hammer.

5.2 Daily inspection and maintenance

S/N	Item	Quantity	Interval (h)			Remark
			everyday	20	100	
1	Check the engine oil level in sump	1	★			
2	Check the hydraulic oil level in hydraulic oil tank	1	★			
3	Check the fuel level in tank	**1**	★			
4	Check if the fuel pipe is leaked or cracked	----	★			
5	Check the oil-water separator to completely drain, any water or sediment out	1		★		
6	Check the work equipment pivots	----			★	
7	Check if the hydraulic hose and the pipeline leak	----	★			
8	Check if the bucket teeth is worn or loosened.	3+2	★			
9	Check the bolts and nuts for tightening torque	----	★			

Note: ★: Maintenance interval under normal conditions

5.3 Periods of overhaul, medium and minor repair

S/N	Maintenance items	Interval (h)									Remark
		50	100	250	500	1000	1500	2000	2500	4000	
1	Greasing of slewing bearing		★								
2	Greasing of slewing bearing gears		★								
3	Change the engine oil	●		★							
4	Change the engine oil filter elements	●		★							

5	Change the hydraulic oil					★					
6	Change the hydraulic oil filter elements				★						
7	Check if the fuel pipe is cracked or bent.		★								
8	Change the oil-waterseparator			★							
9	Check the defection oftrack				★						
10	Maintenance of tensioner	★									
Note: ★: Maintenance interval under normal conditions ●: Maintenance needed at the first inspection											

5.4 Technical maintenance

5.4.1、 Grease

Parts		Quantity	Interval (h)						
			20	50	100	250	500	1000	2000
1. Lubrication of work equipment pins	Pivot at base of boom	7	★						
	Pivot at base of Stick and bulldozer								
	Pivots of bucket and connecting rod								
	Cylinder connection	9	★						
2.Lubrication of slewing bearing		1			★				
3. Lubrication of rotary motor gear		1			★				
Note:b it is recommended to use the lithium grease. ★Maintenance interval under normal conditions									

1. Maintenance and lubrication of work equipment pivots

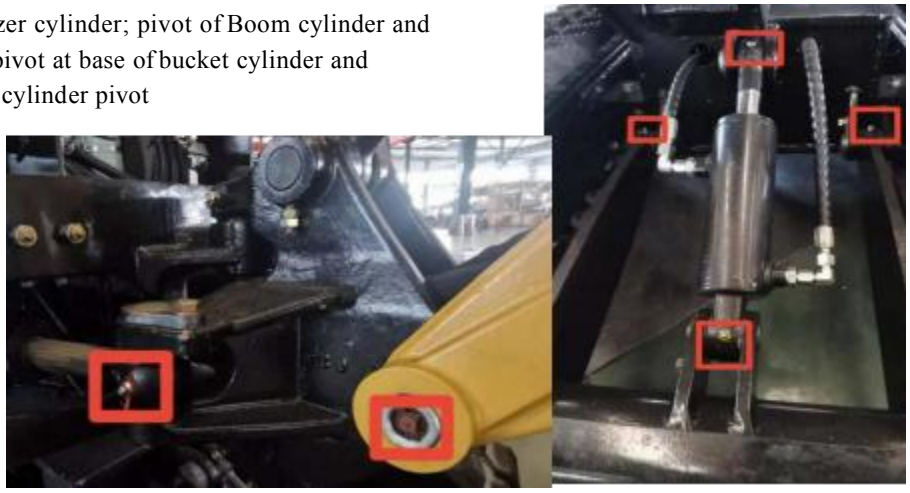
- Pivot between bucket and connecting rod

- Pivot at base of boom

- Pivot at base of Stick and bulldozer

● Others

Pivot of Bulldozer cylinder; pivot of Boom cylinder and stick cylinder; pivot at base of bucket cylinder and deflection head cylinder pivot



5.4.2 Slewing bearing - every 100h

2.1 Park machine on the flat ground.

2.2 Lower the bucket onto ground.

2.3 Idle engine at low speed for 5min.

2.4 Turn the ignition switch to OFF and then take off the key.

2.5 With the upper-structure standing still, add the grease into the two grease nipples.

2.6 Start up engine to lift the bucket free from the ground, and then swing the upper-structure by 45 degree (1/8 cycle).

2.7 Lower the bucket onto ground.

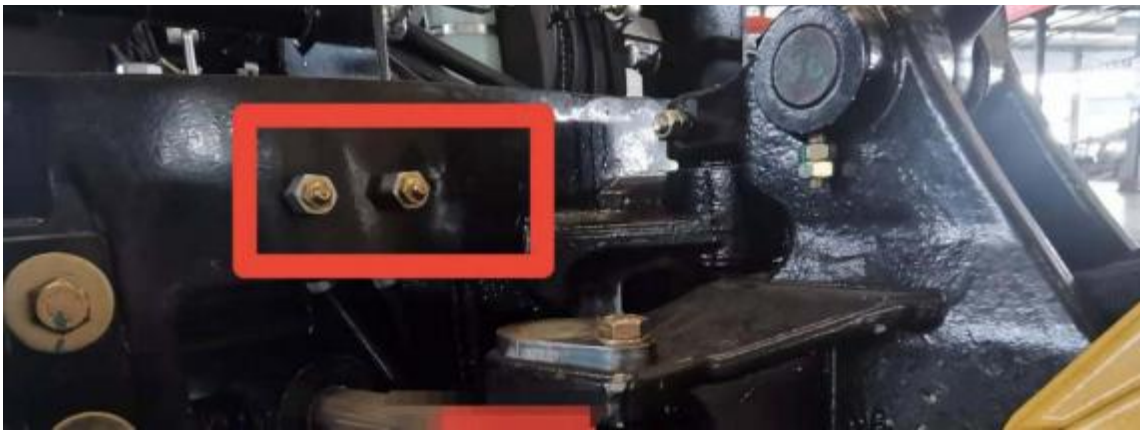
External meshing gear 93 of slewing bearing every 100h

Lower the bucket onto the ground

Turn off the engine

1. Park machine on the flat ground.
2. Lower the bucket onto ground.
3. Idle engine at low speed for 5min.
4. Turn the ignition switch to OFF and then take off the key.
5. The grease has to be stored on the top of external meshing gear of slewing bearing, free of any pollution. Add approximate 0.5kg of grease if needed.

   Any polluted grease should be replaced with new one.

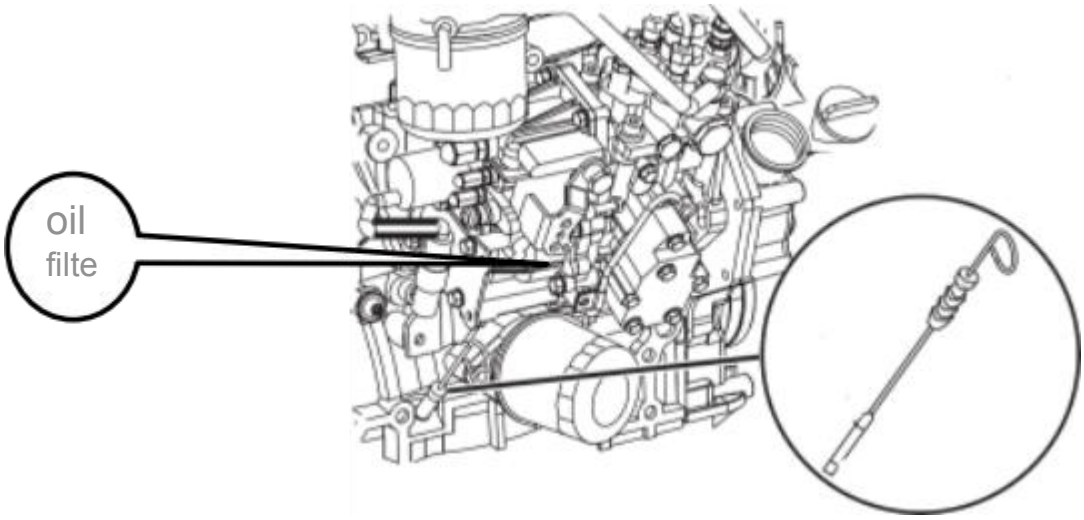


5.4.3 Engine oil

Parts	Quantity	Interval (h)						
		20	50	100	250	500	1000	2000
Engine oil	1		●		Δ			
Engine oil filter	1		●		Δ			

According to the temperature range during the interval, select the viscosity of oil listed in the table below:

Recommended engine oil brand: 15W—40 engine oil



Inspection of engine oil level ———-each day

Change of engine oil ———every 250 h Change

the engine oil filter ———every 250 h

1. Start up engine to preheat up engine oil properly.
2. Park the vehicle on the flat ground.
3. Lower the bucket onto the ground.
4. Idle engine at low speed for 5min.
5. Turn the ignition switch to OFF and then take off the key.
6. Take off the drain plug to have oil pass through clean cloth into the 2Lcontainer.
7. After that, check if there is metal scrap or others left on cloth.
8. Put the drain plug back on and tighten it
9. Loosen the drain plug to have oil flow through the filter cylinder into a container.
10. Take off the screws fixing the engine oil filter elements with a screwdriver to take the filter element out.
11. Reinstall the new filter and tighten the screws fixing the new element with a screwdriver.

12. Remove the oil filter cap to add the recommended oil into engine. After 15 min, check if the oil level is between the circle markers.

13. Put the oil filler cap back on.

14. Shut down engine Unplug the ignition key.

15. Check if the drain plug is leaking.

16. Check the oil level on dipstick.

Caution: keep your body and face away from the breather. When gear oil is still hot, please wait until it cools down and then slowly release the breather pressure!

5.4.4、Hydraulic system

Parts	Quantity	Interval (h)								
		10	50	100	250	500	1000	1500	2000	4000
Check the hydraulic oil level	1	★								
Change the hydraulic oil.(Hydraulic oil for piping and cleaning)	18L						★			
Change the hydraulic oil filter elements	1					★				
Check the hose and pipeline	--	★								
Note: ★ normal maintenance interval										

Ⅰ、Inspection and maintenance of hydraulic system

Caution: in work, the hydraulic system may become very hot. Please cool the machine down before inspection or maintenance!

1. Before maintenance of hydraulic system, make sure the machine stands on flat and solid ground.
2. Lower the bucket onto ground and shut down engine.
3. Do not start any maintenance until the systems, hydraulic oil and lubricant completely cool down, as the hydraulic system may be still hot and pressurized as soon as work is over.
   a. Drain the air out of hydraulic oil reservoir to release inside pressure.
   b. Cool the machine down.

Caution: inspection and maintenance of hot and pressure parts may cause them or hydraulic oil to spray out, leading to personal injury!

c. While removing the bolts or nuts, do not have your body facing them, as the hydraulic parts, even if they cools down, still have pressure. .

d. Never try to check the traveling or slewing motor circuits on slope, as they may have pressure due to their deadweight. .

4. While connecting the hydraulic hoses and pipeline, keep the seal surface free of any dirt and damage. Keep the above mentioned in mind:

a. Clean the hose, the pipeline and inside of hydraulic oil tank with detergent, and then thoroughly dry them.
b. Use the O-ring free of any damage or defect.

c. While connecting the pressure hose, do not twist it; otherwise its service span will be shortened. .
d. Carefully tighten the low-pressure hose clamp.

5. The hydraulic oil to be added should have the same grade. Namely, do not mix the oil with different grades. The hydraulic oil has been added before delivery, and therefore, please use the recommended oil. All oil in system should be changed at once.

6. With no hydraulic oil, never start up engine.

Ⅱ、 Inspection of hydraulic oil level --- each day

Important: With no hydraulic oil, never start up engine!

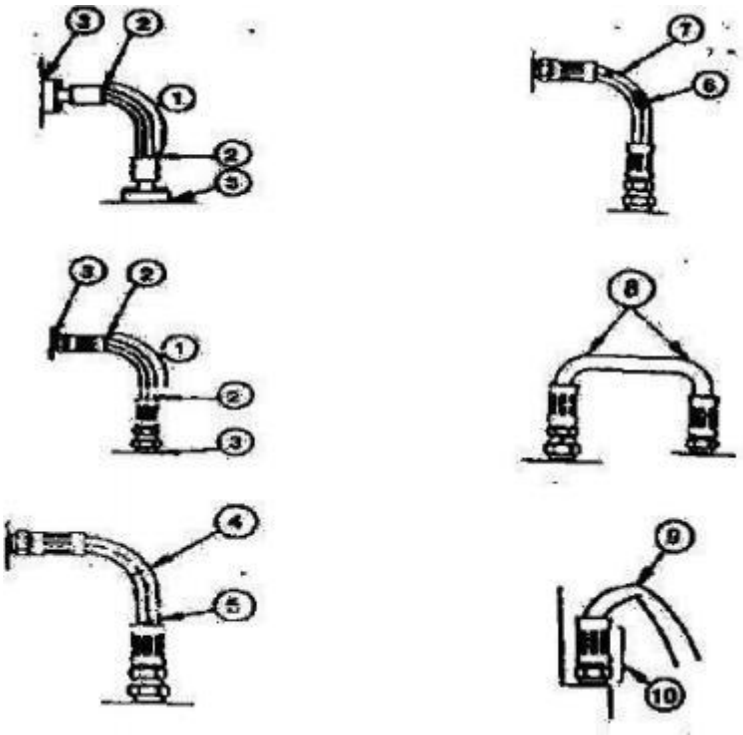
1. Park machine on the flat ground.
2. Completely retract the arm cylinder and extend out the bucket cylinder, so as to locate the machine.
3. Lower the bucket onto the ground.
4. Idle engine at low speed for 5min.
5. Shut down engine Unplug the ignition key.
6. Check if the oil level in hydraulic oil tank between the markers on dipstick, and add it if needed. . .

Caution: Hydraulic oil tank has pressure, and therefore slowly open its cap to release pressure before adding of oil. .

8. Open the hydraulic oil tank to add oil and then check the oil level again. .
9. Put the cap back on hydraulic oil tank

Please use the genuine LeKing excavator parts

Interval (h)	Check points	Abnormal	Measures
Every day	Hose surface Hose end Connector body	Leakage 1 Leakage 2 Leakage 3	Replace it Replace it Tighten or replace the hose or O-ring
Every 250h	Hose surface Hose end Hose surface Hose surface Hose Hose Hose end and joint body	Crack 4 Crack 5 Reinforcing material protruded 6 Local part protruded 7 Bend 8 Bend 9 Deformation or corrosion10	Replace it Replace it Replace it Replace it Replace it Change it (proper bending radius) Replace it



5.4.5 Fuel system

The division of KV12 product series is based on different selected engines, mainly involving Koop,B&S, Kubota z482 diesel engine and YOUPU diesel engine. Finally, a brief introduction of various models of diesel engines is attached.

Capacity of fuel tank: 15L

Parts		Quantity	Interval (h)						
			10	50	100	250	500	1000	2000
Check and Refill Fuel Tank Level		1	★						
Drain Fuel Tank						★			
Drain Fuel Filter / Water Separator		1+1		★					
Check the oil-water separator		1	★						
Change the oil-water separator		1					★		
Check the fuel hose	Leakage	--	★						
	Crack / twist / others	--	★						
★Maintenance interval under normal conditions									

Recommended fuel:

Merely use the quality diesel (selection of fuel grade should be dependent on environmental temperature).

Fill up the fuel

1. Park machine on the flat ground.
2. Lower the bucket onto ground.
4. Idle engine at low speed for 5min.
5. Shut down engine Unplug the ignition key.

Caution: fuel should be disposed carefully. Before filling of fuel, shut down engine. No smoking before filling fuel or with fuel system working.

6. Pay attention to the fuel scale. Add the fuel if needed.

Important: keep any dirt, dust, water or other foreign material from getting into fuel system!

7. While filling of fuel tank, make sure the fuel is not sprayed on machine and added properly.
8. Put the cap back on fuel filler to avoid any lost or damage.

Drain water from oil-water separator check ---every 100h

Oil-water separator is used to separate the water or sediment from fuel. Oil-water separator has a float able to rise up when water becomes full. When there is water or sediment in the collector of oil-water separator, please drain oil-water separator .

Important: shorten the inspection interval of oil-water separator if there is excessive water in the fuel!

Drain steps:

Caution: the drain plug is designed to be counter - thread type and should be turned with hands, instead of vise and wrench for protection of thread

1.Position an approved container under the fuel filter / water separator (1) to collect the contaminants.

2.Close the fuel cock (2)

3.Loosen the drain cock (4) at the bottom of the fuel filter / water separator. Drain any water collected inside.

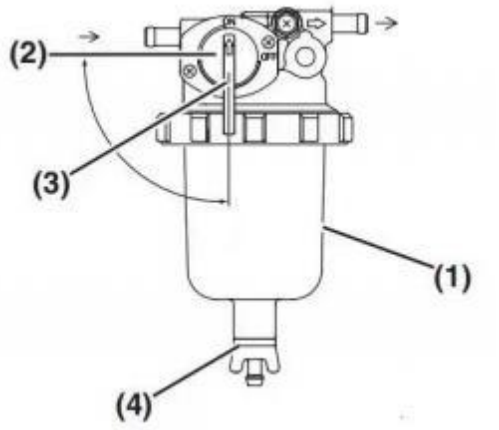
4.Hand-tighten the drain cock.

5.Open the fuel cock (3).

6. Be sure to prime the diesel fuel system when you are done.

7.Check for fuel leaks.

Caution: after the draining, make sure air is drained out of fuel system to make sure the engine could start up normally.



5.4.6 Electrical system - battery

I.Check the battery electrolyte level and the terminals.

Caution: gas inside of battery may explode it. Therefore, keep any spark and flame away from battery. Use a flashlight to check the electrolyte level. In addition, the sulphuric acid in battery electrolyte is as toxic as to burn your skin or your cloth holes or to blind your eyes. . .

Therefore, take the following methods to avoid any rick:

1. Refilling of battery should be done at well-ventilated site.
2. Put on goggles and plastic gloves.
3. Care must be taken not to spray out the electrolyte.
4. Use the proper measures to assist battery startup. If touched with acid:

1. Rinse the skin
2. Use the soda or the lime to neutralize the acid.
3. Rinse eyes for 10 - l5 min and then go to doctor.

Caution:

a. Always firstly disconnect the battery clips (-) away from the ground and then lastly connect it.

b. Always keep the terminals at top to battery and the breather clean, to avoid the battery from discharging. Check if the battery terminal is loosened or rusted. Coat the terminals with vaseline to avoid any corrosion.

Replace the battery

There is a 12V battery with one negative pole (-) grounded.

If battery cannot be charged or store any electricity, replace the battery with same model.

Replace the fuse.

If the electrical device does not work, please firstly check the fuse.

Important: please install the fuse with correct amperage, so as to prevent against burning of electrical system due to overloading!

Others

Parts	Quantity	Interval (h)							
		20	50	100	250	500	1000	2000	4000
Check if the bucket teeth is worn or loosened		★							
Change the bucket	—	If needed							
Replace the bucket and connect the new one to machine.	—	If needed, replace the bucket and connect the new one to machine.							
Adjust the connecting rod of bucket	1	If needed							
Take down the traveling lever	2	If needed							
Check and replace the fuse	1	★	Every 3 years						
Check the track defection	2					★			
Check tensioner	2	★							
Check the fuel injection timing	—	If needed							
Check the bolts and nuts for tightening torque	—				★				
Note: ★Maintenance interval under normal conditions Maintenance needed at the first inspection									

Check the bucket teeth --- each day

1. Check if the bucket teeth is worn or loosened.

   Worn beyond the service limit, the bucket teeth may be replaced.

Bucket tooth dimensions mm

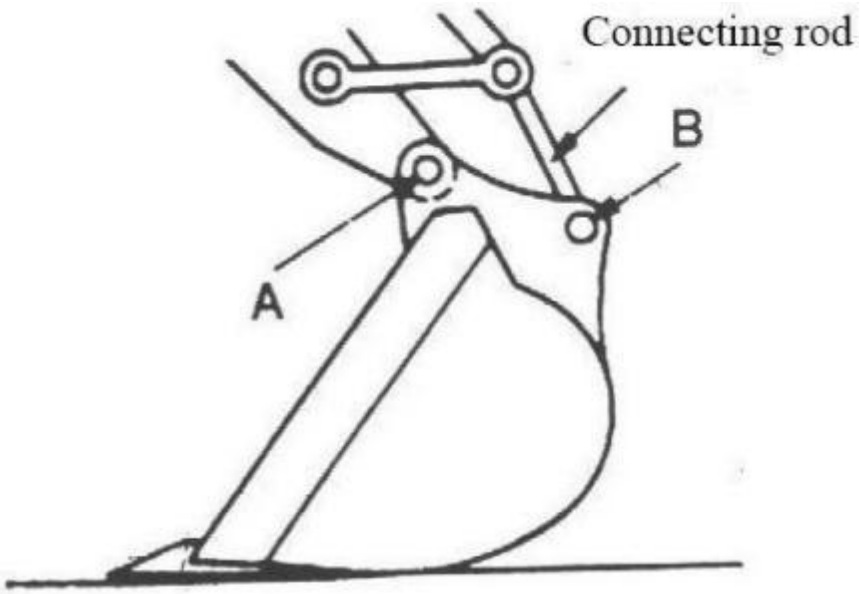
New	Service limit
190	130

Caution: care must be taken to avoid the metal scrap from flying out, leading to personal injury. Wear the goggles or the safe glasses or safe devices suitable for operations!

Change the bucket

Caution: while hitting out or into the connecting pin, care must be taken to prevent against any personal injury due to out-flied metal scrap. Wear the goggles or the safe glasses or safe devices suitable for operations!

1. Park the machine on flat ground and lower the flat surface of bucket onto ground to make sure the bucket does not move after the removal of pin.
2. Slide the O-ring out, as shown in the figure.
3. Remove the bucket pins A and B to separate the bucket and the arm. Clean the pin and its pin hole and then properly grease them.
4. Adjust the arm and the new bucket correctly, and make sure the bucket does not roll away. .
5. Install the bucket pins A and B.
6. Put the locker and ring onto pins A and B.
7. Adjust the connection clearance of bucket at pin A. Refer to the way to adjust the bucket connection clearance.
8. Grease the pins A and B.
9. Start up engine and run it at low speed. Slowly rotate the bucket to two directions to check if there is any interference to movement of bucket. Do not use any machine with interference, which should be solved immediately. .



5.5 Telescopic chassis

- The distance between the tracks of the telescopic chassis must be completed before the work. Changing the distance between the tracks during the work may cause great damage to the machine.
- Use the bulldozer pilot plus its own button switch combination to control the action of the telescopic chassis cylinder.
- When changing the distance between the tracks of the telescopic chassis, the bulldozer and the working device shall be used to lift the machine off the ground; Then pull out the limit pin, operate the hydraulic cylinder to control the track to stretch to the corresponding position, and finally install the limit pin and tighten it.

See the following figure:

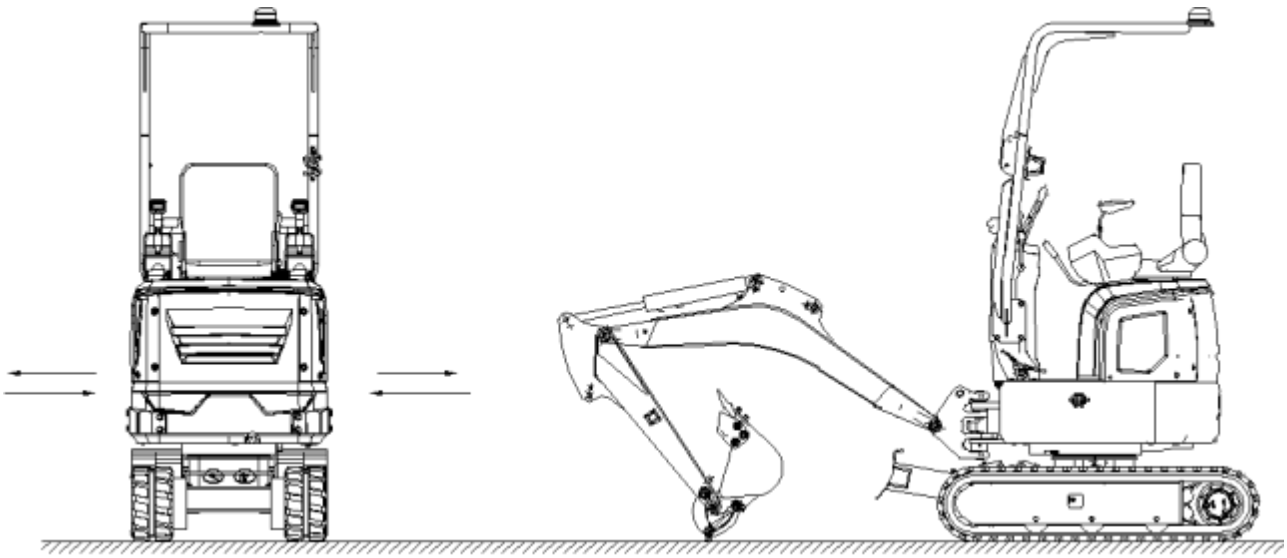


Figure 1; Left and right telescoping
Figure 2: lift the machine off the ground with working device and bulldozer

Check the bolts and nuts for tightening torque

— every 250 h (Originally for every day)

Check the tightness for every day and then every 250 h. Tighten it to the set torque if needed. Replace it with bolts and nuts with same or higher grade.

Important: please use the torque wrench to check the torques of bolts and nuts!

Metric bolts and nuts

Thread dimensions	Standard torque (N.m)	Thread dimensions	Standard torque (N.m)
M6	12±3	M14	160±30
M8	28±7	M16	240±40
M10	55±10	M20	460±60
M12	100±20	M30	1600±200

2. Torque of main components: (N.m)

Thread dimensions	Recommended torque
M12 bolts fixing the traveling motor	120±10
M16 bolts fixing the slewing bearing	325±15
M16 bolts fixing the swing mechanism	325±15

Important:

1. Before installed, the bolts and nuts should be cleaned.
2. Grease the bolts and the nuts (such as the white zinc b able to be dissolved to lubricant), so as to stabilize their abrasion coefficient.
3. The counterweight bolts should be kept tightened up.

Caution: all the tightening torques should be expressed with kgf.m.

For example: use a wrench with 1m long to tighten the bolts and nuts, and apply 12kgf of force to the end of wrench, generating the following torque:

1m×12kgf=12kgf.m To

generate the same torque with 0.25m wrench: 0.25m×y=12kgf.m Needed

force: y=12kgf.m / 0.25m=48kgf

5.6 Maintenance under the special cases

Operational conditions	Precautions for maintenance
Moor land, rainy or snowy	Before operation, check all the drain plugs are tightened up. After operation, clean machine and check bolts and nuts for break, damage, looseness or loss. Lubricate all parts to be lubricated on time.
On beach	Before operation, check all the drain plugs are tightened up. After work, thoroughly clean the clean to remove the salt. Frequently maintain the electrical system from being corroded.
Dusty environment	Air filter: clean the filter element periodically or at shorter interval Radiator: clean the oil cooler screen to avoid any blockage. Fuel system: clean the filter and its element periodically or at shorter interval. Electrical devices: periodically clean it, specially the AC generator and starter's rectifier.
Stony roads	Track: careful operations Frequently check if bolts and nuts are broken, damaged or lost. Loosen the track a little than the usual. Work equipment: parts may be damaged on stony roads, and therefore please use the reinforced bucket or heavy-duty bucket. .
Freezing cold	Fuel: use the high fuel suitable for low temperature Lubricant: hydraulic oil and engine oil with dry quality and low viscosity. Battery: keep the battery fully charged and maintain it at shorter interval. The electrolyte may be frozen if it is not fully charged. Track: keep the track clean. Park the machine on solid ground to avoid the track frozen.
Falling stone	Roof at driver seat: add the protective for cab roof if needed to prevent the machine from being damaged with falling stone.

Storage of machine

1. Repair any worn or damaged parts, and put the new one if needed. .
2. Clean the primary air filter elements.
3. If possible, retract all the hydraulic cylinders. If not, grease all the plungers exposed out of cylinder.
4. Lubricate all the grease points.
5. Put the track on the solid and long pad.
6. Cleaning of machine especially in winter, clean each part of excavator, especially the track.
7. Fully charged, the battery should be stored at dry and safe site. If battery cannot be taken down, separate the battery negative pole from (-) pole.
8. Painting if needed to avoid rusting.
9. Store the machine at dry and safe site. If outdoors, it should be covered with water-proof cloth.
10. If machine is to be stored for long time, run it at least once each month.

6 Troubleshooting

6.1 General

To ensure excellent performance of LeKing excavator, all components and parts are of high quality. Machine's performance and service life are determined not only by manufacturing quality and assembling quality, but also maintenance quality.

The marketing representative and service engineer shall remind the user that preventive maintenance is the easiest and most economical one among various ways of maintenance.

There are daily inspection and long-, medium- and short-term maintenance according to maintenance frequency.

6.2 Troubleshooting of mechanism system

Symptom	Possible causes	How to solve
Noisy structural components	1. The loose fasteners make noise. 2.Aggravated abrasion between bucket and end face of bucket rod	1. Inspect and tighten 2.Adjust the clearance to less than 1mm
Bucket teeth have dropped during operation	1.Deformed spring and weakened elasticity of bucket tooth pin 2.Unmatched bucket tooth pin and seat	Change the bucket tooth pin
The crawler has tangled up	1. Loose crawler 2.The driving wheel moves fast in front on rugged road.	1. Tighten the crawler 2. The guide wheel shall move slowly in front on rugged road

6.3 Troubleshooting of hydraulic system

Symptom	Possible causes	How to solve
The whole excavator does not move	Low oil level of hydraulic oil tank that the main pump sucks no oil	Add enough hydraulic oil
	Oil filter is blocked	Change the filter and clean the system
	Engine coupling is damaged (such as plastic plate, elastic plate)	Change
	The main pump is damaged	Change or repair the main pump
	The servo system pressure is low or zero	Adjust to regular pressure. If it fails to increase the pressure of servo overflow valve, disassemble to wash; if the spring is fatigue, add a washer or change the spring.
	The safety valve is set at low pressure or stuck.	Adjust to regular pressure. If it fails to increase the pressure, disassemble and wash. If the spring is fatigued, ass a washer or change the spring.
	Oil suction pipe of main pump explodes or comes off	Change with a new one

Symptom	Possible causes	How to solve
The unilateral crawler fails to move	The main pump supplying fuel to unilateral crawler is damaged.	Change
	The main valve rod is stuck and the spring is broken	Repair or change
	Traveling motor is damaged	Change
	The upper and lower chambers of swivel joint are connected	Change the oil seal or clean the assembly
	Fuel pipe of traveling system explodes.	Change
The whole excavator moves slowly or powerless	Less oil in hydraulic oil tank	Add enough hydraulic oil
	Low engine rpm	Adjust engine rpm
	Low system safety valve pressure	Adjust to specified pressure
	Serious leak inside the main pump	Change or repair the pump
	The traveling motor, rotation motor and cylinder are worn of different degree, which causes internal leak.	Change or repair the worn parts
	The aged sealing components, worn hydraulic elements, degraded oil of old excavator cause the operation speed becomes powerless along with the increase of temperature.	Change hydraulic oil, change sealing components of the whole machine, adjust the fit clearance and pressure of hydraulic components.
	The blocked engine filter causes serious decrease of loaded rpm and even flames out.	Change the element
	The blocked hydraulic filter accelerates abrasion of pump, motor and valve and leads to internal leak.	Clean and change the element according to the maintenance schedule.
	Serious between main valve rod and valve hole causes serious internal leak	Repair the valve rod
The right and left traveling systems do not move (no other abnormalities)	Central rotation connector is damaged.	Change the oil seal and change the groove if it is damaged
	The high pressure chamber and low pressure chamber of traveling operation valve is connected.	Change
	Serious leak inside the traveling operation valve	Change
	Low overloaded pressure of traveling valve of main valve or the valve rod is stuck.	Adjust and grind
	The left and right traveling reducers fail	Repair

	The left and right traveling motors fail	Repair
	The oil pipe explodes	Change
Deviation during traveling (no other abnormalities)	Wrong adjustment of variable point of main valve or serious internal leak of a pump	Adjust or repair
	Internal or external spring of one traveling valve core of main valve is damaged or tightened	Change
	The traveling motor leaks inside due to abrasion.	Repair or change

Symptom	Possible causes	How to solve
	The sealing component of central rotation connector is aged and damaged.	Change the sealing component
	The lefand right crawlers are of different tightening.	Adjust
Boom (bucket rod and bucket) move to one direction only.	Main valve core is stuck or valve rod spring breaks.	Repair or change
Boom (bucket rod and bucket) does not move.	Boom valve rod is stuck or of low overloaded pressure	Repair
	Fuel supply pipe leaks, detached, O ring damaged or pipe fitting is loose	Change the damaged component
	Sandstone in main valve or the low pressure chamber is connected to the high pressure chamber	Change
Boom (bucket rod and bucket) drops too quick or the cylinder drops at a certain height even it is not operated due to dead weight	Low overloaded valve pressure	Adjust
	Serious internal leak of cylinder	Change the sealing component, repair the inner wall or groove of cylinder or change the cylinder.
	Loose oil pipe fitting, damaged O ring	Change
Boom (bucket rod and bucket) works powerlessly	Serious internal leak of multiway valve or sandstone inside it	Change
	Low overloaded pressure	Adjust
	Serious internal leak of oil cylinder	Change the oil seal
	The main valve is disabled due to internal leak.	Repair or change
Boom (bucket rod and bucket) moves even it is not operated	Multiway valve core is stuck or serious internal leak	Grind or change
	Multiway valve rod spring breaks	Change
	Leak of working cylinder, or the working device drops due to dead weight	Change the oil seal

	Low pressure of overload overflow valve or the spring breaks	Adjust to specified pressure. Change the spring if it is broken.
	Wrong grade of hydraulic oil for excavator	Change the hydraulic oil

Symptom	Possible causes	How to solve
other abnormalities)	Rotary valve rod on main valve is stuck.	Repair
	Rotary motor is damaged	Repair or change
	The rotation support is damaged.	Change
Indifferent left and right rotation speed (no other abnormalities)	The right and left rotation of multiway valve is of different overloaded pressure	Adjust
	Rotation valve rod of multiway valve is slightly stuck.	
Delayed or powered rotation (no other abnormalities) Hot hydraulic oil	Serious external leak of hydraulic oil pipe	Change pipe fitting and sealing components
	Low overloaded pressure for rotation of multiway valve	Adjust
	Serious internal leak of rotary motor	Repair or change
	The high and low pressure chambers of multiway valve are connected, sand hole on valve body due to casting, which causes one-way action or linked actions	Change
The rotation mechanism moves even it is operated	Main valve rod spring breaks	Change
The excavator makes abnormal noise and shakes during operation.	Low oil level of hydraulic oil tank	Add oil
	The oil contains too much moisture and air	Change
	Safety valve of multiway valve makes noise	Adjust
	Damaged coupling	Change
	Vibration caused by loose pipe clamp	Adjust
	Blocked filter	Change
	Air exists in oil suction hose	Release the air
	Hydraulic oil cooler surface is polluted by oil and dirt, which blocks the air hole.	Wash
	Low oil level of hydraulic oil tank	Add enough hydraulic oil
	The hydraulic components such as motor, main valve and oil cylinder or sealing components are seriously worn and cause internal leak, which increases the oil temperature. Traveling rotation and working device are delayed and powerless. The hot temperature degrades the hydraulic oil. The safety valve is of poor air tightness, which leads to overflow.	Change the elements in time
No action of rotation (no	Hydraulic oil pipe breaks	Change

	Uneven engine rpm	Adjust
	The bearing of working device is not lubricated or scraped	Apply lubrication oil or change the shaft or sleeve
Powerless oil cylinder or oil leak	Damaged sealing components	Change the sealing components
	A groove is found on the piston rod due to abrasion or detachment of chromium coating of piston rod, which causes oil leak.	Coat, paint, repair or change
	The air in the cylinder causes shaking noise during operation	Release the air

6.4 Troubleshooting of electrical control system

Fault codes of electrical control system of excavator

① The engine fails to start

② The engine flames out during operation

③ The engine fails to flame out

④ Automatic slow-down does not work

内 Slewing and traveling of all working devices

Principle diagram

1. The engine fails to start

Fault description	The engine fails to start	
The fuel pump system does not supply fuel or supply less fuel	Low engine rpm	Adjust to regular rpm
	Pump fault	Change
	Less fuel in the tank	Add fuel
	Fuel tube breaks, tube connector is loose and O ring is damaged	Change

Possible causes		**Standard value in regular condition and reference value of fault diagnosis**		
1)	Low battery	Battery voltage	Color of charge state densimeter	
		Above 12V	Green (if it is white, change the battery)	
2)	Fuse F1 and F11 fail	In case the fuse is burnt, the GND fail may happen. If he monitoring indicator on the monitor panel is not illuminated, inspect the circuit between battery and specified fuse.		
3)	Engine ignition switch fault	. Turn the start switch of engine to OFF as preparation and keep it at OFF during diagnosis.		
		Ignition switch	Position	Resistance
		Between 30 and 17	OFF	1MΩ
			Start	Below 1Ω
4)	Starter relay K3 fault	. Turn the start switch of engine to OFF as preparation and keep it at OFF during diagnosis.		
		Pin		Resistance
		85-86		200-400Ω
		87-30		Above 1MΩ
		87a-30		Below 1Ω
5)	Security lock switch fault (open circuit inside)	. Turn the start switch of engine to OFF as preparation and keep it at OFF during diagnosis.		
			Lock rod	Resistance

Possible causes		Standard value in regular condition and reference value of fault diagnosis		
		Between 105 and GND	Unlocked	1MΩ
			Locked	Below 1Ω
6)	Start motor fault (open circuit or short circuit inside)	★Turn the start switch of engine to OFF as preparation and keep it at OFF during diagnosis. If all PS, GND, signals and engine start input are correct while engine start output is abnormal, the engine starter relay fails.		
		Engine or start motor	Engine start switch	Voltage
		PS; terminal B and GND	Start	20~30V
		Input of engine start, terminal C and GND		20~30V
7)	Alternator fault	★Turn the start switch of engine to OFF as preparation and keep it at OFF during diagnosis.		
				Voltage
				Below 1V
8)	Disconnected wire harness (disconnect from connector or poor contact)	★Turn the start switch of engine to OFF as preparation and keep it at OFF during diagnosis.		
			Resistance	Below 1
9)	Poor GND of wire harness (contact with earth circuit)	★Turn the start switch of engine to OFF as preparation and keep it at OFF during diagnosis.		
			Resistance	Above 1M
10)	Short circuit of wire harness (contact with 24V circuit)	★Turn the start switch of engine to OFF as preparation and keep it at OFF during diagnosis.		
		Voltage		Below 1V

2. Engine flames out during operation

Symptom		Engine flames out during operation		
	Causes	Standard value in regular condition and reference value of fault diagnosis		
1)	Disconnected wire harness (disconnect from connector or poor contact)	★Turn the start switch of engine to OFF as preparation and keep it at OFF during diagnosis.		
		Between CN-12T ② and CN-132F ⑥	Resistance	Below 1
2)	Poor GND of wire harness (contact with earth circuit)	★Turn the start switch of engine to OFF as preparation and keep it at OFF during diagnosis.		
		Between CN-12T ② and CN-132F ⑥	Resistance	Above 1M

6.5 Troubleshooting of diesel engine

1. Symptoms of failed startup of engine:

When starting the engine, the starter drives the engine but the engine fails to be started.

Possible causes:

(1) Low battery;
(2) Battery terminal is rusted or loose;
(3) Battery earth wire is rusted or loose or poor GND of engine;
(4) Starter relay armature fails to disengage.
(5) Ignition switch fault or starter fault;

How to solve:

(1) Low battery is caused by electrical appliances that are not powered off in previous day. Next time, do not forget to power offall electrical appliances at the end of the day. If you have well charged the battery during driving the day before, the battery shall be on a full charge at the end of the day. For failed start-up caused by low battery, change the battery pack or connect to another battery pack in parallel to start the engine.
(2) Clean the battery terminal, tighten the PS wire clip to contact the PS wire with battery terminal reliably.
(3) Clean the battery earth wire terminal to ensure reliable GND; ensure reliable GND of engine;
(4) Repair or change starter relay;
(5) Inspect and repair ignition switch and inspect and repair the starter;
(6) Long period operation of battery may increase the internal resistance; therefore, it is necessary to repair the battery and correctly charge the battery and change with new battery pack if necessary; the battery shall be fully charged to ensure successful start-up of engine.

2. Check if it is low fuel level that makes hard to start the diesel engine

Symptom:

When starting the engine, the starter runs at acceptable rpm; however, it fails to start the engine. Possible

causes:

(1) Fuel tank is empty;
(2) Fuel supply system channel fault;
(3) Air, water or foreign matter exist in fuel system, which block the system;
(4) Fuel pump fault;
(5) Engine fault;

How to solve:

(1) Fill the fuel tank with standard fuel, start the engine and run the engine to deliver the fuel to carburetor;
(2) Inspect pipeline of fuel supply system, fuel filter and fuel pump; change blocked and damaged assembly if necessary to ensure unobstructed fuel supply.
(3) Release air in fuel system. If the engine can not be started due to air blockage, decrease the temperature properly.
(4) Inspect the fuel pump. Only when the fuel pump works well can the fuel supply be unobstructed. Fuel supply seldom fails and air blockage and water blockage seldom happen when the fuel supply of fuel pump is large.

(5) Inspect and repair the engine. Only when the engine works well can the start-up fail never or seldom happen.

3. Check if it is hard to start the engine

Engine symptom:

(1) Starter runs at correct rpm and drives the engine; however, it is hard to start the engine.
(2) It is hard to start the engine when it is cold.
(3) It is hard to start the engine when it is hot.

Possible causes:

(1) Fuel filter is blocked;
(2) Fuel pump fault;
(3) Wrong injection timing;
(4) Low temperature of oil and intake air;
(5) Intake air filter is blocked.
(6) Leak of fuel tube;
(7) Starter fault;
(8) Improper start operation;
(9) Wrong fuel grade;
(10) Engine fault;

How to solve:

(1) Inspect and change the fuel filter;
(2) Inspect and change the air filter element;
(3) Inspect and adjust the fuel pump;
(4) Inspect the fuel tube and oil channel to ensure unblocked oil supply;
(5) Inspect the starter and start control device for reliable operation.
(6) Start the engine in correct ways.
(7) Add fuel of correct grade and discharge the water in fuel in the low part of fuel tank if necessary;
(8) Repair the engine.

4. Check if the starter fails to start the engine

Engine symptom:

(1) Turn the ignition switch to ON, the starter does not work.
(2) The driving gears of starter do not engage.
(3) The driving gears of starter fail to disengage.
(4) Low engine rpm and uneven engine rpm;

Possible causes:

(1) The battery is not fully charged.
(2) Terminals of battery are loose.
(3) Battery earth wire is loose.
(4)
(5) Start circuit is disabled.
(6) Electromagnetic relay armature is adherent;
(7) Starter fault

(8) Driving gear of starter is stuck by engine flywheel gear ring;
(9) Driving gear of starter adheres to the bearing.
(10) The starter fails to drive the engine;
(11) Engine fault;

How to solve:
(1) Check if the battery is fully charged; if not, charge it; change the battery if necessary.
(2) Connect the battery terminal and connector;
(3) Repair the battery earth wire.
(4) Inspect the start circuit and ensure the terminal of starter shall be live.
(5) Inspect starter electromagnetic relay to eliminate fault of electromagnetic relay; it shall obvious to hear the sound making by the relay when it sucks and separates.
(6) Inspect and repair the starter.
(7) Start again to engage the starter driving gear and engine flywheel gear.
(8) Inspect the bearing on the end of starting shaft of starter;
(9) Small torque of starter, change the starter if necessary.
(10) Repair the engine to ensure sound operation of engine.

7 Transportation

7.1 Precautions for transporting the machine

Shipping weight: Refer to the specifications table.

CAUTION

Select a route for transporting the machine based on the road width and clearance, and the height and weight of the machine.

For safer transportation, comply with all local regulations and laws.

CAUTION

- Before loading, check whether the details and quantity of tools in the toolbox are correct (attach a detailed list);
- The tool box should be locked to avoid loss in the middle. The product operation manual and relevant list details should be placed in a special file cabinet and locked, as shown in the figure;
- The cab door is locked and sealed.

7.2 Machine tie-down

CAUTION

- Do not tie the machine down with a person on or on an attachment.
- Use a chain sufficiently resistant for the machine weight.
- Do not tie the machine down to other points than those indicated below:
- Machine attachments and equipment items that are not secured with limiting devices and may move beyond the vehicle envelope should be prevented from moving. Instructions should be provided on the equipment item limiting the tie-down device movement.
- It is advised to correctly secure on the trailer floor loose parts such as hydraulic cylinders that can move due to vibrations during transport and/or limit their displacement using a tie-down device.

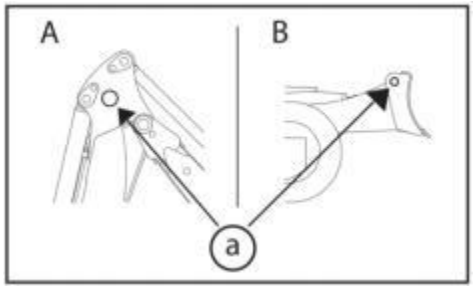
Precautions concerning side movements:

- The machine should be tied down using the securing devices provided for the vehicle, using appropriate tie-down attachments or using devices appropriate for the machine, by tying down the machine chassis using metallic cables or chains.

7.3 Machine slinging

CAUTION

- Never suspend the machine if any person is on the machine or the implement.
- Use wire ropes strong enough for the weight of the machine.
- Do not suspend the machine in any way other than that explained on the following page.
- Failure to suspend the machine as prescribed will throw the machine off balance.
- Do not swing the machine being suspended.
- When lifting the machine, keep the machine in balance taking care on the center of gravity of the machine.
- Never stand near or under the suspended machine.



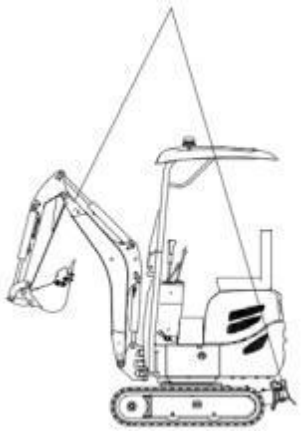
For safety in suspending the machine, comply with all applicable regulations.

Suspend the machine on the level ground as follows:

A： Front side

B： Rear side

a： Hook bores are on both ends.



1) Swing the upper structure so that the blade is behind the operator's seat.

2) Raise the blade to the highest limit.

3) Extend the hydraulic cylinders of the front implement (except for the swing cylinder) to the maximum.

4) Top the engine, and make sure that nothing is left around the operator's seat before leaving the machine.

5) Fit the shackles to the suspending hooks on the front side (one point) and the rear side (two points), and securely fasten a sling belt (or a wire rope) to the shackles.

7.4 Loading machinery

The following rules shall be followed for loading:
The orientation of the machine is as follows:

- With working device: put the working device at the front and walk forward.
- Without working device: walk backwards as shown in the figure (trailer with ladder must be used).
- The center line of the machine shall correspond to the center line of the trailer.
- Slowly drive the machine onto the slope.

1) Remove the anti rollover support: remove the anti rollover device from the whole machine and pack it well to avoid scratches on the paint surface. Put it into the container after the whole machine is loaded into the container.

2) Hoisting: according to the height of the container, a special bracket is made and placed on the upper and lower layers, which can not only save space, increase the utilization rate of container space, but also save transportation costs.

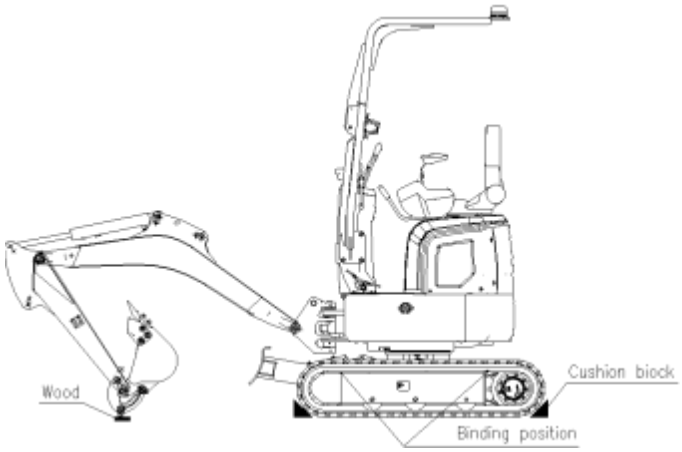
3) Loading container: when the transportation forklift machine holds up the support and starts to tilt towards the container, walk forward slowly until the bracket firmly contacts the container.

CAUTION

- To prevent damage to the bucket cylinder during transportation, the bucket one end of the oil cylinder shall be padded with woodblocks to prevent it from touching the bottom plate.
- Stop the engine and remove the key from the switch.
- Operate the control lever several times until the pressure in the hydraulic cylinder is completely released.
- Turn the safety lever to the vertical direction to prevent the safety accident caused by misoperation.

7.5 Transport

(a) Place spacer blocks at the front and rear of the track. To prevent the machine from moving during transportation. The machine shall be tied firmly with iron chain or steel wire rope of appropriate strength.
(b) Pay special attention to fixing the machine firmly so that it will not slide to one side.



CAUTION

● Horizontal servo mechanism, outriggers and other movable devices that may cause danger during transportation or driving shall be reliably locked at their transportation position.

● Tie the chain or rope to the frame of the machine, and do not cross or press the chain or cable on the hydraulic pipeline or hose.

In the transportation should enable hinged locking mechanism in figure 1:

Non transport should enable hinged locking mechanism in Figure 2

Figure 1

Figure 2

7.6 Unloading

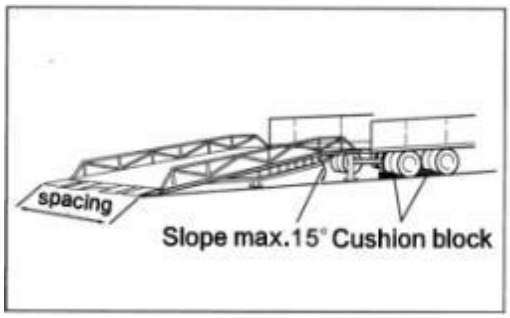
The following rules should be observed during loading:
The direction of the machine is as follows:
The center line of the forklift shall correspond to the center line of the container.
Slowly use the forklift machine to hold the support and drive it to the flat ground.

1) Take out the anti rollover support: take out the anti rollover device from the container and place it properly to ensure that the package is intact to avoid scratching the paint surface.

2) Unloading bracket: when the transportation forklift lifts the bracket and starts to tilt towards the container, walk forward slowly until the bracket firmly contacts the ground,

3) Remove the bracket: when the bracket is placed firmly on the ground, slowly raise the machine according to the position of the hanging shop to completely separate it from the bracket, and slowly move forward until the machine firmly contacts the ground,

4) Install the roll over frame assembly: after the machine is stable, install the roll over frame on the machine。



- The rear end of the trailer flat plate meets the slope in a protruding shape, so drive carefully.
- Prevent possible damage to the working device. When unloading, always keep the included angle between the stick and the boom at 90 °.
- Prevent possible damage to the hydraulic cylinder. Do not let the bucket of the machine collide violently with the ground.

8. Schedule

8.1 Engine configuration

Attachment Ⅰ:

3TNV70-SSY

Engine Model	3TNV70-SSY						
Type	4 cycle, in-line, Water-cooled Diesel engine						
Combustion System	Indirect injecction						
Aspiration	Natural						
No. of Cylinders	3						
Bore × Stroke	2.756 x 2.913 in. (70 × 74 mm)						
Displacement	52.105 cu in. (0.854 L)						
Rated Output	RPM(min-1)	1500	1800	2000	2200	2400	2600
	kW	6.69	8.02	8.97	10	11.0	11.8
	PS	9.10	10.9	12.2	13.6	14.9	16.1
High Idling	RPM(min-1)	1600± 25	1895± 25	2160± 25	2375± 25	2570± 25	2780± 25
Engine Weight (Dry) with Flywheel Housing	106 kg						
Direction of Rotation	Counterclockwise Viewed from Flywheel End						
Cooling System	Liquid-Cooled with Radiator						
Lubricating System	Forced Lubrication with Trochoid Pump						

Attachment Ⅱ:

3TNV74F-SPSY

Engine Model	3TNV74F-SPSY						
Type	4 cycle, in-line, Water-cooled Diesel engine						
Combustion System	Indirect injecction						
Aspiration	Natural						
No. of Cylinders	3						
Bore × Stroke	2.756 x 2.913 in. (74 × 77 mm)						
Displacement	60.585 cu in. (0.993 L)						
Rated Output	RPM (min-1)	1500	1800	2000	2200	2400	2600
	kW	6.69	8.02	8.97	10	11.2	11.8
	PS	9.10	10.9	12.2	13.6	14.9	16.1
High Idling	RPM(min-1)	1600± 25	1895± 25	2160± 25	2375± 25	2570± 25	2780± 25
Engine Weight (Dry) with Flywheel Housing	216.1 lb (98 kg)						
Direction of Rotation	Counterclockwise Viewed from Flywheel End						
Cooling System	Liquid-Cooled with Radiator						
Lubricating System	Forced Lubrication with Trochoid Pump						

8.2 List of auxiliary material consumption

Serial number	Model	Engine oil (L)	Hydraulic pressure required for maintenance Oil capacity (L)	Travel motor reduction oil	Fuel tank (L)	Coolant (L)
1	KV10/ KV12	2.4	11.5	/	13	6

Note: the slewing motor reducer is self lubricated by hydraulic oil.

8.3 KV12 packing list

KV12 **series packing list**

Number	Model	Item name	Company	Quantity	Remarks
1	KV12 series	Hydraulic excavator	Platform	1	Bare pager
2	KV12 series	Random data	Set	1	See data list
3	KV12 series	Random tools	Set	1	See tool list
4	KV12 series	Random spare parts	Set	1	See spare parts list
5	KV12 series	Start key	Hold	2	
6	KV12 series	Hood key	Hold	2	Common with cab door key
7	KV12 series	Tool kit	Individual	1	Store random tools
8	General purpose	Tool kit	Individual	1	Store random tool kits, spare parts, file bags, etc.

Attached data list of CT12 series excavator

Number	Item name	Specification and model	Company	Quantity	Remarks
1	Complete machine certificate	CT12 series	Book	1	Copy
2	Engine instructions	CT12 series	Book	1	
3	Operation and maintenance manual	CT12 series	Book	1	
4	File pocket		Individual	1	Store instructions, certificates, etc

List of attached tools for KV12 series excavator

Number	Item name	Specification and model	Quantity	Remarks
1	Filter element wrench	Belt type	1	
2	Double end wrench	8-10	1	
3	Double end wrench	11-13	1	
4	Double end wrench	14-17	1	
5	Double end wrench	16-18	1	
6	Double end wrench	19-22	1	
7	Adjustable wrench	300mm	1	
8	Inner hexagon spanner	5、6、8	1 piece each	
9	Pressure bar grease gun	200cc	1	

List of attached spare parts for KV12 series excavator

Number	Name	Standard	Quantity	Remarks
1	Grease fitting	M6-180°GB1152	5	
2	Engine oil	CI-4（15W-40） 2.2L/bucket	1	Kubota Z482
3	Oil filter（The engine comes with it）	KV16B-04.04.01.02/119305 - 35170	1	
4	Diesel filter（The engine comes with ）	KV16F-04.04.01.03/119802 - 55801/55810	1	
5	Air filter element	KV16B-04.04.01.01.01 （C100504）	1	
6	Safety filter element	KV16B-04.04.01.01.02 （CF504）	1	
16	O-ring for flange	92.5*3.55	1	
17	O-ring for flange	37.5*3.55	1	
Note: the model and quantity of engine oil supplied with the excavator are different due to different power.				

8.4 Details of KV12 vulnerable parts and maintenance parts

Details of CT12 series vulnerable parts and maintenance parts							
System classification	Product No	Part name	Specifications	Unit consumption (piece / set)	Part properties		
					Wearing parts	Maintenance parts	Non production parts
Hydraulic system	10013752	Air filter	KV16-05.202.03.00 （EFA004-P10B）	1	√		
	10025721	Rotary filter element	C106-58A-01001B0(SPX-06*10)	1	√	√	Yes
	10001109	O-ring GB/T3452.1	92.5*3.55	1	√		
	10001107	O-ring GB/T3452.1	37.5*3.55	2	√		
	10000451	Combined pad	JB 982 ZHD-27	1	√		
	10000490	O-ring JIS	10.8*2.4	5	√		Yes
	10000493	O-ring JIS	13.8*2.4	4	√		Yes
EleKVrical system	10005392	Battery	KV16B-09.05(6-QW-60(580)-L)	1	√		
	10005637	Main power switch	KV16B-09.04(34B0087)	1	√		
	10019361	LED work lights	KV60H-09.12(KD-0803S)	1	√		
	10014306	Oil level sensor	KV18H-09.04P(RG4154)	1	√		
	10025008	Combination switch	C112-92A-01000A0	1	√		
	10025019	Warning light (with sound)	C112-92A-00015A0	1	√		
	10025051	Start switch	JK406C	1	√		
	10025430	Electromagnetic master switch	KV16B-09.15 （SZJ200A/12V）	1	√		
	10025441	Electric horn	KV16B-09.10(DL125-80/12V)	1	√		
	10025018	Combination instrument	C112-94A-00001A0 （SZB401-KT12BA）	1	√		
Structural member	10023693	Oil cup	M6-180	10	√		
	10013269	Bucket teeth (GF)	KV16-03.42/KV18	3	√		
	10024868	Tensioner check valve (FT)	C108-14A-01100A0	2	√		Yes
	10023488	Right tooth （GF）	KV16-03.41/AL15-R	1	√		

	10023489	Left tooth（GF)	KV16-03.40/AL15-L	1	√		
Dynamic system	10014855	Engine shock absorber	KV18- 10.07.02.00	8	√		
	10013741	Auxiliary water tank	KV16U-04.01.03.00	1	√		
	10022672	Oil strainer	C108-46A-00005A0	1	√		
	10022673	Tank cap	C108-46A-00004A0	1	√		
	10024993	Throttle control flexible shaft	C112-48A-01000A0	1	√		
	10025437	Air filter element	KV16B-04.04.01.01.01	1	√	√	
	10025438	Safety filter element	KV16B-04.04.01.01.02	1	√	√	
	10015881	Diesel filter	KV16F-04.04.01.03	1	√	√	Yes
	10015044	Oil filter	119305-35151	1	√	√	Yes
Control system	10025030	Joystick ball joint	C112-64A-00001A0	4	√		
	10000867	Cotter pin	2*10	2	√		
	10024539	R-pin	3*60	2	√		

8.5 Lifting capacity

8.5.1 Lifting capacity for 1.2T

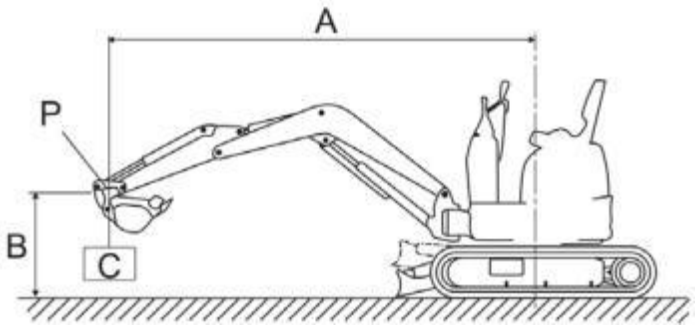
Standard condition, machine with rubber track.

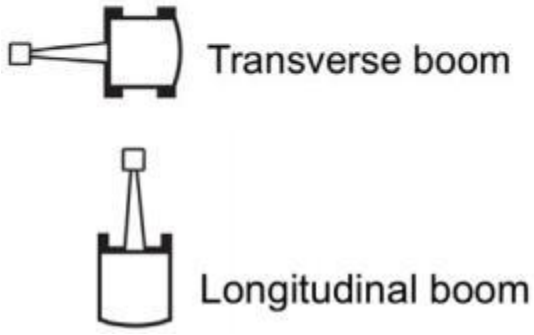
Bucket width: 425 mm Bucket weight: 27 kg

A : Overhang from the axis of rotation

B : Bucket height in meters

C : Load point





Blade down **Unit:(kg)**

A (m)	max		2.5 m		2.0		1.5		1.0	
B (m)										
1.5	*175	*175	*238	*238	*239	*239	—	—	—	—
1	*176	*176	238	*252	*305	*305	*412	*412	—	—
0.5	185	*203	232	*262	317	*355	—	—	—	—
0	188	*191	227	*253	308	*355	464	*480	—	—
-0.5	*180	*180	*218	*218	*214	*214	461	*462	*278	*278
-1	*170	*170	—	—	*245	*245	*365	*365	—	—

Blade up **Unit:(kg)**

A (m)	max		2.5 m		2.0		1.5		1.0	
B (m)										
1.5	*175	*175	*238	225	*239	239	—	—	—	—
1	*176	*176	238	221	*305	305	*412	*412	—	—
0.5	185	172	232	215	317	293	—	—	—	—
0	188	175	227	210	308	284	464	425	—	—
-0.5	*180	*180	*218	209	*214	*214	461	422	*278	*278
-1	*170	*170	—	—	*245	*245	*365	*365	—	—

The data in the table represents the lifting capacity according to is010567 standard. Corresponds to 75% of the maximum dead load before tilting or 87% of the hydraulic working load. The data marked with * indicates the hydraulic limit of the working load.