

Environmental protection sponsor of China

Sinomach Heavy Industry Corporation

Dear consumer:

Thank you for choosing products of **China Sinomach**. Our company is the green manufacturing establishment in the engineering mechanical industry of China. In order to has less influence on the surrounding environment as far as possible and offer the better service for you, we sincerely invite you to comply with following provisions and to supervise ours maintenance staff to comply with following provisions in the utilization and repair and maintenance procedures of the product:

- I. The operation shall be stopped immediately for inspection or connect our maintenance staff to inspect and eliminate the malfunction if the abnormal phenomena occurs such as the abnormal noise, the exhaust emissions exceed the standard, vent the black smoke continuously, the fuel consumption exceeds the standard as well as different kinds of liquid oil leakage during the utilization procedures, and then the machine can be used again. It is strictly forbidden to carry out the operation with defective machine, it will aggravate the malfunction and bring greater difficulty to the reparation and maintenance and make you take unnecessary economic loss as a result, and the resource is wasted and the air and soil at the place will be contaminated at the same time.
- II. Please use the oil pan to collect the used oil during the reparation and maintenance if the fuel, the lubricating oil, the hydraulic oil and other liquid oil shall be drained, do not drain those liquid oil to the ground directly. Classify the discarded components and store them, deliver the iron and steel parts to the recovery station for recovery utilization. Please deliver the parts which cannot be recycled such as the rubber piece, the plastic piece to the hazardous waste processing center for recovery processing, do not discard them at will or it will pollute the environment.

Protecting the environment is to protect our homeland; maintaining the ecological environment is to maintain our life. We will lose our pure land if we take the whole earth as a garbage can. We cannot leave our descendent a well living environment when the green mountain and green area disappear from the earth. Never develop economy at the cost of sacrificing the environment. We have responsibility to rebuild the nature, protect the environment against pollution, and we have the ability and confidence to conquer the nature and improve the environment, but we have no right in the least to destroy the ecology and desecrate the environment. Don't fail to do good even if it is small and don't engage in evil if it is small. The environment protection is starting from you and me and from bit by bit.

China Sinomach Heavy Industry Corporation

Brief introduction to product

Application and operation range:

The excavator is a kind of earthmoving machinery with multifunction and high efficiency. The excavator can excavate the foundation trench, the gutter, clear and planish ground in the construction engineering, which is the importance mechanical equipment in the construction engineering. It can be used to carry out the breaking, loading and unloading, hoisting, piling and so on when replacing the working equipment. The excavator is extensively used in the building construction, the road construction, the hydroelectric power construction, farmland rebuild and military engineering as well as strip mine ground, the open storage and stocking ground, which is the indispensable operation mechanical of mechanized construction.

Product standard:

This product comply with the standard: Q/CHL01.032 "Hydraulic Excavator Specifications"

China Sinomach Heavy Industry Corporation

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Foreword

This manual states the method and procedures of the operation, utilization, lubrication, maintenance, inspection as well as debugging of the excavator. It is helpful for the driver or anybody to exert the optimum performance of the excavator through the effective, economical and safe operation and maintenance.

- Please read this manual carefully before operating this machine.
- Please continue studying this manual until proper operation is completely reinforced into personal habit.
- This manual states the fundamental skill for operating the excavator. The operating personnel can operate the excavator skillfully after they mastered the correct operating method.
- **The machine this manual states shall be used for all kinds of working under normal condition, and it is forbidden to work in flammable explosive environment or the asbestos dust region.**
- **Please contact Sinomach's authorized agent or Sinomach technique service department before operating the machine in high altitude area over 3000 meters.**
- The machine shall be operated, inspected and maintained carefully and the most important thing is the safety. This manual uses **▲** the safety notice, **★** technical notice. The safety notice used in this manual are only the complements of the safety guarantee, insurance requirements, local law, principle and provisions.
- Some photographs and illustration pictures are different from your machine as technical improvement is continuously reflected on it. Revision to up-to-date manual's content is performed in later editions.
- This manual contains the optional purchase part for your choice.
- For the variety of the configuration of the complete machine, the attached "ENGINE SPECIFICATION" will take the lead if the description of the engine in this manual differs from the attached engine specification.

Materials and specifications are subject to change without notice.

Before using equipment

It is the responsibility of the equipment owner as well as all service and operation and maintenance personnel to maintain the equipment to avoid unexpected accident and major casualty.

It is also the responsibility of the equipment owner as well as all service and operation and maintenance personnel to operate the equipment to avoid unexpected accident and major casualty.

The person who is not trained properly and supervised shall not use or maintain the equipment.

All operators and maintenance staffs must be familiar with procedures and matters need attention in each part sufficiently.

All personnel must understand all regulations in relevant nations or provinces in which the engineering facilities are used at the same time.

The procedures in this manual shall not transcend the regulations of the nation and province.

Sinomach cannot predict all possible cases encountered by the equipment during the utilization process. Sinomach excavator is mostly used for excavating, planishing, digging, loading and demolishing in safe region without dropping. This machine is forbidden to hoist and ship spherical object strictly in any case.

All personnel must pay special attention to the potential danger.

Operate within the range of the training and skill.

Consult the intendency when the special circumstances are unclear, do not be rash.

Carry out the operation according to the regular program.

Running-in of new machine

Each machine is carefully adjusted and tested before shipment. However, a new machine requires careful operation during the first 100 hours to run in the various parts.

The performance of the new excavator will be decreased quickly and the service life will be shortened if the new excavator is operated under overload at the early stage, so the new excavator must be operated carefully and the following items shall be paid special attention to:

- Run the engine at idle speed for 5 minutes after the engine was started. Don't operate operating levers and throttle knob during this idle time to make the engine warm-up and then put the engine into the actual work.
 - The heavy duty or high speed operation shall be avoided.
 - Rapid start, acceleration, unnecessary rapid brake and rapid turning shall be avoided.
 - The cooling system of the excavator shall be washed by large numbers of clear water and then fill up the cooling system with cooling water if the water tank on the excavator you received has no cooling water.
- ★ The cleanliness shall be guaranteed when inspect, add or replace the cooling water, the fuel or the lubricating oil.
- ★ The oil filter cartridge or the filter shall be inspected for foreign body and dust when replace them. If there are much foreign body, the reason of which shall be found out before the operation.

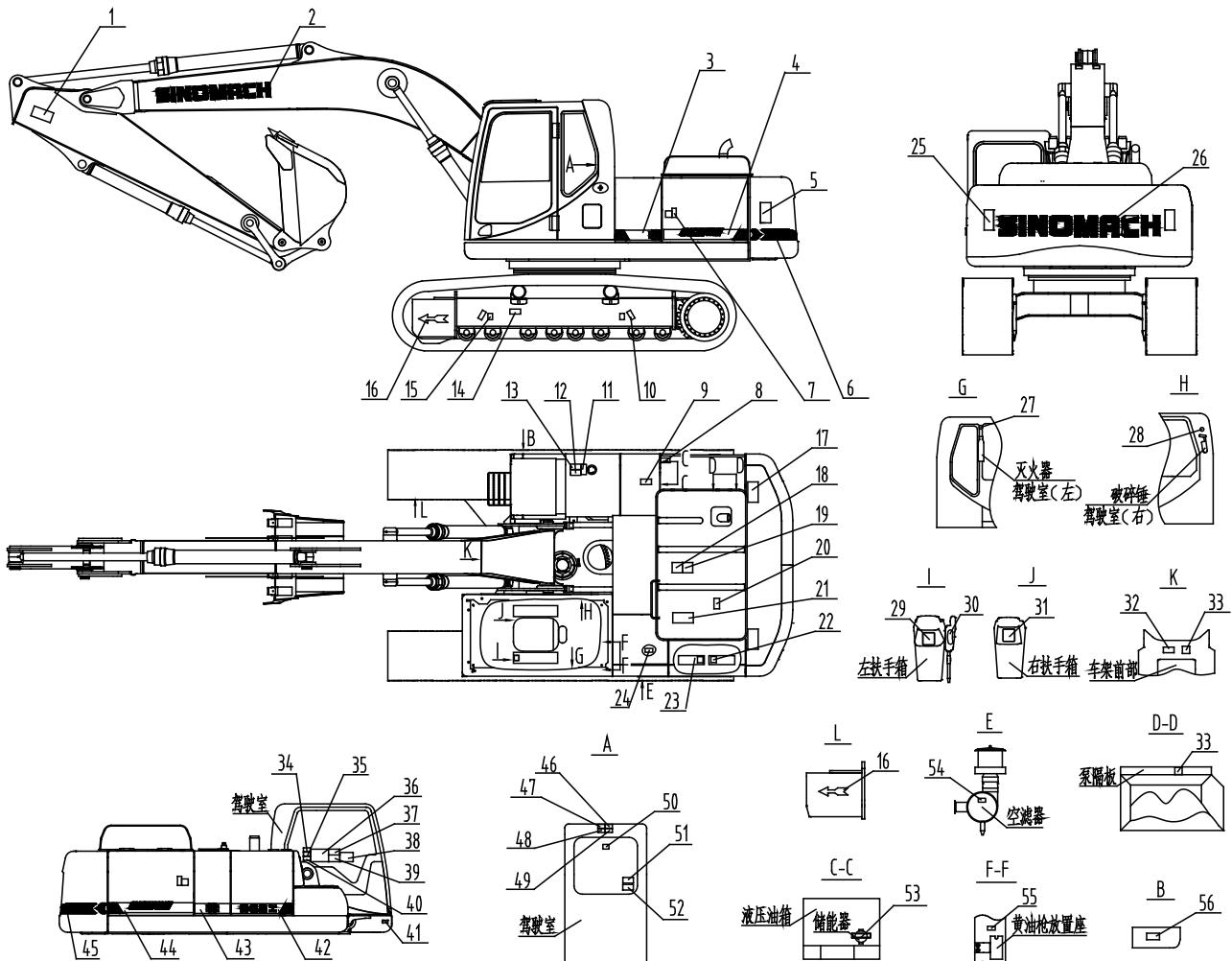
The operation, maintain and preventive measures of the safety operation specifications given in this manual are only applicable to the specified application of this machine. **Sinomach** takes no safety responsibility if the machinery is used for other applications which are not listed in this manual and the consumer takes full safety responsibility of such operation.

The operation prohibited in this manual can not be carried out under any circumstances.

Safety mark

1. Position

Keep those marks clean. Replace it in time if it is lost or damaged.



- | | | |
|------------------------------------|--|--|
| 1 Pay attention to working element | 20 High temperature warning | 39 Mode selection |
| 2 Trademark (SINOMACH) | 21 Shut-down inspection | 40 ATTENTION |
| 3 Outlooking label | 22 Battery warning | 41 Nameplate |
| 4 Model | 23 Battery | 42 Outlooking label |
| 5 Paid attention to both sides | 24 Grease tank location label | 43 Outlooking label |
| 6 Reflection label | 25 Keeping distance | 44 Model |
| 7 Unlock warning | 26 Trademark (SINOMACH) | 45 Reflection label |
| 8 Shutdown during refueling | 27 Fire extinguishing sign | 46 Warning before closing window |
| 9 High temperature warning | 28 Window breaking sign | 47 Refer to the manual |
| 10 Lifting symbol | 29 Manipulative norms | 48 High voltage warning |
| 11 Fall warning | 30 Pilot cut-off indication | 49 Warning |
| 12 Refueling warning | 31 Manipulative norms | 50 Escape symbol |
| 13 Fuel filling opening | 32 Lubrication label | 51 AC warning |
| 14 High pressure grease warning | 33 High temperature and pressure label | 52 AC symbol |
| 15 Anchorage | 34 ATTENTION | 53 Precautions when using accumulators |

16 Steering symbol	35 Controller warning	54 Air filter symbol
17 Lifting forbidden	36 Engine guide	55 Grease filler location
18 High temperature warning	37 Manipulative norms	56 Transportation symbol
19 DO NOT STAND HERE	38 Lubrication label	

2. Description

The following marks contain the meaning relevant to the safety.

Do not tear or damage these marks.

1) Pay attention to working equipment

The mark is located on both sides of the arm.

- ⚠ The falling of working equipment may lead to injury or death accident.
- ⚠ Keep away from the machinery under operation to avoid above accident.



2) Pay attention to both sides

The mark is located on both sides of the counterweight.

- ⚠ This mark indicates that there is the danger of being crushed by the machinery, so keep the distance of working radius from the machinery.

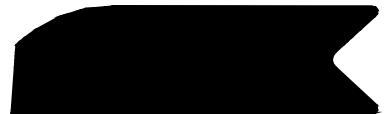


3) Reflection label

The mark is located on both sides of the counterweight.



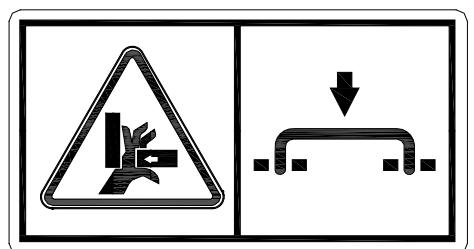
- ⚠ This mark indicates that there is the danger of being crushed by the machinery, so keep the distance of working radius from the machinery.



4) Unlock warning

The mark is located on both sides of the door.

- ⚠ It is needed to make sure that the support is fixed when opening the side door.
- ⚠ The opened door shall be paid attention to because it may be closed by the external force or the affection of the strong wind.



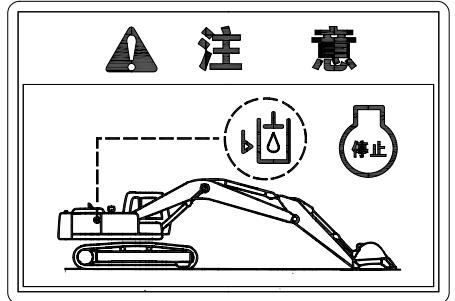
5) Shutdown during refueling

This sticker is located on the hydraulic tank to the left of the oil level gauge.

★ When checking the hydraulic system, place the bucket on the ground as shown on the right.

★ Check the oil level on the level gauge (the oil level is in the middle).

★ If necessary, add the recommended hydraulic oil to the specified level.

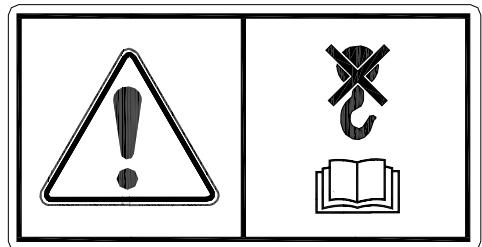


6) Lifting forbidden

The mark is located on both sides of the hook of the counterweight.

▲ Do not attempt to use the hook on the counterweight to lift the whole excavator, otherwise the overload breakage may lead to the injury to persons.

★ Please refer to the chapter "Transportation" of this manual to find the suitable method for lifting complete machine.



7) Fall warning

This sticker is located on the edge of the top channel..

▲ This sticker is located on the edge of the top channel.

This sticker reminds personnel that there is a danger of falling from a height, and do not stand on the edge.

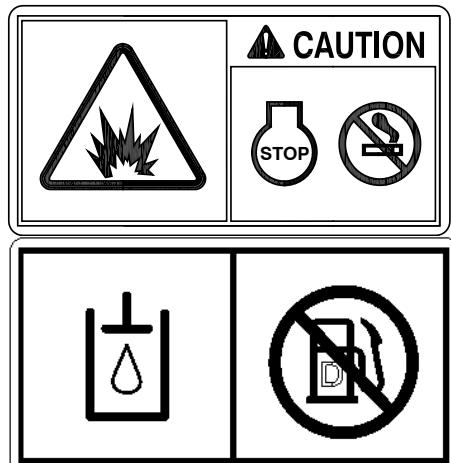


8) Fuel filling opening

The mark is located on right side of the fuel tank filler.

▲ The engine shall be stopped and the naked flame shall be kept away from the engine when filling the diesel fuel.

▲ Please fill high quality diesel fuel.

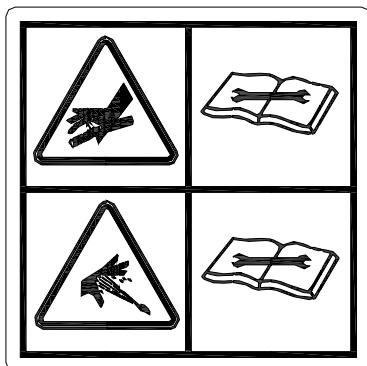


9) High pressure pipe

The mark is located at the front of the upper rotation platform.

⚠ This nameplate indicates that there is the danger of splashing the high pressure oil when the high pressure pipe is cracked.

★ Please refer to the manual for safe and correct operation.



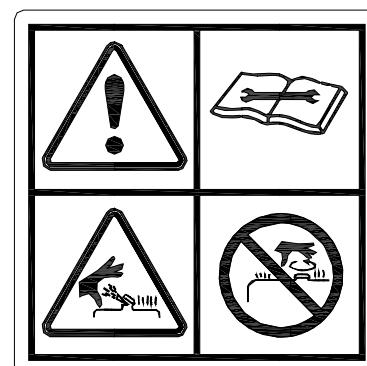
10) Hydraulic oil filling opening

The mark is located on the right side of the ventilation plug on the hydraulic oil tank.

⚠ Do not blend oil with different brands.

⚠ Never open the oil filling cover when the engine is running or the oil temperature is high.

⚠ Loosen the oil filling cover slowly to release the internal pressure of the oil tank.



11) Accumulator electrolyte

The mark is located on the upper site of the accumulator inside the left side shield.

⚠ The electrolyte contains sulfate will lead to the scorch. Avoid splashing on the skin, eye or clothes, in case of which happens, wash it with water and go for medical inspection and treatment immediately.

★ Keep the liquid level recommended of accumulator electrolyte, and fill distilled water only when the engine starts (it is forbidden when the engine stops).

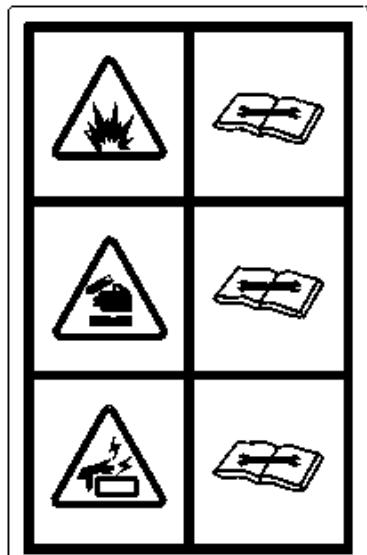
★ Keep the liquid level recommended to avoid the gas accumulation in the accumulator.

⚠ Make sure that there is no open fire or smoking before checking the accumulator.

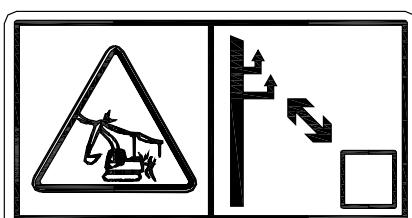
⚠ Match, lighter etc. must be kept away from the accumulator.

⚠ Non-professionals don't replace the accumulator.

⚠ Don't touch the terminal blocks of the accumulator with your wet hand to prevent electric shock.



12) Peak height



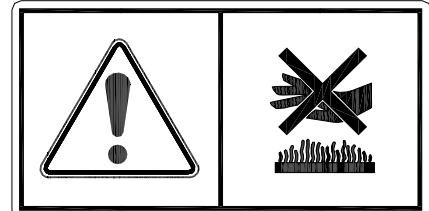
The mark is located on the right side of the cab.

- ▲ Touching the high voltage cable may lead to the severe injury to persons. In order to avoid touching the high voltage cable, the safe distance shall be kept.

13) High temperature warning

The mark is located at the engine hood.

- ▲ Do not touch the turbocharger, it may lead to the serious burn.
- ▲ Do not touch the exhaust pipe of engine, it may lead to the serious burn.



14) Do not pedal the mark on engine hood

The mark is located at the engine hood.

- ▲ Do not pedal the engine hood, it may lead to the deformation, damage of the engine hood and the injury to persons.

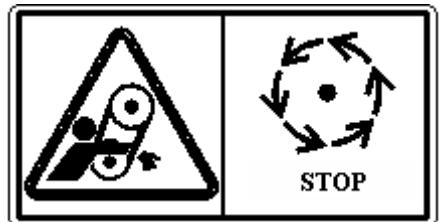


15) Shut-down inspection

The mark is located at the engine hood.

- ▲ This mark indicates that there is the danger of being involved by the belt and other rotating members, do stop the machine when inspecting and maintaining the engine.

- ▲ Do not open the engine hood when the engine is working.



16) High temperature warning of water tank

The mark is located on the water tank.

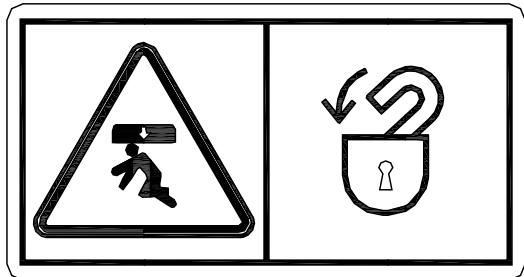
- ▲ Never open the radiator cap when the engine is running or the water temperature of the engine is high. Otherwise the hot water will be ejected and lead to the scald.



17) Front safety window

The mark is located on the right side of the cab window.

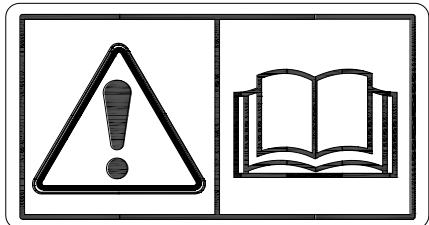
- ⚠ It shall be careful for the front window can be closed quickly.



18) Refer to operation manual mark

The mark is located on the right side of the cab window.

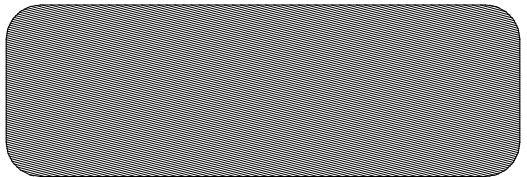
- ⚠ Read this manual seriously before starting and operating the machine.



19) Reflection label

The mark is located on the both side of the rear of the counterweight.

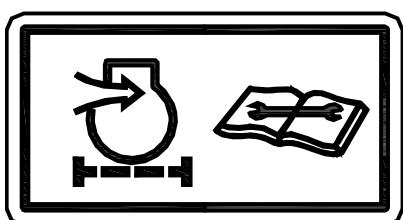
- ⚠ Keep the distance of working radius from the machine to prevent the serious injury to persons or death.



20) Identification of air filter

The mark is located on the air filter cover.

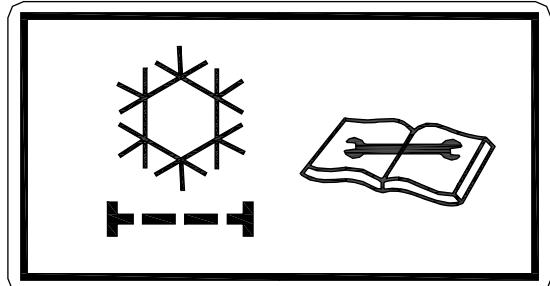
- ★ In order to prolong the engine life, the air filter shall be periodically inspected, cleared and replaced to keep the favorable performance of the engine.



21) Air conditioner identification

The mark is located on the inside of the rear window of the cab.

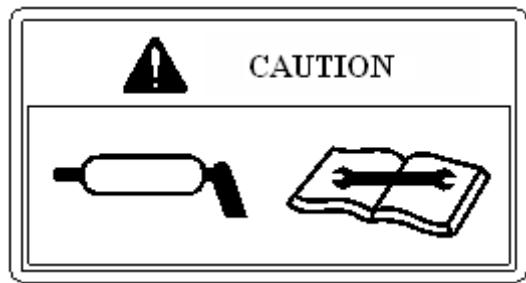
- ★ In order to prolong the life of the air conditioner, the filter element of the air conditioner shall be periodically inspected, cleared and replaced to keep the favorable performance.



22) Lubrication of reduction gear

The mark is located at the front of the upper rotation platform.

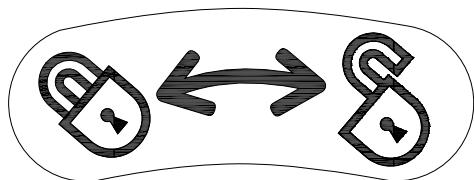
- ★ The grease must be added on the rotation reduction gear periodically, see the “Maintenance diagram” of the chapter “Maintenance” of this manual for details.



23) Safety lock rod

The mark is located on the left controlling box.

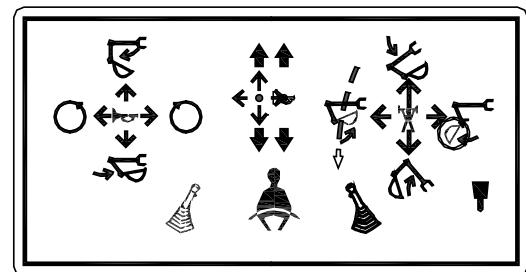
- ★ The pilot cut-off valve operating lever shall be set on the LOCKED position when leaving the cab.



24) Operation description

The mark is located on the right side window of the cab.

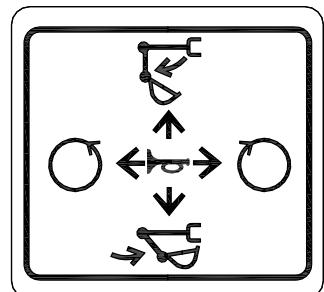
- ★ See the chapter “Operation” of this manual for details.



25) Operation description (left)

The mark is located on the left controlling box.

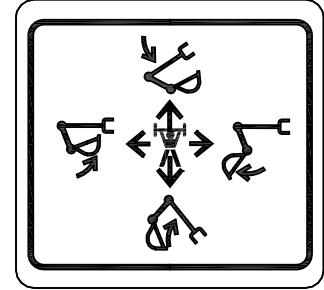
- ★ See the chapter “Operation” of this manual for details.



26) Operation description (right)

The mark is located on the right controlling box.

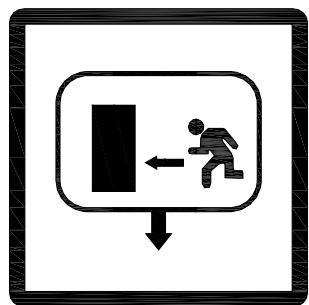
- ★ See the chapter “Operation” of this manual for details.



27) Rear safety window

The mark is located on the inside of the cab rear window.

- ▲ The rear window is a standby security exit.
- ▲ Break the window with the hammer and escape from this security exit when there is emergency.

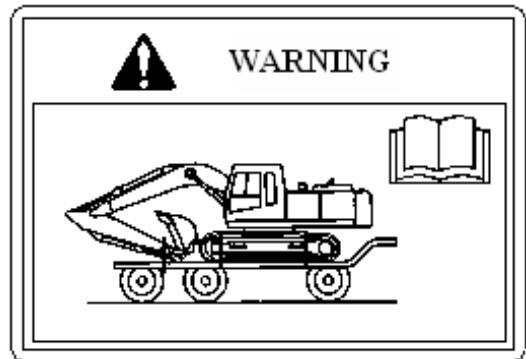


28) Transportation

The mark is located on the right of the upper rotation platform bracket.

- ▲ The operation manual shall be studied before the transportation of the complete machine. The arm and the crawler shall be fixed on the flat plate transporter by using the cord or the steel wire.

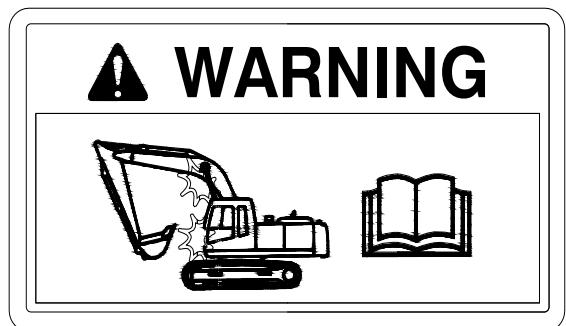
★ See the chapter “Transportation” of this manual for details.



29) Interference

The mark is located on the right side of the cab window.

- ▲ Operate the machine carefully which equips quick coupler, expansion device, breaker, hydraulic shear, hydraulic-pincers etc., of which the working range may be different from the standard original.
- ▲ Pay attention to the possibility of collision when these working device approach to cab, boom, boom cylinder, lower carframe, track etc.



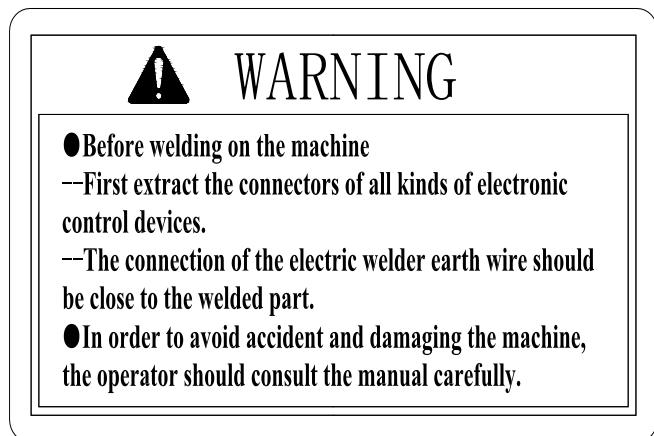
30) Control unit identification

The mark is located at the cover of control unit.

▲ Before welding on the machine:

First extract the connectors of all kinds of electronic control devices.

The connection of the electric welder earth wire should be close to the welded part.



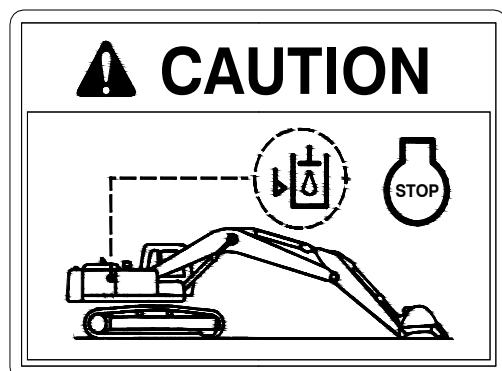
31) Hydraulic oil level

The mark is located on the left stand column of the cab.

★ Place the working equipment as the right picture shows when checking the hydraulic system.

★ Check the oil level in the level gauge (should be at middle position).

★ Fill recommended oil to prescriptive level if it is necessary.



32) Fire extinguisher

The mark is located on the left stand column of the cab.

▲ Using the fire extinguisher obeys its instruction.

▲ See “Fire extinguisher” in the chapter “Safety notice” of this manual for details.

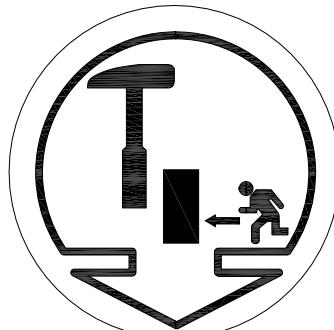


33) Hammer for escaping

The mark is located on the right stand column of the cab.

▲ Using the hammer obeys its instruction.

▲ See “Hammer for escaping” in the chapter “Safety notice” of this manual for details.



34) Anchorage

The mark is located on both sides of the travel rack.

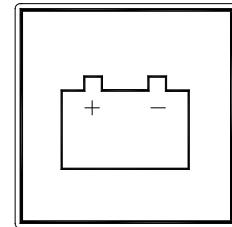
- ⚠ This mark indicates the fixed location of the machine transport.



35) Accumulator

The mark is located at the accumulator.

- ⚠ Pay attention to the connection of positive and negative electrode when installing and replacing the accumulator.



36) Lift symbol

The mark is located on both sides of the travel rack.

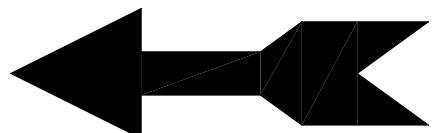
- ⚠ This mark indicates that the machine shall be lifted at this location.



37) Identification of rotation direction

The mark is located on the side of left and right travel racks beside the guide wheels.

- ⚠ This mark indicates the travel direction of the machine.

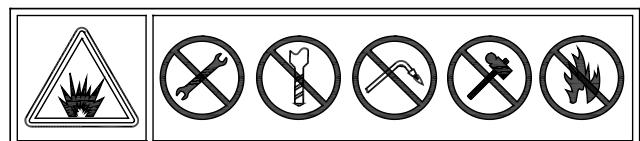


38) Matters need attention of power accumulator

The mark is located at the surface of the accumulator on the right door.

- ⚠ The accumulator is full of high pressure nitrogen. Your improper treatment will lead to danger.

- ⚠ It is forbidden to drill the accumulator.



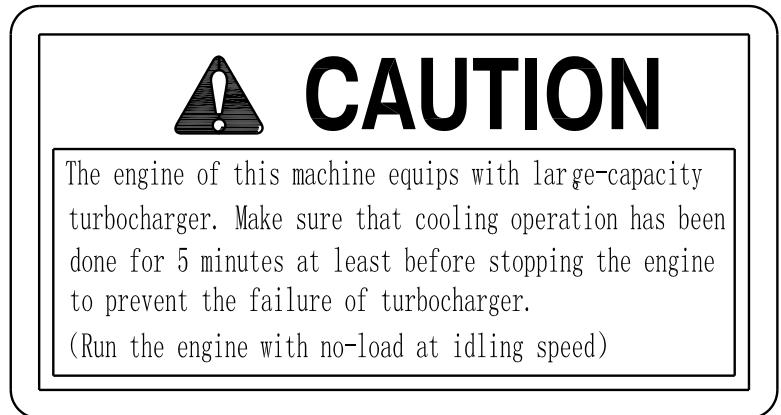
- ▲ It is forbidden to put the accumulator some place with flake or flame.
- ▲ It is forbidden to weld the accumulator.
- ★ Release the gas in the accumulator when disassembling, maintaining or abandoning it.

39) Shutdown for cooling

The mark is located on the right side window of the cab.

- ▲ The engine of this machine equips with large capacity turbocharger. Make sure that cooling operation has been done for 5 minutes at least before stopping the engine to prevent the failure of turbocharger.

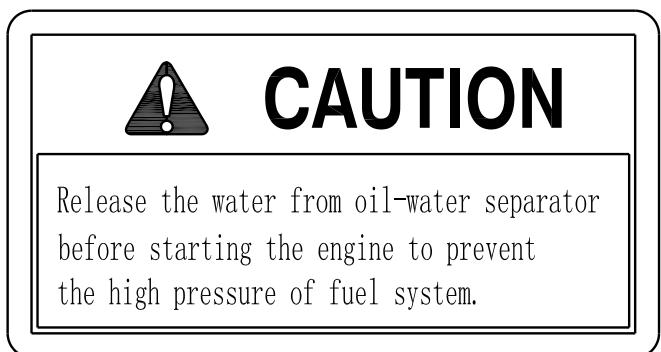
(Run the engine with no-load at idling speed)



40) Oil-water separator

The mark is located on the right side window of the cab.

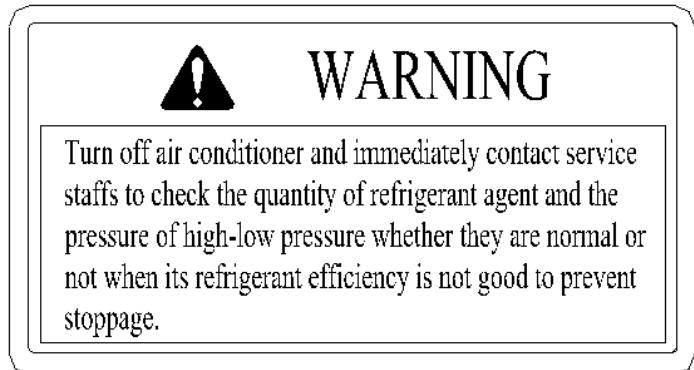
- ▲ Release the water from oil-water separator before starting the engine to prevent the high pressure of fuel system.



41) Air conditioner warning

The mark is located on the back window of the cab.

- ▲ Turn off air conditioner and immediately contact service staffs to check the quantity of refrigerant agent and the pressure of high-low pressure whether they are normal or not when its refrigerant efficiency is not good to prevent stoppage.

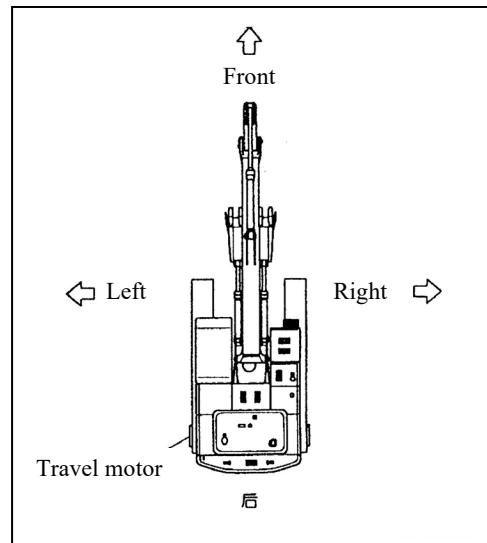


Guide

1. Direction

The direction described in this manual is the direction of which the travel motor is on the rear.

The direction of the travelling machinery is the same as the front and rear, the right and left direction of the operation crews.

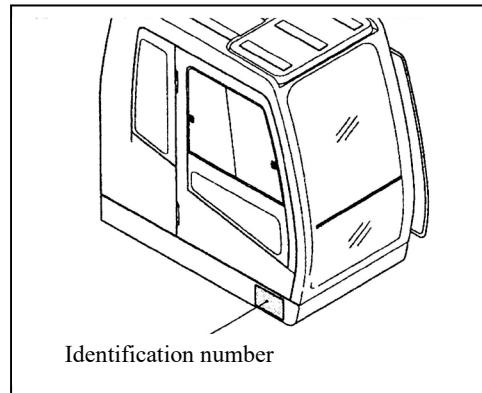


2. Identification number

Please let us know the following contents if the parts or the machinery disagrees with your order.

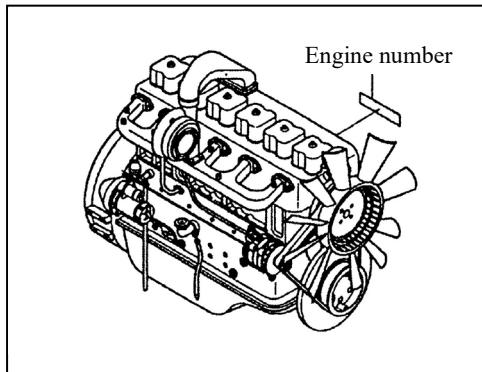
1) Identification number

The Identification number is located on the right lower corner of the cab.



2) Engine number

The engine number is located on the nameplate of the engine.



3. Symbol

▲ Emphasize the secure prompt.

★ Specify the useful information to operation crews.

Chapter I Safety notice

I. General matters need attention

▲ Warning: For the sake of the safety, Please comply with following safety notices.

▲ Warning: Failed comply with following safety measures may lead to serious accident.

1. Comply with safety regulations

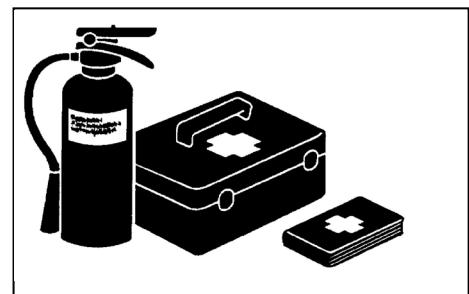
- Read all safety nameplates carefully and comply with those safety nameplates as well as all contents related to the safety in this manual.
- Maintain and replace the safety nameplates when necessary.

If the safety nameplates or this manual is damaged or lost, please place an order to the specified dealer for replacement in the same way of ordering other parts (the model number and the serial No. of the machine shall be specified).

- The machinery and the controller shall be operated correctly and safely.
- The machinery can only be operated by the qualified and well trained person.
- Do not operate the machinery when you feel strange or take the medicament which may lead to the sleeping or drunk. The operation of the machinery under such circumstances may influence your judgment and lead to the accident.
- It shall be guaranteed that all persons can understand the hand signal used when working together with other operation crews or the person who takes the responsibility of traffic command.
- Keep the machinery under the suitable working condition.
- The unauthorized modification on the machinery may have negative influence on the function and the security and shorten the service life of the machine. **Sinomach** takes no responsibility for the injury and damage caused by any unauthorized modification.
- The safety instruction in the "Safety" section is the basic safety regulations of the machine. However, these relevant safety instructions can not cover all hazardous conditions. Please ask for instructions from your headman before the operation and maintenance of the machinery if there are any problems.

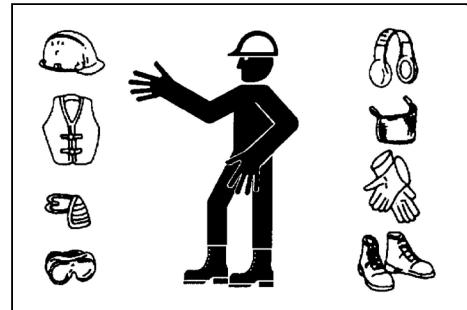
2. Precautions against emergency situation

- Take precautions against the fire or accident.
- Arrange the first aid case at hand, maintain and replace the fire extinguisher periodically.
- Read and understand the instruction on the fire extinguisher carefully and use the fire extinguisher correctly.
- In order to guarantee the normal operation of the fire extinguisher under emergency situation all the time, the fire extinguisher shall be inspected and maintained as per the recommended maintain interval specified in the fire extinguisher manual.
- Establish the emergency guide against the fire and accident.
- Paste the phone numbers of the doctor, the ambulance car, the hospital and fire company near the telephone.



3. Take on the protective clothing

- Dress maillot straitjacket and safety commodity suitable for operation.
- The function of all protective clothing must be checked whether normal or not before being taken on.
- The loose coverall, the ornament or other commodity may catch the operating lever or wear other mechanical parts. Never let the coverall be caught by the parts projected from the excavator.
- It is dangerous that too long hair can not be covered wholly by the safety helmet. Bundle your hair to prevent being involved accident by the machine.
- It is forbidden to close the ignition source with oil soaked coverall; it may lead to the fire.
- Put on the suitable helmet and safety shoes and coverall. The ocular glass, the breathing mask, muffler, the ear-plug or other armour shall be put on if the operation site is dangerous.



4. Acoustics insulation

- The auditory sense may be damaged or lost if the operator is in the environment with large noise for a long time.
- Put on proper hearing conservation device, such as the earcap or the ear-plug to prevent the harmful or uncomfortable large noise.



5. Anticipating application

- Sinomach excavator is mostly used for excavating, planishing, digging, loading and demolishing in safe region without dropping. Making use of all kinds of accessories can extend applied range of the machine.
- This machine is forbidden to hoist and ship spherical object strictly in any case.
- Making use of the machine beyond anticipating application may lead to serious safety accident or damage to machine.
- If there is necessary the machine works or travels in water:
 - The water depth can't exceed the center of carrier rollers.
 - Fill the parts which have been steeped in water for long time with new lubricating grease till the old one is squeezed out completely (especially for the region of bucket pin).

6. Inspect machinery

- In order to avoid the injury to person, the machinery shall be patrol inspected carefully daily or per shift before starting the machinery.
- Be sure to check all items which are described in “Inspection before starting the engine” of the chapter “Operation” of this manual.
- Be sure that there are suitable locations for all shield and cover. Repair immediately all shield and cover are

damaged.

- Study the using method of the safety devices and use them correctly. Don't disassemble anyone of safety devices and keep them working well.

7. General matters need attention of cab

- Eliminate the mud and oil stain on the boot before entering into the cab. The foot may slip off the pedal when operating the pedal and other controller if there are the mud or oil stain at the bottom of the operating boot and lead to the personal injury.
- Do not put the part and the tool around the operating seat, store those in the specified place.
- Do not put the transparent bottle in the cab. Do not hang any kinds of transparent ornament on the windowsill. For it may focus the sunlight and lead to the fire.
- Do not listen to the radio or use the earphone, the mobile telephone when operating the machinery.
- **Fasten your seat belt when operating the machinery.**
- Do not place any flammable explosive substance in the cab.
- Close the ash pan cover all the time to extinguish the match or the cigarette end.
- Do not left the lighter in the cab for it may explode when the temperature of the cab is increased.

8. Use the handrail and the footstep

- The falling is one of the prime reasons of person injury.
- Always keep three points contacting with the footstep and the handrail and face to the machinery when climbing up or down the machinery.
- Do not take any operating handle as the handrail.
- Neither jump on or out of the machinery nor climb up or down the moving machinery.
- Pay attention to the skid of the platform, the footstep and the handrail when leaving the machinery.

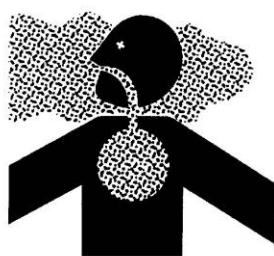


9. Prevent the hazard of the asbestos dust

- It is dangerous of breathing the asbestos dust.

Following instructions shall be followed when handling the material with asbestos fiber.

1. Do not use the compressed air to clear the contamination.
2. Use the water to clear the dirt to prevent the mill dust from flying all about.
3. Back to the wind direction as far as possible during the operation.
4. Use the qualified respirator when necessary.



10. Avoid being squeezed or cut

- Do not put the hand, the arm and other part of the body into or between the active components, such as the working equipment and the cylinder, the frame and the

working equipment, etc.. The clearance will be changed when the machinery is running thereby it can lead to the serious damage or injury to persons.

11. Matters need attention in relation to accessories

- Read the utilization instruction manual and related content in this manual at first when installing and using the optional accessories.
- Do not use the accessories which are not approved by **Sinomach** or **Sinomach** dealer. The unauthorized accessories used may lead to the safety problem and the normal operation and service life of the machine may be influenced.
- **Sinomach** does not take any responsibility of the injury, accident and mechanical failure caused by the unauthorized accessories used.

II. During machine operation

⚠ Warning: For the sake of the safety, Please comply with following safety notices.

⚠ Warning: Failed comply with following safety measures may lead to serious accident.

(I) Before starting operation

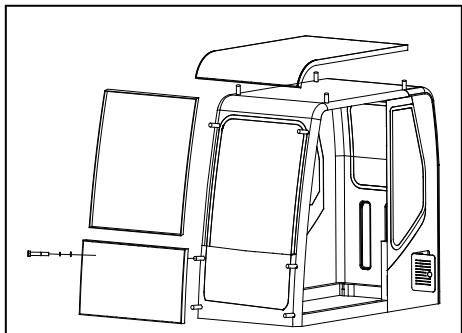
1. Investigate worksite beforehand

- There is the possibility of overturn and it may lead to the severe fatalities when operating on the limes margins or shoulder of road.
- Investigate the landform and ground state of worksite beforehand to prevent the overturn of the machinery or the collapse of the ground, stockpile and the riverside.
- Establish the operation plan and use the machinery correctly suitable for the operation or the worksite.
- Strengthen the ground, the limes margins and the road shoulder as required; keep the machinery at a distance from the limes margins and the road shoulder.
- Use the signaler as required when carrying out the operation on the slope or the road shoulder.
- Strengthen the ground before operation when the foundation is soft.
- Pay special attention to the operation on the frost ground. The foundation may be soft and slippy when the ambient temperature is increased.
- Pay attention to the fire possibility when operating the machinery near the hay and other inflammable material.



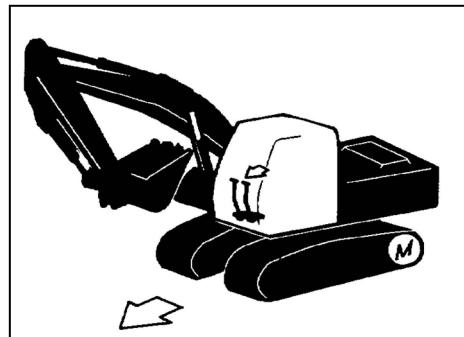
2. Protection for driver

- The standard cab has no functions of FOPS, TOPS, ROPS etc.. The machinery equips this standard cab is forbidden to work in the regions where have the danger possibility of dropping, collapsing and turning over.
- There are necessary installing bases for protection device in cab. Please contact Sinomach to install the protection device (optional) when your machine work in special regions to prevent falling and splashing injury to persons.
- Please contact Sinomach to replace the protection device when there is plasticity deformation or crack damage in its any parts.
- Replacement is the only maintaining pattern when the protection device is damaged. It is forbidden to repair the damaged one.



3. Confirm the travelling direction of the machine

- Wrong operation of the travel pedal/lever may lead to severe casualty accident.
- Make sure the positional relationship of the lower travel rack and the operator before driving the machinery. If the travel motor is located in the front of the cab, the machinery will move backwards when push the pedal/lever forward.



4. Send the signal for multimachine operation

- Use the signal known to all operating persons under multimachine operation. Specify one signaller to organize the operation to make sure that all operating persons submit the command of the signaller.

5. Inspection of oil level

- Inspect fuel level and lubricating oil level as well as the cooling water level. It is strictly forbidden to smoke when inspecting or filling the oil. Inspect the radiator cap and each oil filler cap or oil filler hole plug to sure whether they are tightened or not.
- Inspect the fuel system, the lubricating oil system and the hydraulic system for leakage and repair any leakage, remove all superfluous oil or other inflammable liquid.

6. Adjust seat

- The seat unfit for the operator will lead to the fatigue of the operator soon and lead to the operating failure.
- The seat shall be adjusted every time of changing the machine operator.
- The pedal can be pedaled down to the end when the operator rest his back on the seat back and the operating lever can be operated correctly.
- The seat shall be moved fore and after until the operation mentioned above can be done well.



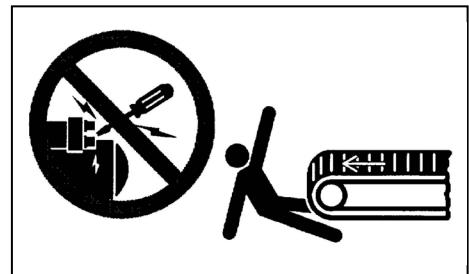
7. Buckle up safety belt

- In the event of roll-over accident, the operator may be injured or throw-out of the cab, or squeezed by the tipping machine, which leads to severe casualty accident.
- Inspect the belt, the buckle and the fastener of the safety belt carefully before operating the machine. The damaged or worn safety belt or its parts shall be replaced before the operation.
- The operator shall sit on the seat and buckle up safety belt well all the time during the operation when the machine is running to decrease the possibility of the injury caused by the accident to the minimum.
- The safety belt shall be replaced every three years regardless of its conditions.



8. Only start the machine when sitting on the operating seat

- Incorrect engine start procedures may bring about the machine is out of control and lead to the severe casualty accident.
- Only start the engine when sitting on the seat in the cab.
- Never start the engine when standing on the crawler or the ground.
- Do not start the engine by short-circuiting the terminal of the starter.
- Make sure that all operating levers are on the mid positions before starting the engine.



9. Inspect cab

- The sufficient ventilation must be kept if must start the engine in a sealed space, or the superfluous engine exhaust gas may cause death.
- Wiping all door window glass and front lights to guarantee the clear vision field.
- Adjusting side rear view mirror to guarantee clear rear view field of the operator on the driving seat. Keep cleanliness of mirror surface. The mirror cracked shall be replaced.
- Inspect ceiling lamp and working lamp to sure if it can operate normally.

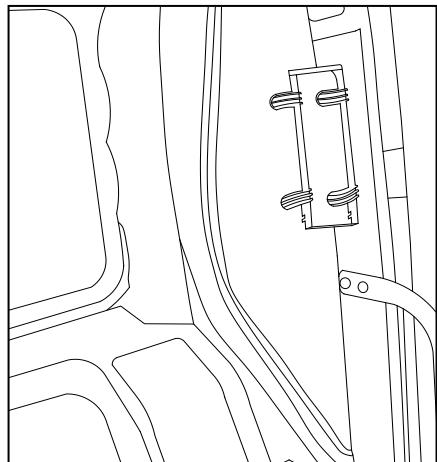
10. Fire extinguisher and hammer for escaping

1) The support for fire extinguisher

There is a support for fire extinguisher at the back of cab.

The support is only suitable for installing the powder fire extinguisher of which weight is 1Kg and diameter is about 90mm.

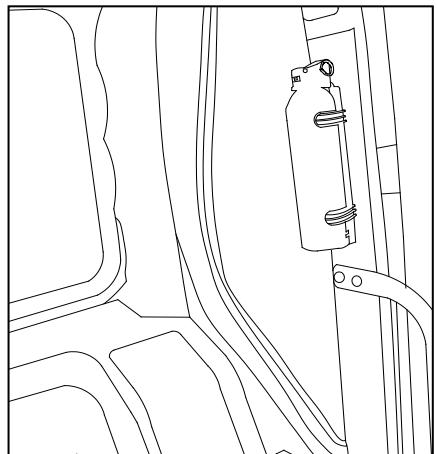
Notice: Clip the black belt of the support when installing the fire extinguisher.



2) Fire extinguisher

There is a fire extinguisher at the back of cab.

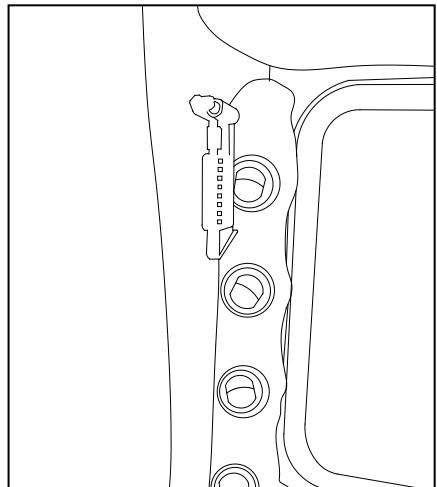
The using method is described on the nameplate of the fire extinguisher, which should be studied and known well in case of fire accident.



3) Hammer for escaping

There is a hammer for escaping at the back of cab.

The rear window is a standby security exit, from where breaking the window with the hammer and escaping when there is emergency and the cab door can't be opened.



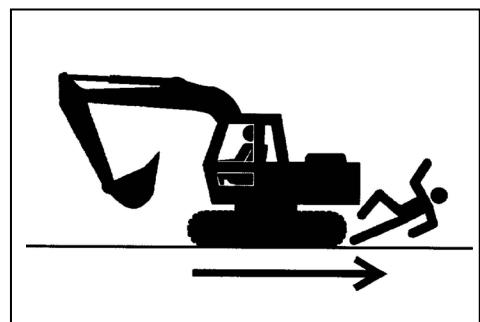
(II) After starting engine

- Make sure that functions of all instrument and warning device are normal and the meter readings are within the specified range.
- Operate the working equipment and make sure that the function of it is normal.
- Drive the excavator slowly and listen to the engine and traveling mechanism carefully for abnormal noise.
- Operate the travel pedal/lever and make sure that the function of the move forward and move backward as well as the running speed are normal.
- Select secure place. Turn the excavator to the left and right to make sure whether the function of the steering gear is normal or not.
- Please contact the person who is responsible for the excavator and the excavator can only be operated with the permission of the person if there are any troubles even if it is very trivial.

(III) In operation

1. Move and operate machine safely

- Person around the machine may be run down
 - Be careful not to run down the surrounding person. Confirm the position of the surrounding person before moving, rotating or operating the machine.
 - Always keep travel alarm device and horn under operating mode. Those devices can warn the person around when the machine begin to move.
 - Please get the help of the signaller and the hand signal shall be coordinated when travelling on the narrow area and rotating or operating the machine.



2. Jump start

- The gas from the accumulator may explode and lead to the severe casualty accident.
- Take care to do follow the procedures described in section "operating engine" if the engine must be started by using the



jump start method.

- The operator must sit on the operating seat to control the machine when starting the engine. Accordingly, the jump start must be done by two persons.
- Never use frozen accumulator.
- The accumulator may explode or the machine may be out of control if the correct jump start procedures are not followed.

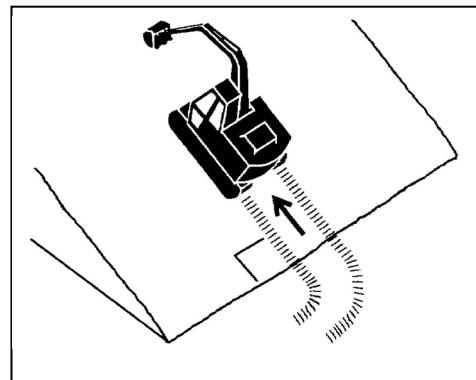
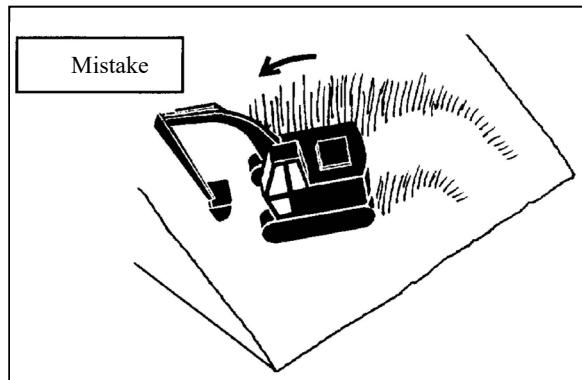
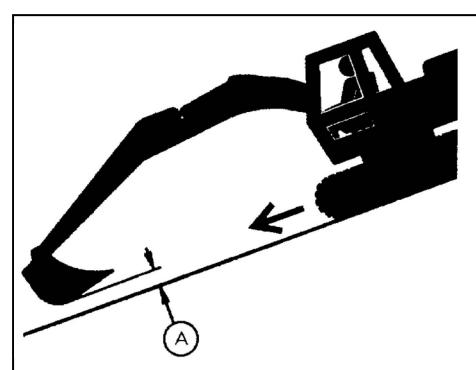
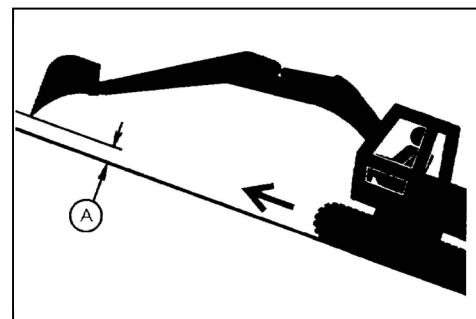
3. Do not let the machine carry the passenger

- The passenger on the machine may be hurt easily, for example, being hit by the foreign matter or dropped from the machine.
- Only the operator is permitted on the machine.
- The passenger can also block the sight line of the operator and the operation may be not safe.



4. Drive the machine safely

- Make sure of the traveling direction of the machine when you operate the travel controlling lever before operating the machine.
- Never fail to detour any obstructions.
- Do not drive the machine over the obstruction. There may be the clod, the stone block and metal article around the machine. Do not let the person stay near the machine when the machine is running.
- The machine may slip or overturn and lead to the serious injury or death when the machine is running on the sloping field.
- The bucket shall be placed to the traveling direction and the distance from the bucket to the ground is of about 0.2 to 0.3m (A) when climbing up or down the slope.
- The bucket must be lowered immediately if the machine begins to slip or becomes instable.
- There is the danger of side slipping or the overturn when traversing or changing the direction on the slope. The machine shall be driven to the level ground and then change the direction.



5. Avoid injury accident in reverse and rotation

- The person near the machine may be hit or overtaken and it may lead to the severe fatalities if there is anybody near the machine when the machine is running in reverse direction or the upper structure is rotated.

In order to avoid injury accident in reverse and rotation:

- Always look round before reversal and rotation to sure whether there is person around the machine or not.
- Keep the alarm device on active state. Watch out constantly for anyone coming into the work area. Use the horn or other signal to warn other people before moving the machine.
- Use the signaler if your sight line is blocked in reversal. Always keep the signaller in your vision field.
- Use the hand signal which complies with local rules when the working condition requires the signaller.
- The machine can only be moved when the signaller and the operator understand the signal distinctly.
- Understand the meaning of all flags, signals and marks which are used for operation and confirm who is responsible for the signal.
- Keep the cleanliness and good conditions of the window, the retroreflector and the lights.
- The dust, heavy rain and the mist, etc. will decrease the visual visibility range. Slow down the speed and use adequate illumination when the visual visibility range is lowered.

6. Avoid the damage caused by the machine which is out of control

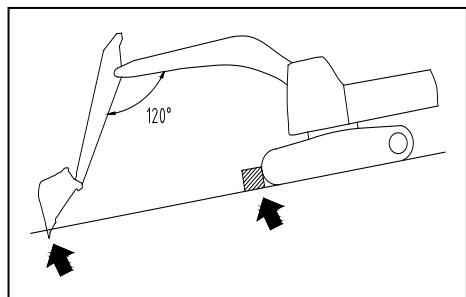
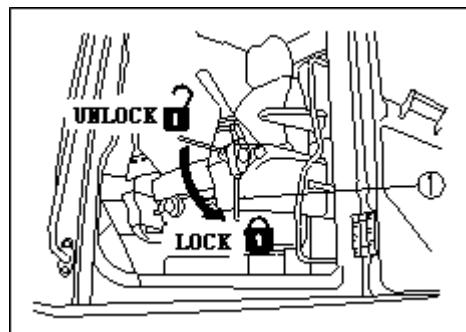
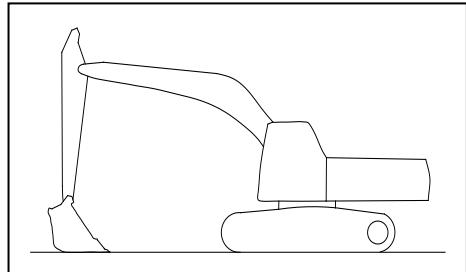
- The severe casualty accident may happen if someone try to climb up or shield off the moving machine.

In order to avoid losing control of the machine:

- Select level ground as far as possible when parking the machine.
- Do not park the machine on the slope.
- Lower the bucket and/or other tools on the ground.
- Tune out the automatic low speed switch.
- Run the engine with no-load at idling speed for 5 minutes to cool the engine.
- Stop the engine and take the key out of the key switch.
- Pull the safety lock rod ① to the LOCK position.
- The crawler on both sides shall be blocked by the blocks and the bucket shall be lowered and cut into the ground if the machine must be parked on the slope.
- Fix the machine to prevent the rolling.
- Park the machine at a place which is away from other machine for an appropriate distance.

7. Avoid unexpected operation

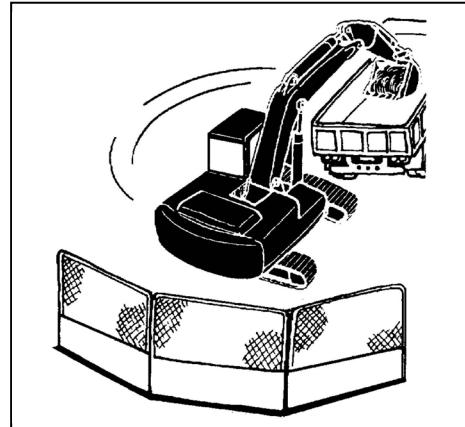
- Be sure to pull the safety lock rod ① to the LOCK position when stopping the machine to avoid unexpected operation.
- Pull the safety lock rod ① to the LOCK position, shutdown,



close the cab door, lock all devices and take the key to the specified location to avoid unexpected operation when leaving the cab.

8. Prevent irrelevant personnel from entering the work area

- The person may be bumped by the rotating front end device or squeezed by other body and it may lead to the severe casualty accident.
- Keep all personnel away from the operating and running area of the machine.
- Set up the enclosure at lateral and rearward of the swinging radius of the bucket to prevent the person from entering the work area before operating the machine.



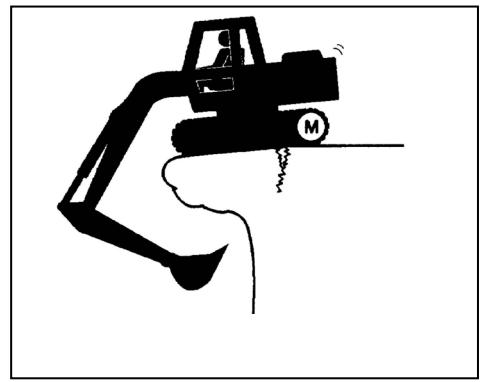
9. Never put the bucket on the upper site of anybody

- Never lift, move or rotate the bucket across the upper site of anybody or truck cab.
- The falling material from the bucket or the bucket may lead to the severe casualties or the machine breakdown.



10. Avoid undercut

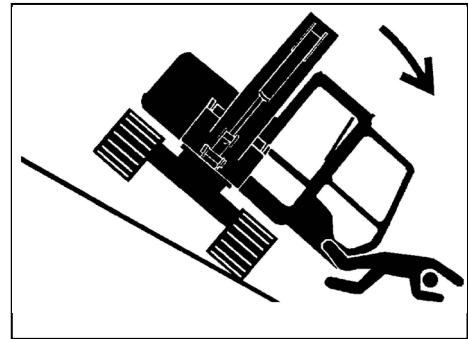
- In order to pull out from the limes margins in case of the collapse of the foundation, the travel motor shall be always set on the rear and the machine shall be parked while the lower body is perpendicular to the limes margins.
- Do not lose your head when the foundation begins to collapse but the machine cannot be pulled out. Generally, the machine can be fixed if the front end device is lowered at the time.



11. Avoid overturn

- ⚠ Warning: Do not try to jump out of the machine which is off-balance, otherwise the serious or fatal bruise.
- ⚠ The overturn speed of the machine is quicker than your speed.
- ⚠ Buckle up safety belt.
- ⚠ The cab of this machine isn't equipped ROPS, so the machine is forbidden to work in the regions have the overturn danger.

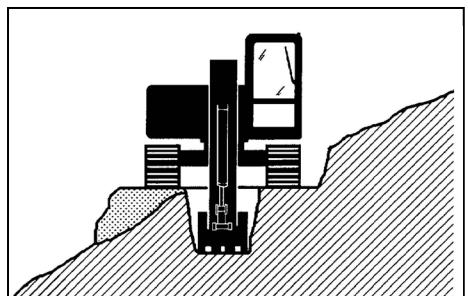
- There is the overturn danger of the machine when operating the machine on the slope and it may lead to the severe casualty accident.



In order to avoid overturn:

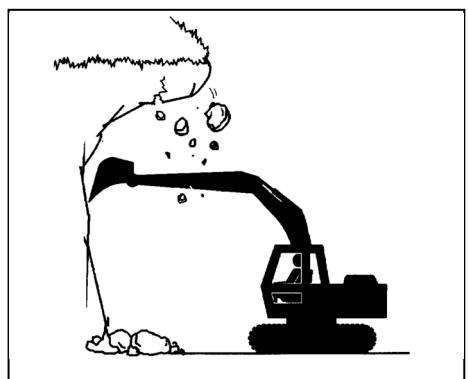
It shall be especially careful when operating the machine on the slope.

- Avoid the operation in the slope of which the gradient exceeds 10 degrees. If the slope operation is inevitable, do planish the operational zone of the machine.
- Lower the bucket to the ground and keep this state and approach the machine.
- Decrease the operating speed to prevent the overturn or slide.
- Avoid direction change when driving the machine on the slope.
- Never try to traverse the slope of which the gradient exceeds 15 degrees if the slope traverse is inevitable.
- Decrease the rotational speed according to the situation when rotating the load.
- It shall be careful when operating the machine on the frozen ground.
- The temperature increment will make the ground soft and the travel of the machine on the ground is unsteady.



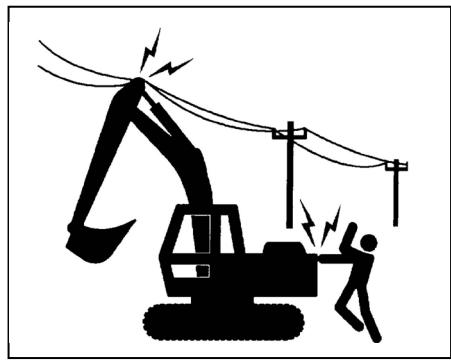
12. Never undercut the high bank

- The high bank undercut may lead to the collapse of the edge or the landslide and it may lead to the severe casualty accident.



13. Keep clear of powerline

- The casualty accident may happen if the safe distance from the machine or the front end device to the electric wire is not kept.
- When operating the machine near the electric wire, never move any part or load of the machine into the range of which the radius is 3m to the electric wire plus 2 times of the insulation block length. The operating safety zone is listed in the following table:



Voltage value of high voltage cable	Minimum safe distance from high voltage cable
6.6kv	3m
33.0kv	4m
66.0kv	5m
154.0kv	8m
275.0kv	10m

- Verify and comply with all applicative local regulations.
- Once the machine touches the electric wire, sit on the seat and do not move and do not touch the machine and guarantee the safety of other person on the ground until the power supply is switched off. The operator can jump out of the machine under emergency situation but do not touch the machine.
- The wet land may enlarge the range which may electric shock the person, keep the surrounding person away from the operational zone.

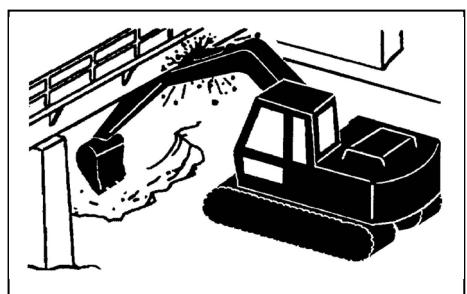
14. Be careful in excavation

- The explosion, the fire or the serious casualty accident may happen if the underground cable or gas pipe is cut off by accident.
- Inspect the positions of the cable, the gas pipe and the water pipe before excavation.
- Keep at least legal minimum range from the cable, the gas pipe and the water pipe.
- Do not see the end of the fiber optic cable or the eye may be seriously bruised if the fiber optic cable is cut off by accident.
- If there are the "Excavation hot lines" on the district where you carry out the operation, please contact them, or contact the local utility company directly to get the positions of all underground cables and pipelines.



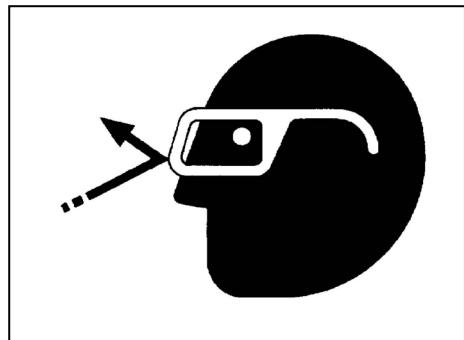
15. Pay attention to operation

- If the front end device or other parts of the machine bump against the overbridge and other overhead creel objects, all of them may be damaged, which may lead to the person injury.
- It shall be careful to prevent the boom or the arm knocking the overhead creel objects.



16. Protection against fly fragment

- The fly fragment come into the eye or any other part of the human body may lead to the severe injury.
- Use the goggles or safe glassed to protect against the injury caused by the flappy sheet-metal or other fragment.
- Prevent other people from entering the working space when knocking the body.

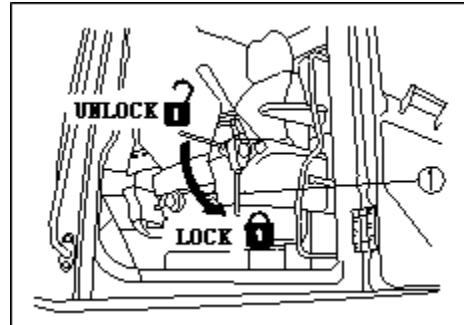
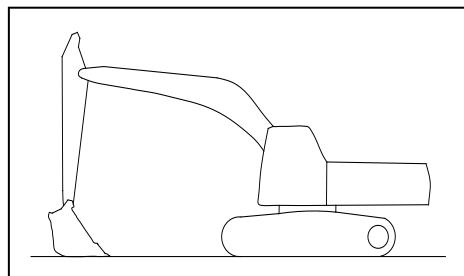


(IV) Parking

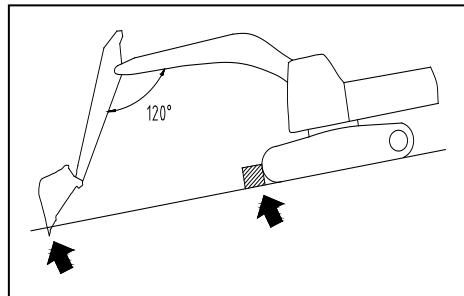
1. Park machine safely

In order to prevent an accident:

- Choose the site has no danger of stone falling, collapsing and drowning for parking.
- Park the machine on the level ground.
- Lower the bucket on the ground.
- Turn off the automatic low speed switch.
- Run the engine with no-load at idling speed for 5 minutes to cool the engine.
- Stop the engine and take the key out of the key switch.
- Pull the safety lock rod ① to the LOCK position.
- Turn off the front window, the side window and the cab door.
- Lock all access door and box room.
- Take the key to the specified location.

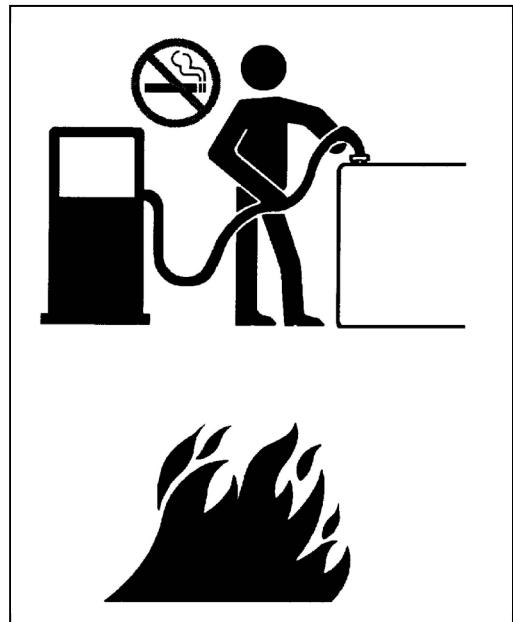


- If the machine must be parked on the slope, follow below rules.
- The bucket shall be lowered and cut into the ground.
- The crawler on both sides shall be blocked by the blocks to prevent the machine to move.



2. Disposal liquid safely to prevent fire

- Disposal the fuel carefully for it is very inflammable. The explosion and fire will occur and it may lead to the personal injury if the fuel is ignited.
- Do not fill the fuel into the machine when smoking or near the naked flame or spark.
- Never fail to stop the engine when filling the fuel.
- Fill the fuel tank outdoors.
- All fuel, most of lubricant and some coolant are inflammable.
- Store the inflammable liquid in a place which has no fire danger.
- Do not fire or puncture the pressure vessel.
- Do not store the oil-bearing rag for it can be ignited or self-ignited.
- Tighten the fuel filler cap and oil filler cap.



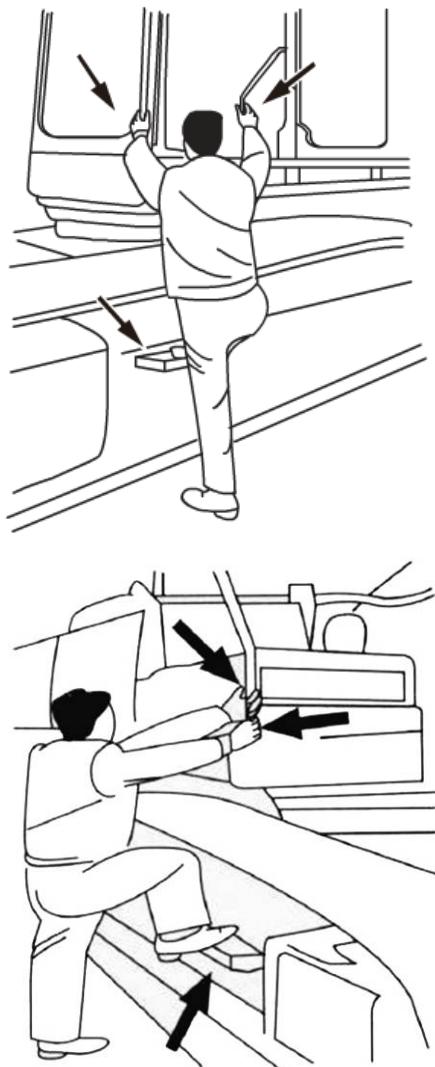
(V) Points to note when getting on and off the machine

- **Handrails and stairs**
- To prevent personal injury from slipping or falling from the machine, do the following:
 - Check handrails and steps (including track shoes) before getting on or off the machine.

If there is oil, grease or mud on the handrails or steps (including the track shoes), wipe them off immediately. Keep these parts clean. If damaged, repair and tighten loose bolts.

- When getting on and off the machine, use the handrails and steps indicated by the arrows in the figure on the right.
- For safety, face the machine and keep three points (two feet and one hand or two hands and one foot) in contact with the handrails and steps (including the track shoes) to support yourself.
- Do not grasp the levers or locking levers when getting on or off the machine.
- Do not get on or off the machine with a tool in your hand.
- Do not climb on hoods or covers without skid pads.

WARNING: Always face the machine when getting on and off.



- Do not jump on or off a machine, climb on a walking machine, or jump on a machine and try to stop it.
- The cab must be on the centerline of the disembarkation track beam before entering or exiting the cab



III. During repair and maintenance

Carry out safety maintenance

In order to prevent an accident:

- Understand maintenance instructions before operation.
- Keep cleanliness and dryness of operational zone.
- Do not spray water or steam in cab.
- Do not add oil or carry out the maintenance when moving the machine.
- Prevent the hands, the feet and the clothes from contacting the driving part.



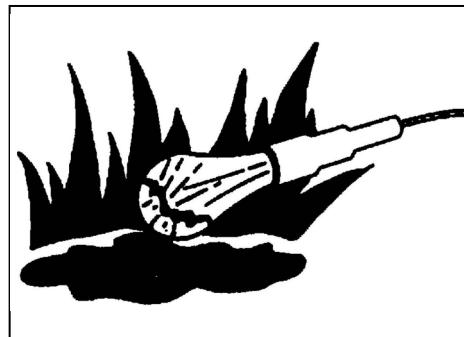
Before maintaining machine:

1. Park the machine on the level ground.
2. Lower the bucket on the ground.
3. Turn off the automatic low speed switch.
4. Run the engine with no-load at idling speed for 5 minutes.
5. Rotate the key switch to OFF and stop the engine.
6. Release the pressure of the hydraulic system by moving the controlling lever for several times.
7. Take off the key from the key switch.
8. Hang a nameplate of "please don't operate" on the controlling lever.
9. Pull the **safety lock rod** to the LOCK position.
10. **Cool engine. Don't open the water-filling cover until the coolant temperature is below 50° C (112° F) to prevent the coolant steam spouting and the injury to persons.**



- There must be an operator on the machine if the maintenance operation must be done while the engine is running.
- The angle between the boom and the arm shall be kept 90 to 110 degrees to support any parts of the machine lifted if the machine must be lifted during the maintenance.
- Never carry out operation under the machine with uplifted boom.
- Periodically inspect some parts and carry out repairing or replacing operation as required. Refer to related content in section "maintenance" of this manual.
- Keep all parts under favorable working condition and make sure that all parts are installed correctly.
- Handle damaged parts in time and replace worn or cracked parts. Clear away any accumulated grease, oil or crumb.

- Always use washing oil with uninflammability and never use the fuel, the gasoline and other oil with high flammability to wash the parts or surfaces.
- The minus earth cable of the accumulator must be disconnected before carrying out the adjustment of the electrical system or the weld operation on the machine.
- Provide sufficient illumination on the operational field and use the maintenance working lamp when working under or in the machine.
- Always use the working lamp with shield. Otherwise the broken bulb may ignite the fuel, oil, the anti-freeze liquid and the window washing liquid spilled.
-

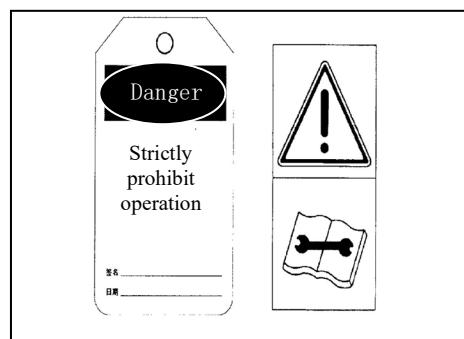


Routine maintenance and maintenance range

- The routine maintenance and maintenance range are limited to the items mentioned in this manual. Don't do any other inspection and maintenance beyond specified items.

1. Warn other people that the machine is under maintenance

- The movement of machine beyond contemplation may lead to severe injury.
- Hang a nameplate of "please don't operate" on the controlling lever before carrying out any operation on machine.



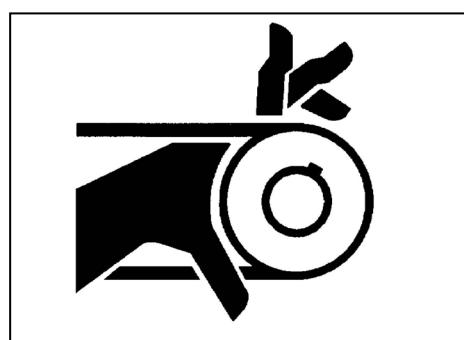
2. Support machine correctly

- Never carry out the repair and maintenance operation before supporting the machine well.
- Always lower the front end device on the ground before carrying out the repair and maintenance operation on the machine.
- The machine or the front end device must be supported firmly if the machine or the front end device must be uplifted to carry out the repair and maintenance operation. Do not use the slag brick, the air core tire or the rack stand to support the machine for they may collapse under continuous load, do not work under the machine supported by single jack.



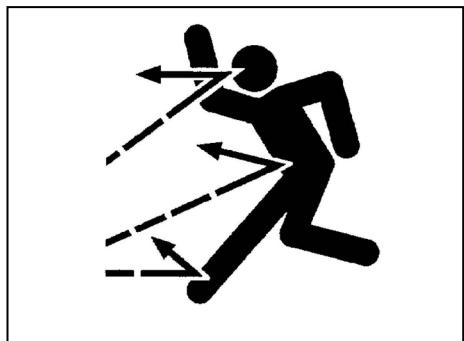
3. Keep away from rotating member

- Involved by the rotating member may lead to severe injury.
- It shall be careful to prevent the hands, the feet, the clothes, the ornaments and the hairs from being caught by the rotating member when working near the rotating member.



4. Prevent the part from fling off

- The grease in the adjuster of crawler is under high pressure, the severe injury, the sightlessness or casualty accident may happen if following matters need attention are not complied with.
 - Do not remove the grease nipple or valve part.
 - The body and face must be away from the valve body for the part may fly off.
- There is the pressure in the travel retarder.
 - The body and face must be away from the air release cock to prevent the injury for the part may fly off. The gear oil is hot.
 - Loosen the air release cock gradually to release pressure after the gear oil was cooled.



5. Store spare parts safely

- Spare parts stored, such as the bucket, hydraulic hammer and the plain shovel, may fall and lead to the severe casualty accident.
- Store spare parts and instrument safely to prevent falling. Keep children and other persons away from the storage area.



6. Prevent heat injury

Liquid ejected with high temperature:

- The engine cooling water is hot and with pressure after operation. There are the hot water and steam in the engine, the radiator and the heater tube, and the severe heat injury may be caused if the skin contacts the hot water or steam spilled.
- Prevent the scald caused by hot water ejected. Do not open the cap of the radiator before the engine is cooled. Rotate the cap to the end slowly at first and take off the cap after the pressure was released completely when opening the cap.
- There is the internal pressure in the hydraulic oil tank and the internal pressure shall be released before removing the cap.



Liquid and surfaces with high temperature:

- The engine oil, the gear oil and the hydraulic oil will be heated during the operation and the engine, the hose, the pipeline and other parts are heated too.
- The inspection or maintenance work can only be done after the oil and components were cooled.

Superheating parts:

- The superheating parts include the engine, muffler and exhaust pipe.
- Be sure that there are suitable locations for all shield and cover. Repair immediately all shield and cover are damaged.**

7. Periodically replace the rubber hose

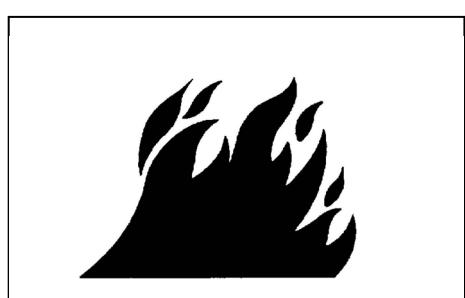
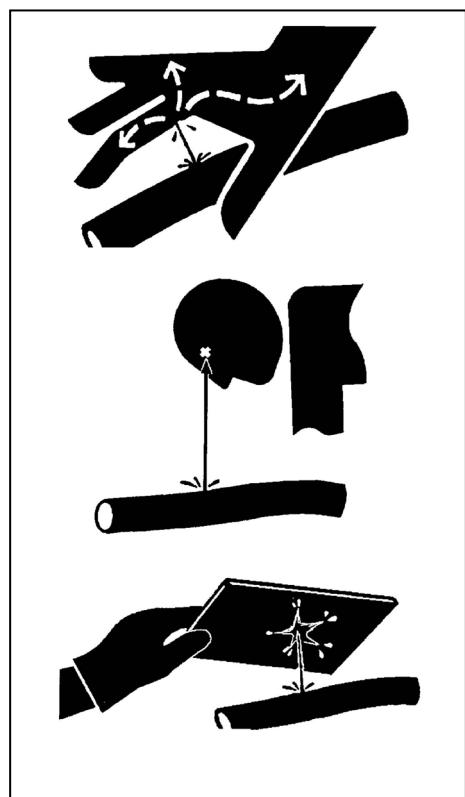
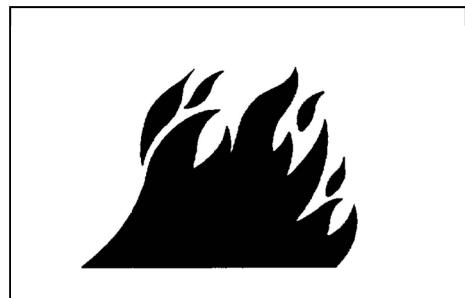
- The rubber hose containing the flammable liquid may crack under pressure for the weathering, the fatigue and worn. The weathering and worn extent of the rubber hose cannot be judged by the inspection only.
- The rubber hose shall be replace periodically. (**Refer to "Periodical replacement of safety related parts" in the chapter "Maintenance" of this manual**)
- The Rubber hose replaced irregularly may lead to the accident of fire, the liquid injecting into the skin or the front end device hitting the surrounding person, and the serious scald, mortification or other injuries and deaths.

8. Take care of the liquid with high pressure

- The diesel fuel, the hydraulic oil and other liquid ejected under pressure may penetrate the skin or inject into the eye and lead to the severe injury, sightlessness or death.
- Release pressure before disconnecting the hydraulic pressure pipeline or other pipeline to avoid this danger.
- Tighten all connections before pressurization.
- Use the cardboard to find out the leakage, pay attention to protect your hand and body from contacting the liquid with high pressure. Pull on the face shield or goggles to protect eyes.
- In the event of accident, please see the traumatic doctor who is familiar with this type traumatic for treatment. The liquid come into the skin must be eliminated in few hours; otherwise it may lead to the mortification.

9. Prevent fire**Inspect oil leakage:**

- The leakage of the fuel, the hydraulic oil and the grease may lead to the fire.
- Inspect the loss of the holder, the twist of the hose, the mutual friction of the pipeline and the damage to the oil cooler as well as the relaxation of the flange bolts on the oil cooler to prevent the oil leakage.
- Tighten, repair or replace any loss, loose or damaged holders, pipeline, hose, oil coolers and flange bolts on the oil coolers.
- Do not bend or knock high pressure line.
- Do not install the bending or damaged pipeline, pipe or hose.



Inspect short circuit:

- Short circuit may lead to the fire:
- Clean up and tighten all electrical connections.
- Inspect the looseness, twist, hardening or burst of the cable and the electric wire before each shift or after an operation of 8 to 10 hours.
- Inspect loss or damage to the terminal covers before each shift or after an operation of 8 to 10 hours.
- Do not operate the machine if the cable or electric wire is loose or twisted.

Clear away the inflammable material:

- The fuel, the hydraulic oil, the antifreezing agent, the window washing liquid, the garbage, the grease, the crumb, the accumulated breeze and other inflammable material may lead to the fire.
- Daily inspect and clean up the machine and eliminate the inflammable article sprinkled and accumulated to prevent fire.

Inspect key switch:

- The fire behavior will be aggravated and it is not good for fire fighting if the engine cannot be stopped when fire occurs.

Daily inspect the function of the key switch before operating the machine:

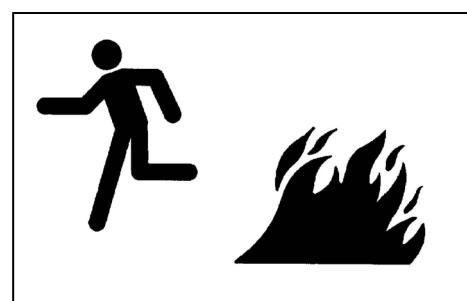
1. Start the engine and run the engine at low speed with no-load.
2. Switch the key switch to OFF position to see whether the engine can be stopped or not.
- Any abnormality found must be eliminated before operating the machine.

Inspect the shield for engine:

- The damaged or lost shield for engine may lead to the fire and unexpected injury to persons.
- If the damaged or lost shield for engine is found, the new one shall be installed before operating the machine.
- Make sure the engine has been shut down before opening the shield.

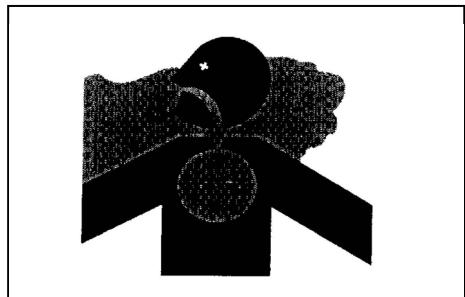
10. Pull out when fire

- Pull out from the machine according to method below if fire occurs:
- Switch the key switch to OFF position to see whether the engine can be stopped or not if possible.
- Use the fire extinguisher to fight fire if possible.
- Pull out from the machine.
- Use the safety hammer to smash the front window or the rear glass window and leave the cab if the cab door or the front window cannot be opened under emergency situation, refer to "Emergency pull out method".



11. Be cautious to exhaust smoke

- The exhaust gas of the engine may lead to the disease or death, take care to prevent the asphyxia.
- The sufficient ventilation must be guaranteed if the machine must be operated in the building. Use the lengthened exhaust pipe to discharge the smoke or open the door window to lead sufficient surrounding air into the work area.



12. Matters need attention in weld and grind

- Implement the below process before weld and grind:
- Shut down the engine and take out the key.
- Disassemble the earth wire to prevent short circuit.
- Disconnect the electric generator circuit.

Make sure all above work have been done well before weld and grind to protect the electronic control system.



- The welding operation will generate gas and flame.
- The welding operation must be done in a place with well ventilation and sufficient preparation. The combustible material must be placed at safety location before welding.
- The welding work can only be done by qualified and trained person.
- The grinding machine will generate the spark. The combustible material must be placed at a safety location before grinding.
- Inspect welded peripheral zone again for abnormal phenomena such as smoke after welding and grinding.

13. Do not heat the vicinity of the pressure fluid pipe

- The inflammable mist spray will be generated by the heat near the pressure pipe and it may lead to the serious burn to the person nearby.
- Do not carry out the welding or autogenous cutting operation near the pressure fluid pipe or other flammable materials.
- The pressure fluid pipe may be cut at any time when the heat exceeds the direct firing area. The temporary fire prevention sleeve shall be set up to protect hose or other material when carrying out the welding operation.

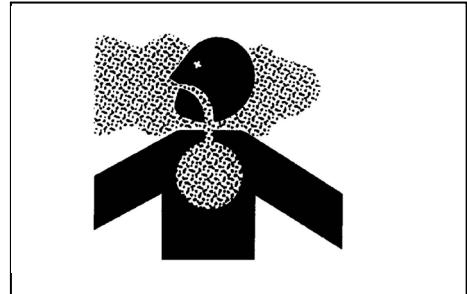


14. Do not heat the pipe with inflammable liquid

- Do not weld or autogenous cut the pipe or hose with inflammable liquid.
- Use the non inflammable solvent to clear away the inflammable liquid in the pipe thoroughly before welding or autogenous cutting the pipe.

15. Eliminate paint before welding or heating

- The paint will let out noxious gas when it is heated during the welding or autogenous cutting.
- The gas inhaled may lead to the nausea.
- Eliminate the toxic gas and mill dust.
- Carry out the paint eliminating operation in outdoors or a place with well ventilation; handle the paint and the solvent correctly.
- Eliminate paint before welding or heating:
 - Take measures to prevent the mill dust from inhaling when using the abrasive paper and abrasive wheel to eliminate the paint. Put on the qualified respirator.
 - If the solvent or varnish remover is used: The varnish remover shall be washed away by the water and the soap and the solvent or varnish remover container and other combustible material in the working space must be eliminated. The evaporable gas must be dropped away at least for 15 minutes before welding or heating.
 -



16. Prevent explosion of accumulator

- The gas from the accumulator may explode. Do not let the spark, the live match as well as flame approach the top of the accumulator.
- The electrolyte of the accumulator is harmful. Take care to put on the goggles when inspecting the specific gravity of the electrolyte with the voltmeter or the gravimeter.
- Incorrect operation will result in serious fire disaster and the injury to persons. Obey following items strictly:
 - Do not use the accumulator or charge the accumulator when the electrolyte level is lower than the specified level, otherwise the accumulator may explode. Make sure to check the level of the electrolyte and add up distilled water at regular intervals to keep the level upon the upper level.
 - Wear rubber gloves and protecting glasses while disposing the accumulator.
 - Smoking and open fire are forbidden to exist nearby the accumulator.
 - If the sulfate splashed on the skin or clothes, wash it with a large quantity of water immediately.
 - If the sulfate splashed into eyes, wash it with a large quantity of water and go for medical inspection and treatment immediately.
 - Do not charge the frozen accumulator, or the accumulator will explode. Heat the accumulator to 16°C.
- There is a risk of spark engendering. Obey following items strictly:
 - Avoid the connection of the tool or other metal with accumulator terminal.
 - Hydrogen will be produced when charging the accumulator, so put the accumulator in a place with well ventilation and disassemble its cover.
 - Install the cover firmly when finish the accumulator charging, and then fasten it on its own location.



- Before disassembling the accumulator (suitable for the accumulator with cut-off switch), turn the starting switch to the position OFF for more than a minute, then turn the accumulator cut-off switch to the position OFF and withdraw the key of it and cut off the grounding cable (the negative pole(-) terminal usually). Assemble the positive pole terminal first when assembling the accumulator, and then connect the earth wire.

17. Maintain air-conditioning system safely

- The refrigerant agent splashed on the skin may lead to the frost injury.
- Correctly use the refrigerant agent according to the instruction on the refrigerant agent R134a container when maintaining the air-conditioning system.
- Use the recovery or circulatory system to prevent the refrigerant agent from being released to the atmosphere.
- Never let the refrigerant agent R134a liquid contact the skin.

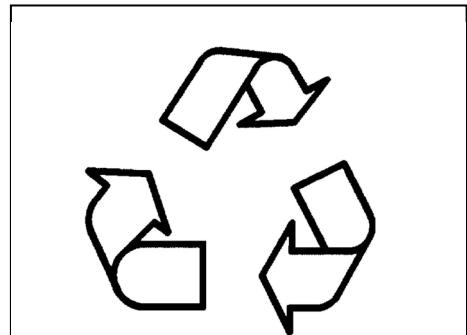


18. Handle chemicals safely

- The direct contact with the noxious chemicals may lead to the serious injury to the human body.
- The chemicals, such as the lubricant, the coolant, the paint and the bonding agent used in this machine may be harmful.

19. Handle waste correctly

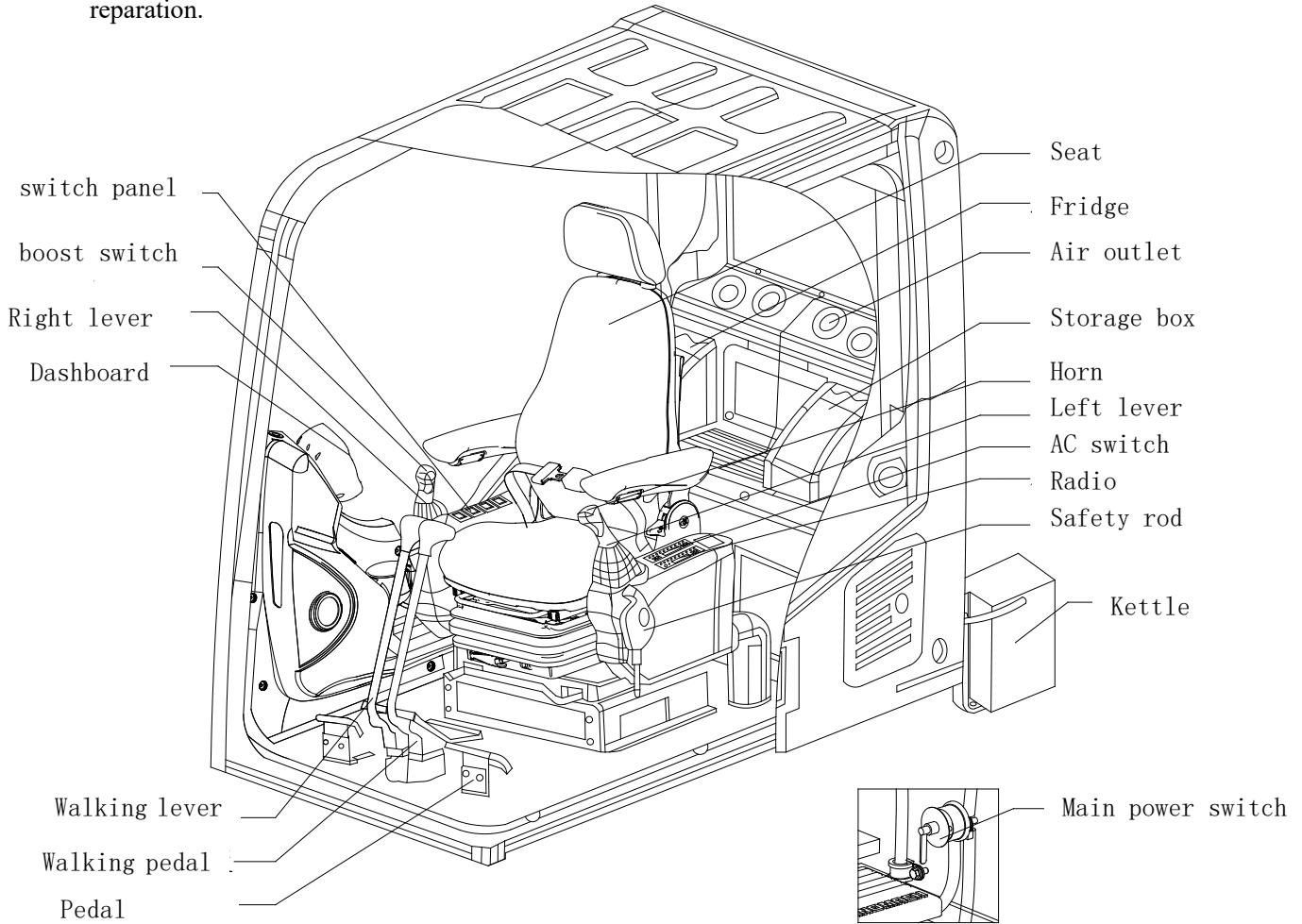
- The garbage handled inappropriately will lead to the hazard to the ecology. The potential hazardous waste in Sinomach equipment is oil, coolant, brake fluid, filter and accumulator, etc.
- Use leak proof container when draining the liquid. Do not use the food product or beverage container, for it may lead to the people to drink that material by mistake.
- Do not dump the waste liquid on the ground, into the sewerage or any water source.
- The refrigerant agent of the air conditioner leaked into the atmosphere may damage the aerosphere of the earth.
- Inquire the local environmental protection center or recovery center or your specified dealer for correct recovery or waste handling method.



Chapter II Control device

1. Cab device

- 1) The instrument console and the suspension seat designed according to the ergonomics are comfortable for the operation of the driver.
- 2) Electronic monitoring system
 - (1) The centre electronic monitoring system can monitor the machine state.
 - (2) There is the security alarm system which can find the malfunction of the machine at early stage.
 - (3) The malfunction of the electrical system can be found on the instrument panel and it is more convenient for reparation.



2. Instrument panel

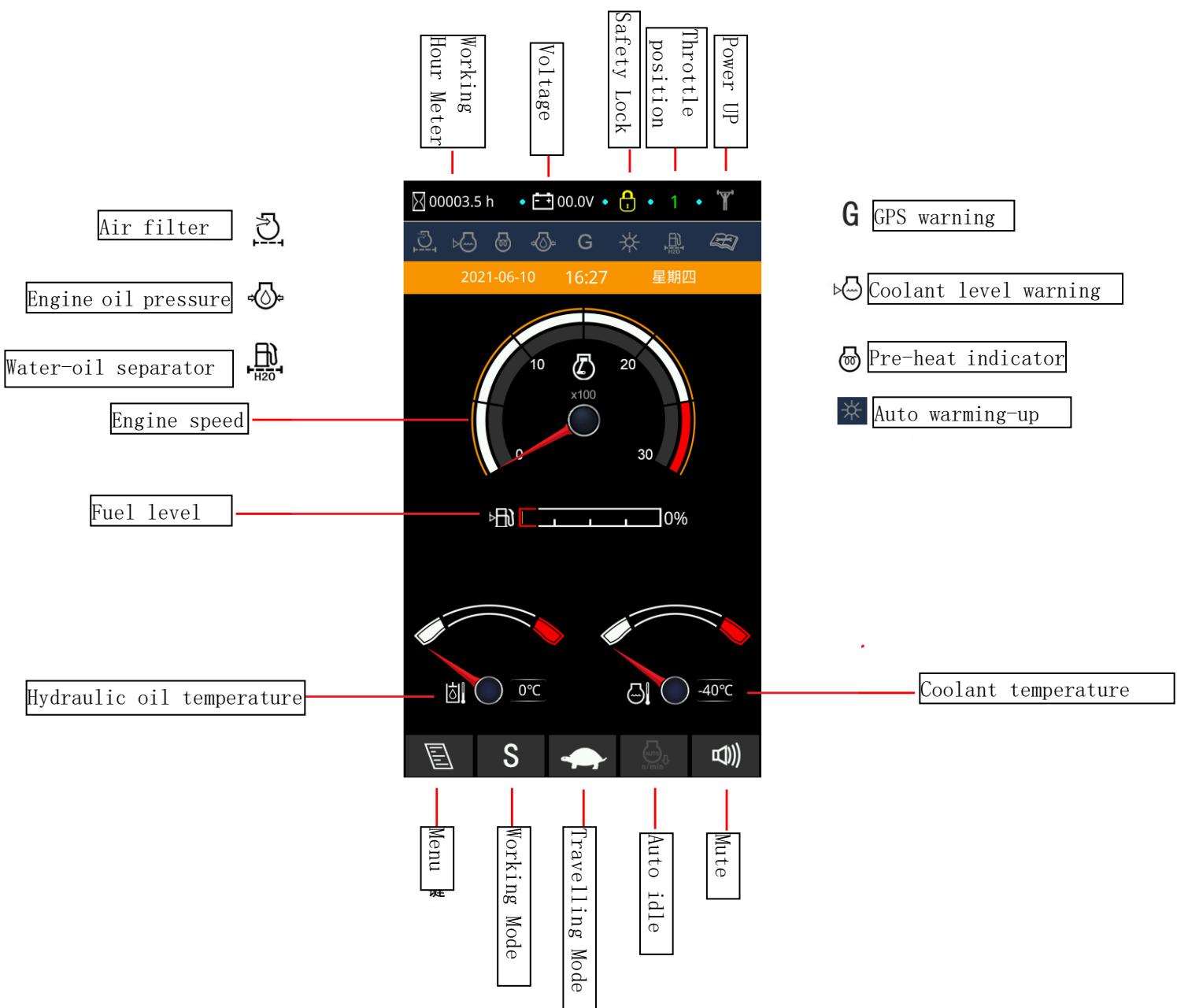
1) Monitor panel

There are three display devices on the monitor panel and they can alarm the driver to pay attention to proper operation and inspection when the machine is under normal conditions.

- Instrument type: indicate the operating conditions of the machine
- Warning light: indicate the error state of the machine (red or yellow light is illuminated)
- Indicating light: indicate the operating conditions of the machine

★ The monitoring device cannot guarantee the state of the machine completely.

Carry out the inspection as well as the repair and maintenance operation according to the content “**Maintenance and checking table**” in chapter VI.



a、 Instrument

- (1) Working hour meter: Display excavator working hours
- (2) Voltage: Display electric system voltage
- (3) Throttle position: Displays the throttle position corresponding to the throttle knob
- (4) Power Up:



When holding down the power-up button at the top of the right handle or when the system is automatically power-up, the icon will be brighter; otherwise, the icon will be dark.

- (5) Auto warming-up



When the engine is started, if the coolant temperature is less than or equal to 10°C (can be set), the system will enter the automatic warm-up state; when the water temperature is greater than or equal to 30°C or the warm-up state has been in the warm-up state for 3 minutes, the system will exit the automatic warm-up state. In the warm-up state, the controller controls the engine speed to increase step by step (starting from the 1st gear, it increases by one gear every minute, and the highest is the 3rd gear). During the warm-up process, the speed is not controlled by the throttle knob. At this time, the function icons corresponding to the buttons at the bottom of the instrument interface are blank, and the instrument prompts "The device is warming up, the speed is limited, press any key to cancel the warm-up". When the warm-up is canceled or the warm-up is over, the function icon corresponding to the key is displayed normally.

- (6) Safety lock



When the pilot safety lever is lifted, the safety lock icon is in the unlocked state; at this time, the whole machine can move.

NOTE: With the pilot safety lever up, the device cannot be started.



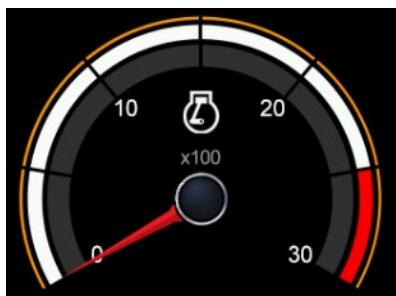
When the pilot safety lever is lowered, the pilot safety lock icon is in the locked state; at this time, the whole machine cannot operate.

- (7) Engine tachometer



When the engine speed is greater than or equal to 2350rpm, the icon turns red and prompts "The engine speed is too fast, please check!", and the buzzer sounds and makes a fault record.

This icon is green in normal state.



Indicates the current engine speed value. The display range is 0~3000rpm. The green segment is the normal working segment, and the red segment is the alarm segment.

(8) Fuel level



When the fuel level is less than or equal to 5%, the icon turns red and prompts "Low fuel level, please check!", and the buzzer sounds at the same time.

This icon is green in normal state.



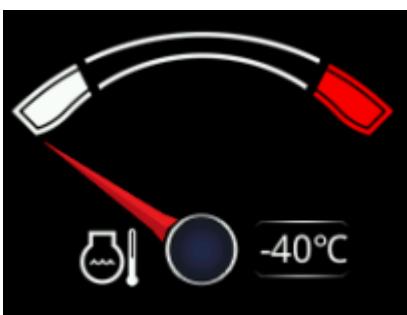
Indicates the current fuel level. The display range is 0 to 100%. The green segment is the normal working segment, and the red segment is the alarm segment

(9) Coolant temperature



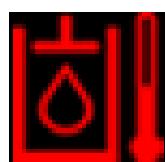
When receiving the high water temperature alarm information from the engine ECM (water temperature $\geq 107^{\circ}\text{C}$), the corresponding icon in the instrument turns red, and prompts "The cooling water temperature is high, please check!" At the same time, the buzzer sounds and makes a fault record.

This icon is green in normal state.



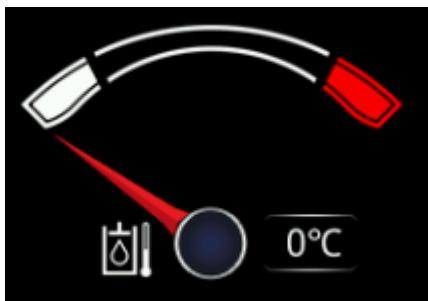
Indicates the current engine coolant temperature. The display range is 40 to 120°C. The green segment is the normal working segment, and the red segment is the alarm segment.

(10) Hydraulic oil temperature



When the hydraulic oil temperature is greater than or equal to 90°C, the icon turns red, and prompts "hydraulic oil temperature is high, please check!", and the buzzer sounds and makes a fault record.

This icon is green in normal state.



Indicates the current temperature of hydraulic oil, the display range is 40 ~ 120 °C. The green segment is the normal working segment, and the red segment is the alarm segment.

(11) Air filter



When the air intake resistance of the air filter becomes larger, the icon turns red and prompts "The air filter is blocked, please check!", and the buzzer sounds and makes a fault record.

This icon is gray in normal state

(12) Low coolant level



When the water level of the engine radiator drops, the icon turns red and prompts "The cooling water level is low, please check!", and the buzzer sounds and makes a fault record.

In normal state, this icon is gray (this function is optional)

(13) Low engine oil pressure



When the engine oil pressure is low, the icon turns red and prompts "low oil pressure, please check!", and the buzzer sounds and makes a fault record.

This icon is gray in normal state.

(14) Pre-heating indicator



When the key switch is turned to the preheating gear, the icon turns red and prompts "Preheating in progress...".

This icon is gray in the non-warming state

(15) Water-oil separator warning



When there is too much water in the oil-water separator, the icon turns red and prompts "Oil-water separation alarm, please check!", and the buzzer sounds and makes a fault record. At this time, the oil-water separator needs to be drained.

This icon is gray in normal state

(16) GPS warning



When a GPS-related abnormality occurs, the icon turns red, and text prompts, and the buzzer sounds at the same time. Currently, the following GPS-related alarm information can be prompted:

- ① GPS first-level car lock alarm;
- ② GPS secondary lock car alarm;
- ③ GPS antenna failure alarm;
- ④ SIM card abnormal alarm;
- ⑤ GPS connection abnormal alarm.

This icon is gray in normal state.

(17) Menu



Press the corresponding physical key below it to enter the menu

(18) Video



When the camera is connected, in the main interface, this key will display a bright icon [camera], press this key, the instrument screen will display the video screen, and then press the button corresponding to the icon [video], the instrument will return to the main interface; if the camera is not connected, this key show dark icons [camera].

Press the button, the meter prompts: "The camera is not purchased".

(19) Travelling mode



Low travelling speed



High travelling speed

Press the corresponding physical key below it to switch the walking mode, and the corresponding walking mode icon will be displayed after switching.

The mode cycle is: low-speed mode→high-speed mode.

Power-on defaults to low-speed mode.

(20) Auto idle



Auto idle allowed



Auto idle banned

(21) Mute



Red beep status



Red mute status



White NO WARNING status

After an alarm or prompt signal causes the buzzer to sound, the meter will display the icon of red buzzing state, press the corresponding physical key below it, the buzzer will stop beeping, and the icon of red muting state will be displayed.

If the alarm or prompt signal disappears, a white icon with no alarm status will be displayed

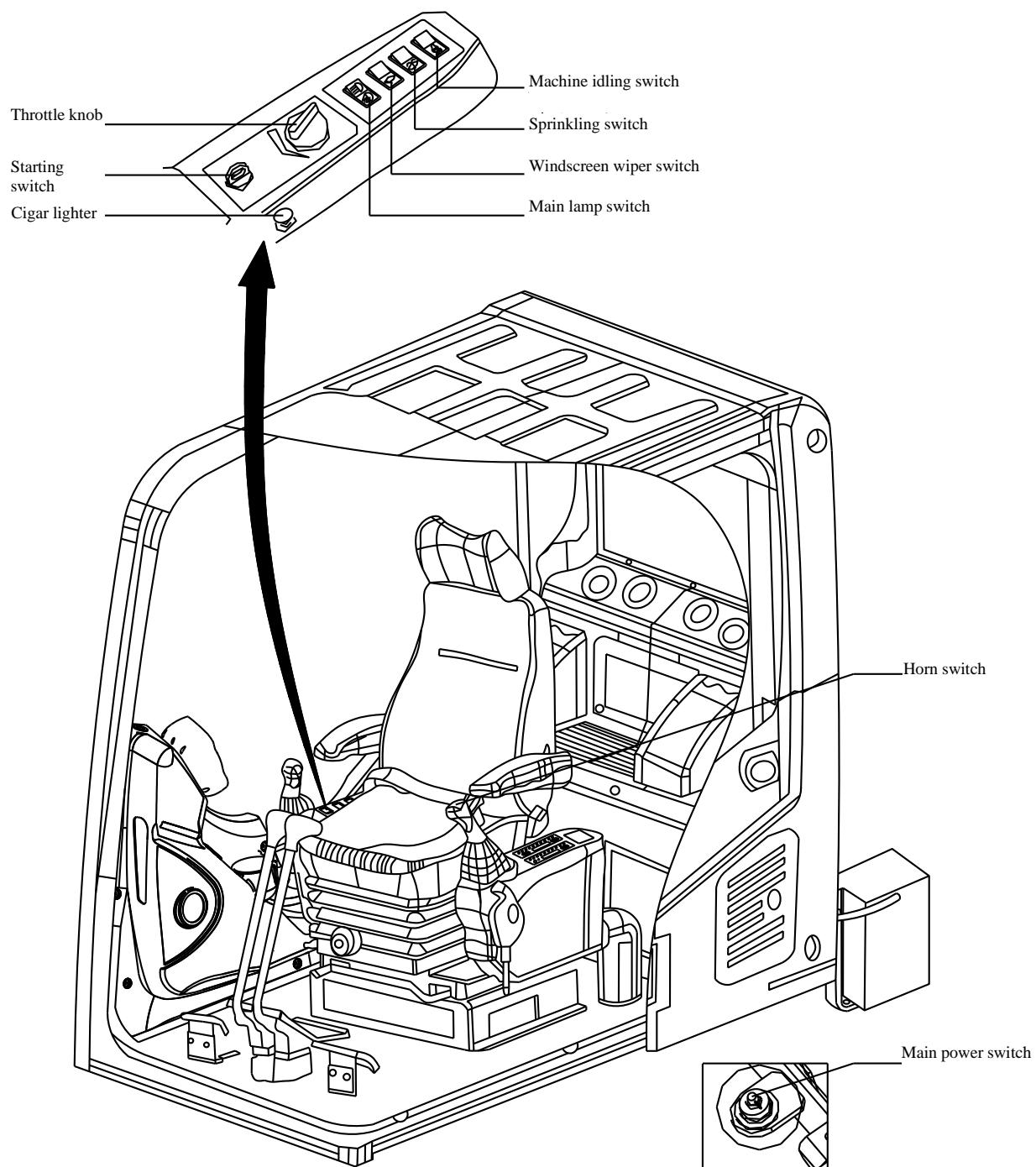
(22) Time/alarm content prompt

When the system has no alarm state, this area displays the current time,

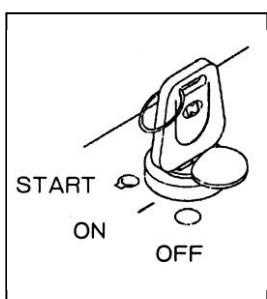
When the system has an alarm signal, it will display the alarm text prompt content.

When there are two or more alarm signals in the system, each alarm signal will be displayed in turn at a time interval of 3 seconds

3. Switch



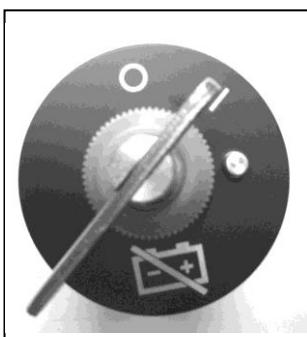
1) Starting switch



(1) Three positions such as "OFF", "ON" and "START"

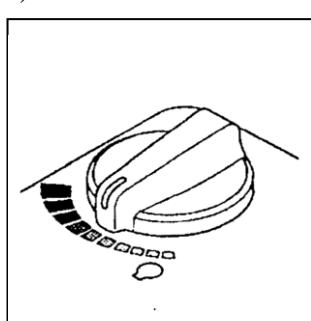
- OFF: the electrical circuit doesn't function;
- ON: all the systems of the machine can be operated;
- START: used to start the engine; after starting, immediately loosen the key.
 - ★ During engine running, turn the start key to "ON" position for purposes of keeping normal electrical and hydraulic functions and preventing serious machine damage.

2) Main power switch



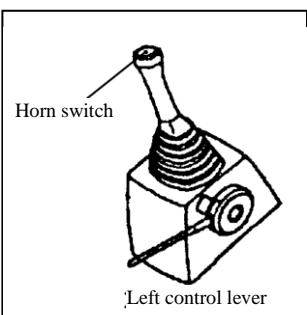
- (1) The switch is used to close the whole electrical system.
- (2) I: meaning that the battery is connected with the electrical system.
- O: meaning that the battery is disconnected from the electrical system.
- ★ During engine running, do not turn the battery switch to O position, which will otherwise damage the engine and electrical system.
- ★ When the machine is not used for long, the switch shall be turned to O position to avoid power consumption.
- ★ During welding operation, turn the switch to O position. If it is turned to I position during welding, this will damage the electrical devices such as CPU etc.

3) Throttle knob



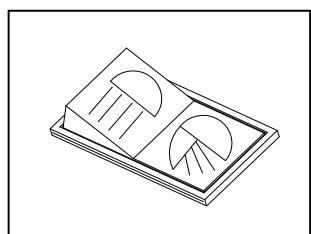
- (1) There are 10 segments of scale marks.
- (2) Scale 1 means the low speed position and scale 10 the high speed position.
- Turn the switch to the right: the engine speed increases;
- Turn the switch to the left: the engine speed decreases;
- (3) The lower the switch is set, the lower the speed is. Then the oil consumption decreases accordingly.

4) Horn switch



The switch is used to control the horn. The horn blares by pressing the switch. The horn doesn't blare by releasing the switch.

5) Main lamp switch

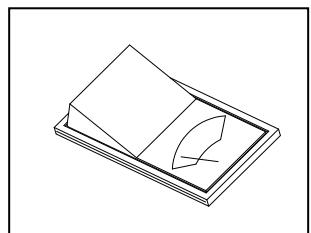


The switch is used to operate the head lamp and working lamp (two-gear).

Gear I: the head lamp is on;

Gear II: the head lamp and the working lamp are on simultaneously.

6) Windscreen wiper switch

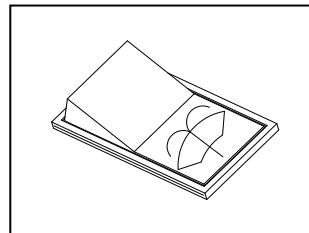


The switch is used to operate the windscreen wiper (high speed and low speed).

Gear I: low speed motion of the windscreen;

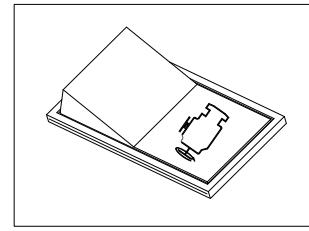
Gear II: high speed motion of the windscreen;

7) Sprinkling switch



The switch is used to operate the sprinkling system. After pressing the switch, the sprinkling motor runs. After releasing the switch, the sprinkling motor stops running.

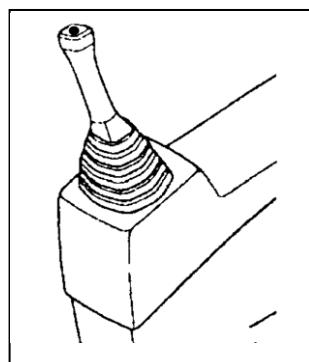
8) Mechanical idling switch



When the operation pilot handle and the traveling handle are at the middle position, the engine throttle is controlled and the engine is directly decelerated to idle state after pressing the switch. When the left and right pilot handle or the traveling handle takes action, the control system automatically turns the engine throttle back to the throttle position corresponding with the current throttle knob; meanwhile, the mechanical idling function is automatically cancelled.

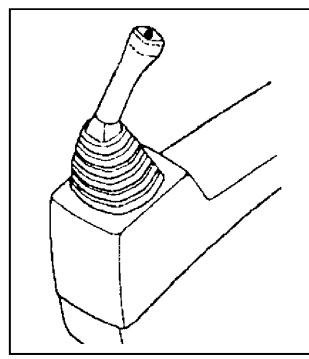
4. Control lever and pedal

1) Left operation handle



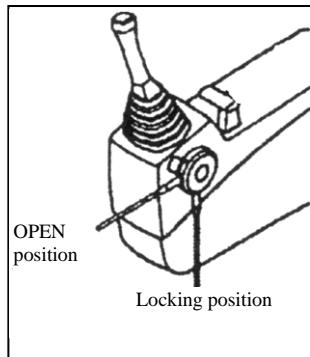
- (1) The left control handle controls rotation and bucket arm action.
- (2) For the operation in details, refer to Page 82.

2) Right control handle



- (1) The right control handle controls the boom and bucket.
- (2) For the operation in details, refer to Page 82.

3) Safety rod



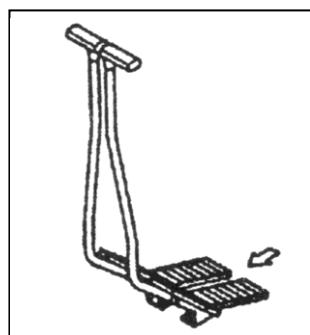
(1) After pushing down the safety rod (as shown in the figure), all the control levers and pedals will not function.

★ Be sure to pull the rod to LOCKED position when leaving the seat in the cab.

(2) Operation can be performed after pulling the safety rod.

★ Do not use the safety rod handle when getting on or off.

4) Traveling pedal

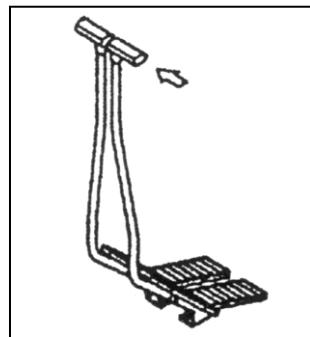


(1) The pedal is used to control machine motion forward or backward.

(2) The left crawler moves after pressing down the left pedal. The right crawler moves after pressing down the right pedal.

★ For the operation in details, refer to Page 83.

5) Traveling control lever

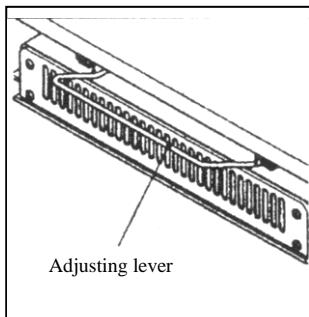


(1) The lever is installed on the traveling pedal and used to replace the foot pedal.

(2) The operation method is consistent with that for the traveling pedal.

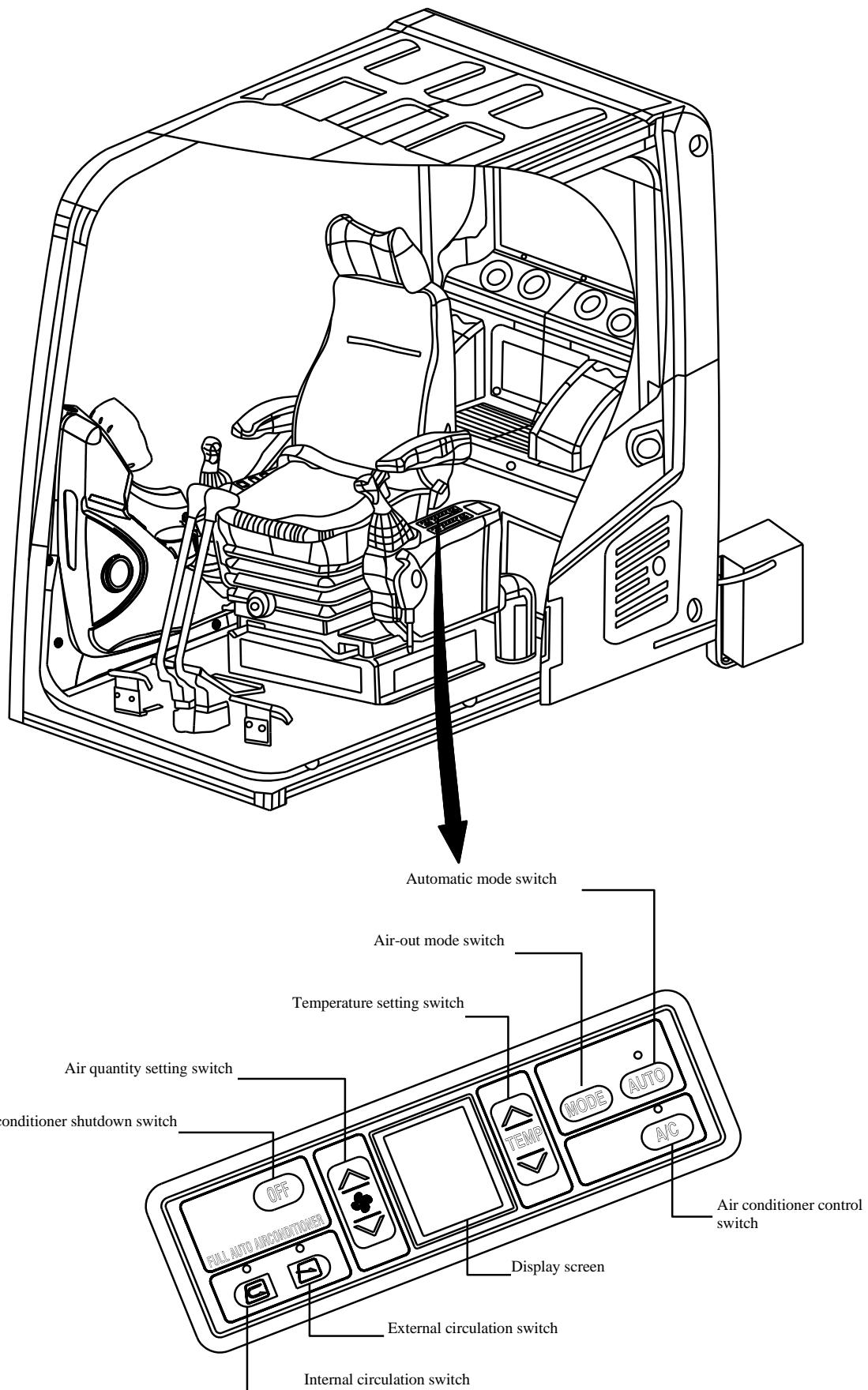
★ For the operation in details, refer to Page 83.

6) Seat and control box adjusting lever



- (1) The adjusting lever is used to move the seat and control box to achieve the operation comfort degree for the driver.
- (2) About 180mm can be adjusted back and forth by lifting the adjusting lever.

5. Air conditioner and air heater



1) Air conditioner shutdown switch



① Press the switch to enter shutdown state.

② At the time of shutdown, the show of temperature setting (N) and air quantity (A) on the monitor display as well as the indicator lights in the upper part of the automatic switch (L) and air conditioner switch (J) are off, and the LCS shows only the air blowing mode;

2) Automatic mode switch

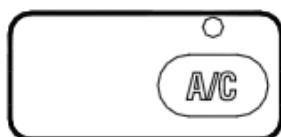


① It is used in automatic mode switching of the air conditioning system.

② The system enters the automatic air conditioning function after pressing the switch when the system is started and normal. After entering the automatic state, the controller will automatically control the air conditioning system according to the parameters such as the set temperature, water temperature and sunlight intensity.

③ The automatic mode indicator light is on.

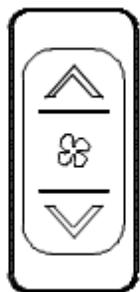
3) Air conditioner control switch



① Control starting and shutdown of the compressor.

② The air conditioner starting indicator light is on or off.

4) Air quantity setting switch



① Adjust the air quantity of the air blower.

② The LCD shows the air quantity.

③ ♦ The air quantity of grades 1~6 can be set.

♦ Press \wedge to add air quantity and \vee decrease.

♦ During automatic operation, the system automatically decides the air quantity according to the comparison of internal temperature with external temperature, and the user doesn't need to set the air quantity.

5) Internal circulation switch

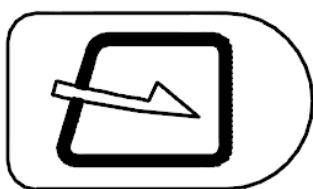


① Used for controlling internal / external circulation throttle state.

② The internal circulation indicator light is on.

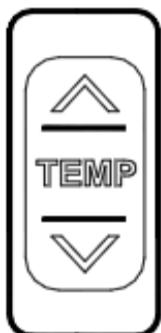
③ The air intake mode is switched into internal circulation mode.

6) External circulation switch



- ① Used for controlling internal / external circulation throttle state.
- ② The external circulation indicator light is on.
- ③ The air intake mode is switched into external circulation mode.

7) Temperature setting switch



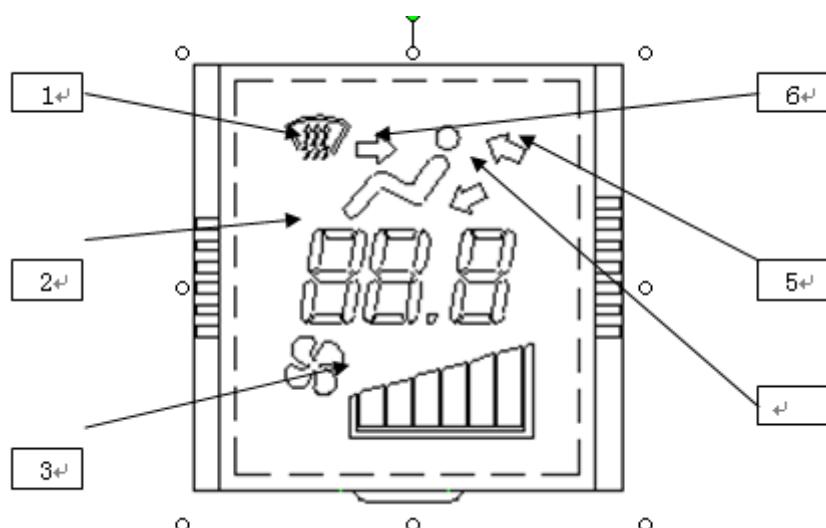
- ① The switch is used to adjust the temperature in the cab.
- ② The LCD shows the set temperature.
- ③ ◆ The set temperature is 18~32°C or 63~91F;
- ◆ The set temperature increases or decreases by 0.5°C pressing the switch each time;
- ◆ The cold and warm air door changes the mixing ratio of cold air to warm air during temperature setting.

8) Air-out mode switch



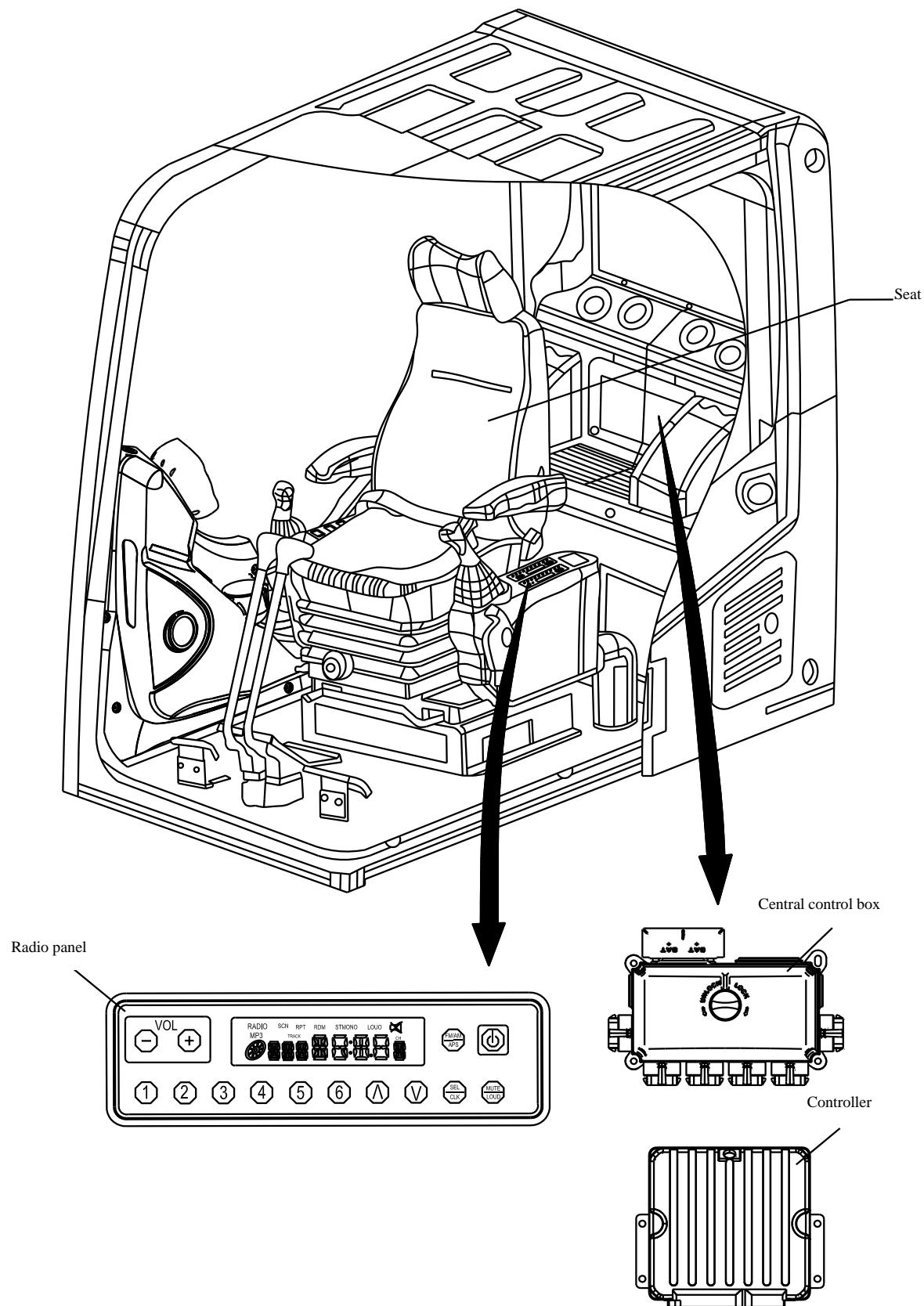
- ① Control the air-out mode.
- ② The LCD shows the air-out mode.
- ③ ◆ The air door is fixed on the selected position;
- ◆ Adjustment as per the sequence: front and rear face and sole air blowing → front and rear face air blowing → front face air blowing → sole air blowing → sole and defrosting air blowing → defrosting air blowing;
- ◆ The LCD shows the air-out mode corresponds with the actual air door position.

9) Display screen



- | | |
|---|--|
| 1. Front defrosting state display | 2. Set temperature display; |
| 3. Air quantity grade display; | 4. Sole air blowing state display |
| 5. Rear face air blowing state display; | 6. Front face air blowing state display; |

6. Others

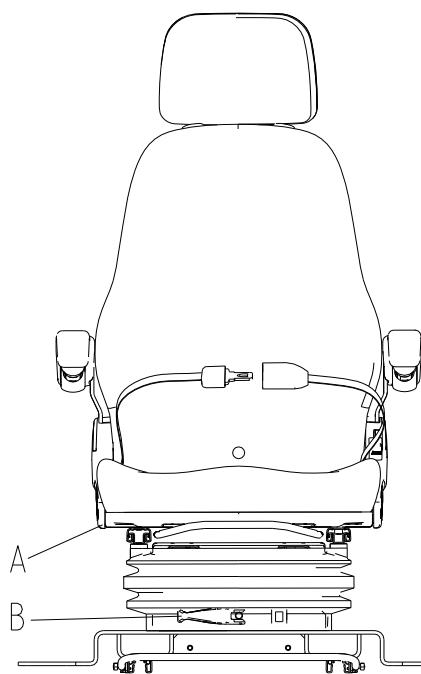


1) Radio

For its specific operation and function, see the “*Radio Operation Manual in the accompanied data*”.

2) Seat

The seat can be adjusted according to the health status of the operator, thereby reducing the long-term working fatigue degree of the operator and improving working efficiency.

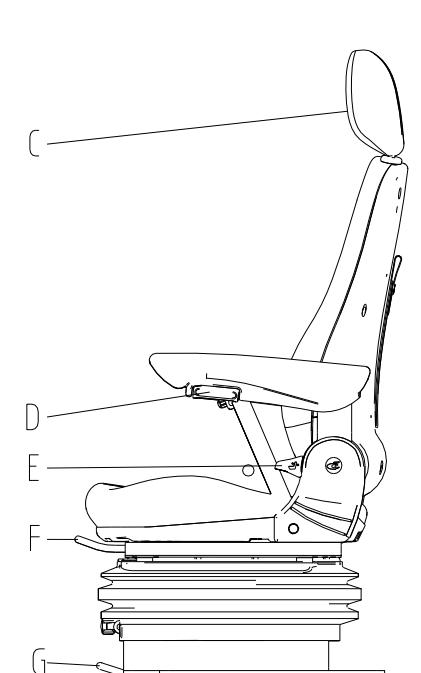


(1) Upper and lower adjustment (A)

Lift the stool up with both hands to adjust the height of the seat. It is divided into three gears, each gear is 30mm.

(2) Buffer adjustment (B)

Adjust the handle according to the weight of the operator, and the adjustment range is 50-130kg.



(3) Headrest adjustment (C)

It can be adjusted up and down according to the needs of the operator. It is divided into six gears, each gear is 20 mm.

(4) Handrail adjustment (D)

Rotate the roller d to adjust the inclination position of the armrest, with the horizontal as the reference, up and down continuously adjustable for 35 °, At the same time, the armrest can be folded upward for about 100 degrees °.

(5) Back adjustment (E)

Turn the handle e to adjust the seat back angle and lock it backward 73.5 °, Forward locking 63 °.

(6) Buffering adjustment (F、G)

① Pull the pull rod f to adjust the front and rear position of the seat relative to the control box. The maximum movement is 180mm, 90mm in front and 90mm in back, and 15mm in each gear;

② Pull the pull rod g to adjust the front and rear positions of the left and right control boxes and seats together. The maximum movement is 160mm, 80mm in front and 80mm in back.

★ The operator shall fasten his safety belt as per its state before operation.

★ The safety belt shall be replaced at least once every three years.

For the specific operation, see the “*Seat Operation Manual in the accompanied data*”.

3) Cigar lighter



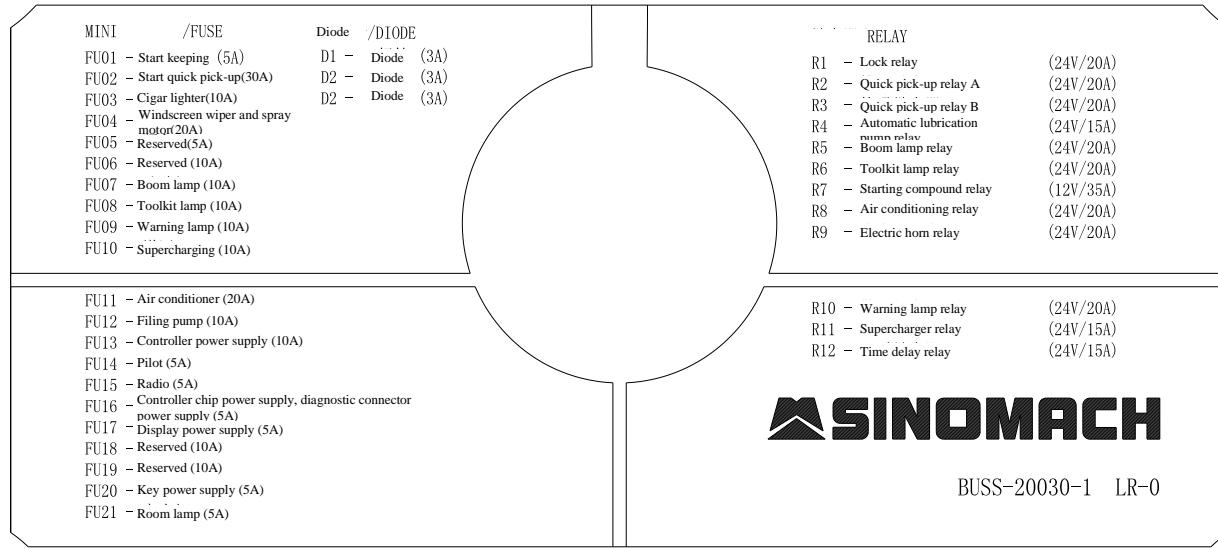
- (1) The cigar lighter can be used when the start key is at “ON” position.
- (2) After pressing down the cigar lighter, it will pop up in short time and then can be used to light up a cigarette.

★ Socket repair

There is a need for power supply during repair, and the socket of the cigar lighter can be used.

But the voltage and power shall not exceed 24V and 100W respectively.

4) Central control box



(1) The fuse in the box is used to protect electrical components and circuits from burn-out.

(2) When various lamps are not on or electrical components are out of work, this is because the fuse has been burned out in general. The burned-out fuse will be conveniently found as per the mark on the box cover.

★ The burned-out fuse must be replaced with the fuse of the same specification.

★ Be sure to turn the start key to “OFF position” when replacing the fuse.

5) Controller



(1) The controller judges the load according to the engine speed and system pressure, automatically regulates the proportional solenoid valve as per the variation of the operation load, and changes the absorbed power of the hydraulic pump, thus fully developing the power of the engine, matching the output power of the engine with the power needed by the pump all the time and achieving the optimal use effect.

(2) The controller performs automatic idling as per the selected power mode on the instrument panel and drives the adjustable speed motor and thus regulates the engine speed according to engine speed increase/decrease signals.

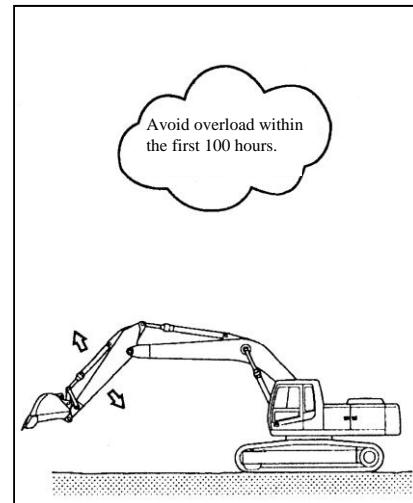
Chapter III Operation

1. Suggestions on a new machine

- 1) The new machine shall run for 100 hours so as to reach the designed performance.
- 2) The machine shall be operated within the first 100 hours as per the following steps to avoid overload.

Working hours	Load
Within 50h	About 60%
Within 100 h	About 80%
After 100 h	Total

★ Overload will damage the potential performance of the machine and thus shorten its service life.

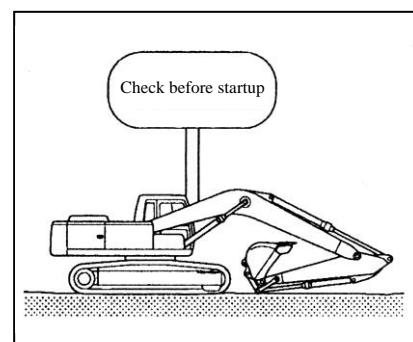


- 3) Be sure to pay attention to the following within the first 100 hours:
 - (1) Check for the level of cooling water, engine oil, hydraulic oil and fuel oil and leakage per day.
 - (2) Check for lubrication regularly. Apply grease to all lubrication points per day.
 - (3) Tighten bolts.
 - (4) Fully preheat the machine before operation.
 - (5) Often check instruments during operation.
 - (6) Shut down the machine for inspection in case of finding any anomaly during operation.

2. Check before starting the engine

- 1) Check for loosened bolts and nuts, leakage of hydraulic oil, fuel oil and cooling fluid and good working state of the hydraulic system and working equipment around and below the machine. In addition, check for electric wire loosening and existence of hidden trouble possibly causing high temperature.

★ Refer to daily pre-starting maintenance .



- 2) Adjust the seat for operation easiness.
- 3) Adjust the rear view mirrors.

3. Starting and stalling of the engine

1) Check the indicator lamp.

(1) Turn the main power switch to “ON”.

(2) Check whether all the operation handles are at the middle position.

(3) Turn the starting switch to “ON” position and check for the following:

① After the startup LOGO flickers for 2s, the instrument operation interface is shown on the monitor display.

② Only two of the alarm lamps below can be on after 2s and all other ones shall be off.

- 1—engine oil pressure alarm lamp

- 2—charging indictor lamp

2) Start the machine (at normal temperature).

(1) Turn the main power switch to “ON” .

(2) Turn the starting switch to “ON” position, check whether there are people or other objects near the machine, and remind others by honking.

(3) Turn the starting switch to “START” position to start the machine. When the starting switch is released, it will automatically return to “ON” position.

★ If the engine is not started favorably for the first time, please wait for 15s and then restart it. If it is not started successfully three times continuously, wait for 2min and then start it.

★ Repeated starting in short time will damage the starting motor.

★ If such fault exists after shutdown each time, please contact the agency authorized by SINOMACH or the customer service center.

3) Starting the machine in cold weather

★ Check whether there are other people or other objects near the machine, and remind others by honking.

★ Check whether the battery electrolyte is frozen or leaks before starting. If the battery electrolyte is frozen, defreeze the battery electrolyte instead of charging the battery or starting the engine with different power supplies; otherwise, the battery will be in danger of being on fire.

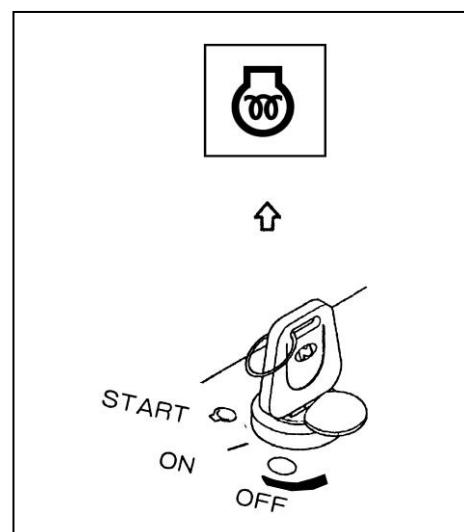
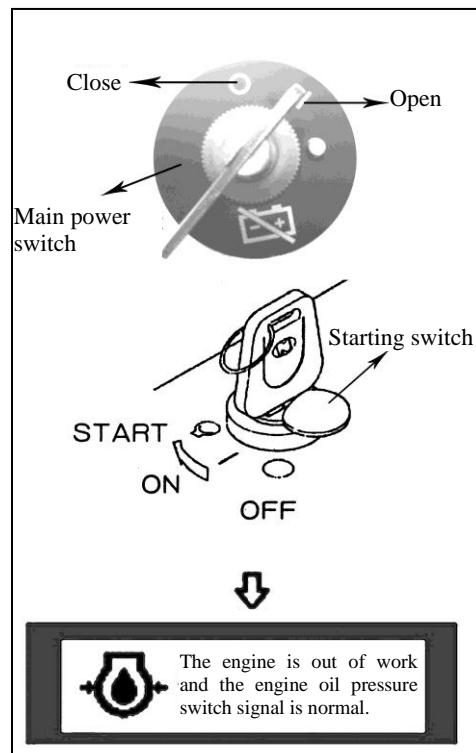
★ Replace engine oil and diesel oil as required.

★ Add antifreezing agent into cooling fluid as required.

(1) Check whether all the handles are at the middle position.

(2) The engine control system automatically detects temperature, the preheating indicator lamp is on, the preheating icon is shown, and there is a text prompt “Preheating...”. After about 15s, the icon disappears, the LCS shows the text prompt “Preheating Completed”, and the buzzer sounds.

★ If the engine is not started, wait for starting motor stop for 2min to restart the engine.



(3) Release the key immediately after starting the machine.

4) Check after engine starting. Check and confirm the following after machine starting:

(1) Whether the hydraulic oil level is normal;

(2) Whether oil or water leaks;

(3) Whether all the alarm lamps (1-8) are off;

(4) Whether the pointers of the water thermometer (9) and hydraulic oil thermometer (10) are in the green area;

(5) Whether the engine sound and the color of the exhausted gas are normal;

(6) Whether sound and vibration are normal

★ Do not increase the engine speed immediately after starting, which will otherwise damage the engine and turbocharger.

★ In case of finding an alarm prompt on the instrument panel, immediately shut down the engine and solve the problem as required.

5) Warming-up operation

★ The most appropriate temperature of hydraulic oil is 50°C. In case of sudden operation at <25°C hydraulic oil temperature, the hydraulic system may be seriously damaged. Before starting work, the hydraulic oil temperature must rise to least to 25°C.

(1) Run the engine in idle state for 5min.

(2) Increase the speed so that the engine runs within the range of medium speed.

(3) Operate the bucket handle for 5min.

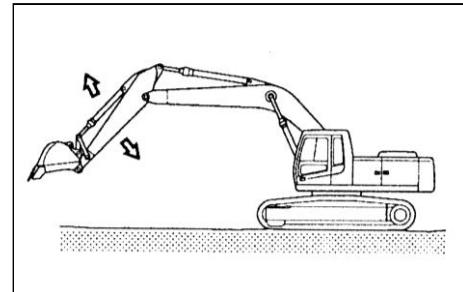
Do not operate any other handles except the bucket handle.

(4) Run the engine at high speed and operate the bucket and bucket arm for 5~10min.

★ Only the bucket handle and bucket arm handle can be operated.

(5) After operating all oil cylinders several times and carrying out traveling and rotating action, warming-up operation is ended.

★ Increase warming-up time in winter.



6) Shutdown

★ In case of sudden shutdown of the engine before cooling, its service life may be shortened greatly. Hence, do not shut down the engine suddenly except in an emergency.

★ Especially in case of engine overheating, run the engine at medium speed to gradually cool it and then shut down it instead of sudden shutdown.

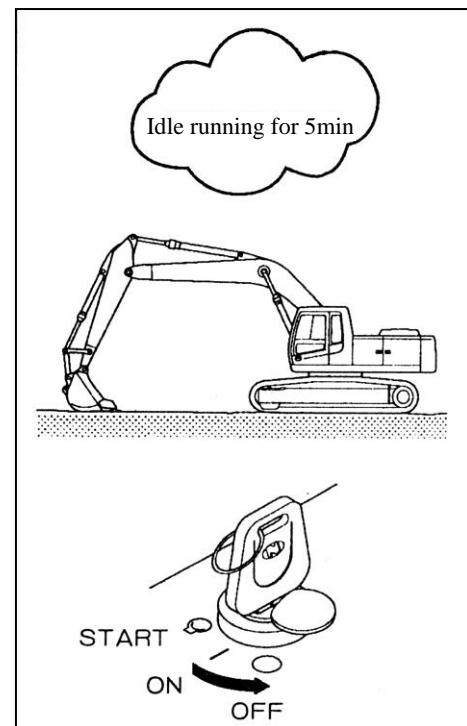
(1) Place the bucket onto the ground and turn all the handles to the middle position.

(2) Run the engine at low idle speed for about 5min.

(3) Turn the start key to “OFF” position.

(4) Close the safety locking control lever and take off the key to prevent other people from using the machine.

(5) Lock the door of the cab.



4. Mode selection system

1) How to operate the operating mode selection system:

(1) Turn the key switch to “ON” position.

① When the key switch is turned to “ON” position, after 5s, all other alarm indicator lamps are off except that the engine oil pressure alarm lamp is on.

② The operating mode on the instrument panel is S mode, the automatic idling indicator lamp flickers, and the traveling mode shows low speed (tortoise mark). If GPS is online, the G indicator lamp is on. When the safety rod is put down, this shows locking state, the safety solenoid valve is of power failure, the hydraulic system has no action, and all other indicator lamps are off.

③ The self-diagnosis system can detect electrical system failure in initial state.

(2) After engine startup

① After engine startup, the default operating mode is S mode and the default traveling mode is low speed mode.

- In this case, the tachometer shows idle speed, which is 1350rpm.

- After 2-3min, you can select any operating mode according to your working need. The operating mode can be converted from S→H→L→B.

② When the starting switch is turned to “ON” position, the self-diagnosis function can come into play.

2) Operating mode selection

(1) H mode

By pressing the “Operating Mode” key, “H” is on and H mode is selected.

Engine racing max. speed rpm	Note:
2100 ± 50	Engine throttle is at max. oil supply position, and engine is putting into operation with full power

- ★ When the throttle is switched to below Gear 10, and when the engine speed is decreased, each scale mark will decrease the speed by 100 rpm or so.

(2) S mode

By pressing the “Operating Mode” key, “S” is on and S mode is selected

Engine racing max. speed rpm	Note
2000 ± 50	The sum of input power of hydraulic pump is about 85% max. engine power

- ★ When the throttle is switched to below Gear 9, and when the engine speed is decreased, each scale mark will decrease the speed by 100 rpm or so.

(3) L mode

By pressing the “Operating Mode” key, “L” is on and L mode is selected

Engine racing max. speed rpm	Note
1950 ± 50	The sum of input power of hydraulic pump is about 65% max. engine power

- ★ When the throttle is switched to below Gear 7, and when the engine speed is decreased, each scale mark will decrease the speed by 100 rpm or so.

(4) B mode

By pressing the “Operating Mode” key, “B” is on and B mode is selected

Engine racing max. speed rpm	Note
1750 ± 50	The sum of input power of hydraulic pump is about 65% max. engine power

- ★ When the throttle is switched to below Gear 10, and when the engine speed is decreased, each scale mark will decrease the speed by 100 rpm or so.

3) Monitor Menu Instructions

Main menu: Press the menu key to enter the main menu bar, after entering the main menu, there are: image system, system parameters, use information, fault record, user settings, system settings, a total of 6 items, as shown in the figure below;



1.1 Video system: After entering the video system menu by selecting the arrow keys, there are: turn on the video function, turn off the video function. Click "Turn on Video Function", and the camera shooting screen will be displayed at the bottom of the screen.



1.2 System parameters: After entering the system parameter menu through the arrow keys, there are 4 submenus: running parameters, fault alarm information, system status information, and GPS information.



1.2.1 Working parameters: Use the arrow keys to select and enter the running parameters to view the analog value of the current system running, and use the up and down keys to turn the page.



1.2.2 Fault alarm information: After entering the fault alarm information menu, you can view the fault alarm information by selecting the arrow keys, and turning the page by the up and down keys.



1.2.3 System status information: After entering the system status information through the arrow keys, you can view the switch value status information of the current system

operation.



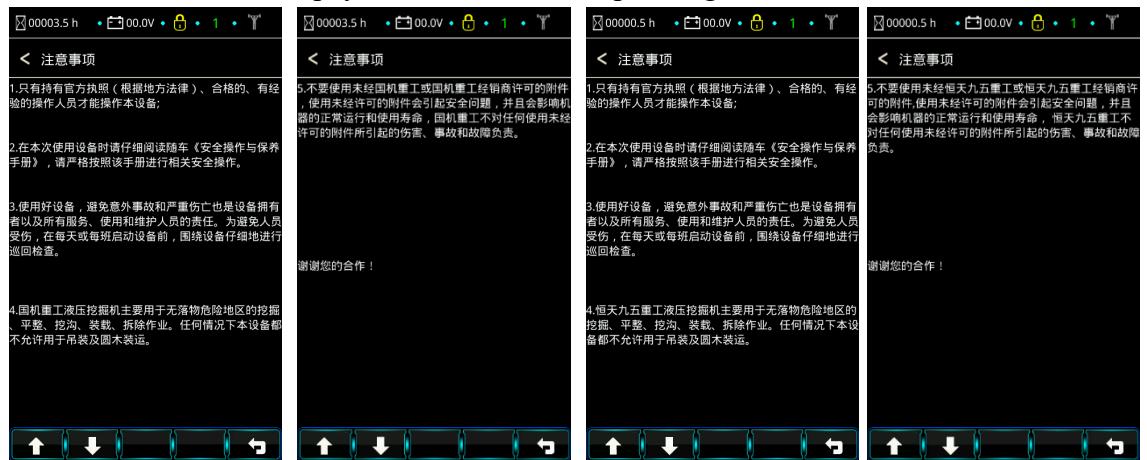
1.2.4 GPS information: After selecting to enter GPS information through the arrow keys, you can view the current GPS status information



1.3 Use information: After entering the use information menu by selecting the arrow keys, there are 5 sub-menus: precautions, host information, controller information, instrument information, and maintenance information.



1.3.1 Precautions: Use the arrow keys to select and enter the precautions to view some basic matters that the user should pay attention to when operating the host.



1.3.2 Host information: Select the host information by the arrow keys and view the host model, host serial number, service phone, website and other information.



1.3.3 Controller information: Use the arrow keys to select and enter the controller information to view the software version number of the controller.



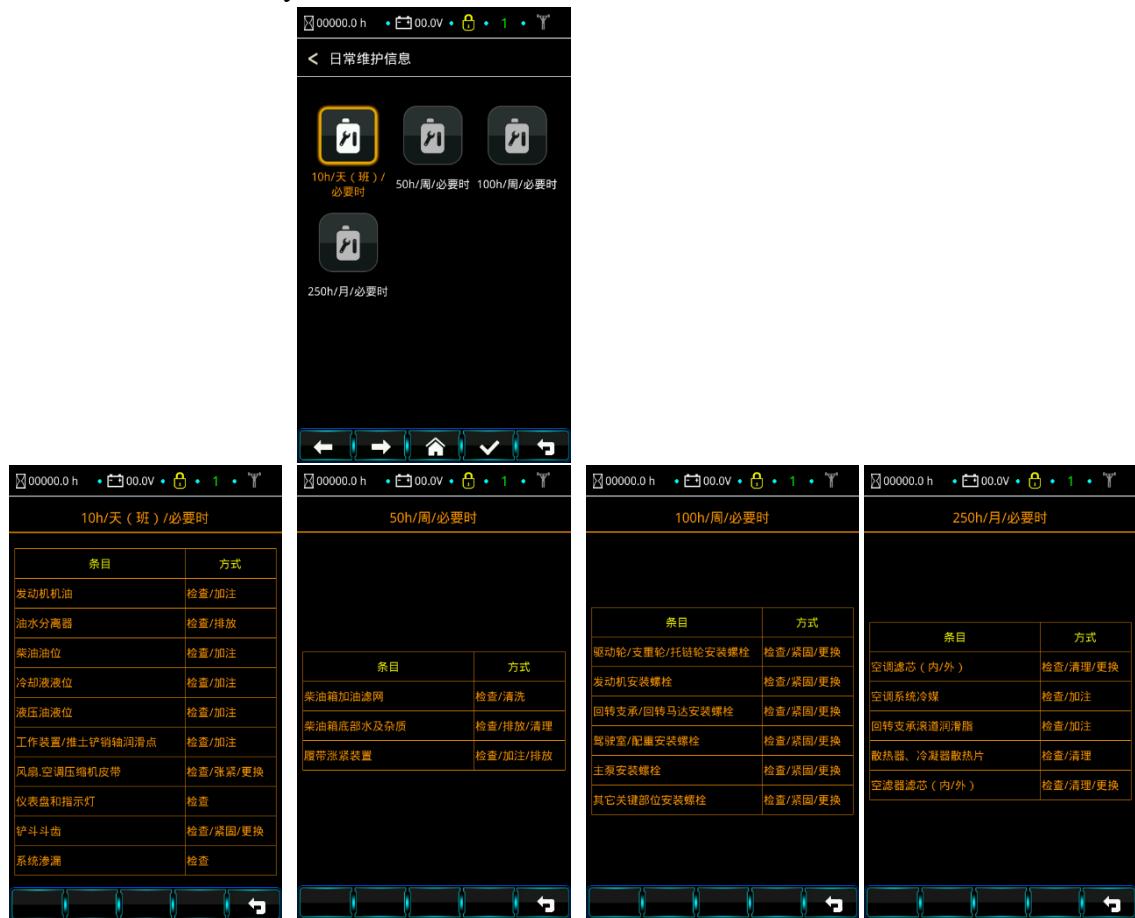
1.3.4 Instrument information: Select the instrument information through the arrow keys to view the instrument model, instrument serial number, software version and other information.



1.3.5 Maintenance information: Maintenance information includes 4 submenus: daily maintenance information, maintenance items, restore default cycle and monitoring switch.



1.3.5.1 Daily maintenance information: After selecting the daily maintenance information through the arrow keys, you can view the maintenance inspection items of 10h/day (shift)/when necessary, 50h/week/when necessary, 100h/week/when necessary and 250h/month/when necessary.



1.3.5.2 After selecting the maintenance item through the arrow keys, you can view the cycle and remaining time information of each maintenance item.



1.3.5.3 Use the arrow keys to select to enter the restore default cycle to choose whether to restore the default cycle information.



1.3.5.4 After selecting the monitoring switch through the arrow keys, you can choose whether to monitor the information of each maintenance item.



1.4 Fault record: After entering the fault record menu by selecting the arrow keys, there are two menus: the whole machine fault and the engine fault. Check the fault serial number, content, system time at the time of occurrence, hour meter at the time of occurrence, etc. If the fault is an analog quantity, record the value at the time of the fault at the same time



1.4.1 Whole machine failure: After entering the whole machine failure through the arrow keys, you can view the whole machines historical failure, failure code, content, system time when it occurred, etc.

No.	代码	发生时间
01	--	2021-06-10 18:42
02	--	2021-06-10 18:42
03	--	2021-06-10 18:42
04	--	2021-06-10 18:42
05	--	2021-06-10 18:42
06	--	2021-06-10 18:42
07	--	2021-06-10 18:42
08	--	2021-06-10 18:42
09	--	2021-06-10 18:42

1.4.2 Engine fault: After selecting the engine fault through the arrow keys, you can view the engine fault history, fault code, content, system time when it occurred, etc. .

No.	FC	SPN	FMI	OC	发生时间
01	234	190	0	-	2021-06-10 18:41
02	213	175	4	-	2021-06-10 18:41
03	212	175	3	-	2021-06-10 18:41
04	425	175	2	-	2021-06-10 18:41
05	719	22	3	-	2021-06-10 18:41
06	2112	52	4	-	2021-06-10 18:41
07	2111	52	3	-	2021-06-10 18:41
08	2114	52	0	-	2021-06-10 18:41
09	729	22	4	-	2021-06-10 18:41

1.5 User settings: clock adjustment, language setting, brightness setting, instrument key tone, throttle calibration, secondary automatic idle speed, boom priority setting, a total of 7 sub-menus;



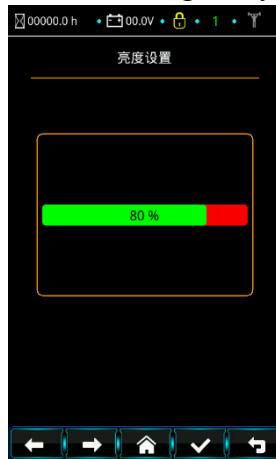
1.5.1 Clock adjustment: After entering the clock adjustment through the arrow keys, you can set the year, month, day, hour, minute and other items of the current system time. When setting, press the left and right keys to select the single item to be set, the confirm key to enter the single item setting, the up and down keys to increase or decrease the size of the value, and then press the confirm key to complete the single item setting, when all settings are completed, you can press the return key to exit.



1.5.2 Language setting: After entering the language setting through the menu operation, you can select the text of the current display operation (Chinese or English display)



1.5.3 Brightness setting: Use the arrow keys to select and enter the brightness setting to adjust the display brightness of the color LCD. Press the up and down keys to coarsely adjust (the step is 10), and press the left and right keys to fine-tune (the step is 1)。



1.5.4. Instrument key sound: After entering the instrument key sound setting, you can view the current switch status of the key sound, and choose to turn it on or off to set the key sound on or off.。



1.5.5 Throttle calibration: select through the arrow keys to enter the throttle calibration menu, there are 2 submenus: automatic throttle and manual throttle.



1.5.5.1 Auto throttle: After entering the auto throttle setting by selecting the arrow keys, the following steps are displayed in sequence:

1. Preparation process: display requesting throttle calibration...please wait!;
2. Calibration process: display the current set gear position and throttle feedback value;
3. Calibration result: Setting succeeded or Setting failed.

This function generally runs after the device has been used for a long time to calibrate the throttle. The whole process is completed automatically without intervention.



1.5.5.2 Manual throttle: After selecting the manual throttle setting via the arrow keys, press the left button to shrink the throttle and increase the speed. Press the right button to extend the throttle and reduce the speed. Press the down key to complete the setting. This function is for emergency use, that is, when the accelerator knob is damaged and fails, it can temporarily control the accelerator. Under normal circumstances, the user does not need to operate this function.



1.5.6 Second-level automatic idle speed: Select to enter the second-level automatic idle speed setting through the arrow keys, press the up and down keys to operate, confirm to close or open, and then press the return key to return. When the device detects that the handle has no movement for 5 seconds, it will automatically reduce the speed to the third gear. If there is no movement for 25 seconds, the speed will be reduced to the first gear. This is the second-level automatic idle speed. If it is turned off, the device will only down to third gear.



1.5.7 Boom priority setting: Use the arrow keys to select to enter the boom setting, press the up and down keys to operate, confirm to close or open, and then press the return key to return.



1.6 System Settings: Not open to users

5. Working equipment manipulation

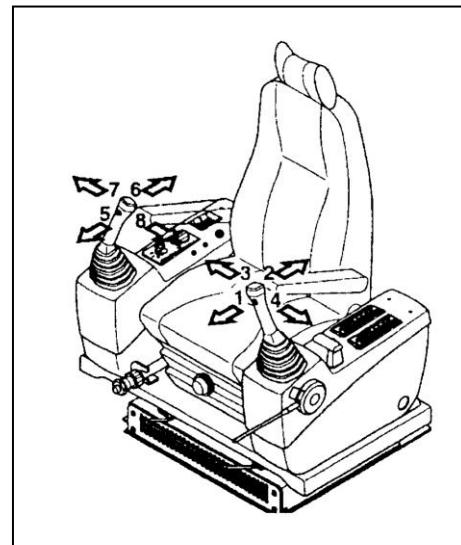
★ Confirm the relationship of control handle operation with working equipment action.

1) The left control handle controls the bucket arm and rotation.

2) The right control handle controls the boom and bucket.

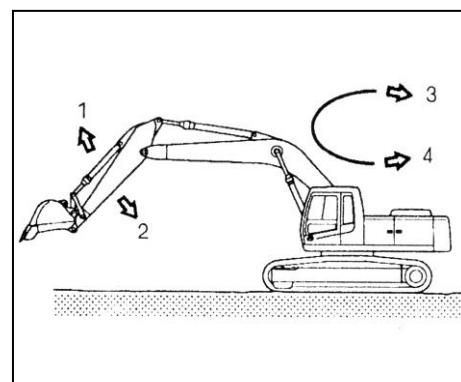
★ Rotation inertia shall be taken into account during rotation operation.

★ Take great care when operating the machine equipped with a telescopic arm or a two-section arm. Especially when the bucket approaches the cab, take care to prevent the bucket from impacting the cab and thus causing fatal injury.



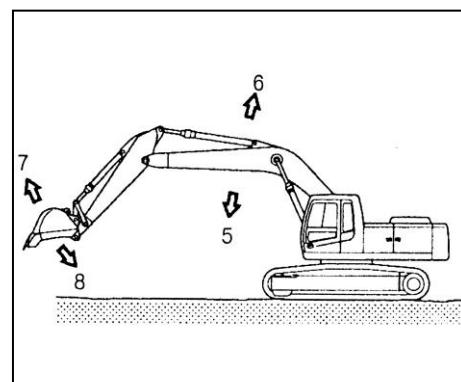
★ Left control handle

1. Bucket arm outstretching
2. Bucket arm retracting
3. Right turn
4. Left turn



★ Right control handle

5. Boom down
6. Boom up
7. Bucket releasing
8. Bucket withdrawal



6. Machine traveling

1) Basic operation

(1) Traveling position

When the machine is at the traveling position, the traveling motor is in the rear and the working equipment is in the front.

⚠ Note that the driving direction is opposite after the whole machine is rotated by 180°.

(2) Traveling operation

Traveling can be controlled by operating either the handle or the pedal.

★ Do not travel continuously for long.

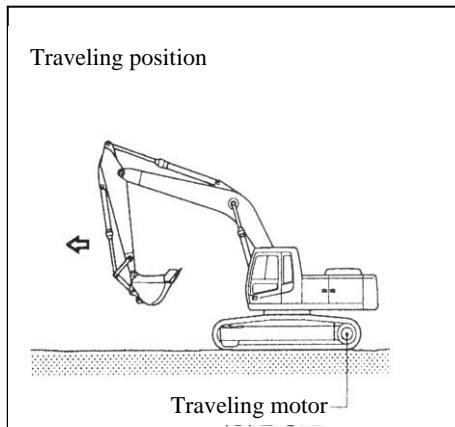
★ During traveling on uneven ground, reduce the speed of the engine and travel at low speed.

★ During traveling on obstacles such as gravels and stubs, the machine (especially the lower body) will be impacted very greatly; therefore, the traveling speed shall be reduced, the center of the crawler shall cross obstacles, and such obstacles shall be eliminated to the greatest extent possible or traveling shall be avoided on obstacles.

(3) Traveling forward and backward

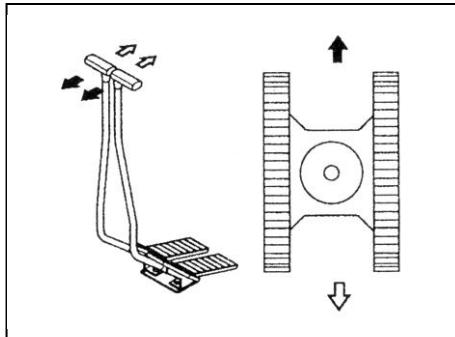
When the left and right traveling handles or pedals are pushed at the same time, the machine will travel forward or backward.

★ The traveling speed is controlled by the travel of the operation handle or pedal, and the change of the traveling direction is controlled by the difference in the travel of the handle or pedal.



(4) Turning around the pivot

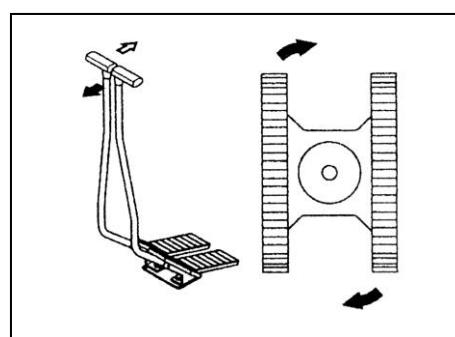
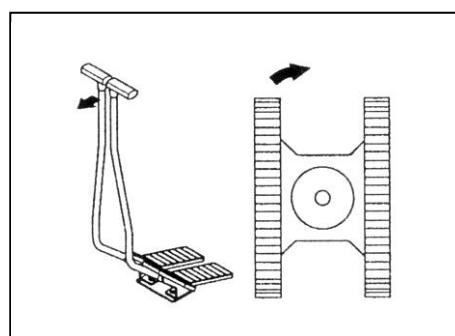
Turning can be completed by operating the handle or pedal on only one side and through the motion of the crawler on one side.



(5) Rotation in place

The direction can be changed in place through the motion of the left and right crawlers.

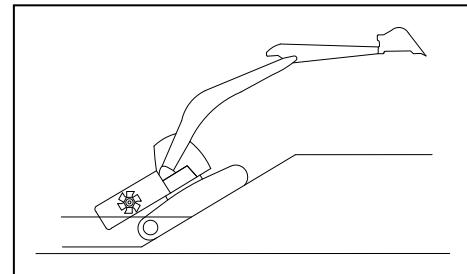
The handles or pedals on the two sides are operated oppositely at the same time.



(6) High speed traveling

The machine shall travel at low speed on uneven roadbeds such as stone roadbeds or uneven roads with large stones. In case of high speed traveling, the guiding wheel shall be set up in the direction of forward motion.

- ★ Press the high and low speed selection button in order to switch the traveling speed. The corresponding traveling speed mode mark is shown on the monitor.

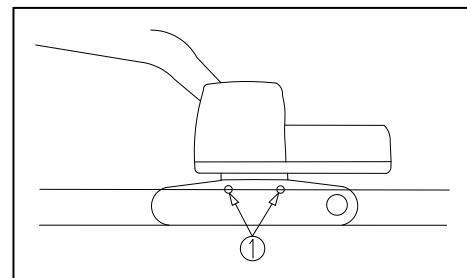


(7) Permissible water depth

Do not drive the machine in the water with the depth exceeding the centerline of riding wheel (1).

Apply grease to the parts which have been soaked in water for long till the used grease has been completely squeezed out (especially around the bucket pin).

- ★ When the machine is used in water, if the angle of the machine exceeds 15°, the rear part of the upper part of the machine will enter water, and water will be stirred up by the radiator fan. This will damage the radiator. Be particularly careful when the machine is driven out of water.



2) Driving on slopes

(1) Confirm that the traveling motor is at the correct position and ensure correct manipulation of the driving handle.

(2) Lower the bucket to 20~30cm from ground. In an emergency, it can be used in braking.

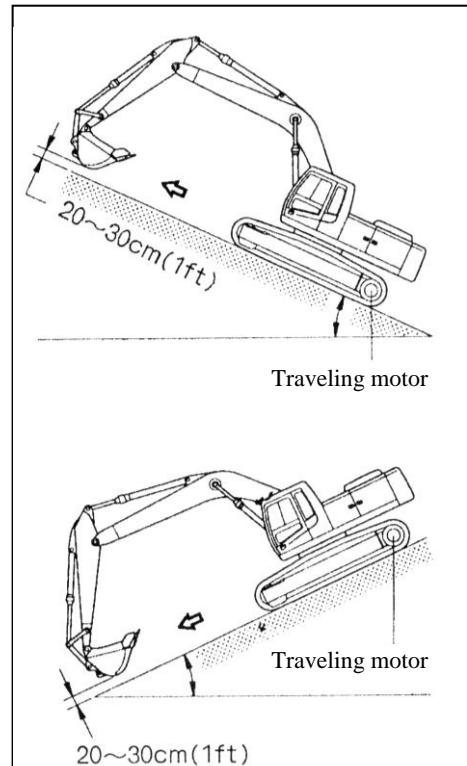
(3) If the machine begins to glide or lose stability, immediately lower the bucket to brake the machine.

(4) During parking on slopes, use the bucket in braking while placing a block after the crawler to prevent gliding.

- ★ In case of low hydraulic oil temperature, the machine cannot be driven effectively on slopes. Warming-up operation shall be performed in order to drive the machine on slopes.

▲ Be particularly careful during working on slopes; otherwise, the machine may lose balance or be upturned.

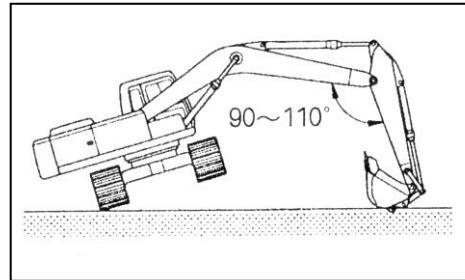
▲ Confirm that the traveling speed switch is at the low speed gear (tortoise mark) during driving on slopes.



3) Driving on wetland

- ★ If possible, avoid operating the machine on wetland.
- (1) When possible, try to make the machine move forward.
- (2) Take care not to exceed the depth where the machine can be dragged during operation on wetland.
- (3) When the machine cannot be driven, reduce the bucket and use the boom and bucket arm to push the machine.

Operate the boom, bucket arm and driving handle simultaneously to prevent machine subsidence.

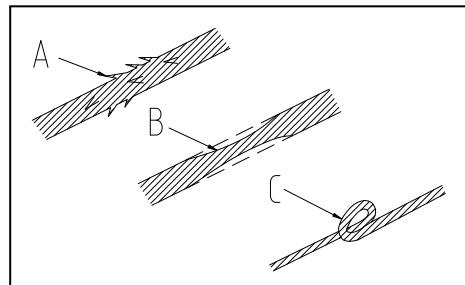


4) Machine towing

⚠ Incorrect towing of the faulty machine or selecting wrong wire ropes will lead to serious consequences.

⚠ Often check the wire rope for towing and ensure that it has enough strength to bear the weight of the towed machine.

★ It is forbidden to use partially broken ropes (A), partially thinned ropes (B) or knotted ropes (C). Otherwise, ropes will be in danger of breakage during towing.



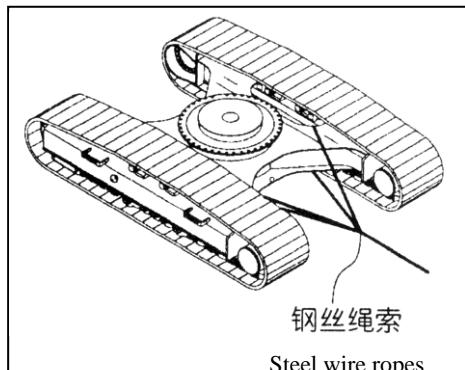
- (1) Be sure to wear leather gloves when holding wire ropes.
- (2) It is forbidden to tow the machine on slopes.
- (3) It is strictly forbidden to stand between the towing machine and the towed machine during towing.
- (4) Slowly tow the machine and take care not to cause wire ropes to bear sudden loads.

(1) If the machine is stuck in the mud and cannot be driven out depending upon its own power or its towing rod bar is used to tow weights, wire ropes shall be used as shown in the right figure.

(2) Wood blocks shall be placed between wire ropes and the machine body to avoid damaging wire ropes and the machine body.

(3) Keep wire ropes horizontal and ensure the direction of wire ropes is consistent with that of the crawler frame.

(4) During towing, the driving speed shall be less than 1km/h. The machine shall be driven to the place that has a distance of several meters and is suitable for repair.



⚠ It is forbidden to tow the machine with light load towing holes.

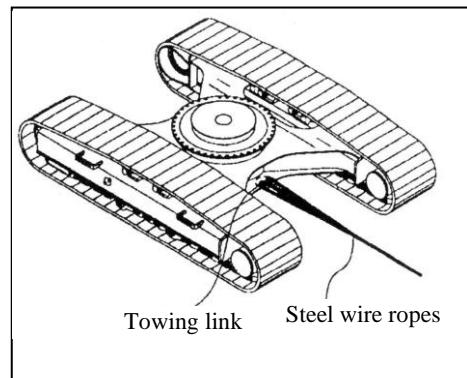
★ Hook links must be used when towing holes are used in an emergency.

(1) Keep wire ropes horizontal and ensure wire ropes directly face the crawler frame.

(2) Move the machine slowly.

(3) A hanging hole is set up on the crawler frame and a hook link is put on the hole to tow light objects.

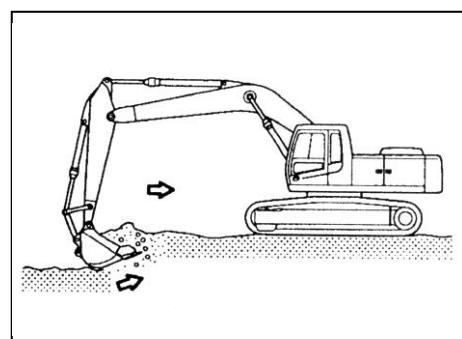
(4) Permissible towing load: maximum 108,000N (11,000kgf).



7. Effective working method

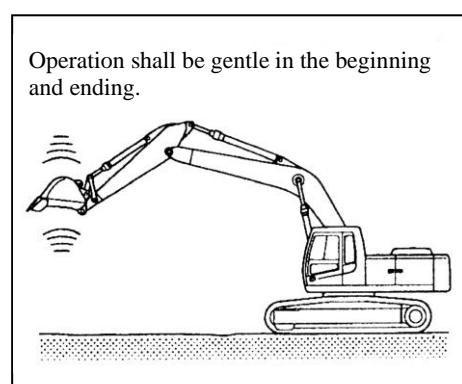
1) Excavation with the bucket arm

Carry out excavation with the tensile force of the bucket arm; if necessary, combine it with the excavation force of the bucket.

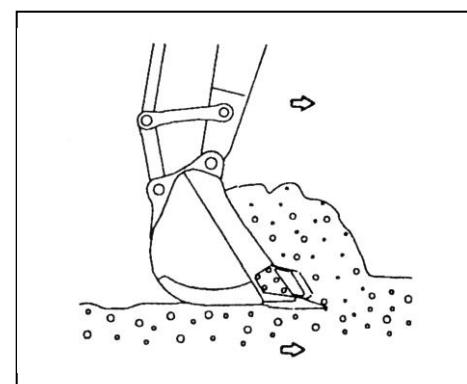


2) Operation shall be gentle at the beginning and end of lowering and lifting the boom.

Especially sudden stop in case of lowering the boom will damage the machine.

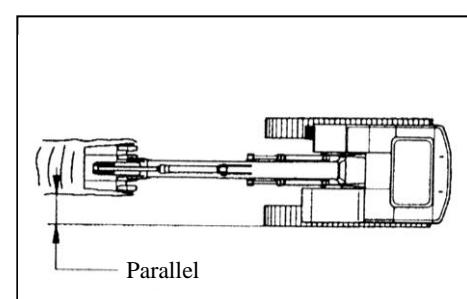


3) Excavation resistance and bucket tooth wear can be reduced by aligning the bucket tooth top with the excavation direction.

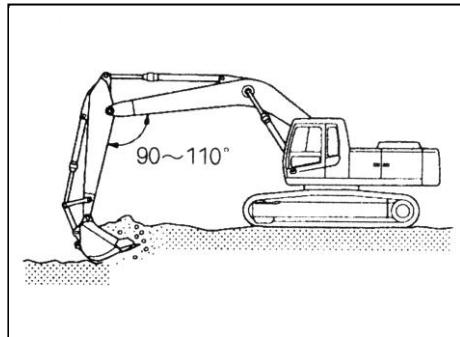


4) Keep the crawler parallel with a ditch during its excavation.

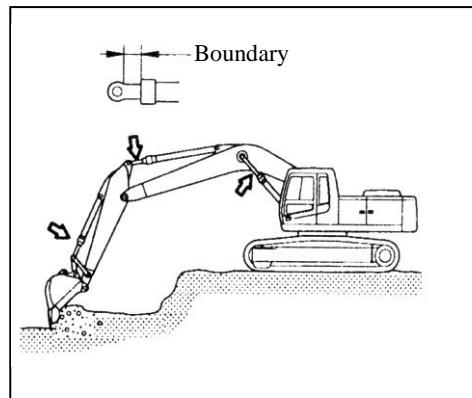
Do not rotate during excavation.



- 5) During excavation, the angle between the boom and the bucket arm is kept at 90~110° and in this case, the maximum excavation force can be obtained.



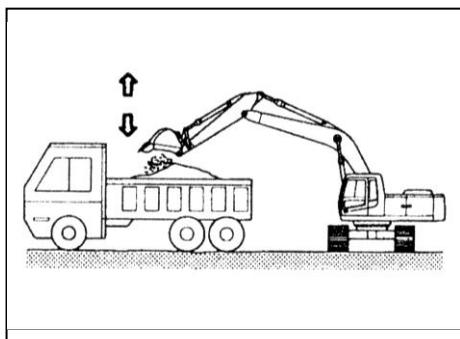
- 6) A small safety area is reserved at the two ends of the cylinder stroke during machine working.



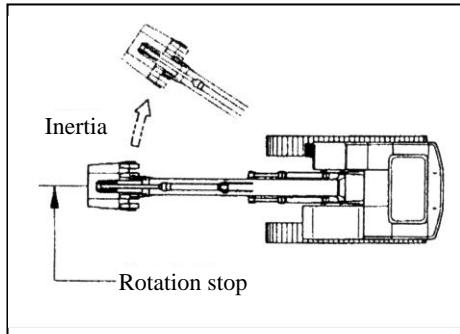
- 7) During soil unloading from the bucket, the bucket shall be at the dumping position and the bucket arm shall be horizontal.

Operate the bucket handle for 2 to 3 times in case of difficult dumping.

★ Do not impact with the bucket tooth during dumping.

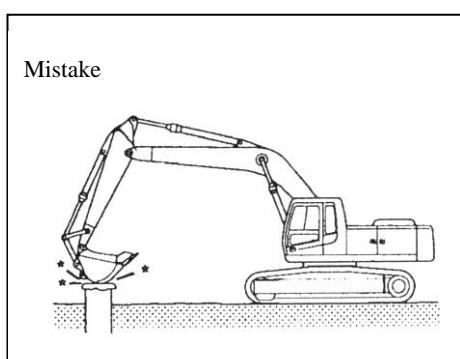


- 8) In case of rotation stop, consider the rotary gliding distance caused by inertia after the handle returns to the middle position.



- 9) Do not use the working equipment for excavation to impact other objects.

Impact force may damage the machine.

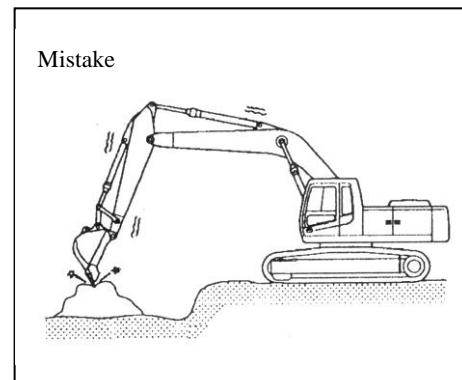


10) Do not use the bucket to break hard objects such as concrete, stones, etc.

Otherwise, this will possibly fracture the bucket tooth pin or bend the boom.

11) Overload operation shall not be performed.

Overload operation may cause accidents.



8. Operation at special work sites

1) Machine operation in cold weather

(1) Please use correct engine oil and diesel oil.

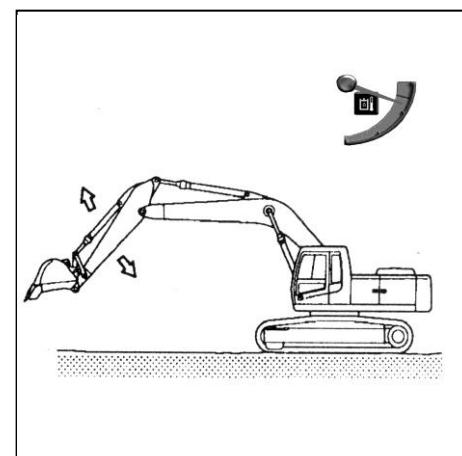
(2) Add antifreezing agent into cooling fluid as required.

(3) Start the engine and increase the warming-up time referring to the machine starting method in cold weather.

(4) Fully charge the battery.

★ The non-charged battery is frozen more easily than the charged battery.

(5) Keep the machine clean and place it on a wood board.



2) Working at work sites with dust and sand

(1) Often check the filter element of the air filter.

If the warning lamp is on and simultaneously the buzzer makes sound, the filter element shall be immediately cleaned or replace without need to consider the inspection period.

★ After the filter element is cleaned six times, it shall be replaced.

(2) Often check the radiator and keep cooling fins clean.

(3) Prevent sand or dust from entering the oil tank when adding fuel oil or hydraulic oil.

(4) Tighten the air filter of the hydraulic oil tank to prevent sand for dust from entering the hydraulic system.

(5) Keep the lubricating parts such as pins and shaft sleeves clean.

(6) If the air conditioner or heater is blocked, cooling or heating effect will be reduced. The filter element shall be often cleaned or replaced.

3) Littoral operation

(1) Tighten all screw plugs, valves and bolts to prevent salinity from entering.

(2) Wash the machine after operation to remove salt residues. Specially take care to prevent electrical components and hydraulic cylinders from being corroded.

(3) Be sure to frequently check and lubricate the machine.

Add sufficient grease into the bearing and the shaft sleeve of the working equipment to replace the grease which has been soaked in water for a very long time.

9. Normal operation of the excavator

The following phenomena will occur during operation because of characteristics of the excavator:

- 1) When the bucket arm is retracted, the motion of the bucket arm at “×” point shown in the figure will possibly stop for a moment; after passing through “×” point, the motion speed returns to normal.

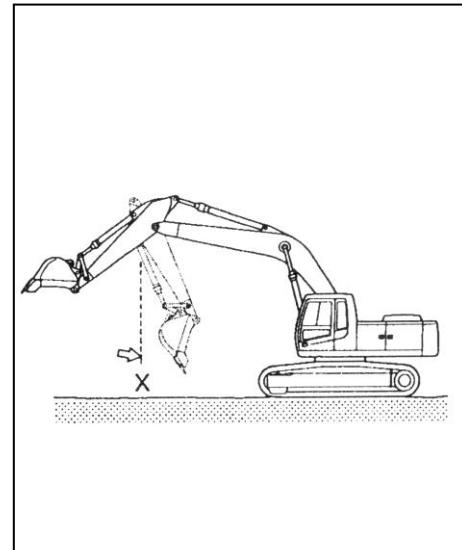
This is because the motion speed caused by bucket arm weight is higher than the speed of oil flowing into the cylinder.

- 2) Continuous sound can be heard when the boom is lowered. This is due to oil flowing in the valve.

- 3) In case of overload, the safety valve will be opened, thus making sound. This can protect the hydraulic system.

- 4) When the machine begins and stops rotation, sound will be made at the rotary motor.

The sound is caused by brake valve action.



10. Working equipment lowering (engine shutdown)

- 1) Operate the pilot handle to the boom lowering position within 2min after engine shutdown for the machine with an accumulator. Then the boom will be lowered under the action of its dead weight. Here the starting switch shall be at “ON” position and the safety locking control lever shall be in working state.

After engine shutdown, set the safety locking control lever in locking state.

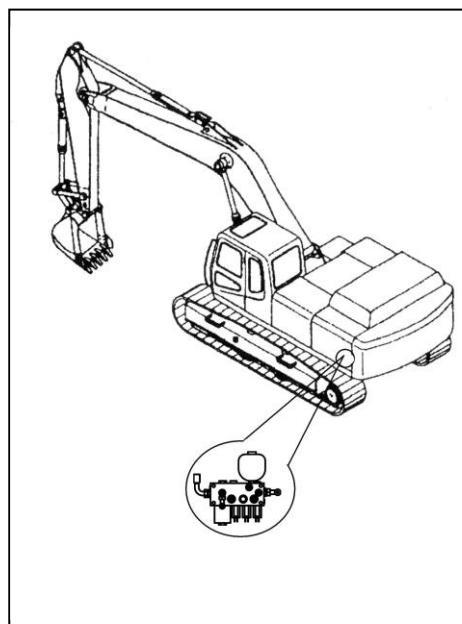
▲ When the boom is let down, confirm no person near or below the working equipment.

- 2) The accumulator is filled up with high pressure nitrogen. Wrong operation is very dangerous. Be sure to operate according to the following procedure.

(1) The accumulator cannot be dismantled or holed in the presence of open fire.

(2) Welding and repair cannot be performed.

★ Before dismantling and repair, be sure to exhaust the gas in the accumulator. Here a special gas relief valve is needed. Please contact the agency authorized by SINOMACH or the customer service center.



11. Storage

When the machine is stored for over 1 month, please maintain it according to the following requirements.

1) Machine cleaning

Clean the machine and check and adjust the crawler. Apply grease to each lubrication part.

2) Replace all the oil of each lubrication point.

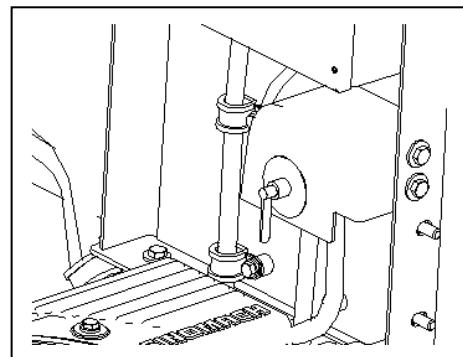
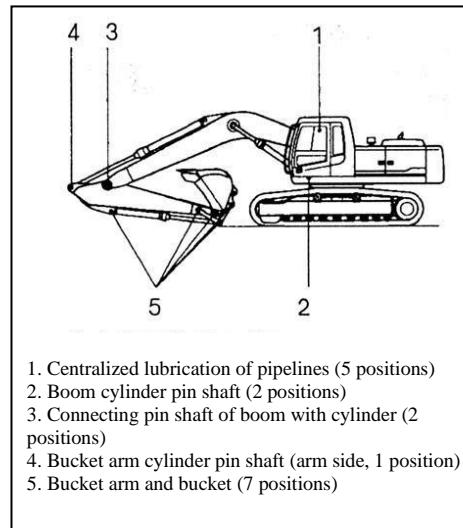
★ Be particularly careful when the machine is re-used. Oil may become thin during machine storage.

Carry out anticorrosive lubrication of the exposed part of the cylinder piston and the easily rusted part of the machine.

3) Main power switch

When the machine is stored, the main switch on the frame is turned to “OFF” position.

4) Add anticorrosive antifreezing fluid into the radiator.

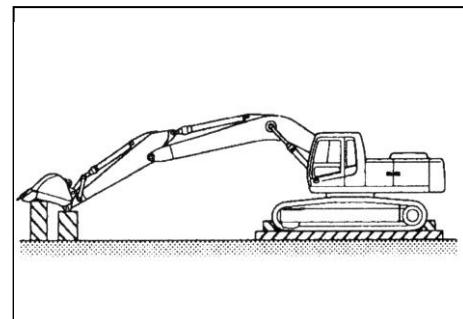


5) Preventing dust and dampness

Keep the machine dry. Wood blocks shall be placed on ground during machine storage.

★ The exposed part of the piston rod shall be covered.

★ Lower the bucket to ground and place upholders below the crawler.



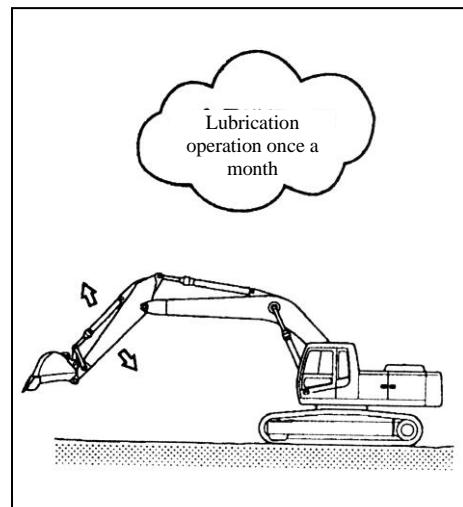
6) Storage process

Start the machine once a month to run the machine and working equipment several times; apply grease to each part.

★ Check for the level of the engine oil and cooling fluid before starting as required; in case of insufficient level, supplement oil and fluid.

★ Remove the anticorrosive agent of the exposed part of the piston rod of the cylinder.

★ Make the machine travel and rotate and operate the working equipment to ensure that each functional component is fully lubricated.



7) Before long-term storage

- ★ Fill up the fuel tank and hydraulic oil tank with oil to the maximum scale.
- ★ Check for antifreezing fluid property and when necessary, completely discharge fluid.
- ★ Cover the exhaust port (when the machine is parked outdoors).

Chapter IV Transportation

1. Preparation before transportation

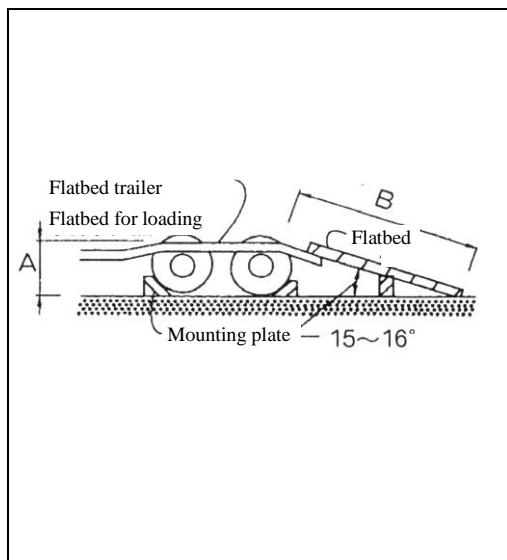
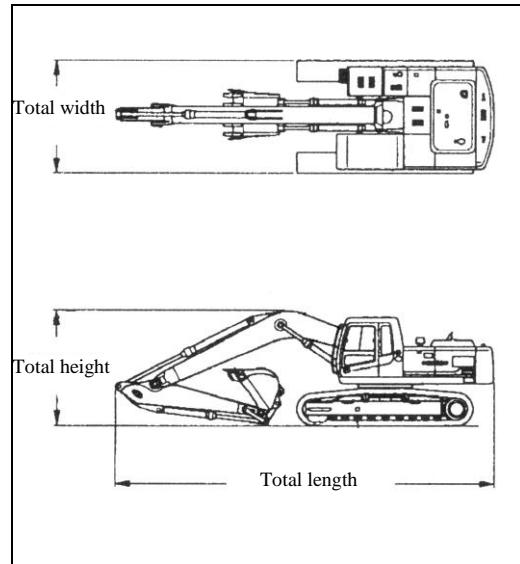
- 1) When transporting the machine, you should follow various traffic rules, road transportation vehicle laws and vehicle restriction regulations etc.
- 2) Select the appropriate trailer according to the weight and size in Section 2 of this Chapter.
- 3) Check for the width and height of roads and bridges which will be passed on the whole journey and their restrictions on the weight etc.
- 4) If necessary, the license shall be taken from related department.

Prepare the trailer having sufficient carrying capacity to transport the machine.

- 5) Select the flatbed for safe loading according to the following table and the figure.

Unit: m

A	B
1.0	3.65~3.85
1.1	4.00~4.25
1.2	4.35~4.60
1.3	4.75~5.00
1.4	5.10~5.40
1.5	5.50~5.75

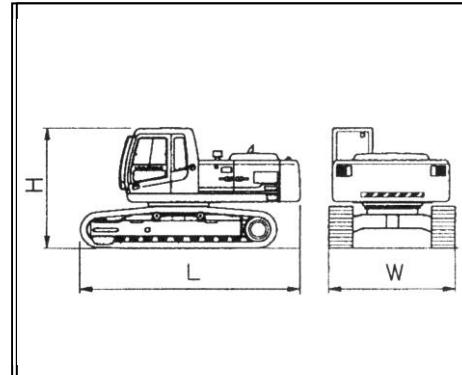


2. Size and weight

(1) Basic

Code	Item	Unit	ZG3365LC-9C
L	Length	mm	5822
H	Height	mm	3145
W	Width	mm	3280
Wt	Weight	kg	23800

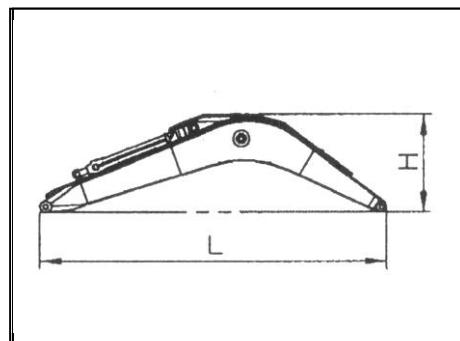
★ 600mm 3-teeth track and 6400kg counterweight



(2) Arm assy

Code	Item	Unit	ZG3365LC-9C
L	Length	mm	6430
H	Height	mm	1790
W	Width	mm	776
Wt	Weight	kg	3070

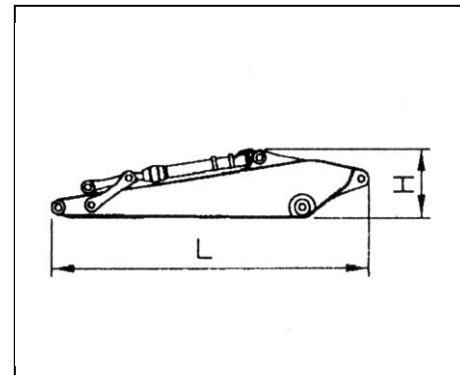
★ 6.2m Arm and bucket rod cylinder (including oil pipe and axis pin)



(3) Bucket rod assy

Code	Item	Unit	ZG3365LC-9C
L	Length	mm	3853
H	Height	mm	1016
W	Width	mm	345
Wt	Weight	kg	1630

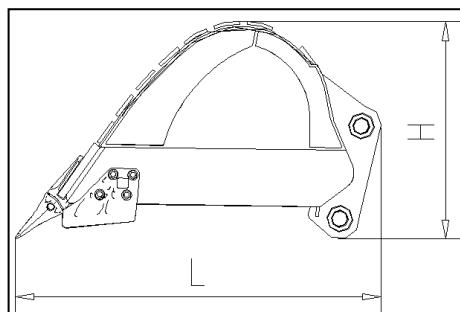
★ 2.65m bucket rod and bucket cylinder (including link and axis pin)



(4) Bucket assy

Code	Item	Unit	ZG3365LC-9C
L	Length	mm	1768
H	Height	mm	1249
W	Width	mm	1612
Wt	Weight	kg	1447

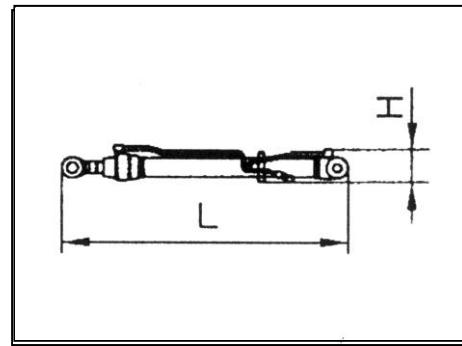
★ Standard bucket



(5)Arm cylinder

Code	Item	Unit	ZG3365LC-9C
L	Length	mm	2215
H	Height	mm	286
W	Width	mm	404
Wt	Weight	kg	280

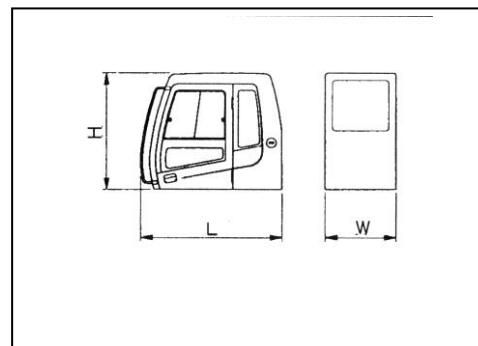
★ Including pipeline



(6) Cab assy

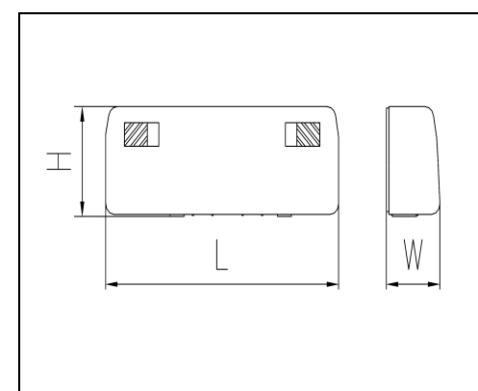
Code	Item	Unit	ZG3365LC-9C
L	Length	mm	1920
H	Height	mm	1808
W	Width	mm	1000
Wt	Weight	kg	780

★ Including front - bottom protective net



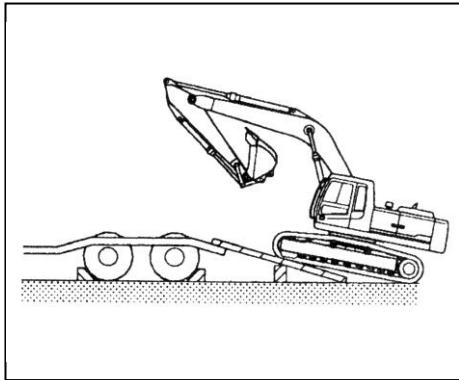
(7) Counterweight

Code	Item	Unit	ZG3365LC-9C
L	Length	mm	2910
H	Height	mm	1114
W	Width	mm	790
Wt	Weight	kg	6400



3. Loading and unloading of machine

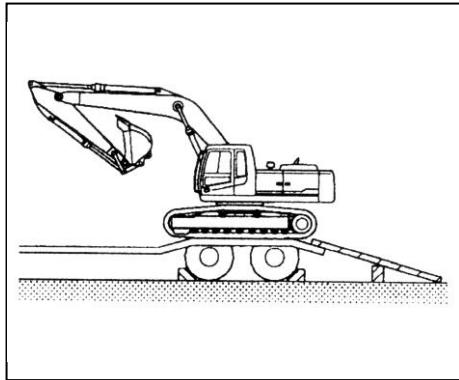
- 1) Loading and unloading of machine on flat ground.



2) Use a springboard which accord with the requirements in the aspects of length, width, thickness and inclination.

3) Before towing the machine to the flatbed of the trailer, you should confirm whether the center lines of machine and the trailer are parallel.

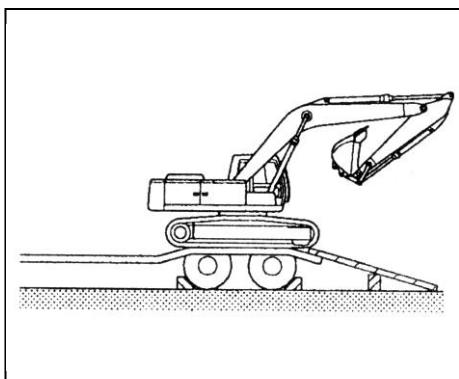
When loading the vehicle, you should place the traveling motor at the rear of the machine, and when unloading the vehicle, you should place the traveling motor at the front of the machine.



4) After the machine is towed onto the trailer, perform the following operations:

(1) When the machine reaches the horizontal position of trailer's rear wheels, stop the moving of the machine.

(2) Rotate the machine by 180°.



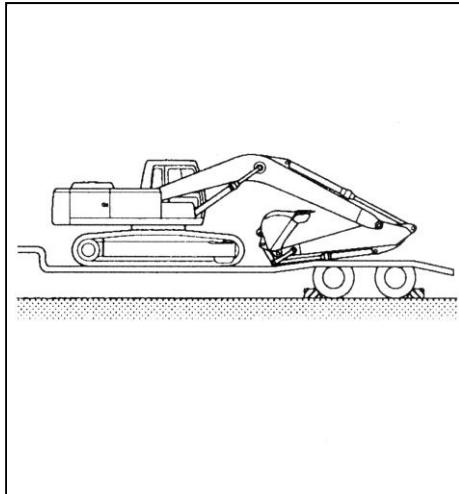
(3) When correctly in place, then slowly lower the operating device.

★ When loading / unloading, you should turn the Auto Speed Reduction switch to OFF position. If the Auto Speed Reduction switch is still at ON position, the machine will move suddenly.

★ When loading the machine onto trailer or unloading it from the trailer, you should slowly move the machine. Do not operate the traveling speed selection switch.

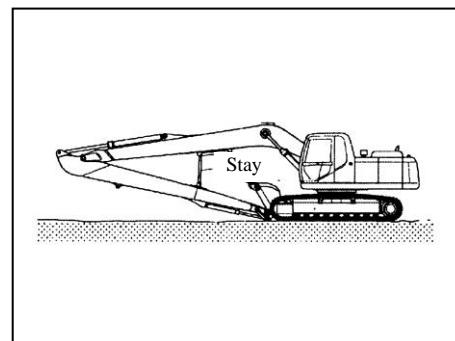
★ Run the engine at low speed and set it at the low speed state. When loading/unloading, you should slowly operate the machine.

★ During auto warming operation, do not load/unload the machine. If during the loading/unloading, you cancel the auto warming operation, then the speed will change suddenly.



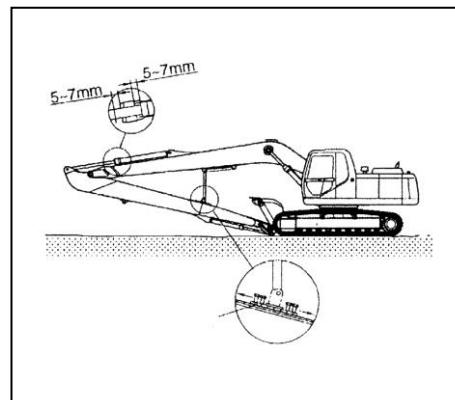
- ★ When loading/unloading the machine, you should select solid, smooth ground. Keep the road edges at a distance.
- ★ Use a rampway having sufficient width, length, thickness and strength, and having a Maximum loading/unloading slope of 15° . When using earth slope, you should completely solidly press the piled-up earth and adopt measures to prevent from slope face collapsed.
- ★ In order to prevent the machine from slipping on the slope, you should clear all mud and dirt from the track before operation. Ensure the road surface to be clean, without water, snow, ice, lubrication grease or oil.
- ★ Do not correct the rotation direction on the rampway, otherwise the machine will risk for turning-over. If the turning is a must, you should drive the vehicle out of rampway and correct the direction, then enter the rampway again.
- ★ Do not use working device to perform loading/unloading operation, because this is dangerous.
- ★ Do not operate any other control levers except the traveling control lever.
- ★ At the junction of rampway and the trailer, the center of gravity for the machine will change suddenly, thus risking for the loss of machine balance. Therefore, when crossing this position, it is necessary to travel slowly.
- ★ When rotating the upper structure on the trailer, the trailer is not stable. Therefore, you should withdraw the working device and slowly rotate.

▲ For the machine with long arm working device, you should use stay bar to fix the movable arm and bucket rod during transportation.



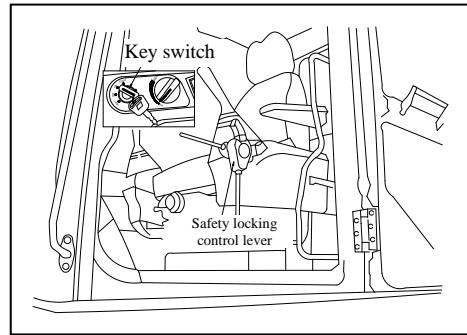
5) Fixing method for stay bar support

- (1) Stretch the bucket rod cylinder to the Maximum position.
- (2) On piston, make a mark at a place 5-7mm away from the cylinder liner.
- (3) Retract the bucket rod cylinder to the mark position.
- (4) Adjust the stay bar support and fix it at the correct position.

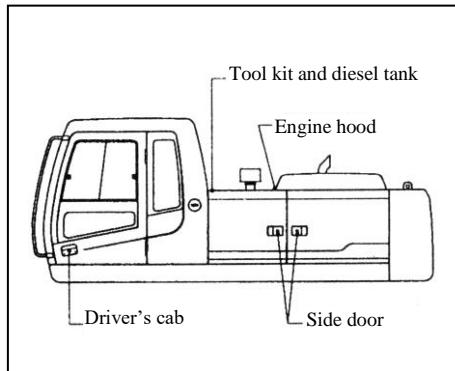


4. Fixing of machine

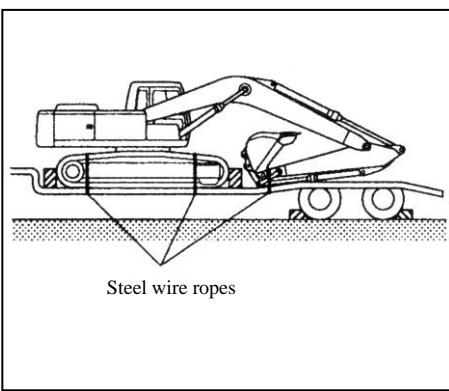
- 1) Lower the working device onto the loading flatbed of trailer.
- 2) Place the Safety Locking control lever to LOCKING position.
- 3) Turn off all switches, and take away the key.



- 4) Lock all locks.

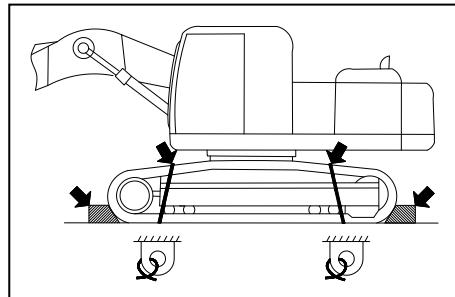


- 5) Place chocks below the tracks, and use steel wire ropes to fix the machine to prevent it from moving forward, backward, leftward or rightward.



5. Anchoring

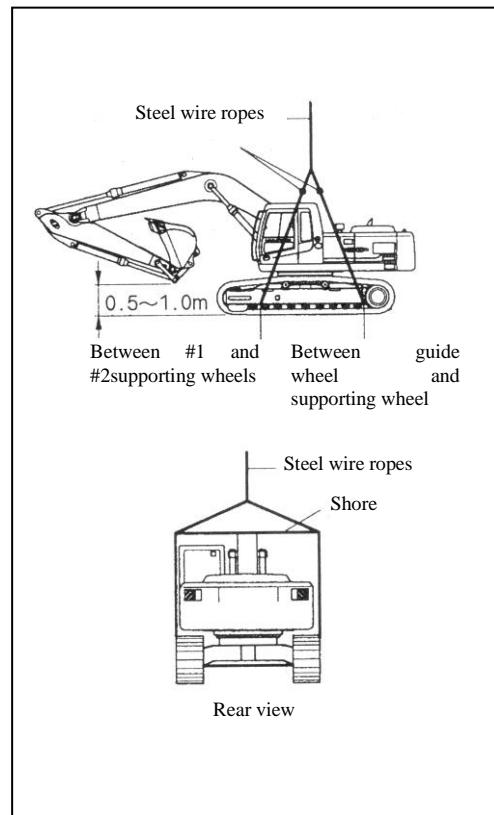
- 1) Place blocks below both ends of the track to prevent the machine from moving during transportation, and use iron chains or steel wire ropes to fasten the machine securely.
- 2) Pay special attention to fastening the machine securely, making it not sliding towards to side.



6. Loading/unloading the machine using crane

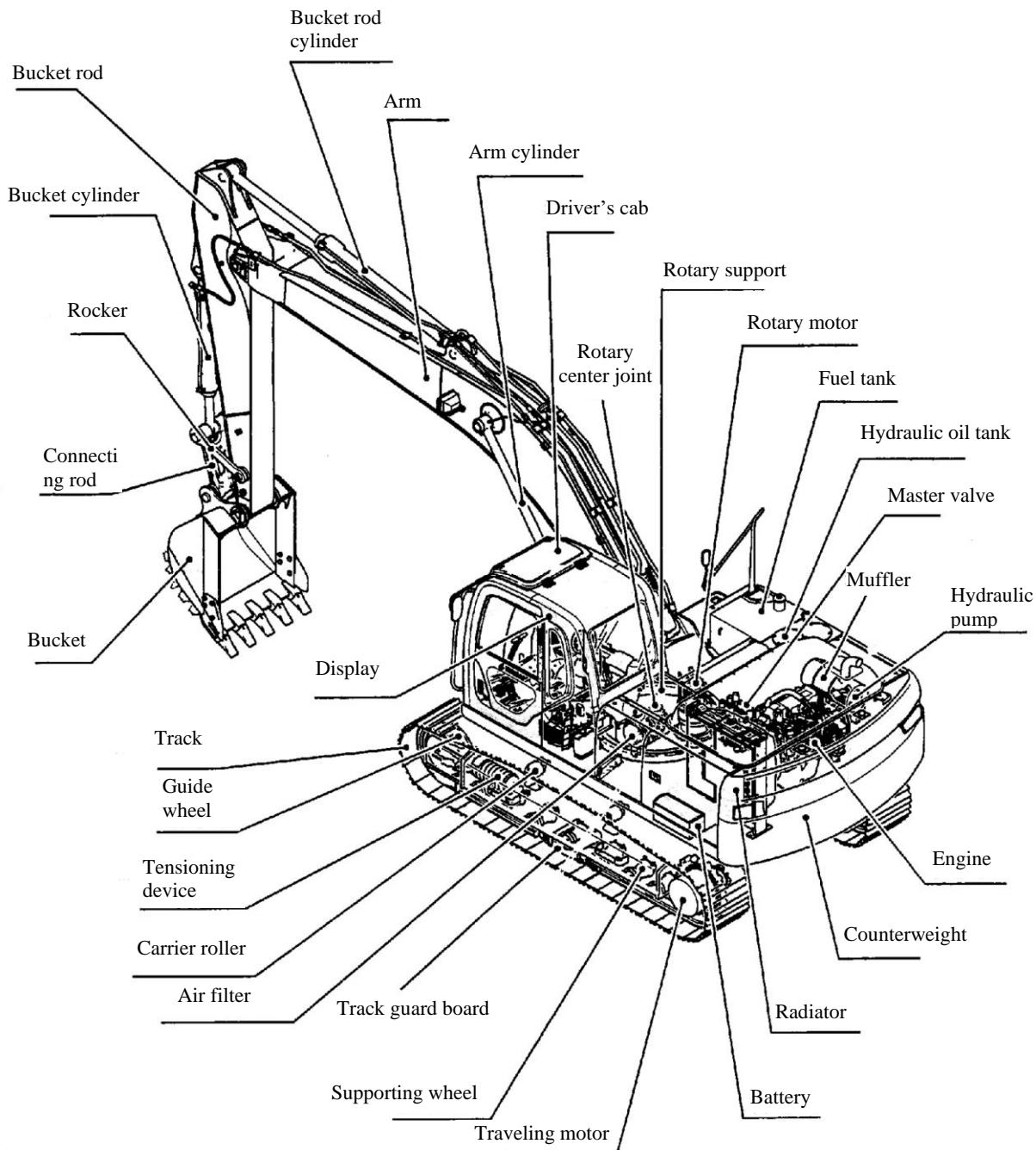
- 1) When you want to lift the machine, first check the width, length, height of the machine according to the requirements in Section 2 "Size and weight".
- 2) Select long steel wire ropes and the shore to make the ropes keep a distance from the machine to prevent from damaging the machine.
- 3) Place a rubber chock between the steel wire ropes and machine to prevent from damaging the machine.
- 4) Place the crane to the correct position.
- 5) Install the steel wire ropes as per requirements shown in the figure on the right.

- ⚠ Confirm whether the size of steel wire ropes is suitable.**
- ⚠ Place the safety locking control lever to the LOCKING position to prevent the machine from moving during lifting.**
- ⚠ Wrong lifting mode or steel wire ropes installation may cause the machine to move.**
- ⚠ Wrong lifting mode or steel wire ropes installation may cause damage the machine.**
- ⚠ Avoid the sudden lifting of the machine.**
- ⚠ No persons shall be allowed to stand in the loading/unloading areas.**

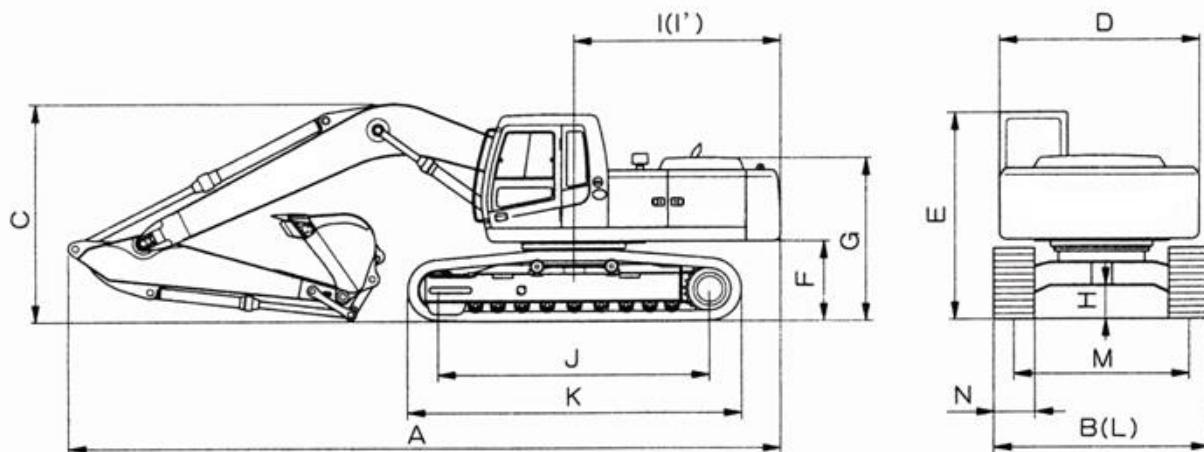


Chapter V Parameters of Machine

1. Main components

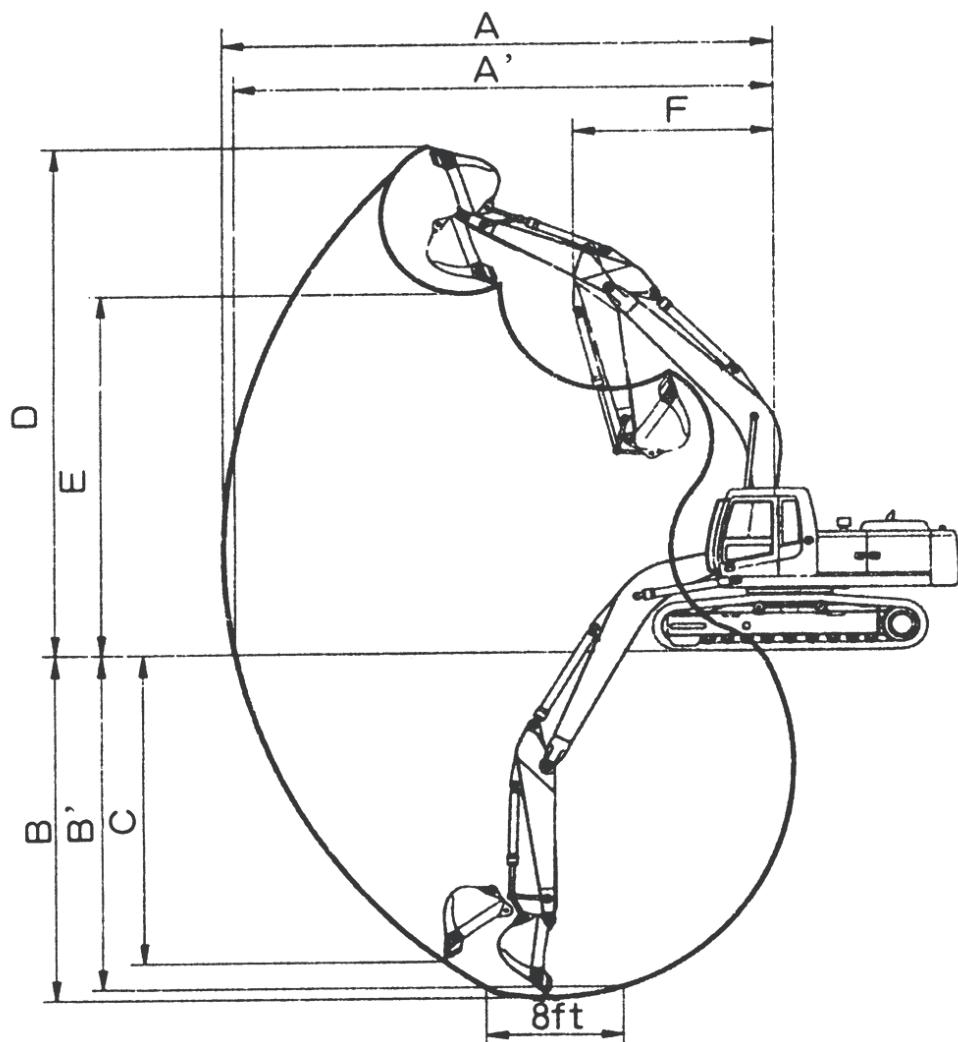


2. Technical specification



Designation	Unit	Technical specification	
		ZG336LC-9C	
Operation weight	Kg	34000	
Power	KW/rpm	241/2000	
Standard bucket capacity	m ³	1.7	
Total length	A mm	10806	
Total width(600mm Track)	B mm	3280	
Total height	C mm	3546	
Turntable width	D mm	3060	
Cab height from the ground	E mm	3145	
Counterweight clearance above ground	F mm	1193	
Engine hood height	G mm	2640	
Min. Distance above Ground (mm):	H mm	471	
Turntable tail end length	I mm	3325	
Tail end turning radius	I' mm	3370	
Track axle distance	J mm	4030	
Chassis length	K mm	4950	
Chassis weight	L mm	3280	
Track gauge	M mm	2680	
Standard track width	N mm	600	
Maximum tractive force	KN	273	
Traveling speed (H/L)	Km/hr	5.1/3.1	
Rotary speed	rpm	10.0	
Grade ability	Degree(%)	35 (70%)	
Ground specific pressure	Kgf/cm ²	0.631	

Operation Scope



Classification		ZG3365LC-9C	
		2.65m Bucket rod (Standard)	
Maximum digging radius	A	10233 mm	
Maximum digging radius on ground	A'	10028 mm	
Maximum digging depth	B	6536mm	
Maximum digging depth on ground (2438mm horizontal)	B'	6331 mm	
Maximum vertical digging depth	C	4758 mm	
Maximum digging height	D	9617 mm	
Maximum unloading height	E	6666 mm	
Min. rotary radius	F	4256 mm	
Bucket digging force	ISO	225 KN	
Bucket rod digging force	ISO	182 KN	

3. Main component performance parameters

Component	Item	Unit	ZG3365LC-9C	
Engine	Model		Cummins 6LTAA8.9-C325	
	Type		In-line, 6-cylinders, 4-stroke,Turbocharging	
	Discharge		China Off-road , Phase II	
	Cooling mode		Water cooling	
	Ignition order		1-5-3-6-2-4	
	Cylinder diameter × stroke	mm	114×145	
	Cylinder displacement	L	8.9	
	Compression ratio		16.6: 1	
	Rated power		241KW@2100rpm	
	Net power		-	
	Max. torque (1400rpm)	N.m	1400	
	Engine oil capacity	L	27.6	
	Net weight of diesel engine (kg)	Kg	650	
	Maximum no load speed	r/min	2000	
	Minimum no load speed	r/min	800	
	Rated fuel consumption rate	g/KW.h	217	
	Starter		24V-8.5kW	
	Generator		24V-70A	
Hydraulic system:	Primary pump		Duplex variable piston pump	
	Maximum system flow	L/min	2x266	
	Master overflow valve	Setting press force	MPa	34.3
		Instant pressure rise	MPa	36.3
	Setting pressure for outlet safety valve	Movable arm big cavity/small cavity	MPa	39
		Bucket rod big cavity/small cavity	MPa	39
		Bucket big cavity/small cavity	MPa	39
	Setting pressure of rotary motor overflow valve	MPa	29.5	
	Setting pressure of traveling motor	MPa	34.3	
	Pilot pump		Gear pump	
	Pilot circuit	MPa	3.9	
	Movable arm cylinder	Cylinder diameter × rod diameter × travel	mm	Φ140xΦ100x1480
		Buffer		Only for the extension
	Bucket rod cylinder	Cylinder diameter × rod diameter × travel	mm	Φ160xΦ110x1748
		Buffer		When extending and retracting
	Bucket cylinder	Cylinder diameter × rod diameter × travel	mm	Φ140xΦ100x1285
		Buffer		Only for the extension

★ The color of cylinder piston rod may change because of the friction of piston rod surface.

★ The color of piston rod surface cannot influence the cylinder performance.

Component	Item	Unit	ZG3365LC-9C
Working device	Movable arm (standard configuration)	mm	6200
	Bucket rod (standard configuration)	mm	2650
Traveling device	Track shoe width	mm	600
	Track assy	Piece	2
	Number of track shoe (per piece)		48
	Track tensioning device	PCS	2
	Drive wheel	PCS	2
	Guide wheel assy	PCS	2
	Supporting wheel		9 pieces at each side
Electric system	Carrier roller		2 pieces at each side
	System voltage	V	24
A/C system	Battery		2x12V
	Refrigerating capacity	W	5000
	Air volume for cooling	m ³ /h	550
	Heating capacity	W	5800
	Air volume for heating	m ³ /h	400
	Voltage	V.DC	24
	Total power consumption	W	≤310
	Compressor oil consumption power	KW	3.02
	Refrigerant		R134a
	Refrigerant injecting volume	g	950±50
	Compressor		10S15L (Denso)
	Refrigeration oil		ND-OIL8 (electric fitting dedicated compressor oil)

★ Choose and purchase of track shoe

Choose and purchase track shoe according to the working conditions in operation.

Methods for Choosing and purchasing of track shoe:

First confirm the category of track shoe in Table 2 according to the working conditions in operation of excavator, and then select the track shoe in Table 1. The wide track (Category B and C) has the limitation in application. Check first the precaution before using wide track, and then confirm whether the use of this track is suitable.

When choosing narrow tracks, you should consider the ground specific pressure. The use of too wide track may cause other problems such as the track shoe bent, the link cracked, the axis pin damaged, the track bolt loosened.

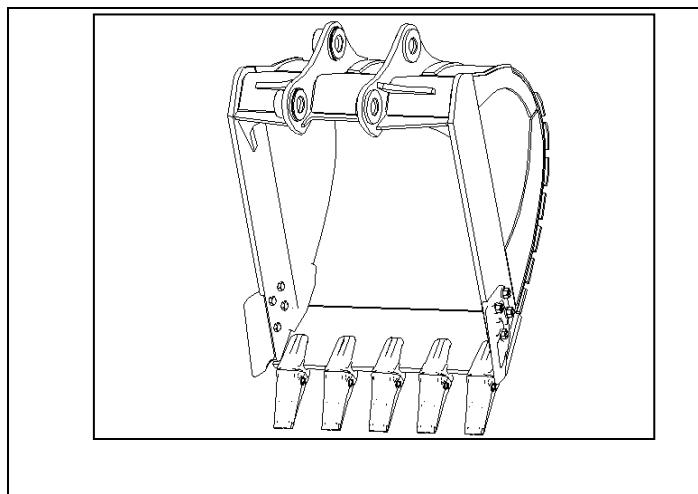
Table 1

Track shoe	Specification	Classification
600mm 3-teeth track shoe	Standard	A
700mm 3-teeth track shoe	Selection	B
800mm 3-teeth track shoe	Selection	C

Table 2

Classification	Working conditions	Matters need attention
A	Stony ground, river bed, and ordinary soil	Travels at low speed on a rough ground with larger obstacles
B	Ordinary soil, Soft ground	This kind of track cannot travel on a stony, rough ground, but only travel at high speed on a flat ground. If the obstacles are inevitable to pass, you should drive at low speed to pass.
C	Extremely soft ground (moor ground)	<ul style="list-style-type: none"> ● Only the working machine can operate in the sinking working conditions, but category A and B tracks cannot. ● This kind of track cannot be chosen for using on a solid, stony ground with larger obstacles such as round cobbles or tree roots. ● If the obstacles are inevitable to pass, you should drive at low speed to pass.

4. Bucket choose guide



Bucket choose guide

Bucket type	Bucket capacity m^3	Bucket width mm	Weight Kg	Bucket teeth EA	ZG3365LC-9C
					6.2m arm 600mm track shoe, 6400Kg counterweight
					2.65m stick (standard)
Directly install the bucket	Reinforced bucket	/	/	/	/
	★Stone bucket	1.7	1612 (including the lateral tooth)	1567	5

★ Standard bucket

Material density: Kg/m³

C:0~1800D: 1900~ X: not Recommended

Chapter VI Maintenance

1. Note:

1) Maintenance period

- (1) The maintenance must be performed according to the working hours shown on the Dashboard and as per the regulations specified on Page 120.
 - (2) Appropriately shorten the time interval of inspection and maintenance (e.g., dust, quarrying, marine rocks etc).
 - (3) When the maintenance interval is upgraded, it is necessary to perform a complete inspection and maintenance.
- For example, perform the maintenance for 1000h, and meanwhile perform the complete maintenance (500h, 250h and daily maintenance).

2) Safety Precautions

- (1) The maintenance work cannot be started unless you are thoroughly familiar with the machine.
- (2) The monitor installed on the machine not always guarantee the machine's working conditions, so you must conduct the daily inspection according to the maintenance content specified in this Chapter.
- (3) The engine and hydraulic parts have been well adjusted in the factory. The laymen never fiddle with them.
- (4) Consult the host National machinery / heavy industrial authorized distributor or the sales service center if you have any doubts.
- (5) Put the used oil and refrigerant into the container, and dispose them as per the regulations for industrial waste liquids specified in individual countries and various regions.

3) Correct maintenance

(1) Replacement and maintenance of parts

The quick-wear parts and consumable parts must be frequently replaced, e.g., bucket teeth, side blade, filter element etc.

The timely replacement of damaged parts and worn parts can guarantee the operating performance of the machine.

(2) Use genuine accessories.

(3) Use the recommended oils

(4) Apply the parking brake.

(5) Before oiling, remove the dust and accumulated water around the oil filler.

(6) Drain the oil when the oil is warm.

(7) Do not perform any maintenance work when the machine is running.

(8) Before repairing the hydraulic system, first screw off the dust cover of air filter after cooling and press the manual exhaust unit to release the pressure in hydraulic system.

(9) After finishing the maintenance work, keeps each instrument working normally.

(10) For more details about the maintenance, you can consult the host National machinery / heavy industrial authorized distributor or the sales service center.

★ Pay special attention to that the maintenance work cannot be started unless you are thoroughly familiar with "Safety Instructions" in Chapter I.

4) Release of hydraulic system pressure

★ Once the machine is started, the machine and hydraulic oil are in high pressure state.

If, at this moment, loosen the cover or pipe, the oil will splash out to cause damage or injury.

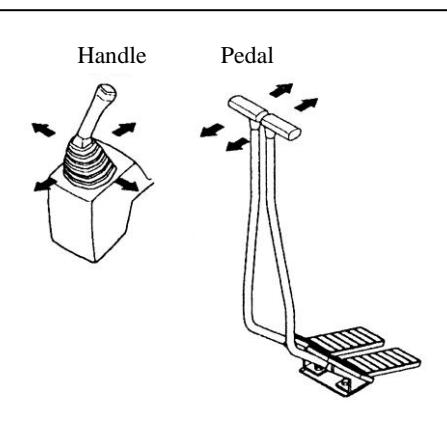
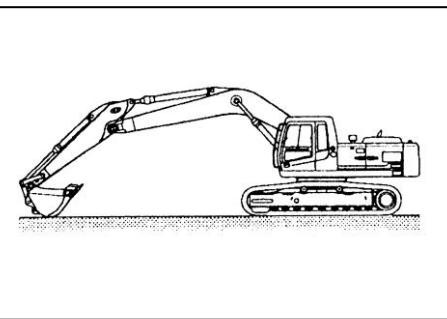
Before service of machine, confirm that the hydraulic system oil pressure has been released.

(1) Place the machine at the PARKING location, and turn off the engine.

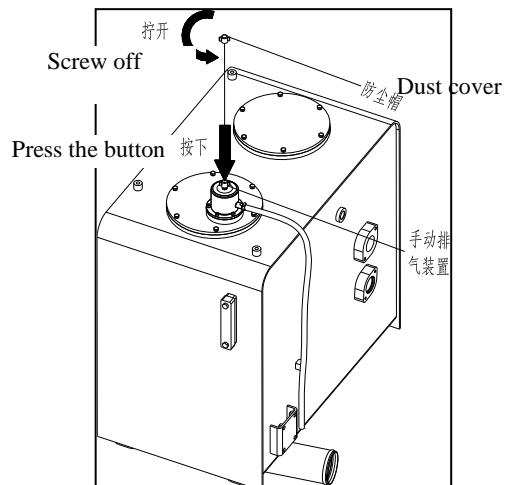
(2) Place the starting key switch to “ON” position, and the safety locking control lever to operating state position.

(3) Operate the pilot handle and pedal forward, backward, leftward, rightward several times to release the control system pressure.

★ The pressure cannot be completely release by conducting these actions, so when servicing hydraulic components and parts, it is necessary to slowly loosen the joint, with persons leaving a little distance to prevent from the injury by splashing oil.



(4) Screw off the dust cover, and press manual exhaust device to release the pressure in oil draining tank.



5) Safety precautions for installing oil pipe

(1) Drive very carefully not to damage the oil pipe joint and functional parts to prevent from pollution.

(2) Before assembling, first wash the oil pipe and joint etc.

(3) Use genuine accessories.

(4) When installing the oil pipe, you should avoid the distortion or too small turning radius.

(5) Tighten it as per the specified torque.

6) Regularly replace the parts related to safety

- (1) In order to ensure the machine safety and operation life, it is necessary to regularly conduct the maintenance for the machine. Moreover, the required regular replacement of the parts related to safety is not only related with safety, but also related with the keeping good working state.
- (2) With the machine operation and time elapse, the quality of these parts will be weakening, the wear and fatigue will occur, thus possibly injuring the human life and damaging property.
- (3) Even if these parts have abnormalities before the recommended replacement period, they must be repaired or replaced timely.

Replacement interval for safety parts		Interval
Engine	Fuel pipe	Every 2 years or 4000 working hours, whichever comes first
Hydraulic system	High pressure pipe	
AC system	High pressure refrigerant pipe and air conditioning water pipe	
Seat	Safety belt	Every 3 years

- ★ 1. When replacing the oil pipe, you should also replace O-ring and gasket at the same time.
- 2. When checking and replacing oil pipe, the cracked hoop should be immediately replaced if any.

2. Tightening torque

The unlabeled tightening torque shall be determined as per the following table:

1) Bolt and nut

Bolt size (Coarse thread)	Level 8.8		Bolt size (Fine thread)	Level 8.8	
	N·m	N·m		kgf·m	kgf·m
M6×1.0	-	-			
M8×1.25	20	30	M8×1.0	2.2~3.4	3.0~4.4
M10×1.5	49	65	M10×1.0	4.5~6.7	5.9~8.9
M12×1.75	88	110	M12×1.25	7.8~11.6	10.6~16.0
M14×2.0	137	190	M14×1.5	13.3~18.1	17.9~24.1
M16×2.0	205	280	M16×1.5	19.9~26.9	26.6~36.0
M18×2.0	295	400	M18×1.5	28.6~43.6	38.4~52.0
M20×2.5	390	570	M20×1.5	40.0~54.0	53.4~72.2
M22×2.5	540	760	M22×1.5	52.7~71.3	70.7~95.7
M24×3.0	690	960	M24×2.0	67.9~91.9	90.9~123
M30×3.0	1420	1940	M30×2.0	137~185	182~248
M36×4.0	2400	3260	M36×3.0	192~260	262~354
			M42×3.0		330~430

2) Transition joint (at oil filler end)

Thread specification (Light series)	Opposite side size (mm)	Recommended torque value (N·m)	Thread specification (Heavy series)	Opposite side size (mm)	Recommended torque value (N·m)
M10×1	14	18	M27×2	41	180
M14×1.5	19	45	M33×2	50	310
M16×1.5	22	55	M42×2	55	450
M18×1.5	24	70	G1/2	27	90
M22×1.5	27	125	G3/4	32	170
M24×1.5	30	-	G1	41	225
M26×1.5	32	180			
M33×2	41	310			
M42×2	50	450			
G1/8	14	15			
G1/4	19	35			
G3/8	22	74	Torque requirements on port joint for Aluminum parts		
G1/2	27	90	G1/4	19	16
G3/4	32	170	G3/8	22	34
G1	41	225	G1/2	27	53

3) Rubber tube (24° cone, metric system swivel nut)

Nut specification (Light series)	Opposite side size	min-max	Nut specification (Heavy series)	Opposite side size	min-max
	(mm)	(N·m)		(mm)	(N·m)
M14×1.5	17	16	M18×1.5	22	53
M16×1.5	19	26	M20×1.5	24	-
M18×1.5	22	37	M22×1.5	27	79
M22×1.5	27	47	M24×1.5	30	84
M26×1.5	32	89	M30×2	36	126
M30×2	36	116	M36×2	46	179
M36×2	41	137	M42×2	50	263
M45×2	50	226	M52×2	60	368

4) Tightening torque for major components

S/N	Contents		Thread	Torque N·m
1	Engine	Engine fixing bolt (at flywheel end)	M24×2.5	950
2		Engine fixing bolt (at fan end)	M16×2.0	270
3		Radiator fixing bolt and nut	M12×1.75	115
4		Coupling fixing bolt	M20×2.5	570
5		Coupling tightening screw	M20×2.5	200
6		Fixing bolt for master cylinder shell	M10×1.5	65
5	hydraulic pressure System	Fixing bolt for main valve	M20×2.5	570
6		Control valve fixing bolt	M16×2.0	280
7		Fuel tank fixing bolt	M20×2.5	570
8		Hydraulic oil tank fixing bolt	M20×2.5	570
9		Fixing bolt for rotary joint	M12×1.75	115
10	Drive System	Fixing bolt for rotary motor	M24×3.0	940
11		Fixing bolt for rotary support upper portion	M24×3.0	940
12		Fixing bolt for rotary support lower portion	M24×3.0	940
13		Fixing bolt for traveling motor	M24×2	820
14		Fixing bolt for drive wheel	M24×2	820
15	Chassis	Carrier roller fixing bolt, nut	M16×2.0	280
16		Supporting wheel fixing bolt	M20×2.5	545
17		Track tensioning cylinder fixing bolt	M16×1.5	280
18		Track slice fixing bolt, nut	M22×1.5	500×120°
19		Track guide rail fixing bolt	M20×2.5	570
20	Others	Fixing bolt for Counterweight	M36×3.0	3260
21		Cab fixing bolt	M16×2.0	280
22		Silicone oil damper fixing bolt	M10×1.5	65

Notes: For the tightening torques of engine and other components, for the details, refer to the related regulations for engine servicing.

3. Technical specifications for fuel, coolant and lubrication oil

1) New machine

In normal temperature areas (-20°C ~ 40°C), new machine shall use and inject with following oils:

Contents	Technical specification
Engine oil	SAE 15W-40(Above API CI-4)
Hydraulic oil	Caltex Rando HD 46(solid particle pollution degree:18/15)
Gear oil	SAE 85W-140(API GL-5)
Lubrication grease	Complex Lithium-based lubrication grease NLGI 2
Fuel	GB19147light diesel0(or10)
Coolant	Fleetguard Compleat™ -37°
Refrigerant	HFC-134a
Refrigeration oil	Denso ND 8

In extremely cold areas (-40°C ~ 40°C), new machine shall use and inject with following oils:

Contents	Technical specification
Engine oil	SAE 5W-40(API CJ-4)
Hydraulic oil	Caltex Rando MV 46
Gear oil	SAE 75W-90(API GL-5)
Lubrication grease	Chevron Ulti-Plex Synthetic Grease EP
Fuel	GB19147light diesel-35(or-50)
Coolant	Fleetguard Compleat™ -45° pre-mixed liquid
Refrigerant	HFC-134a
Refrigeration oil	Denso ND 8

SAE: Society of Automotive Engineers

NLGI: National Lubricating Grease Institute

ISO: International Standard Organization

API: American Petroleum Institute

2) Recommended lubrication oil

It is only possible to use following oils or its equivalent varieties.

Do not mix using different trade marks of oils.

Application	Classification	Environment Temperature °C(°F)									
		-40 (-40)	-30 (-22)	-20 (-4)	-10 (14)	0 (32)	10 (50)	20 (68)	30 (86)	40 (104)	
Engine oil pan	Engine oil										SAE 15W-40
											SAE 5W-40
Rotary motor	lubrication grease										Multifak EP 2
Rotary support											
Grease nipple											Chevron Ulti-Plex Synthetic Grease EP
Rotary motor	Gear oil										SAE 85W-140
Traveling motor											SAE 80W-90
											SAE 75W-90
Hydraulic oil tank	Hydraulic oil										Rando HD 46
											Rando MV 46
Fuel tank	GB19147 车用柴油										0 OR 10
											-10 OR -20
											-35
											-50
Radiator	Mixing with ant freezing agent 1:1										Fleetguard Compleat™ -37°
Engine body											Fleetguard Compleat™ -45°

SAE: Society of Automotive Engineers

NLGI: National Lubricating Grease Institute

ISO: International Standard Organization

API: American petroleum Institute

4. Maintenance checklist

1) Maintenance before starting everyday

Inspection items	Maintenance	Page
Diesel oil level	check,fill	124
Hydraulic oil level	check,fill	127
Engine oil	check,fill	118
Coolant level	check,fill	119
Oil-water seperator	check,discharge,replace	124
Fan,A/C compressor belt	Check,tension,	122、125
Dashboard and indicator	check	136
Woking device/pin shaft lubrication point	check,fill	134
bucket tooth	check,fasten,replace	133
System leakage	check	

2) Maintenance needed to be done every other 50 hours

Inspection items	Maintenance	Page
Fuel Filtration Screen for Diesel Tank	check,clean	124
Water and Impurities at the Bottom of Diesel Tank	check,discharge,clean	124
Track tensioner	check,fill,discharge	131

3) The maintenance of new machine within initial 100 hours

Inspection items	Maintenance	Page
Installation bolts for driving wheels, supporting wheels and supporting sprockets	check,fasten,change	
Engine Installation Bolts	check,fasten,change	
Installation bolts for slewing bearings and rotary motors	check,fasten,change	
Cab, counterweight mounting bolts	check,fasten,change	
Main Pump Installation Bolt	check,fasten,change	
Installation bolts in other key parts	check,fasten,change	

4) Maintenance needed to be done every other 250 hours

Inspection items	Maintenance	Page
Air conditioning filter element (inside and outside)	check, clean,change	140
Refrigerant in air conditioning system	check,fill	141
Rotary bearing raceway grease	check,fill	130
Radiator, Condenser Radiator	check,clean	122
Air filter filter element (inside and outside)	check,clean,change	123

5) New machine maintenance for the first 50 hours

Inspection items	Maintenance	Page
Engine oil	change	118
Engine oil filter	change	118

★The above items are only applicable to new machines and will be maintained at regular intervals in the future.

6) New machine maintenance for the first 250 hours

Inspection items	Maintenance	Page
Rotary motor gear oil	change	129
Gear oil for walking motor	change	130
Hydraulic oil return filter	change	128
Hydraulic pilot filter	change	129

★The above items are only applicable to new machines and will be maintained at regular intervals in the future.

7) Maintenance at 500 hours intervals

Inspection items	Maintenance	Page
Engine oil	change	118
Engine oil filter	change	118
Oil-water separator filter	change	124
Diesel filter	change	125
Rotary motor grease	check,fill	129
Rotary bearing ring grease	check,fill	130
Hydraulic air filter element	change	128
Radiator, Condenser Radiator	check,clean	122
★ Air filter element (inside and outside)	change	123

★ When the filter element of the engine air filter is blocked and the alarm is alarmed, the outer filter element must be cleaned.

The outer filter element can be disassembled and cleaned up at most 6 times. The inner filter element is not allowed to be cleaned up. The filter element must be replaced at the same time every 500 hours.

8) Maintenance at 1000 hours intervals

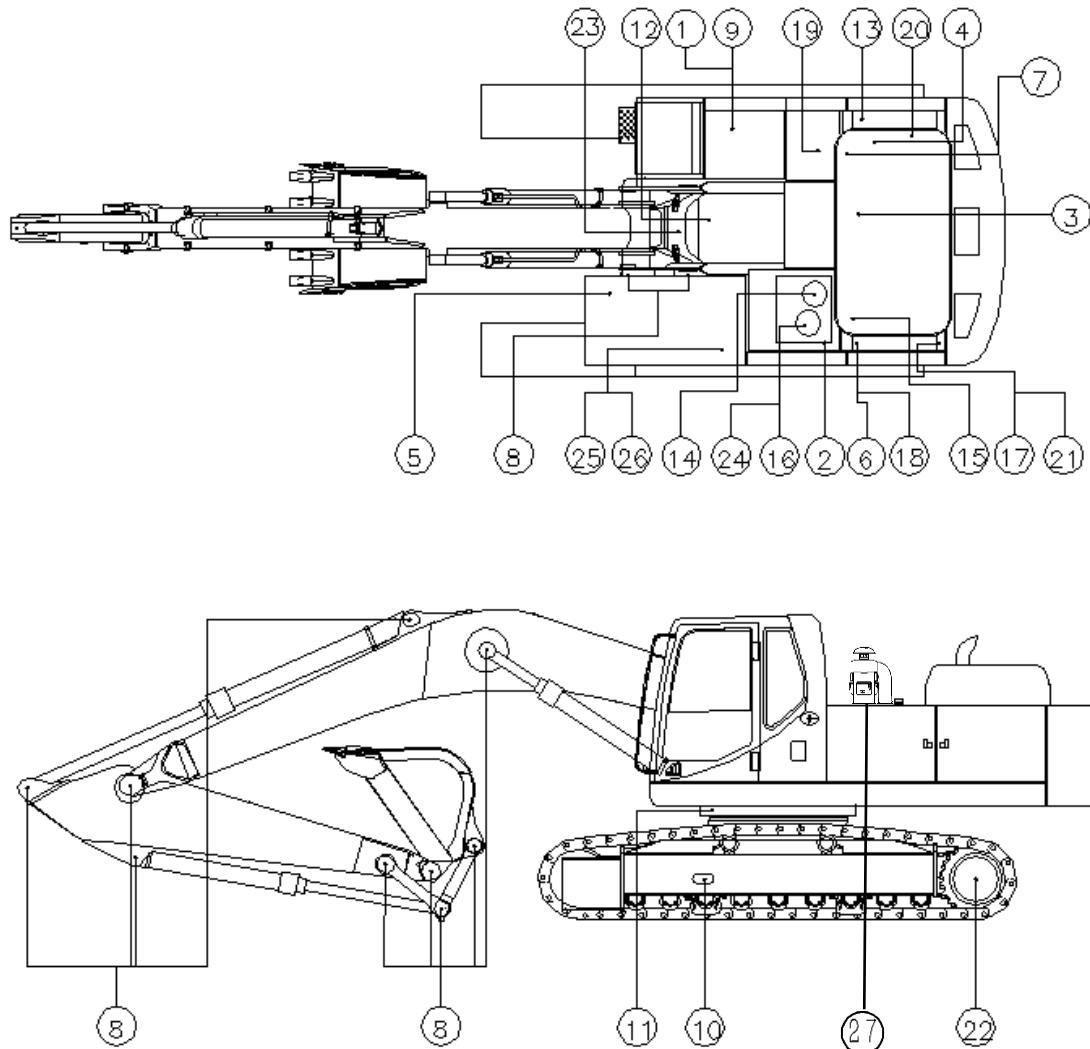
Inspection items	Maintenance	Page
Rotary motor gear oil	change	129
Gear oil for walking motor	change	131
Hydraulic oil return filter	change	128
Hydraulic pilot filter	change	129
Diesel tank	chek,discharge,clean	124

9) Maintenance at 2000 hours intervals

Inspection items	Maintenance	Page
★Hydraulic oil	change	127
coolant	change	120
Hydraulic oil-absorbing filter	change	128

★ Hydraulic oil must be replaced after 600 hours of continuous use of hydraulic crusher.

5. Maintenance chart



Caution:

1. The maintenance interval depends on the reading from working hour meter.
2. Each number represents the lubrication points on the machine.
3. Shutoff the machine when oiling, and avoid the naked flame.
4. For other details, for the details, refer to this manual.

Daily maintenance and inspection:

Maintenance interval	S/N	Item	Contents	Symbol	Capacity (L)	Remarks
10h or everyday	1	Diesel level	Check and fill	DF	600	
	2	Hydraulic oil (system)	Check and fill	HO	430	
	3	Engine oil	Check and fill	EO	31.6	
	4	Coolant level	Check and fill	C	27	
	5	Dashboard and indicator lamps	Check			
	6	Oil-water separator	check, discharge, replace			
	7	Fan, A/C compressor belt	Check, tension.			
	8	Working device/pin shaft lubrication	check	PGL		16 处
		Bucket tooth	check, fill			
		System leakage	check, fasten, replace			
Every 50 hours or every week (when necessary)	9	Fuel Filtration Screen for Diesel Tank	check, clean			
	9	Water and Impurities at the Bottom of Diesel Tank	check, discharge, clean			
	10	Track tensioner	check, fill, discharge	PGL		
	27	Oil level of oil bath prefilter	Check ,fill	EO	3.8	
	27	Clasp of oil bath prefilter	Check, fasten			
Every 100 hours or every week (when necessary)		Installation bolts for driving wheels, supporting wheels and supporting sprockets	check, fasten, change			
		Engine Installation Bolts	check, fasten, change			
		Installation bolts for slewing bearings and rotary motors	check, fasten, change			
		Cab, counterweight mounting bolts	check, fasten, change			
		Main Pump Installation Bolt	check, fasten, change			
		Installation bolts in other key parts	check, fasten, change			
Every other 250 hours	25\26	Air conditioning filter element (inside and outside)	check, clean, change			
		Refrigerant in air conditioning system	check, fill			
	11	Rotary bearing raceway grease	check, fill	PGL		3 处
	20	Radiator, Condenser Radiator	check, clean			
	19	Air filter element (inside and outside)	check, clean, change			
		Oil of oil bath prefilter	Check ,clean, recharge	EO	3.8	
		Filter of oil bath prefilter	Check, clean			

注: DF: Diesel oil GO: Gear oil HO: Hydraulic oil C: Coolant PGL: Grease EO: Engine oil

Periodicity maintenance and inspection:

Maintenance interval	S/N	Item	Contents	Symbol	Capacity (L)	Remarks
New vehicle 50h	3	Engine oil	change	EO	31.6	
	17	Engine oil filter	change			
New machine maintenance for the first 50 hours	12	Rotary motor gear oil	change	GO	10.5	
	22	Gear oil for walking motor	change	GO	6×2	
	14	Hydraulic oil return filter	change			
	15	Hydraulic pilot filter	change			
	11	Rotary bearing ring grease	check, fill	PGL		3 处
Maintenance at 500 hours intervals	3	Engine oil	change	EO	31.6	
	17	Engine oil filter	change			
	6	Oil-water separator filter	change			
	18	Diesel fine filter	change			
	19	Air filter element (inside and outside)	change			
	16	Hydraulic air filter element	change			
	12	Rotary motor grease	check,fill	PGL	3.7	
	23	Rotary bearing ring grease	check,fill	PGL	42.6	
	20	Radiator, Condenser Radiator	check,clean			
	21	Coolant filter	Recharge			
	24、26	Air conditioning filter (inside and outside)	check,clean			
		Oil of oil bath prefilter	Recharge			
		Filter of oil bath prefilter	check,clean			
Maintenance at 1000 hours intervals	22	Gear oil for walking motor	change	GO	6×2	
	12	Rotary motor gear oil	change	GO	10.5	
	14	Hydraulic oil return filter	change			
	15	Hydraulic pilot filter	change			
	9	Diesel tank	check,clean,change			
Maintenance at 2000 hours intervals	2	Hydraulic oil	change	HO	430	600 hours of continuous use of hydraulic crusher
	24	Hydraulic oil-absorbing filter	change			
	4	coolant	change	C	27	Or maintenance at 1 years intervals
250 hours of continuous use of hydraulic crusher	14	Hydraulic oil return filter	change			
	15	Hydraulic pilot filter	change			
	16	Hydraulic air filter element	change			

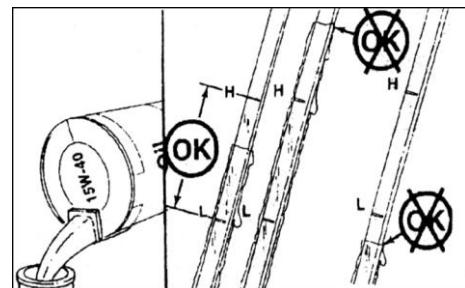
Note: DF: Diesel oil GO: Gear oil HO: Hydraulic oil C: Coolant PGL: Grease EO: Engine oil

6. Overhauling description

1) Check the engine oil level.

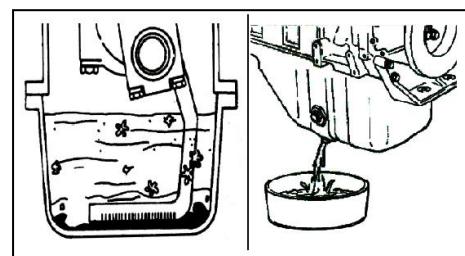
With machine placed on flat ground, check the engine oil level before driving.

- (1) Take a dipstick and use clean cloth to wipe out.
 - (2) Completely insert the dipstick into the dipstick hole, and then take it out again to check.
 - (3) If the level is too low, add oil and check again.
- ★ If the engine oil is polluted or diluted , replace the oil regardless of the oil change interval.
- ★ The dipstick shall be checked 5 minutes after stopping machine.
- ▲ If the engine oil level is wrong, do not start the engine.



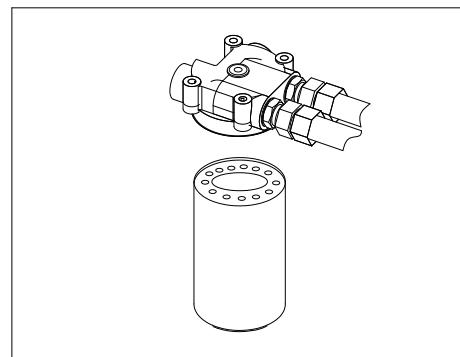
2) Replacement of engine oil and filter element

- (1) Run the engine until the water temperature reaches up to 60°.
 - (2) Turn off the engine.
 - (3) Drain the engine oil using the oil drain adapter delivered together with engine, ensuring that all engine oil and suspending dirt in the engine are eliminated.
- ★ Use a basin with a capacity of 30L to collect the oil.



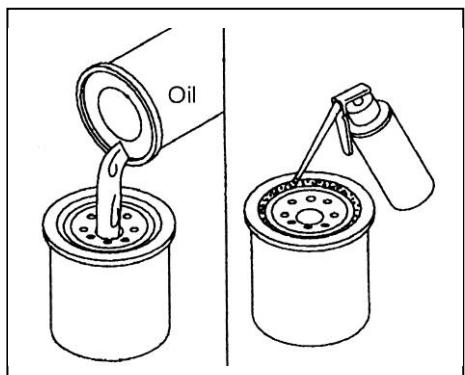
- (3) Clean the upper portion of the filter, and take down the filter and clean the shim surface.

Wrench: use the strip type filter wrench in the on-board tool kit.



- (4) Before installing the filter element, apply a thin layer of engine oil on the shim sealing surface.

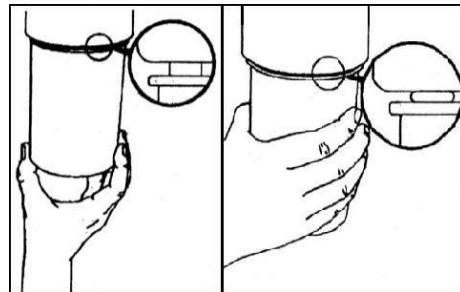
★ Add pure engine oil into filter element.



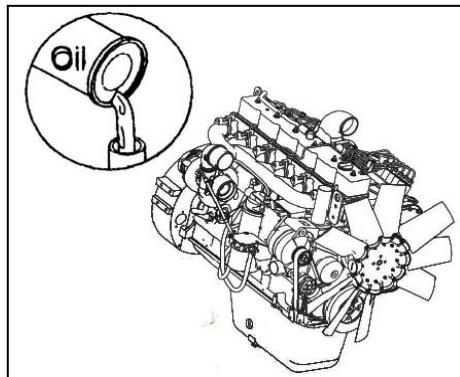
(5) Mount the filter element

★ Too large mechanical tightening force can damage threads or damage the filter element seal.

- Mount the filter element according to the regulations specified by the Manufacturer.



(6) Add pure engine oil into the engine until it reaches a suitable level.



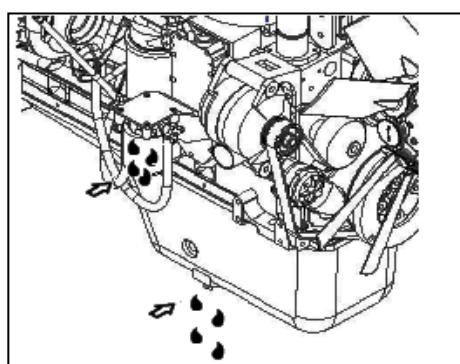
(7) Run the engine at idle speed to check the filter element and the drain plug for oil leakage.

Turn off the engine, and use again the dipstick to check the engine oil level.

Wait for 5 minutes before checking, to let the engine oil return from the upper portion of the engine.

★ Add the engine oil up to the high oil level (H) mark on the oil scale plate.

★ Within 15 minutes after the engine is started, the engine oil pressure must be displayed on the Instrument. If there is no display for the engine oil pressure, immediately stop the engine to avoid the damaging of engine. Confirm whether the oil level in the oil sump is correct.

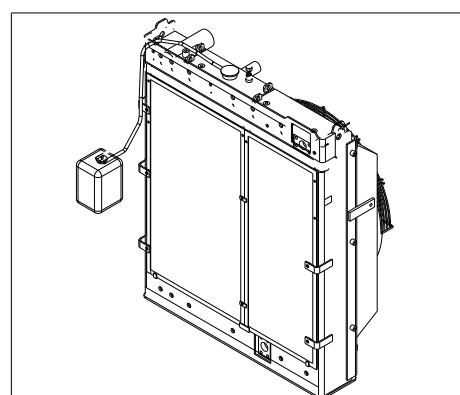
**3) Checking and filling of coolant**

(1) Check whether the oil level in the liquid tank is between "FULL" and "LOW".

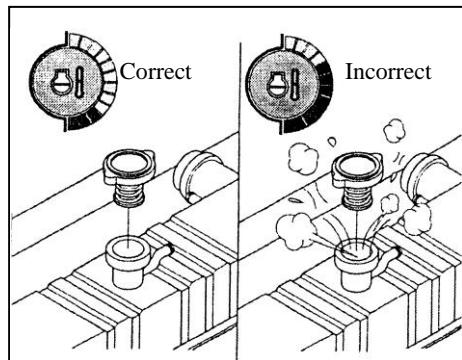
(2) If the coolant is not enough, open the cover of liquid tank and add the mixed liquid of antifreeze and water.

(3) If the coolant in the liquid tank is confirmed to be empty, you should open the cover of radiator to fill.

(4) Replace the radiator shim if it is damaged.



⚠ The opening of radiator cover when the engine is hot may cause coolant to splash, so you should open the cover after cooling of the engine.

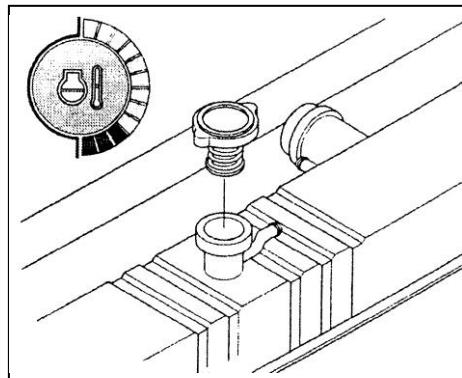


4) Flushing of cooling system and replacement of coolant

(1) The coolant can only be replaced after flushing of radiator system.

⚠ Prevent the skin from repeatedly touching the waste antifreeze, because in this way the skin will be injured or other things damaged.

- Thoroughly rinse once the skin touches the waste antifreeze.
- Prevent children from approaching.

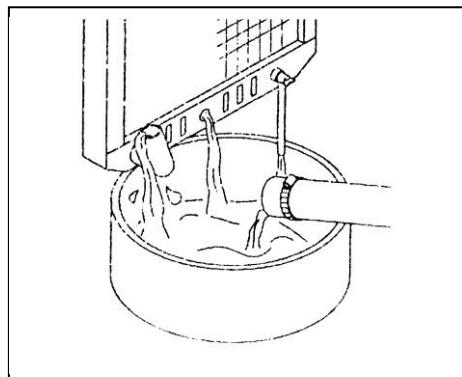


★ Environment protection: The handling of antifreeze shall follow the local related laws and regulations implemented in individual countries and province and municipality. Use the approved waste water treatment facility. Such as the facilities used for treatment of living waste water and automotive wastes. If any doubts, please consult the local related department to appropriately deal with the waste liquids.

⚠ Wait for the temperature to be lower than 50°C, then you can open the tank cover.

Otherwise, the hot coolant may cause to injure your body.

Open the drain valves of radiator and cooler to drain to emptying. Generally, you should use a basin with a capacity of 40L to receive the liquids.

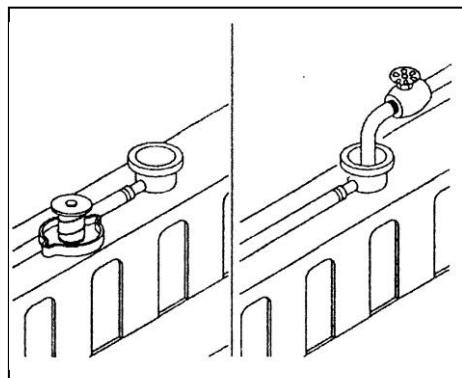


(2) Flushing of cooling system

① Pour the mixture of sodium carbonate and water (or the equivalent materials) into the system.

★ Add 0.5 kg sodium carbonate for every 23L water.

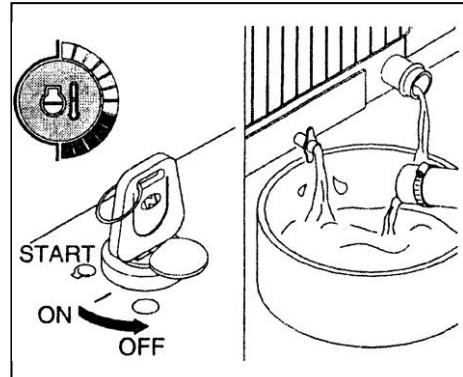
★ Do not install the radiator cover.



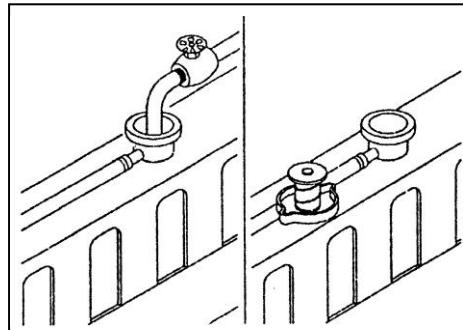
★ The air may invade in when filling. Open the air escape switches of engine and engine radiator.

The coolant must be slowly filled to prevent from air lock.

Wait for 2-3 minutes to exhaust the air, and then fill mixed liquid up to the top of water tank.



② Run the engine for 5 minutes after the water temperature reaches higher than 80°C, turn off the engine and drain the water.



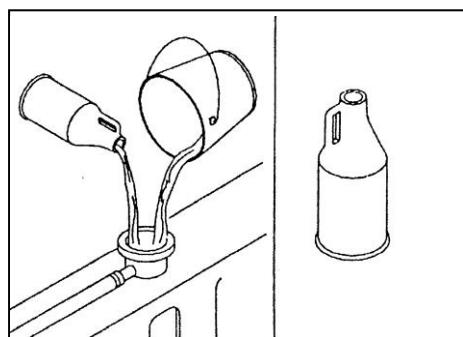
③ Add pure water into system.

★ Completely discharge the air to facilitate the fully filling of water.

★ Do not install radiator cover and new coolant filter element.

④ Run the engine for 5 minutes after the water temperature reaches higher than 80°C. Turn off the engine and drain the water.

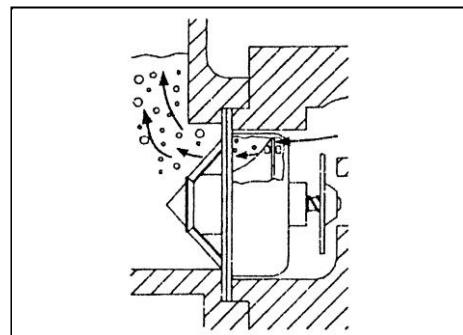
★ If the drained water is still not clean, it is necessary to flush again until the drained water is clean.



(3) Fill up with coolant.

① Add into cooling system.

★ Add appropriate DCA4 corrosion remover to protection the system.



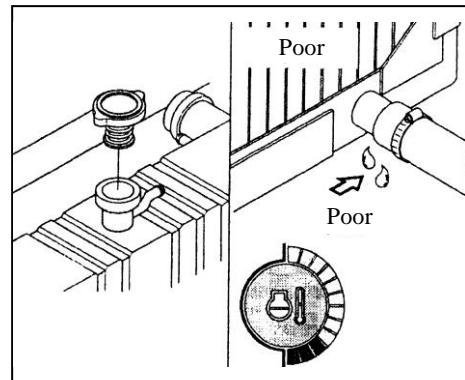
② The Maximum filling speed is 14L/min. Do not exceed this speed.

★ When filling, it is necessary to accomplish slowly to prevent from air lock.

When filling, the air must be vented from the cooling pipe of the engine.

Open the air valve, and then fill the mixed liquid to make the oil level reaches the top position in the water tank.

★ The clogged vent air may cause the filling to be slow. It is possible to conduct the filling by letting engine be stationary for a period or running the engine at idle speed.



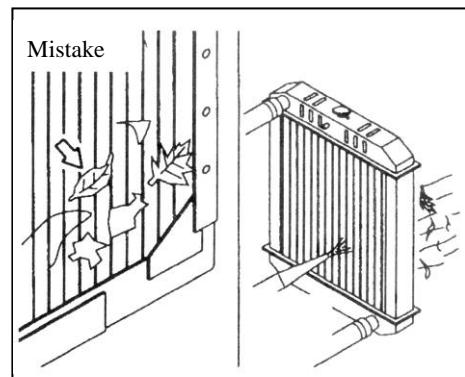
③ Install the cover, and start the machine.

When the coolant temperature reaches 90°C, then check for the leakage.

Check the engine coolant level again.

5) Clean the radiator

Check and clean the radiator, oil cooler external surface, and wipe out. If severely dusty, it is necessary to frequently clean.



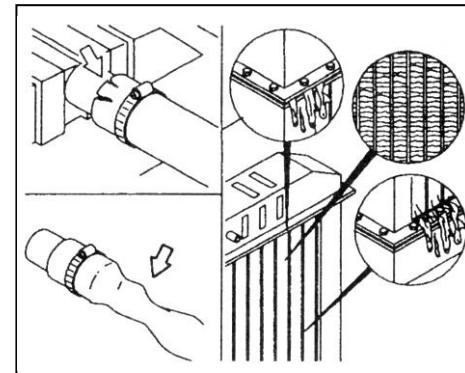
(1) Visually check the radiator vane for blocking.

(2) Use 550kPa compressed air to blow off the trash from the vanes.

You should blow along the reverse direction of the fan.

(3) Visually check the radiator vane for bend or crack.

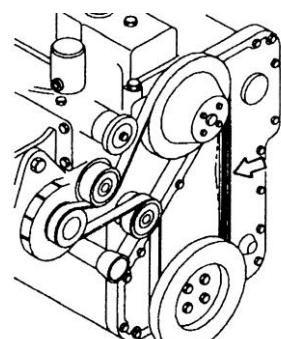
★ If the vane is bent or cracked severely, replace the radiator. Otherwise it will cause the engine to be too hot, refer to Manufacturer's replacement guide.



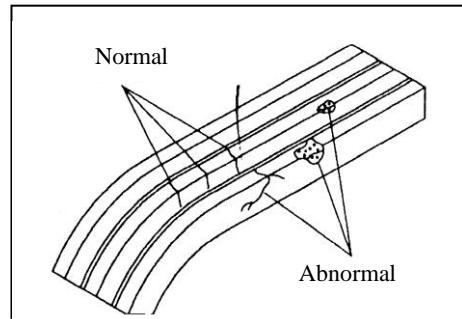
6) Fan belt tensioning

(1) Measure the offset at the position where the belt is the longest.

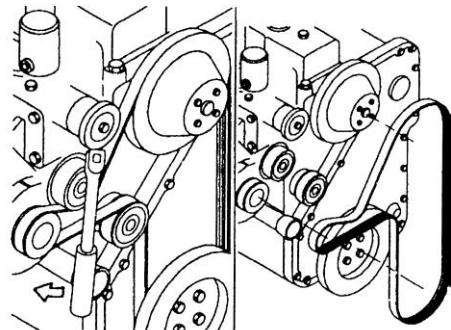
Maximum offset: 10~15mm



(2) Check for the scar.



(3) Check the belt, bearing and fan wheel.



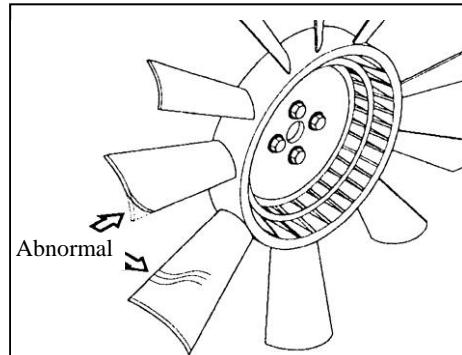
7) Inspection of cooling fan

⚠ The fan vanes may cause personnel injury. Do not pull or pry the fan, because in this way the fan vanes will be damaged, thus inducing the accident.

★ Use engine teeth to rotate the crankshaft .

★ Everyday you must visually check the fan vanes for cracks, distortion, loosening or rivet loosening.

Ensure that the fan is safe and solid. Tighten the screw if necessary. The damaged fan must be replaced.



8) Clean air filter element

(1) Master filter element

① Open the rear cover, and carefully take out the master filter element.

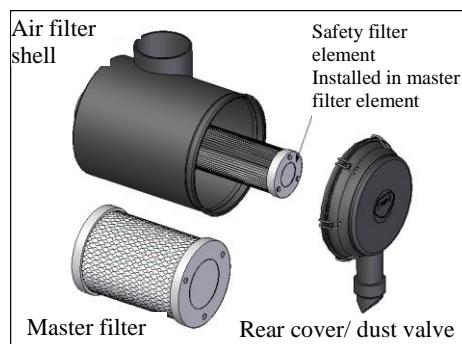
★ You can gently rotate forwards and backwards the master filter element while straightly pulling outwards.

② Check the filter element for degumming.

③ Clean both sides of the outlet and check the ash valve.

④ At a place some distance away from the master filter element, use compressed air (lower than 1kgf/cm²) to blow from inside to outside the dusts from the filter element.

★ Pay attention to not blowing the filtration paper broken. The filter element must be replaced once the filtration paper is blown broken.

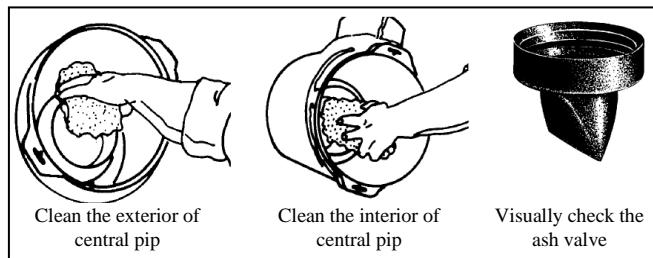


⑤ In the lamplight, check the filter element for damage or crack.

⑥ Insert the master filter element, and cover the rear cover.

★ Immediately replace the damaged ash valve, if any.

★ It is strictly prohibited to clean the master filter element by flapping it.



(2) Safety filter element

★ The A\C external filter element can be dismounted and cleared for 6 times at most, and the safety filter element shall not be allowed to be cleared, but must be replaced together with internal/external every other 500 hours.

9) Inspection of fuel tank

(1) Fill up with fuel when the accumulated water is the Minimum, and check the oil scale mark before starting the machine.

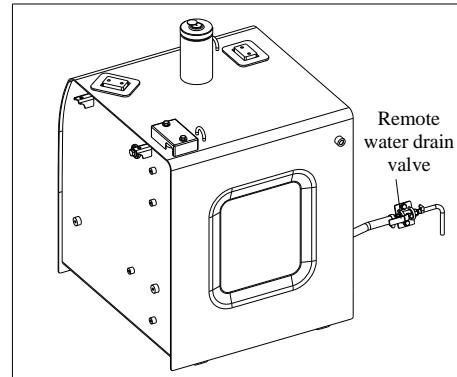
(2) Open the water drain valve to discharge the water and the deposits.

★ Ensure the fuel tank cover is fastened down.

★ Clean the stained strainer, if any.

▲ Stop the engine when fill oil.

Keep away from the kindling materials when fill oil.



10) Drainage and replacement of oil-water separator

(1) Loosen the water plug to drain water and sediment

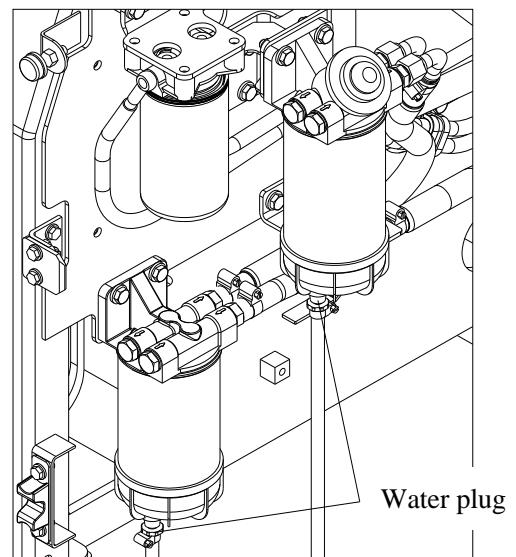
(2) Tighten the drain plug again until clean fuel is released.

(3) Check the leakage.

★ Once the water level of oil-water separator alarms, it must be drained.

★ If the fuel pipeline is mixed with air when discharging water, the air should be discharged.

★ Do not tighten the drain plug too tightly. Too tightly tightening will damage the threads and gaskets.



11) Replacement of Diesel Filter

Wrench: use the belt filter wrench that comes with the toolbox

(1) Clean the area around the diesel filter cap. Remove the filter;

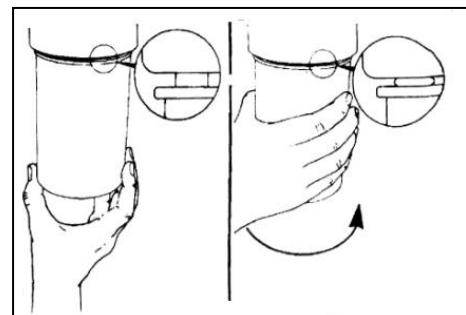
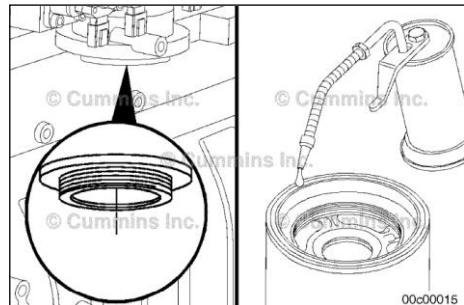
(2) Clean the gasket surface of the diesel filter cover;

(3) Replace the O-ring;

(4) Fill the new diesel filter element with clean fuel, and lubricate the O-ring with clean 15W-40 engine oil.

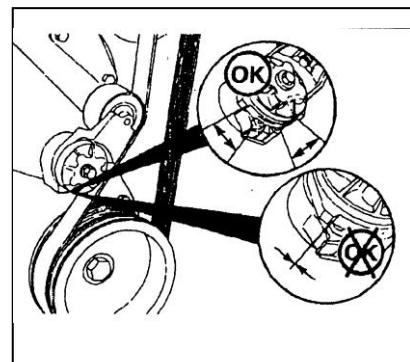
★ Only diesel filters with a filtration accuracy greater than or equal to 5μ can be pre-filled with diesel before installation

- In order to prevent fuel leakage, make sure that the filter element of the diesel fine filter has been installed tightly, but do not screw it too tightly.
- Excessive tightening will damage the filter element of diesel fine filter.
- Install the diesel fine filter in accordance with the filter manufacturer's fixed installation



12) Belt tensioning, Auto adjusting

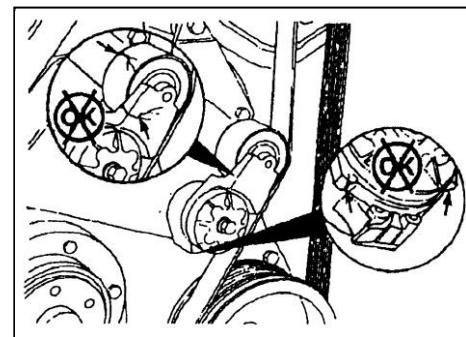
(1) Every 1000h or 1 year (whichever comes first), check the belt auto tensioner. With engine flame out, check the upper portion and bottom stops for not contacting with cast boss. If any stop contacts with the boss, replace the generator belt. Whatever the conditions, check and ensure that the correct part number is used.



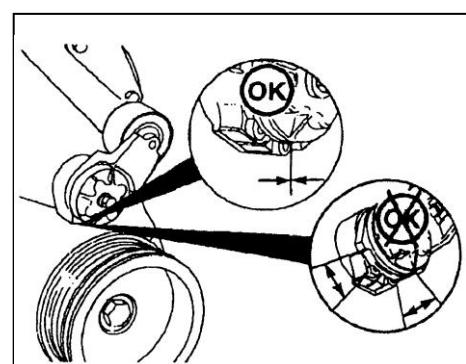
(2) Check for the cracks of tensioner body and pulley.

If any crack is found, the tensioner must be replaced. Refer to CUMMINS authorized maintenance points list.

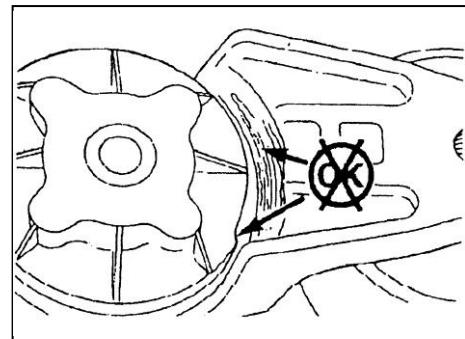
Check the tensioner for the accumulated dirt. If any, remove and clean the tensioner.



(3) Check for the contact between the stop at tensioner bottom and the boss on upper portion of tensioner base. If they are not contacted, the tensioner must be replaced.



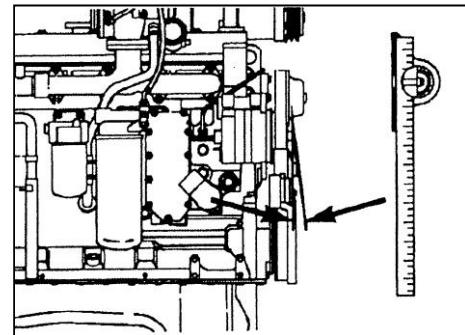
- (4) Check for the contact between the rocker revolving surface of tensioner and the supporting base of the stationary cylinder. If they are contacted and the rocker shaft sleeve is invalid, the tensioner must be replaced.



- (5) The play existing inside the worn tensioner and the belt's drifting away from the pulley indicate the pulley deviation.

★ The Maximum deviation of pulley is 3°. You can measure using ruler and inclinometer.

- (6) Install belt

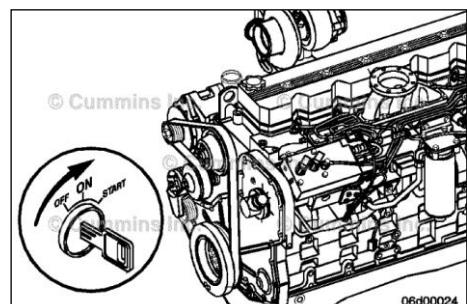


13) Fuel system exhaust

(1) The engine comes with an electronic fuel pump. Turn the start key to the "on" position. The electronic fuel pump will start working for 30 seconds and then stop.

(2) After turning the start key to the "off" position, turn it to the "on" position again, the electronic fuel pump will work again.

(3) Repeat the above operation 3 to 4 times, and start the engine after the gas in the fuel system is exhausted.



★ The excavator controller has a delayed power-off function. After turning the start key to the "off" position, you need to wait at least 5S before the system is completely powered off.

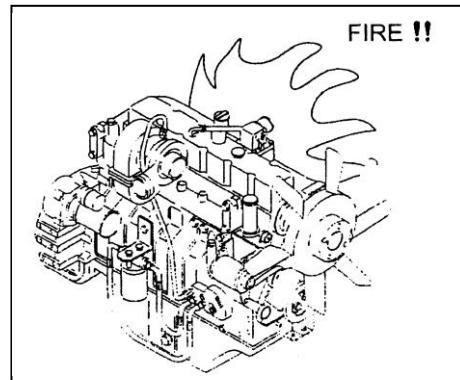
★ Exhaust is required in the following conditions:

- Oil-water separator and fuel filter are not filled before installation.
- Replacement of fuel injection pump;
- Looseness the connection of high-pressure fuel pipeline or replace the fuel pipeline;
- The start-up of an engine after its initial start-up or long-term non-start-up;
- The machine runs until the fuel in the fuel tank runs out.

▲ Do not exhaust the hot engine, otherwise it will cause fire hazard.

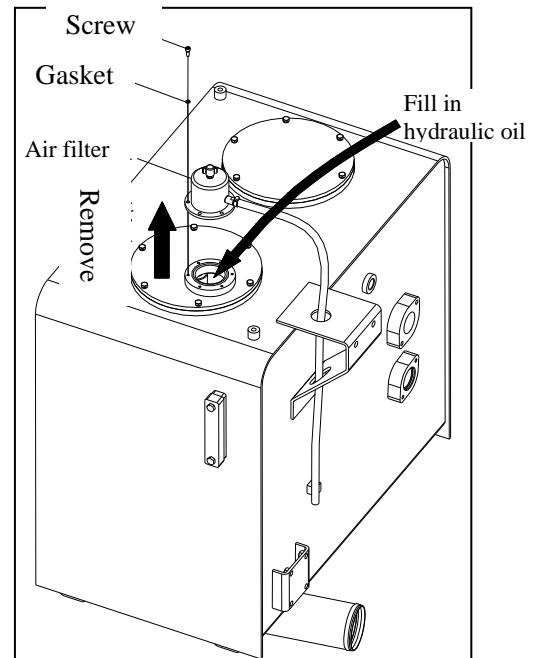
14) Leakage of fuel

⚠ Carefully wipe out the leaked oil from fuel pipe, injection pump, the fuel filter and other connecting parts. Otherwise it may cause fire.



15) Fill in hydraulic oil

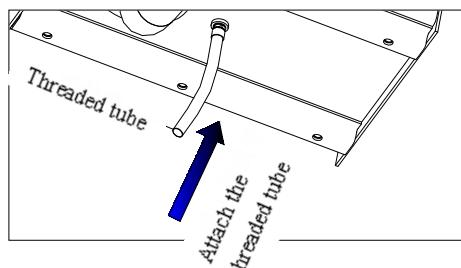
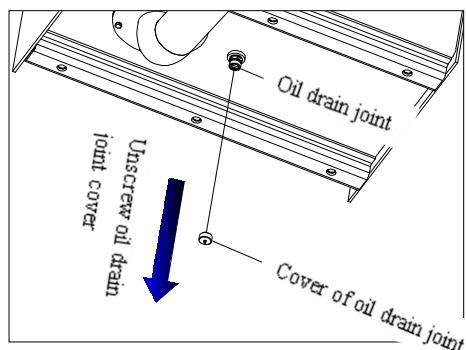
- (1) Park the machine as checking the level, and turn off the engine.
 - (2) Press the air filter manual exhaust device to release pressure.
 - (3) Remove the air filter.
- ★ The hydraulic oil is in high temperature state after starting the engine, so wait for it cooling down, then turn on the filter dust cap, and press air filter manual exhaust device.
- (3) Add oil to the specified oil level
 - (4) Start the engine after oiling, and operate the working device for 5-10 times.
 - (5) After stopping the machine, check the hydraulic oil level at *Oil Level Inspection* position, and then install the hydraulic air filter.



16) Replace with new hydraulic oil

★ Hydraulic oil is in high temperature state after the engine is started. Screw off the dust cover of air filter after cooling and press the manual exhaust unit of air filter.

- (1) Lay the bucket down to ground, and fully retract both bucket rod and bucket cylinders.
- (2) Press the air filter manual exhaust device to release pressure.
- (3) Remove the air filter.
- (4) Prepare one appropriate container.
- (5) Open the oil drain plug at the bottom of fuel tank to drain the oil.
- (6) Add in moderate hydraulic oil.
- (7) Install hydraulic air filter.
- (8) Start the engine and run it continuously to operate each control lever to full stroke for several times to exhaust the air.



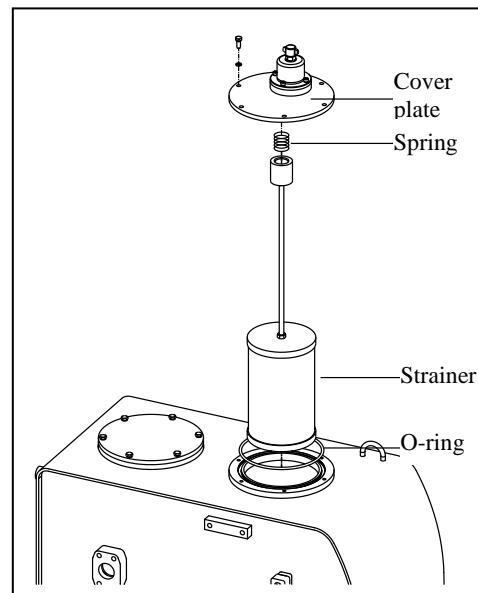
17) Clean hydraulic oil-sucking strainer

★ Hydraulic oil is in High temperature state after the engine is started. Screw off the dust cover of air filter after cooling and press the hydraulic manual exhaust unit of air filter.

Following the guide below, clean the hydraulic oil-sucking strainer when filling fuel.

- (1) Open the cover on top of the fuel tank.
- (2) Take the filter element from fuel tank.
- (3) Wash the materials on exterior of strainer using gasoline or cleaning oil.
- (4) Replace filter element if any damage exists.
- (5) Fit the parts in reverse order of dismounting. Ensure to replace with a new O-ring, and then put it into the oil tank.

★ Be slowly to loosen cover bolt, because the cover may shoot out by the spring when performing dismounting.



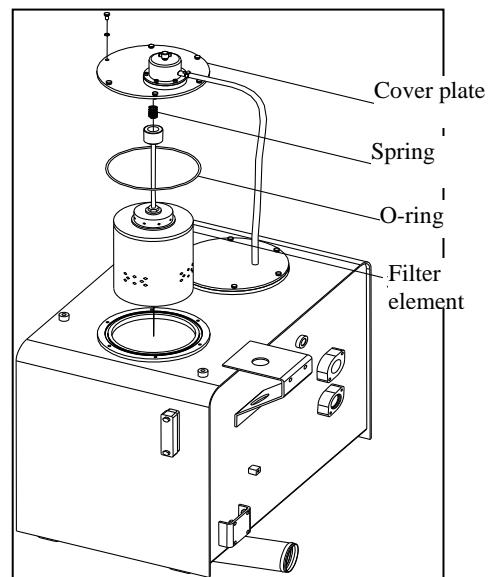
18) Replacement of hydraulic oil-return filter element

★ Hydraulic oil is in High temperature state after the engine is started. Screw off the dust cover of hydraulic air filter after cooling and press the manual exhaust unit of air filter.

Perform the replacement as mentioned below, and pay attention to the protection during replacing:

- (1) Open the cover on top of the fuel tank.
- (2) Take out the O-ring, spring and the oil-return filter.
- (3) Replace with new filter element and new O-ring. Please clean the spring first and install parts second.
- (4) Fit the parts in reverse order of dismounting.

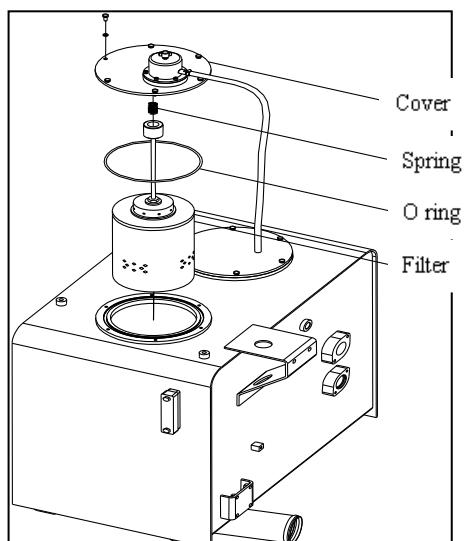
★ Be slowly to loosen cover bolt, because the cover may shoot out by the spring when performing dismounting.



19) Replacement of hydraulic air filter element

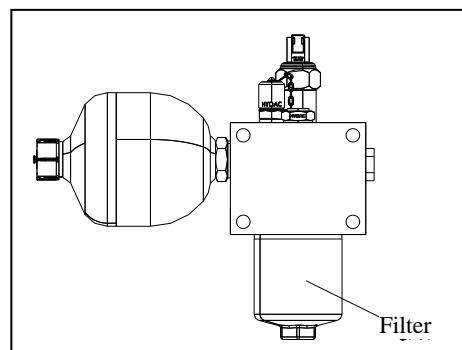
★ Hydraulic oil is in high temperature state after the engine is started. Screw off the dust cover of air filter after cooling and press the manual exhaust unit of air filter.

- (1) Press the manual exhaust device to release pressure.
- (2) Sequentially remove shims, nuts and covers.
- (3) Take out the filter element.
- (4) Wash it using gasoline or cleaning oil. Replace filter element if any damage exists.
- (5) Fit the parts in reverse order of dismounting.



20) Replacement of hydraulic pilot filter element

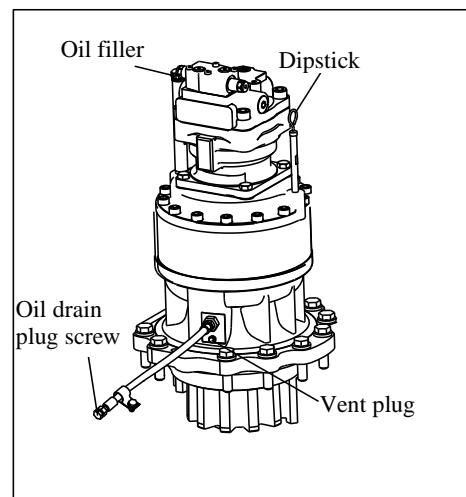
- (1) Loosen the nuts on filter.
 - (2) Take out the filter element and clean the shell.
 - (3) Install the filter element, and fasten it as per specified torque.
- ★ Timely replace filter element after initial 250h operation.
Later on, replace the filter element every 1000h.

**21) Check rotary motor gear oil**

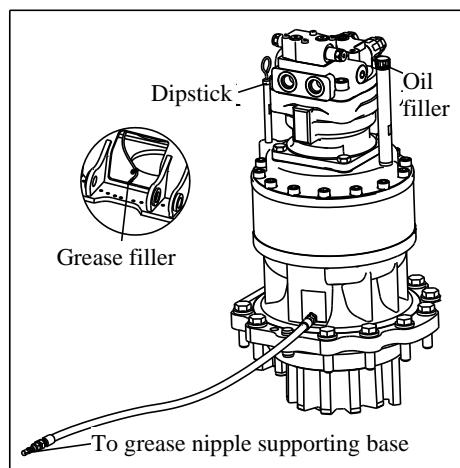
- (1) Take out the dipstick and wipe out.
 - (2) Put back the dipstick.
 - (3) Take out again the dipstick to check oil level.
If the oil is not enough, you can add oil again.
- ★ Fully insert the dipstick to perform the inspection.

22) Replace rotary motor gear oil

- (1) Park the machine on a flat ground and make the oil temperature rise by rotating the upper portion before replacement of oil.
- (2) Pull out the dipstick.
- (3) Loosen the oil drain plug screw to drain the oil into an appropriate container.
- (4) Add in moderate oil from oil filler.
- (5) Wash the oil drain plug screw, tighten up and fasten the drain pipe to other rubber hose.

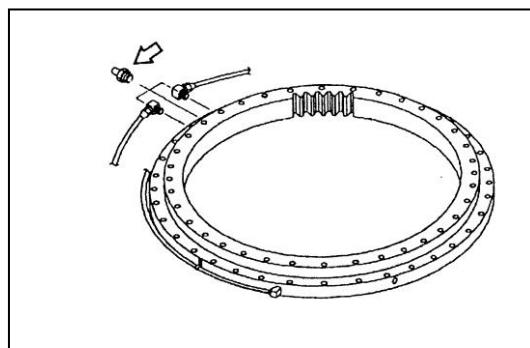
**23) Fill in rotary motor lubrication grease**

- (1) Remove the vent plug.
 - (2) Remove grease cap.
 - (3) Use grease gun to fill the lubrication grease until there is new lubrication grease flowing out from the vent plug.
 - (4) Tighten the vent plug.
- ★ Lubricate every 1000h.



24) Lubrication of rotary ring gear

(1) Fill in lubrication grease from three grease nipples.

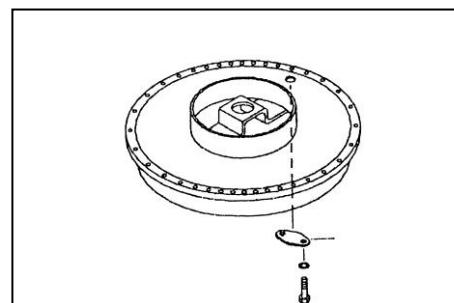
**25) Replacement of rotary ring gear and pinion lubrication greases**

(1) Drain the lubrication grease.

① Remove the lower frame chassis.

② Remove the lower frame oil drain cover.

③ Operate the fully rotation (360°) for several times.



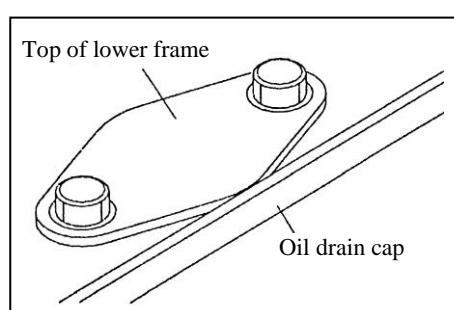
(2) Fill in new lubrication grease.

① Install the lower frame oil drain cover.

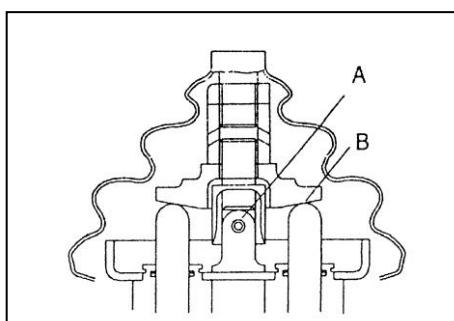
② Install the lower frame bottom.

③ Fill in new lubrication grease.

④ Install the upper frame oil filling cover.

**26) Lubricate the pilot operation handle**

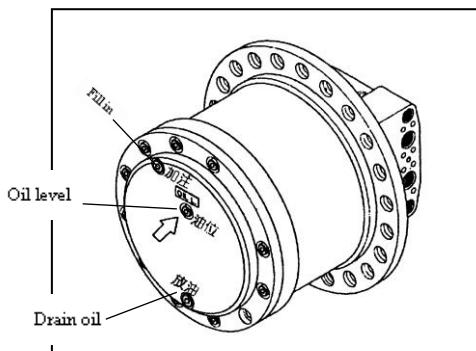
Remove the cup, and use grease gun to fill the grease axis pin (A) and the contact (B).

**27) Check travel motor gear oil**

(1) Park the machine on a flat ground, and make the oil drain hole facing downwards.

(2) Open the oil level hole plug, and check the oil level.

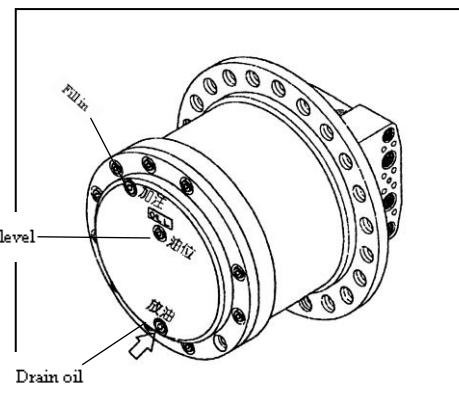
★ If the oil level is at the oil level hole position, it is normal.
If not, add the gear oil.



28) Replacement of travel motor gear oil

- (1) Travel the machine to make the oil temperature rise.
- (2) Stop the machine and make the oil drain hole facing downwards.
- (3) Open the oil scalemark hole plug and oil drain plug.
- (4) Drain the oil into an appropriate container.
- (5) Tighten the oil drain plug and fill in moderate oil from the oil filler.
- (6) Tighten the plug and slowly travel the machine to check for the leakage.

★ Confirm that no materials such as metal chips, debris, and foreign materials sneak in.



29) Adjustment of track tensioning cylinder

★ The correct adjustment of the tension of track is has a significant relation with the life of track and travel device.

★ The wear of chassis pin and operating conditions are related with the geology. Therefore, it is particularly important to frequently adjust track tension to keep its normal range.

- (1) Use Movable arm and bucket rod to raise the chassis.
- (2) Measure the distance from track frame bottom to track shoe, L.

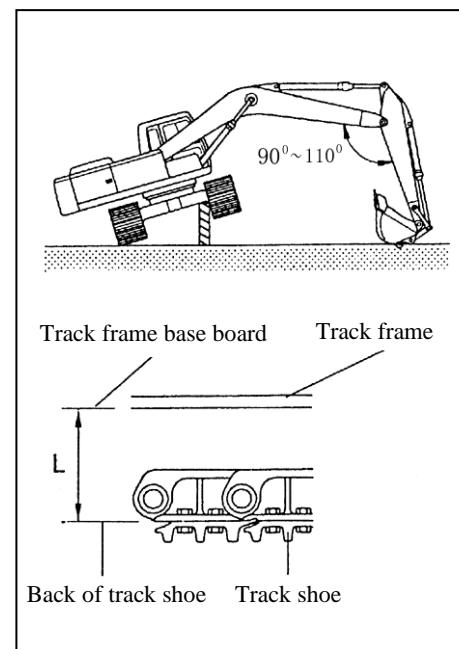
★ Remove the mud before measurement.

- (3) If too tight, drain the grease from the nipples; if too loose, add the lubrication grease.

▲ When loosening the nipples, do not screw it back for more than one turn. Because the high pressure lubrication grease will spray out from the nipples.

★ Gently move the track back and fro after the lubrication grease is drained out.

If they are still too loose after fully adding in the lubrication grease, it is necessary to replace the pin and shaft sleeve, because they are severely worn.



Working Conditions	Range (L)
Normal	270~300mm
Humid	300~340mm
Rocky, sand or soft ground	About 340mm

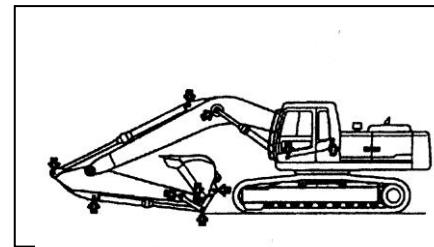
30) Replacement of bucket

⚠ When using the hammer to assemble the axis pin, there is the possibility for metal debris to hurt people, so please wear the gloves, eyeglasses etc safety device.

★ After removing the bucket, put it on a flat and smooth ground.

★ Pay attention to the safety when assembling and disassembling.

(1) Lay the bucket down on the ground as shown in the Figure on the right.



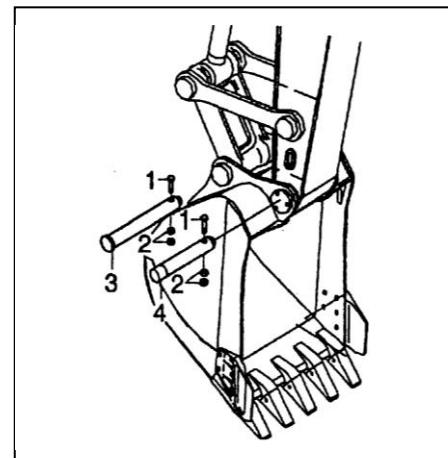
2) Place the Safety Locking control lever to LOCKING position, and then close it.

(3) First remove bolt (1) and nut (2), and then remove pins (3, 4), and finally remove the bucket.

★ When removing axis pins, let the bucket gently touch with ground.

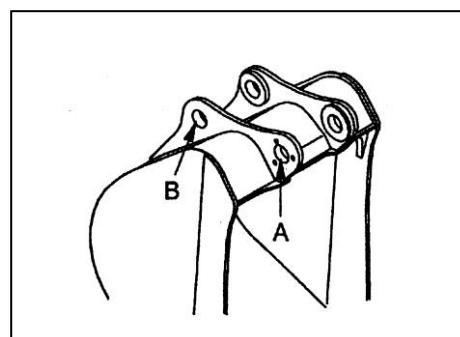
★ The contact between bucket and ground shall not be too heavy, otherwise the friction will be increased , making the removing of axis pin very difficult.

★ After removing the axis pin, there should be no dust staining on the surface. And the seals on both sides shall not be damaged.

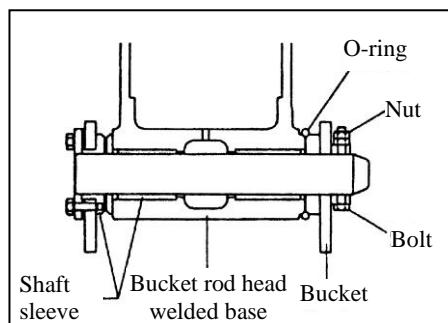


(4) After leveling the bucket rod hole (A) and link hole(B), apply again the lubrication grease , and then assemble the axis pins (3, 4).

★ When installing bucket, O-ring is easily to be damaged, so when installing O-ring, you should install O-ring on to the bucket base as shown in the Figure. After installing axis pins, install the axis pins into the grooves.



(5) Assemble bolt and nut , and then fill in the lubrication grease.

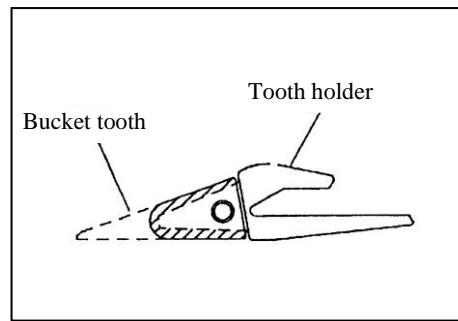


31) Replacement of bucket teeth and side blades

(1) Replacement time

① Check the wear conditions as shown in the Figure, the bucket toothed sleeve shall be replaced once the wear reaches the bucket tooth base.

② If overused until the bucket tooth base is also worn, then you cannot replace the bucket toothed sleeve.



(2) Guide for replacement

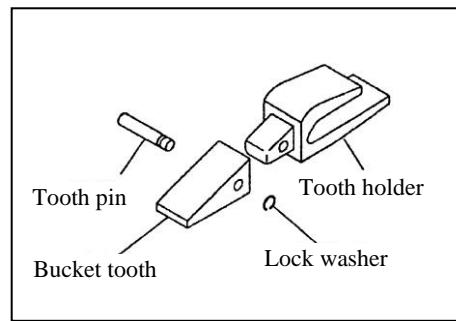
● Replacement of bucket teeth

① Take out the pins by hammering, avoiding the damage of lock washer.

② Use a knife to eliminate the mud on the bucket tooth base.

③ Place the lock washer, and install the bucket toothed sleeve.

④ Insert the pins to make lock washer just locate in the cotterway.



● Replacement of side blades

① Loosen the mounting bolt and remove the side tooth.

② Use new parts to replace nuts and bolts.

⚠ Pay attention to that the falling down of bucket will cause personal injury.

⚠ Block up the bucket before replacing bucket tooth or side blades.

32) Replacement of bucket clearance

(1) Lay the bucket down on the ground as shown in the Figure on the right.

(2) Rotating leftwards to make bucket rod boss closely snug with the left side of bucket.

(3) Use safety lever LOCKING position to turn off the engine.

(4) Measure the clearance between bucket and bucket rod boss. This is the total clearance.

(5) Adjustment (only for the special bucket)

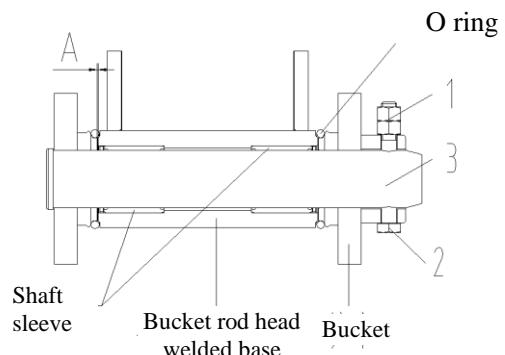
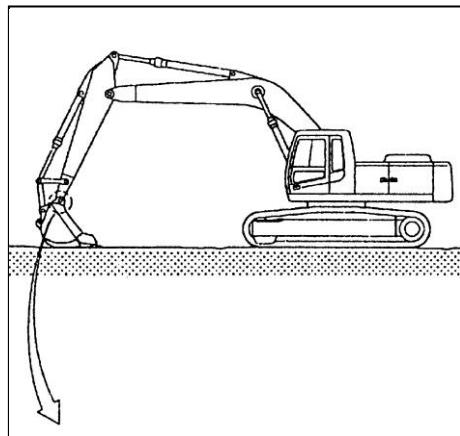
① Remove the bolt (2) and nut (1), remove shaft (3).

② Add the shims whose quantity is equal to the measured value.

③ Install bolt、nut and shaft.

● Normal clearance (A): 0.5~1.0mm

★ If the bucket clearance is not properly adjusted, it will cause noise, vibration, O-ring damage, and quickening wear of shaft and shaft sleeve during operation.

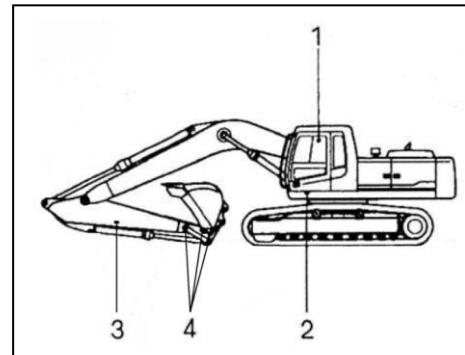


33) Lubrication of working device axis pin

1) Lubricate each axis pin for working device

Fill lubrication grease into nipple according to the lubrication interval.

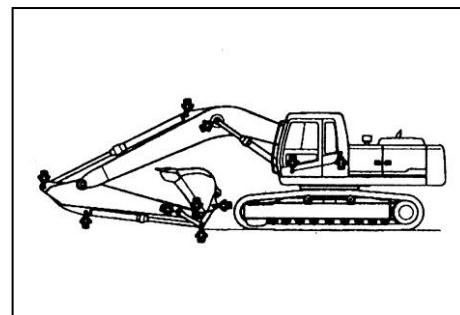
S/N	Item	Number of points
1	Arm central lubrication pipe	5
2	Arm cylinder axis pin	2
3	Arm and bucket rod connecting axis pin	3
4	Bucket cylinder (head, bottom) axis pin	3
	Bucket link (control lever)	1
	Bucket rod and bucket connecting axis pin	1
	Bucket and link connecting axis pin	1



★ Shorten the lubrication interval if the moisture, dust is severe.

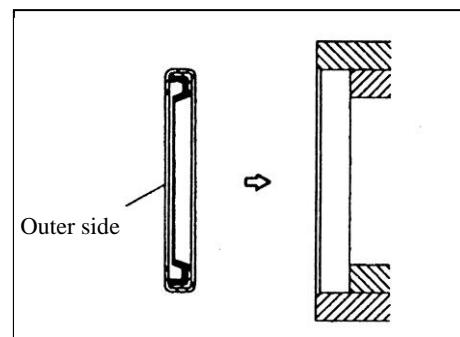
(2) The dust rings are installed for drive parts on working device to extend the lubrication interval.

★ When replacing the dust seals, you should make the lid side facing outwards.



★ If stalling in wrong direction, the wear of shaft and shaft sleeve will be quicken during operation, and the noise and vibration will be generated.

★ When replacing, install as per description in the Figure, and you should use the plastic hammer.



34) Replacement of engine coolant filter

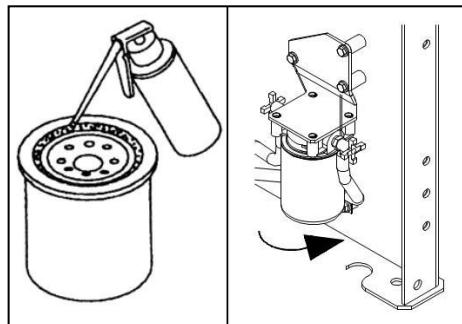
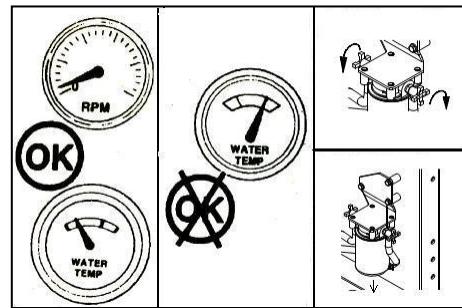
⚠ DO NOT remove the radiator pressure cover from the high temperature engine. High temperature steam can cause serious personal injury, wait for the coolant temperature to drop to 50 °C (122°F) and then remove the cover.

- (1) Before removing the coolant filter, remove the cooling system pressure cover and shut-off the cutting valve first.

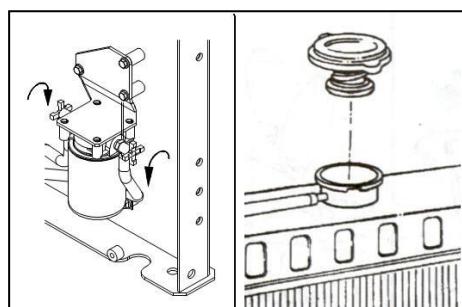
Clean the washer surface of coolant filter.

- (2) Before install the coolant filter, apply some clean lubricating oil to the washer.

★ Overtightening will damage the threads or damage the coolant filter cover.



- (3) Open up the engine coolant cutting valve and install the cooling system pressure cover.



35) Maintenance inspection of oil-bath prefilter

- (1) Place the machine on flat ground and check

★ Check the buckle, fasten if loosen.

- (2) Open the buckle and remove the lower barrel

★ Shake the lower barrel. If the oil is full of impurities and does not flow easily, you need to clean the lower filter with a cleaning agent (diesel, gasoline) (the upper filter does not need to be cleaned) to remove the dust in the lower barrel, and the oil must be replaced at the same time

- (3) Remove the filter, observe the oil level. If the oil is insufficient, refill it to the corresponding scale line

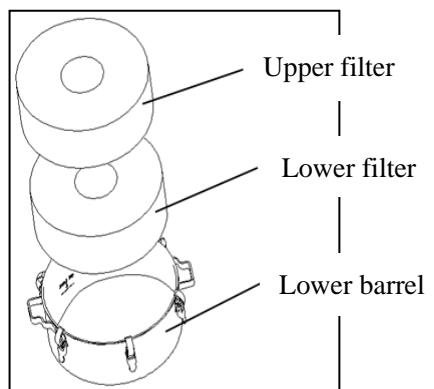
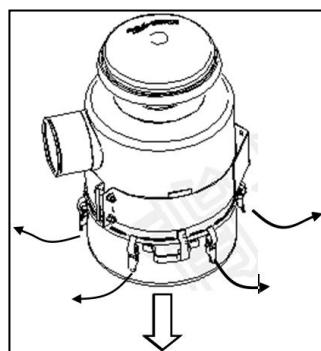
★ When the oil becomes turbid, change the oil and add to the corresponding scale line

★ Clean the metal filter every 2000 hours, or clean it according to the blockage

★ The metal filter can be used for a long time and does not need to be replaced

★ Heavy blows and fires are strictly prohibited when cleaning up

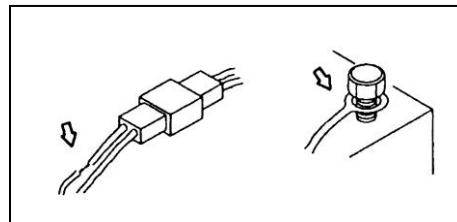
- (4) Reassemble the oil-bath type prefilter



7. Electrical system

1) Wires and Instrument

Frequently check and repair the instruments found to be loosened or invalid.



2) Battery

(1) Battery specification

12V/battery, totaling to 2 batteries, with a total voltage of 24V.

(2) Check and repair

- ① If the terminal is stained, use hot water to wash and apply moderate lubrication grease.

⚠ The electrolyte is of acid type. You should prevent it from staining clothe and skin, and never splash it into the eye. If such occasion occurs, use water to wash and see a doctor.

★ Let the battery be far away kindling, spark.

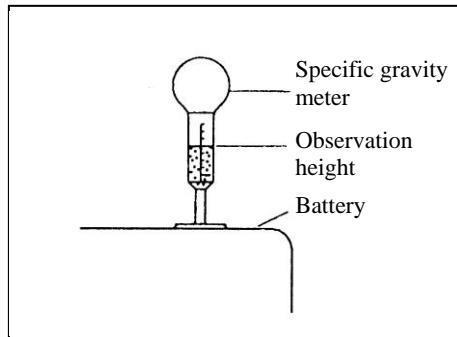
⚠ Strictly prohibit using wet hands to touch the battery.

(3) The specific gravity of battery electrolyte

The charging ratio can be measured through specific gravity.

The specific gravity varies with environment temperature.

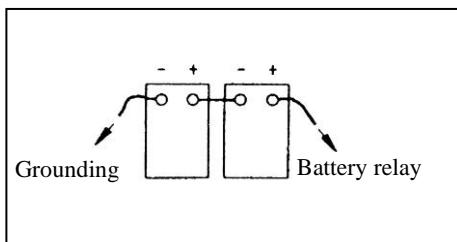
Test the charging ratio as per the table below.



Temperature Charging ratio	20°C	10°C	-10°C
100%	1.26	1.27	1.28
90%	1.24	1.25	1.26
80%	1.22	1.23	1.24
75%	1.21	1.22	1.23

(4) Method for removing battery wires

First remove the Ground wire (negative end), and then remove the positive pole wire.



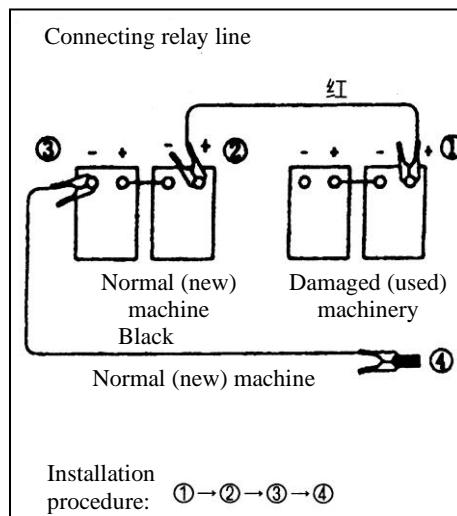
3) Start using auxiliary cables

If the auxiliary cable is connected wrongly, the battery will explode, therefore, operate as follows:

The starting by using auxiliary cables shall be performed by two persons (with one person sitting on operator, while another one operating the battery).

When using other machine to start, do not let the two machines contact each other.

When suing the auxiliary cables to connect the two machines, put both starting switch of the fault machine and the shutoff switch of battery to OFF position, and then turn the starting switch of the sound machine to OFF position. Otherwise, you will risk of moving the fault



machine when turning on the power.

When installing the auxiliary cables, be sure to first connect (+).

When you want to remove the auxiliary cables, first disconnect Ground cable or Negative (-) cable (at Ground side).

When removing the auxiliary cables, pay attention to not letting the auxiliary cable clamps contact each other or let the cable clamp touch with the machine.

When using the auxiliary cables to start the engine, be sure to wear the goggle and rubber gloves.

Ensure the connection of auxiliary cables is correct. Finally, the cables should be connected to the rack of superstructure.

However, the spark may be generated during connecting. Therefore, connect them to a place away from the battery as far as possible.

(Then avoid connecting cables to working device, because the conductivity of working device is poor).

Start the engine as per following procedure:

(1) Wiring

★ Use the batteries with same capacity.

① Use Red wire to connect the positive poles of dead battery and the new battery together.

② Use Black wire to connect the negative poles of dead battery and the new battery together.

★ Keep the contact is in good state, because the loosen contact will cause spark.

(2) Start the engine.

① Ignite using the key.

② If not able to start, start again after 2 minutes.

(3) Remove the relay line.

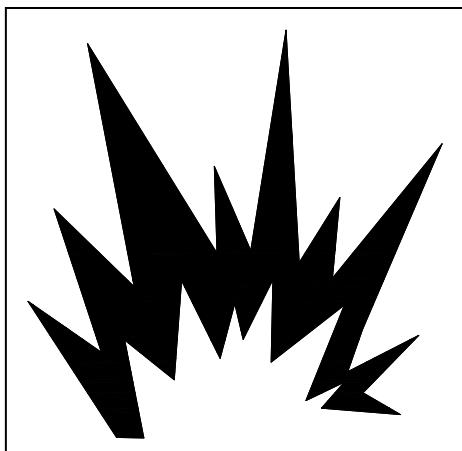
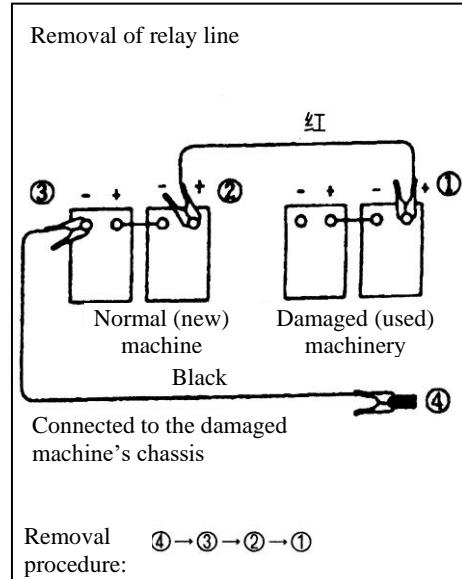
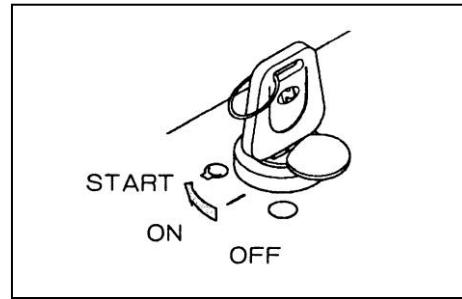
① Take down the Black wire.

② Take down the Red wire.

③ Make engine idle at high speed to fully charge the dead battery.

⚠ The combustible gas can be generated during power using or charging. Keep away from the kindling to avoid producing the spark.

★ Perform the charging in good ventilation conditions.



- ★ When charging, the machine shall park on the soil ground or cement ground, not parking on the steel plate.
- ★ When using the relay line, do not short the Positive (+) and Negative (-) poles, because this will cause the short circuit.
- ★ 24V voltage is used in the starting system of this machine. 24V voltage should also be used for a normal machine.
- ★ The specifications of auxiliary cables and wire clamps shall be applicable to battery specification.
- ★ The battery capacity of normal machine must be the same with that of the engine to be started.
- ★ Check the cables and clamps for damage or corrosion.
- ★ Ensure the cables are securely connected to clamps.
- ★ Check the safety locking control lever of two machines for being at the LOCKING position .
- ★ Check each control lever for being at the middle position.
- ★ For machine equipped with battery shutoff switch:

Before using auxiliary cables to connect the two machines, and in order to prevent from damaging the electrical system of machine, disconnect the battery of the fault machine and take away the key for battery shutoff switch.

(4) Welding repair

Before welding operation for repair, operate the machine as follows:

- ① Turn off the engine and take away the key;
- ② Remove the grounding wires to avoid the short circuit;
- ③ Disconnect the generator circuit;
- ④ Disconnect all plug-ins for engine ECM;
- ⑤ Disconnect all connectors for various electronic control devices.

▲ Do not start the welding working before finishing the aforementioned operations. Otherwise, it will severely damage the electronic control system.



4) Shutoff the battery and put the SHUTOFF switch to OFF position under the following conditions:

- ① After the machine has been stored for a month or more;
- ② During repairing of electrical system;
- ③ When conducting the electrical welding;
- ④ When dealing with the battery ;
- ⑤ When replacing fuses.

▲ Before changing over the switch, turn the start switch to OFF position, wait for one minute or more, then shutoff the battery SHUTOFF switch to OFF position, and take away the key for battery SHUTOFF switch.



5) Removal of installation of battery

- ▲ After installation of battery in place, check the battery for movable. If movable, re-install it.
- ★ When removing, it is necessary to begin the removal from the Grounding side (Negative pole (-)).Note

that any tool should not be used to touch the portion between Positive (+) terminal and the machine. Because this can generate the spark, such touch is dangerous.

- ★ When installing the battery, the terminal connected to the Ground shall be connected.
- ★ When replacing the battery, you should use battery clamp to securely fix the battery.
- ★ The tightening torque for mounting bolt: 9.8—14.7Nm.

6) Discharging of battery

- ★ That the charging of battery when the battery is still installed on the machine is dangerous. Before charging, be sure to remove the battery from the machine.
- ★ When checking or dealing with the battery, you should turn off the engine and turn the starting switch to OFF position.
- ★ The battery produces Hydrogen, there is the danger of explosion. Do not make spark in the vicinity of the battery.
- ★ The electrolyte in the battery is diluted sulfuric acid, and it can corrode the clothe or skin. If the diluted sulfuric acid splashes onto clothe or skin, immediately use plenty of water to wash. If it enters the eye, wash the eye and use clean water to wash and immediately see a doctor.
- ★ When dealing with the battery, you should wear goggle and gloves.
- ★ When removing battery, first disconnect the grounding cable (generally it is the wire connected to Negative (-) terminal). When installing, first install the Positive (+) terminal. If the tool touches with positive terminal and rack, it is possible to risk the producing spark, therefore be extremely careful.
- ★ If the terminal is loose, you would risk of producing the spark and causing the explosion because of the poor contact.
 - ① When installing the terminals, be sure to securely install them. When removing or installing the terminals, you should confirm which one is positive (+) terminal and which one is negative (-) terminal and which one.
 - ② The dirt around the terminal is the reason for the battery to discharge by itself .Use a sand paper to grind the terminal to remove the dirt, and then apply a thin layer of lubrication grease on the terminal.

7) Charge the battery

- ▲ When charging the battery, if operate wrongly, you would risk of causing the explosion of battery.
- ★ Adjust the voltage of the charger to be matched with that of the battery. If the voltage is wrongly selected, the charger will be overhot and cause the explosion.
- ★ Connect the positive (+) wire clamp to the positive (+) terminal of the battery. Then, connect the negative (-) wire clamp to the negative (-) terminal of the battery. Be sure to securely fix the wire clamp.
- ★ Adjust the battery current to be 1/10 of the rated battery capacity; When conducting quick charging, you should adjust the battery current to be lower than the rated battery capacity. If the charging current is too high, the electrolyte will leak out or evaporates to be dried, thus causing the battery to be on fire and explosion.
- ★ If the electrolyte of the battery is iced, do not charge the battery, nor use different power supply to start the engine. This will risk of causing the ignition of battery's electrolyte and the explosion of the battery.

8.Air conditioner and air heater

1) Clean and replace the external filter element

★ Before maintenance, be sure to make the engine flame off.

(1) Use the key to open the door at the lower right corner.



(2) Take down the external filter element.

Remove the pressing plate nut (1) and pressing plate (2), and take out the external filter element (3).

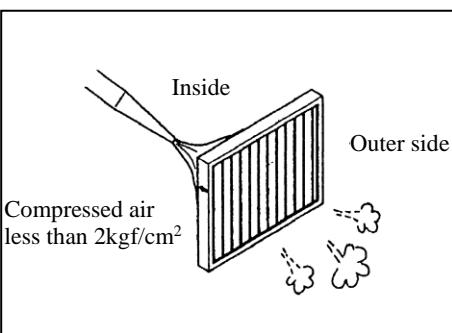
★ When installing the filter element, be careful not to change the direction of filter element.



(3) Use compressed air (2kgf/cm^2 , lower than 28psi) to clean the filter element.

▲ Wear the safety goggles when using compressed air.

(4) Make inspection after the cleaning if the filter element. If there damage is found, use new filter element to replace it.



2) Clean internal filter element

★ Before maintenance, be sure to make the engine flame off.

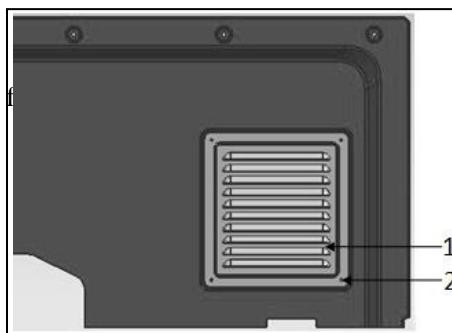
(1) Use adjusting lever to move the seat and manipulating box along the direction shown by the arrow.

Remove the trim cover plate of the air conditioner.



(2) Remove the A\C internal filter element

Unscrew the bolt (2), move the baffle (1) and take out the internal filter element.

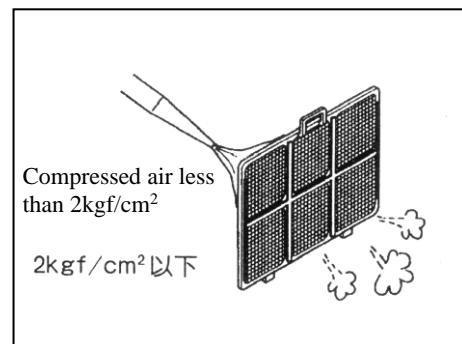


(3) Use compressed air ($2\text{kgf}/\text{cm}^2$, lower than 28psi) or use water to clean the A\C internal filter element.

⚠ Wear the safety goggles when using compressed air.

★ When use water to wash, you should blow it to be dried.

(4) Make inspection after the cleaning if the filter element. If there damage is found, use new filter element to replace it.



3) Precautions for using air conditioner

(1) When using A\C for a long time, open the window once every one hour.

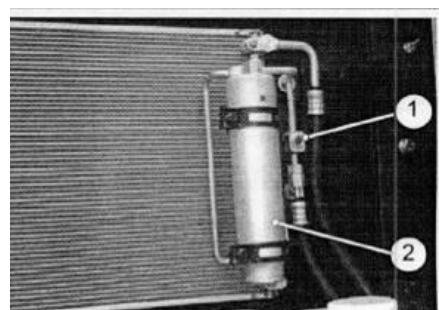
(2) Pay attention to not making the cab too cold.

(3) If the temperature inside the cab is 5°C lower than external temperature, the driver will feel very cold. This temperature is a more proper temperature.

(4) If feeling cold, it is possible to change the air power.

4) Inspection and fill of refrigerant during the use of air condition

If the refrigeration effect is not satisfactory during the use of air conditioning, please check the lack of refrigerant in the air conditioning tank in time. The upper part of the liquid storage tank (2) is equipped with a visual liquid mirror (1). When the air conditioning system is working normally, through the visual liquid mirror (1) if the smooth flow of refrigerant is observed, the refrigerant quantity is appropriate. If the refrigerant flow with obvious bubbles is observed, the refrigerant in the system is leaked, please contact the authorized agent or customer service center of the mechanical heavy industry to supplement the refrigerant in time.



⚠ If the refrigerant leak is found, it is necessary to first check whether the connection between the various components of the air conditioning system and the hose is loose.

⚠ Use the recommended brand of Refrigerants and refrigerating oils. Different brands of refrigerating oils of different brands can't be mixed to use.

⚠ Inhalation of air conditioning refrigerant gas by ignited cigarettes or other means, or inhalation of the smoke from the flame dispersion in contact with air conditioning refrigerant can cause personal damage, dead and casualties.

⚠ Wear protective glasses or masks when using refrigerant and detector to detect the leakage, adjusting pipe joints and connecting high and low pressure combination meter joints

⚠ When maintaining the air conditioning system, the high pressure, high temperature and chemical substances of the system will cause harm to the human body. Running parts and rotation of the pulley can also cause harm to the human body.

⚠ Refrigerant tank can not be collided, violent collision may occur explosion, causing personal

accidents.

⚠ The phosgene produced by the contact of refrigerant vapor with open fire is highly toxic and harmful to human body. When the content of refrigerant gas in air exceeds 25%, it will lead to suffocation death.

5) Every month operate the air conditioner for 2-3 times (several minutes each time), to prevent the lubrication oil on various parts of the air conditioner from being dried.

After the season when using the air conditioner, you should operate the air conditioner at least for 2-3 times a month under the condition of running the engine. When the temperature in the cab is lower than 15°C, the air conditioner may be unable to be started. At this moment, you should first use the heater to warm up the cab.

6) Check and adjust the tension of AC compressor belt

Check

With a finger force of about 58.8N (6Kgf), press the belt in the middle between the drive pulley and the compressor pulley and check that the deflection should be 5-8mm (0.2in-0.3in)

Adjust

1、 Loosen bolt ① and ③

- The bracket ② holds the compressor. When the bolts ① and ③ are loosened, the bracket ② rotates with the fixed position of the bolt ④ as the fulcrum
- Tighten the bolt ④ so that the belt deflection is 5-8mm about 58.8n (6kgf)

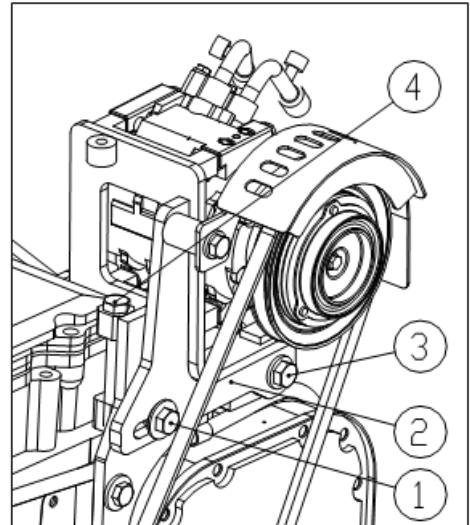
2、 Fasten bolt ① and ③ and bracket ②

3、 Check whether the pulleys, V-shaped grooves and V-shaped belts are worn

- Specially check that the V-belt cannot touch the bottom of the V-groove

4、 If the belt is stretched, no adjustment margin or if there are cuts or cracks on the belt, the belt needs to be replaced.

5、 When replacing a new belt, readjust the belt after one hour of operation



Chapter Fault Analyze Guide

1. Engine

The items listed in the table below are the common faults.

Fault	Service	Remarks
When the engine speed is raised after the engine is fully warmed, the engine oil pressure alarming lamp is lit up.	<ul style="list-style-type: none"> ● Add oil to the specified oil level ● Changing the oil filter element ● Check for the oil leakage at oil pipe or at the joint. ● Replace the monitor. 	
There is vapor overflow from the pressure valve on the top of radiator. The cooling water level alarming lamp is lit up.	<ul style="list-style-type: none"> ● Add coolant and check for leakage. ● adjust the fan belt tension. ● Clean the interior of cooling system. ● Clean and repair cooling fin. ● Check thermostat. ● Tighten the radiator cover or replace its seal. ● Replace the monitor. 	
The engine cannot be started, but the starting motor is normal.	<ul style="list-style-type: none"> ● Add fuel ● Check for the air leakage to the fuel system. ● Check high pressure pump or oil injection nozzle. ● Check the valve clearance. ● Check the compression pressure for the engine. 	
The exhaust presents white color or blue color.	<ul style="list-style-type: none"> ● Adjust the engine oil quantity to the appropriate level. ● Replace fuel as per requirements. 	
The exhaust some times presents black color.	<ul style="list-style-type: none"> ● Clean and replace the filter element of the air filter. ● Check the injection nozzle ● Check the compression pressure for the engine. ● Clean and replace turbocharger. 	
The combustion sound is some times abnormal.	<ul style="list-style-type: none"> ● Check the injection nozzle 	
The engine sound is abnormal.	<ul style="list-style-type: none"> ● Check the fuel you use for according the requirements. ● Check for overheat. ● Replace the muffler. ● Adjusting the valve clearance. 	

2 Electrical system

Fault	Service	Remarks
The lamp is not lit up even if the engine runs at high speed.	<ul style="list-style-type: none"> • Check the wires or joints for loosening. 	
The lamp blinks when the engine is running.	<ul style="list-style-type: none"> • Adjust belt tension. 	
The charging indicator is lit up when the engine runs at high speed.	<ul style="list-style-type: none"> • Check the engine. • Check electric wires. 	
The generator produces abnormal sound.	<ul style="list-style-type: none"> • Check the engine. 	
The motor does not rotate when the key switch is turned to “START” position.	<ul style="list-style-type: none"> • Check and repair the related electric wires. • Charge the battery. • Check the starting motor. • Check safety interrupter. 	
The start motor gear action is abnormal.	<ul style="list-style-type: none"> • Charge the battery. • Check safety relay. 	
The start motor cannot easily start the engine.	<ul style="list-style-type: none"> • Charge the battery. • Check the starting motor. 	
The start motor is disconnected before the engine started.	<ul style="list-style-type: none"> • Check and repair the related electric wires. • Charge the battery. 	
The engine warming lamp is not lit up.	<ul style="list-style-type: none"> • Check and repair the electric wires. • Replace the monitor. 	
When starting switch is at “ON” position, The engine oil pressure lamp is not lit up. (Engine does not start)	<ul style="list-style-type: none"> • Replace the monitor. • Check warning lamp switch. 	
When starting switch is at “ON” position, The battery charging indicator is not lit up. (Engine does not start)	<ul style="list-style-type: none"> • Replace the monitor. • Check and repair the electric wires. 	

3. Self diagnosis function and troubleshooting of air conditioner

(1) This system real-time monitors the operation states of vehicle interior / exterior temperature sensor, evaporator surface temperature sensor, and cooling/warming air valves position sensor, and performs the diagnosis for the circuit.

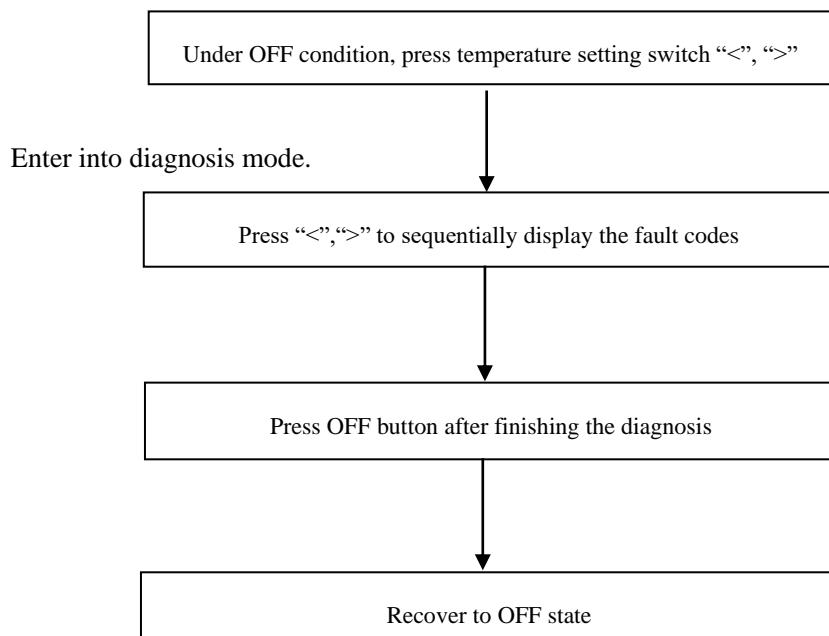


Table of error codes

Table of error codes	List of faults	Fault position
E--	Normal	
E11	Vehicle interior temperature sensor circuit opened	<ul style="list-style-type: none"> ● Vehicle interior temperature sensor; ● The harness or connector between temperature sensor and A\C controller; ● A\C controller.
E12	Water temperature sensor circuit shorted	<ul style="list-style-type: none"> ● WATER temperature sensor; ● The harness or connector between water temperature sensor and A\C controller; ● A\C controller.
E15	Water temperature sensor circuit opened	
E16	Water temperature sensor circuit opened	<ul style="list-style-type: none"> ● WATER temperature sensor; ● The harness or connector between water temperature sensor and A\C controller; ● A\C controller.
E18	Sunlight sensor circuit is shorted.	<ul style="list-style-type: none"> ● Sunlight sensor ● The harness or connector between sunlight sensor and A\C controller; ● A\C controller.
E43	The windshield at wind gap is abnormal	
E44	The air mixing windshield is abnormal.	
E51	The refrigerant is abnormal	<ul style="list-style-type: none"> ● Pressure switch ● The harness or connector between pressure switch and A\C controller; ● A\C controller.

Fault-tolerant function

In order to guarantee this system can normally run when the fault occurs, the system adopts the following measures:

S/N	Item	Fault phenomenon	Safety Precautions
1	Interior temperature transducer	Open circuit / short circuit	Is fixed as to be 25°C
2	Water temperature sensor;	Open circuit / short circuit	Is fixed as to be 25°C

2) Precautions for using air conditioner

1. When the air conditioner is to be run, be sure to start it when the engine runs at low speed. Do not start the air conditioner when the engine is running at high speed. This will cause the damage of air conditioner.
2. If the water invades in the control panel or in the sunlight sensor, it will cause the accidental faults. Therefore, pay attention to not letting water touch with these parts. Moreover, do not let the naked flame approach these parts.
3. In order to make the auto functions of the air conditioner operate normally, it is necessary to keep the cleanliness of sunlight sensor, and no materials should be left around the sensor. Otherwise, it will influence the functions of sunlight sensor.

- When using refrigerator, make the cab frequently ventilate.

If someone smokes when the refrigerator is running, the smoke will harmfully influence your eyes, therefore you should open the window to ventilate and perform the chilling for a short time to remove the smoke. When the air conditioner is to run for a long time, you should conduct the ventilating and refrigerating once for an hour.

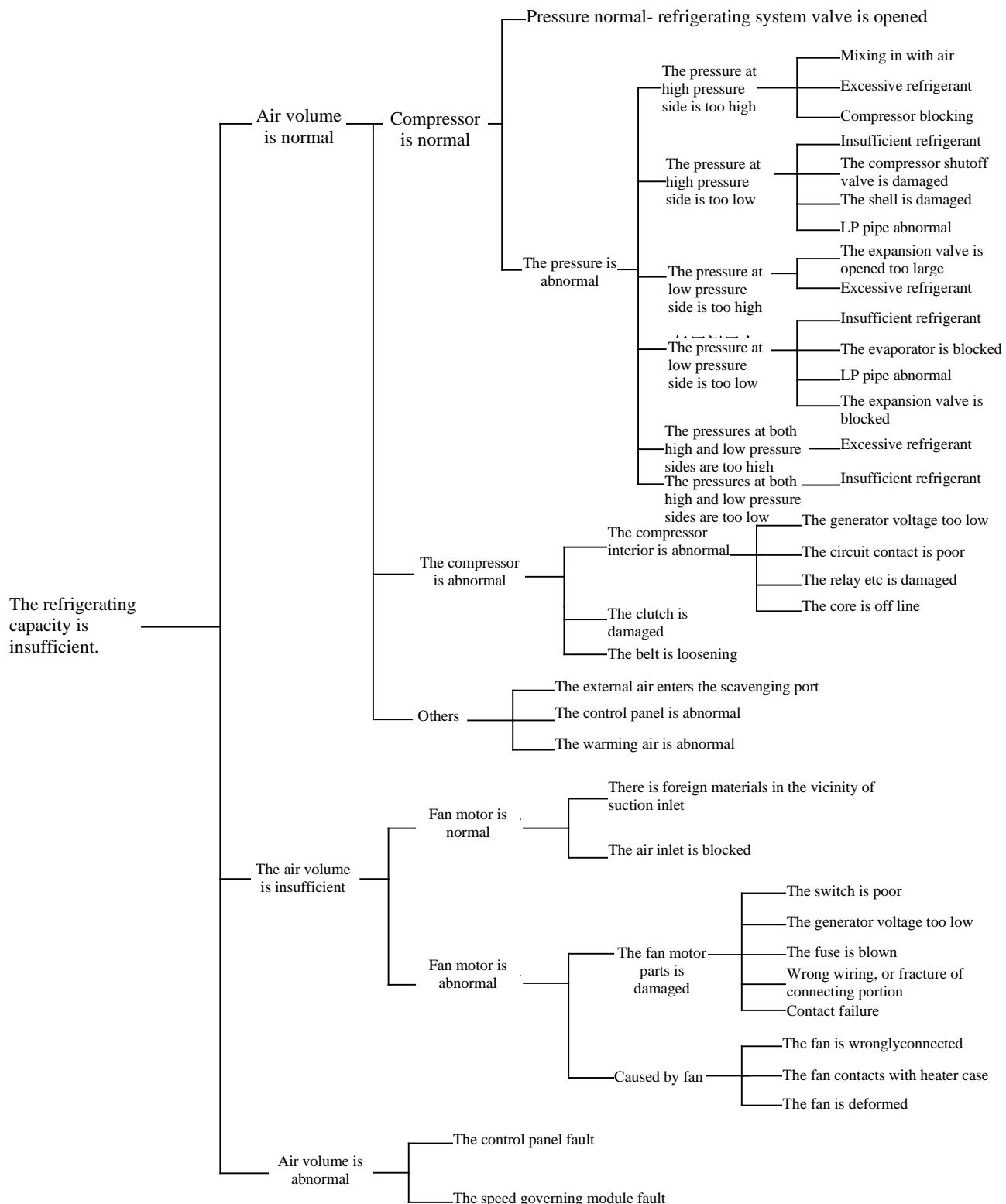
- Pay attention to not making the cab temperature too low

When the refrigerator is running, adjust the temperature to the extent that when you come into the cab, you will feel a little cold (5~6 °C lower than the outside temperature). Such temperature is thought to be the most suitable for human body, therefore pay attention to properly adjusting the temperature.

- Check and maintain the machine installed with air conditioner

Check the machine installed with air conditioner. See “Table of maintenance procedure”, and performance the inspection as per the table.

(3) Troubleshooting of common faults



4 Others

Fault	Service	Remarks
The drive is excessively worn. The track tension is insufficient.	<ul style="list-style-type: none"> ● Adjust track tension. 	
The moving speeds of traveling, rotating, movable arm, bucket rod and bucket are slow.	<ul style="list-style-type: none"> ● Check the hydraulic oil level. ● Check the main overflow valve for blocking. 	
The abnormal sound is generated from the pump.	<ul style="list-style-type: none"> ● Check the oil return filter element ● Check the hydraulic oil level. <p>Wash oil sucking strainer in hydraulic oil tank.</p>	
The hydraulic oil temperature is too high, and the temperature rise is too fast.	<ul style="list-style-type: none"> ● Wash hydraulic oil cooler. ● Adjust belt tension. ● Check the hydraulic oil level. 	

Chapter VIII Other Accessories

1. Hydraulic Crusher

1) Selection of hydraulic Crusher

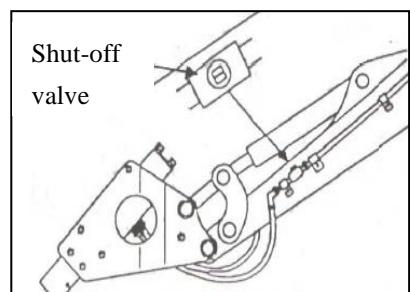
- (1) Select the appropriate crusher as per the machine type.
- (2) In order to guarantee the ideal performance, you should consider carefully the flow, pressure and impact force when selecting the crusher.
- (3) Consult the host National machinery / heavy industrial authorized distributor or the sales service center when you select the crusher for your machine.

2) Cautions when piping

- (1) When piping, please give priority to the spare stem on the main valve
- (2) Considering the back pressure, the tubing with the proper diameter should be selected
- (3) It is recommended to be equipped with a separate relief valve on the oil circuit, and its set pressure shall refer to the relevant requirements for the use of the crusher.
- (4) There must be a shut-off valve on the inlet and return lines of the crusher, and the shut-off valve should be arranged as close as possible to the crusher
- (5) The oil return line of the crusher should be directly returned to the oil tank return filter element. Do not connect to the cooler. It is forbidden to connect the oil return line of the crusher to the drain line of the main control valve, swing motor, walking motor or pump, otherwise they will be injured
- (6) Do not randomly change the original circuit of the excavator and the set pressure of the first-stage relief valve during the piping process
- (7) Please give priority to using the excavator to reserve broken installation holes. If you must weld the tubing bracket to prevent damage due to vibration, you should contact the authorized agent or customer service center of SINOMACH during welding.

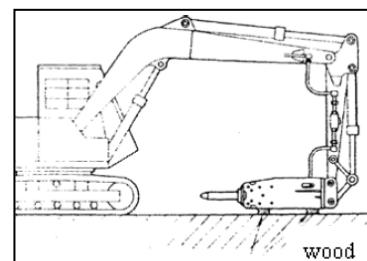
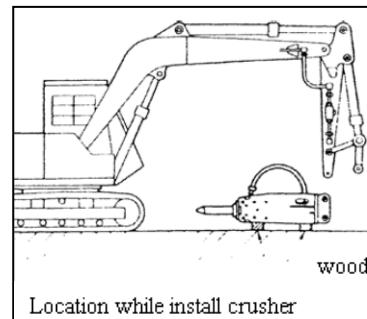
3) If your excavator is equipped with the original crushing pipeline when it leaves the factory, please pay attention to the following points

- (1) When choosing a crusher, please pay attention to the compatibility of the hose connector and the original pipe connector. If it does not match, please use the adapter
- (2) There are plugs in the pipeline oil ports on both sides of the forearm to avoid oil pipeline pollution. Please do not disassemble before installing the crusher pipeline.
- (3) The shut-off valves on the oil inlet and return lines are closed when leaving the factory. Before using the crusher, please rotate the joint to open the shut-off oil path.
- (4) The limit device of the broken pedal in the cab. Before using the crusher, please loosen the limit device. When you stop using the crusher, please tighten the limit device to avoid injury caused by misoperation.
- (5) The hydraulic system pressure set by the overflow valve is 200~220 kgf / cm².

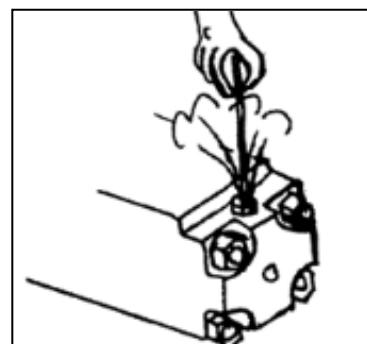
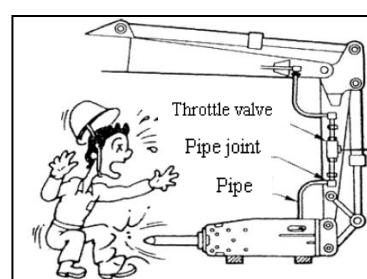


4) Precautions for disassembly and assembly of the crusher

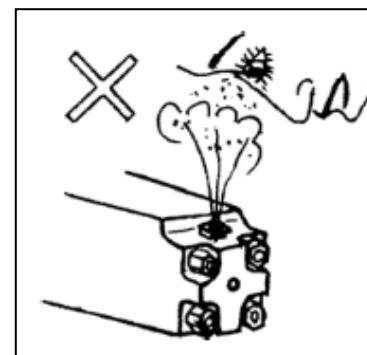
- (1) Before installing or disassembling the crusher, please read the "Excavator Instruction Manual" and "Crusher Instruction Manual" carefully
- (2) Please connect or dismantle the crusher and the excavator in a flat, hard, spacious place without mud, dust and debris (preferably indoor)
- (3) When two or more people are working together, they must strictly abide by the contact information agreed in advance, such as sign language, etc.
- (4) During the entire installation or removal process, the crusher must be stable to avoid it from tipping over.
- (5) Before installation or disassembly, first park the machine in a spacious position in the correct posture, then turn off the engine, release the system pressure, wait for the oil temperature to drop, and ensure that the shut-off valve is closed
- (6) Note that foreign objects such as garbage and water should not be mixed into the hydraulic system. If the breaker is installed on an old machine, the connecting parts must be cleaned with cleaning oil to ensure that the system is clean. When removing the crusher, keep the removed parts
- (7) The nitrogen in the nitrogen tank of the new crusher has been discharged before leaving the factory, so when using the crusher for the first time, you must inject nitrogen into the nitrogen tank. For specific operations, please refer to the "Crusher Instruction Manual"



Location while install crusher



- (8) When disassembling the crusher, be sure to discharge the gas in the piston chamber first, otherwise, the parts may suddenly pop out, causing danger



- (9) When exhausting, please keep your head away to avoid foreign matter ejected by the power of the jet during the gas discharge, which may cause danger

5) Maintenance

(1) The maintenance of hydraulic oil and filter

① For the machine equipped with hydraulic crusher, the hydraulic oil is easily polluted severely.

① Therefore, if you do not conduct the regular maintenance, the machine is easily out of order.

② Periodically check and maintain the hydraulic oil and 3 kinds of filter element to extend the life of machine.

④ After the crusher working for a period of time, replace the hydraulic oil and filter element as per the standard shown on the right.

Maintenance cycle: Unit: hours

Work device	Operation rate	Hydraulic oil	Filter element
Knapper	100%	600	250

- Replace the oil filter element the same time
- Hydraulic oil return filter element: 1 place
- Hydraulic pilot filter element: 1 place
- Hydraulic oil tank air filter element: 1 place

- ★ Once the hydraulic oil is deteriorated or contaminated, please replace it all quickly
- ★ Be sure to maintain the specified fuel tank oil level scale range
- ★ When it is cold weather , be sure to warm up the engine before operation. When it is hot, keep cool. It is recommended to use the crusher at the recommended oil temperature (50~70°C)

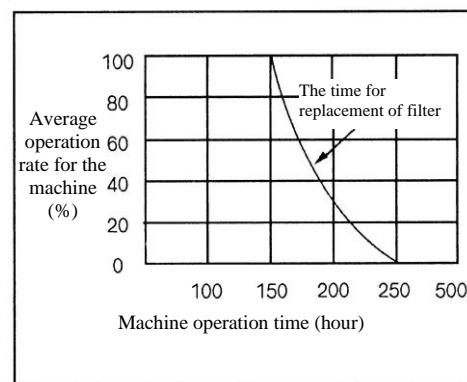
(2) Release the pressure inside the crusher

After the crusher finishes working for about 10s, stop the machine, and meanwhile manipulate the pedal switch to release the pressure in the oil way system.

If the pressure still exists, the life of inner diaphragm of the energy accumulator shall be shortened.

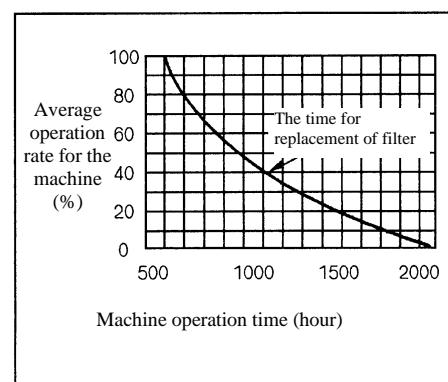
(3) When using crusher, the bolts and nuts of the main device may be loosened due to the vibration. So we must shorten the inspection cycle..

Guide for replacement of the filter of crusher



(4) Regardless of whether you choose the standard crusher of SINOMACH, please maintain the crusher in accordance with the requirements of the "crusher instruction manual" that comes with the crusher

Guide for replacement of the filter of crusher

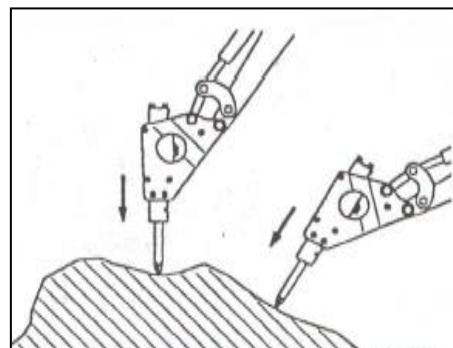


6) Safety precautions for operating crusher

Before using the breaker, please read the "Instruction Manual for the Breaker" carefully

(1) The loading direction of the crusher must be perpendicular to the crushed surface

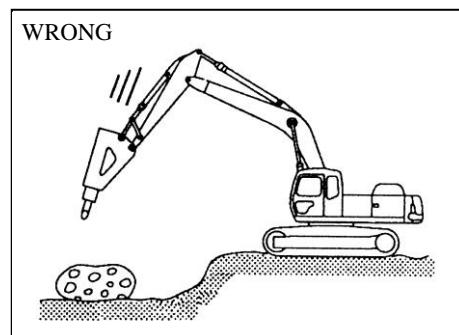
Otherwise, the drill rod will easily slip off the loading surface, causing damage to the drill rod and piston.



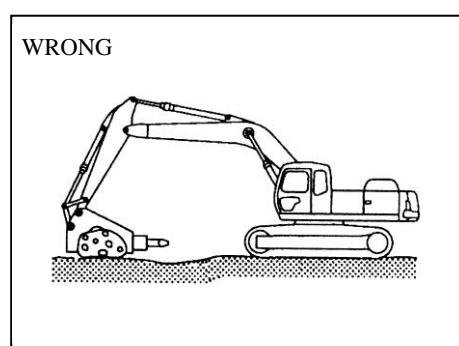
(2) Do not impact the stone when the crusher is falling down

Because the crusher is heavier than bucket, be sure to be slowly when operating.

If the crusher drops quickly, the working device may be damaged.

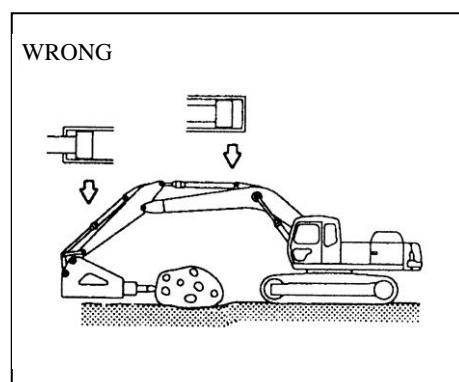


(3) Do not use crusher to push the stone through the rotation operation. This will hurt the rotating system and the working device.



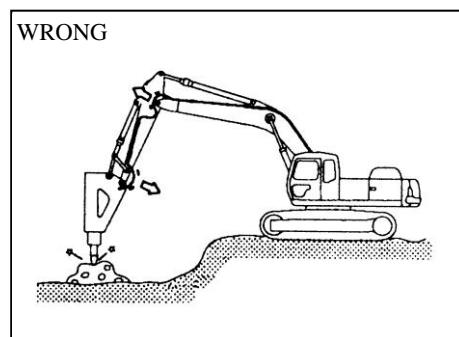
(4) When operating the crusher, make the piston end 100mm (4in) away from the cylinder block.

If the piston end contacts the cylinder block, it will damage the oil cylinder when operating the crusher.

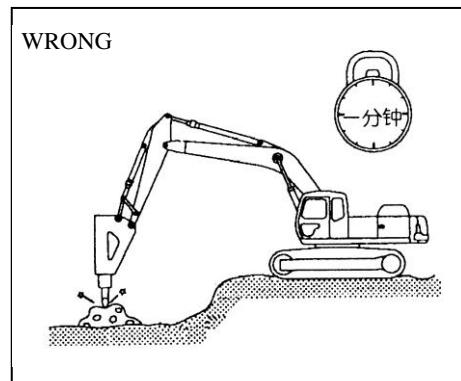


(5) If the hydraulic rubber pipe vibrates excessively

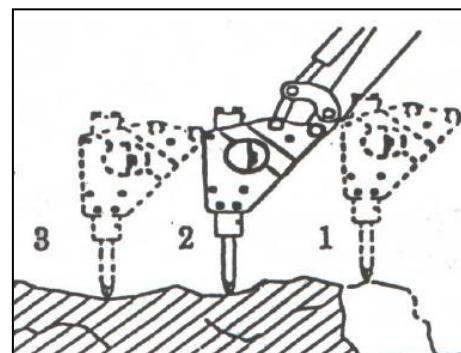
Under this circumstance, the continuous operating of the machine will cause the bolt to be loosened, the oil to be leaking the oil pipe on the pump to be damaged.



(6) Do not let the big arm and the bucket rod work on the same position for more than 1 minute. Otherwise, it will make the oil temperature increase, damage the energy accumulator and sealing parts.

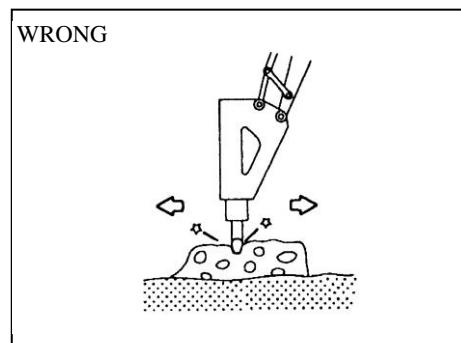


(7) When the target is larger and harder, please crush it from the edge



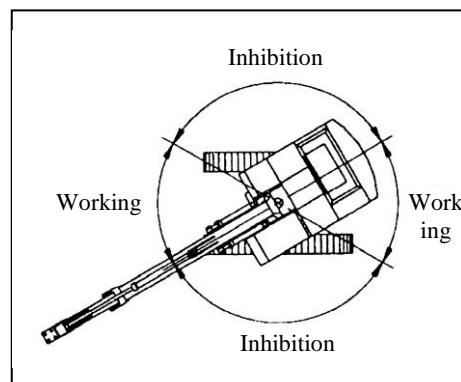
(8) When performing the impact work, do not move the machine or crusher.

During the crushing operation, do not operate the excavator to move left and right, or move the breaker, and use the drill rod as a prying rod. Otherwise, it will cause breakage of the crusher bolt, drill rod, etc. and abnormal wear of the guide sleeve; Cause malfunctions of working devices and slewing systems.



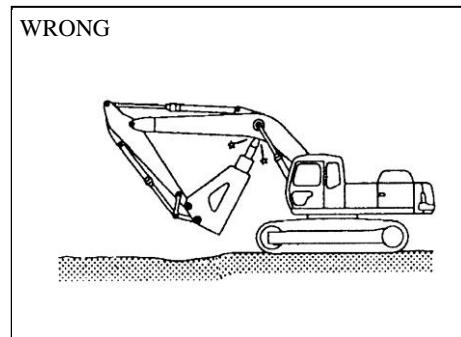
(9) Do not make the breaker work on the side of the machine

When the crusher is operated on the side, the whole machine is unstable and shortens the service life of the components of the lower traveling system.

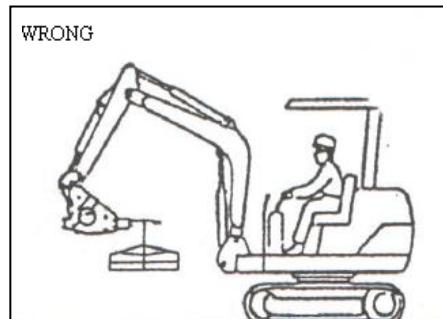


(10) Prevent the crusher to damage the arm

After the crusher is installed, the working range of the whole machine is limited. The stick cylinder and bucket cylinder cannot move in full stroke. Pay special attention when controlling the movement of the working device to avoid the crusher from damaging the arm.

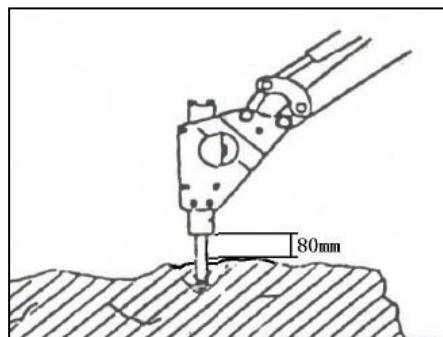


- (11) Do not use excavator and breaker for hoisting, otherwise, it will cause malfunction of working device or breaker



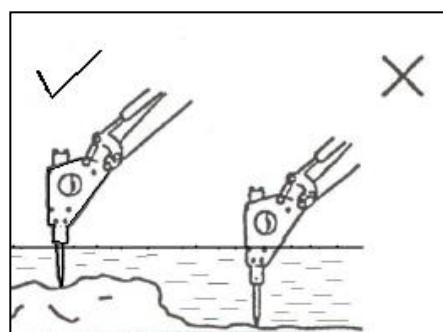
- (12) Do not immerse all the drill rods into the broken object

During the crushing operation, the drill rod shall be exposed at least 80mm, otherwise, it will cause the breaker or working device to malfunction



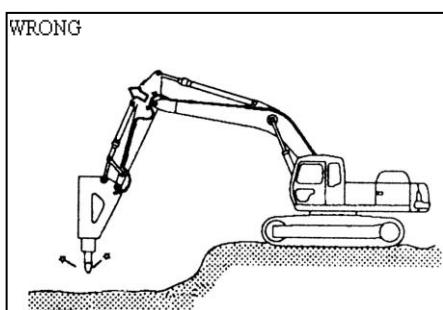
- (13) No underwater operations

Use ordinary crusher, do not immerse the part except the drill rod for underwater operation, otherwise it will cause the crusher and excavator to malfunction



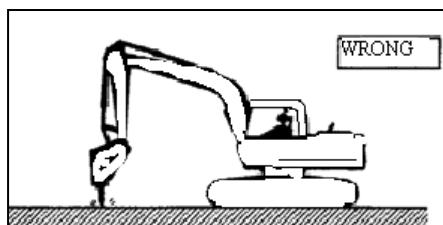
- (14) No air crushing

Once the stones are broken, stop the operation immediately to avoid air crushing, otherwise the accumulator may be damaged, the bolts will be loose or broken, and it will also have a bad impact on the excavator.



- (15) When the stick is in the vertical position, avoid crushing operation

When the stick is in the vertical position, the stick cylinder will vibrate violently, causing oil leakage or even damage



- (16) The use of crusher needs the increase of the protective devices. No crushing operation shall be allowed to perform without the protective device.

When using the crusher, the crushed material may fall or fly into the cab. In order to protect the safety of the operator, please install a protective frame in front of and on the cab.

2. Automatic refueling system

1) General introduction

The automatic refueling system is used to refuel from the oil drum to the excavator [typical fuel tank size 200-600 liters (50-150 gallons)]

2) Technical specifications

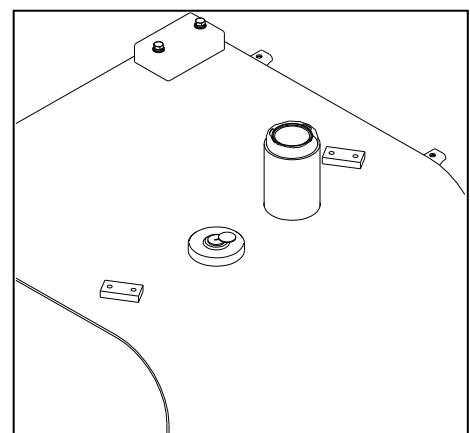
Model	VR050-C24
Operating temperature	-30°C~+50°C
Connector	3/4'BSP 25mm soft pipe
Motor	24V DC Permanent magnet motor, corrosion resistant Protection grade IP55
Performance	When using diesel fuel at 40°C, when the head is up to 3 meters, it can work continuously, and the self-priming is up to 3 meters. Rated 50L/min
Working period	Automatic disconnection control after 10 minutes (factory setting)
Random vibration	MIL-PRF-28800F
Protection grade	IP55 BS EN 60529:1992
Electromagnetic Compatibility	ISO 13766



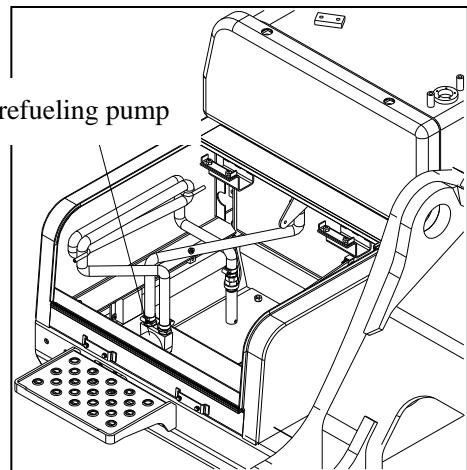
WARNING: DO NOT use this fuel pump for gasoline or any product with a flash point lower than 37°C. Use of it may cause an explosion or casualties.

3) Instructions

- (1) Open the fuel tank filler cap (to vent the fuel tank)
 - Ensure that all electrical connections are in a dry location
 - The pump must work under the fuse protection of its power supply

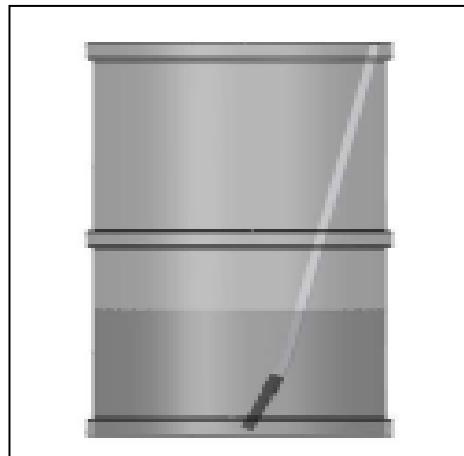


- (2) Untie the coiled hose from the storage location in the vehicle



Automatic refueling pump

- (3) Insert the hose with the bottom valve into the diesel drum or other oil drum to make sure it is completely submerged



- (4) Press the start button (1) to pump the diesel from the oil drum into the oil tank

★ If the oil drum is emptied, the pump will automatically stop, or you can press the stop button (O) to stop the pump at any time

★ The fuel pump is equipped with "JABSCO Intelligent Controller"

- The pump will automatically stop when there is empty suction
- Automatically stop the pump after working for 10 minutes (factory setting)
- Built-in thermal circuit breaker to prevent the motor from overheating
- This intelligent controller is connected to the vehicle control system. When the fuel in the fuel tank is filled to 90% of the volume, the pump will automatically stop; if you need to continue filling, you should continue to press the start button (1) and release the button (1) to stop refueling.



★ If you change to another oil drum, you should press the start button (1) again

- (5) Pull out the hose from the oil drum after refueling, and wipe off the residue on the surface of the hose. Coil the hose (minimum diameter 150 mm) and return it to the storage location.

(6) Put on the filler hole cover

4) Precautions

- DO NOT start the pump before the bottom valve is immersed in liquid
- If the pump fails to start, press the stop button (O), wait 3 seconds, and then press the start button (1)
- Ensure that the bottom valve filter is not damaged
- Violation of product operating procedures can cause premature failure and leakage.
- Check the hose for damage or leakage every time you use it



WARNING: Observe all necessary precautions when handling fuel. Avoid leaks. Use appropriate personal protection measures

