



# Yuchai U35/YC35SR Hydraulic Excavator

# Operator's Manual



**Guangxi Yuchai Heavy Industry Co., Ltd.**  
GUANGXI YU CHAI HEAVY INDUSTRY CO., LTD.

## **Warning**

**Improper operation of the machine may cause injury or death. The following shall be done before using the machine:**

- **Keep in mind the safety regulations and correct usage specifications of the machine.**
- **Read and understand the relevant description of the instruction on safe operation of the machine.**
- **Understand and be familiar with all safety markings on the machine.**
- **Keep the irrelevant personnel be away from the working area.**
- **Before formally operating the machine in the working area, the safety operation training of the machine shall be carried out in advance.**

**You are responsible for complying with relevant laws and regulations and the instructions of Yuchai Heavy Industry on machine operation and maintenance.**

# YUCHAI

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# Contents

<b>1. PREFACE</b> .....	<b>1</b>
<b>TO USERS</b> .....	1-2
<b>PRODUCT INFORMATION</b> .....	1-3
<b>MACHINE DIRECTION</b> .....	1-5
<b>COMPOSITION OF THE MACHINE</b> .....	1-6
<b>TECHNICAL SPECIFICATIONS</b> .....	1-7
<b>2. SAFETY REGULATIONS</b> .....	<b>1</b>
<b>GENERAL SAFETY RULES</b> .....	2-2
<b>SAFETY WARNING</b> .....	2-3
<b>SAFETY EQUIPMENT</b> .....	2-4
<b>SAFETY SIGNS</b> .....	2-5
<b>SAFETY IN THE WORKPLACE</b> .....	2-12
<b>SAFE OPERATION</b> .....	2-13
<b>MACHINE TRANSPORTATION AND HANDLING</b> .....	2-24
<b>DOWNTIME FOR MAINTENANCE</b> .....	2-25
<b>FIRE, EXPLOSION AND POISONING PREVENTION</b> .....	2-26
<b>BATTERY</b> .....	2-27
<b>HYDRAULIC SYSTEM</b> .....	2-28
<b>CAB FLIPPING</b> .....	2-30
<b>3. INTRODUCTION OF COMPONENTS</b> .....	<b>1</b>
<b>OVERVIEW OF CONTROLS</b> .....	3-2
<b>DIGITAL COMBINATION INSTRUMENT</b> .....	3-3
<b>SWITCH ASSEMBLY OF THE RIGHT CONTROL BOX</b> .....	3-9
<b>SWITCH ASSEMBLY OF THE LEFT CONTROL BOX</b> .....	3-11
<b>SAFETY LOCK PARTS</b> .....	3-12
<b>OPERATION OF THE ATTACHMENT AND SLEWING MECHANISM</b> .....	3-13
<b>TRAVEL CONTROL</b> .....	3-15
<b>MECHANICAL ACCELERATOR AND ELECTRONIC ACCELERATOR</b> .....	3-16
<b>DRIVER SEAT</b> .....	3-17
<b>SEAT BELT</b> .....	3-18
<b>AIR CONDITIONING CONTROL</b> .....	3-19
<b>RADIO</b> .....	3-23
<b>DOOR AND WINDOW</b> .....	3-25
<b>4. OPERATION GUIDE</b> .....	<b>1</b>
<b>PREPARATION BEFORE OPERATING THE MACHINE</b> .....	4-2
<b>ENGINE OPERATION</b> .....	4-3
<b>GET ON/OFF THE MACHINE</b> .....	4-7
<b>MOVEMENT OF THE MACHINE</b> .....	4-8
<b>STEERING OF THE MACHINE</b> .....	4-10

<b>SLEWING OF THE MACHINE</b> .....	4-11
<b>OPERATION OF THE ATTACHMENT</b> .....	4-12
<b>WORK ON SLOPES OR IN WATER</b> .....	4-14
<b>KEEPING AWAY FROM MUDDY ENVIRONMENT</b> .....	4-15
<b>OPERATION GUIDE FOR CONSTRUCTION</b> .....	4-16
<b>DISASSEMBLY AND INSTALLATION OF THE BUCKET</b> .....	4-19
<b>PARK THE MACHINE</b> .....	4-20
<b>AFTER OPERATION</b> .....	4-22
<b>LOADING/UNLOADING AND TRANSPORT OF THE MACHINE</b> .....	4-23
<b>OPERATION IN COLD/HOT WEATHER</b> .....	4-27
<b>STORAGE OF THE MACHINE</b> .....	4-28
<b>TROUBLESHOOTING</b> .....	4-30

<b>5. MAINTENANCE</b> .....	1
<b>COMMON SENSE FOR MAINTENANCE</b> .....	5-2
<b>MAINTENANCE OUTLINE</b> .....	5-4
<b>MANDATORY REPLACEMENT PARTS</b> .....	5-6
<b>OIL SELECTION TABLE</b> .....	5-7
<b>TIGHTENING TORQUE</b> .....	5-8
<b>REGULAR INSPECTION AND MAINTENANCE SCHEDULE</b> .....	5-11
<b>REGULAR INSPECTION AND MAINTENANCE SCHEDULE (CONTD.)</b> .....	5-12
<b>ROUTINE INSPECTION</b> .....	5-13
<b>ENGINE FUEL SYSTEM</b> .....	5-14
<b>ENGINE COOLING SYSTEM</b> .....	5-16
<b>ENGINE LUBRICATING SYSTEM</b> .....	5-20
<b>ENGINE AIR INTAKE SYSTEM</b> .....	5-22
<b>OTHER MAINTENANCE OF THE ENGINE</b> .....	5-23
<b>HYDRAULIC SYSTEM</b> .....	5-24
<b>TRAVEL REDUCER</b> .....	5-32
<b>TRACK</b> .....	5-34
<b>TRACK ROLLER, SUPPORT ROLLER, AND GUIDE ROLLER</b> .....	5-36
<b>LUBRICATION</b> .....	5-37
<b>AIR CONDITIONER (IF PROVIDED)</b> .....	5-38
<b>BUCKET TEETH REPLACEMENT</b> .....	5-41
<b>WASHING OF FLOOR MATS</b> .....	5-42
<b>MAINTENANCE OF ELECTRICAL SYSTEM</b> .....	5-43

<b>6. ACCESSORIES GUIDE</b> .....	1
<b>SAFETY PRECAUTIONS</b> .....	6-2
<b>ASSEMBLY/DISASSEMBLY STEPS OF ACCESSORIES</b> .....	6-4
<b>ACCESSORIES OPERATION GUIDE</b> .....	6-4
<b>DAILY INSPECTION OF HYDRAULIC BREAKER HAMMER</b> .....	6-10

**APPENDIX: CIRCLE FILLING INSTRUCTION FOR PRODUCT CONFIGURATION OF THE CERTIFICATE OF CONFORMITY**

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**Preface**

## To users

Dear users,

Thanks for selection of the excavator from Yuchai Heavy Industry and thanks for your great support for Yuchai business.

This manual is for safety guidance and the correct use and maintenance of the machine. Before starting and operating the machine for the first time and before repairing the machine, please read this manual carefully and fully understand the safety regulations, operation guidelines and maintenance matters until you fully understand them. For convenience of reference, please keep this manual in a designated place so that the qualified machine operators can read it regularly. Please immediately order this manual from us or our agent in case that this manual is lost, damaged, or difficult to read. When transferring this machine, please also give the new owner this manual so that he can use this machine correctly.

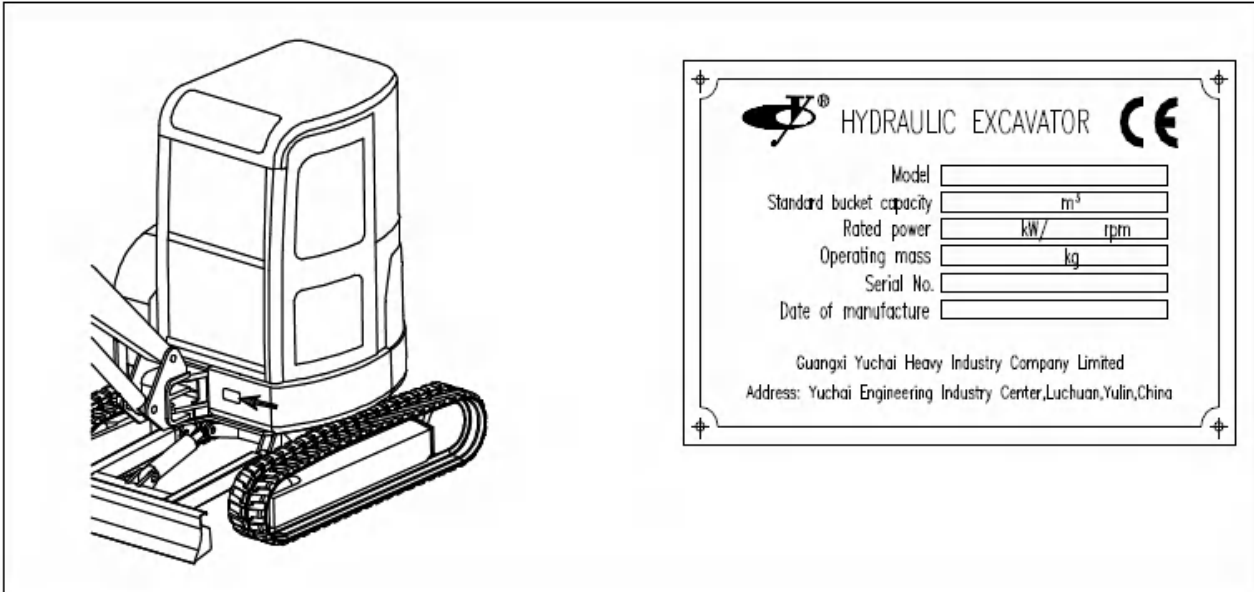
Please entrust Yuchai agent or the maintenance station to overhaul and adjust the machine, and the original accessories and spare parts from Yuchai shall be used. If non original accessories or parts are used, it may exert no obvious impact on the machine at that time, but it is likely to cause a series of adverse consequences in the future. If the machine failure is caused by the use of non original accessories and parts or maintenance by an unauthorized unit, Yuchai Heavy Industry will not undertake the three guarantee warranty business (repair, replacement and return) even within the guarantee period.

With adherence to the principle of "customer first", Yuchai Heavy Industry continuously improves its products to provide the best products to users as far as possible. Therefore, the improvement may be implemented at any time. For those in sale, if you need to know the basic information of the machine, you can check it according to the position shown in the figure.

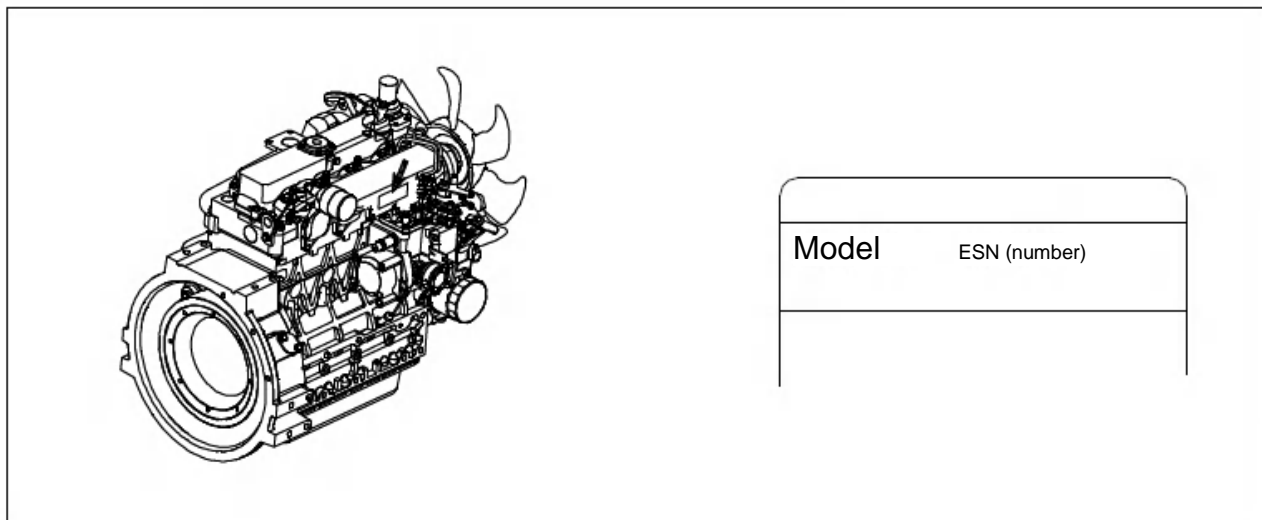
**Guangxi Yuchai Heavy Industry Co., Ltd.**

## Product Information

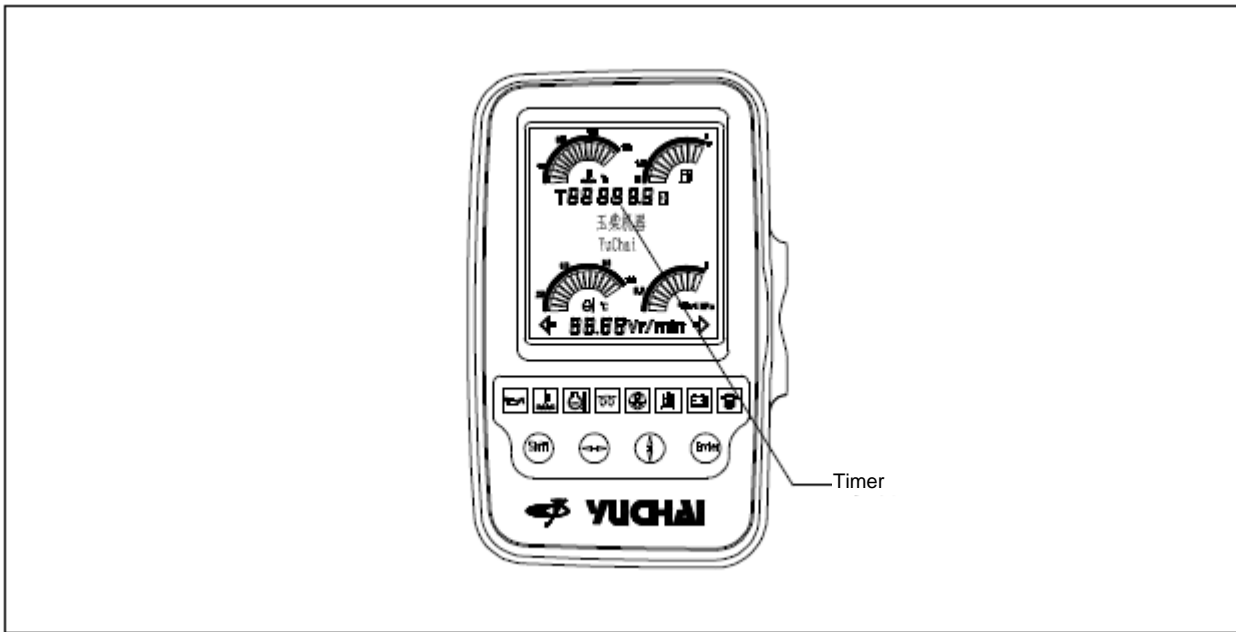
- Machine information (the nameplate of the machine is in the right front of the platform)



- Engine information (the engine nameplate is located in the middle of the engine)




- **Machine operation information (the engine timer is located on the digital instrument cluster in the cab of the machine)**



## Machine archive

Fill in the product serial number and engine serial number of your machine in the table below. When you need to purchase machine parts or want to obtain relevant information, you can inform Yuchai of these codes.

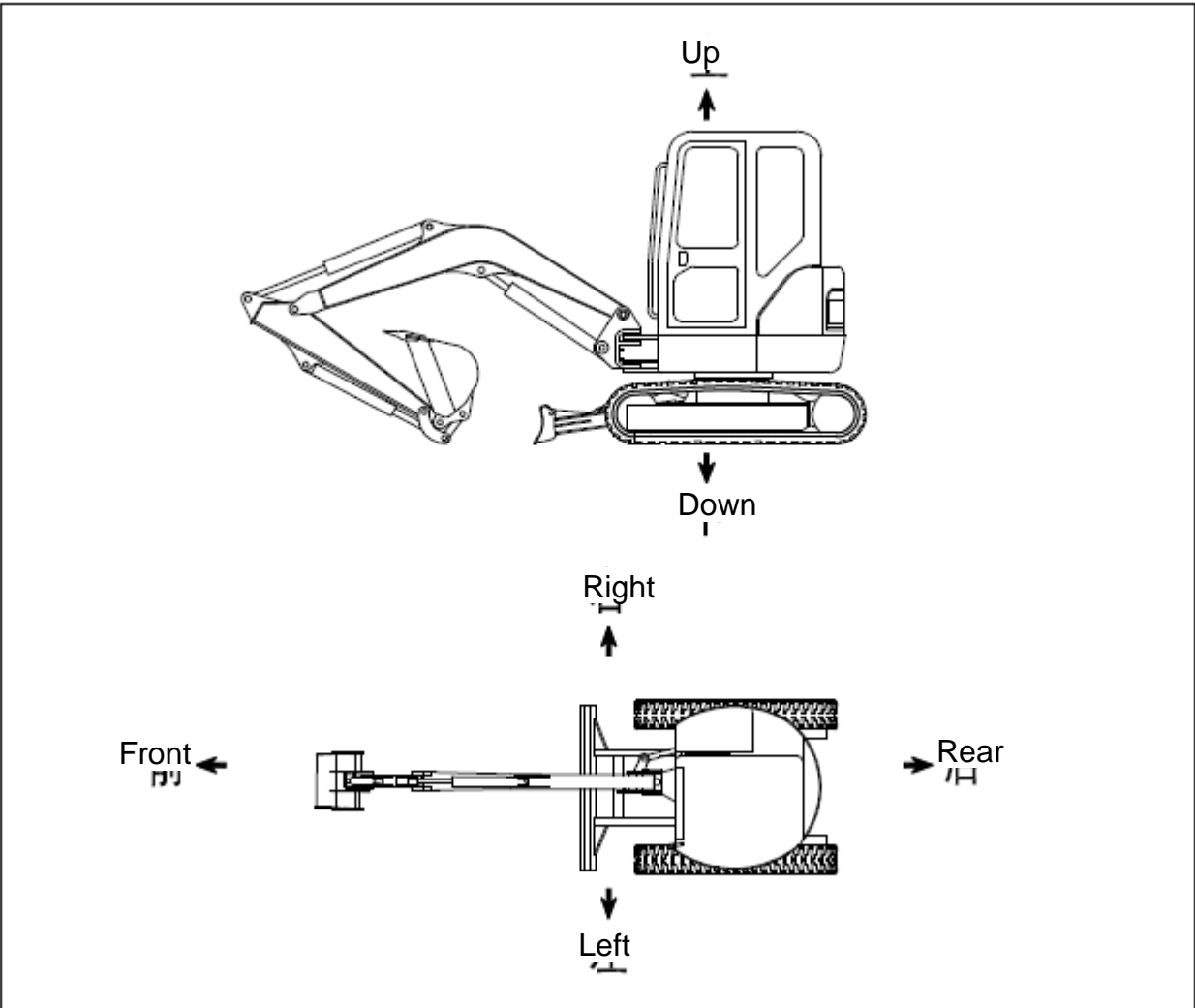
Please record these numbers and keep them together with the product certificate. If your machine has been stolen accidentally, you can submit the information to the local public security agency.

	<ul style="list-style-type: none"> <li>● Machine model _____</li> <li>● Machine serial number _____</li> <li>● Engine number _____</li> <li>● Distributor information            _____            _____            _____            _____</li> </ul>
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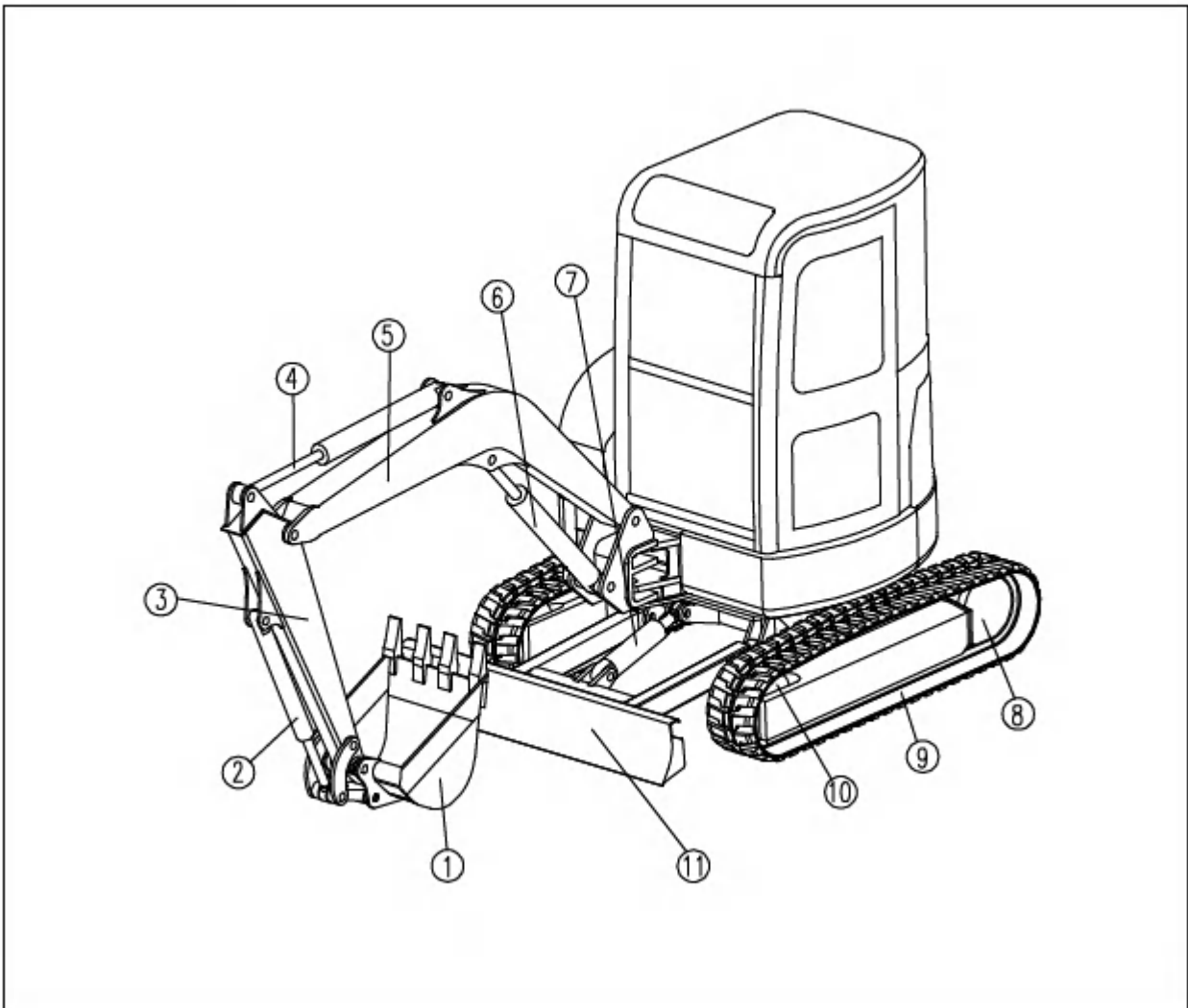


# Machine direction

The front, rear, left, right, up, and down in this manual refer to the various directions of the illustrated state.



## Composition of the machine



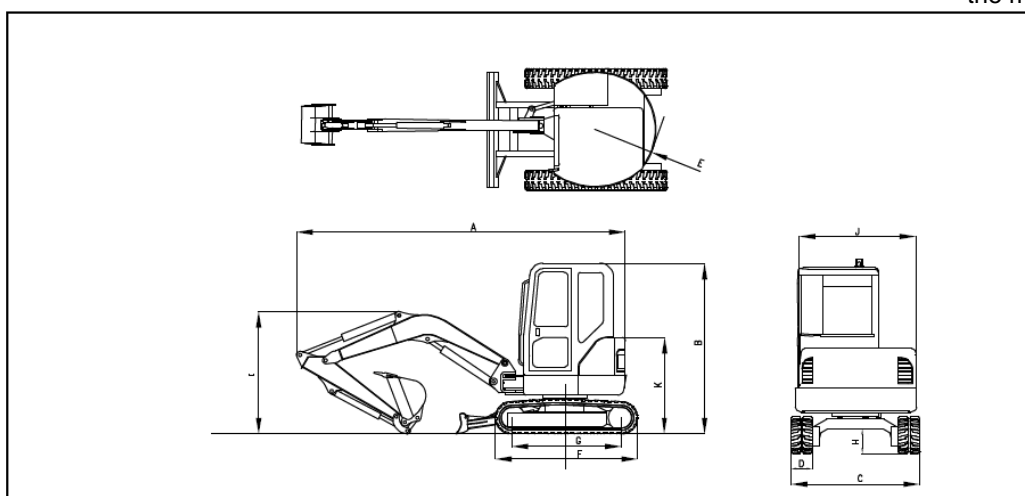
- |                  |                    |                |                        |                  |
|------------------|--------------------|----------------|------------------------|------------------|
| 1. Bucket        | 2. Bucket cylinder | 3. Bucket arm  | 4. Bucket arm cylinder | 5. Boom          |
| 6. Boom cylinder | 7. Dozer cylinder  | 8. Drive wheel | 9. Track               | 10. Guide roller |
| 11. Dozer blade  |                    |                |                        |                  |

## Technical specifications

### 1. Structural size parameters

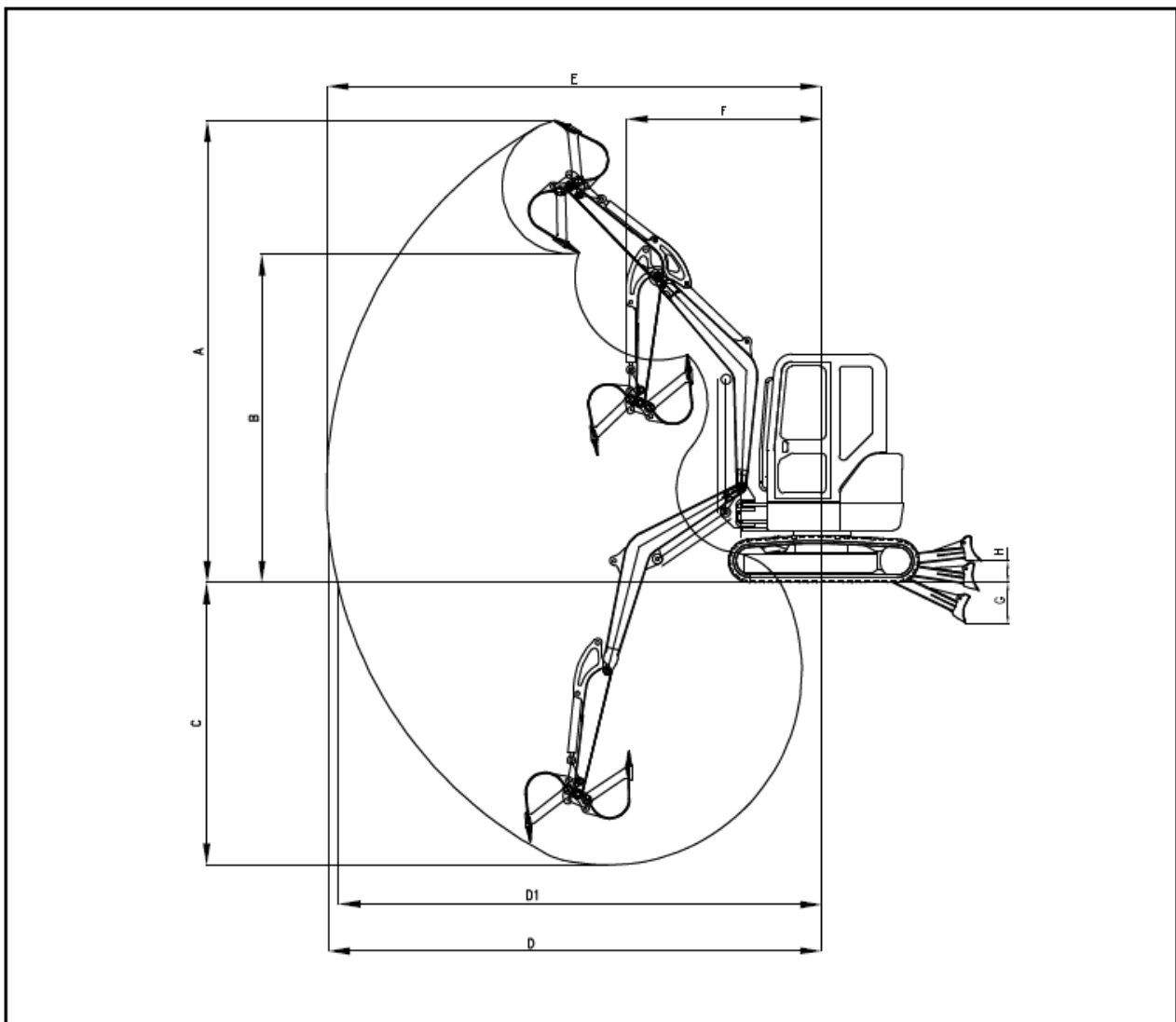
Code	Item	Unit	U35
			U35-BF51
	Operation weight	kg	3875
	Standard bucket capacity	m <sup>3</sup>	0.12
	Engine name		3TNV88F
	Engine power	kW/rpm	18.2/2200 (net)
<b>A</b>	Total length	mm	4630
<b>B</b>	Total height	mm	2550
<b>C</b>	Overall width	mm	1800
<b>D</b>	Track width	mm	300
<b>E</b>	Platform turning radius	mm	900
<b>F</b>	Track length	mm	2100
<b>G</b>	Axle track	mm	1620
<b>H</b>	Ground clearance	mm	350
<b>1</b>	Total height of boom end	mm	1510
<b>J</b>	Platform outer width	mm	1740
<b>K</b>	Engine hood height	mm	1425
<b>L</b>	Platform ground clearance	mm	575
	Backhoe outer width	mm	638
	Travel speed (low/high)	km/h	3.1/4.8
	Platform rotation speed	rpm	11-13
	Cab		•
	Driving cab		
	With swing configuration		•
	Swing angle (L/R)	°	67.7° /53.7°

Note: The above structural parameters are nominal values, and no prior notice will be given if they are changed by the manufacturer.



## 2. Work parameters

Code	Item	Unit	U35
			U35-BF51
A	Maximum excavation depth	mm	5156
B	Maximum unloading height	mm	3588
C	Maximum excavation depth	mm	3170
D	Maximum excavation radius	mm	5557
D1	Maximum ground level digging distance	mm	5438
E	Digging radius of the maximum digging height	mm	2948
F	Minimum radius of gyration	mm	2260
G	Maximum bucket depth of the dozer blade	mm	425
H	Maximum lifting height of the dozer blade	mm	373
	Maximum excavation force	kN	32.7



Note: No prior notice will be given if they are changed by the manufacturer.

### 3. Bucket series

S/N	Bucket capacity m <sup>3</sup>	Width mm	Weight Kg	Number of bucket teeth
1	0.12	593	100	4

	Travel speed (km/h)	Maximum traction (kN)	Climbing capacity
High speed	4.8		35°
Low speed	3.1	34	

### 4. Travel mechanism

Independent drive is achieved by a hydraulic motor through a multi-stage planetary reducer. The reducer is hidden in the width of the crawler.

### 5. Hydraulic system

Load sensitive hydraulic system

Main pump: theoretical displacement: 45 cc/r

Main valve: rated flow 90L/min

System pressure: 24Mpa

Oil return filter: 10 μm

Oil suction filter: 5μ

### 6. Electrical system

Voltage: 12V

Battery: 60Ah

### 7. Environmental conditions

Temperature: -15~40°C

RH: <85%

Altitude: The engine will output at normal power below 1200 meters above sea level, and the engine output power will be corrected according to the diesel engine manual for those above 1200 meters above sea level.

Ambient temperature at transportation and storage: -15~40 °C

## 8. Mechanical interference of the machine

The working devices of various series of hydraulic excavators may interfere with the boom oil cylinder or the boom lower cover plate when they are equipped with some non-standard working devices. Therefore, the attention should be paid to the angle between the bucket and the boom when retrieving the stick if the machine uses non-standard working devices to prevent interference with the boom oil cylinder and damage to the machine body.

The following are all non-standard attachment attachments provided by the manufacturer:

Buckets	Bucket accessories directly mounted on the bucket arm
	Bucket accessories for use with quick change couplings
	Bucket accessories for use with quick change devices
Crushing hammer	Crushing hammer directly mounted on the bucket arm
	Crushing hammer for use with quick change devices
Drilling tools	Drilling device directly mounted on the bucket arm
	Drilling device for use with quick change devices
Grab bucket	Grab bucket directly mounted on the bucket arm

If the model you purchased has any of the above configurations, please pay attention to the issues mentioned above.

## 2 Safety regulations

## General safety rules

Following the relevant safety regulations in this manual can avoid most accidents that endanger the operation and maintenance of the machine. Before the operation or maintenance of the machine, please read and understand all the safety information and the safety markings of the machine in this instruction.

The safety related description in this instruction points out the possible problems during the normal operation and maintenance of the machine, and it provides the possible troubleshooting to these problems.

Please refer to each chapter of this instruction for the description related to safety, which constitute the general guidance on safety with the description in this chapter.

The safety information in this instruction and the machine does not include all potential hazards and possible countermeasures. If you adopt the methods or actions not recommended or allowed in this instruction and the machine, necessary measures shall be taken to ensure safety.

Under no circumstances shall it engage in the use or operation prohibited by the instruction.

The excavator shall be operated and maintained by trained and qualified personnel.

Before starting, all functions of the machine shall be checked. If you find the machine is abnormal, stop it immediately to find out the cause, and work after troubleshooting.

The inspection, maintenance and service shall be carried out in strict accordance with the provisions of this instruction, and the operator shall work and operate in accordance with the operation methods, safety provisions and the working scope of the machine specified in this instruction.

If you are under the influence of alcohol or drugs, please do not operate or maintain the machine, it will make you and the people around you very dangerous.

Do understand the meaning of the relevant signals and gestures.

During moving on the road, please be familiar with the relevant laws and regulations of the local country or region and strictly abide by them.

Please ensure that there are no other people in the work area before operating the machine.



## Safety warning

### 1. Warning signs






In this instruction, this warning marking points out important information about safety. If you find the sign, please carefully read the information and advice to avoid possible casualty accident.

### 2. Safety reminders

This instruction provides precautions, signs and descriptions of potential hazards for the safe use of the machine. Before operating, maintaining or repairing the machine, please read this manual and the safety signs affixed carefully, and work in accordance with the relevant procedures.

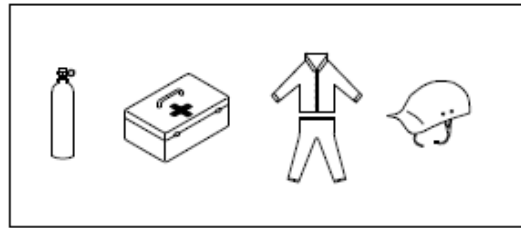
The safety prompts of this machine are indicated with words such as "Danger", "Warning" or "Note". Their explanations are as following:

-  **Danger:** it indicates that the consequences of danger will lead to death or serious injury if not avoided. It is only applicable to a few occasions with the most serious danger.
-  **Warning:** it indicates the potentially dangerous consequences may lead to death or serious injury if not avoided.
-  **Attention:** it indicates that the consequences of potential hazards may lead to low or medium injury if not avoided, and it can also be used to prompt unsafe operations that may lead to personal injury.

# Safety equipment

## 1. Protective equipment for operators

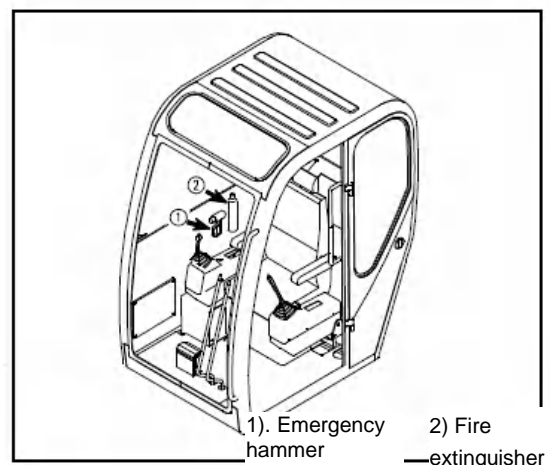
- 1) The operator must wear tight-fitting and suitable work clothes, safety helmets, working leather shoes and other related safety protection equipment (such as: protective earplugs, gloves, protective glasses, seat belts, etc.) before operation or maintenance.
- 2) If the operator's hair is too long, please tie it up and cover it with a safety cap, which will protect your hair from being entangled by the machine.
- 3) The user must provide emergency medicines in the machine, conduct regular inspections, and add medicines when necessary, so that they can be used when they are urgently needed.
- 5) Before operation or overhauling, please be sure to check whether all protective equipment functions normally.



## 2. Emergency hammer and fire extinguisher

The emergency hammer and fire extinguisher are installed on the right wall panel of the cab.

When someone is trapped in the cab and cannot get on or off normally, and it is necessary to escape from the cab, please smash the glass by aiming the pointed cone of emergency hammer to the glass until the glass is broken. Please pay attention to the protection of eyes and face when smashing the glass.



Use a fire extinguisher prepared for the machine in advance to extinguish the fire when the machine is on fire.

Please carefully read the instructions on the fire extinguisher and use the fire extinguisher strictly according to the instructions.

Regularly check and maintain the fire extinguisher.

# Safety signs



**Warning: Failure to understand the safety signs or loss of safety signs may result in injury or death. Please replace the missing or damaged signs in time, and keep the surfaces of all safety signs clean and easy to distinguish.**

Before operating, maintaining, and repairing the machine, you must carefully read the operating instructions and the warning signs affixed to the machine to ensure that you fully understand its contents and follow the relevant procedures.

Check the signs before starting the machine every day. If you can't see clearly, please clean it.

When cleaning the signs, only cotton cloth, water and soap can be used. Do not use organic solvents, gasoline, etc., as that will easily cause the signs to fall off.

If the signs are damaged, lost or illegible, please replace them. If the label is on the part that needs to be replaced, make sure that the new part is equipped with a sign.

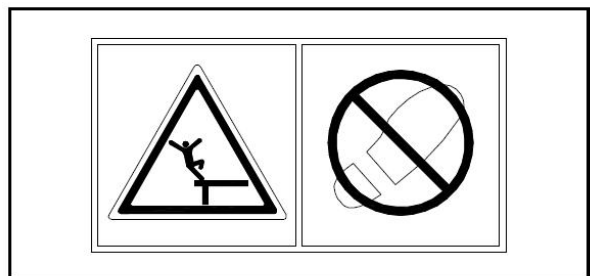
Please contact Yuchai agent to obtain a new safety mark.

## 1. Classification of safety signs

The safety marks in this manual and on the machine adopt "graphic safety sign" and "graphic and text safety sign".

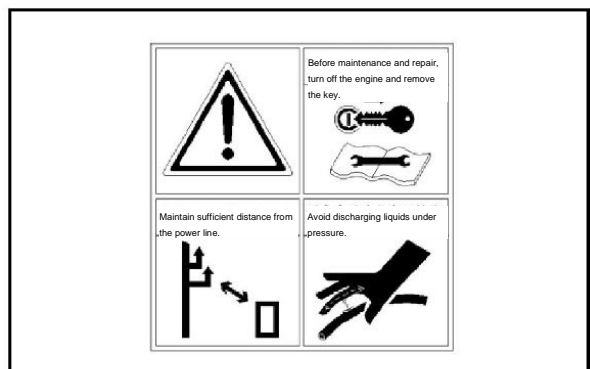
### A. Graphic safety signs

This kind of safety sign uses graphics to show safety warning information, which is easy to understand and clear at a glance.



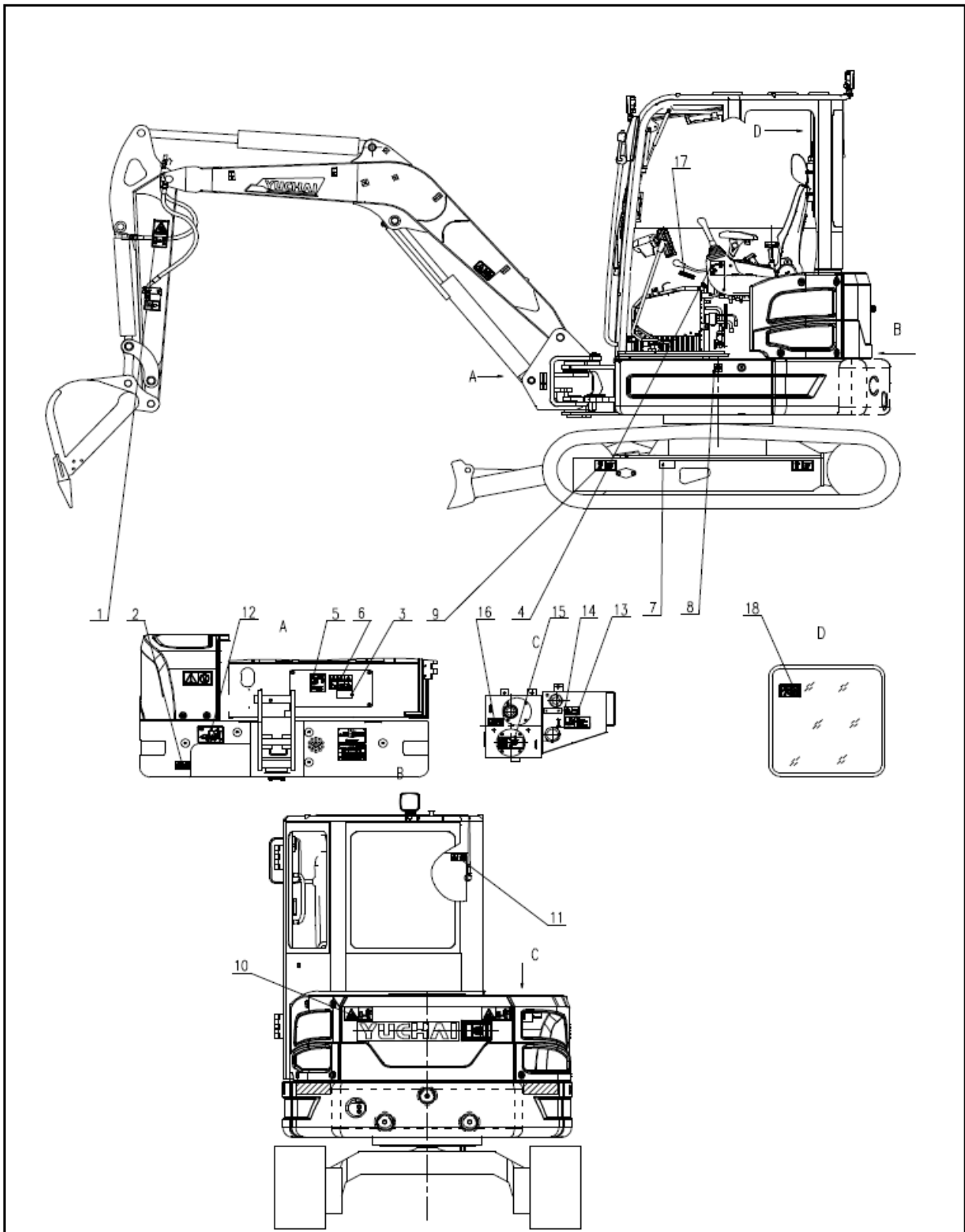
### B. Graphic and text safety signs

This safety sign is provided with graphics and corresponding explanatory text, which is used where the graphics cannot fully express safety information and requires text for further explanation.



## 2. Safety sign pasting location

The sign shown in the graphics is only the "safety sign" part of all signs, and the rest of the function signs will be introduced in the following chapters.



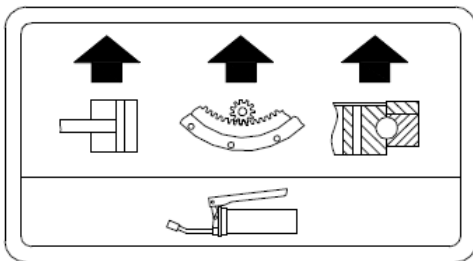
### 3. Safety sign diagram and instructions

#### 1) Pay attention to and stay away from the attachment

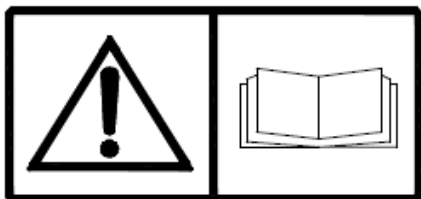


Movement of the attachment can cause personal injury. Keep a safety distance away from the attachment area.

#### 2) Grease refilling sign

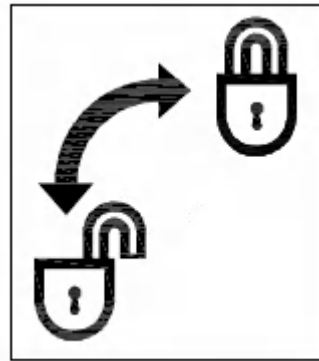


#### 3) Read the instruction manual carefully

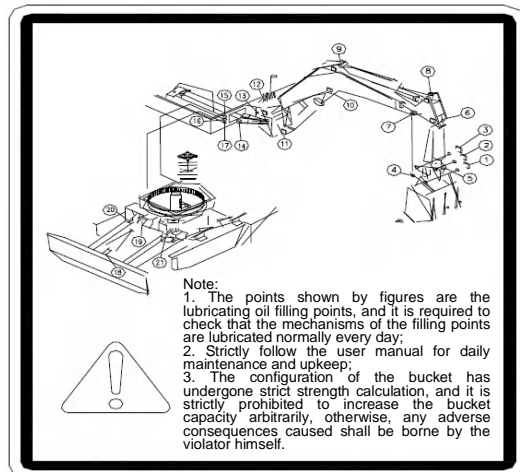


Before operating, maintaining, disassembling, assembling, and transporting the machine, please always read the instruction manual.

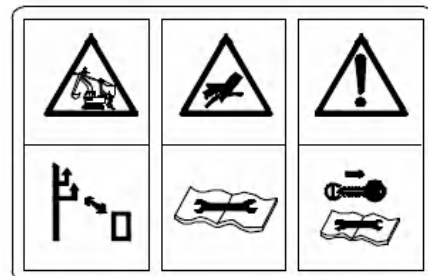
#### 4) Lock sign



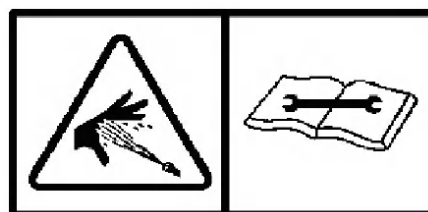
#### 5) Grease filling sign



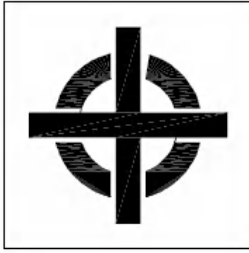
#### 6) Safety information for attention during operation and maintenance



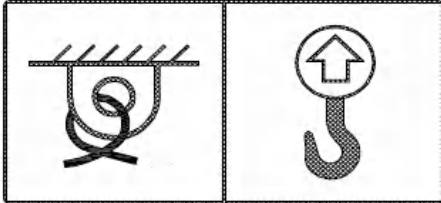
#### 7) Pay attention to the danger of high-pressure oil injection when adjusting the tension of the track



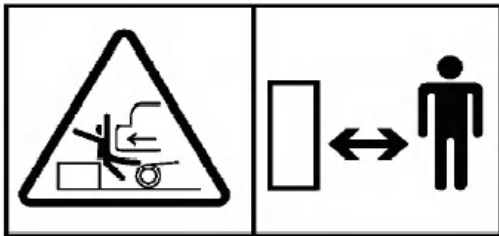
**8) Slewing center**



**9) Cable lifting combination**

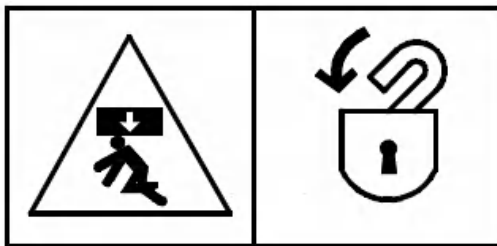


**10) Keep staying away from the excavator**



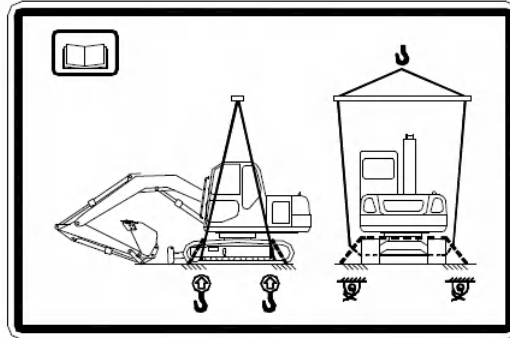
When the machine is rotating, the upper rotating body may pinch your body, please do not enter the rotating range.

**11) Please lock it tightly after opening the flip window of the cab**

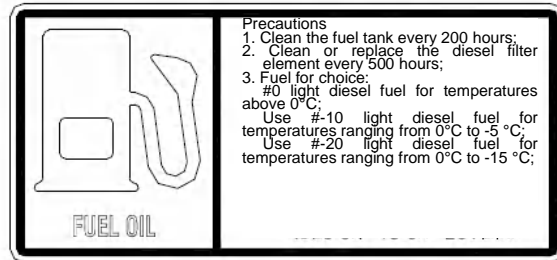


Unlocked windows will suddenly close due to some external force or machine vibration, which may cause personal injury.

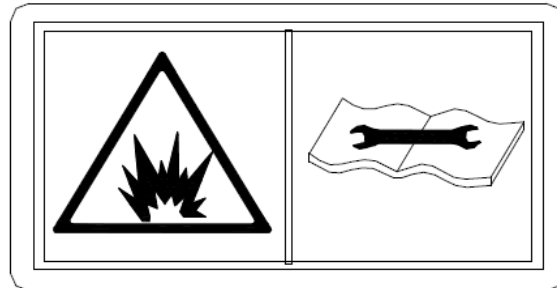
**12) Lifting sign**



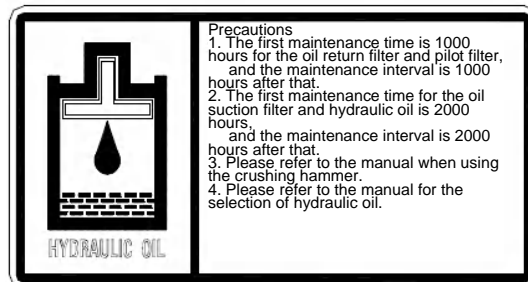
**13) Fuel filling sign**



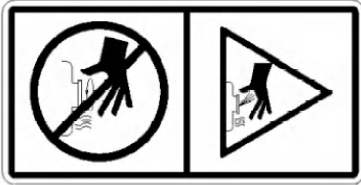
**14) Fire sign**



**15) Hydraulic refueling sign**



**16) The container cover of hydraulic oil and engine coolant cannot be opened at high temperature**

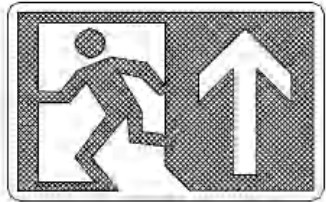


The high temperature hydraulic oil and coolant have high pressure. When opened at this time, the hot oil will be sprayed out, causing personal injury. Wait for it to cool down before removing the lid.

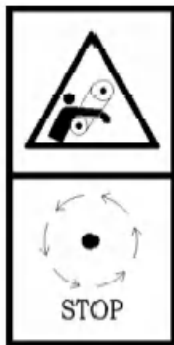
**17) Accelerator sign**



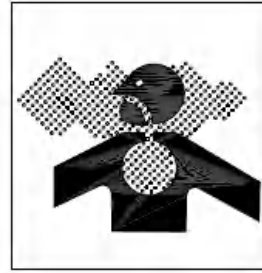
**18) Directions for escape warning sign**



**19) The engine should be shut down when inspecting and adjusting the inside of the machine**

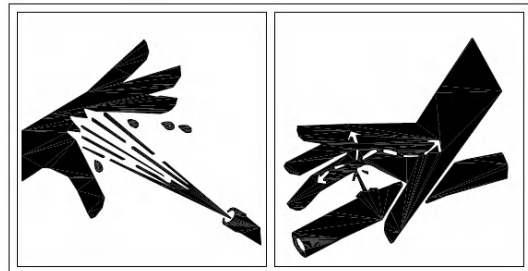


**20) Beware of toxic gases**



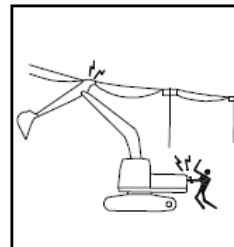
Toxic gases or toxic fumes can suffocate people.

**21) High pressure fluid (injection, leakage/spray) hazard**



Do not feel the leakage point of high pressure fluid by your hands or other parts of your body, and do not be sprayed by high pressure fluid, otherwise it will cause human injury.

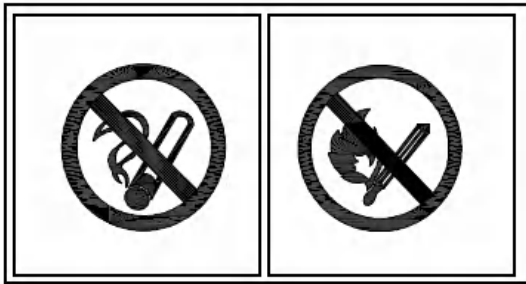
**22) High-altitude wires warning sign**



**23) Fire extinguisher**



**24) No smoking, no fireworks**



**25) Watch out for explosions**

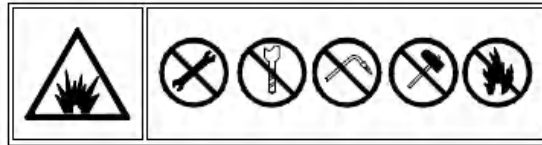


**26) Precautions for the use of emergency escape hammer**



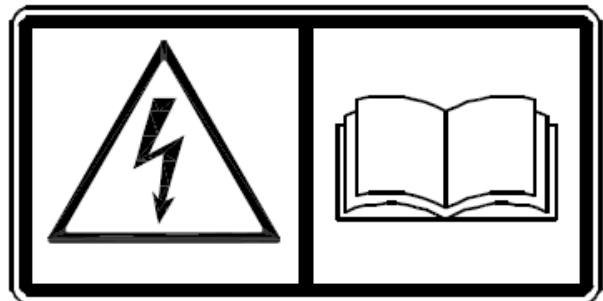
Read it carefully and keep it in mind, in case you need it from time to time.

**27) Accumulators and gas spring high-pressure devices are not allowed to be disassembled, drilled, cut or hit, and should be kept away from open flames or high temperatures**



These parts contain high-pressure gas, improper handling can cause injury. Please have it handled by an experienced person.

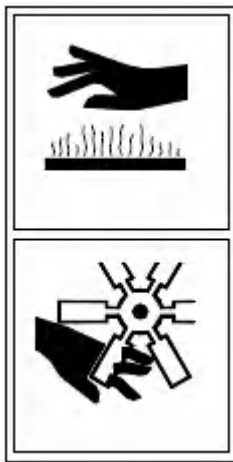
**28) Pay attention to the manual and related materials when repairing electrics**



Electrical systems are prone to dangers such as electric shock, so you must follow the instructions and other relevant instructions when repairing.

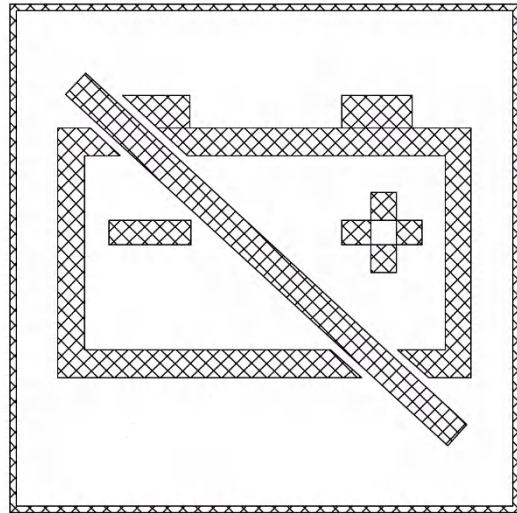


**29) Be careful of personal injury caused by high temperature parts such as engine, water tank, muffler, and engine fan**

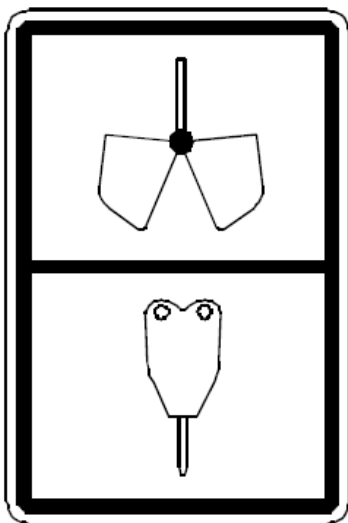


Do not touch it directly. When repairing these parts, turn off the flame and wait for their temperature to drop to a suitable temperature.

**31) Identification of battery disconnect switch**



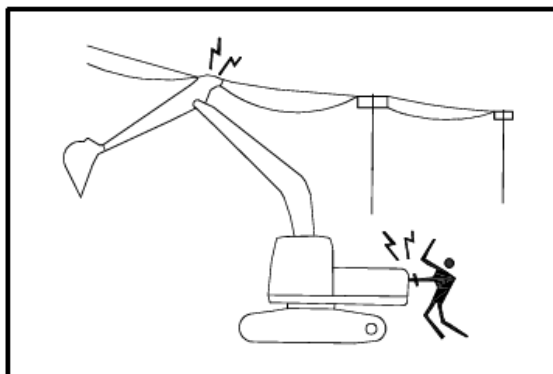
**30) Accessory pipeline identification. The above figure shows the inlet oil line, and the following figure represents the return oil line.**



## Safety in the workplace

**Know the area where you will work as much as possible in advance. Please check:**

1. Location of the slope.
2. Open ditch.
3. Falling objects or hanging objects.
3. Soil condition (soft or hard).
4. Standing water and swamp area.
5. Rocks and stumps.
6. Boundary of buried foundations, pillars or walls.
7. The boundary of burying garbage or filling soil.
8. Holes, obstacles, mud or ice.
9. Traffic volume.
10. Dense dust, dense smoke, dense fog.
11. Buried or suspended electricity, gas. The exact location of telephone, water, sewage or other public pipelines. If necessary, ask the utility company to mark, close or move these facilities before you start work.



**Warning: Before starting the excavation project, please contact the local utility service system and department.**

12. When constructing in a building, figure out the headroom for the head, the porch and the aisle, etc., and the load-bearing capacity of the floor and ramp. Ensure adequate ventilation during indoor operation. What you are unclear about will hurt you.
13. Understand the precise distances between wires, telephone lines and machines, and distances between machines and the ground. If possible, it is best to cut off the power supply. If you can't cut off the power, ask the signalman for guidance.



**Warning: Touching or approaching the power supply or the machine connected to the power supply can cause electric shock. Do not let any part of the machine get close to the power cord in the air. Unless necessary safety precautions have been taken. Please be very cautious.**

14. It must be ensured to keep the legal minimum distance from underground gas pipes, cables, telephone lines and water pipes.



**Warning: if you look in from the damaged cable end, the cut optical fiber will seriously hurt your eyes.**

## Safe operation



**Warning: It is strictly prohibited to transport or lift personnel with the excavator.**

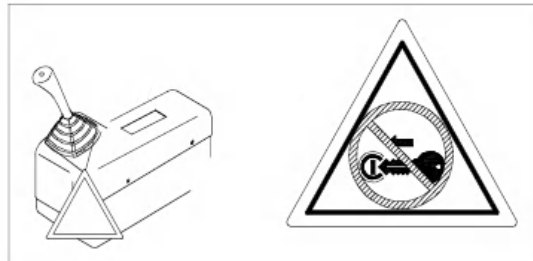


**Warning: before operating the machine, you must wear a seat belt, honking the horn, and confirm that there is no one around the working area before starting work.**

### 1. Start the engine

#### A. Safety rules for starting the engine

- 1) Before starting the engine, you must sound the horn to warn
- 2) Except for the operator, no other people are allowed
- 3) Only allowed to sit on the seat to operate the machine
- 4) It is not allowed to start the engine by short-circuiting the starting motor.
- 5) The machine must be warmed up in cold weather.



**Warning: 1. It is not allowed to start the engine when a warning sign prohibiting engine starting is hung on the joystick.**

#### B. After starting the engine

The following must be checked after starting the engine:

- 1) Whether the seat belt is fastened.
- 2) Whether the attachment, dozer unit, traveling, slewing, attachment swing and other moving parts are normal.
- 3) Whether the sound, vibration, smell or instrument of the machine is abnormal.
- 4) Check for oil and fuel leaks.

## 2. Traveling and slewing

1) Before traveling, please turn the upper part of the machine platform to a suitable position, with the attachment in the same direction as the dozer blade. If the attachment is in the opposite direction of the dozer blade, the operation is reversed.

2) Before traveling and slewing, sound the horn to warn people in the work area from approaching.

3) The excavator must travel and operate on solid ground that is over 1.5 times of its width.

4) Close and lock the cab door before walking. The cab windows, flip windows, and sunroof (if fitted) are allowed to be opened, but they must be locked.

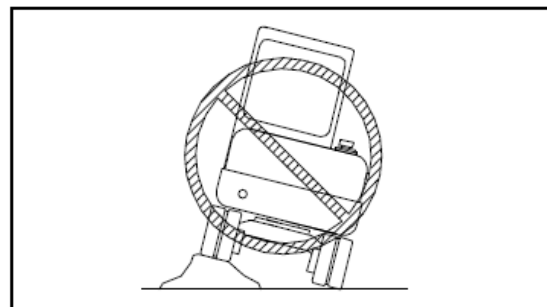
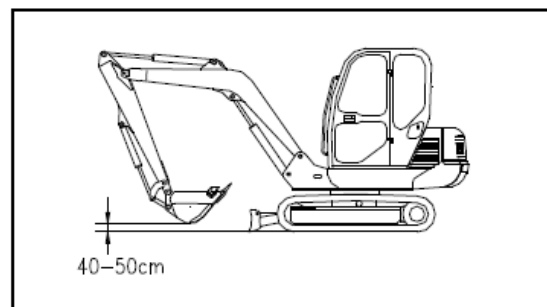
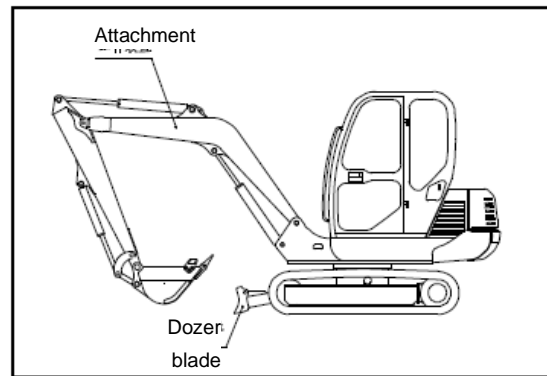
5) If there is an area at the back of the machine that cannot be seen before the machine moves back or turns, a signal commander should be arranged for giving instructions.

### ● Safety rules for traveling

1) When the machine is walking on a flat road, you must lower the boom, retract the stick, and maintain the best position of the center of gravity. Keep the bottom of the bucket at a distance of 40-50 cm from the ground.

2) Travel slowly on rough and uneven roads; no sudden turning should be allowed, otherwise it may cause the machine to overturn and endanger personal safety.

3) The machine should not travel on obstacles leaning towards one side, as this may cause the machine to tip over.



4) During traveling or operating, it is important to maintain a safe distance from people, buildings, or other machines to avoid contact.

5) When traveling through height-restricted areas such as underground passages, bridges, or power lines, it is necessary to ensure command by a specially designated personnel. In addition, a safety distance must be kept.

6) Be sure to lock the platform when going uphill or downhill.

7) When passing across bridges, buildings, or supports, it is necessary to first confirm whether they are sufficient to support the weight of the machine.

8) If it needs to drive on the highway, first consult the local traffic management department and obtain permission before starting traveling on the road.

### 3. Traveling or working on slopes

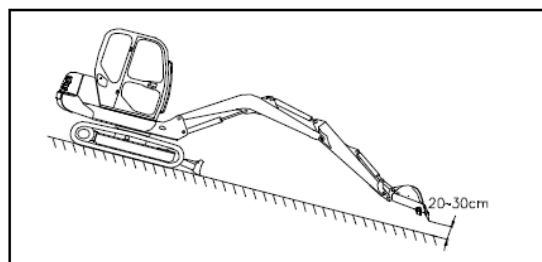
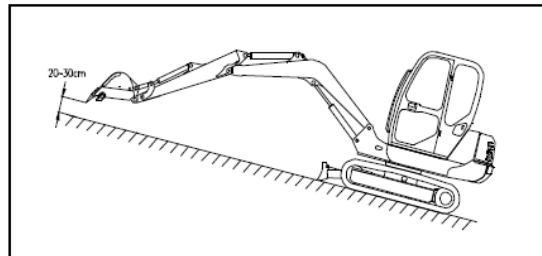
It is extremely dangerous for traveling and operating the excavator on slopes, therefore, special care must be taken in this case.

1) It is not recommended climbing or descending on long slopes greater than 20 degrees.

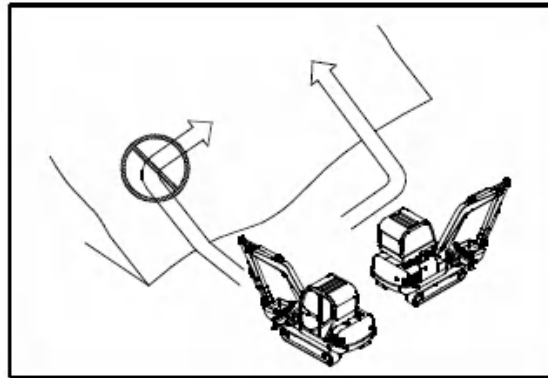
2) The operator shall fasten the seat belt when the machine is in operation, especially on slopes and in hazardous areas.

3) When the excavator is moving uphill, the drive wheel should be in the downhill direction, the boom and stick are fully extended parallel to the slope, the bucket teeth are 20-30cm away from the ground, and the platform is locked. Then go uphill at a low speed.

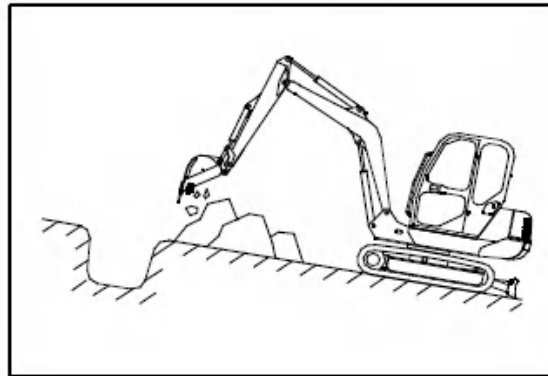
4) When the excavator is moving downhill, the platform should be locked, the drive wheel should be in the uphill direction, the boom and stick are fully extended, the bucket teeth are 20-30 cm away from the ground. Go downhill at low speed.



5) Do not turn on slopes or cross slopes. Be sure to go down to a flat area and change the position of the machine before climbing up the slope.




6) When working on a slope, it is necessary to start from a high place and gradually excavate towards the downhill direction, with the dozer blade at the back and pressing against the ground, and the unloading position is in the uphill direction.



7) Travel at low speed on grass, fallen leaves, or wet steel plates, as even on small slopes, there is a risk of machine slipping.

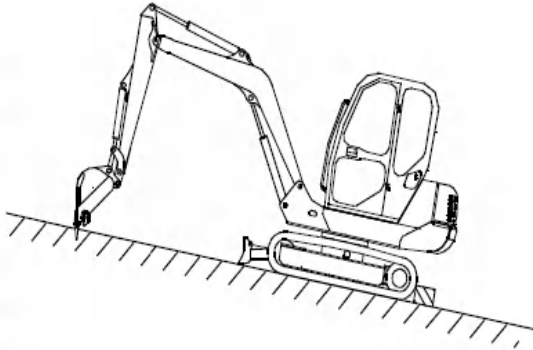
8) It is strictly prohibited to make sharp turns when going uphill or downhill, otherwise the machine may tip over.

9) When stopping on a slope, the front dozer blade must be lowered and inserted into the soil. Only after it has stopped steadily can the engine be stopped and the driver be allowed to get off.

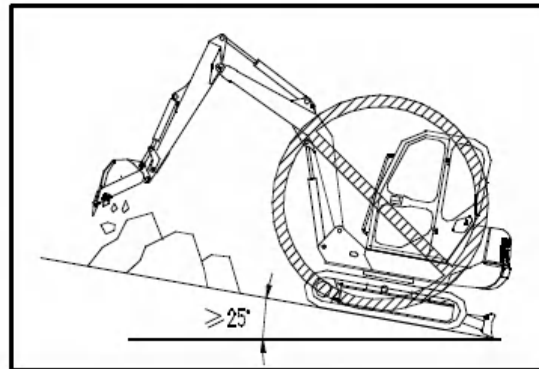


**Danger**

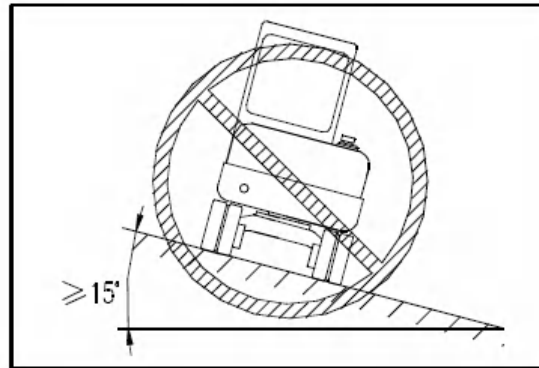
**Stopping on a slope is very dangerous! If it is unavoidable, the following must be followed: if the engine stalls on a slope, immediately lower the bulldozing blade and bucket to the ground, and place all handles in the neutral position, and then restart the engine. Even if the machine is stopped for a short time on a slope, the bucket and dozer blade should be lowered to the ground, and all levers should be pulled to the center position. At the same time, sufficient obstacles should be placed at the lower end of the track for securing.**



10) It is strictly prohibited to travel on slopes with a longitudinal slope direction greater than 25 degrees.



11) It is strictly prohibited to travel and work on slopes with a transverse slope greater than 15 degrees.

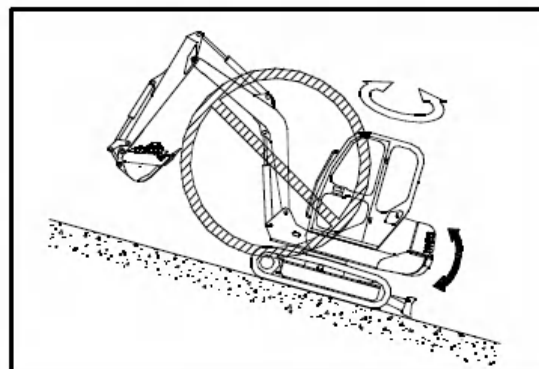


12) Try to maintain machine balance and strictly prohibit traveling on rocks or crossing obstacles.

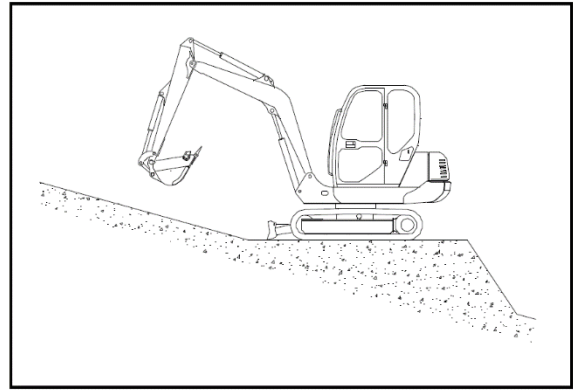
13) No reversing is allowed on slopes.

14) When going uphill, it is necessary to ensure that the engine and hydraulic oil are properly preheated, otherwise it may cause accidents.

15) When the excavator is on a slope with two tracks at a 90 degree angle to the slope, turning is very dangerous and should be avoided. When it is necessary to rotate, make the bucket close to the ground and also close to the machine, with the track facing towards the top of the slope, and rotate slowly.



16) When working on slopes, there is a risk of the machine losing balance and tipping over when operating for slewing and the attachment. This can cause serious injury or equipment damage, therefore, when performing these operations, it is necessary to pile up a sturdy and level platform with soil.



#### 4. Safe excavation operation

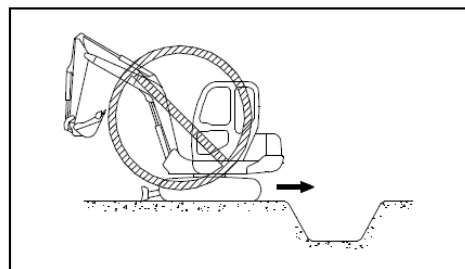


**Warning: The operator must memorize the functions of each joystick to avoid wrong operation.**



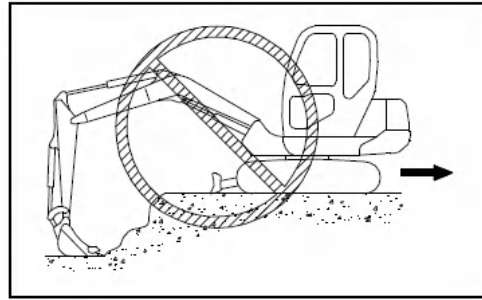
**Warning: Improper use of the excavator may result in tipping and slipping. Remembering this section provides correct guidance for ensuring your personal safety.**

- 1) Before work, idle personnel inside the excavation site should be cleared out.
- 2) Confirm that the workplace can fully support the machine before driving in.
- 3) The two tracks of the excavator should be kept on the same plane as much as possible before operation.
- 4) Confirm that there are no cables, gas pipes, or water pipes underground in the workplace, or that their specific locations have been identified before excavation can be carried out.
- 5) When the machine is working backwards (such as digging trenches), it should be checked whether the movement route is flat and free of obstacles. Only when safety is ensured can the machine be moved, otherwise it may cause the machine to tip over.

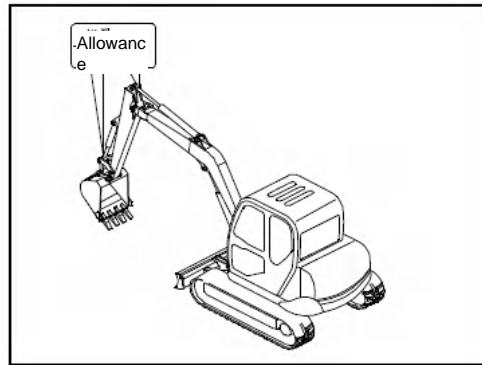




6) When the bucket is subjected to special resistance on the ground, do not travel or rotate, otherwise the machine may be damaged.



7) During operation, if the hydraulic cylinder is operated to the end of its stroke, the force will act on the limit ring inside the cylinder, thereby reducing the service life of the machine. To prevent this situation from happening, a small margin should always be left when operating the hydraulic cylinder.



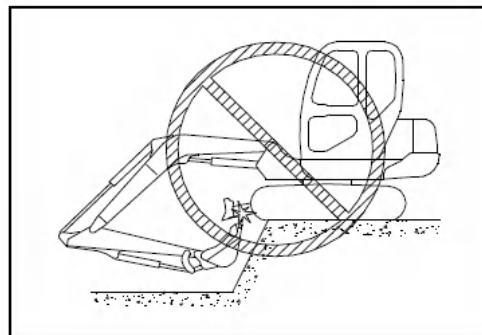
8) For deep excavation, it is necessary to avoid the bottom of the boom or the hose of the bucket cylinder from touching the ground.

9) When operating the machine, it is necessary to avoid foreign objects from touching the boom, bucket arm, bucket, and cab.

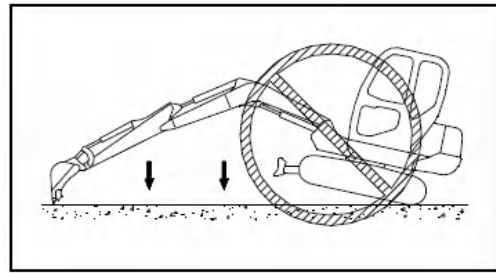
10) For rotating the machine, it is necessary to avoid touching the engine hood and rear counterweight.

11) When lowering the boom, never stop suddenly to avoid machine operation damage and improve work safety.

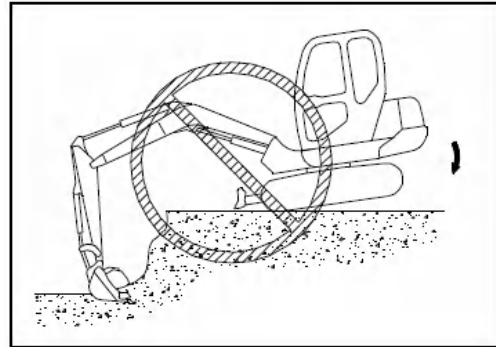
12) Do not excavate towards the machine body.



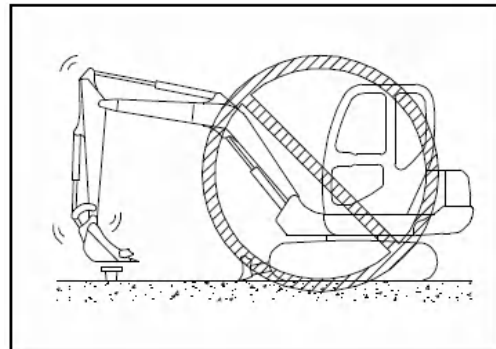
13) Do not carry out excavation operations when the track is off the ground, which may cause damage to the machine and structure.



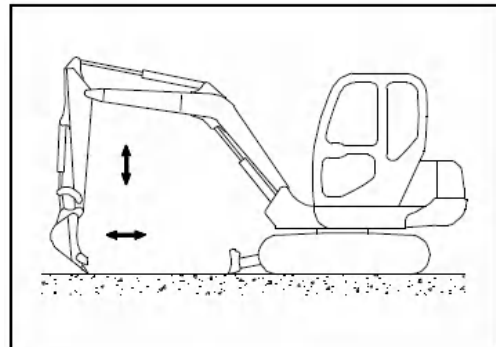
14) Do not use the weight of the machine to increase its excavation force.



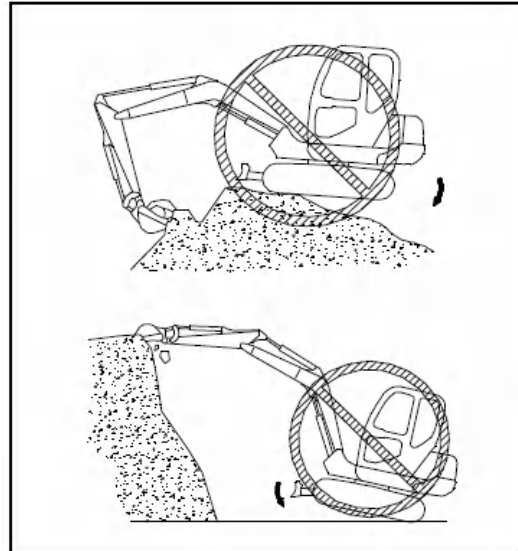
15) Do not use the downward force of the bucket as a hand pick, crusher, or pile driver, which will cause excessive force to be applied to the rear of the machine. This not only damages the machine, but also is very dangerous.



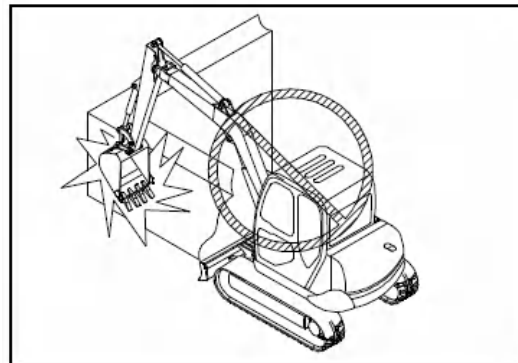
16) Do not use the bucket too much to level the road, otherwise, the components will damage the machine due to overload operation.



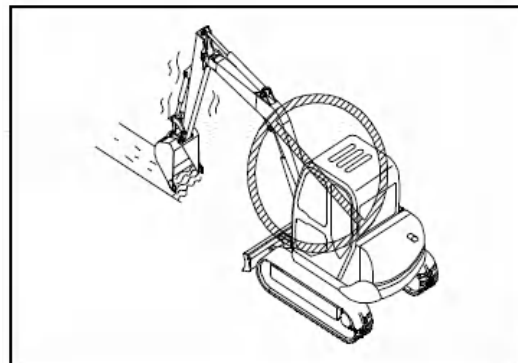
17) Do not use the downward force of the machine for excavation, as it may damage the machine.



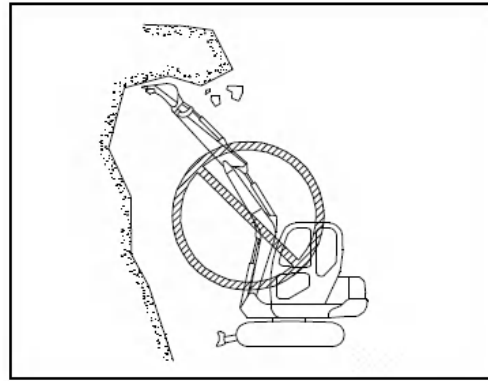
18) Do not use the rotational force to compact soil or damage soil piles and walls. When rotating, do not insert the bucket teeth into the soil, which will damage the attachment.



19) Do not excavate with the traveling force by digging the bucket into the ground, which will cause excessive force on the rear of the machine.



20) Do not excavate the working surface below the suspended part, as there is a risk of falling rocks or the suspended part collapsing and hitting the machine.



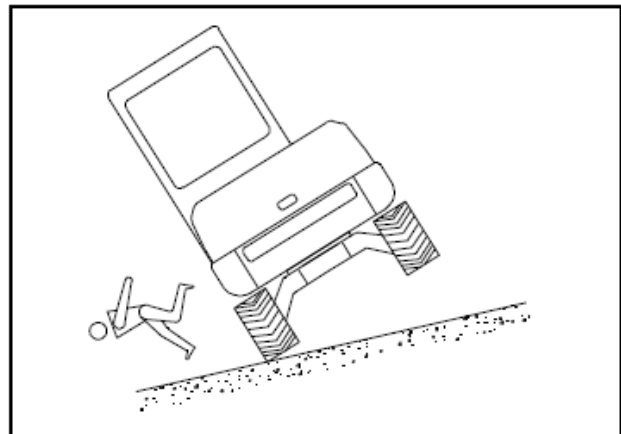
## 5. Prevention of tipping, slipping and handling during operation



**Warning:** 1) When you have to turn on a ramp, you can only turn in a large arc. When the machine is about to turn right, extend the boom bucket arm to the left, with the bucket about 30 cm above the ground, and then lock the platform. And vice versa.  
2) When skidding, immediately press the dozer blade and bucket to the ground.  
3) When the machine is overturned, the driver must not jump off the car, but should firmly grasp the handrail in the cab or the column of the cab. **Jumping from a cab can easily cause injury or death accidents.**

The machine is extremely prone to overturning in the following situations that must be avoided:

- 1) When the machine moves on uneven ground, the two tracks are high on one side and low on the other, or more than half of one track is suspended.
- 2) When one track is on loose soil while the other track is on solid soil.
- 3) When there are karst caves or mud pits underground on one side of the machine.
- 4) When traveling on slopes with a longitudinal slope greater than  $25^{\circ}$  while unloading in the downhill direction.
- 5) When traveling on slopes with a transverse slope greater than  $15^{\circ}$  while unloading in the downhill direction.
- 6) On a slope, the two tracks are in a  $90^{\circ}$  direction with the slope, and the platform rotates for more than  $90^{\circ}$ .
- 7) When working on slopes, the machine makes sharp turns, the platform quickly turns, or suddenly stops.
- 8) When the machine swings  $180^{\circ}$  downwards on a slope.
- 9) When the backing operation (ditching, etc.) shifts the uneven road surface.



10) When the machine excavates deeply under the machine.

11) Traveling on frozen ground.

12) When there is oil or lubricating oil on both tracks, the machine is prone to slipping.

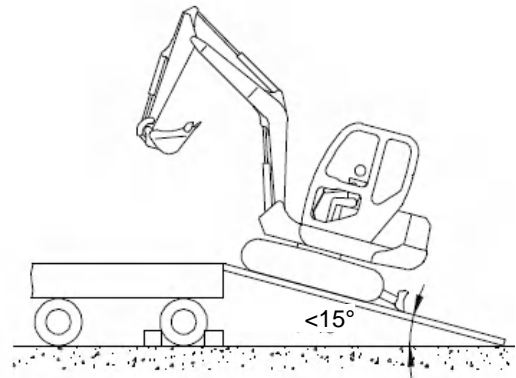
## **6. Turn off the machine**

See the section "Park the machine".

## Machine transportation and handling

**The transportation (loading and unloading) of the excavator must strictly follow the safety principles.**

- Transportation of the excavator shall comply with relevant national and local industry safety transportation (loading and unloading) rules or good practice.
- When transporting the excavator, it is strictly prohibited to carry any personnel or other items inside the cab, and it is strictly prohibited to transport people and machine together.
- When loading and unloading the excavator, it is strictly prohibited to have any person and objects that may hinder the loading and unloading within the moving radius of the crane boom (including the lifted objects)
- During loading and unloading of the excavator, no person or other objects that hinder loading and unloading is allowed within the travel range of the excavator being loaded and unloaded (including the rotation range of the excavator).
- In addition to lifting method or directly driving from the dock, two sufficiently strong landing plates can also be used to allow the excavator to drive onto the transport vehicle. The inclination angle of the landing plate should be less than  $15^\circ$ , the length of the slope should be over 3.5 times the height, and the width of the landing plate should be equal to 1.2-1.5 times the width of the track.
- Before going up and down the ramp, be sure to put down the positioning lever of the slewing platform to prevent it from slewing.
- During going up and down the ramp, it is not allowed to pull any other lever except the traveling lever.
- The machine must be parked on a solid and flat face.
- When driving the machine on the road, it is necessary to ensure that clearance flags, lights, and warning signs are ready and visible to others. Ensure that vehicles behind can see the 'Slow Moving Vehicle' sign.
- Tracked machines may damage the road surface and may be subject to some restrictions when driving on the road. Therefore, please use trucks for transportation when driving on these roads.



## Downtime for maintenance

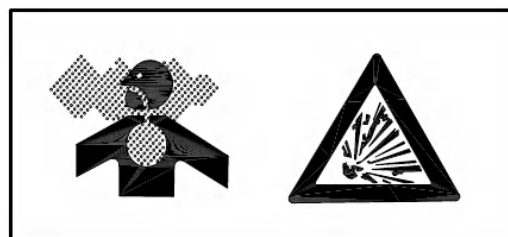


**Warning: When carrying out any maintenance work on the machine, the warning sign “No Operation” must be hung on the joystick.**

- The machine must be parked on solid and flat ground.
- After the excavator has stopped, it is necessary to lower the bucket to the ground, run the engine at idle for three minutes, stop the machine, and finally remove the switch key.
- Fully release the hydraulic system pressure.
- When the machine is forced to stop on a slope, the sufficient obstacles should be set up in the downward direction of the crawler tracks on both sides.
- Be sure to keep a certain distance from other machines when parking.
- When repairing electrical systems or welding, it is necessary to remove the negative cable of the battery to prevent the current flow.
- Before servicing the machine, if you need to support the machine or accessories to work, support the machine or accessories firmly, and do not work with only one jack supporting the machine.
- After the machine is started, do not lubricate or repair, and do not let your hands, feet or clothing contact the power rotating parts.
- To carry out maintenance work while the engine is running, the machine must be supervised by someone.
- Do not store loose items in your pocket to prevent them from falling into the moving parts.
- The high pressure liquid will splash the eyes or skin, so it should be avoided during maintenance.
- Clean up all the sundries inside the machine to prevent possible wrong operation, causing injury to personnel or damage to the machine.
- Properly dispose the waste liquid. Do not pour oil into the ground, drainage ditch, stream, pond or lake. When discharging oil, fuel, antifreeze, plastics, batteries, and other hazardous waste, environmental regulations should be followed.

## Fire, explosion and poisoning prevention

- Avoid contact with wires when the excavator is transported, walked, or excavated, otherwise it will cause serious casualties.
- The electrical appliances and wiring of the excavator should be checked frequently. If they are found to be damaged, or aging, they must be replaced in time to prevent a short circuit of electrical wiring and causing fire.
- Keep the wire connectors clean and securely fixed. Check whether the wires are loose or damaged every day, tighten loose joints or wire clamps, and repair the damaged wires.
- Do not place flammable and explosive materials inside the excavator to prevent fires.
- When refueling, the engine must be stopped, and refueling in a place far from the ignition source and the machine should not be left alone.
- Do not allow fuel to spill onto overheated surfaces or electrical system components during refueling.
- After refueling, wipe off any spilled fuel or oil and tighten the fuel and oil tank cap.
- Timely remove the leaves, wood chips, paper chips and other inflammable materials accumulated or stuck inside the engine, exhaust pipe, muffler, and interior of engine compartment.
- Do not place oil-soaked rags in the machine to avoid spontaneous fire and burning.
- The user should configure a fire extinguisher in the machine and put it in a place where it is easily accessible.
- When welding the machine, it is strictly forbidden to do without isolating the hydraulic oil pipeline and the fuel pipeline.
- To prevent fires caused by hydraulic pipelines: check whether the clamps, guards, and cushions of all hoses and pipes are firmly fixed in place. If it is loose, it will vibrate and rub against other parts during operation, causing hose damage, high pressure oil spraying, and fire hazards or serious injuries.
- Keep the battery away from fire and avoid high temperature, otherwise, it will cause an explosion.
- For excavators with sealed cabs, the sealing of the middle partition should be checked to prevent engine exhaust gas from entering the cab and causing poisoning to the driver. It is strictly forbidden to work in poorly ventilated areas to prevent the driver from suffocating.
- In the event of a fire, do not use water to extinguish the fire. Use a powder fire extinguisher or sand to extinguish the fire. You can also use a cover or tarp to extinguish the fire.



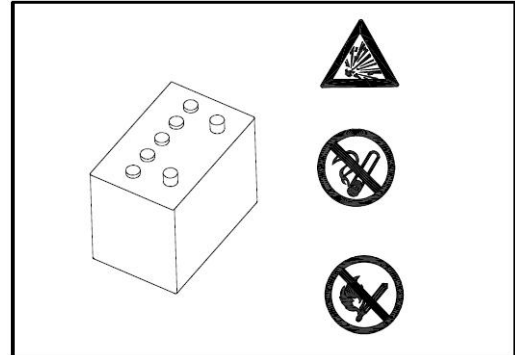


## Battery

### Safety rules for the battery

The electrolyte of a battery contains sulfuric acid, which can produce flammable and explosive hydrogen gas. Incorrect operation can cause serious injury or fire, so the following precautions must be followed:

- Regularly check the electrolyte level of the battery and replenish it with distilled water, so that the electrolyte level is between the "upper level" line and the "low level" line. If the battery electrolyte is lower than the "low level" line, do not use the battery or charge the battery.
- When operating the battery, wear safety glasses and rubber gloves.
- Smoking or open flames are not allowed near the battery.
- If sulfuric acid splashes on eyes, clothes, or skin, immediately rinse with plenty of water and seek medical attention.
- Before operating the battery, turn the key switch to the OFF position.
- Check the electrolyte level with a flashlight, and turn off the engine when checking.
- The expansion of the closed end of the battery indicates that the battery has frozen. When the battery freezes, do not charge the battery or jump start the engine. Do not heat a frozen battery above 15 °C, otherwise the battery may explode.



### Explosion prevention of the battery

**Warning: Electric sparks or flames can cause hydrogen gas in the battery to explode. To prevent explosion, please note:**



- 1) To disconnect the battery cable, the negative (-) cable should be disconnected first;
- 2) To connect the battery cable, the negative (-) cable should be connected finally;
- 3) Do not short circuit the terminals of the battery with metal components;
- 4) Do not weld, grind, or smoke near the battery.

Due to the risk of sparks, follow the below steps.

- Firmly install the battery in the designated position.
- Do not allow tools or other metal objects to come into contact between the battery terminals. Do not leave tools or other metal objects near the battery.
- Connect or disconnect the positive and negative poles of the battery in the correct order. The battery terminals should be securely fixed.
- When charging a battery, flammable hydrogen gas will be generated. Therefore, before charging, remove the battery from the lower body of the vehicle, place it in a well ventilated area, and remove the battery cover.
- Tighten the battery cover firmly.

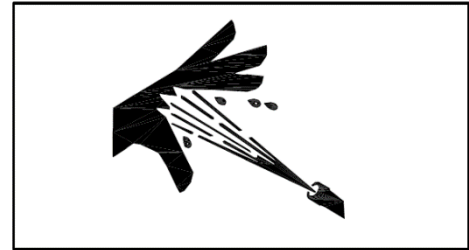
**Attention: When repairing electrical systems or welding, it is necessary to remove the negative terminal of the battery to prevent the current flow.**

## Hydraulic system

### 1. Safety rules for high pressure oil

There is always pressure inside the hydraulic system. When inspecting or replacing pipes or hoses, be sure to check whether the pressure in the hydraulic oil circuit has been released. If the oil circuit is still under pressure, serious injury or damage will be caused, so follow these regulations:

- 1) Do not check or replace when there is pressure in the hydraulic system.
- 2) If there is any leakage in the pipe or hose, the surrounding area is wet, so check if the pipe or hose is broken and the hose is swollen. Wear goggles and leather gloves when performing an inspection.
- 3) The high-pressure oil leaking from the small holes will penetrate into the skin, and there will be a risk of blindness if it directly touches the eyes. If you are injured by high pressure oil hitting your skin or eyes, rinse with clean water and contact your doctor for treatment immediately.



### 2. Safe operation of high pressure hoses

If the high pressure hose leaks oil or fuel, it may cause a fire or operation failure, resulting in serious injury or damage. If the bolts are found to be loose, stop the work and tighten the bolts to the specified torque. When welding the machine, it is strictly forbidden to do it without isolating the hydraulic oil pipeline (hose). If any damage to the hose is found, stop the operation immediately and get in touch with the Yuchai agent.

If the following problems are found, replace the hose:

- 1) Damaged or leaking hydraulic pipe joints;
- 2) The cladding is worn or broken, or the steel wire of the reinforcing layer is exposed;
- 3) The cladding swells in some places;
- 4) The movable part is twisted or crushed;
- 5) There are impurities in the cladding.

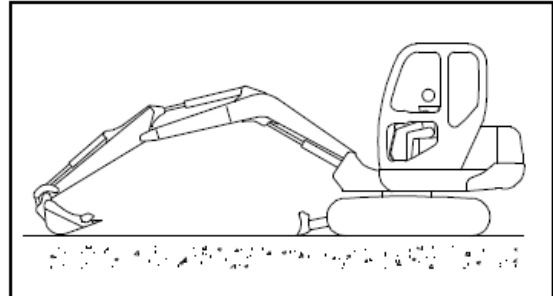
### 3. Safety rules for hot oil

The hydraulic oil that is not cooled during or after work is at high temperature and high pressure. To prevent scalding caused by sprayed oil or contacting hot parts when checking or draining oil, wait until the oil cools to the temperature that can touch the cover or plug before starting operation. Even if the oil has cooled, slowly loosen the cover or plug before removing the cover or plug to drain the internal pressure.

#### 4. Release the internal pressure of the hydraulic system

The hydraulic oil in the hydraulic pipeline is at high temperature and high pressure when the machine is working intermittently. When disassembling the oil port, oil may spray out, so rotate the oil filler cap before removing the cap to release internal pressure.

1) If the attachment is not in the state as shown in the figure, start the engine to run at low speed, extend the bucket cylinder, and retract the bucket arm cylinder. Then land the bucket, place the dozer blade on the ground, and turn off the engine.



2) Within 15 seconds after turning off the engine, turn the start switch to the ON position, and operate the joystick (working device, walking) in each direction to release the internal pressure.

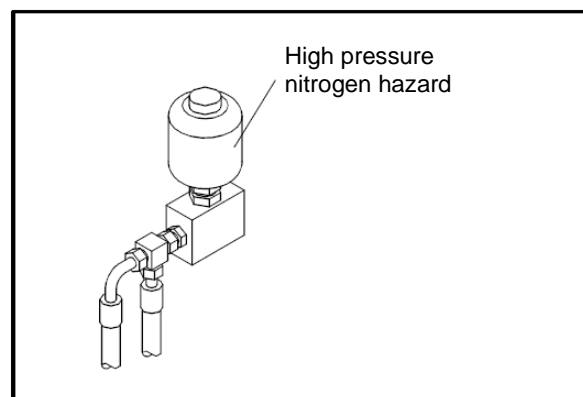
#### 5. Operation safety of accumulator



**Warning: The accumulator is a component filled with high pressure nitrogen, which may cause explosion and other hazards if used incorrectly. The accumulator cannot be disassembled, and the operation such as drilling and welding also cannot be carried out on it. Avoid the accumulator from being close to the fire source, and avoid collision and impact on the accumulator. Professional personnel shall be invited to dispose the accumulator.**

The machine is equipped with accumulators in the control pipeline. The accumulators in the control pipeline are the pressure storage devices. When these devices are installed, the control pipeline can be operated for a short time even after the engine stops.

By operating the joystick, the attachment can be lowered under its own weight.



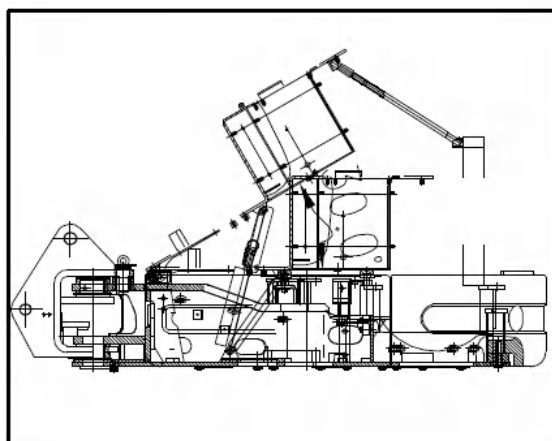
#### Pressure relief method for the control pipeline of the machine equipped with accumulators

- 1) Lower the attachment to the ground, and then disable the hydraulic crushing hammer and other accessories.
- 2) Turn off the engine.
- 3) Turn the start key to the ON position again to allow the current to flow in the circuit.
- 4) Adjust the safety lock control lever to the free position, and then operate the attachment joystick and accessory control pedal (if equipped) in full travel forward, backward, left, and right to release the pressure in the control pipeline.
- 5) Turn the safety lock joystick to the locked position to lock the control lever and accessory control pedal.

## Cab flipping

When flipping the cab, first lower the boom and bucket arm close to the ground, and then perform the flipping operation. Otherwise, if the attachment is not placed on a horizontal surface, flipping up the cab may cause the front window of the cab to touch the boom and damage the glass.

When maintaining and inspecting the interior of the machine platform, first open the rear door, and then make sure to unscrew the two bolts connecting the platform and the cab. Then, insert a hand joystick into the hand pump and follow the instructions of the hand pump to lift the cab. For safety reasons, support the cab with the hand joystick, with one end of the protective rod supported on the control baseplate, and the other end fixed on the frame beam support, then carry out internal maintenance or repair work.

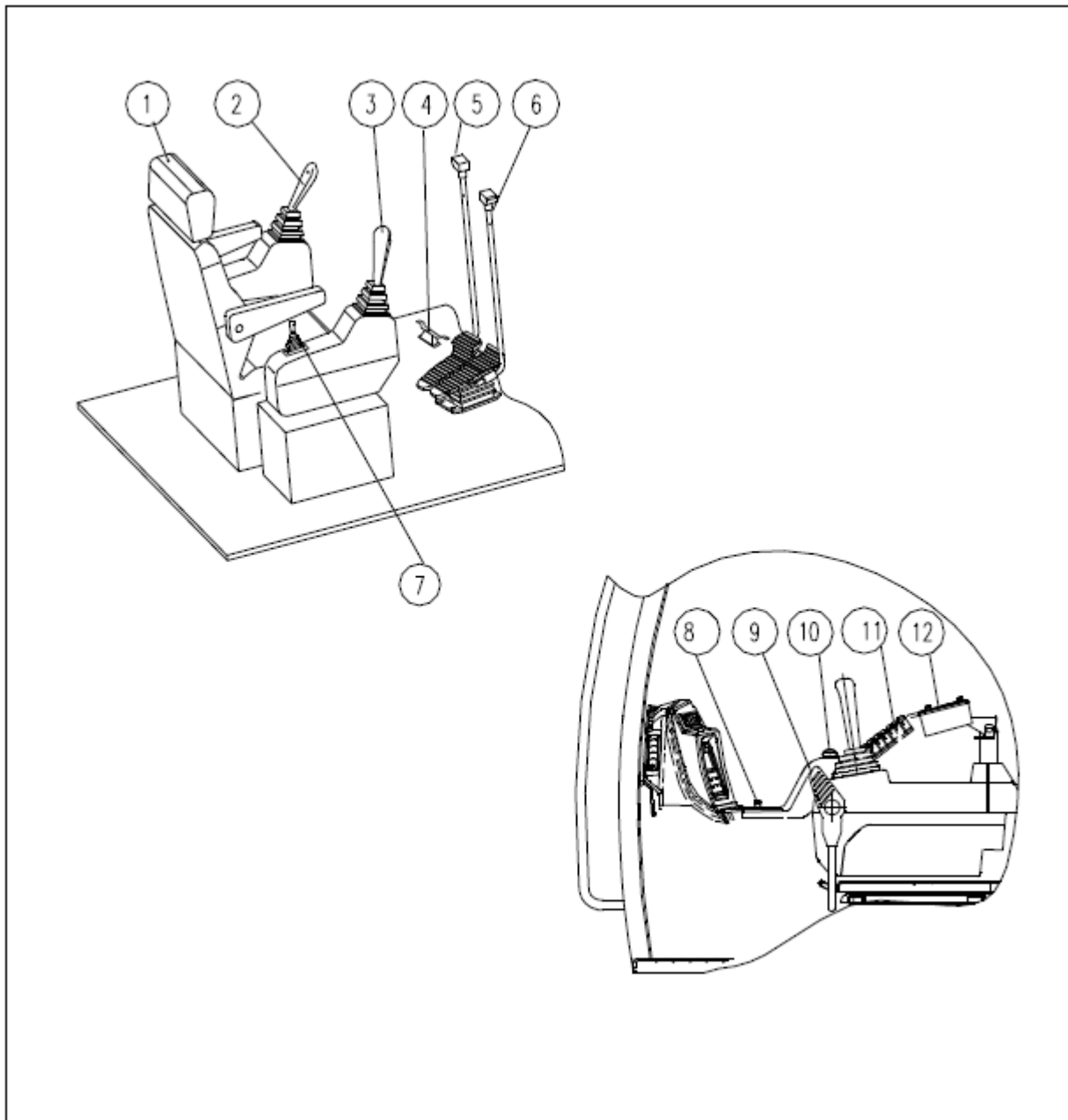


**Warning:** Due to the fact that the two bolts are connected to the beam of the platform and the driver's cab, which is relatively concealed and cannot be seen clearly, it is necessary to ensure that the two bolts are unscrewed before shaking the pump. Otherwise, the forced pressure may affect the service life of the hand pump.

**3**

# **Introduction of components**

## Overview of controls

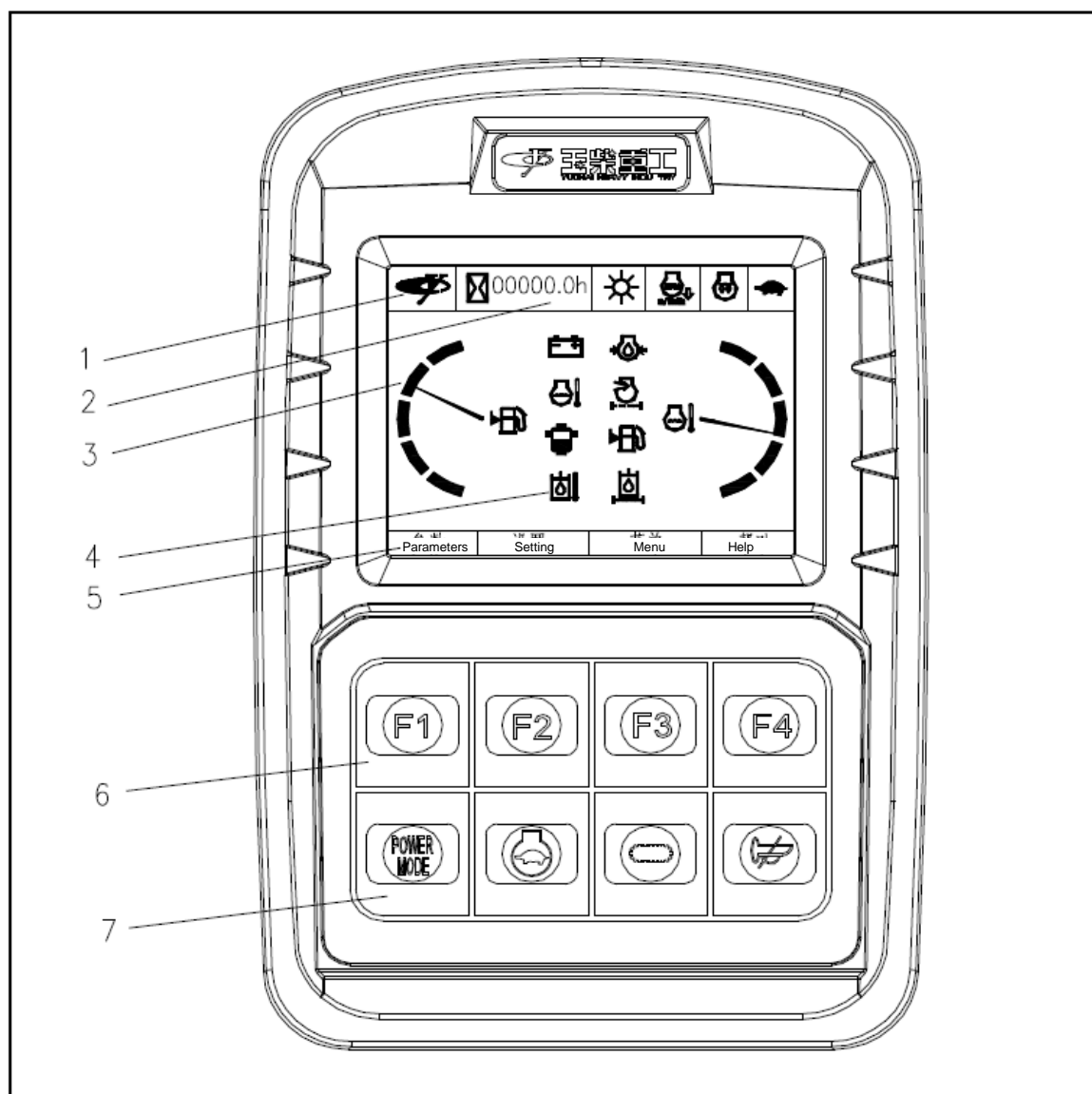


1. Driver seat
2. Joystick of the left attachment
3. Joystick of the right attachment
4. Pedal cover of auxiliary control pilot valve
5. Travel left joystick

6. Travel right joystick
7. Dozer blade joystick
8. Cigarette lighter
9. Pilot safety lock lever
10. Engine accelerator

11. Control panel
12. Radio

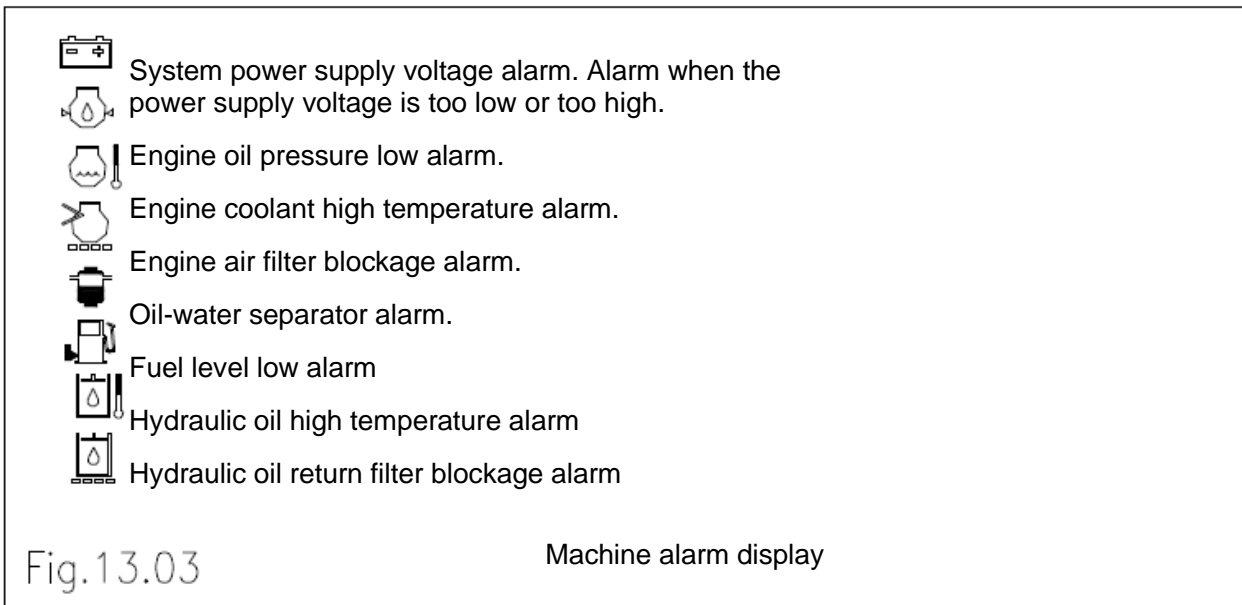
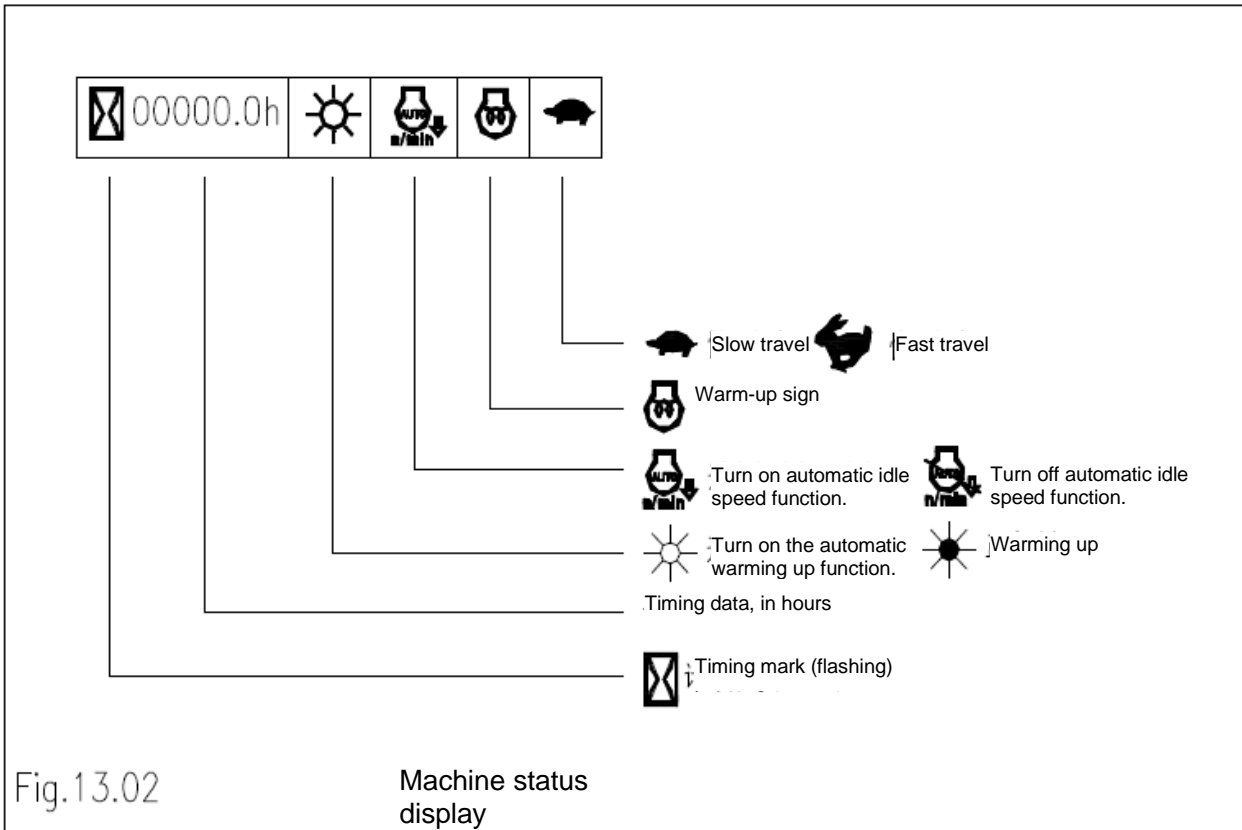
## Digital combination instrument



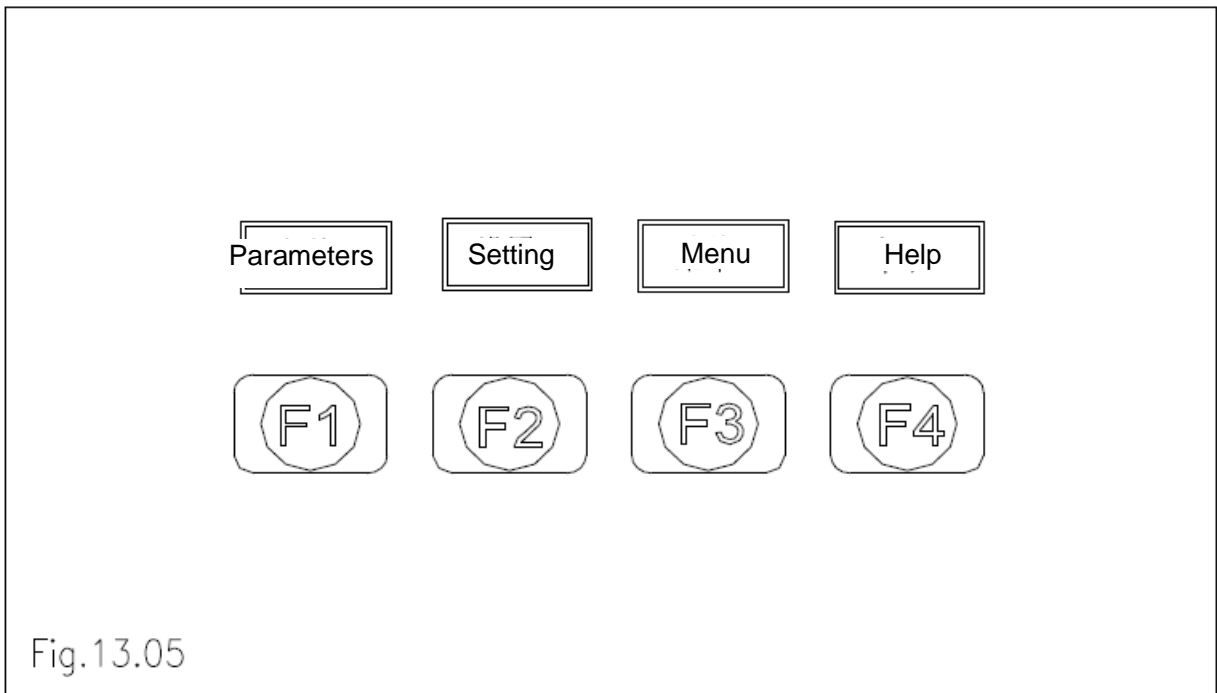
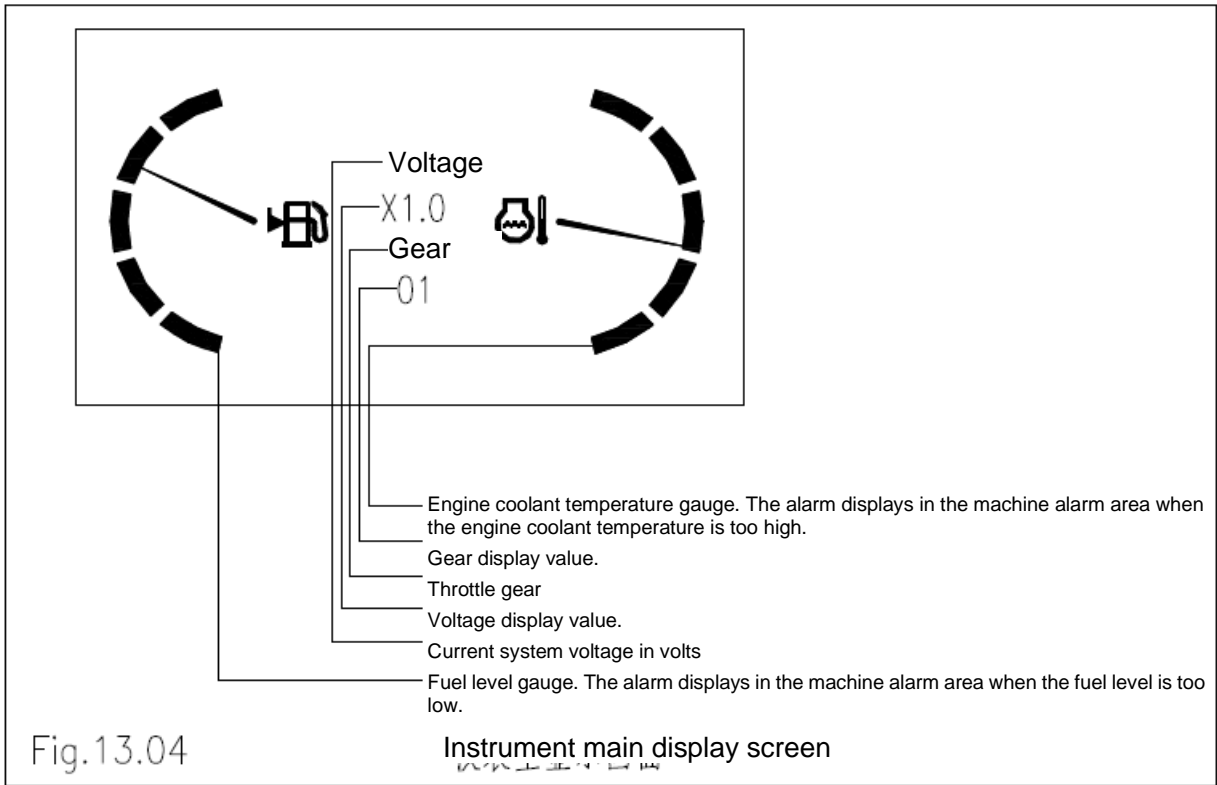
1. Machine trademark
3. Main display area
5. Soft key area
7. Function keys

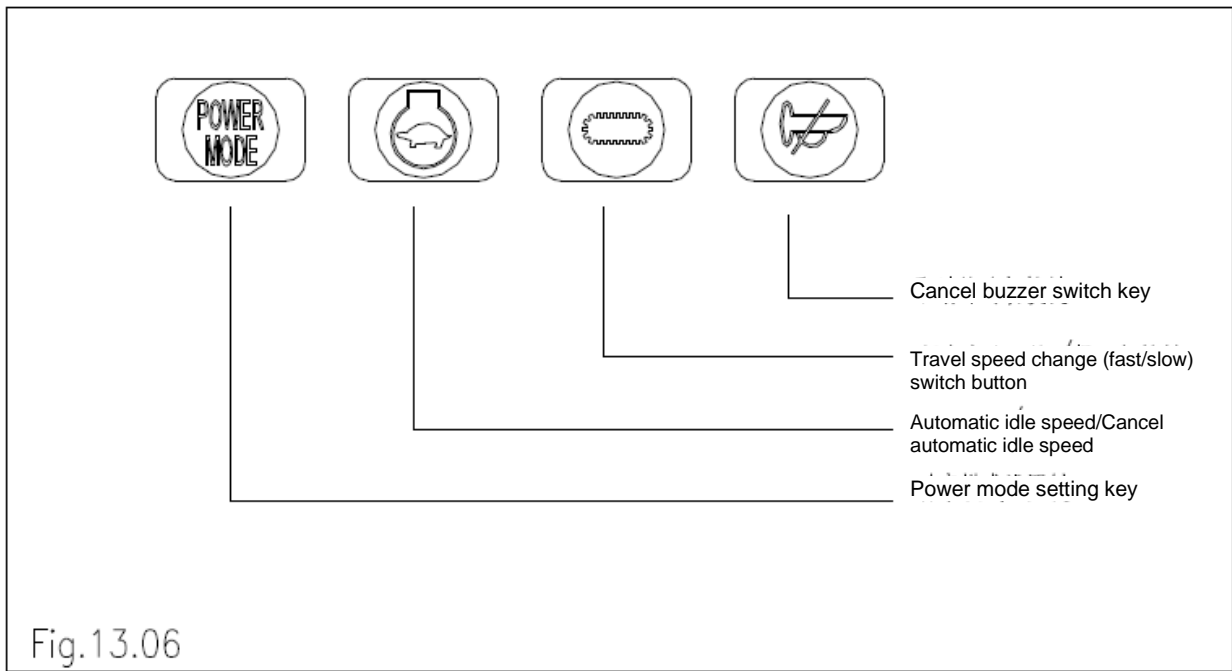
2. Machine status display area
4. Alarm display area
6. Keys (corresponding to soft keys)

## A. Instrument panel display







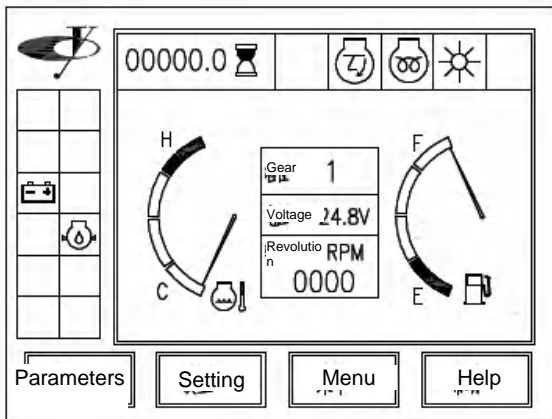


### Function selection key and alarm indicator

During the function selection key operation, the selection result can be determined by observing the display of the machine status area.

Alarm indicator light: As long as there is an alarm display on the monitor, the red alarm indicator will light up.

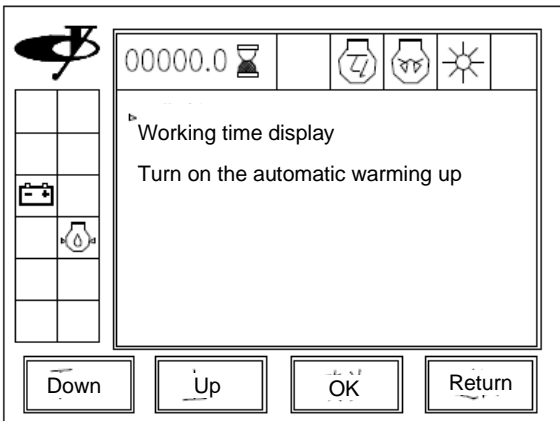
### B. Display during instrument operation



Turn on the power supply; in normal state, the main screen of machine monitoring is as shown in the left. After the engine is started, the power alarm and low oil pressure alarm signs disappear and the timing starts.

Oil pressure	0700	KPa
Fuel level	100	%
Engine speed	1015	RPM
Coolant high	040	°C
Hydraulic oil temperature	025	°C
Working time	00000.0	h
Phase working time	0000.0	h

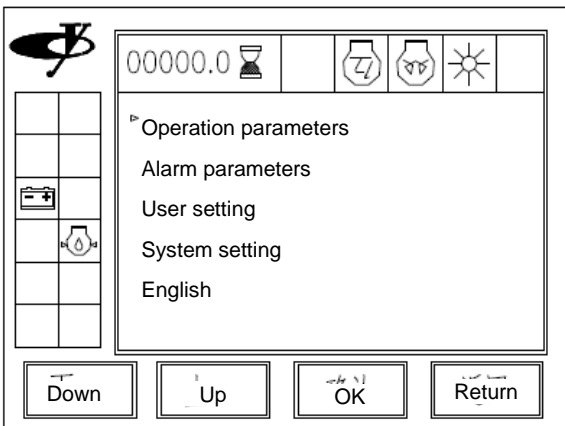
Select "Parameter" by pressing the key, and the monitor will display the operation data of the machine.



Select "Set" By pressing the key, and the monitor displays the system setting menu. Select the menu position by "Up" and "Down", and change the options by "Confirm". Including:

1. Working time display/stage working time;
2. Turn on/off automatic warming up; If you choose to turn off the automatic warm-up function, the warm-up status icon will not be displayed.

Press "Back" to return to the main monitoring screen.



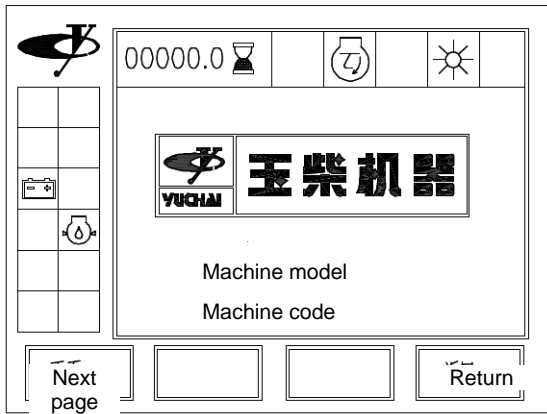
Select "Menu" By pressing the key, and the monitor displays the system setting menu. Select the menu position by "Up" and "Down", and change the options by "Confirm". Including:

1. When "Run parameter" is selected, the operation data of the machine will be displayed;
2. When "Alarm parameter" is selected, the alarm setting parameters set by the machine will be displayed. When the machine runs beyond the set alarm value, the monitor will send out alarm information;
3. When 'User Settings' is selected, it enters the User Settings menu; User settings mainly include setting user passwords and resetting phase timing.
4. Enter the system setting menu by selecting "System setting", which is used by the factory commissioning. This is omitted;
5. Select "English" and change the options: English/Chinese by "Confirm" to set the monitor to Chinese or English display mode.

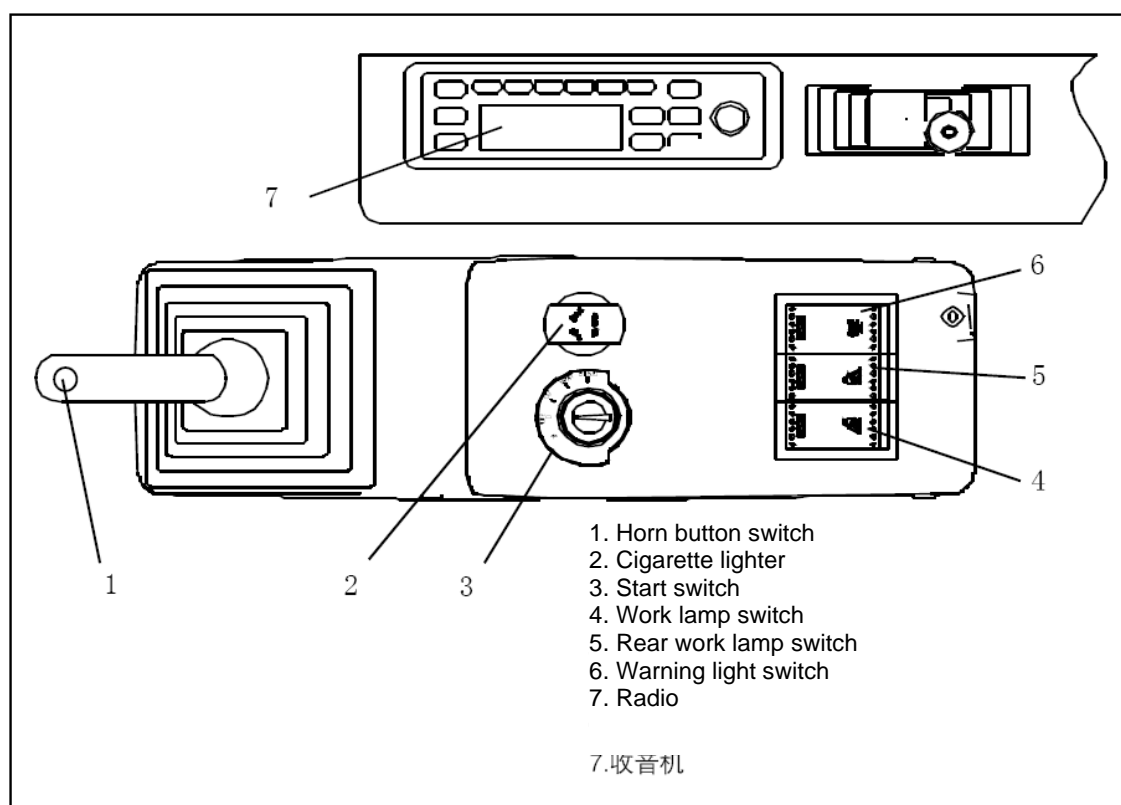
Oil pressure alarm	100	KPa
Fuel level alarm	015	%
Coolant temperature alarm	103	°C
Hydraulic oil temperature alarm	090	°C
High voltage alarm	28.6	V
Low voltage alarm	26.1	V
Flywheel teeth number setting	130	

The alarm setting parameters set in the machine will be displayed by selecting "Alarm parameter". (This parameter is set before delivery)

Select "Help" by pressing the key, and the monitor displays system help information. It mainly displays the machine model and machine code, and the "next page" displays the hardware and software version numbers of the monitor.



## Switch assembly of the right control box



### 1. Horn button switch

When the electric horn button switch at the top of the right attachment joystick is pressed, the horn sounds.



### 2. Cigarette lighter

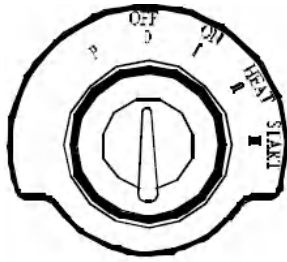
It can be directly connected to the cigarette lighter component, or a cigarette lighter cable can be used to provide power for other electrical equipments.

**Note: The total current capacity provided shall not exceed 10A.**



### 3. Start switch

For turning on/off the engine. This switch has 4 positions.



**OFF**

At which the key can be inserted or removed, all switches in the electrical system are turned off, and the engine is stopped.

**ON**

When the engine is running, keep the start switch key in the ON position.

**START**

This is the engine starting position. When starting the engine, hold the key in this position. After the engine is started, release the key and it will automatically return to the ON position.

**HEAT**

When starting the engine in winter, turn the key to this position. When the key is turned to the HEAT position, the preheating indicator light comes on. After preheating, release the key and it will automatically return to the ON position. Then turn the key to the START position and start the engine.



**4. Work lamp switch**

Front light switch on top of the cab: Press the rocker switch, and the side with a switch mark is ON, while the other side is OFF.



**5. Rear work lamp switch**

Rear light switch on top of the cab: Press the rocker switch, and the side with a switch mark is ON, while the other side is OFF.



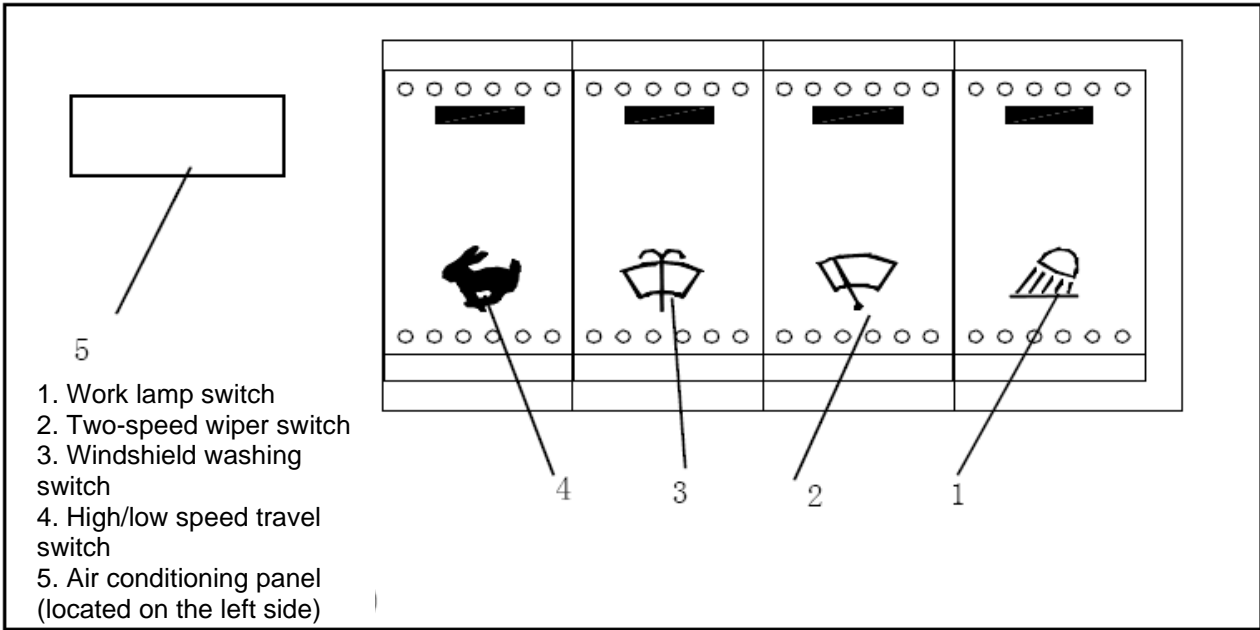
**6. Warning light switch**

Warning light switch: Press the rocker switch, and the side with a switch mark is ON, while the other side is OFF.

**7. Radio**

Please refer to "Radio".

## Switch assembly of the left control box



### 1. Work lamp switch

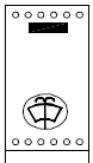
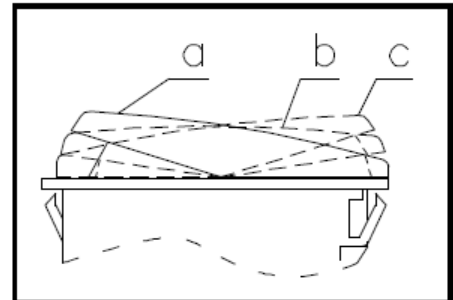
Boom work light switch: Press the rocker switch, and the side with a switch mark is ON, while the other side is OFF.



### 2. Two-speed wiper switch

Controlling the front window wiper. The rocker switch has two positions.

- a) OFF: The wiper does not move.
- b) ON: The wiper moves slowly.
- c) ON: The wiper moves quickly.



### 3. Windshield washing switch

Controlling washing: Press the rocker switch, and the side with a switch mark is ON, while the other side is OFF.



### 4. High/low speed travel switch

Controlling the switching between high and low speed traveling: Press the rocker switch, and the side with a switch mark is ON, while the other side is OFF.

### 5. Air conditioning control panel

Please refer to "Air conditioning control".

**Attention: Please do not turn on all the lights at the same time.**

## Safety lock parts

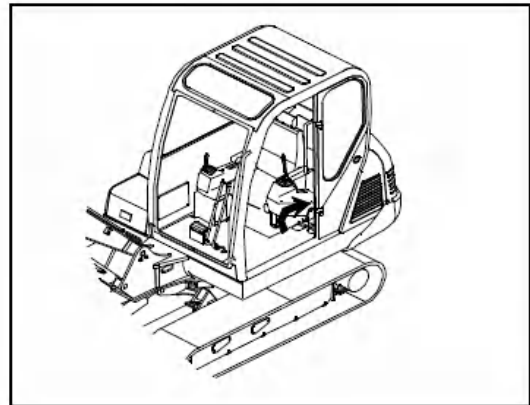
### 1. Safety lock



**Warning:** the safety lock mechanism of the attachment is an important part of the machine safety system. Safety lock must be enabled before the driver leaving the cab. If the left control box is not in the locked position, the handle may move, causing the working device or platform to move, which may result in an accident.

Lift the left control box to the locked position, the general control of the pilot system does not supply oil, and the machine working device and platform rotation can not work (except for left and right travel control, dozer blade), which plays a role in safety protection.

Lower the control box and press it to the bottom to the free position, the pilot system is connected to the oil pressure source, and the machine can work normally.





## Operation of the attachment and slewing mechanism

### 1. Operation of excavation equipment and platform slewing mechanism (the type of the boom does not swing).

Use the direction of left and right work device joysticks, as shown in the right figure.

#### A. Left working device joystick:

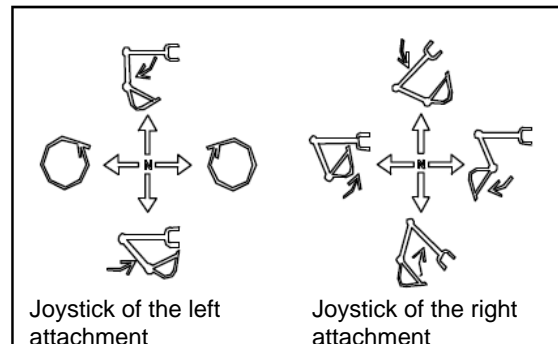
**Stick control:** the stick extends when pushing forward, and retracts when pulling backward.

**Platform rotation:** the platform turns right when swinging to the right, and it turns left when swinging to the left.

#### B. Right attachment joystick

**Boom control:** The boom goes down when being pushed forward; goes up when being pulled back.

**Bucket control:** The bucket flips outward when it swings right, turns inward when it swings left.



### 2. Operation of excavation equipment and platform slewing mechanism (boom swing type with steering head)

#### A. Left attachment joystick

**Stick control:** the stick extends when pushing forward, and retracts when pulling backward.

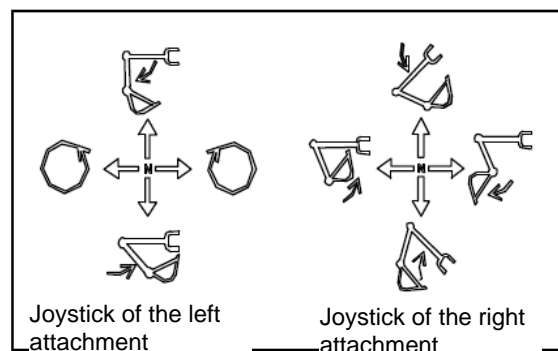
**Platform slewing:** The platform turns right when it swings right; turns left when it swings left.

**Boom slewing:** The boom slews right when it swings right; slews left when it swings left.

#### B. Right working device joystick

**Boom control:** The boom goes down when being pushed forward; goes up when being pulled back.

**Bucket control:** The bucket flips outward when it swings right, turns inward when it swings left.

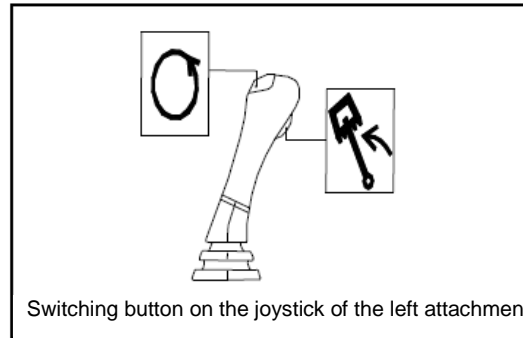


- **Selection and control of rotation and deflection**

For models of boom swing type with steering heads, it is necessary to switch between platform slewing or boom swing modes through the switch button on the left attachment joystick in advance to select the platform swing function or boom swing function.

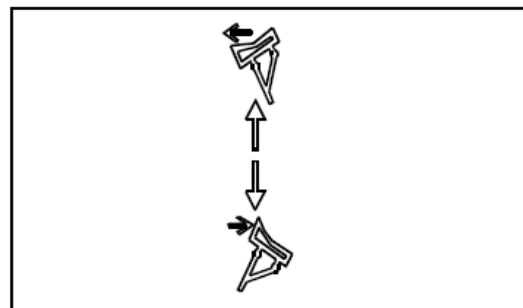
In normal state, it is the platform slewing mode, and the left attachment joystick can be directly used to control the platform rotation.

When the switch button above the left attachment joystick is pressed, the left attachment joystick can be used to control the swing of the steering head. Then, press the reset button of the left attachment joystick to return to the platform slewing mode.



### **3. Dozer blade operation**

Push the joystick downward, and the bulldozing blade cuts down. When being pulled up, the dozer blade is lifted.



### **4. Operation of auxiliary working devices**

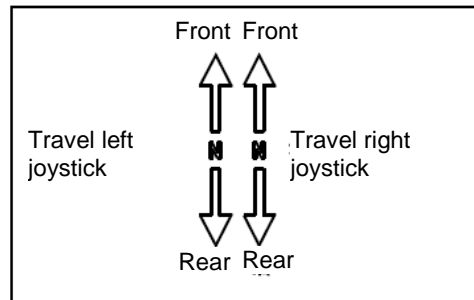
When the machine is equipped with an auxiliary working device, the cover plate of the variable speed and auxiliary control pilot valve can be opened forward, and then the auxiliary oil source can be connected by stepping down the pilot valve pedal.

# Travel control

## 1. Direction control

Operate the left and right travel joysticks to control the left and right tracks of the machine for traveling.

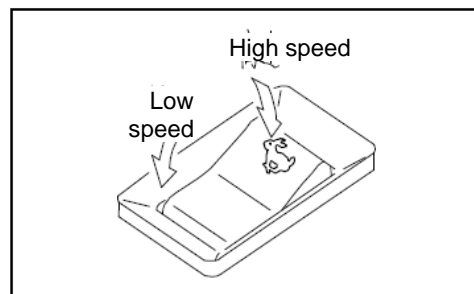
Control of the joystick on one side can achieve single side steering of the machine.



## 2. Speed control

1) For standard configuration models, speed control is achieved through auxiliary operation of the pilot valve. Lift the auxiliary control pilot pedal forward and then lower the pilot valve pedal downward to achieve high-speed machine travel.

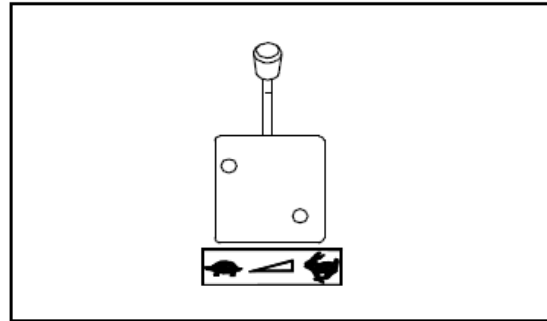
2) When intelligent speed control is selected, the high and low speed travel modes are controlled by controlling the high and low speed control buttons on the left control box panel.



## Mechanical accelerator and electronic accelerator

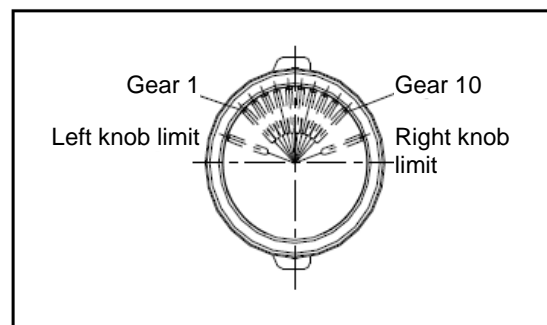
### 1. Mechanical accelerator (for models of mechanical accelerator)

Push the engine throttle lever forward to increase the accelerator. Before stopping the engine, push the lever all the way forward.



### 2. Electronic accelerator (for models of electronic accelerator)

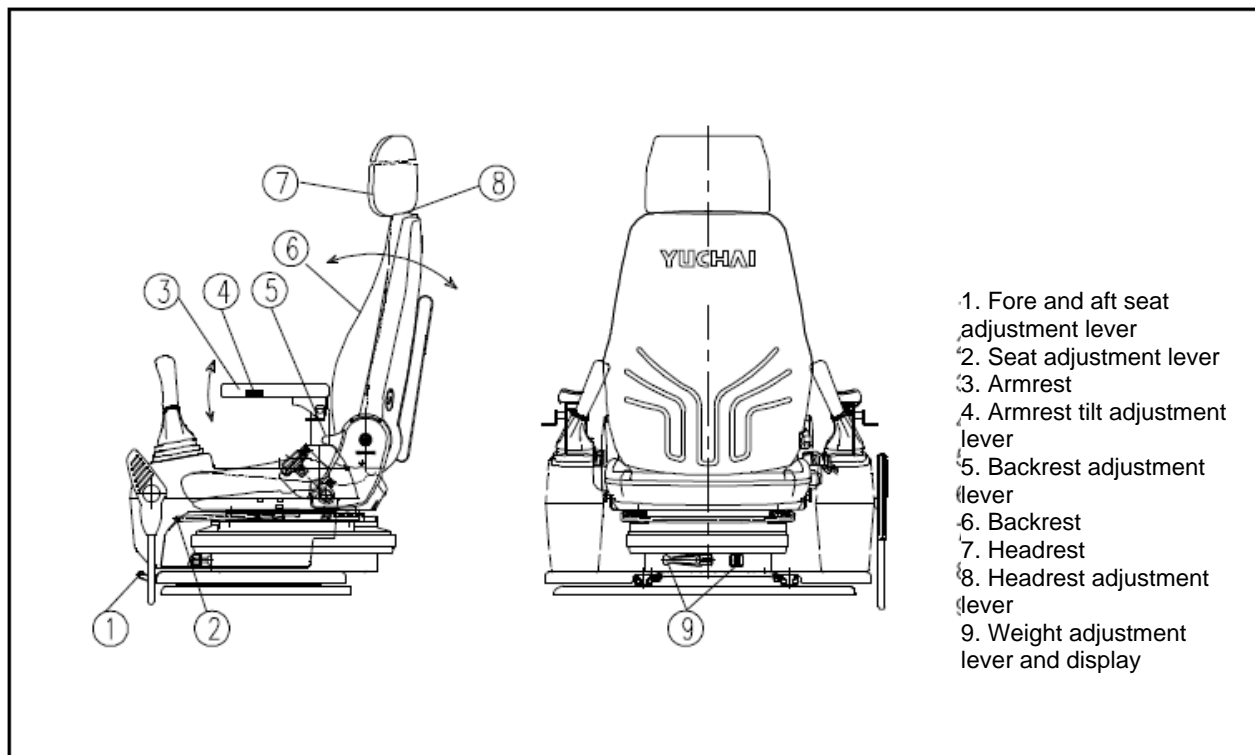
Turn the engine accelerator knob to the right and increase the accelerator. Before stopping the engine, turn the accelerator knob to the left limit position.



## Driver seat



**Warning: Accidental tipping or sudden movement of the machine may cause injury or even death. Therefore, for safety reasons, it is important to fasten the seat belt and adjust the seat before starting the machine.**



- **Fore and aft seat adjustment:** Twist the front and rear adjustment handles of the seat to allow five gears of  $0 \sim \pm 75\text{mm}$  forward and backward movement. Loosen the handle and the seat will be locked.
- **Backrest adjustment:** Pull up the backrest adjustment handle, the backrest can be adjusted in 5 positions, release the handle, and the backrest locks in place.
- **Headrest adjustment:** move the headrest adjustment handle backwards, and then push and pull the headrest to a suitable position.
- **Armrest tilt adjustment:** Turn the armrest tilt adjustment handle, the armrest can be tilted.

**Attention: When adjusting the seat, stop the machine. After adjusting, gently shake the seat to ensure reliable locking.**

## Seat belt



**Warning:** the seat belt is an important part of the machine safety system. Before operation, you must wear a seat belt. If you do not wear a seat belt, the cab or the machine may press on your body and cause injury when the machine tipped over.



**Warning:** before using the seat belt, check the installation of the seat belt for abnormalities. If the seat belt is worn or damaged, replace it.

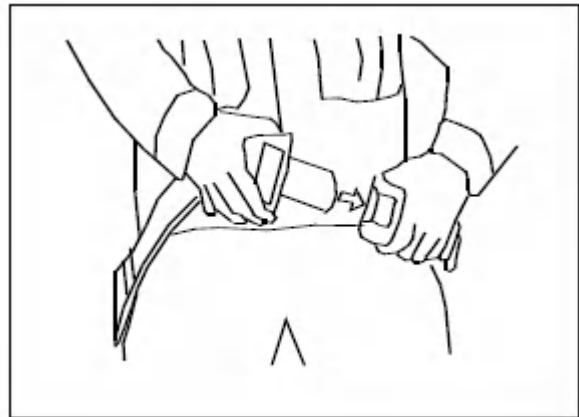
- Even if you do not see any abnormality in the seat belt, you must replace the seat belt every 3 years. The production date of the seat belt is displayed on the manufacture date label of the seat belt.
- During operation, be sure to wear a seat belt.
- When wearing a seat belt, do not twist the seat belt.

### 1. Secure the seat belt

Hold the seat belt clip, check whether it is twisted, adjust the length of the seat belt, and then insert the tongue firmly into the buckle. Pull the seat belt slightly to check whether the seat belt is properly locked.

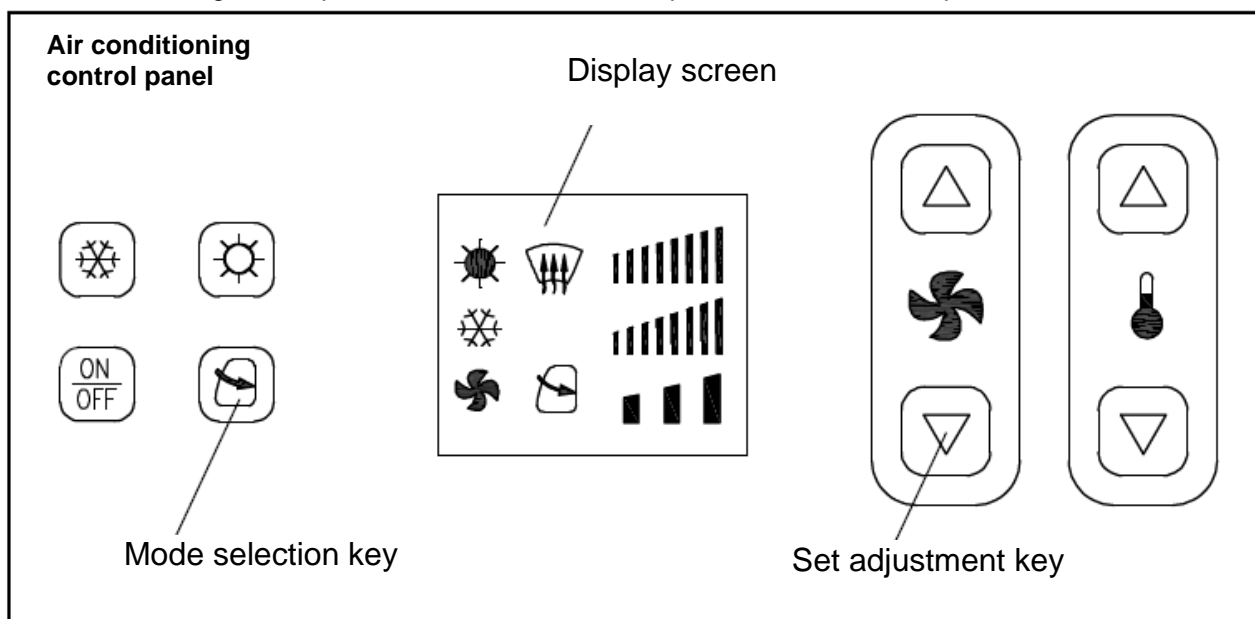
### 2. Remove the seat belt

Press the red button on the buckle and remove the tongue from the buckle to remove the seat belt.



## Air conditioning control

The air conditioning control panel is located on the switchpack of left control box panel.



### 1. Key functions and basic operations

#### Power switch



The air conditioning system is powered when pressed, the screen backlight is turned on, the fan runs at low speed for 3 seconds (no other operation is accepted during this time), and then the state before the last shutdown is restored. Press this key again when the power is turned on to memorize the current working state (cooling/heating/defrosting, wind speed, cooling and heating set value), and turn off the power.

#### Cooling key



Press this key in the ventilation mode to memorize the current status (wind speed setting value), and the system will enter the refrigeration mode. The screen displays (in middle row), and restores the last cooling state parameters (cooling volume setting value, wind speed setting value).


Press this key in the cooling mode to memorize the current status (cooling volume setting value, wind speed setting value), and the cooling mode is cancelled. The screen (in middle row) graphics disappears, and the system enters the last ventilation state (wind speed setting value).


Press this key in the heating mode to memorize the current status (heating volume setting value, wind speed setting value), and the system will enter the defrosting mode. The screen displays (in upper row) (in middle row), and restores the last defrosting state (heating volume setting value, wind speed setting value).


Press this key in the defrosting mode to memorize the current status (heating volume setting value, wind speed setting value), the defrosting mode is cancelled and the system will enter the heating mode. The screen (in upper row), (in middle row) graphics disappears, and the system enters the last heating state (heating volume setting value, wind speed setting value).

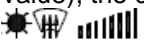
### Heating key



Press this key in the ventilation mode to memorize the current status (wind speed setting value), and the system will enter the heating mode. The screen displays  (in upper row) graphics disappears, and the system enters the last ventilation state (wind speed setting value).



Press this key in the cooling mode to memorize the current status (cooling volume setting value, wind speed setting value), and the system will enter the defrosting mode. The screen displays  (in upper row) graphics disappears, and the system enters the last ventilation state (wind speed setting value).

Press this key in the cooling mode to memorize the current status (cooling volume setting value, wind speed setting value), and the system will enter the defrosting mode. The screen displays  (in upper row) (in middle row), and restores the last defrosting state (heating volume setting value, wind speed setting value).

Press this key in the defrosting mode to memorize the current status (heating volume setting value, wind speed setting value), the defrosting mode is cancelled and the system will enter the cooling mode. The screen  (in upper row) graphics disappears, and the system enters the last cooling state (cooling volume setting value, wind speed setting value).



### Circulation air key



Press this key to enter the external circulation mode. The screen displays,  press this key again to cancel the external circulation mode in the external circulation mode, the system enters the internal circulation mode, and the graphics  disappears.



### Increase setting key




In the cooling mode, it means to increase the cooling volume, and the bar numbers of  (in middle row) displayed on the screen will increase accordingly; In the heating or defrosting (the cooling and heating work at the same time) mode, it means to increase the heating volume, and the bar numbers of  (in upper row) displayed on the screen will increase accordingly. The bar number increases by 1 bar each time you press this key.

### Decrease setting key




In the cooling mode, it means to decrease the cooling volume, and the bar numbers of  (in middle row) displayed on the screen will decrease accordingly; In the heating or defrosting (the cooling and heating work at the same time) mode, it means to decrease the heating volume, and the bar numbers of  (in upper row) displayed on the screen will decrease accordingly. The bar number decreases by 1 bar each time you press this key.



Press this key to increase the wind speed, and the bar number of  displayed on the screen will increase accordingly. The bar number increases by 1 bar and the wind speed increases by 1 gear each time you press this key.



Press this key to decrease the wind speed, and the bar number of  displayed on the screen will decrease accordingly. The bar number decreases by 1 bar and the wind speed decreases by 1 gear each time you press this key.



## 2. Application of special operations

### 1) Forced cooling operation

This operation should normally be selected in hot weather, especially in the period before the cold air is turned on. The method: select the cooling mode, press the key "Increase wind speed" to select the maximum wind speed, and press the key "Increase temperature setting" to select the maximum cooling capacity.

### 2) Weak cooling operation

This operation should usually be selected in a slightly hot climate, especially when the indoor temperature has been suitable or even cooler after the cold air has been turned on for a period of time. The method: select the cooling mode, press the key "Decrease wind speed" to select the minimum wind speed, and press the key "Decrease temperature setting" to select the minimum cooling capacity.

### 3) Forced heating and defrost operation

This operation should normally be selected in cold weather, especially in the period before the heating is turned on, and when the frost on the outside of the glass needs to be removed. The method: select the heating mode, press the key "Increase wind speed" to select the maximum wind speed, and press the key "Increase temperature setting" to select the maximum heating capacity.

### 4) Weak heat operation

This operation should usually be selected in a slightly cold climate, especially when the indoor temperature has been suitable or even warmer after the heating has been turned on for a period of time. The method: select the heating mode, press the key "Decrease wind speed" to select the minimum wind speed, and press the key "Decrease temperature setting" to select the less heating capacity.

### 5) Dehumidification and demisting operation

A layer of fog usually forms on the inside of the glass, which affects the vision, in a humid climate (including indoor water vapor exhaled by human body and human sweating), when the indoor temperature is higher than the outdoor temperature (including the use of heating), except that indoor humidity makes people feel uncomfortable. This operation should normally be selected at this time.

There are two ways to do this:


A. Select "weak cooling operation" in a warm or slightly hot climate (see above "4" for details).


B. Select heat and cooling to make them function at the same time in a slightly cold climate (that is, "defrost mode" in Table 1, and the screen will display graphics).

In this defrost mode, the cooling capacity has been set by using the program, and cannot be adjusted or displayed; The heat capacity can be adjusted by the operator according to the indoor temperature.


## 3. Other instructions

① The indoor stale air may not be fresh if the internal circulation is used for a long time (no

graphic  display on the screen), but it will cause partial loss of cooling or heat if the

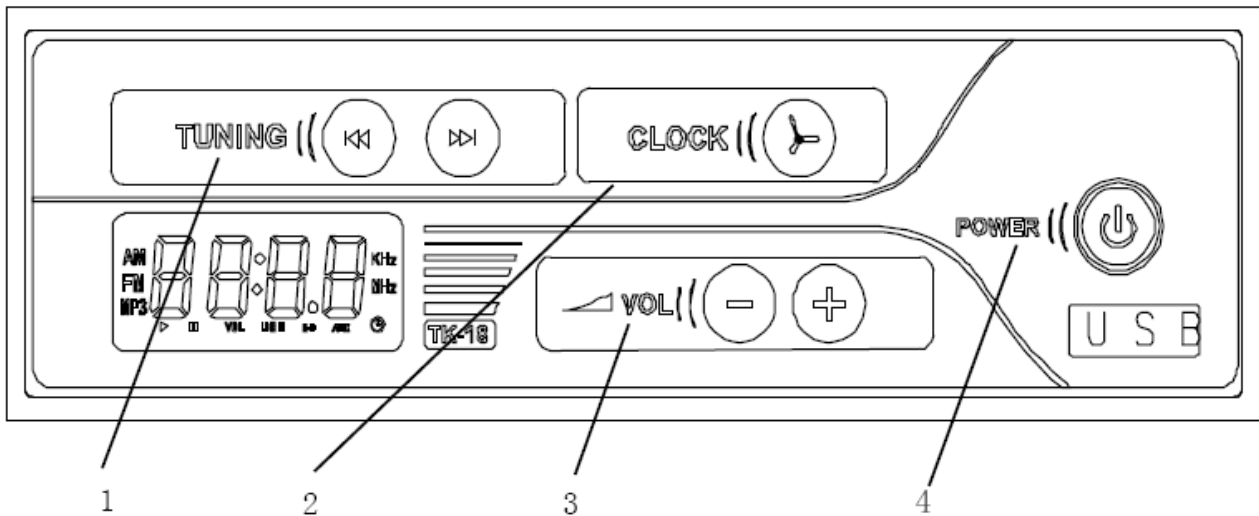
external circulation is used for a long time (with graphic display  on the screen). Therefore, the operator is requested to use it as appropriate.

Machine setting: the system will automatically close the external circulation damper (enter the internal circulation mode) as long as the system operation mode is changed or the machine is shut down. If the operator needs to use the external circulation function after changing the operation mode or just starting the machine, it can only be effective by

pressing the  key.

②. Except for the circulating air mode, the machine will immediately automatically remember any change in mode and settings (including the state before shutdown - mode and settings). When you use this mode again, the machine will automatically restore the previous settings (including the state before the last shutdown after startup). This is very convenient for users, for example, when turning on the machine at work in the morning, it automatically restores the operation state from last night shutdown after work; when returning to work after an intermediate break, the user automatically restores the previous operation state; when the machine is turned on at work in the afternoon, it automatically restores the operation status when the machine is turned off after work in the morning.

## Radio



1. TUNING/manual/automatic radio search button for selecting to play MP3 previous/next song
2. CLOCK timer setting key.
3. The VOL -/+volume adjustment button is used in conjunction with CLOCK to set the clock
4. POWER switch and mode switching button.

### Radio operation instruction

#### 1. FM radio mode button function description

Press POWER button for the first time to turn on the FM radio mode and hold it turn off.

Press TUNING/to automatically reduce/increase the search step size from the current frequency until the radio station is locked;

Hold TUNING/to quickly reduce/increase the search step size from the current frequency, and then enter the manual single step FM state. After waiting for about 3 seconds, it will automatically switch to automatic mode.

That is, pressing to automatically search for a radio station, holding to manually adjust the radio frequency in one step.

Volume adjustment control in FM radio mode

In FM radio mode, press the VOL -/+ to decrease/increase the current volume by only one level;

Hold the VOL -/+ to quickly and continuously decrease/increase the current volume step by step until the button is released.

Clock setting in FM radio mode

When the FM radio is working, press the CLOCK and the display will switch to display the current frequency and time. When the display is in time display state, hold the CLOCK and the hour number will flash. Now press the VOL -/+ to decrease/increase the hour number; after completion, holding CLOCK again will cause the minute number to flash. Now pressing the VOL -/+ will decrease/increase the minute number to reach the set time. Finally, press the CLOCK again to exit the time setting.

After setting, the clock will continue to cycle when BAT (yellow line) is continuously powered on.

## 2. Function description of USB MP3 playback mode buttons

In radio operation mode, inserting a USB drive will automatically switch to USB drive playback mode.

Press TUNING/ to select the previous/next MP3 song to play;

Hold TUNING/ to quickly select several previous/next songs, until the button is released to play the selected songs.

Volume adjustment control in USB MP3 playback mode

In USB-MP3 playback mode, press the VOL -/+ to decrease/increase the current volume by only one level;

Hold the VOL -/+ to quickly and continuously decrease/increase the current volume step by step until the button is released.

Refer to the operating steps in section 1.3 for clock settings in USB MP3 playback mode.

## 3. Function description of other mode buttons

Press the POWER key to switch the radio or USB MP3 mode to AUX audio input mode (optional). In AUX audio input mode, the TUNING/button does not work.

In AUX audio input mode, the volume level can be adjusted with VOL -/+.

In AUX audio input mode, the clock can be adjusted and set with CLOCK and VOL -/+.

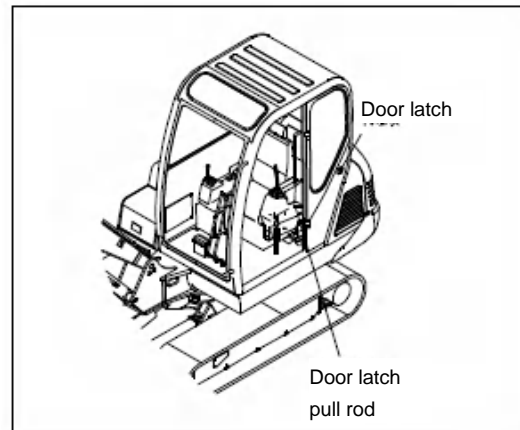
Refer to 1 for clock setting in AUX audio input mode 3 operation steps.

# Door and window

## 1. Cab door

The excavator door is the only path for the driver to get on or off the machine normally. The door must be locked when the driver leaves the cab.

Please fasten the door lock on the door latch when the cab door is open to avoid hurting others. When it is necessary to close the door, press the door latch lever to open the door latch, and the cab door can rotate.



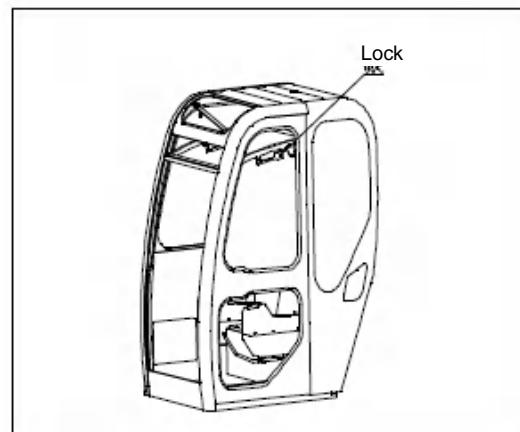
## 2. Rear window

The rear window can be used as an emergency exit. When the cab door cannot be opened for some reason, someone is trapped in the cab and cannot get on or off normally, and it is necessary to escape from the cab, please smash the glass by aiming the pointed cone of escape hammer to the rear window glass until the glass is broken, and then escape from it.

## 3. Front window (flip window)

The driver can get better observation conditions and air circulation if the flip window is opened.

If you want to open the flip window (front window), you need to open the handle lock on both sides of the flip window at first. By operating the handle of the flip window handle lock, you can slide the flip window up and down. When the flip window is pulled to a proper position, you can push the flip window up to the locked position, and lock the flip window by releasing the handle lock.



Conversely, the flip window can be lowered.

# 4 **Operation guide**

## Preparation before operating the machine

- 1) The excavator should be operated by trained drivers who meet the specific requirements for drivers in each region before independent operation.
- 2) Drivers are strictly forbidden to manipulate before reading the instruction manual.
- 3) Drivers must wear tight-fitting and suitable clothing and relevant safety protection equipment adapted to the work before operation, such as safety helmets, leather shoes, gloves, protective glasses, seat belts, etc.
- 4) Check the machine carefully according to the usage requirements before starting every day.
- 5) Check whether the attachment, oil cylinder and hose are damaged.
- 6) Clean the dust and dirt around the engine, radiator, and battery.
- 7) Check the hydraulic device, fuel tank, hose and joints for oil leakage (you can check whether there are obvious oil traces on the parking floor).
- 8) Check whether each component (tracks, drive wheel, guide roller etc.) of the lower frame are damaged and whether the bolts are properly secured. The bolt connection between the frame and the platform is properly secured.
- 9) Check that all meters and monitors are not damaged.
- 10) Clean the rearview mirror, check for damage, and adjust the angle so that you can see the correct field of view.
- 11) Check that the seat belt is not damaged.
- 12) Make sure that the correct maintenance has been carried out in accordance with the specified requirements.



**Warning: Before operating the machine, you should ensure that you have understood and memorized the contents of the safe operation of the machine in the "Safety Regulations" of this manual.**

## Engine operation



**Warning:** Before starting the engine, please refer to the safety details in this manual. Read all safety signs on the machine. There must be no other people in the workplace. Before operation, learn and practice safe operation. When operating the machine, you must be clear about and follow the relevant operation and maintenance sections of the manual, and comply with the corresponding laws and regulations.

### 1. Check before starting the engine

- 1) Check whether the seat belt is fastened, honking the horn, and confirm whether there are people around the working area and on or under the machine.
- 2) Check whether each window glass and rearview mirror can provide a good field of vision.
- 3) Check for dust or dirt around the engine, battery, and radiator, and clean as necessary
- 4) Check the attachment, cylinder, connection rod, and hydraulic hose for cracks, excessive wear or clearance. If an abnormality is found, it must be replaced and repaired.
- 5) Check the hydraulic device, hydraulic oil tank, hoses, and joints for oil leakage.
- 6) Check the lower body (tracks, sprockets, guide roller, etc.) for damage, wear, loose bolts, or oil leakage.
- 7) Check whether the display of the meter is normal, whether the work lamps can work normally, and whether there is an open circuit in the electrical circuit.
- 8) Check if the coolant level, fuel level, hydraulic oil level, and engine oil level are between the upper and lower limits.
- 9) In cold weather, it is necessary to check whether the coolant, fuel, hydraulic oil, battery electrolyte, engine oil, and lubricating oil are frozen. If so, they must be thawed before starting the engine.
- 10) Check whether the control is locked.
- 11) Check the working condition, direction, and position of the machine in order to provide relevant information for the operation.



## 2. Start the engine



**Warning: Do not start the engine when there is engine start warning sign on the joystick.**



**Warning: Before starting the engine, it is necessary to confirm that the safety lock lever is in the locked position to prevent accidental contact with the control lever during starting, resulting in sudden action of the attachment and causing accidents.**



**Warning: If the battery electrolyte freezes, do not charge the battery or start the engine with a different power source. Doing so poses a risk of battery ignition. Before charging or using a different power source for the engine, the battery electrolyte should be melted and checked for freezing and leakage before starting.**

Before starting the engine, insert the key into the start switch and turn it to the ON position. Check the display status of all indicator and alarm lights on the digital combination instrument. If an alarm is found, please first troubleshoot the relevant faults before starting the engine.

### A. Starting the engine at normal temperature

Turn the key clockwise to the ON position. The alarm indicator goes out to indicate that the machine can start normally. Continue to turn to the START position and keep it at this position for no more than 10 seconds. After the engine is started, release the key and it will automatically return to the ON position. If the engine fails to start, it will take 30 seconds to restart.

**Attention: The continuous starting time should not exceed 10 seconds; the interval between two starts should not be less than 1 minute; if the engine cannot be started three times in a row, check whether the engine systems are normal.**



**Warning: 1) Do not turn the key when the engine is in operation, which may damage the engine.**

**2) Do not start the engine while dragging the excavator.**

**3) Do not start the engine by short-circuiting the starting motor circuit.**

- Start the engine with an auxiliary cable.



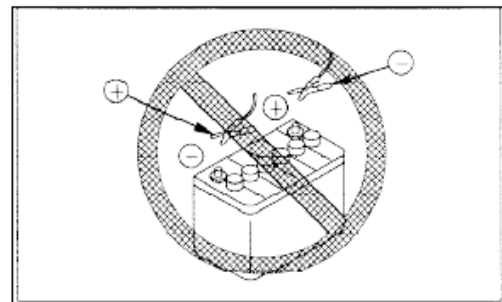
**Warning:** When the battery electrolyte freezes, if (1) you try to charge, or (2) jump-start the engine, the battery will explode. To prevent the battery electrolyte from freezing, keep it fully charged. If you do not follow these instructions, you or others will be harmed.



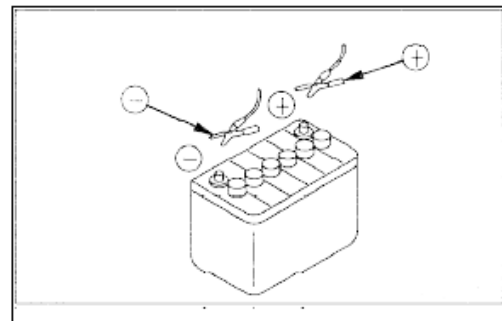
**Warning:** The battery can produce explosive gases. Keep away from sparks, flames, and fireworks. When charging or using the battery in enclosed areas, it is important to maintain ventilation and wear eye masks when working near the battery.

Incorrect auxiliary cable connection can cause battery explosion. Therefore, it is necessary to abide by the following regulations.

- 1) When starting with an auxiliary cable, two people are necessary for the operation (one person to sit in the operator's seat and the other to operate the battery).
- 2) When starting with another machine, the two machines should not come into contact.
- 3) When connecting auxiliary cables, turn the key switches of the normal and faulty machines to the OFF position. Otherwise, there is a danger of the machine moving when the power is turned on.



- 4) When installing the auxiliary cable, be sure to connect the battery negative (-) last; when removing the auxiliary cable, disconnect the battery negative (-) cable first.
- 5) When disassembling the auxiliary cables, be careful not to let the auxiliary cable clamps come into contact with each other or with the machine.
- 6) When starting the engine with an auxiliary cable, be sure to wear protective goggles and rubber gloves.
- 7) When connecting a normal machine to a faulty machine with auxiliary cables, use a normal machine with the same battery voltage as the faulty machine.



### **3. After the engine is started**

#### **A. Engine warm-up and machine heating**

The normal working temperature of hydraulic oil is 50°C~80°C. Operating the hydraulic oil below 20°C will damage the hydraulic components. So before starting work, if the oil temperature is below 20 °C, the following preheating process must be followed.

- 1) Run the engine at a speed above idle speed 200rpm for 5 minutes.
- 2) Run the engine with the throttle in the center position for 5-10 minutes.
- 3) At this speed, extend and retract each cylinder several times, and gently operate the slewing and traveling motors to preheat the cylinders. Only when the oil temperature reaches 20 °C or above can it work. If necessary, the bucket cylinder can be extended or retracted to the end of the stroke, and the hydraulic oil can be preheated at full load, but each time it should not exceed 30 seconds. It can be repeated until the oil temperature requirement is met.

#### **B. Check after starting the engine**

- 1) Check if all the indicator lights are off.
- 2) Check for oil leakage (lubricating oil, fuel) and water leakage.
- 3) Check if there is any abnormality in the sound, vibration, heating, smell, and instrument of the machine. If an abnormality is found, repair immediately.

### **4. Turn off the engine**

**Attention: If the engine is suddenly shut down before cooling, its service life will be greatly shortened. Therefore, do not suddenly shut down the engine except in emergency situations.**

**If the engine is overheated, don't shut it down suddenly, but run at a medium speed to gradually cool the engine, and then shut down the engine.**

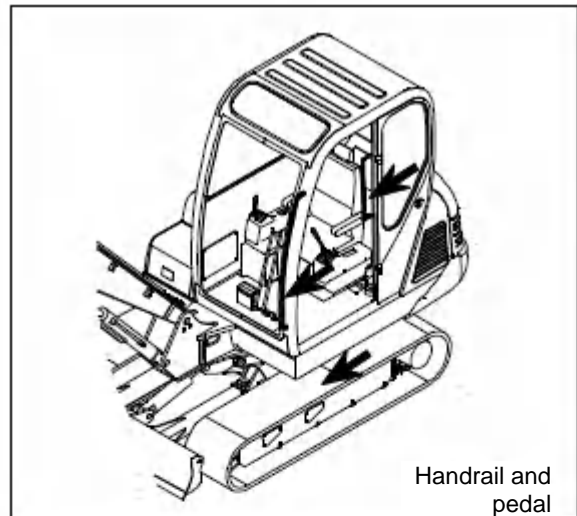
- 1) Run the engine at low idle for approximately 5 minutes to gradually cool down.
- 2) Push the throttle to the end, and pull the parking handle back to the end.
- 3) Turn the key switch to the OFF position and turn off the engine. All the indicators go off.
- 4) Take off the key.

### **5. Check after starting the engine**

- 1) Regularly check the attachment, machine exterior and chassis, and check whether there is water leakage or oil leakage. If an abnormality is found, repair it.
- 2) Refuel the fuel tank.
- 3) Check the engine compartment for paper scraps and debris. Remove paper scraps and debris to avoid a fire.
- 4) Remove the mud attached to the chassis.

## Get on/off the machine

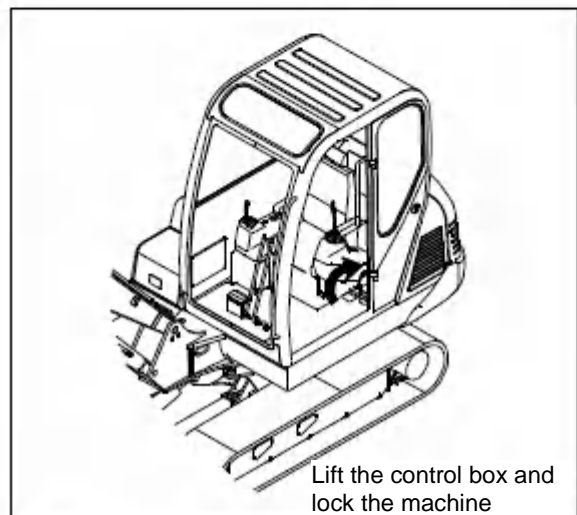
- 1) Make sure to hold the handrail (indicated by the arrow) at the door of the cab as shown in the figure.
- 2) Ensure that the foot is firmly pressed on the track.
- 3) When getting on and off the machine, it is not allowed to grasp the joystick for security.
- 4) Before getting on and off the machine, you must confirm whether there are any substances such as mud and grease on the surface of the handrails and tracks that can cause slippage. If there are, please clean them up.
- 5) Do not jump on or off the machine, and do not get on or off the machine while it is in motion.



- 6) Before leaving the machine, the working device must be completely lowered to the ground, and then lift control box with the safety lock lever, in the machine locked state, turn off the engine and keep this state until the next time the machine is operated.

**Attention: Please remove the key and lock all doors and windows when leaving.**

It is not allowed to climb to the top of the fuel tank, engine hood, and cab.  
No matter in what state, no people is allowed on the attachment (such as the bucket, bucket arm, boom, and accessories).



## Movement of the machine

### 1. Safety rules for moving the machine

- 1) Before starting the excavator, it is required to be familiar with the surrounding environment of the site, whether there are pedestrians, obstacles, ground bearing capacity, etc.
- 2) Before starting the excavator, the horn should be sounded to alert the people nearby to pay attention.
- 3) It is strictly prohibited for the driver to start and operate the machine while standing on the ground.
- 4) The excavator must travel and operate on solid ground that is over 1.5 times of its width.
- 5) When traveling through areas such as underground passages, bridges, or high-voltage power lines, it is necessary to ensure command by a specially designated personnel.
- 6) When traveling, it is necessary to lower the boom and bucket arm to maintain the optimal position of the center of gravity.
- 7) When the machine is moving, only the driver is allowed to drive on the machine and no passenger is allowed on the machine.
- 8) Before operating the steering joystick, check the direction of the track frame.
- 9) If the dozer blade is in the rear side, the operation of the travel joystick is reversed.
- 10) No one is allowed in the area around the machine.
- 11) Clear all obstacles on the travel route of the machine.
- 12) The rear of the machine is a blind spot, so special attention should be paid for reverse traveling.

**Warning: Sudden switching of the joystick during high-speed traveling can be dangerous.**

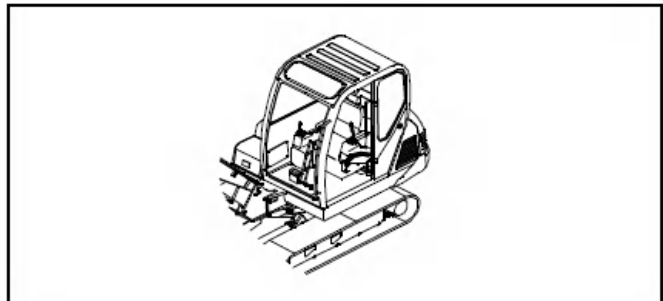


- 1) Do not suddenly switch the joystick, otherwise it may cause sudden start.
- 2) Avoid sudden switching of the joystick from forward to reverse (or from reverse to forward).
- 3) Avoid sudden changes in the joystick, such as sudden stops from high speed (releasing the joystick).

### 2. Preparation for moving the machine

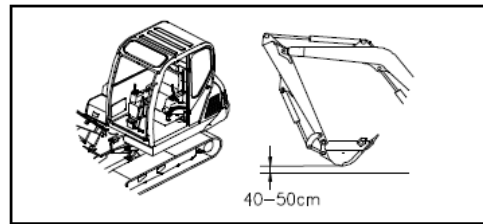
- 1) Lower the left flip box.

- 2) Turn the accelerator lever to the high speed position to increase the engine speed.



### 3. Move the machine forward

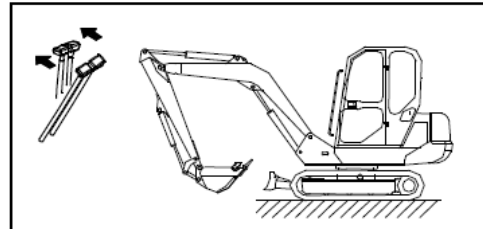
1) Adjust the control box to the free position, raise the working device and lift it 40 to 50 cm off the ground.



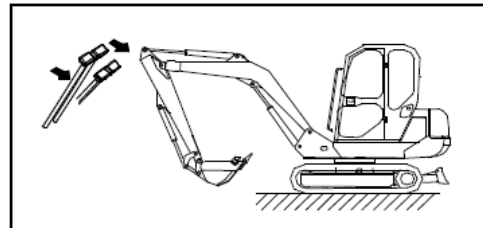
2) Follow the steps below to operate the left and right travel joystick.

When the dozer blade is in front:

Slowly push the front of the joystick forward to move the machine.



When the dozer blade is in the rear of the machine:  
Slowly pull back the joystick to move the machine.



**Attention: If the travel speed of the machine is abnormal at low temperatures, it is necessary to thoroughly warm up the machine. In addition, if the lower body of the machine is blocked by soil and the travel speed is abnormal, please make sure to remove the dirt and soil.**

### 4. Reverse the machine

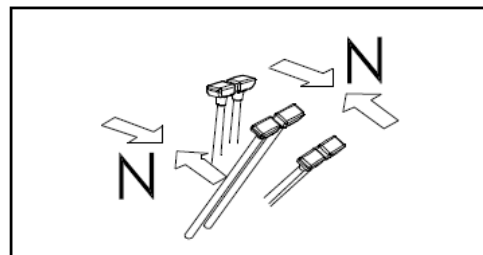
1) Adjust the control box to the free position, raise the working device and lift it 40 to 50 cm off the ground.

2) The operation is in reverse order for moving forward.

### 5. Park the machine

Place the left and right joysticks in the center position to park the machine.

**Attention: Avoid sudden stopping of the machine while traveling; there should be sufficient space for parking.**



## Steering of the machine

**Attention: Before operating the travel joystick, check the position of the dozer blade. If the dozer blade is in the rear side, the operation of the travel joystick is reversed.**

Use the left and right travel joystick to change the direction of travel.

Try to avoid sudden changes in direction as much as possible. Especially when turning in reverse (turning in place), park the machine before turning.

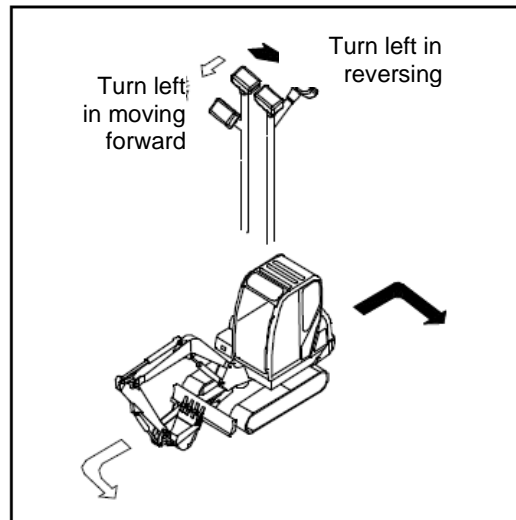
### 1. Steering when the machine is parked

**Steering left:**

When traveling forward, push the right travel joystick forward to turn the machine to the left.

When reversing, pull the right travel joystick back to turn the machine to the left.

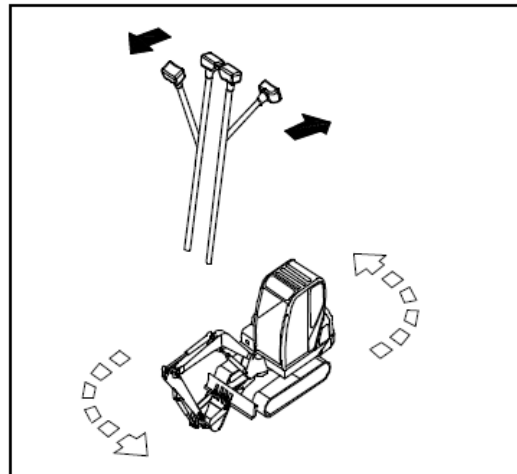
When turning to the right, operate the left travel joystick in the same way.



### Steering in place

When making a left turn in place, pull the left travel joystick back and push the right travel joystick forward.

When making a right turn in place, pull the right travel joystick back and push the left travel joystick forward.

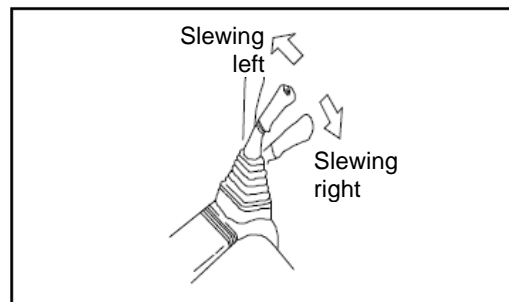
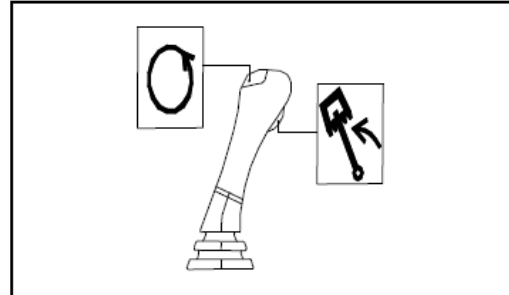


## Slewing of the machine

- Before rotating the upper structure, check the surrounding area for safety.
- If you operate the swing joystick quickly, the upper structure will rotate quickly; if you operate the swing joystick slowly, the upper structure will rotate slowly. Pay attention to the operating speed of the joystick.

1) If the machine is equipped with a steering head, operate the selection button on the left attachment joystick to confirm that the machine is in a platform slewing state.

2) Operate the left working device joystick to rotate.





## Operation of the attachment

If you operate the working device joystick quickly, the working device will move quickly; if you operate the working device joystick slowly, the working device will move slowly.

The attachment is operated by the left and right control pilot valves. The left control pilot valve operates the bucket arm and slewing (if equipped with a steering yoke, the left control pilot valve can also control the steering yoke to swing). Joystick of the right attachment controls the boom and bucket.

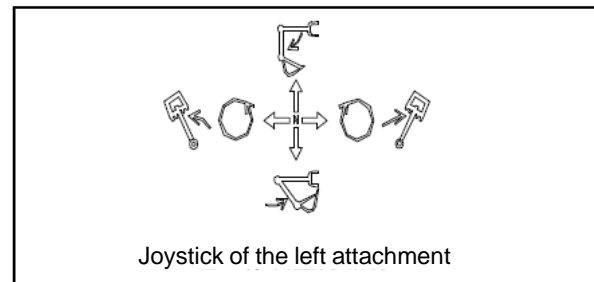
When the joystick is released, it will automatically return to the neutral position and the working device will remain in the original position.

If the pilot valve is operated within 15 seconds of shutting down the engine, the attachment can still be lowered to the ground.

In addition, the control pilot valve can be operated to release the remaining pressure in the hydraulic oil line and lower the boom after the machine is mounted on the trailer.

### 1. Bucket arm control

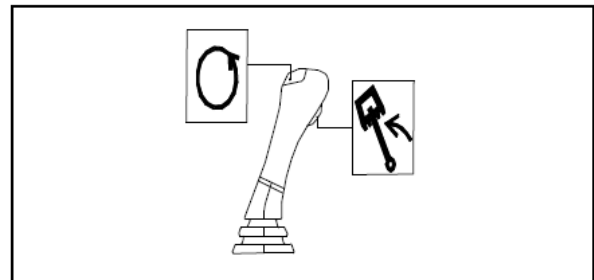
Push forward the left control pilot valve to extend the bucket arm; pull it back to retract the bucket arm.



### 2. Slewing control

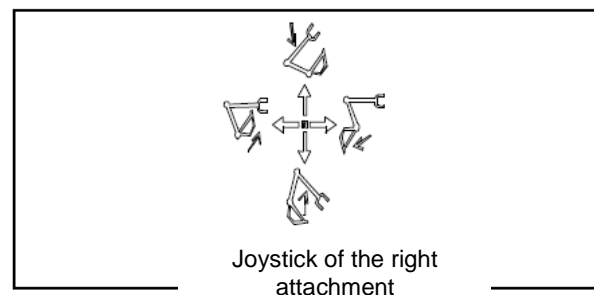
When the left control pilot valve swings left, the platform turns left; when it swings right, the platform turns right.

For the machine with the swing function of the boom, it is necessary to make sure that the machine is in the rotating state before rotating.



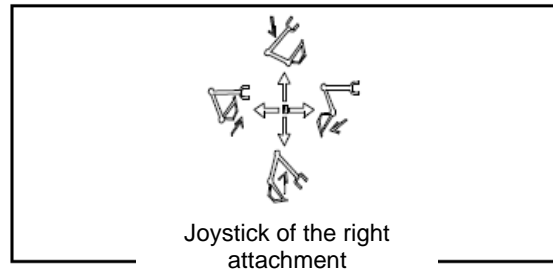
### 3. Boom control

Push the right control pilot valve forward to lower the boom; pull it back to lift the boom.



#### 4. Bucket control

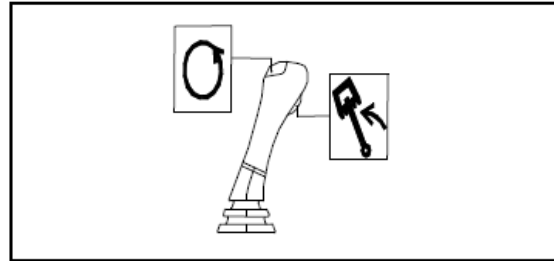
Swing the right control pilot valve right to turn the bucket out; swing it left to turn it back.



#### 5. Boom swing (steering yoke) control

When the left control pilot valve swings left, the steering yoke turns left; when it swings right, the steering yoke turns right.

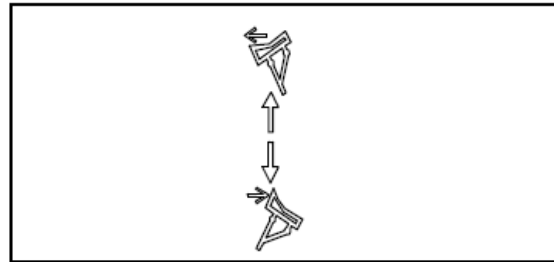
For machines with boom swing function, it is necessary to ensure that the machine is in boom swinging mode before swinging the boom.



#### 6. Dozer blade operation

Push the dozer joystick downward and the dozer blade cuts down.

When being pulled up, the dozer blade is lifted.



**Attention:** There may be stagnation during the operation of the bucket arm, which is not a mechanical fault but a normal phenomenon of the excavator, as the weight of the bucket arm itself during movement may accelerate the movement of the arm and cause insufficient fuel supply.

## Work on slopes or in water



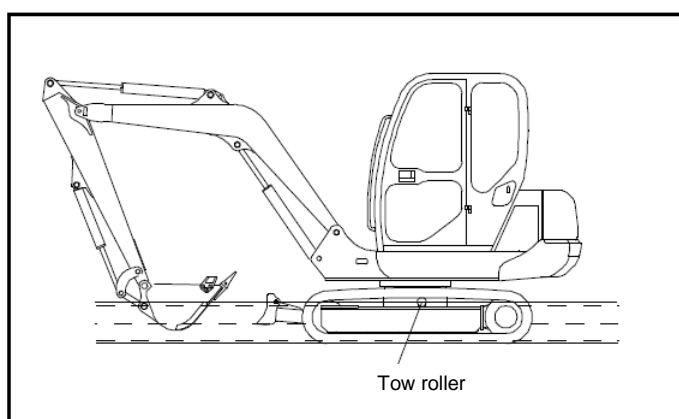
**Warning: Construction near the foothills and slopes is very dangerous. Different operating conditions such as rainwater, muddy ground, snow covered ground, icy ground, loose sand, and soft ground can pose potential hazards to operational safety. Therefore, when constructing in dangerous areas such as foothills or ramps, it is necessary to make a correct judgment on whether safe operations can be carried out in order to make a decision.**

- For traveling, lift the bucket approximately 20-30 cm above the ground.
- Don't travel backwards downhill.
- When walking on bumps or other obstacles, keep the attachment close to the ground and travel slowly.
- Do not turn on slopes or cross slopes. The direction can be changed in advance on a flat place.
- When working on a slope, turning the machine or operating the attachment can cause the machine to lose balance and tip over, so it is important to avoid such operations. When the bucket is loaded, slewing towards the downhill direction is very dangerous. If this operation is necessary, a platform should be piled up on the slope with soil so that the machine can maintain balance during operation.
- Do not climb or descend steep slopes as there is a risk of the machine tip-over.
- When traveling uphill, if the track shoes slip or the force of the track alone cannot climb the slope, do not help the machine climb the slope with the pull of the bucket arm, as there is a risk of the machine tip-over.
- When going uphill, it is necessary to ensure that the engine and hydraulic oil are properly preheated, otherwise it may cause accidents.

### Allowed water depth

Do not drive the machine in water with a depth exceeding the centerline of the rail support plate.

Add grease to parts that will be immersed in water for a long time until the used grease is completely squeezed out.



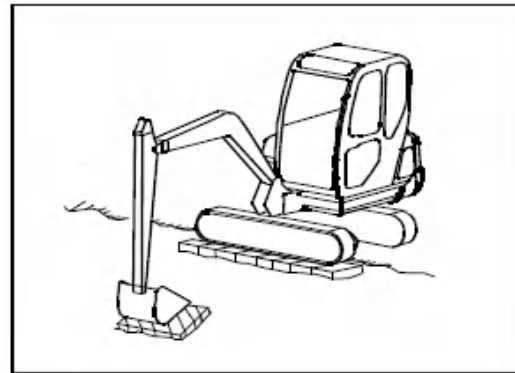
## Keeping away from muddy environment

Always handle with caution to avoid getting stuck in the mud. If the machine gets stuck in mud, follow the steps below to drive the machine out.

### A. The track on one side stuck

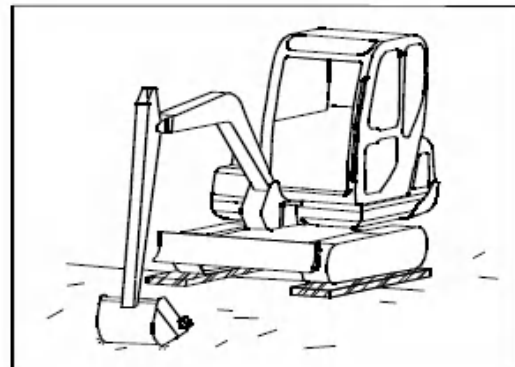
**Attention:** When lifting the machine with a boom or bucket arm, make sure that the bottom of the bucket is in contact with the ground. (Do not push with the bucket teeth.) The angle between the boom and the bucket arm should be 90-110 degrees.

When only one side of the track is stuck in the mud, lift the track with the bucket, and then place a wooden board or log under it to drive the machine out. If necessary, place wooden boards under the bucket as well.



### B. Both the tracks stuck

If the tracks on both sides are stuck in mud, slipping, and cannot move. Pad wooden boards or logs in the above way. Dig the bucket into the ground ahead, operate the bucket arm in the same way as during excavation, and adjust the travel joystick to the forward position to pull out the machine.



# Operation guide for construction

## 1. Backhoe operation

Backhoes are suitable for digging below the machine.

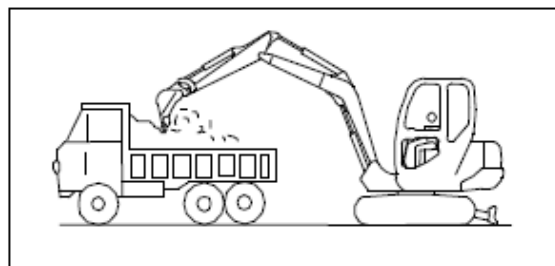
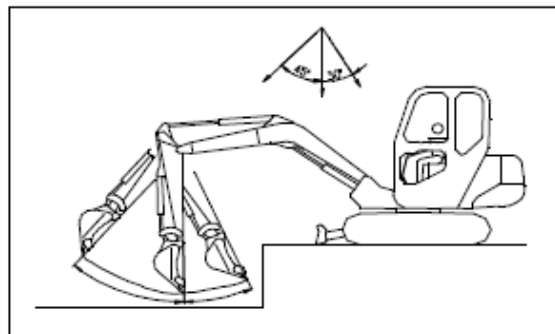
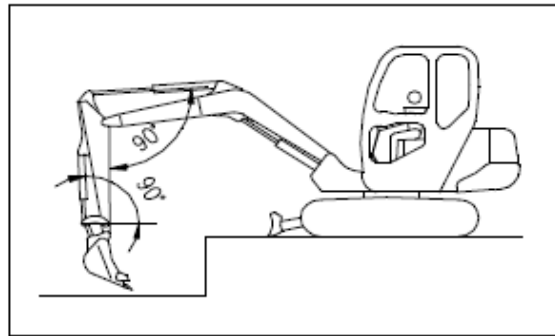
When the machine is in the state shown in the right figure, that is, when the bucket cylinder is at a  $90^\circ$  angle to the connecting rod and the bucket arm cylinder is at a  $90^\circ$  angle to the bucket arm, the maximum push-excitation force of the bucket can be obtained.

Effectively using this angle during excavation can optimize work efficiency.

The excavation range of the bucket arm is from a  $45^\circ$  angle away from the machine to a  $30^\circ$  angle towards the machine.

Depending on the depth of excavation, there may be some differences, but it is important to operate within the above range as much as possible, rather than operating the cylinder to the end of its stroke.

**Note: For hard rock ground, it is recommended to crush the ground first with other method before the excavation, which not only minimize the damage to the machine, but also is economical.**



## 2. Loading operation

In areas with small turning angles, park the dump truck in a location that is easily visible to the operator to improve work efficiency.

Loading from the rear of a dump truck is more convenient and has a larger loading capacity than loading from the side of the truck.

### **3. Trenching operation**

Position the dozer blade at the rear and anchor it into the soil surface.

Extend the boom and bucket arm, and insert the bucket teeth into the soil surface.

During the excavation process, adjust the excavation and loading angles of the bucket in a timely manner using the bucket arm cylinder, or switch to using the bucket cylinder for excavation. When excavating, do not insert the bucket teeth too deep into the soil to avoid being unable to dig due to hydraulic system overload. If the soil cannot be excavated, the boom can be lifted appropriately for improvement. After the bucket is filled, lift the boom and bucket arm to raise the bucket above the ground, and rotate the platform to the appropriate position to unload the soil.

#### **Note:**

**1) Do not touch the overhead electric wires.**

**2) Only after the situation of underground pipelines and cables have been learned can excavation begin to avoid damaging the pipelines and causing electric shock accidents.**

**3) When an electric shock accident occurs, the driver should not leave the seat and warn others not to approach. Drive the machine to a safe area and cut off the power before leaving.**

### **4. Backfill or leveling**

In order to fill the trench flat, the excavator should travel perpendicular to the trench. After cutting the dozer blade into the soil to a certain depth, release the dozer joystick, start the machine to move, and push the soil into the trench with the dozer blade.

### **5. Shake off the sediment and soil from the bucket**

Place the bucket arm in an approximately horizontal position with the bucket in the unloading position. If sediment and soil cannot fall off, operate the bucket joystick several times to shake the sand and soil out of the bucket. Avoid using the method of shock vibration at the end of the bucket cylinder stroke to shake off sand and soil.

### **6. Precautions for using related components**

#### **A. Precautions for use of the track**

1) Excessive debris entering the tracks will increase the working strength of the tracks and cause damage.

2) Avoid making a sudden turn on a road with a strong friction.

3) Try to avoid getting contaminated with salt water or salty gases, as salt can corrode the tracks.

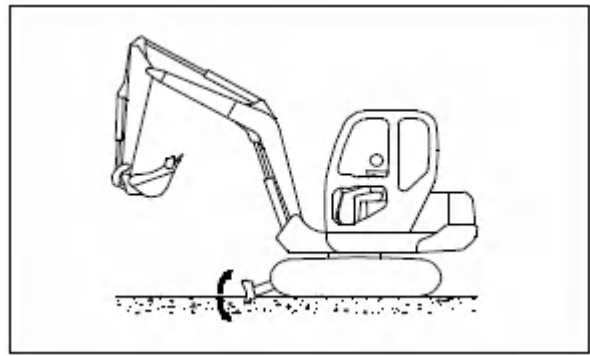
4) Tracks that will not be used for a considerable period of time should be stored in a cool and dry place.

5) When one track and the front device are jacked up, the other track cannot be used for walking, which will cause wear.

6) The track during traveling should not be loose, otherwise it may fall off or be damaged.

## **B. Precautions for use of the dozer blade**

- 1) The bulldozer can only be used to move soil, do not use it for digging, otherwise, it will damage the bulldozer or crawler system. (see the right figure.)
- 2) The dozer blade cannot withstand large or unstable weights, otherwise the dozer blade or track system may be damaged.
- 3) When walking, the bulldozer should not hook any objects, otherwise, the bulldozer or crawler system will be damaged.
- 4) When jacking up the machine with a bulldozer shovel, make sure that the road is smooth and the bulldozer shovel touches the ground steadily.



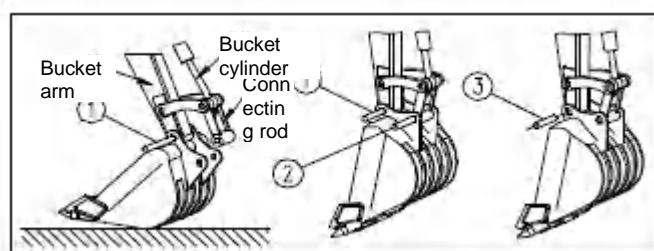
## Disassembly and installation of the bucket

### Safety rules

- When hitting the pin shaft with a hammer, metal shavings may fly into the eyes, causing serious injury. When performing this operation, always wear goggles, safety helmets, gloves, and other protective equipment.
- Removed bucket should be placed stably.
- Forcefully hit pin may fly out and harm personnel in the surrounding area. Therefore, before striking the pin shaft, ensure that the surrounding area is safe.
- When disassembling the pin shaft, be particularly careful not to stand under the bucket, and do not place any part of your feet or body under the bucket.
- When disassembling or installing the pin shaft, be careful not to injure your hands.
- When aligning the holes, do not put your fingers into the pin shaft.

### Installation

Park the machine on a solid and level surface. In case of connection work, for safety reasons, it is important to understand the signals of each other and work carefully.



Place the excavator in working condition and operate the bucket arm by facing the bucket until the holes in the bucket arm and the bucket align. Insert a  $\Phi 30$  mm steel rod (1) into the hole.

Lift the boom and bucket arm so that the bucket is vertically suspended from the bucket arm.

Operate the bucket arm cylinder to align the holes of the connecting rod with the connecting holes of the bucket. Install shaft (2), remove steel rod (1) and install shaft (3).

### Disassembly

Park the machine on a solid and level surface. It is required to place the bucket in a position that is in direct contact with the ground. If the bucket falls heavily to the ground, it will increase resistance and make it difficult to remove the pin shaft.

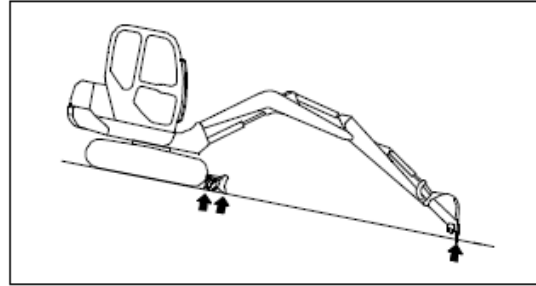
Remove the double nuts from the locking bolt of each pin shaft on the bucket arm and connecting rod, remove the bolts, and then remove the bucket arm pin shaft (3) and connecting rod pin shaft (2), and remove the bucket.



## Park the machine

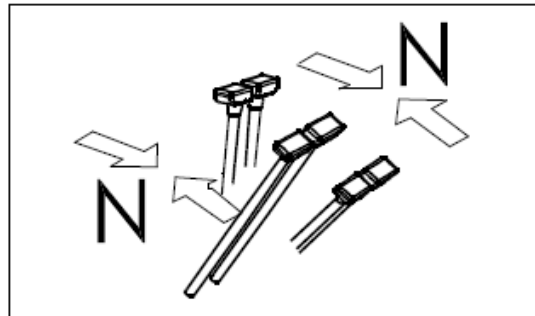
### Safety rules

- 1) Avoid sudden stop. When parking the machine, leave as much space as possible.
- 2) Park the excavator on solid and level ground. Avoid park the machine on a slope. If it is necessary to park the machine on a slope, place a pad under the track and insert the attachment into the ground to prevent the machine from moving.
- 3) If you accidentally touch the control lever of the working device, the working device or machine will suddenly move, causing serious personal injury or accident. So, before getting up from the seat, be sure to put the safety lock control lever in the lock position.

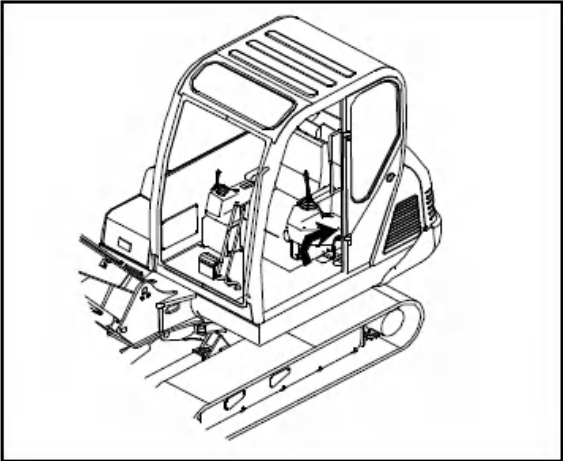


### Park the machine

- 1) Place the left and right travel joysticks in the center position. Park the machine.
- 2) When the engine is working under heavy load, don't stop it immediately, let it run at low speed for 5 minutes, and stop it after removing the overheating.
- 3) Drop the bucket and dozer blade to the ground.
- 4) Push the accelerator all the way forward and pull the shutdown lever all the way back (if installed).
- 5) Turn the start key to the "OFF" position (all indicator lights turn off).



6) After the engine shuts down, reset the shutdown lever.



## After operation

### 1. Check

Check the engine water temperature, hydraulic oil temperature, oil pressure, fuel level, etc. on the digital monitor of the machine.

### 2. Locking

The following positions should be locked.

1) Cab door (don't forget to close the window and flip window). In any case, if you want to open the flip window, you need to open the handle lock on both sides of the flip window at first. By operating the handle of the flip window handle lock, you can slide the flip window up and down. When the flip window is pulled to a proper position, you can push the flip window up to the locked position, and lock the flip window by releasing the handle lock.

Conversely, the flip window can be lowered.

2) Fuel tank filler port

3) Filling port of hydraulic oil tank

4) Battery box cover.

5) Engine hook

**Attention: When opening the engine hood, no one should stand at the rear of the hood. Bounce-up of the engine hood may cause injury.**

## Loading/unloading and transport of the machine

### 1. Safety rules for shipment of the machine

- 1) Run the engine at a low speed, and operate the machine slowly when loading/unloading.
- 2) Do not load/unload the machine during automatic warm-up operation.
- 3) If the automatic warm-up operation is cancelled during the loading/unloading operation, the speed will suddenly change.
- 4) When loading/unloading the machine, it is necessary to choose a solid and flat ground. Maintain a safe distance from the edge of the road.
- 5) To use a ramp with sufficient width, length, thickness and strength, the width of the slab is equal to 1.2 to 1.5 times of the track width. To avoid any accidents, it is recommended that the loading/unloading slope should be less than 15°, or the length of the slope should be greater than 3.5 times the height. When soil slope is used, it is necessary to completely compact the soil and take measures to prevent slope collapse.
- 6) To prevent the machine from slipping on the ramp, remove all soil and dirt from the tracks before starting. Ensure that the surface of the ramp is clean and free from water, snow, ice, grease, or oil.
- 7) Do not correct steering on a ramp, as there is a risk of the machine tipping over. If it is necessary to turn, drive out of the ramp to correct the direction, and then enter the ramp again.
- 8) Do not use working devices for loading and unloading operations, this is dangerous.
- 9) When on a slope, do not operate any joystick other than the traveling joystick.
- 10) At the junction between the ramp and the transportation vehicle, the center of gravity of the machine will suddenly change, posing a risk of the machine losing its balance. Therefore, travel slowly when crossing this area.
- 11) When rotating the upper structure on a transport vehicle, the transport vehicle is unstable. Therefore, it is necessary to retract the attachment and slowly rotate it.
- 12) Whether getting on or off the vehicle, the wheels of the transportation vehicle should be wedged.
- 13) Keep the excavator in a fixed position with a wooden wedge on the transportation vehicle during transportation. Tie the excavator to the transport vehicle with a rope.
- 14) Before the work or operation is completed, the driver should first lift the left control box to cut off the source of the pilot control oil line and avoid misoperation of the machine due to errors or unintentional touch with the joystick.

## 2. Truck loading

1) Truck loading can only be allowed on solid and flat ground, and a certain safe distance should be maintained from the edge of the road.

2) Appropriately apply brakes to the transport vehicle, and put a pad under the tire to ensure that the transport vehicle does not move.

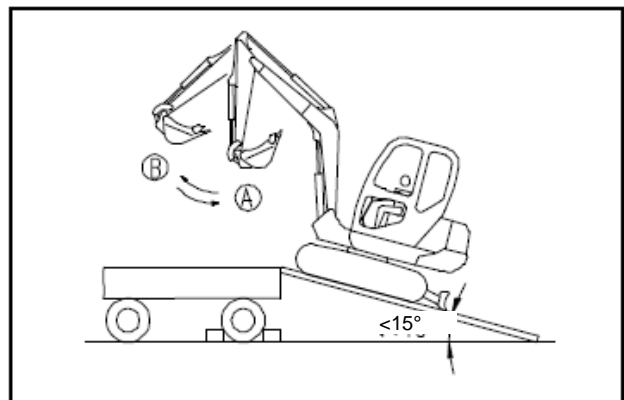
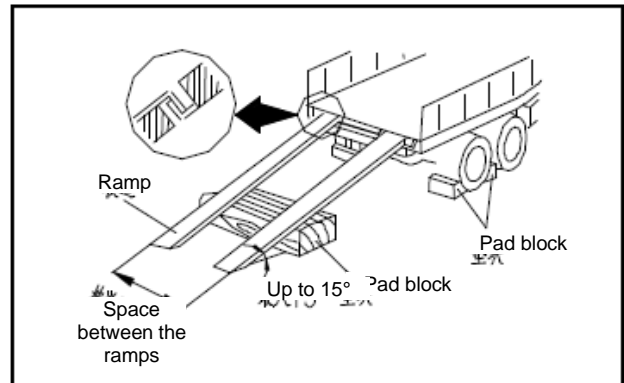
3) Install a ramp between the transportation vehicle and the machine, ensuring that both sides of the ramp are on the same level. The maximum slope of the ramp shall not exceed 15 degrees. Adjust the space between the ramps to match the center of the track.

4) Align the excavator with the slab ramp, with the bulldozer at the rear. For safety reasons, the excavator should approach and slowly climb up the ramp until the end of the slope.

**Attention: When on a ramp, only the travel joystick can be operated. Do not operate any other joystick or pedal.**

5) Stop driving and extend the stick (position B in the figure), so that the front part of the excavator track is tilted down to the bottom plate of the transport vehicle. Be careful not to let the working device touch the body of the transport vehicle when the machine is tilted down. Continue driving the machine to the designated position on the transport vehicle.

6) Put down the stick, drop the bucket on the floor, put down the bulldozer, and park the machine at the specified position on the transport vehicle.

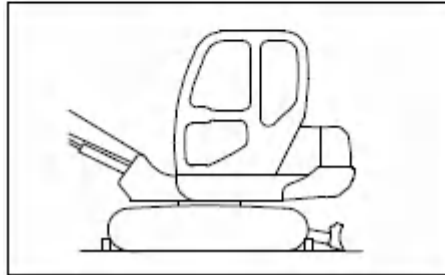
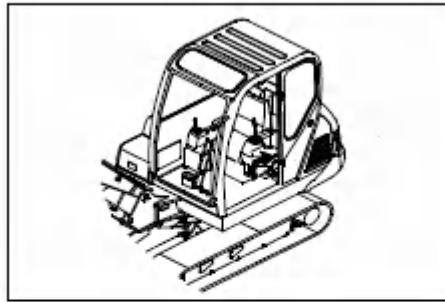


**Before the work or operation is completed, the driver should first pull up the safety lock/lever to lift the left control box to cut off the source of the pilot control oil line and avoid misoperation of the machine due to errors or unintentional touch with the joystick.**

**Attention: Please choose a transport vehicle that matches the weight and dimensions provided in this manual.**

### 3. Securing the machine on the transport vehicle

- 1) Well arrange the attachment.
- 2) Turn off the engine and remove the key from the start switch.
- 3) Lift the safety lock lever and the above control box
- 4) Lock the cab and engine hood.



- 5) Place blocks under both ends of the track to prevent the machine from moving during transportation, and secure the machine with wire ropes. Make sure to secure the machine firmly so that it will not slide to one side.

### 4. Unloading from the transport vehicle

- 1) Truck loading/unloading can only allowed on solid and flat ground, and a certain safe distance should be maintained from the edge of the road.
- 2) The transport vehicle is braked, and a pad is placed under the tire to ensure that the vehicle does not move.
- 3) Install a ramp between the transportation vehicle and the machine, ensuring that both sides of the ramp are on the same level. The maximum slope of the ramp shall not exceed 15 degrees. Adjust the space between the ramps to match the center of the track.
- 4) Remove the wire rope securing the machine.
- 5) Start the engine. In winter, thoroughly warm up the engine.
- 6) Put down the safety lock handle.
- 7) Lift the bucket arm and bucket, and raise the dozer blade.
- 8) Check that there are no obstacles within the range of excavator activity.
- 9) Pull out the locking pin of the platform to rotate it 180 degrees, with the excavation device facing the slope and the excavator in the forward direction.
- 10) Drive the excavator slowly forward until it reaches the top of the landing plate, extend the bucket arm outward, cause the excavator track to tilt down onto the slope, and then slowly advance until it reaches the ground.

## 5. Lifting the machine

### A. Safety Precautions

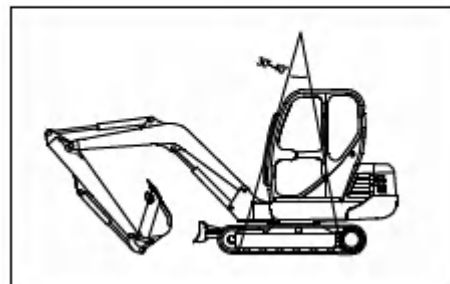
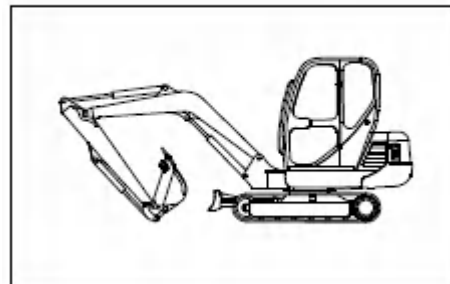
- 1) Do not lift the machine when there are people on it.
- 2) Ensure that the steel wire rope used for lifting the machine has sufficient strength to withstand the weight of the machine.
- 3) Do not lift the machine in any position other than the one provided in the following procedure, as there is a risk of the machine losing its balance.
- 4) Do not lift the machine with the upper structure turning to the side. Before hoisting, turn the working device to one end of the sprocket and make the lower track parallel to the upper structure.
- 5) When lifting, keep the machine level.
- 6) It is very dangerous to walk under the machine when lifting it. Do not walk under the lifted machine.

### B. Lifting procedures - machines with standard technical specifications

**Attention: The lifting procedures are applicable to standard technical specifications. According to the accessories and options actually installed, the hoisting method will be different due to different dimensions, weight, center of gravity distribution, etc.**

When hoisting the machine, make operations on the flat ground by following the below steps.

- 1) Turn the upper structure so that the working device is at one end of the sprocket.
- 2) Fully extend the bucket cylinder and stick cylinder, and then use the boom cylinder to drop the working device to the ground, as shown on the right.
- 3) Turn off the engine, make sure there is nothing around the cab, and then leave the machine. Close the cab doors and windows.
- 4) Put a wire rope between the guide wheel and the track thrust wheel from the front, and between the drive wheel and the track thrust wheel from the back. It is also possible to thread the wire rope from under the tracks.
- 5) Adjust the lifting angle of the wire rope to 30° to 40°, and then slowly hoist the machine.
- 6) After the machine leaves the ground, carefully check whether the machine is balanced, and then slowly hoist it.



## Operation in cold/hot weather

### 1. Operation in cold weather

Cold weather can cause special problems, so special attention should be paid to protection to prevent serious damage to the machine. Maintenance in cold weather will extend the service life of the machine.

- 1) Electrical system: Keep the battery clean and fully charged. Check the battery cables and connectors, clean the connectors, and apply a layer of grease to prevent corrosion.
- 2) Lubricant: Apply each joint with lubricating oil of the appropriate viscosity. Please use the recommended oils.
- 3) Fuel system: Is the fuel supply suitable for the cold weather at that time. Change to low viscosity fuel.

Check the water in the fuel system. Cold weather can concentrate water in the fuel tank. Check the water in the fuel filter every 50 hours of operation. If there is no water present, the inspection cycle can be extended. Check the fuel tank for any water present.

- 4) Cooling system: Before operating the machine in cold weather, check the coolant to adjust the appropriate mixing ratio. Use antifreeze suitable for the ambient temperature conditions.
- 5) Working device: Before operating the machine, shift to low gear and slowly start the machine, then stop the machine and operate the attachment for about 10 minutes, or until all hydraulic cylinders are considered to be working properly before starting the operation.

### 2. Operation in hot weather

In order to prevent damage to the machine, please do as follows:

- 1) Ensure that the amount of coolant in the radiator is normal.
- 2) Check the radiator before the start of the hot season and replace the coolant if necessary.
- 3) Remove all dirt and scale from the radiator and engine surfaces.
- 4) Check the fan rotation belt.
- 5) Use lubricating oil of appropriate viscosity.
- 6) Use a suitable proportion of coolant in the cooling system.
- 7) It is necessary to regularly check the air filter for working in extremely poor conditions such as high dust.



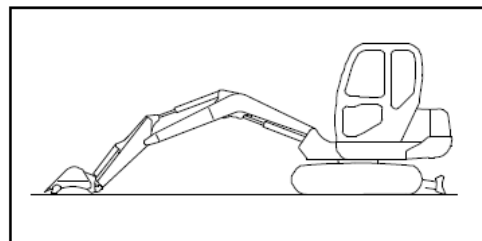
## Storage of the machine

### 1. Preparation for the storage

To store the machine for a long time, do as follows:

- 1) Clean and flush all components before placing the machine indoors. If the machine has to be stored outdoors, choose a flat ground and cover it with canvas.
- 2) Apply a thin layer of lubricating grease to the metal surface of the piston rod. Lubricate all the lubricating points.
- 3) Remove the battery, charge it, and store it in a dry and non-freezing place.
- 4) Drain the engine oil when it is still hot and fill with corrosion-resistant oil. The corrosion-resistant oil used for piston engines is MIL-L-21260 type. For storage in winter, Grade 1 or 2 SAE10W should be used; for storage in summer, Grade SAE30 should be used.
- 5) Add 4-6% of the same type of corrosion-resistant oil to the fuel and mix the two well. To prevent condensation, the fuel tank needs to be refilled with this mixed fuel.
- 6) Check the antifreeze performance of the coolant and add antifreeze to ensure its antifreeze strength is at least -20 °C. Coolant not containing anti-corrosion agents due to climate reasons should be added with the agents (such as 5% anti-corrosion agent according to MIL-G4339C).
- 7) Start the engine and let it run for more than 15 minutes, with different speeds but without load. When draining the lubricating oil of hydraulic components and reducers, it should also be allowed to run and drain, and then replaced with new oil for storage.
- 8) Close the inlet of the air filter and the outlet of the exhaust pipe. For this, it is recommended to use thick plastic paper and adhesive tape.
- 9) Lock the platform, raise the safety lock handle (raise the left control box), so that the control levers and pedals are in a locked state.
- 10) Place the shut-off valve for installing accessories on the machine in the locked position. Install a screw plug on the elbow.
- 11) Keep the machine clean and store it in a dry place.

**Attention: When storing the machine, adjust it to the position shown in the right figure to protect the cylinder piston rod and prevent rust on the piston rod.**



## 2. During the storage

- 1) During storage, the machine should be operated once a month to apply a new oil film to the surface of the moving parts. At the same time, charge the battery.
- 2) The air conditioner (if any) on the machine should also be run.
- 3) Run the track



**Warning: If rust prevention operations for machine stored indoors are necessary, open the doors and windows to improve the air circulation to prevent gas poisoning.**

## 3. Recovery from storage

Before using a machine that has been stored for a long time, the following steps should be followed.

- 1) Wipe off the lubricating grease applied to the surface of the cylinder piston rod.
- 2) Fill all parts with oil and grease.
- 3) When the machine is stored for a long time, water in the atmosphere will enter the oil. Before or after starting the engine, check the oil in all parts. If there is water in the oil, replace all the oil.

**Attention: 1) Under normal climatic conditions, the storage method mentioned earlier can allow the excavator to be stored for one year. However, after 6 months of storage, each component should be run for 15 minutes without loading. At the same time, lubricating oil should also be added to each component.**

**2) Before putting the excavator that have been stored for a long time back into use, necessary work and inspections must be carried out. After the excavator has been stored for one year, the oil in the reducer and hydraulic line also needs to be replaced.**

## Troubleshooting

Fault	Causes	Solutions
<b>1. The engine cannot or is difficult to start</b>	• Faulty starter motor	• Replace or repair the starter motor
	• Insufficiently charged battery	• Charge or replace a new battery
	• Improper use of preheating lines or plugs	• Repair or replace the preheating plug
	• Abnormal injection timing	• Check the injection timing
	• Oil pipeline blockage	• Clean the oil line
	• The fuel filter is blocked	• Clean or replace the fuel filter
	• Water, dust, or air in the fuel system	• Purge the air and clean the oil line
	• Dirty fuel injector or low fuel injection pressure	• Have it repaired by the local repair point
	• Malfunction of the fuel injection pump	• Consult with dealers of the manufacturer
	• Insufficient fuel	• Refill the oil
• Blocked intake and exhaust system	• Smoothen the intake and exhaust system	
<b>2. Engine knocking, irregular operation, or shutdown</b>	• Massive gas release	• Consult with dealers of the manufacturer
	• The fuel filter is blocked	• Clean the oil filter
	• Dirt or air in the fuel system	• Purge the air and clean the oil line
	• Oil filter clogged, dirty or faulty nozzle	• Have it repaired by the local repair point
	• High pressure oil pipe damage	Replace the high pressure oil pipe
	• Insufficient fuel	• Refill the oil
	• Governor connection cannot be adjusted	• Consult with dealers of the manufacturer
	• Failure of fuel spray pump	• Consult with dealers of the manufacturer
	• Incorrect fuel injection timing or stuck fuel injection nozzle	• Check the injection timing and oil nozzle
<b>3. Engine power drop</b>	• Air in the fuel	• Exhaust the air
	• Oil supply is not smooth	• Check and clean
	• Change of injection timing	• Adjust according to the specified value
	• Poor operation of fuel injector	• Check the working pressure and spray atomization
	• Air filter blocked	• Clean the filter.
	• Incorrect clearance between intake and exhaust valves or unsealed valves	• Adjust the valve clearance
	• Damaged or leaking cylinder gasket	• Replace the cylinder gasket
	• Poor operation of fuel injection pump	• Consult with dealers of the manufacturer
	• Overheated engine	• Check if the coolant used is correct. If there is any looseness in the water pump and belt, it should be repaired or replaced, and the blockage in the water channel should be removed

<b>Fault</b>	<b>Causes</b>	<b>Solutions</b>
<b>4. Engine overheated</b>	• Low coolant level	• Add coolant
	• Faulty temperature sensor	• Replace the sensor
	• Air filter blocked	• Clean the air filter
	• Loose or faulty fan belt	• Retighten or replace
	• Dirt in the cooling system line	• Clean the coolant line
	• Poor or excessive oil quality	• Replace the oil
<b>5. Low oil pressure</b>	• Low oil level	• Refill the oil
	• Oil filter blocked	• Clean oil filter
	• Oil pipeline leakage	• Retighten or replace
	• High engine cooling water temperature	• Correct mixing ratio for coolant preparation or consult with local dealers of the manufacturer
<b>6. The engine emitting gray black smoke</b>	• Poor fuel quality	• Use the correct fuel
	• Air filter blocked	• Replace the filter element
	• Abnormal injection timing	• Adjust according to the specified value
	• Poor nozzle atomization	• Check and replace the parts
<b>7. The engine emitting white smoke</b>	• Poor fuel quality	• Use the correct fuel
	• Excessive engine oil	• Restore to the recommended oil level
	• Abnormal injection timing	• Adjust according to the specified value
	• There is water in the cylinder and fuel	• Check and replace the fuel
<b>8. Failure of battery charging</b>	• Loose or rusty connection	• Clean or retighten
	• Generator belt loose and faulty	• Retighten or replace
	• Generator charging failure	• Consult with dealers of the manufacturer
	• Electrolyte failure of the battery	• Replace the battery
	• Electrolyte failure of the battery	• Replace the battery
<b>9. The starter does not work or rotates slowly</b>	• Loose or rusty connection	• Clean or retighten
	• Insufficiently charged battery	• Replace
	• Damaged circuit	• Consult with dealers of the manufacturer
<b>10. Engine running and generator alarm light on</b>	• Generator failure	• Consult with dealers of the manufacturer
	• Electronic regulator malfunction	• Replace
	• Circuit failure	• Maintenance
<b>11. Hydraulic system components move too slowly</b>	• Cold hydraulic oil	• Control action heating up
	• Low pilot system pressure	• Consult with dealers of the manufacturer
	• Incorrect hydraulic oil used	• Use the correct hydraulic oil
	• Slow engine RPM	• Consult with dealers of the manufacturer

<b>Fault</b>	<b>Causes</b>	<b>Solutions</b>
<b>12. High hydraulic oil temperature</b>	• Incorrect hydraulic oil used	• Use the correct hydraulic oil
	• Oil path blocked	• Consult with dealers of the manufacturer
	• Hydraulic oil filter blocked	• Clean or replace
	• Worn oil pump	• Consult with dealers of the manufacturer
	• Oil cooler blocked	• Clean oil cooler
	• Oil cooler failed	• Consult with dealers of the manufacturer
	• The pressure of the main safety valve or the relief valve of the slewing system is too high	• Consult with dealers of the manufacturer
	• Dirty oil	• Replace the oil
	• Faulty sensor	• Replace
<b>13. Hydraulic oil emulsified or with foam</b>	• Air leakage in the pipeline between the oil tank and the oil pump	• Maintenance and retighten
	• Incorrect hydraulic oil used	• Use the correct hydraulic oil
	• Water in hydraulic oil	• Replace the oil
	• Low oil level	• Correct the oil level
<b>14. Oil pressure too low or no pressure</b>	• Hydraulic pump damaged	• Consult with dealers of the manufacturer
	• Insufficient oil in the system	• Refill the oil
	• Safety valve failure	• Consult with dealers of the manufacturer
<b>15. No part can work</b>	• Hydraulic pump damaged	• Consult with dealers of the manufacturer
<b>A. Noise of the oil pump</b>	• Lack of hydraulic oil	• Refill the oil
	• Oil suction pipe leaking	• Repair or replace
<b>B. Oil pump noise unchanged</b>	• Auxiliary pump damaged	• Replace
	• Hydraulic safety control device not functioning	• Check and repair
<b>16. Each oil cylinder or motor works insufficiently or fails to work</b>	• Hydraulic pump damaged	• Consult with dealers of the manufacturer
	• Low pressure of the main safety valve	• Re-adjust the pressure
	• Low oil pressure and level	• Refill the oil
	• Oil suction filter blocked	• Clean the oil filter
	• Oil seal damaged	• Repair or replace
	• Piston rod damaged, leading to oil leak	• Repair or replace
	• Pilot valve out of work	• Replace
	• Pilot valve broken or oil leaking	• Repair or replace
<b>17. The two traveling devices do not work</b>	• Oil leakage of the central swivel joint	• Consult with dealers of the manufacturer
<b>18. One traveling device does not work</b>	• Traveling device damaged	• Consult with dealers of the manufacturer
	• Control mechanism damaged	• Maintenance

<b>Fault</b>	<b>Causes</b>	<b>Solutions</b>
<b>19. Abnormal traveling</b>	• The track is too tight or loose	• Re-adjust
	• Reduced oil pump performance	• Consult with dealers of the manufacturer
	• Crawler frame distorted	• Repair or replace
	• Crushed stones or rocks in the track chain	• Take the stone out and repair
	• Oil leakage of the control valve	• Consult with dealers of the manufacturer
	• Reduced motor performance	• Consult with dealers of the manufacturer
<b>20. Abnormal slewing</b>	• Reduced oil pump performance	• Consult with dealers of the manufacturer
	• Slewing motor damaged	• Consult with dealers of the manufacturer
	• Pilot valve out of work	• Consult with dealers of the manufacturer
<b>21. Discontinuous slewing</b>	• Worn slewing gear	• Consult with dealers of the manufacturer
	• Slewing bearing or ball bearing damaged	• Consult with dealers of the manufacturer
	• Lack of grease	• Consult with dealers of the manufacturer
	• Oil leakage of the control valve	• Consult with dealers of the manufacturer
<b>22. Air conditioning system noise</b>	• Loose electrical connectors causing abnormal clutch noise	• Insert the connector securely or repair as necessary
	• Loose belt	• Tighten appropriately, replace if damaged
	• Loose blower blades	• Reassemble securely
	• The blower does not work normally	• Repair or replace
	• The fan does not work normally	• Repair or replace
	• Damaged compressor bearing	• Replace
	• Damaged tensioner bearing	• Replace
<b>23. Air conditioner cooling does not work</b>	• Electrical circuit failure	• Repair or replace
	• Air conditioning switch failure	• Repair or replace
	• No refrigerant	• Check for leakage, repair, and refill refrigerant
	• System blockage	• Clean or replace
	• Belt loose or broken	• Adjust or replace
	• Expansion valve failure	• Clean or replace
	• The compressor operates abnormally	• Repair or replace
	• Pressure switch failure	• Replace
<b>24. Unsteady cooled air</b>	• Poor circuit contact	• Maintenance
	• Loose belt	• Adjust the belt tension
	• Improper adjustment of air	• Re-adjust

conditioning switch cooling degree	
• Too much water in the system and internally blocked with ice	• Replace the drying bottle
• The electronic fan or its relay is damaged	• Repair or replace

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**Maintenance**



## Common sense for maintenance

### **New machine running-in**

The initial 100 hours of the machine are the running-in period. During this period, it is important to use the machine with caution and not use it for tasks with excessive load or work intensity. During the first 50 hours of the running-in period, only 80% of the working load is allowed. The quality of the running-in period affects the service life of the machine.

After the first 50 hours of work, the first inspection and maintenance of the machine should be carried out according to the inspection and maintenance checklist. At the same time, check the contamination level of hydraulic oil, and the value should not exceed grade NAS9. Otherwise, replace the hydraulic oil.

When the hydraulic system is not working, the engine should not be run at high speed. Only when the hydraulic oil temperature exceeds 20 degrees Celsius can the attachment be operated.

### **Construction on a dusty site**

Operation on dusty site shall be done with the following procedure finished:

- It is necessary to frequently check the air filter for blockage with the air filter blockage sensor, and the filter element shall be cleaned frequently.
- Clean the radiator core frequently to avoid blockage.
- Frequently clean and replace the fuel filter element.
- Clean the electrical components, especially starting motors and alternators, to avoid dust accumulation.
- During checking or replacing the oil, move the machine to a dust-free place to prevent dust from entering the oil.
- Clean the debris adhered to the piston rod of each oil cylinder and keep the piston rod clean.

### **Oil and filter element**

Please use clean oil and grease, and prevent impurities from entering the container of the oil.

After replacing the oil or the filter, check the waste oil and filter element for metal chips or impurities. If a large amount of metal chips or impurities are found, report it to the person in charge of the machine and take appropriate measures.

Do not mix different grades of oil together. If different oil brand need to be added, the old oil should be drained and replaced with the new brand oil.

### **Timer reading**

Check the timer on the dashboard every day to check if it is time for maintenance according to the number of working hours.

### **Use original accessories**

The use of original Yuchai accessories is an important factor in ensuring the normal operation of the machine and prolonging the service life of the machine.

### **Waste disposal**

For environmental protection, special attention should be paid to the disposal methods of waste:

- Put the oil discharged from the machine into a container. Do not discharge the oil directly onto the ground, or pour it into sewers, drains, rivers, oceans or lakes.
- When handling harmful substances such as oil, fuel, coolant, antifreeze, plastic accessories, solvents, filter cartridges, batteries, and other harmful substances, relevant environmental regulations should be followed.

### **Prevent articles from falling into the machine**

- When opening the tank filling port for inspection, be careful not to drop bolts, nuts, gaskets, or tools into the interior of the machine. Otherwise, this will cause damage and malfunction of the machine, and may lead to accidents. If foreign material falls into the machine, take it out immediately.
- Before and after the inspection, check the tools and parts you carried to make sure that nothing has fallen into the machine.

### **Regular inspection and maintenance**

Regular inspection and maintenance shall be carried out in accordance with the items listed in the "Regular Inspection and Maintenance Table", which is an important prerequisite for ensuring the normal operation of the machine and prolonging its service life. Be sure to observe the inspection and maintenance cycle.

### **Recheck after inspection and maintenance**

If there is no recheck after each inspection and maintenance, there is a possibility of unexpected failure, leading to serious injury or damage. Make sure to check as follows:

- Are there any missing parts that should be inspected and maintained.
- Have all inspection and maintenance items been carried out correctly.
- Check if any tools or parts have fallen into the machine. It is very dangerous for parts to fall into the machine and get stuck in the linkage mechanism.
- Check around the machine to see if there is any water or oil leakage, and whether all the bolts have been tightened.

## Maintenance outline

### Lubricating oil

- Oil that meets the grade and temperature given in the "Oil Selection Table" of this manual should be used. Within the specified time, even though the oil is not dirty, it must be replaced.
- Pay attention to preventing impurities (water, metal particles, dust, etc.) from entering the lubricating oil. Most problems with the machine are caused by impurities entered.
- Do not mix lubricants of different grades or brands together.
- Refill according to the prescribed amount of the oil. Too much or too little oil can cause malfunctions.
- When changing the oil, it is necessary to replace the relevant filter element, especially when replacing the oil filter element. Before installation, the new filter element must be filled with oil with cleanliness as regulated.

### Fuel

- When storing or adding fuel, special care should be taken not to allow impurities to enter.
- Be sure to use the fuel specified in the "Oil Selection Table" of this manual. Fuel should be selected based on the ambient temperature, otherwise it can easily solidify at low temperatures (especially when it is below -15 °C (5 °F)). Therefore, it is necessary to replace fuel that matches the ambient temperature.
- To prevent moisture in the air from condensing and forming water in the fuel tank, the fuel tank should be filled up after daily work.
- Before starting the engine, or after adding fuel for 10 minutes, drain the sediment and water from the fuel tank.
- If the engine has run out of fuel or if the filter element has been replaced, the air in the oil circuit must be exhausted.

### Grease

- Lubricating grease is used to prevent twisting and noise at the connection.
- If any component appears inflexible or produces noise after prolonged use, lubricating grease should be added.
- Wipe off the old grease that is squeezed out during the lubrication process.
- Any old grease visible should be wiped off as sand or dust sticking to the grease can cause wear on rotating parts.

### Coolant

- Antifreeze shall be used in any weather.
- Check the coolant level as regulated and refill as necessary. Coolant insufficiency will cause engine overheat.
- According to the ambient temperature, mix the coolant and antifreeze in an appropriate ratio.
- Do not add coolant when the engine is overheated and not yet cooled.

### **Filter element**

- Regularly replace all filter elements. However, when working in harsh conditions, the filter element should be replaced in a shorter period based on the lubricating oil and fuel (sulfur content) used.
- Do not reuse the filter element after cleaning it (filter element type). Replace with a new one.
- When replacing the filter element, check if there are metal particles adhering to the old filter element. If metal particles are found, please contact your Yuchai dealer.
- Do not open the packaging of the spare filter element before use.

### **Hydraulic system**

- During and after work, the hydraulic system is at high temperatures. In operation, it is still in high pressure state. Therefore, when inspecting and maintaining the hydraulic system, make sure that the temperature has dropped and the pressure has released in the hydraulic cylinder pipeline.
- When loosening plugs, screws, or hose connections, do not stand in front of the parts. Before disassembly, gradually loosen to release the internal pressure.
- When inspecting or maintaining the hydraulic oil line, it is necessary to exhaust the air to release the internal pressure.
- The inspection or maintenance of the hydraulic system includes checking the hydraulic oil level, replacing the filter element, and refilling hydraulic oil.
- When disassembling the high-pressure hose, check for damage to the O-ring. Replace if damaged.
- When disassembling parts in areas sealed with O-rings or gaskets, clean the mounting surface and replace with new parts.
- When installing hoses, it is not allowed to twist the hoses or bend them into small diameter rings, which will damage the hose and obviously shorten the service life of the hose.

## **Mandatory replacement parts**

With the accumulation of machine working time, some parts that play an important role in safety, mainly some oil hoses, will age, wear or deteriorate in material, affecting their normal function and also becoming potential safety hazards. Such phenomena are not easy to determine. So these parts must be forcibly replaced after the specified usage period.

If these parts exhibit abnormalities before the specified time limit, they must be repaired or even replaced immediately. When replacing the hose, also replace the corresponding seal.

## Oil Selection Table

Select suitable oils based on factors such as environmental temperature and operating conditions. Oil that meets the following specifications must be used.

Type	Lube or Fuel	Use temperature	Viscosity	Fill-in
Lube of the engine	Chilliness area: CJ4 15W/40 General area: CJ4 5W/30	-15° upwards -25° upwards		
Hydraulic oil	HS46+	-35° upwards	41.5-50.5 centipoise (When it is 40°C)	Hydraulic oil that meets the requirements of Yuchai Enterprise Standard "Technical Specification for Hydraulic Oil of Construction Machinery"
Lube of the driving reducer	Overload use the gear oil (GL-5)	Winter/summer		SAE80W/90
Lube of the driving reducer	Overload use the gear oil (GL-5)	Winter/summer		
Lube of the guide wheel/carrier wheel	Vehicle oil Hz-23	All the temperatures	20-25 centipoise (When it is 50°C)	
Lubricating oil	lubricating grease(3#)	-20 °C ~ 160 °C		
Fuel	Summer: 0# light diesel oil Winter: -10# light diesel oil -20# light diesel oil -35# light diesel oil	>0 °C 0 °C ~ -5 °C -5 °C ~ -15 °C -15 °C ~ -28 °C		
Coolant (Glycol engine)	JT 225-1996 -25# -35# -45#	>- 15 °C >- 25 °C >- 35°C		

### ● Oil capacity data

Type	Unit	Value
Fuel tank	Litre	48
Engine oil	Litre	7.6
Total capacity of hydraulic system (pipelines, oil tanks, and cylinders)	Litre	42
Hydraulic oil tank	Litre	35

## Tightening torque

The tightening torque of each bolt and nut on the machine shall refer to the values in the table below. If the bolts or nuts are not tightened to the specified torque, the fastened or connected parts will become loose or even damaged, causing machine failure or affecting operation.

### Tightening torque of general parts

Bolt strength grade	Yield strength N/mm <sup>2</sup>	Nominal bolt diameter mm							
		6	8	10	12	14	16	18	20
		Tightening torque Nm							
8.8	640	9-12	22-30	45-59	78~104	124-165	193~257	264~354	376~502
10.9	900	13-16	30~36	65-78	110~130	180~210	280~330	380~450	540~650
12.9	1080	16-21	38~51	75-100	131-175	209~278	326~434	448~597	635~847

Bolt strength grade	Yield strength N/mm <sup>2</sup>	Nominal bolt diameter mm						
		22	24	27	30	33	36	39
		Tightening torque Nm						
8.8	640	512~683	651~868	952-1269	1293~1723	1759~2345	2259~3012	2923~3898
10.9	900	740-880	940~1120	1400~1650	1700~2000	2473~3298	2800~3350	4111~5481
12.9	1080	864~1152	1098~1461	1606~2142	2181~2908	2968~3958	3812~5082	4933~6577

### Tightening torque of hydraulic hose

Metric threaded rotary nut			
Metric thread	Outer diameter of steel pipe	N.m	
		Nominal moment	min./max
M12X1.5	6	20	15 ~25
M14X1.5	8	38	30 ~45
M16X1.5	8 10	45	38 ~52
M18X1.5	10 12	51	43-85
M20X1.5	12	58	50-65
M22X1.5	14 15	74	60 ~88
M24X1.5	16	74	60 ~88
M26X1.5	18	105	85-25
M30x2	20 22	135	115-155
M36x2	25 28	166	140-192
M42x2	30	240	210-270
M45x2	35	290	255-325
M52x2	38 42	330	280-380



### Tightening torque of hydraulic hose

BSP thread and swivel nut			
BSPP thread	Metric torque	N.m	
		min./ max	
G1/4	20	15 ~25	
G3/8	34	27 ~41	
G1/4	60	42 ~76	
G5/8	69	44-94	
G3/4	115	95~135	
G1	140	115~165	
G1.1/4	210	140~280	
G1.1/2	290	215-365	
G2	400	300-500	

ORFS rotary nut			
UNF thread	Marking specifications	N.m	
		min	max
9/16~18	-4	14	16
11/16~16	-6	24	27
13/16~16	-8	43	47
1~14	-10	60	68
1.3/16 ~12	-12	90	95
1.3/16 ~12	-14	90	95
1.7/16 ~12	-16	125	135
1.11/16 ~12	-20	170	190
2~12	-24	200	225

## Regular Inspection and Maintenance Schedule

According to the table below, regularly inspect and maintain the machine according to the working hours indicated by the engine timer. If the machine is in poor working condition or has high working intensity, or is equipped with accessories such as hydraulic crushing hammers, the inspection and maintenance interval of certain components needs to be reduced.

S/N	Page	Inspection and maintenance details	Maintenance period (total working hours)					
			10	50	100	250	500	1000
1		<b>Routine inspection</b>						
		• Any leakage of oil, water, and fuel	▲					
		• Appearance of mechanical parts and hoses	▲					
		• Fixation of bolts and hydraulic joints	▲					
		• Operating conditions of control components, work lighting, and indicator lights	▲					
		• Diesel engine work conditions	▲					
2		<b>Engine fuel system</b>						
		• Check the fuel level and refill	▲					
		• Eliminate the condensate and impurities			▲			
		• Clean the tank				▲		
		• Check the fuel injection pressure					▲	
		• Replace the filter element			▲			
3		<b>Engine cooling system</b>						
		• Check the condition of rubber hoses and clamps	▲					
		• Check the cooling water level	▲					
		• Clean the radiator fins					▲	
		• Replace coolant		☆				■
		• Check the coolant concentration	▲					
4		<b>Engine lubricating system and others</b>						
		• Check the oil level (refill as necessary)	▲					
		• Replace the oil		☆			▲	
		• Replace the oil filter element		☆			▲	
		• Check the tension of the fan belt		☆	▲			
		• Check the valve clearance					☆	▲
		• Check the tightness of the cylinder head					☆	▲
		• Check the tightness of the engine support		☆		▲		

## Regular Inspection and Maintenance Schedule (contd.)

S/N	Page	Inspection and maintenance details	Maintenance period (total working hours)						
			10	50	100	250	500	1000	2000
5		<b>Engine air intake system</b>							
		• Empty the dust accumulation tank	▲						
		• Clean the air filter element			▲				
6		• Replace the air filter element					▲		
		<b>Hydraulic system</b>							
		• Check the hydraulic oil level (refill as necessary)	▲						
		• Remove water and dirt from the oil tank				▲			
		• Replace the hydraulic oil, clean the oil suction screen.							▲
7		• Replace the filter element for the hydraulic oil return and pilot oil line		☆				▲	
		• Check the system pressure					▲		
		<b>Battery</b>							
8		• Check the electrolyte level		▲					
		• Check acidity and charging status					▲		
		<b>Travel reducer</b>							
9		• Check the oil level and refill				▲			
		• Replace the oil						▲	
		• 检查减速机连接螺栓拧紧力矩		☆				▲	
10		<b>Track</b>							
		• Check and adjust the track tension	▲						
11		<b>Track roller, support roller, and guide roller</b>							
		• Check the tightening torque of the track roller bolts		☆			▲		
		• Check the oil level of the guide roller and support roller							▲
11		<b>Lubrication</b>							
		• Refill lubricating oil to each lubrication point		▲					

▲ Follow the normal period   
☆ Conduct upon the first maintenance   
■ Once a year in spring and autumn

## **Routine inspection**

Perform a general routine inspection of the machine every day or every 10 hours.

- 1) Leakage inspection to check for oil, water, and fuel leaks in various parts of the machine.
- 2) Check for scratches, breaks or deformations on the elastic connectors and accessories.
- 3) Check the fixation and connection of the hydraulic devices.
- 4) Check the appearance of mechanical parts.
- 5) Check the working conditions of operating devices, control indicator lights and various indicators.
- 6) Check the operation of the engine. Check for any problem with the exhaust color, any abnormal sounds, and determine the location of the abnormal sounds.

# Engine fuel system

## Maintenance instructions

Tank capacity .....	100 liters
Oil level inspection .....	10h
Drain water and impurities from the tank .....	100h
Clean the tank .....	250h
Replace the fuel filter element .....	500 hours

### 1. Oil level check and refilling

The fuel level shall be checked through the fuel gauge on the side of the fuel tank or the fuel level indicator on the combined instrument on the front right of the cab. Check once every day or every 10 hours. To avoid the formation of condensate, the tank should be filled up after daily work. The fuel filler port is located in front of the fuel-hydraulic tank.

### 2. Drain water and impurities from the tank

Condensate and sediment are discharged every 100 hours.

Loosen the oil valve to allow the condensate and sediment to flow out. Once fuel flows out, reinstall the drain plug.

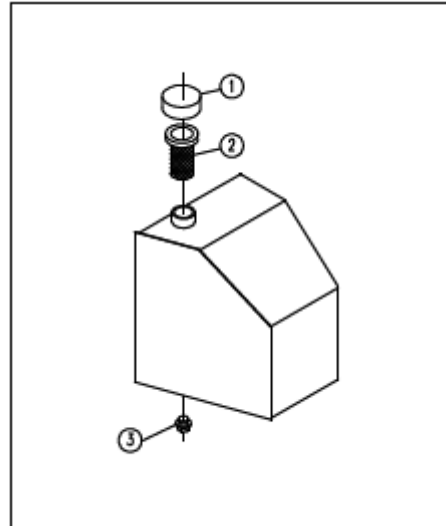
Based on the quality of the fuel used, users can redefine the cycle for discharging condensate water themselves;

### 3. Clean the fuel tank

Clean once every 250 hours.

- 1) Prepare a container to receive the discharged fuel
- 2) Remove the oil drain valve and take out the filter screen located in the oil filler port. Fill half of the fuel tank and empty again.
- 3) Clean the refueling filter and install it in place.
- 4) Reinstall the fuel drain plug and fill up the fuel through the filter in the fuel hole.
- 4) Exhaust the air in the oil circuit.

**Attention: Only diesel instead of trichloroethylene should be used for flushing the interior of the fuel tank.**

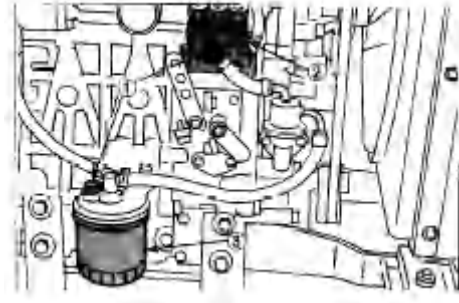


#### 4. Exhaust of the fuel circuit

If air flows into the fuel line due to replacing the fuel filter element, disconnecting the fuel pipeline, cleaning the fuel filter or inadvertently emptying the fuel tank, the air shall be removed before restarting the engine.

#### Discharge the fuel circuit

- 1) Fill the fuel tank and open the fuel filter control lever;
- 2) Loosen the vent plug on the fuel filter by several turns
- 3) When there are no air bubbles in the fuel flowing out of the vent bolt, tighten the screw plug;
- 4) Open the vent plug on the fuel plunger pump.
- 5) When there are no air bubbles in the fuel flowing out of the vent bolt, tighten the screw plug;



- 1) Vent plug.
- 2) Plunger pump
- 3) Fuel filter

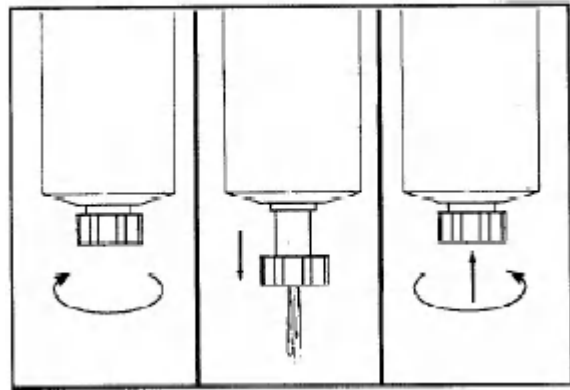
#### 6. Diesel prefilter (diesel strainer)

Replace the filter element every 500 hours (see the section "Replace the fuel filter element" below).

Drain the water and sediment in the oil-water separator every day.

- 1) Turn off the engine, open the drain valve by hands, turn the valve counterclockwise for about three and a half turns, until the valve drops at 25.4 mm (1 in) and begins to drain;
- 2) Drain the water from the separator until the clean fuel is visible.
- 3) To close the valve Turn the valve clockwise until it is tightened by hands.

**Note: Do not overtighten the drain valve when closing it. Overtightening will damage the thread.**



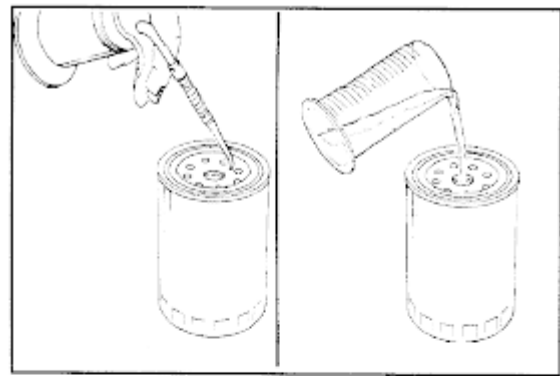
Turn the valve counterclockwise      Valve lowering      Turn clockwise

### 7. Replace the oil filter element

Replace the filter element every 200 hours or 3 months. Make sure to use genuine filter element.

- 1) Remove the fuel filter;
- 2) Clean the gasket surface of the filter seat with a lint free cloth;
- 3) Discard the O-ring;
- 4) Install a new O-ring;

**Note: Check whether there is an old seal on the filter element seat. It will cause oil leakage if the old seal is stuck on it.**

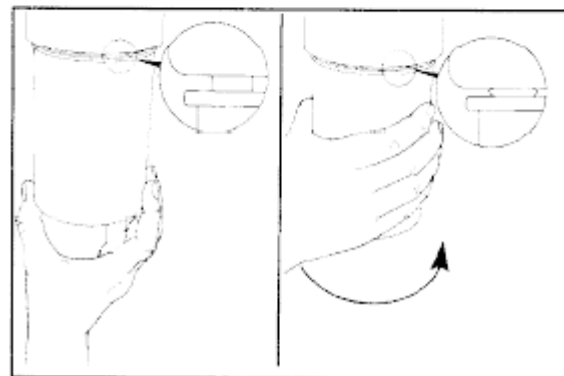


- 5) Fill up the new filter with clean fuel, and lubricate the O-ring with clean engine oil;

- 6) Install the fuel filter as specified by the filter manufacturer.

**Note: To reduce the possibility of fuel leakage, ensure that the fuel filter is installed firmly but not too tightly. Excessive mechanical tightening will damage the fuel filter.**

- 7) After replacing the filter element, start the engine and check the sealing surface of the filter element for oil leakage.



## Engine cooling system

### Maintenance instructions

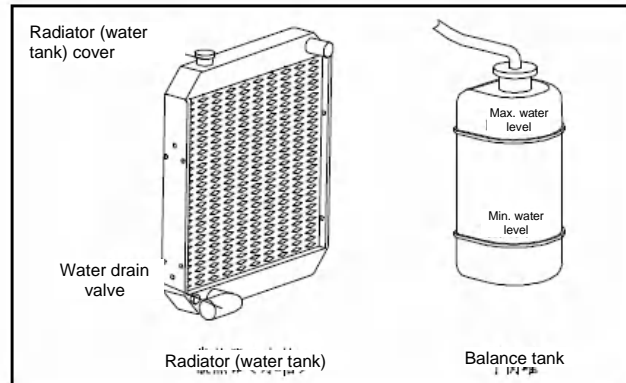
Radiator capacity .....	5.7 liters
Coolant level check .....	every day or every 10 hours of operation
Check the condition of rubber hoses and clamps .....	every day or every 10 hours of operation
Clean the radiator blades .....	every 500 hours of operation
Coolant replacement .....	once a year in spring and autumn
Coolant concentration check .....	every day or every 10 hours of operation


### 1. Check the coolant level

Before starting a new machine, the coolant level in the radiator should be checked, after that, it should be checked every day or every 10 hours.

Remove the radiator (water tank) cap and check the level of the coolant. When the engine is cold, the coolant level shall be 20 mm below the water filler port.

Observe the level of the coolant level in the balance tank. If the engine is cold, the coolant level shall be between the highest and lowest water levels.





**Warning: When the radiator cap is unscrewed, hot coolant will spray out. Cover unscrewing method: After the system cools down, slightly loosen the cover and wait for the pressure to fully release. If the cover is unscrewed too quickly, coolant may spray out, which may cause personal injury.**

### 2. Check the condition of rubber hoses and clamps

Check every 10 hours or every day.  
 Check the rubber hose. If there are cracks or if it becomes hard due to aging, replace it with a new one.  
 Check if the hose clamp is locked tightly, and if there is looseness or damage, replace it in a timely manner.



### 3. Clean and inspect the radiator fins

Check once every 500 hours.  
 Dust on the surface of the radiator (water tank) can affect the cooling effect and must be cleaned in a timely manner.



Open the engine hood and use high-pressure water or compressed air to blow away debris such as dust or leaves that clog the radiator fins, oil cooler fins. At the same time, clean the protective strainer in front of the oil cooler. For machines equipped with air conditioning, it is also necessary to clean the condenser fins.



**Warning: If compressed air, high-pressure water, and steam directly hit the body, or are used to blow away dust or dirt, there is a risk of serious injury. Therefore, it is necessary to use goggles, dust masks, and other protective masks.**

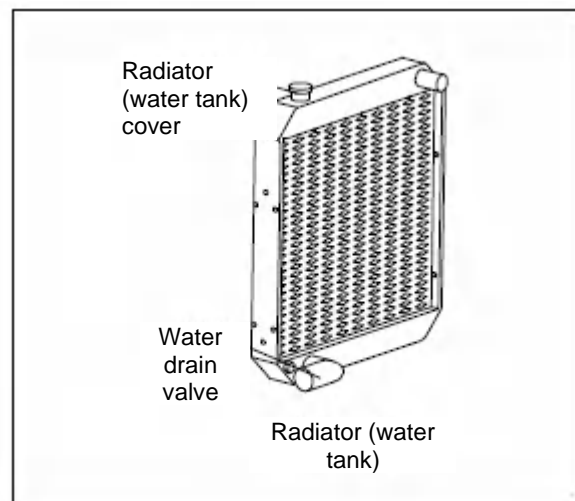
Attention: To prevent damage to the heat sink, the distance between the nozzle of high-pressure water or compressed air and the surface of the radiator (water tank) should be over 500 mm.

Damaged heat dissipation fins can cause water leakage or overheating. In dusty areas, check the heat dissipation fins daily, which shall not be limited by the maintenance intervals.

#### 4. Replace the coolant

After 50 hours of operation, perform the first replacement. Replace twice a year thereafter, once each in spring and autumn.

- 1) Remove the radiator (water tank) cover, unscrew the water valve, and drain the coolant;
- 2) Clean the cooling circuit, close the drain valve, fill up the special cleaning fluid, then start the engine, operate the engine at low speed for 10 minutes, and then stop the engine to discharge the cleaning fluid;
- 3) Close the drain valve again;
- 4) Fill up the coolant, make the engine idle for a few minutes, so that the coolant fills the entire cooling circuit;
- 5) Check the coolant level and replenish the coolant.



**Warning: Do not open the radiator (water tank) cover from a hot engine. The radiator cover should not be opened until the coolant temperature drops below 50°C. Otherwise, the spraying of high-temperature coolant or steam may cause personal injury!**

#### 5 Check the coolant level

Before the start of the cold season, check the concentration of the coolant. The coolant should be able to operate at an ambient temperature of minus 20 degrees Celsius. If the ambient temperature is lower, the amount of the antifreeze should be increased.



**Warning: The coolant is toxic. Avoid children and pets coming into contact with the coolant. If no longer used, dispose of it in accordance with local environmental regulations.**



**Warning: Antifreeze shall be used in any weather.**

**Do not use only water as coolant. Otherwise, it may be damaged due to corrosion.**

**River water contains a large amount of calcium and other impurities. If river water is used, scale will form and adhere to the engine cooling water channel and radiator, causing heat exchange failure and overheating. Do not use water that is not suitable for drinking.**

**Antifreeze is flammable, so be particularly careful not to approach open flames.**

**If antifreeze splashes into the eyes, it should be immediately washed with water and the patient should be promptly sent to the hospital for treatment.**

# Engine lubricating system

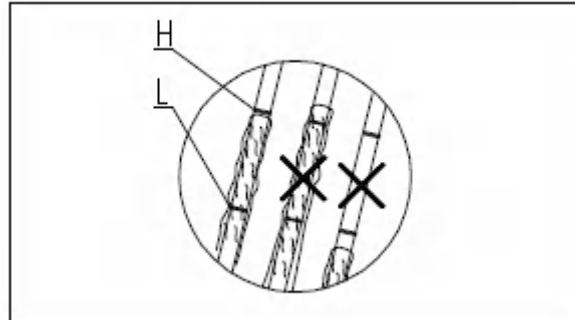
## Maintenance instructions

Oil volume ..... 7L  
Oil level check ..... Every 10 operation hours or every day  
Change the oil or replace the fuel filter element..... Every 500 hours of operation

### 1. Check the oil level

Before starting a new engine, check the oil level once, and thereafter check every 10 hours.

- 1) Park the excavator on a level ground and stop the engine.
- 2) Open the engine hood, take out the oil dipstick, and observe the sticky part on the oil dipstick. The oil level should be located between the minimum (L) and maximum (H) marks.
- 3). If necessary, you can fill oil from the oil port to make the oil level reach the specified value.



**Warning: The components and oil are still at high temperatures upon shutdown of the engine, which can cause serious burns. Maintenance is allowed only after the temperature has dropped.**

### 2. Replace the engine oil

The oil shall be changed after new machine works for 50 hours, and then it will be changed every 500 hours.

- 1) Park the excavator on a level ground and stop the engine, and drain the oil while it is hot.
- 2) Remove the oil drain plug to make the oil flow out completely.

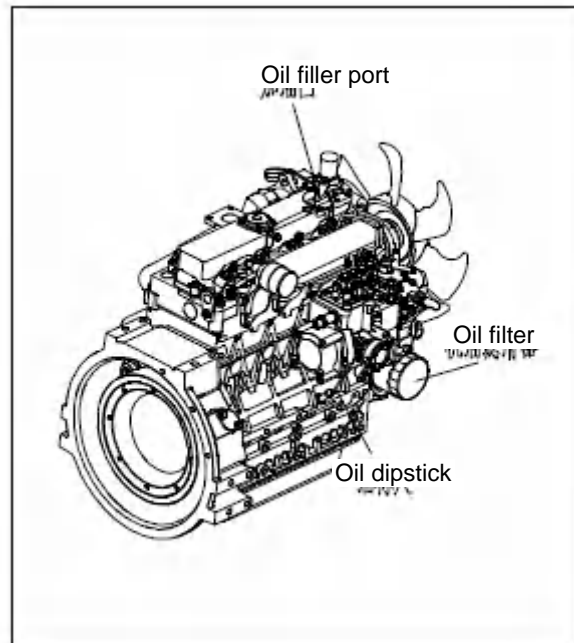


**Avoid inhaling oil vapor, swallowing, and prolonged contact with used oil.**

- 3) Clean the drain plug and reinstall it. If the seal ring is damaged, replace it.
- 4) Open the oil filler port.
- 5) Refill with new oil until the oil reaches the "Maximum" mark H on the oil dipstick.
- 6) Cover the oil filler cap and allow the engine to idle for 5 minutes.
- 7) Check the oil level 10-20 minutes after the engine is stopped. Refill oil as necessary.

### 3. Replace the engine oil filter element

The new machine shall be cleaned for the first time after 50 hours of operation, and every 500 hours thereafter.



### Replace oil filter

- 1) Clean the area around the filter seat, remove the oil filter, and clean the sealing gasket surface on the filter seat;
- 2) The oil filter has two gaskets, which are lubricated;
- 3) Before installing the filter, apply a layer of engine oil on the surface of the sealing gasket;
- 4) Install the oil fuel filter as specified by the oil filter manufacturer.
- 5) Run the engine at low idle speed and check whether the oil filter leaks;
- 6) Shut down the engine and wait for 15 minutes to allow the oil in the engine parts to fully flow back;
- 7) Check the oil level and, and add oil to the maximum mark "H" on the oil dipstick if necessary.

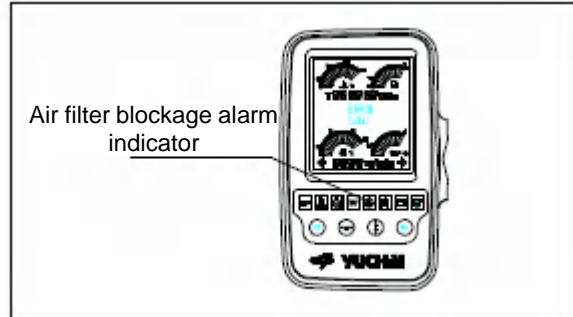
# Engine air intake system

## Maintenance instructions

Air filter element replacement frequency.....Every 500 operation hours

### 1. Replace the air filter element

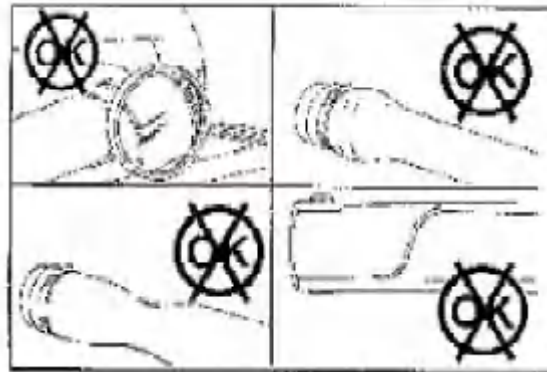
When the air filter blockage alarm indicator light on the digital detector is on or for every 500 hours, the air filter should be replaced.



### 2. Intake pipeline inspection

Check the intake pipe every day for signs of wear, pipe damage, loose clamps, or pipe breaking that may damage the engine.

If necessary, replace damaged pipes and tighten loose clamps to ensure that the intake system does not leak.



## Other maintenance of the engine

**Warning:** To prevent injury, do not perform maintenance while the engine is running. If maintenance must be carried out with the engine running, it should be carried out with at least two people and in accordance with the following regulations:



There must always be one person sitting in the operator's seat and ready to turn off the engine at any time. All the personnel shall keep touch with each other.

Great caution should be made when operating near fans, fan belts, or other rotating components for there is a risk of being caught by the components.

Do not drop or insert tools or other objects into the fan or fan belt. Otherwise, it may cause the parts to break or fly out.



**Warning:** Too high noise of the machine may cause temporary or permanent hearing problems. When performing engine maintenance and working under prolonged exposure to noise, ear muffs or earplugs should be worn.

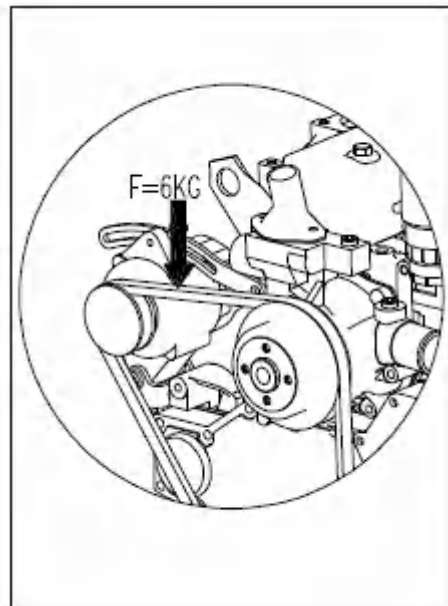
- **Check the tension of the fan belt**

After working for 50 hours, perform the first inspection. Check once every 100 hours thereafter.

In order to ensure the normal operation of the generator and the service life of the belt, it is necessary to tension the fan belt correctly.

For a correctly tensioned belt, apply 6kg perpendicular to the belt between the fan pulley and the generator pulley, and the sinking amount for the belt is about 5-10mm.

If the belt is found to be damaged, it shall be replaced.



- **For the maintenance cycle and specific methods of other components of the engine, please refer to the "Diesel Engine User Manual" attached to this machine.**

# Hydraulic system

## Maintenance instructions

Hydraulic oil tank capacity .....	50L
Oil level inspection .....	Every 10h
Change filter .....	Every 1000/2000 hours
Hydraulic oil change .....	Every 2000 hours
Check the system pressure .....	Every 500 hours



**Warning: If hydraulic oil or grease is injected into the skin, it can cause serious injury and death. Prevent your hands or body from approaching the area of pressure oil leakage. Check for leaks with cardboard or paper. If hydraulic oil accidentally injected into the skin, immediately seek for medical attention.**

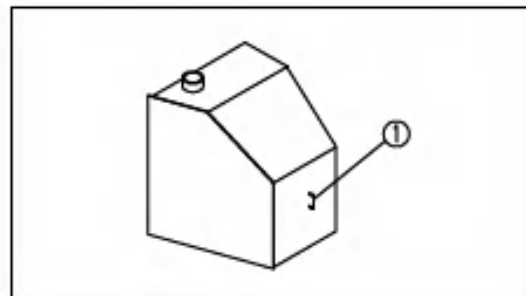
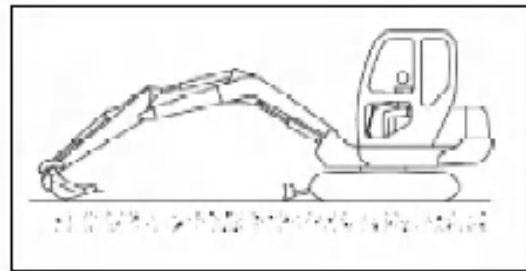


**Warning: To avoid burns, maintenance should be carried out only when the hydraulic oil has cooled down or before daily work. In order to prevent oil from spraying out, it is necessary to slowly rotate the cover to release internal pressure when removing the fuel filler flange cover.**

## 1. Check the oil level in the hydraulic oil tank

Check the hydraulic oil tank level every 10 hours.

- 1) Park the machine on a level surface.
- 2) Start the engine to make each cylinder reciprocate.
- 3) Retract the stick cylinder, extend the bucket cylinder, and then the bucket falls to the ground, the dozer blade shall be placed on the ground and shut down. As shown in the figure.
- 4) Observe the hydraulic oil level through the oil gauge tube on the hydraulic oil tank.



The liquid level of the hydraulic oil shall be observed through the oil standard tube (as ① in the figure).

The hydraulic oil level shall be clearly seen on the oil leveler, and the oil shall not be filled over much, otherwise the level can not be seen through the oil leveler. Since this may cause damage to the hydraulic oil line or injection of oil. If the refueling is too full, stop the machine and drain the excess oil from the oil drain plug

after the oil cools. If the oil gauge shows that the liquid level is too low or the liquid level is not visible, oil shall be refilled in time through the oil filler port on the top of the hydraulic oil tank.

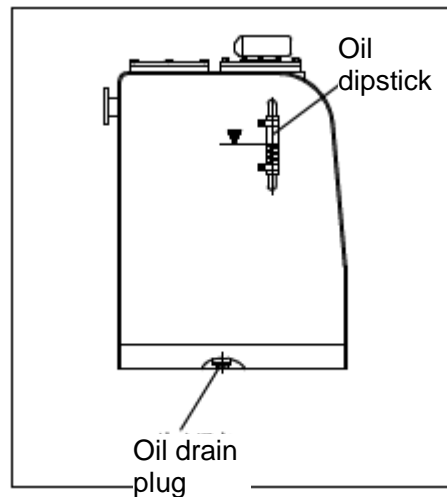
**Attention: The hydraulic oil level will change with the increase of oil temperature during operation. Before operation, the oil level is in the middle of the oil leveler. During normal operation, the oil temperature rises and the oil level will approach the upper end of the oil leveler.**



## 2. Remove water and dirt from the hydraulic oil tank

Drain the water and dirt from the hydraulic oil tank every 250 hours.

- 1) After stopping the machine until the oil temperature drops or before starting work every day, discharge the air from the oil tank.
- 2) Slowly loosen the drain valve or the drain plug at the bottom of the fuel tank (as shown in the figure).
- 3) Drain water or dirt until the clear and clear hydraulic oil is discharged. Close the drain valve again or tighten the screw plug.
- 4) Fill oil if the oil in the oil tank is insufficient.



## 3 Replace the hydraulic oil, clean the oil suction screen.

The first replacement shall be carried out after 2000 hours working for a new machine, and thereafter it shall be done every 2000 hours.

**Warning: 1) To avoid burns, oil draining should be carried out only when the hydraulic oil has cooled down or before daily work.**

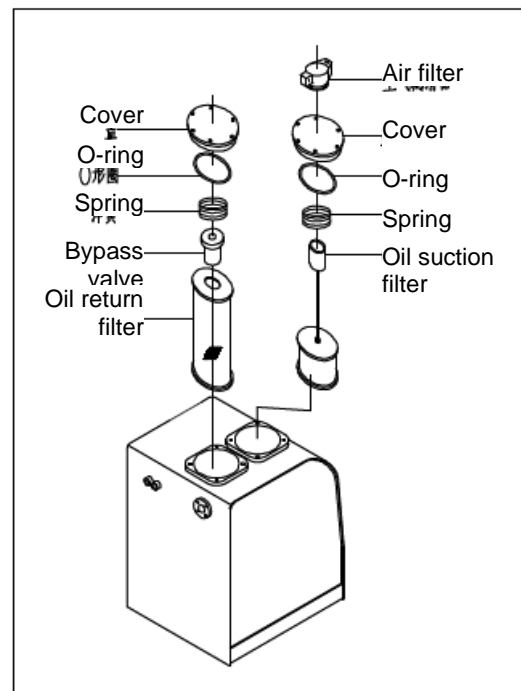


**2) In order to prevent oil from spraying out, it is necessary to slowly rotate the cover to release internal pressure when removing the fuel filler flange cover.**

**3) When changing the oil, make sure no water, dirt, mud, etc. enter the oil tank.**

### Oil change procedures:

- 1) Park the excavator on level ground.
- 2) Slowly loosen the air filter on the upper filler flange assembly of the fuel tank to reduce the air pressure stored in the fuel tank.
- 3) Remove the cover under the air filter.
- 4) Pump the hydraulic oil with the oil pump and put it into the empty oil barrel.
- 5) Loosen the drain valve or the drain plug at the bottom of the tank to completely drain the remaining oil.
- 6) Lower the oil suction filter.
- 7) Clean the inside of the oil tank thoroughly.
- 8) Clean the drain plug and reinstall it.
- 9) Clean the oil suction filter.
- 10) Add the hydraulic oil that meets the requirements (see the oil selection table), and the new oil shall be added to the oil



tank to reach the middle of the oil dipstick.  
11) Install the oil suction filter and cover  
the air filter.

#### **4. Exhaust the air in the hydraulic system**

##### **A. Exhaust the air in the pump**

- 1) Loosen the exhaust screw plug in the exhaust port, and check whether there is oil flowing out. The exhaust is completed.
- 2) Tighten the screw plug after the exhaust is completed.

**Note: If the pump is operated if the pump is not full of oil, it will be abnormally heated and cause premature damage to the pump.**

##### **B. Discharge the air between the pump and the hydraulic oil tank**

- 1) Start the engine and keep it running at medium and low speeds.
- 2) Operate the working device slowly for about 5 minutes to exhaust air.

**Note: If the air between the pump and the fuel tank is not discharged to allow the engine to run at a high speed, it will also cause the pump to be heated and damage the pump.**

##### **C. Discharge the air in the oil cylinder**

- 1) At low engine speed, extend and retract the oil cylinder to the position about 100mm from the stroke end for 4-5 times. (Be careful not to extend or retract to the stroke end).
- 2) Then, operate each cylinder to the end of its stroke 3 to 4 times.
- 3) Finally, operate each cylinder to the end of its stroke 4~5 times to completely exhaust the air.

**Note: If the engine is operated at high speed or the oil cylinder is operated to the end of the stroke immediately after starting the machine, the air in the oil cylinder will damage the piston seal and damage the oil cylinder.**

##### **D. Discharge the air in the swing motor (when the oil in the housing of the swing motor is discharged)**

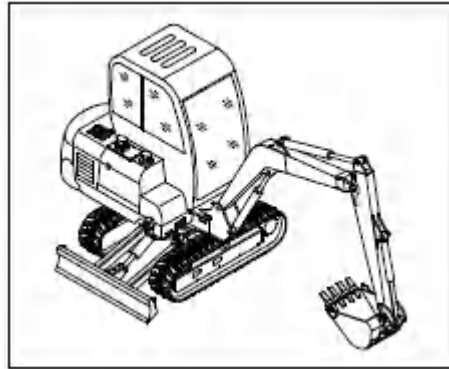
Note: During the exhaust, the machine cannot be rotated under any circumstances.

- 1) Run the engine at idle speed, loosen the exhaust plug, and check whether the oil flows out from the exhaust plug.
- 2) If there is no oil flowing out, remove the exhaust plug and fill the motor housing with hydraulic oil.
- 3) After the exhaust is completed, tighten the exhaust plug.
- 4) Finally, run the engine at a low idle speed and slowly turn the upper part of the car body left and right at least twice. So that the air is completely exhausted.

**Note: If the air in the motor is not exhausted, the bearings of the swing motor may be damaged.**

### **E. Discharge the air in the walking motor (when the oil in the casing of the walking motor is discharged)**

- 1) Run the engine at idle speed and loosen the exhaust plug. If oil comes out, tighten the screw plug.
- 2) Run the engine at idling speed and rotate the working device 90 degrees so that it is located on the side of the crawler. (As shown on the right)
- 3) Jack up the machine with the working device, keep the crawler on one side slightly away from the ground, and rotate the crawler for 2 minutes under no load. Repeat this action on the left and right tracks and rotate the tracks forward and backward equally.



### **F. Exhaust the air in the accessories**

If the accessory is installed, run the engine at idle speed and operate the accessory pedal several times (about 10 times) until the air is discharged from the accessory oil circuit.

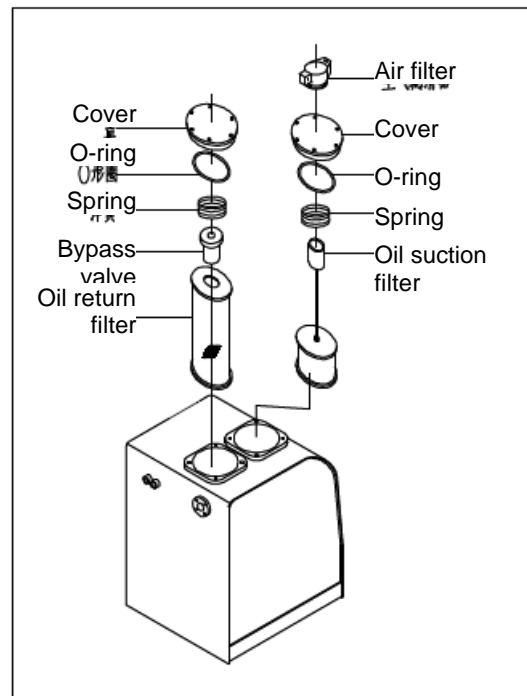
#### **Note:**

1. If the manufacturer specifies a specific exhaust method, which shall be followed strictly.
2. After the exhaust operation is completed, turn off the engine and let the machine stand for at least 5 minutes before starting operation to eliminate air bubbles in the oil in the hydraulic cylinder.
3. There shall be no leakage during the inspection. Wipe the spilled oil if any.
4. After the exhaust operation is completed, check the oil level, and fill if the oil level is low.

## 5. Replace the oil return filter element

After that, replace every 1000 hours. The oil return filter is in the hydraulic oil tank, so:

- 1) Unscrew the cap on the top of the tank.
- 2) Remove the spring, bypass valve, and oil return filter from the inside of the tank.
- 3) Clean the spring and bypass valve by using the diesel filter element or a new filter element, and then reinstall them.
- 4) Install the fuel tank cap.

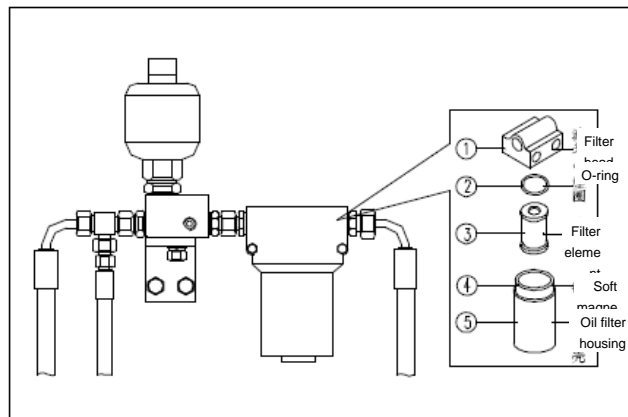


## 6. Replace the fuel filter element of pilot oil circuit

After that, replace every 1000 hours.

**Attention: Be sure to discharge the air pressure in the hydraulic oil tank before removing the filter element.**

- 1) Unscrew oil filter housing (5).
- 2) Remove the filter element (3).
- 3) Install the new O-ring (2) in the filter head (1) groove.
- 4) Before assembling the new filter element, apply a layer of hydraulic oil on the sealing surface of the filter element and install the filter element into the filter head.
- 5) Clean the oil filter housing (5) and soft magnet (4), be careful not to allow dirt, dust or water to enter the filter housing.
- 6) Tighten the oil filter housing and filter head with a torque of 25~35N.m.
- 7) Connect the pipeline and start the engine slowly. Operate continuously for 3-5 minutes to discharge the air in the system.
- 8) Park the machine on the level ground, stop the machine to check the oil level, and add oil if necessary. Pay attention that the oil filling shall not exceed the required maximum oil level limit.



■ **During using accessories (such as breaker hammer), the replacement cycle of hydraulic oil and filter elements shall be shortened.**

Since if the hydraulic hammer is used, the pollution of the hydraulic system is increased and corrosion is accelerated. Compared with excavating devices, the replacement cycle of hydraulic oil and filter elements shall be shortened accordingly, so as not to damage the hydraulic pump and other hydraulic components. The recommended replacement cycle is as follows: (unit: hour)

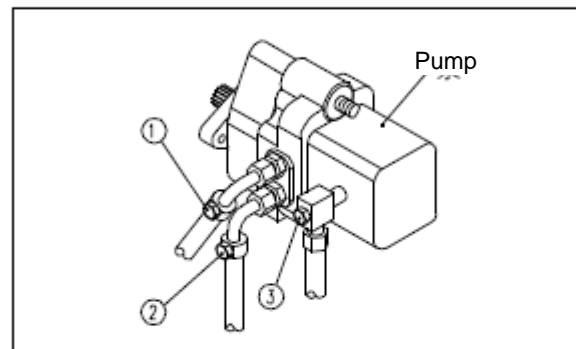
Hydraulic hammer operating rate	Hydraulic oil changing cycle	Replacement cycle
50%	1000	Oil return filter element 750, oil suction filter element 1500
100%	500	Oil return filter element 500, oil suction filter element 1000

**Note: If a hydraulic hammer is used, the system pressure shall be adjusted appropriately according to the requirements of the hydraulic hammer.**

### 7. Check the system pressure

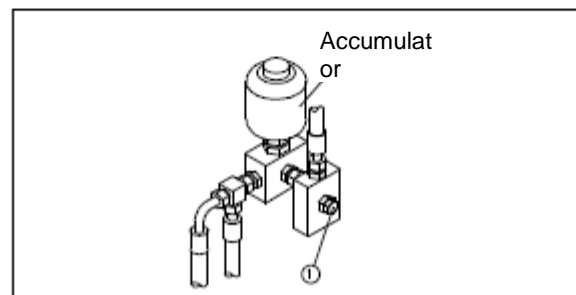
Check once every 500 hours.

- 1) After the hydraulic oil temperature reaches 50 °C, perform pressure adjustment and inspection.
- 2) Use a pressure gauge with a flexible tube, with a pressure gauge range of 0~30Mpa.
- 3) Connect M10× 1 pressure gauge with a direct head to the plunger pump as shown at ① and ② in the following figure.
- 4) Check the pressure setting value of the main circuit safety valve, which should be 21Mpa±0.2Mpa. If the pressure value does not meet the requirements, adjust the main safety valve on the multi-way valve until it reaches the specified value.



### Testing the pilot pressure

- 1) Unscrew the screw plug of the output connector of the pilot oil supply valve (as shown in ① for the accumulator in the figure ) and connect it with a straight head M10 × 1 pressure gauge. The measuring range is 0~6Mpa.
- 2) Check the pressure value of the pilot oil line, which should be 3Mpa ± 0.5Mpa. If the pressure value does not meet the requirements, the safety valve at the oil source valve should be adjusted to reach the specified value.



**Attention: If the pressure of the main oil line, dozer oil line, and pilot oil line can not meet the requirements, please contact Yuchai service agency.**

## Travel reducer

### Maintenance instructions

Lubricating oil capacity of rotary reducer .....	1.6L
Lubricating oil capacity of walking reducer .....	2.5L (each side)
Check the lubricating oil level and add oil .....	every 250 hours
Replace the lubricating oil .....	every 1000 hours of operation
Check the tightening torque of the reducer connecting bolts .....	every 500 hours of operation

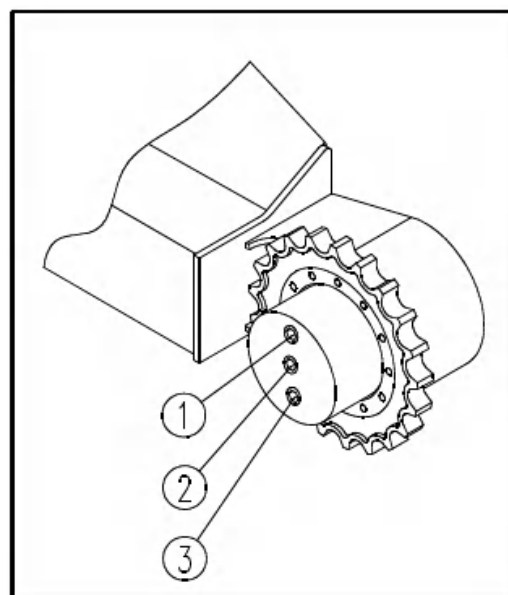
### 1. Check the lubricating oil level of the travel reducer and fill oil



**Warning:** The oil in the reducer will heat up shortly after the machine moves. After stopping the equipment, the travel reducer and oil are still at a high temperature, which can cause severe burns. Before operation, wait for the oil to cool down. Loosen the exhaust screw plug by two to three threads and release the air pressure in the box before removing the screw plug. It is dangerous to remove the plug quickly. It is dangerous to remove the screw plug quickly.

Check once every 250 hours.

- 1) Prepare an Allen wrench.
- 2) Park the excavator on level ground.
- 3) Rotate the travel reducer to make the two screw plugs on its outer end face reach the position shown in the figure, and then stop the machine.
- 4) Slowly open the plug ① after the oil cools down
- 5) Tighten the plug ① after the air pressure in the tank is released.
- 6) Open the plug ② and check the position of the oil level. The liquid level shall reach the lower edge of the plug hole.
- 7) Refill the engine oil (according to the refueling method) if necessary.
- 8) Clean the drain plug ② and reinstall it to the reducer.



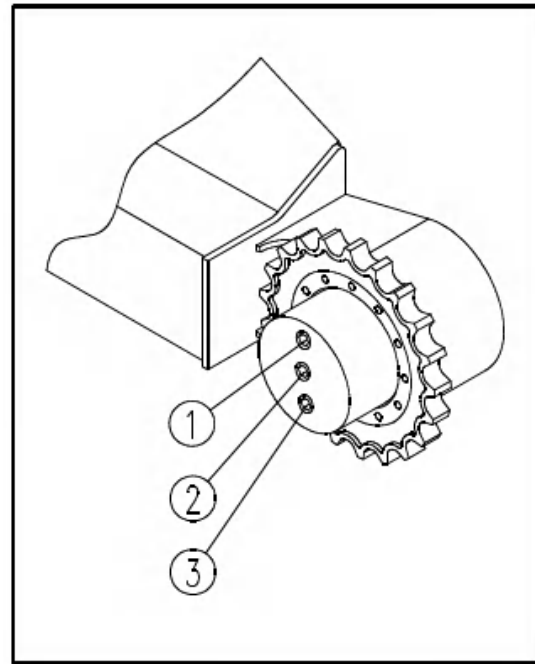
## 2. Replace the lubricating oil (for each reducer)

After that, replace every 1000 hours.

- 1) Park the excavator on level ground.
- 2) Rotate the reducer so that the screw plug is in the position shown in the previous section
- 3) Drain the oil when the reducer oil is hot.

**Note: Don't burn yourself by hot oil.**

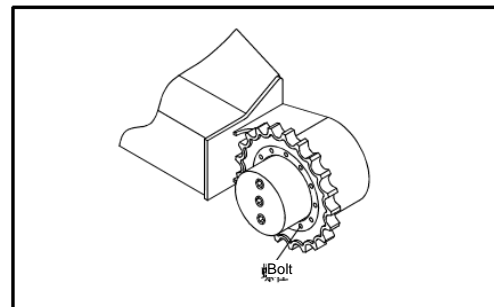
- 4) Loosen screw plug ③ to drain oil, and loosen screw plug ② to drain oil completely.
- 5) Rotate the reducer so that the plug ③ is in the straight-up position.
- 6) Add the specified lubricating oil from the oil filling hole ③ until oil flows out from the oil level inspection hole ②.



## 3. Check the tightening torque of the connecting bolts of the walking reducer and the rotary reducer

### A. The tightening inspection of the connecting bolts of the walking reducer

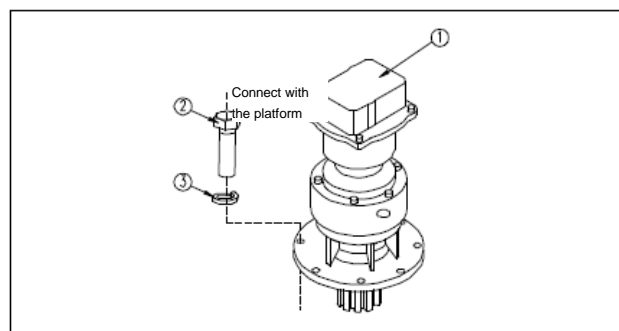
The first inspection after working for 50 hours and then every 500 hours.  
Tighten the bolts connecting the reducer with the underframe and the drive wheel.



### B. The tightening inspection of the connecting bolts of the rotary reducer

The first inspection after working for 50 hours and then every 500 hours.

Tighten the bolts connecting the reducer and the platform.





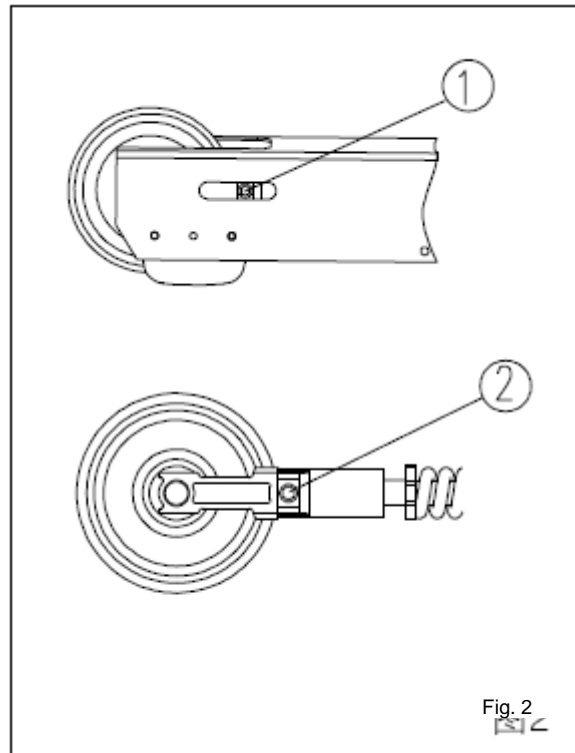
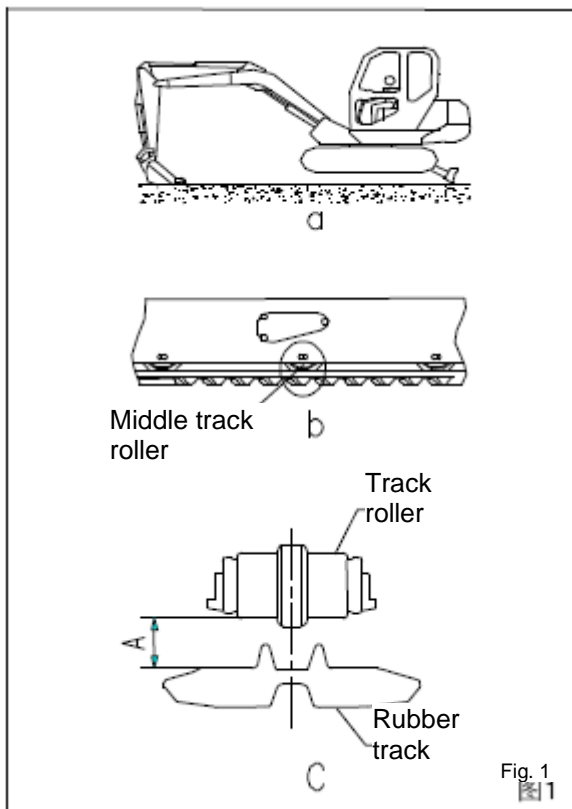
# Track

## Check and adjust the tension of the track

### A. Rubber track

Check every 10 hours.

- 1) Park the excavator on a level and solid ground.
- 2) Put the bulldozing blade at the back and extend the piston rod of the bulldozing cylinder until the crawler is slightly lifted.
- 3) Support the bucket on the ground and manipulate the boom cylinder to raise the front of the excavator (as a in Figure 1).
- 4) Correctly tension the track so that there is a 10-15mm deflection between the middle thrust wheel and the track (as c in Figure 1).
- 5) Remove the cover (b in Fig. 1) on each track frame, and expose the fuel nozzle of the tensioner (① in Fig. 2).
- 6) In order to loosen the track, first loosen the joint ② (Fig. 2) to let the grease flow out, and then retighten it after getting the correct tension.
- 7) In order to tension the track, connect the joint of grease gun (provided as a random tool) with the joint ② (Fig. 2). Then add oil by using a grease gun until it is correctly tensioned.

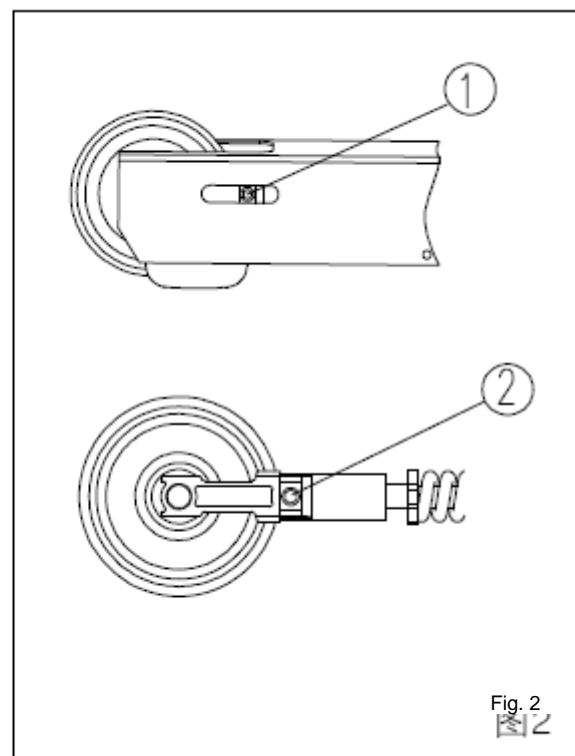
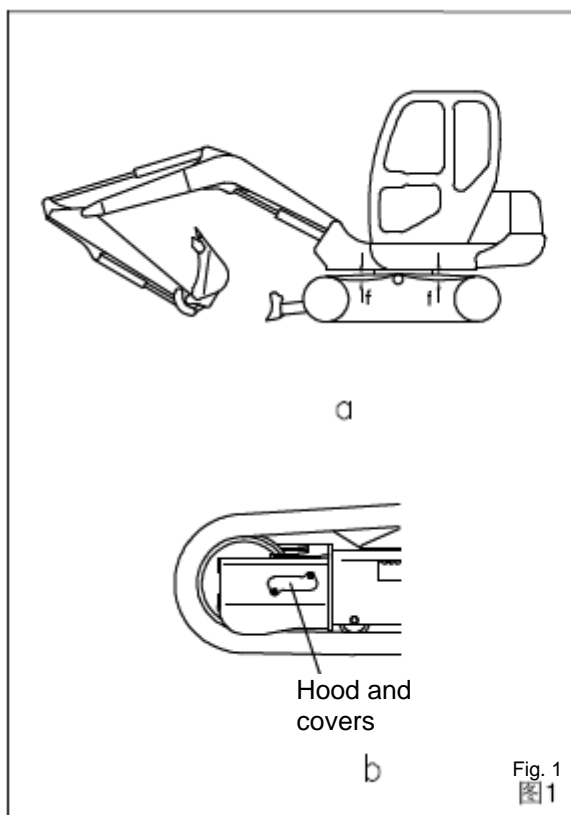


## Check and adjust the tension of the track

### B. Steel track

Check every 10 hours.

- 1) Park the excavator on a level and solid ground.
- 2) Correctly tension the track so that the branch amount  $f$  on the track is controlled at a deflection of 15-25 cm (a in Fig.1).
- 3) Remove the cover (b in Fig. 1) on each track frame, and expose the fuel nozzle of the tensioner (① in Fig. 2).
- 4) In order to loosen the track, first loosen the joint ② (Fig. 2) to let the grease flow out, and then retighten it after getting the correct tension.
- 5) In order to tension the track, connect the joint of grease gun (provided as a random tool) with the joint ②(Fig. 2). Then add oil by using a grease gun until it is correctly tensioned.



**Warning: Do not knock on the tension spring of the track. The spring will break explosively and cause personal injury due to the huge pressure. Do not disassemble the spring in a stretched state.**

## Track roller, support roller, and guide roller

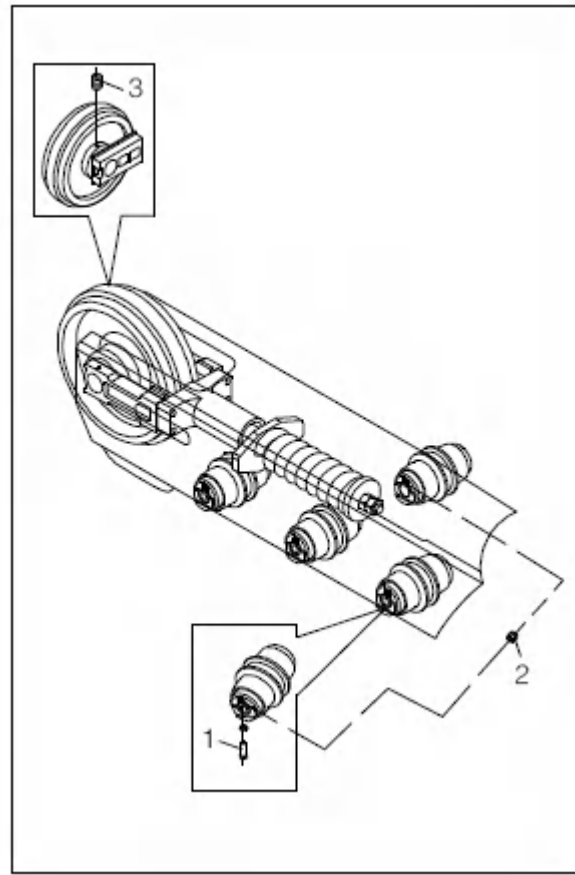
### 1. Check the tightening torque of the track roller

The first inspection after working for 50 hours and then every 500 hours.

The tightening torque of bolt ① shall be 420 N·m.

If the bolts loose, unscrew the bolts, remove the thread locking agent between the bolt threads, and then apply the thread locking agent to the threaded joints and tighten them as per the specified torque.

If the bolts must be replaced, they shall be replaced with bolts of the same specification and strength class.



### 2. Check the oil level of the supporting wheels and guide wheels

Check every 1000 hours.

- 1) Take out the screw plugs ② and ③ respectively from the supporting wheel and guide wheel.
- 2) Fill the oil in with an oil pot.
- 3) If oil flows out from the oil filling hole, re-tighten the screw plugs ② and ③.

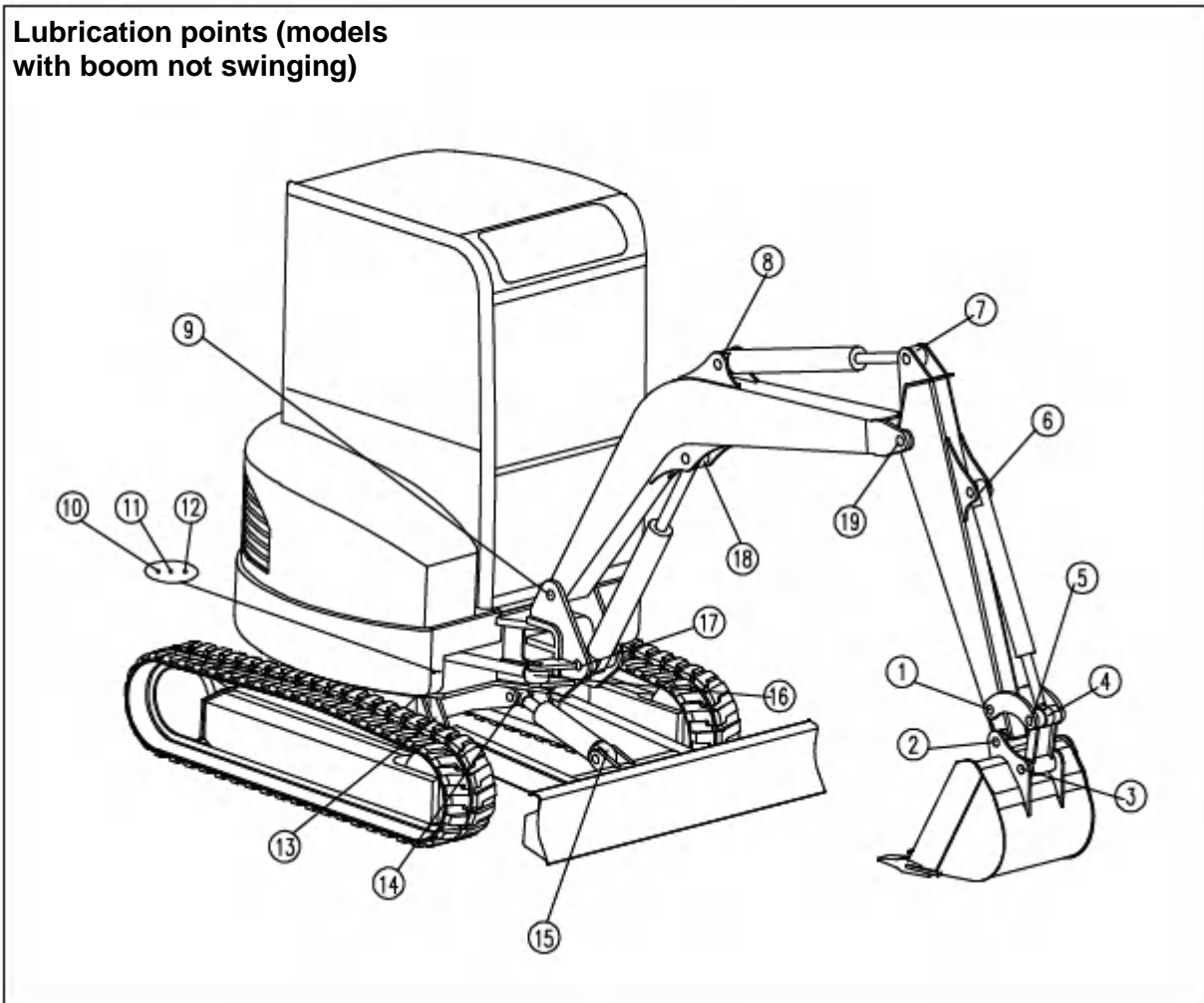
# Lubrication

Lubricate the lubrication points of the machine every 50 hours.

Lubrication steps:

- 1) Start the working device and put the bucket on the ground.
- 2) Put the bulldozing shovel on the ground.
- 3) Stop the engine.
- 4) Wipe clean the filling nozzles of each oil cup.
- 5) Lubricate each lubrication point and wipe off excess grease squeezed out.

## Lubrication points (models with boom not swinging)



1. Hinge point between stick and bucket
2. Hinge point between bucket arm and bucket
3. Hinge point between connecting rod and bucket
4. The lubrication point of the bucket cylinder head
5. Hinge point between rocker and connecting rod
6. Lubrication point at the tail of bucket cylinder

7. Lubrication point at the head of the swing cylinder.
8. Lubrication point at the tail of stick cylinder
9. Hinge point between stick and platform
10. Lubrication point of the swing cylinder
11. Lubrication points inside the rotary support raceway
12. Lubrication point at the rotary support gear ring

13. Hinge point between bulldozer blade and frame
14. Hinge point a the bulldozing cylinder head
15. Lubrication point at the head of the swing cylinder.
16. Lubrication point of the swing cylinder
17. Lubrication point at the tail of the boom
18. Lubrication point at the boom cylinder head.

19. Hinge point between rocker and stick

## Air conditioner (if provided)

For the air conditioning equipped for the cab of this machine, its operating knob is set on the left control box panel of the cab.

For the specific operation and maintenance of the air conditioning system, please refer to the operation manual of the air conditioner attached to the machine while referring to this manual.

### 1. Precautions for air conditioning maintenance

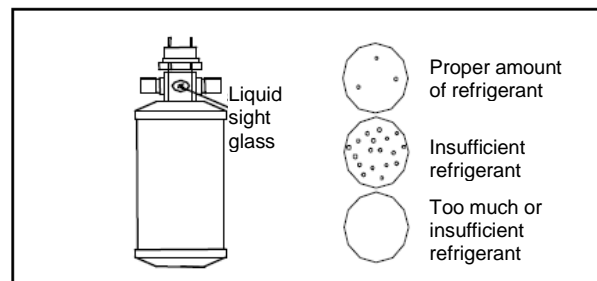
- 1) Air conditioning box assembly with dust screen must be cleaned regularly once a month, otherwise the dust and dirt will block the dust screen, making the indoor air cannot pass through the heat exchanger smoothly, affecting the air conditioning effect.
- 2) When using the refrigeration system in summer and ventilation systems in spring and autumn, the heating valve should be closed first; when using the heating system in winter, the heating valve should be opened first and the air conditioning switch should be turned to the OFF position.
- 3) Because the heater core is connected with the engine water tank, the water tank will be short of water once the heater core leaks, causing the engine to overheat. In winter, it is very important to prevent the heating core from freezing and cracking, just as it is to prevent the water tank from freezing and cracking. In order to prevent the heating core or water tank from freezing and cracking due to the frozen coolant, please use the coolant designated by the OEM. If necessary, in winter when the coolant may freeze, drain the coolant if the shutdown time is long!
- 4) If the air conditioning system is not used for a long time, please operate it every half a month for 5 to 10 minutes each time.

### 2. Inspection of refrigerant dosage



**The skin and especially eyes can easily be frozen by refrigerant. In addition, the refrigerant will emit toxic phosgene when catching open fire. Therefore, whenever it is necessary to disassemble the refrigeration system, it is necessary to recover or discharge the refrigerant before disassembly in the condition that the refrigerant will not be sprayed on the skin and eyes. Make sure there is no open fire during the whole process!**

If there is no refrigerant, the cooling performance will be poor. Check the refrigerant every month or every 250 hours. Operate the air conditioning to reach a strong cool state when the engine is idling at high speed. Determine the amount of refrigerant according to whether there are bubbles in the liquid sight glass on the drying bottle, in order to check the refrigerant dosage.

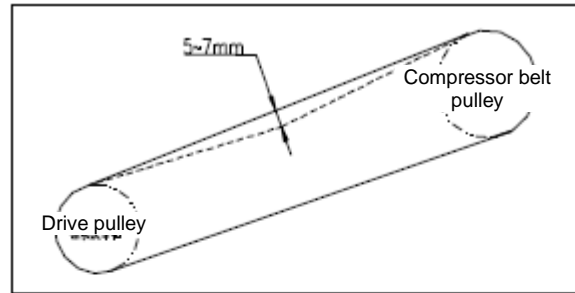


### 3. Check and adjust the tension of the air conditioning compressor belt

Check and adjust the tension of the air conditioning compressor belt every 250 hours.

#### A. Inspection

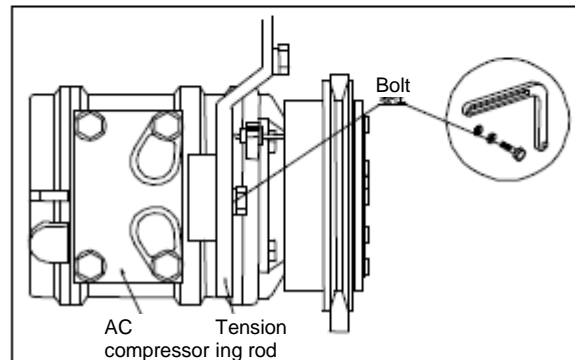
Press the belt in the middle between the drive pulley and the compressor pulley with a finger force of about 12N and check that its deflection is about 5-7mm.



Check the pulley for damage. There is no adjustment allowance if the belt has been stretched, or replace the belt if there is a cut or crack on the belt.

#### B. Adjustment

Loosen the bolts shown in the figure, use a small pry bar to slightly pry open the air conditioning compressor outward, adjust the belt to the appropriate tension, and then tighten the loosened bolts. If necessary, loosen the two bolts securing the air conditioning compressor below.



#### 4. Regular inspection contents of air conditioning

S/N	Inspection items	Inspection contents	Inspection cycle	
			Every month	Every season
1	All fasteners	Whether there is looseness and falling off	★	
2	Air conditioning belt	Tension and wear	★	
3	Pipeline	Whether there is abrasion or crack	★	
4	Joint	Any abrasion or leakage?		★
5	Electric fan	Whether it operates normally	★	
6	Wire harness	Whether there is abrasion and burning	★	
7	Condenser	Whether the surface is blocked by dirt		★
8	Electromagnetic clutch (compressor)	Whether there is slipping	★	
9	Compressor	Whether there is abnormal noise		★
10	Refrigerant dosage	Whether there are bubbles in the liquid sight glass	★	
11	Dust screen	Whether there is blockage by dirt	★	

## Bucket teeth replacement

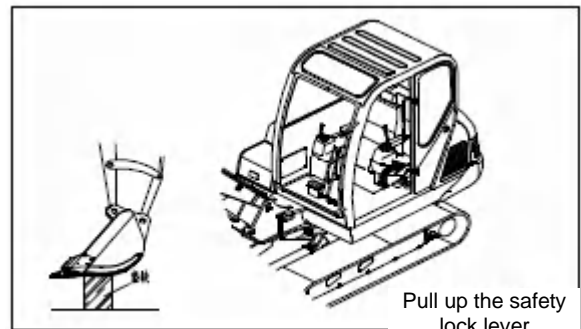
Replace the bucket teeth before the bucket teeth base is worn.



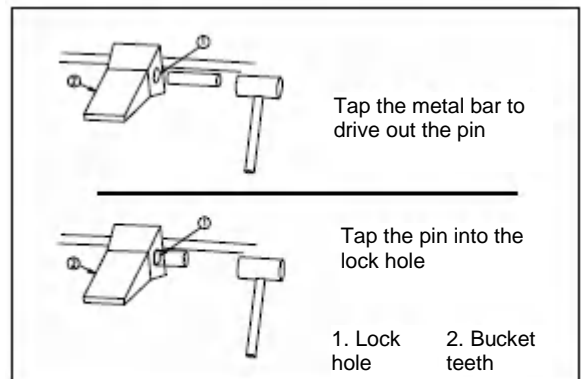
**Warning:** When replacing the bucket teeth, it is very dangerous if the working device moves accidentally due to wrong operation. Therefore, before replacing the bucket teeth, turn off the engine and then lift the left control box to place the attachment in a locked state. During replacement, wear necessary protective equipment to prevent the lock pin from flying out.

### Replace the bucket teeth

1) Place the bottom of the bucket on blocks so that the pin can be removed. Check that the working device is in a stable state and the bucket is placed horizontally. Then, pull up the safety lock lever on the left control box to lock the whole machine and shut down the engine.



2) Place a metal bar with a diameter slightly smaller than the pin on the pin head, knock the metal bar with a hammer to knock out the pin and remove the bucket teeth.



3) Clean the mounting surface. Install the new bucket teeth into the teeth base, push in the pin partially by hand, and then knock the pin into the lock by using a hammer to install the bucket teeth onto the teeth base.



## Washing of floor mats

If the floor rubber mats are dirty, clean them at any time to prevent accidents due to slipping and falling of the floor.

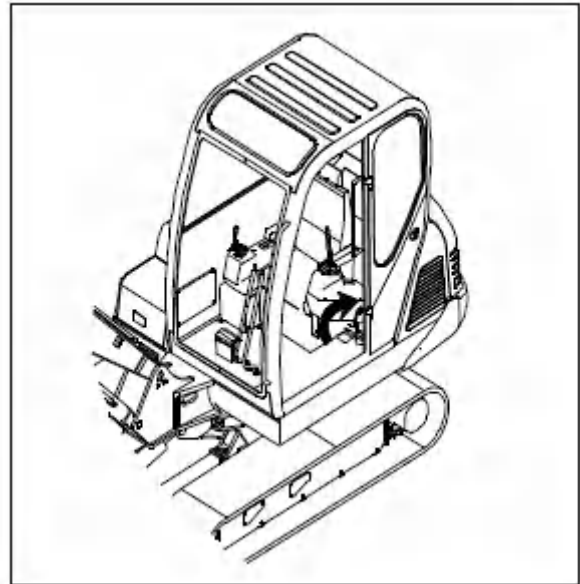


Warning: If you accidentally touch the joystick, the working device or machine will suddenly move, causing serious accidents.

Therefore, be sure to stop the machine on a solid and flat ground before removing the rubber floor mat. The operator must lift the pilot safety handle and its upper control box to lock the pilot system before standing up from the seat.

### Washing steps of floor mats

- 1) Take out the floor rubber mat in the cab.
- 2) Remove dirt with a brush to or directly rinse the floor mat with water.
- 3) Mop the floor in the cab clean.
- 4) After the floor rubber mat is blown dry, recover the mats in the cab.



## Maintenance of electrical system

The electrical aspect of the excavator is an important part, and the maintenance of the electrical system shall be carried out in strict accordance with the instruction. During inspecting and maintaining electrical components, be sure to turn off the power.

1. First, check whether the battery connector is loose, the battery is the main power source, therefore, it shall be tightened to ensure normal power supply.
2. Long-term use of the excavator must inevitably bring oil, dust and other impurities to the circuit, which is likely to cause short-circuit or circuit break or machine failure. Therefore, the circuit shall be checked every half month and the circuit and joints shall be wiped with a clean towel.
3. Check the appearance of the circuit. Check whether the circuit is broken, aging, etc. If so, invite an electrician with relevant experience to replace it.
4. Check whether the fuse of the working electrical appliance is effective. If the electrical appliance fails to work, first check whether the following fuses are burnt out, if so, replace the fuses. Note that iron wires or other conductors shall never be used in place of the fuse.
5. If the electrical equipment is damp or the wire insulation is damaged, it is very dangerous, which will cause leakage and cause machine failure. Do not wash the inside of the cab with water. During flushing the machine, prevent the water from flowing into the electrical parts.
6. Do not install any electronic components other than those specified by Yuchai Heavy Industry.
- 7 External electrical interference may cause electrical system failures, so please contact Yuchai Heavy Industry dealers before installing radio receivers or other wireless devices.
8. During working on the beach, clean the electrical system carefully to prevent corrosion.
9. During installing the cab air cooler or other equipment, which shall be connected to a special power source. The selected power source shall not be connected to a fuse, start switch or relay.

6

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## **Accessories guide**

## Safety Precautions

If you install accessories or options that are not approved by Yuchai, it will not only affect the service life of the machine, but also cause some safety problems.

During installing accessories that are not approved by Yuchai, please contact Yuchai dealer in advance.

If not, we will not be liable for any accidents or damages caused.

### 1. Safe operation accessories

- The accessories have powerful auxiliary functions. To prevent serious injury or damage, the accessories shall be used correctly.
- Do not use the accessories before reading and understanding the instruction thoroughly. If the instruction is lost, please ask the manufacturer or accessory sales company for a new one.
- Install the necessary front guard on the machine as per condition of the accessories.
- According to the condition of the accessories, vibration and noise can make it difficult for colleagues to convey operating instructions. Before starting the operation, a commander shall be assigned and the signal to be used shall be determined.
- If there is a heavy load on the accessories, do not make turning to the side, especially on slopes, it is very dangerous.
- Compared with a machine equipped with a bucket, the load at front of the working device is larger and is unstable for the machine equipped with a breaker hammer. To avoid the risk of tipping, do not operate if the accessory is turned to the side.
- After installing the accessories, the rotation range and the center of gravity of the machine are different, and the machine may move unexpectedly. Be sure to properly check the condition of the machine.
- Before starting operation, set a cordon around the machine to prevent personnel from entering. Do not operate the machine if there are people near the machine.
- To prevent serious accidents caused by wrong operation, do not put your feet on the pedals except operating the pedals.

### 2. Disassembly or assembly of accessories

During accessories disassembly or assembly, be sure to follow the steps below to ensure safety.

- Disassembly and assembly on a firm and level ground.
- If there are two or more people performing operations, ensure and follow these signals during operation.
- A crane shall be used during lifting or carrying heavy objects (over 25Kg).
- During disassembling heavy parts, support the parts before disassembling. During lifting with a crane, pay special attention to the position of the center of gravity.
- It is dangerous to operate if the load is lifted by a crane. Prepare a support and keep it safe.

- During placing disassembled accessories or assembled accessories, make sure that they are in a stable state and will not tip over.
- Do not walk under the load lifted by the crane. Stand in a safe place where there is no danger even if the load falls.

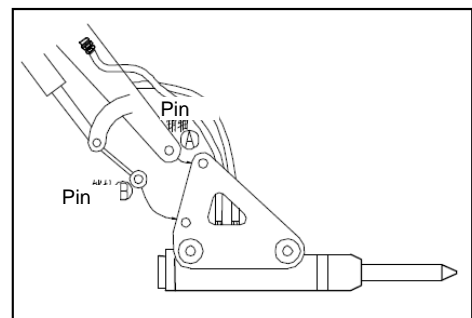
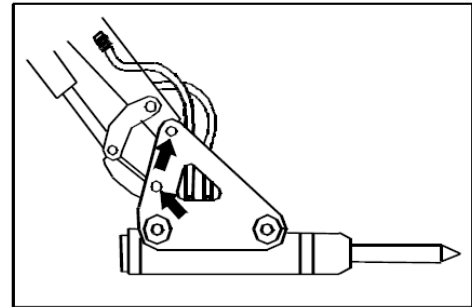


**Warning: A qualification certificate is required to operate a crane. Unqualified personnel are not allowed to operate the crane. For details on disassembly and assembly operations, please contact Yuchai Heavy Industry dealer.**

## Assembly/disassembly steps of accessories

### 1. Disassembly steps

- 1) Put the accessories on the ground and turn off the engine.
- 2) Turn the start switch to the ON position and push the left control box to the free position.
- 3) Operate each working device joystick and accessory control pedal 2 to 3 times forward, backward, left and right full stroke to eliminate the internal pressure in the hydraulic oil circuit.
- 4) After confirming that the oil temperature has decreased, lock the rotary valves connected to the inlet and outlet pipes on the stick side.
- 5) Remove the hose on the accessory side, put the plug on the combined washer and tighten it to the two outlets.
- 6) Remove the accessories by removing the pins (2). Then install the bucket.
- 7) Wrap the unconnected ends of the two rubber tubes of the hydraulic hammer with a clean plastic bag, and dust-proof measures shall be taken. Keep well the accessories.



### 2. Assembly steps

- 1) Remove the bucket.
- 2) Put the accessory on a flat place, and connect the stick and the hydraulic hammer and the connecting rod and the hydraulic hammer with pin A and pin B in turn.
- 3) After confirming that the oil temperature has decreased, remove the plugs from the outlet and inlet respectively. Be careful to prevent dust, dirt, etc. from sticking to the hose port. If the combination gasket is damaged, replace it with a new one.
- 4) Connect the hose on the accessory side. During connecting, check the flow direction of the oil, and be careful not to make a wrong connection.
- 5) Unlock the rotary valves connected to the inlet and outlet pipes on the stick side.
- 6) After installing the accessories, confirm whether the oil level in the hydraulic oil tank is proper .

## Accessories operation guide

This section introduces the precautions that shall be observed for operating hydraulic excavators equipped with accessories.

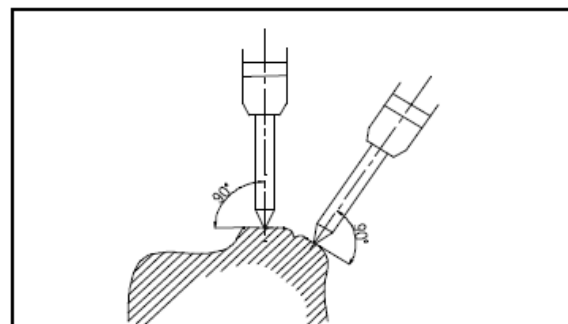
**Note: Select the most suitable accessory for the main engine. The models of machines that can install accessories are different. For the selection of accessories and machine models, please contact your Yuchai dealer.**

## Hydraulic breaker hammer

### 1. Guidelines for the use of hydraulic breaker hammer

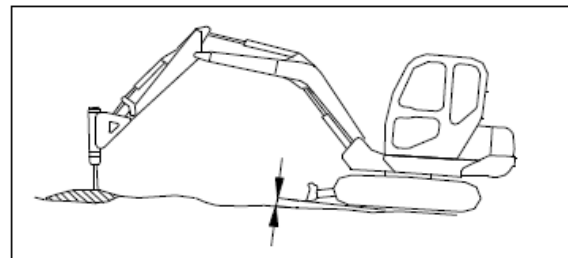
Hydraulic breaker hammer is the most common work accessory. It is widely used in the demolition of buildings, road cracking, tunnel operations, steel slag crushing, stones, and crushing operations in quarries.

1) During crushing operations, please make sure that the direction of the apex of the hammer drill rod is perpendicular to the surface of the broken object, and keep it as long as possible. If it is inclined to the surface of the broken object, the drill rod may slip off the surface, which may damage the drill rod and affect the piston.

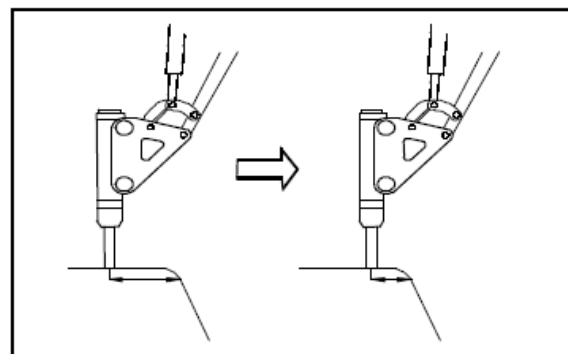


During crushing, please select the appropriate hitting point, and confirm that the drill rod is indeed stable before hitting.

It is required to keep adjusting the bucket cylinder during operation to keep the penetration direction of the drill rod and the direction of the breaker hammer body in a straight line.



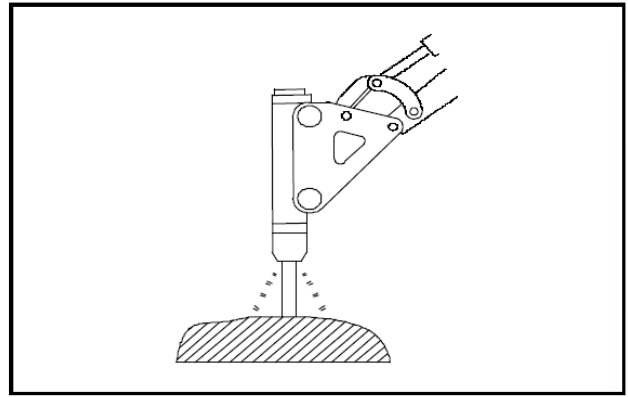
2) During impacting, press the drill rod onto the impact surface to make the chassis is about 5 cm off the ground, and the machine shall not be away from the ground too much.



3) During continuous impacting to the same impact surface, if the drill rod cannot penetrate or break the surface within 1 minute, change the impact position to break it near the edge.

4) Make sure that the drill rod always impact the surface properly to prevent the impact force from being used if there is no resistance.

If the rock or the target has been crushed, stop the action of the breaker hammer immediately. The continuous aimless impacting will cause the front part and the main bolts to loosen and damage, and even damage the excavator itself.



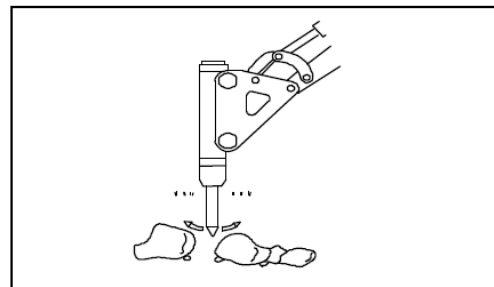
Aimless impacting comes from improper insertion and shaking during use of the breaking hammer.

## 2. Operation taboos for hydraulic breaker hammer

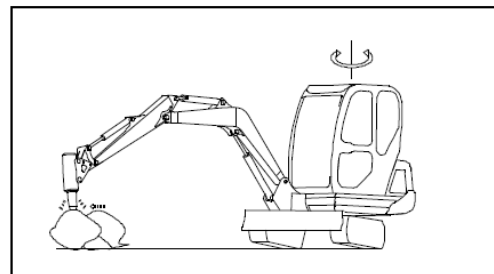
In order to ensure longer service life and safe operation, do not operate the machine in any of the following:

**Note: Do not operate all cylinders to the end of the cylinder stroke, and always leave a margin of about 5 cm.**

1) Push heavy objects or large rocks with the breaking hammer.

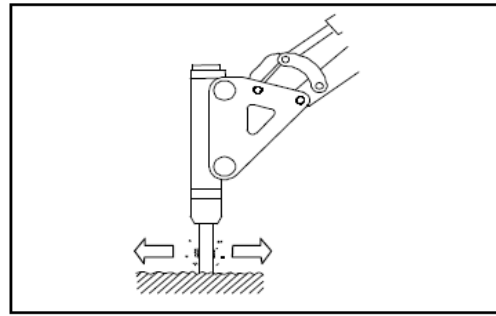


2) Operate with turning force.

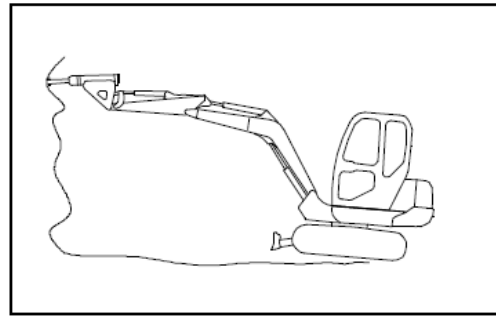




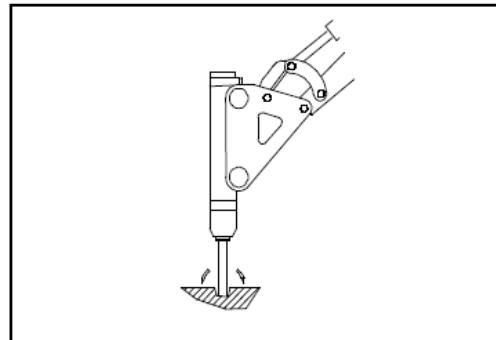
3) The drill rod is moved during impact operation.



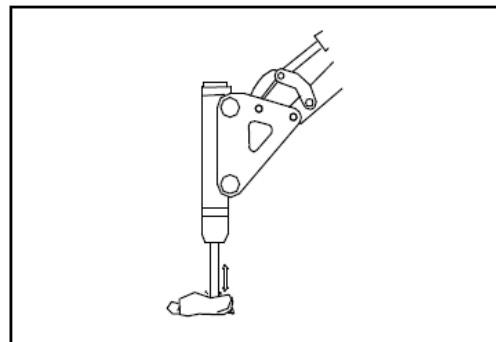
4) Apply impact force horizontally or upward



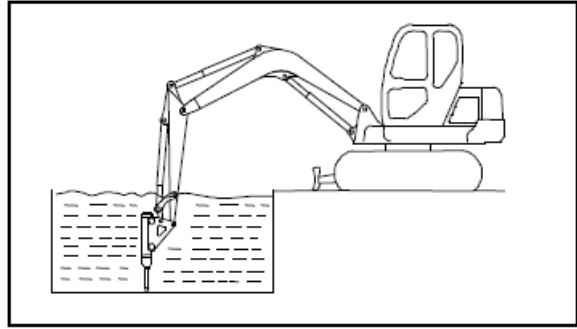
5) Swing the breaker after it has penetrated the rock



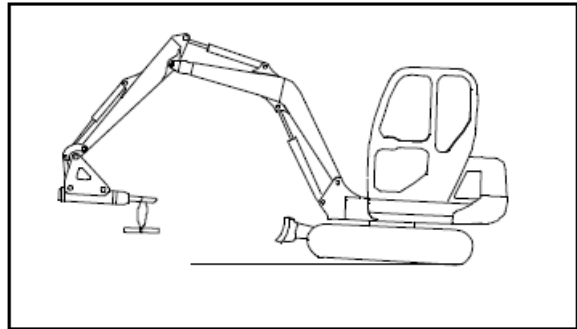
6) Pecking operation



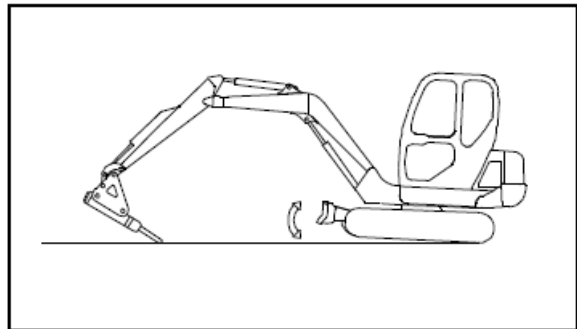
7) Carry out crushing operations in water or muddy ground



8) Use the breaking hammer as a tool for lifting heavy objects.



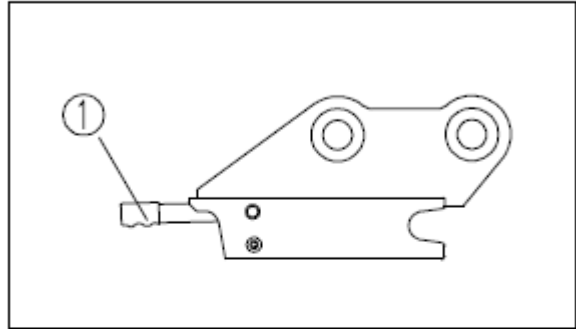
9) The bucket cylinder is fully extended to lift the machine off the ground.



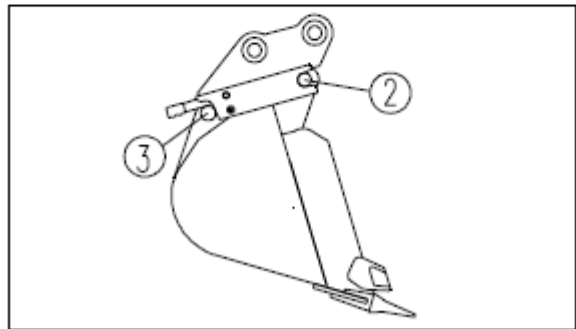
## Quick coupler

### 1. Bucket installation

1) Pry up ① with a crowbar.



2) Put the bucket pin into ②③, put down the crowbar, and the bucket is installed.



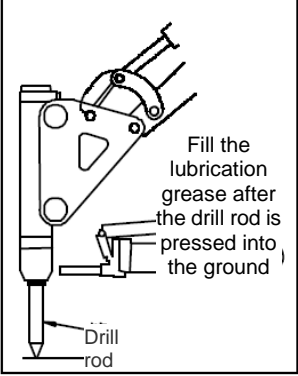
### 2. Unloading the bucket

1) Pry up ① with a crowbar.

2) Unload the bucket.

## Daily inspection of hydraulic breaker hammer

Carry out the daily inspection and maintenance of the hydraulic breaker hammer according to the following table.

Serial number	Inspection or maintenance items	Check points	Maintenance method
1	Check whether the bolts and nuts are loose or missing	Body bolts and side plate bolts	Tighten the bolts or reinstall new bolts
2	Check the hose parts for looseness, hose damage or oil leakage	High pressure tubing of breaker hammer hydraulic pipeline	Re-tighten the loose part and replace the severely damaged part
3	Lubrication 	Lubrication shall be carried out with lubricating oil before operation and after each continuous operation for 2 to 3 hours.  Lubricating oil shall be filled at 5-10 times for each lubrication.	Fill lubricating oil from the lubricating oil filling hole at front of the breaking hammer
4	Check the capacity and pollution of hydraulic oil	Condition of hydraulic oil	The hydraulic oil quality changes due to different working environments. The simple way to judge the quality of the oil is to observe whether the color of the oil changes. If the oil quality deteriorates seriously, please drain the hydraulic oil in the hydraulic oil tank and clean the oil tank before filling new hydraulic oil.

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