



HYDRAULIC EXCAVATOR

YC230-9

OPERATOR'S MANUAL

GUANGXI YUCHAI EQUIPMENT TECHNOLOGY COMPANY LIMITED

Caution

Incorrect operation of the machine will cause accident. Thus please do as follows before operating the machine:

- *Keep in mind the safety procedures and operating specifications of the machine.
 - *Read to understand the safe operating practice on its operator's manual.
 - *Understand and be familiar with all the security signs on the machine
 - *Keep irrelevant personnel out of the workplace
 - *The training of the safety operation of the machine should be made before operating the machine.
- You are responsible for compliance with relevant laws and regulations and to comply with the relevant guidance of Yuchai Equipment Technology Co., Ltd. for operating and maintaining the machine*

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1

Foreword

To the Users

Dear User:

Welcome you use Yuchai Heavy excavators and thank you for your strong cooperation with Yuchai business.

The manual is mainly provided for the use of the drivers and maintenance personnel. Hope you can read the manual carefully before the operation and maintenance of the machine, and be in strict accordance with the manual on safety procedures, use methods, lubrication and regular maintenance requirements. The proper methods, regular maintenance and repair are the necessary guarantees for the machine to work reliably and extend work life, as well as to play a good role in the work.

Please make the overhaul repair and adjust the machine in the repair stations and agencies that are commissioned by our company, and use the genuine accessories and spare parts provided by our company. If non-genuine accessories and parts have been used, then perhaps there is no significant impact on the machine, but they are likely to cause a series of adverse consequences to the machine in the future. If the machine failures are caused by the non-genuine accessories, parts or the organization without the authorization of our Company, even in the warranty period, Yuchai Equipment Technology Co., Ltd. does not assume the warranty service.

Based on the principle of *Customer First*, Yuchai Heavy constantly improves products to provide the best products to the users. Thus, the improvement may be implemented at any time, without replacing the information and prior notice to the product on sale.

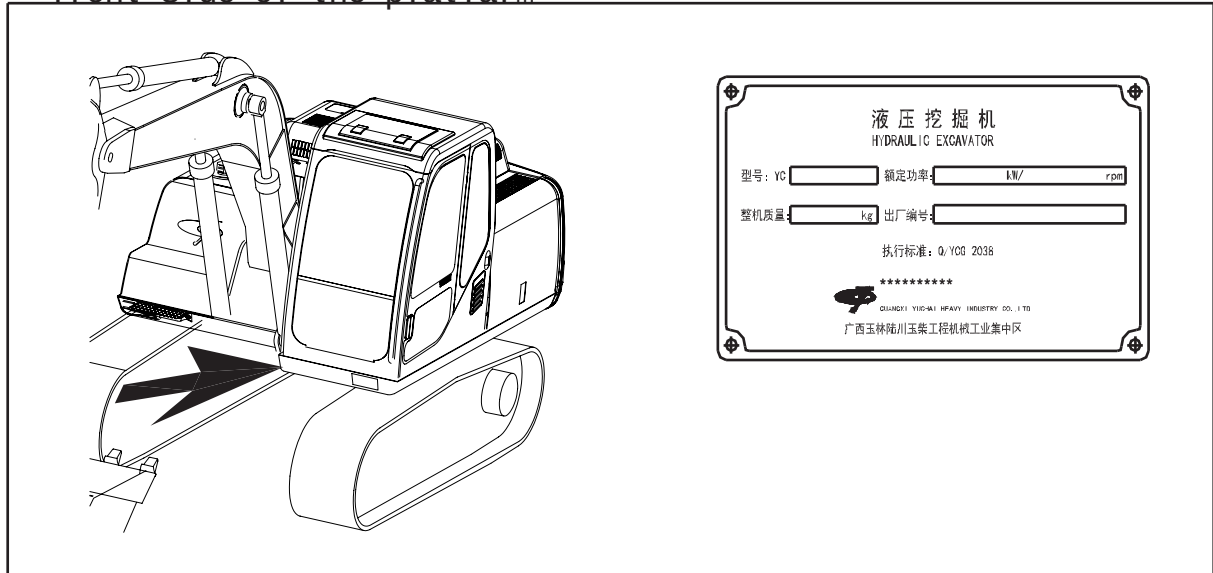
Sincerely hope that this machine can serve you better and create greater value under your proper use and care.

Guang Xi Yuchai Equipment Technology Co., Ltd.

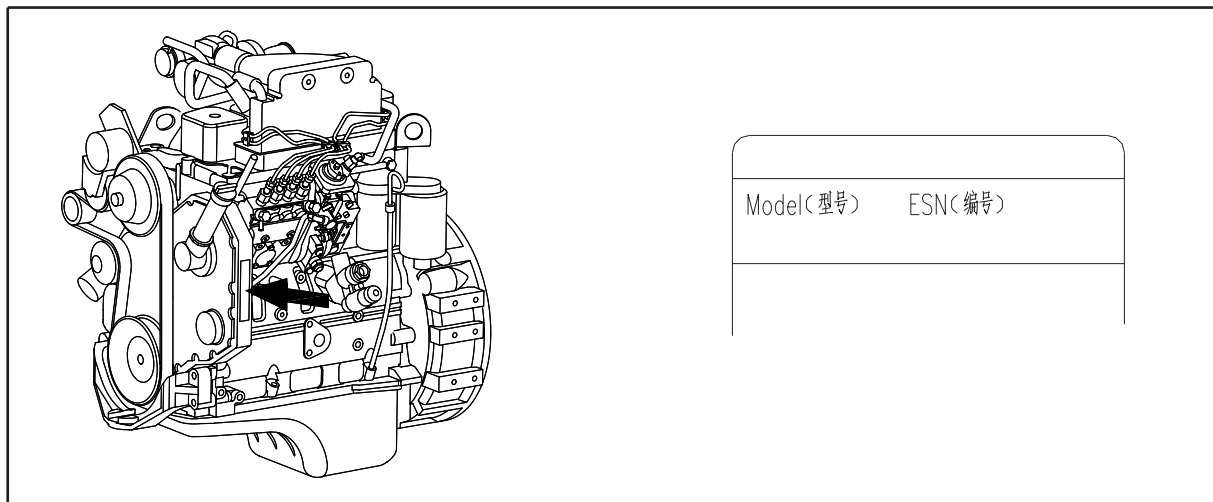
Product Information

The basic information of the machine can be viewed according to the position shown in the diagram

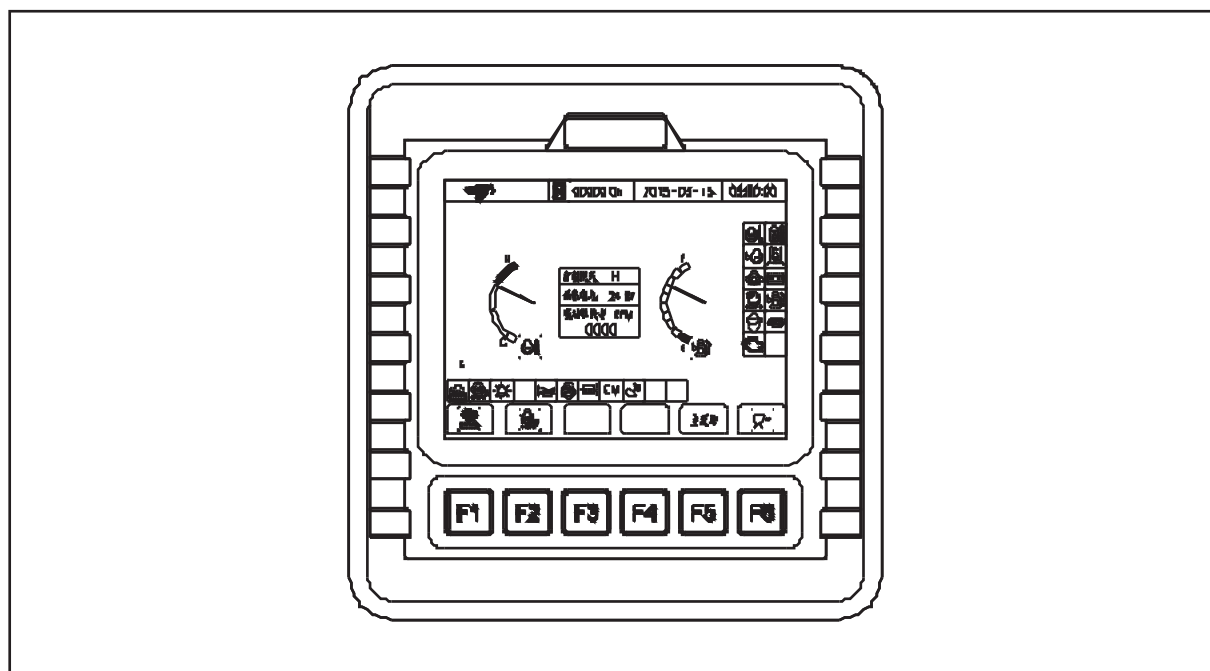
- The machine information*the name plate is fitted on the left front side of the platform*



- Engine information



- Machine operation information*The engine hourmeter is displayed on the Digital combination meter in the cab.*



Machine File

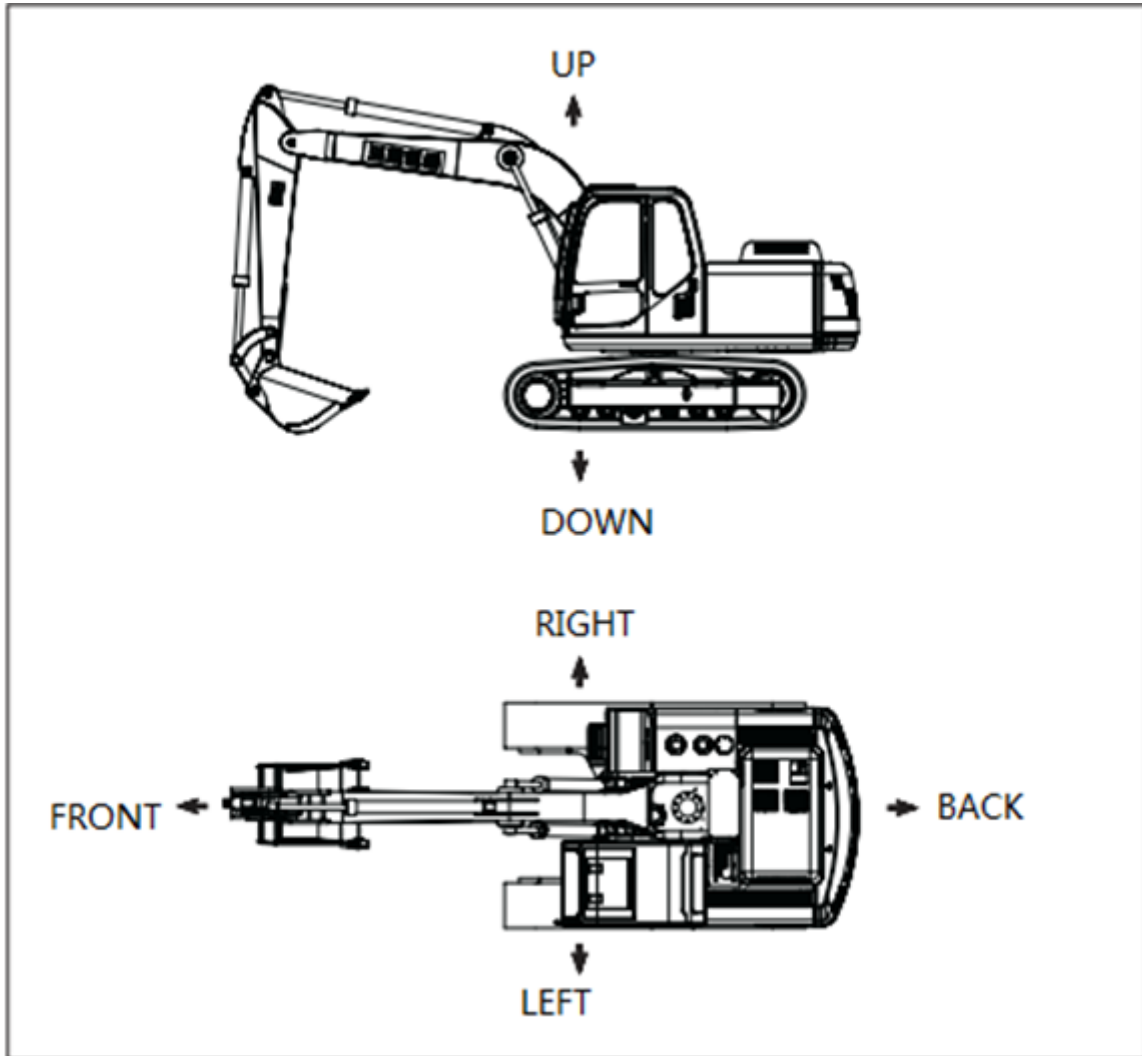
Fill in the machine number and engine number of your machine in the form below. When you need to buy parts or obtain information of this machine from Yuchai please provide this codes.

Please record these Numbers and keep them with the certificate. If your machine was stolen by accident, you can submit the information to the local public security organs.

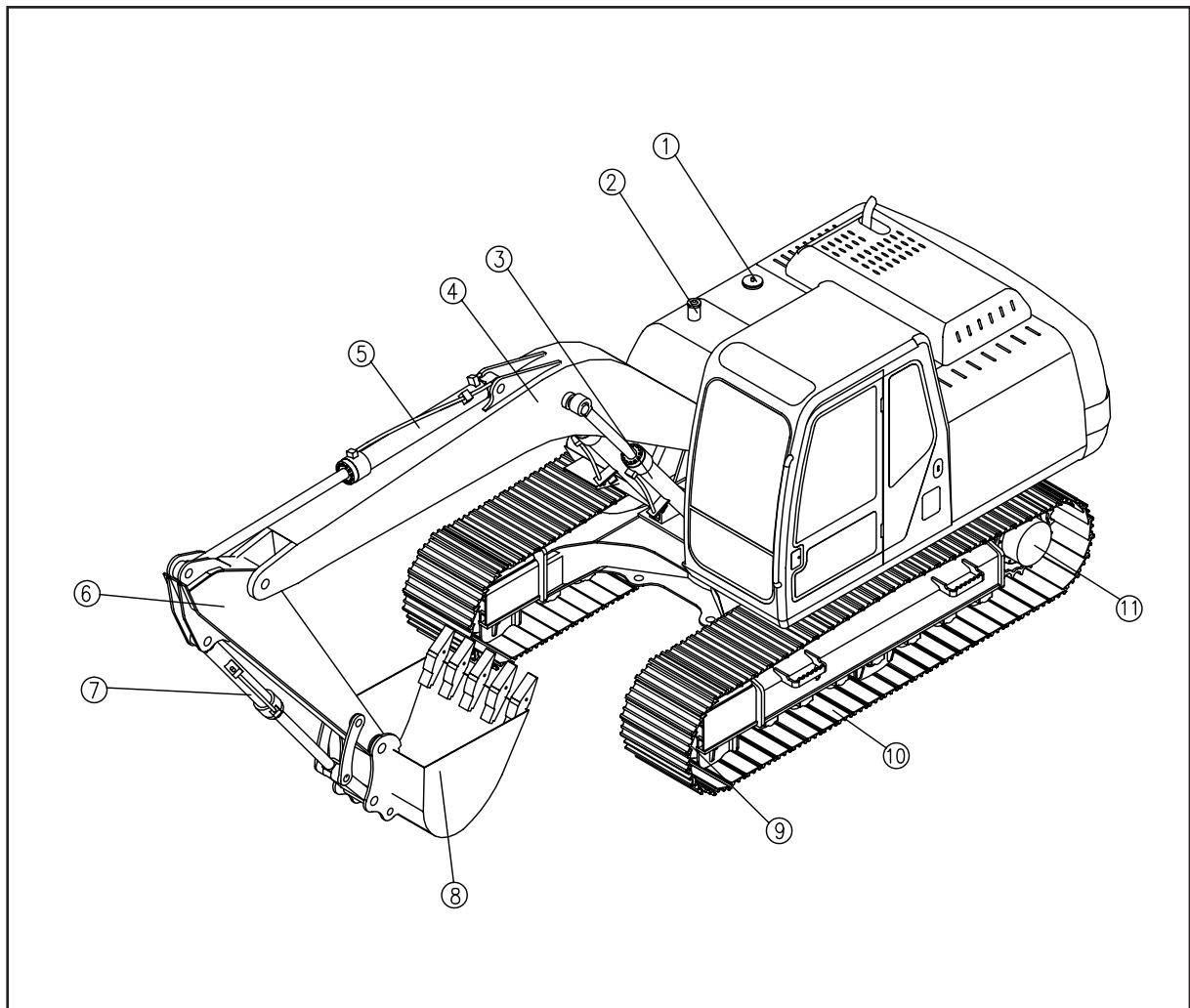
	● Machine Model _____
	● Machine serial number _____
	● Engine serial number _____
	● Information of the dealer _____

Direction of the machine

The directions covered in this manual are as shown below.



Compenentation of the Machine



- 1. Hydraulic tank
- 2. Fuel tank
- 3. Boom cylinder
- 4. Boom
- 5. Arm cylinder
- 6. Arm

- 7. Bucket cylinder
- 8. Bucket
- 9. Guide wheel
- 10. Track
- 11. Driving wheel

Machine Profile

Assignment

This machine is mainly used for the following operations,

- *Digging

- *Ditching

- *Loading

- *Flatting

For the relative operating instructions please refer to the contents of the operating guide and the accessories guide.

Running-in

The machine has been sufficiently inspected and adjusted before delivery. Forcible operation from the start will accelerate the performance degradation and shorten the machine's service life. Therefore, during the running-in process, in the first 100hours(as the time display on the instrument),the load should be controlled at 80% of the full capacity.

Safety related information

Most accidents related to operational operations, inspection maintenance and repair operations are caused by negligence of basic safety precautions and hazard prediction. Such accidents can be prevented by predicting the possibility of dangerous. Therefore, attention must be paid to the location and type of danger. In order to perform such operations correctly, the operator must have the required training, techniques and tools. The operator will absolutely not be permitted to run or maintenance the machine before he read to understand and master all the contents about safety notes, warnings and methods of taking precaution against accident stated in this manual and posted on the machine.

Please pay attention that any negligence of the cautions may result in death or injury.

The safety tips on the manual and safety signs on the machine are indicated by the "Dangerous""Warning""Note" and other words, whose corresponding explanations are as follows:

*  **Dangerous:** If it is not avoided, the consequence of the danger will result in death or serious injury. This word only be applies to the few situations where there is the most dangerous.

*  **Warning:** If it is not avoided, the consequence of the danger will result in death or serious injury.

*  **Note:** If it is not avoided, the consequence of the danger will result in low or moderate injury. This word also be used to indicate unsafe operations that may cause personal injury.

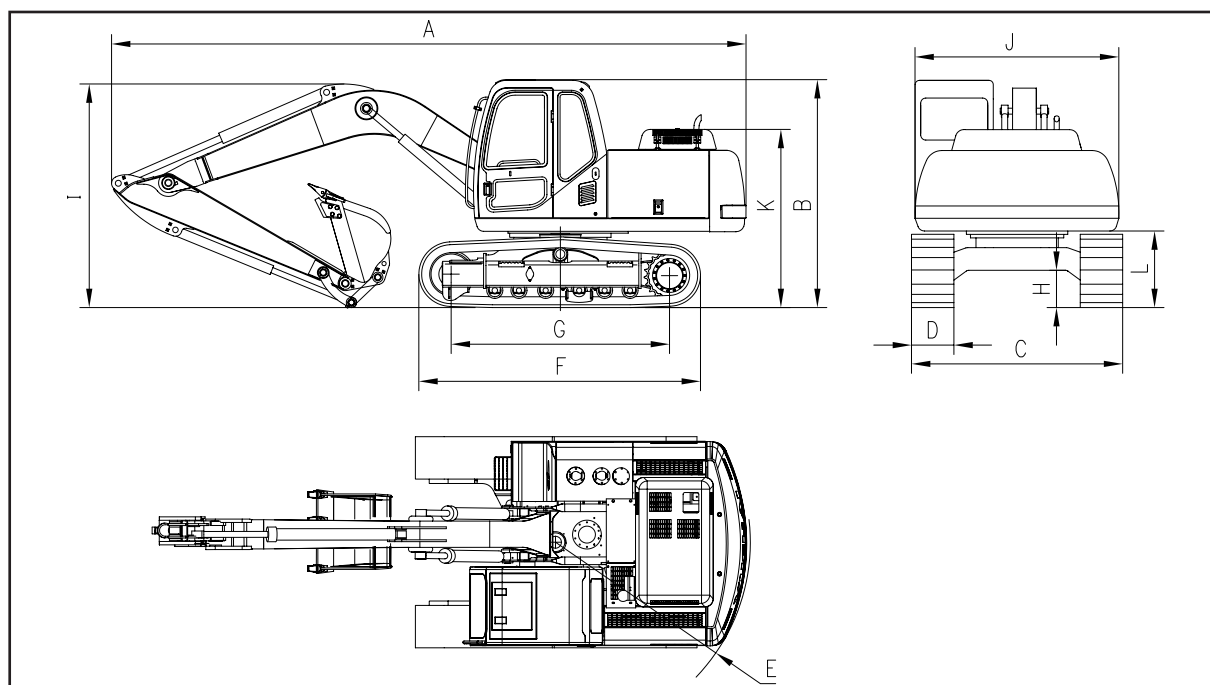
The company cannot predict all hazards of operation, inspection, maintenance and repair in all environments. Therefore, this manual and the warnings on the machine do not cover all cases. In case of carrying out any operation, inspection, maintenance or repair not covered in this manual, the user has to consider necessary safety precautions and take necessary security measures responsibly.

Technical Specifications

1. Structure Size Parameters

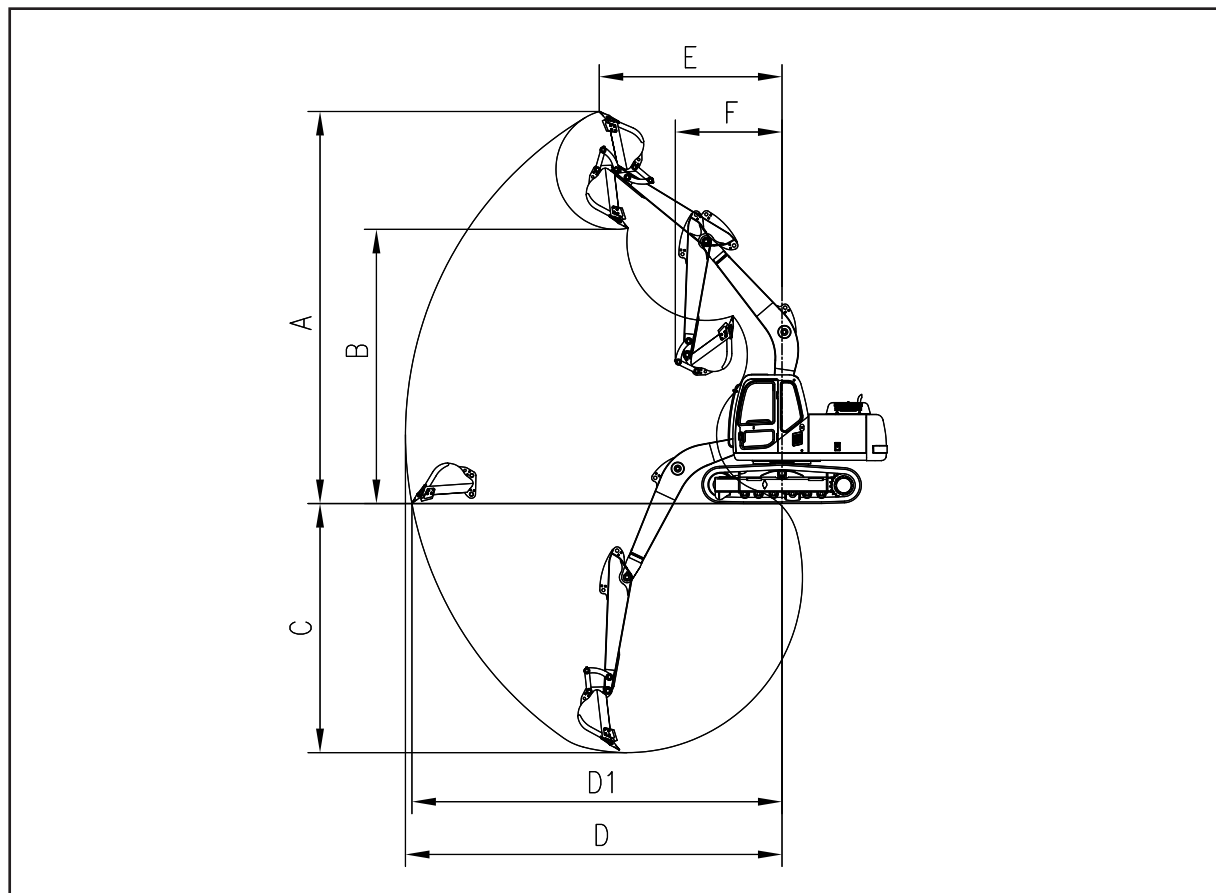
Code	Item	Unit	YC230-9
			E230AF01
	Operating weight	Kg	23100
	Standard bucket capacity	m ³	1.08
	Engine Name		Cummins QSB7
	Engine Power	KW/rpm	124/2050
A	Overall Length	mm	9695
B	Overall Height	mm	3115
C	Overall Width	mm	2990
D	Width of track	mm	600
E	Platform tail turing radius	mm	2945
F	Length of track	mm	4450
G	Trake gauge	mm	3655
H	Height between undercarriage and ground	mm	470
I	Height between top of the arm and ground	mm	3115
J	Outer width of the platform	mm	2700
K	Outer width of the engine hood	mm	2440
L	Height between undercarriage and ground	mm	1070
	Outer width of the bucket	mm	1340
	Traveling speed	Km/h	5.2
	Slewing speed of platform	rpm	13-15

Note: Specifications are subject to change without prior notice.



2.Operating parameters

Code	Item	Unit	YC230-9
			E230AF01
A	Maximum digging height	mm	9725
B	Maximum dumping height	mm	6815
C	Maximum digging depth	mm	6625
D	Maximum digging radius	mm	9890
D1	Maximum digging radius on ground level	mm	9725
E	Digging radius on maximum digging height	mm	5775
F	Minimum slewing radius	mm	3410
	Maximum digging force of bucket	KN	139.3
	Maximum digging force of arm	KN	102



Note: Specifications are subject to change without prior notice.

3.Bucket

Bucket types	Back-hoe bucket						Rock bucket	
Bucket Capacity (m3)				1.08	1.2		0.95	1.1
Bucket Width (mm)				1340	1280		1210	1300
Weight(kg)				825	898		1015	1096
Bucket teeth				5	5		5	5

4.Bucket work environment

Bucket types			Back-hoe bucket					
Bucket Capacity (m3)				0.95	1.1	1.08	1.2	
Standard boom (5680mm)	Standard stick (2900mm)	Normal assembly		D	D	C	C	
		Quick hitch device		X	X	X	X	
		Normal assembly						
		Quick hitch device						

Code	A	B	C	D	E	X
Bulk density range of the work object.	*1200kg/m3	200kg/m3 ~1600kg/m3	1600kg/m3 ~1800kg/m3	1600kg/m3 ~1800kg/m3	1900kg/m3 ~2000kg/m3	Unav ailable
Soil level	Sand, silt soil, mud and planting soil	Light clay, small stone, mud and planting soil with roots	Mail clay, heavy sandy soil and dry loess	Heavy sandy soil, hard loess and stony clay	Compacted hard loess, light marl and unconsolidated shale	

5. Hydraulic hammer

Type	Tower-type	
Length(mm)	2823	
Striking frequency(bpm)	350~700	
Weight(kg)	1754	

Standard boom (5680mm)	Accessory Type		Tower-type	
	Standard stick (2900mm)	Normal assembly	★	
		Quick hitch	★	
		Normal assembly		
		Quick hitch		

Note:★ mainly used for breaking the higher grade pavement, such as highways, municipal pavement, demolishing the low buildings, breaking weathered rock and re-crushing of the low stiffness small ore.

X Unavailable.

6. Travelling mechanism

By the hydraulic motor via the multi-stage planetary reducer to achieve independent drive.

	Traveling speed(km/h)	Gradeability
High speed	5.2	70%(35*)
Low speed	3.4	

7. Hydraulic system

Negative flow control hydraulic system

Main valve: Imported multiplex valve

Maximum system flow: 215X2L/min

Pressure (MPa): 31.4

Return oil filter: 10*filter element

Hydraulic oil suction filter: Metal filter element

8. Electrical system

Voltage: 24V

Battery: 120AH X 2

9. Working environment

Temperature: -15*40*

Humidity: <85*

Altitude: *2500m

Temperature for transportation and storage:-15*40*

10. Interference of the machine

The working device of each series of the hydraulic excavators may interfere with the boom cylinder or the lower cover plate of the boom when the machine was installed with non-standard working devices. So, to prevent interference with the boom cylinder or damage to the machine, attention should be paid to the angle of the recovering arm and boom, if the machine is mounted with non-standard working device.

The following are all the non-standard accessory working devices provided by our company.

Bucket	Bucket accessories mounted directly on the bucket pole(arm)
	Bucket accessories mounted on the arm via quick-change coupler
	Bucket accessories with quick hitch
Breaking hammer	Breaking hammer mounted directly on the bucket pole
	Breaking hammer with quick hitch
Drilling tool	Drilling tool mounted directly on the bucket pole
	Drilling tool with quick hitch
Grab	Grab mounted directly on the bucket pole

You need to pay attention to the problems mentioned above, if the machine you bought mounted with any of the above accessories.

2

Safety Regulations

General Safety

Follow the relevant safety regulations in this manual, most of the accidents caused by the dangerous operation or maintenance of the machine could be avoided. Before you operate or maintain your machine, please read to understand all the safety information stated in this manual and safety signs on the machine.

The content relating to safety of this manual specifies the possible situations in the normal operation and maintenance of the machine, as well as the possible ways to deal with these situations.

The contents relating to safety, found in each chapter of this manual, and the contents of this chapter constitute the comprehensive guidance of safety in this manual.

The safety information in this manual and on the machine does not include all potential hazards and possible countermeasures. If there is no recommended or permitted method or action on this manual and the machine, it is your responsibility to take necessary measures to ensure safety.

You cannot engage in any prohibited uses or operation listed in this manual in any cases.

The excavator should be operated and maintained by the person who has been trained and qualified.

Before starting to work you should check the various functions of the machine. If the machine is not working properly, you should immediately stop the machine and find the reason. The machine can start to work only after troubleshooting.

The inspection and maintenance shall be carried out in strict accordance with the provisions of this manual* And the operator shall work and operate the machine in accordance with the operation methods, safety regulations and the working scope of the machine as stipulated in this manual.

If you are under the influence of alcohol or drugs, please do not operate or maintain the machine, or it would put you and others in danger.

The operator must know the meaning of the related signals and gestures.

When walking on the road, the operator must be familiar with the relevant laws and regulations of the country or region you are in and strictly abide by them.

Before operating the machine, please make sure there is no one else in the working area.

This machine is only used for normal excavation on the ground. Please do not use it for underwater, culvert, explosion-prone site or toxic environment.

Safety Tips

1.Warning signs



In this manual, this warning sign refers to important information about safety. When you see this sign, you should carefully read the information and advice of the signs to avoid possible injury or death.

2.Safety warnings

This manual provides the safety precautions, identifications and description of potential hazards. Before operating, maintaining, and repairing the machine, the operator should carefully read the safety warnings in this manual and on the machine, and do the work in accordance with relevant procedures.

Safety warnings of the machine are indicated by the "Dangerous", "Warning" "Note" and other words, whose corresponding explanations are as follows:

-  **Dangerous***If it is not avoided, the consequence of the danger will result in death or serious injury. This word applies to only a few occasions of the most serious risk.
-  **Warning***If it is not avoided, the consequence of the potential danger could result in death or serious injury.
-  **Note***If it is not avoided, the consequence of the potential danger may lead to low or moderate injury. This word can also be used to prompt the unsafe operation which may lead to the personal injury.

Safety Equipment

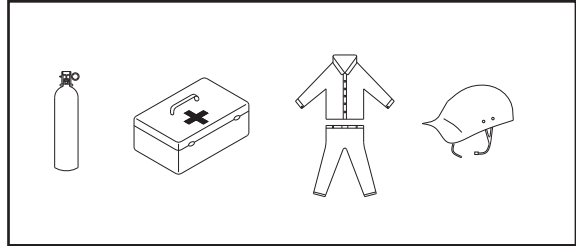
1. Protective equipments for operators

1) Before the operation and maintenance, the operators must wear tight-fitting suitable overalls, helmets, shoes and other related safety products (such as: ear protection, gloves, protective glasses, belts, etc).

2) If the operator's hair is too long, please band it, and cover up it with the helmet, which will protect your hair from being entangled in the machine.

3) In case of urgent need, the user must prepare the emergency medicine in the machine, and conduct regular inspections, add drugs for the use when needed.

4) Before the operation and maintenance, you must check and make sure all the protective equipment functions are normal.



2. Cab safety, Fire extinguisher, Escape hammer

The outer frame of the cab is a safety protection structure. If any of the outer frame structures appears plastic deformation or fracture, you shall contact the authorized service point for maintenance or replacement to ensure the safety protection capability.

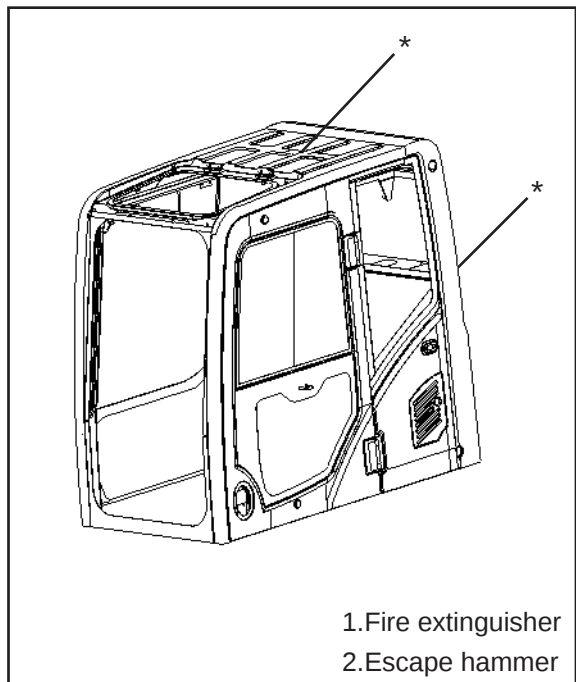
Please equip with escape hammer, fire extinguisher, etc., for use in case of accident or fire. Please fully grasp the use of escape hammer and fire extinguisher.

When trapped in the cab, use the escape hammer to smash the glass to get out. Please pay attention to your eyes and face protection when striking glass.

When the machine is on fire, use the fire extinguisher to put out the fire.

Please read the instructions on the fire extinguisher carefully and follow them strictly.

Please check and maintain the fire extinguisher regularly.



Safety Signs



Warning: It may cause death if the safety signs could not be well understood or missing. Please replace the lost or damaged signs immediately, and keep all safety identification surfaces clean and legible.

Before the Operation and maintenance and repair of the machine, you must read the manual and the warning signs on the machine carefully to have a full understanding of its contents, and operate in accordance with relevant procedures.

Before starting the machine, you should check the warning signs. If they are not clear enough, please clean them.

Please use cotton cloth, water and detergent to clean the signs. Do not use organic solvents and gasoline, which would make the signs fall off easily.

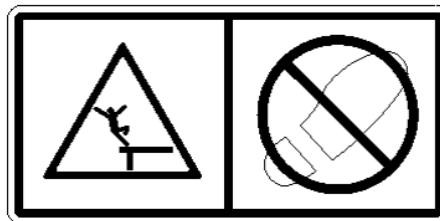
Replace the label if it is damaged, lost or illegible. If the sign is on the part that needs to be replaced, make sure that the new part is properly marked.

1. Classification of the safety signs

There are two kinds of safety signs in this manual, Graphical safety signs and Image-text safety signs.

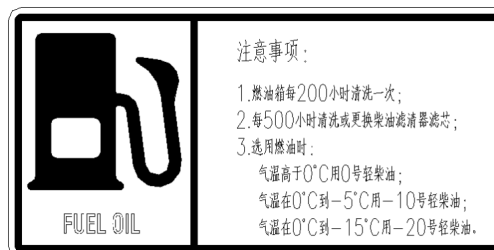
A. Graphical safety signs

This kind of safety signs use graphics to represent, which are easy to understand.



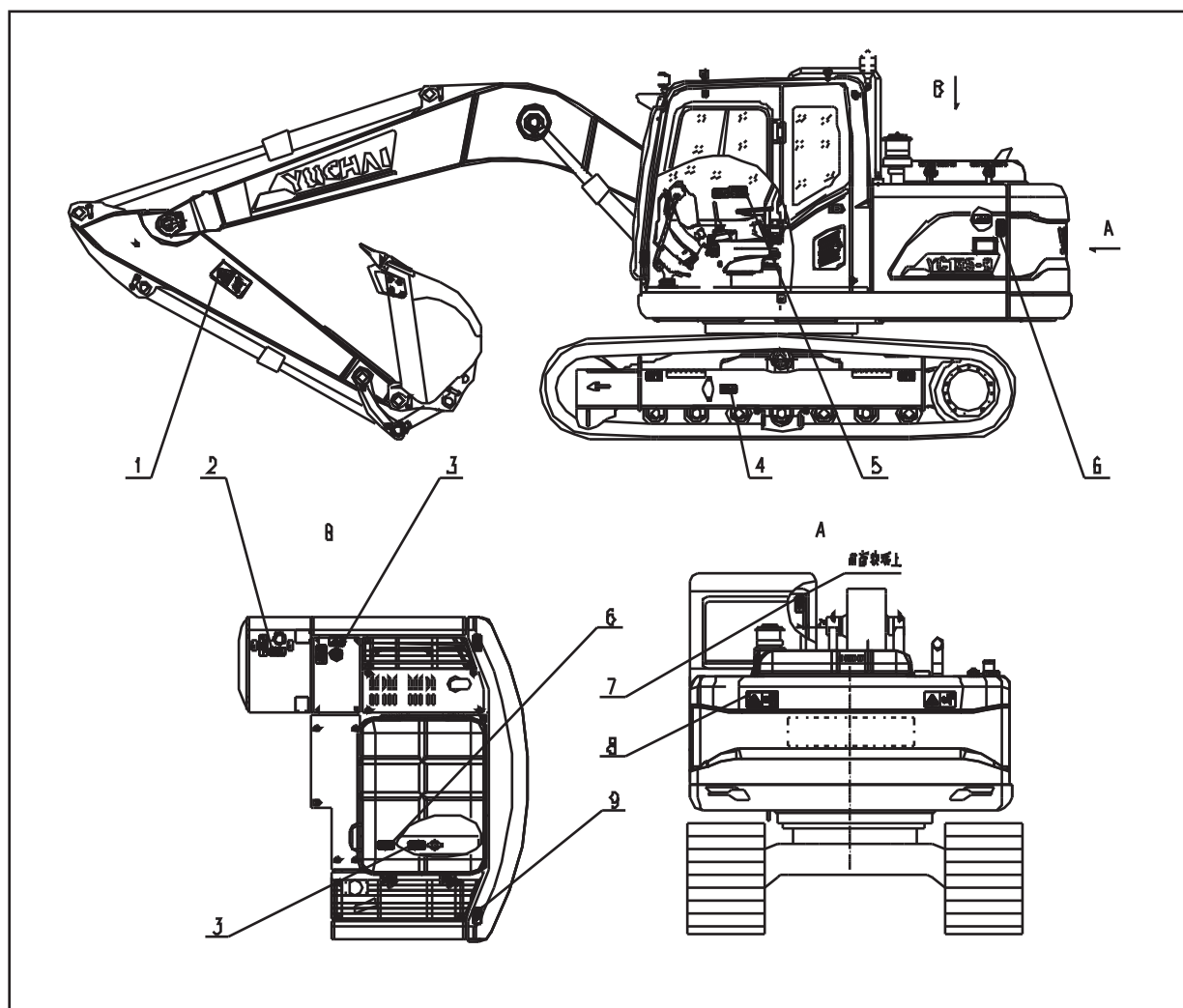
B. Image-text safety signs

This kind of safety signs use pictures and related caption, which fully express security information.



2. Location of the safety signs

The identity shown below is only the "security identity" section of all the identities. The rest of the functional identity is described in the following sections.



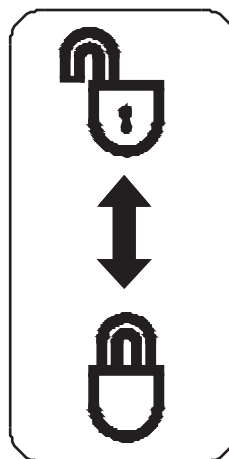
3.Safety signs and their descriptions

1) Be attention & away from the working devices



The moving working device can bring injury. Keep a safe distance from the working device.

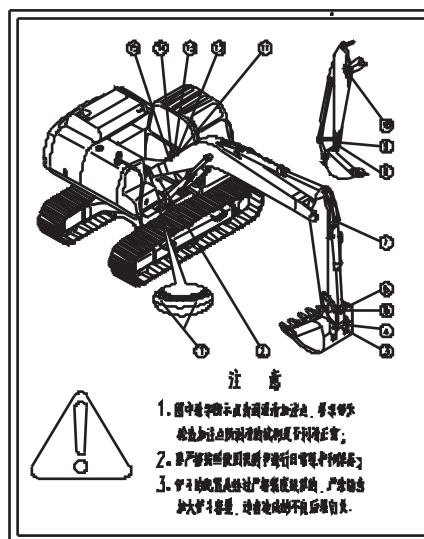
4) Locking & unlocking signs



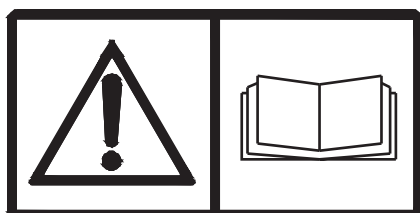
2)Be Careful when getting on and off the machine 5)Lubricating oil filling sign



Move slowly. Grab the handrails on both sides, face the machine, and use the footsteps and track shoes on the machine

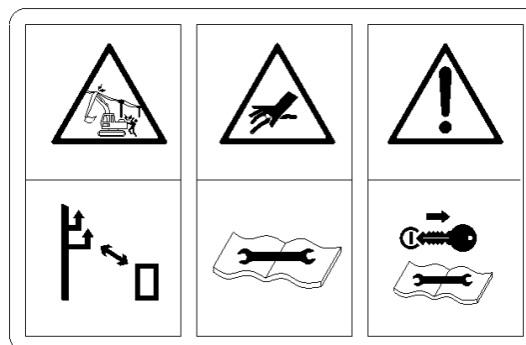


3)Read the instructions carefully

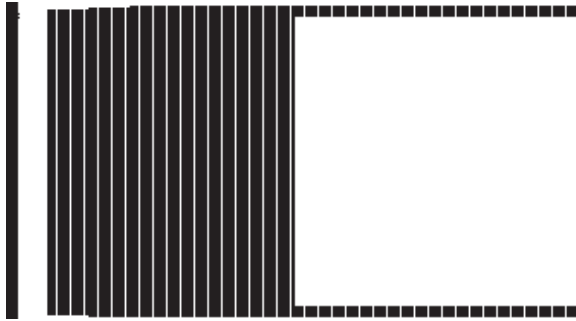


Be sure to read the operation manual before operating, maintaining, decomposing, assembling, transporting, etc.

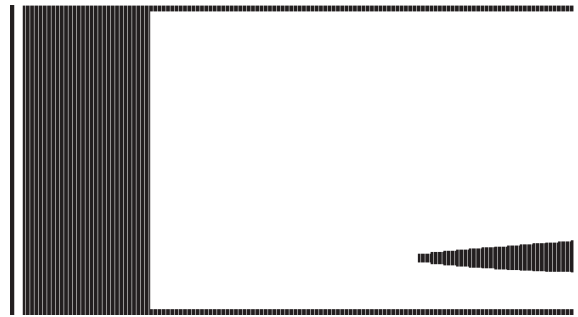
6)Safety information for operation and maintenance



7) Pay attention to the danger of high pressure oil when adjusting crawler tension.

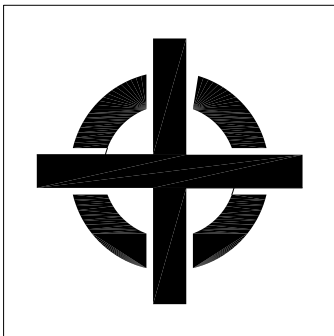


10) Stay away from excavators

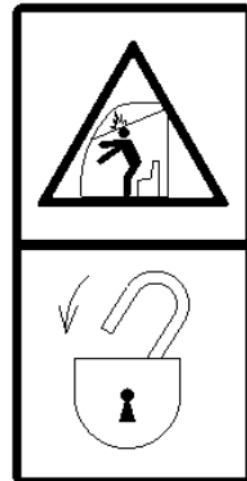


Do not enter the rotation range. When the machine is rotating, the upper rotating body may clamp the body.

8) Sign of slewing center

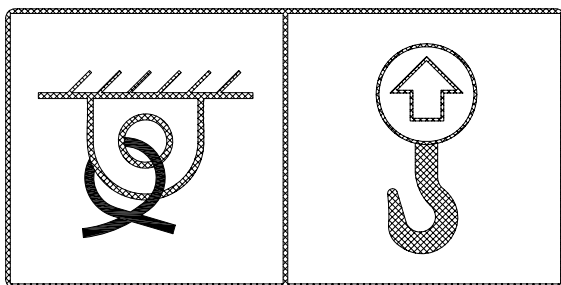


11) Please lock the cab flip window tightly after opening it.

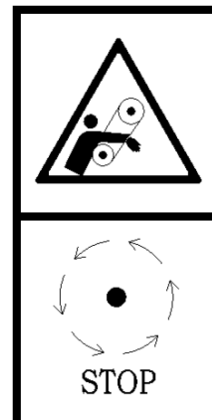


The unlocked window will be closed suddenly by some force or vibration of the machine, which may cause personal injury.

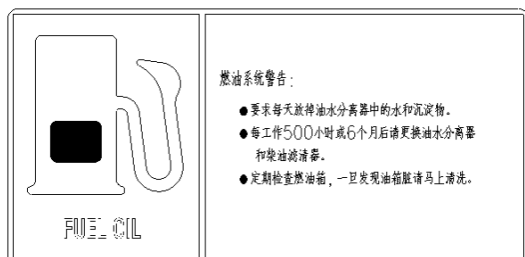
9) Signs of Cable crane combination



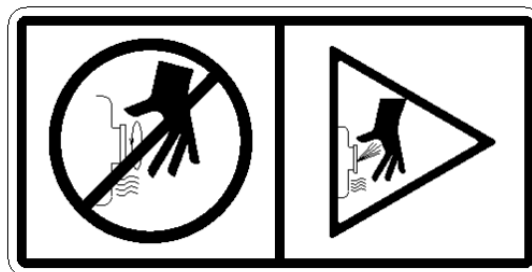
12) Shut down the engine while repairing or adjusting the machine.



13)Fuel filling sign

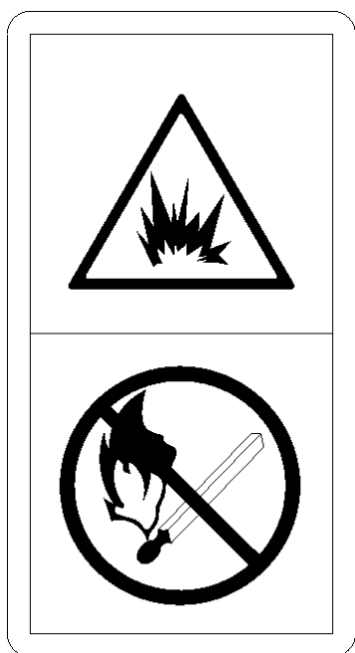


16)Do not open the container lid of hydraulic oil or engine coolant at high temperature.

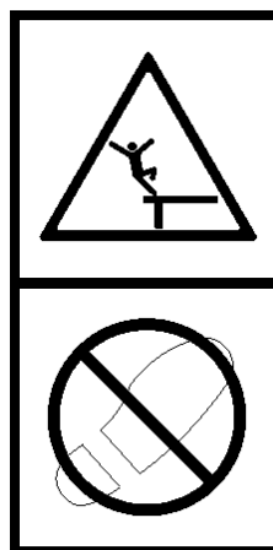


High-temperature hydraulic oil and coolant are with high pressure, if the container lid were opened, the hot oil will spray out and bring personal injury. Only remove the lid while it cools.

14)Fire signs

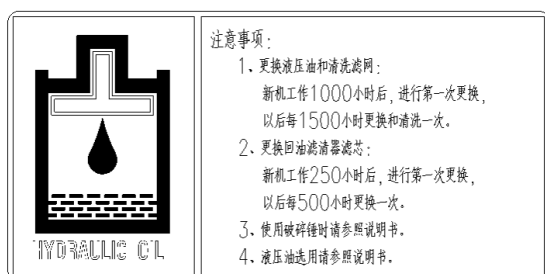


17)No trampling and easy

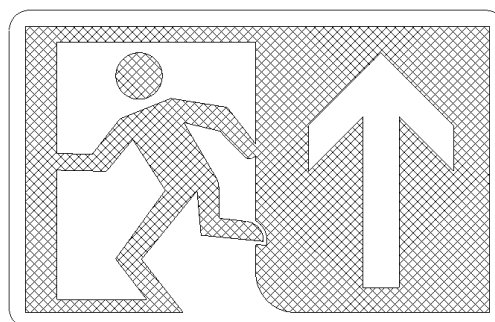


No trampling, no stopping in this area. Danger of falling.

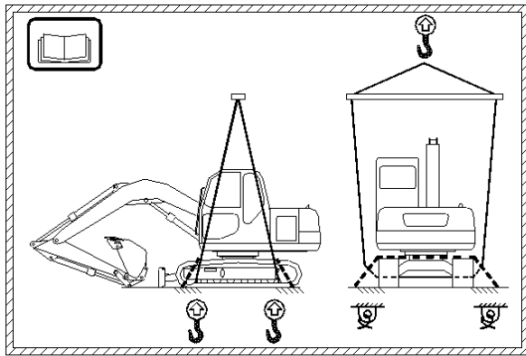
15)Hydraulic refueling sign



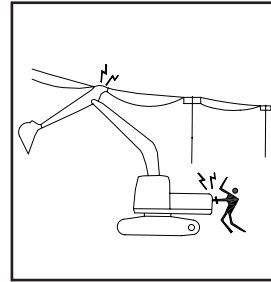
18)Signs of escape directions



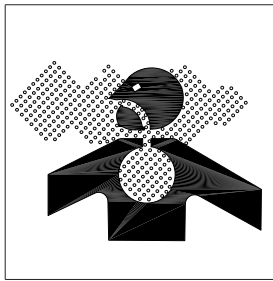
19*Lifting sign



22*Watch out for high wire



20*Beware of poisonous gases

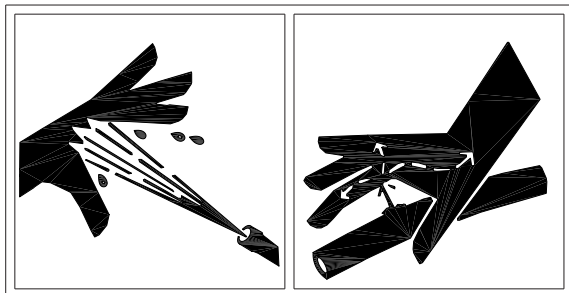


Toxic gases or toxic fumes can cause people to choke.

23*Fire extinguisher

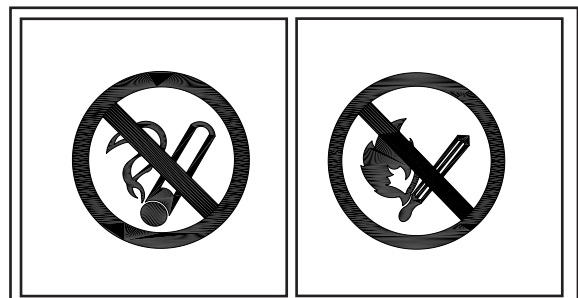


21*High pressure fluid (injection, leakage/injection) hazard

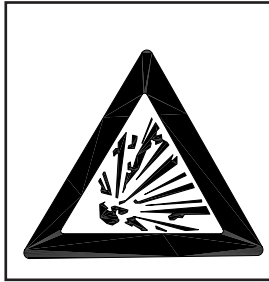


Do not use hand or other parts of the body feel high pressure fluid leak, don't be trapped by high-pressure fluid injection, otherwise it will cause the body to hurt.

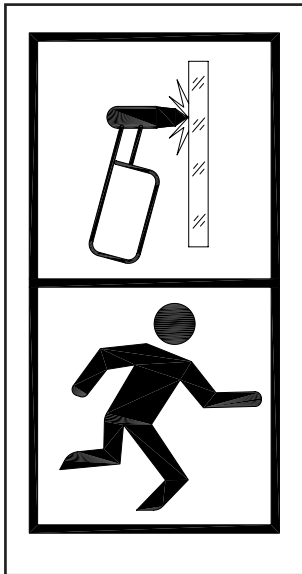
24)No smoking, no fireworks



25*Explosion warning

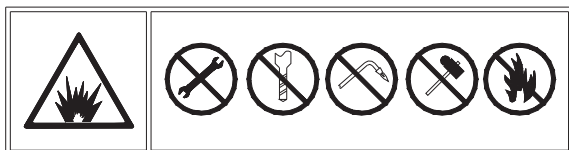


26)Notes for the use of emergency escape hammer



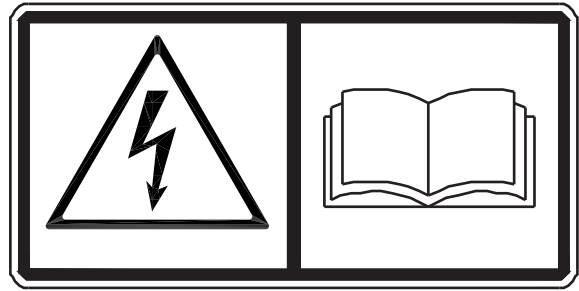
Read it carefully and memorize it in case of

27)Do not split, drill, cut or hit the accumulators or gas-spring high voltage devices. Stay away from open fires or high temperatures.



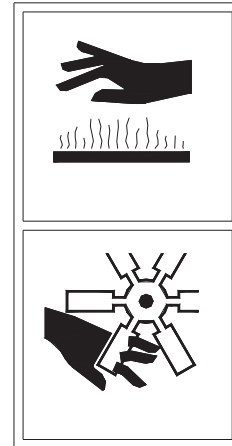
These components contain high pressure gases that can cause injury if not handled correctly. Please let someone with experience handle it.

28)When doing the electric maintenace please read the manual and related information



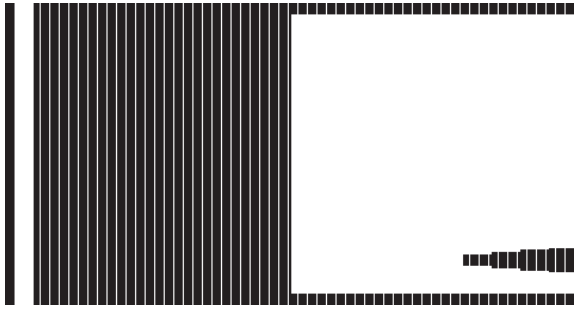
Electrical system is prone to electric shock and other hazards, maintenance must follow the instruction manual and other relevant guidance.

29)Be cautious in the personal injury by the engine, water tank, muffler and other high temperature components and engine fan.

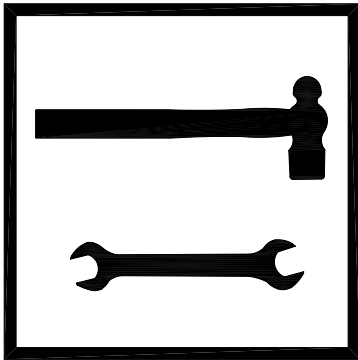


Don't touch directly. Turn off the machine wait for the temperature to drop to a suitable temperature whenbeforevicings these parts.

30) Flip window warning sign



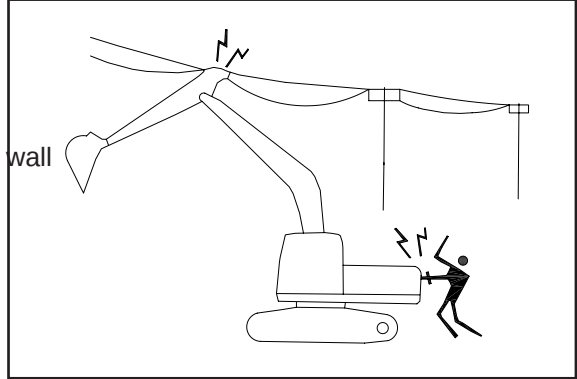
31) Toolbox sign



workplace safety

To have a prior knowledge of your work area, you should inspect:

1. Position of the slope
2. Ditches
3. Falling or hanging objects
4. Soil conditions (soft and hard)
5. Water and marsh areas
6. Rocks and stumps
7. Boundaries of the buried foundations, pillar and the wall
8. Boundaries of the buried waste and filling soil
9. Holes, obstructions, mud or icy
10. Traffic
11. Thick dust, smoke and fog
12. Exact location of the buried or suspended lines of electricity, gas, telephone, water, sewage and other utility lines. If necessary, please inform the Utility companies to mark, shut down or relocate these facilities before starting work.



Warning: please contact your local utility service systems and departments before the excavation project starts.

12. When working inside the building, you should know clearly the clearance of the head, porch, aisle and so on, as well as the load-bearing capacity of the ramps and floor. Ensure adequate ventilation when operating indoors. The things you do not know may hurt you.

13. Know the precise distance between the cable, telephone and the machine, the machine and the ground. If possible, it's better to cut off the power. If you cannot do this, please request the signalman to direct.



Warning: Touching or approaching the power or the machine connected with the power can cause electric shock. Do not let any part of the machine close to the power cord in the air, unless the necessary safety precautions have been taken. Please be especially careful.

14. A legal minimum distance must be maintained from underground gas, cable, telephone and water mains.



Warning: If you look inside through the damaged cable, the cut fiber can seriously hurt your eyes.

15. Do not operate this machine in the culvert or under the ground.

16. Do not operate this machine where there are hazardous chemical substances.

17. Do not operate this machine in the explosive place.

Safe Operation



Warning* Excavators are strictly prohibited to carry or lift personnel.
Excavators are strictly prohibited to lift materials.

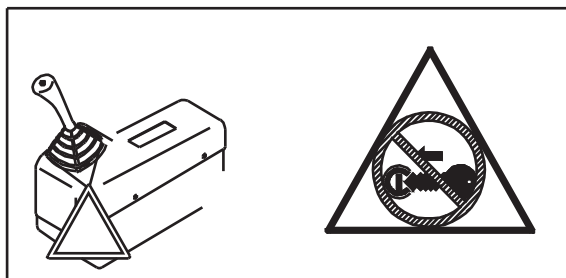


Warning: Before operating the machine, you must fasten your seat belt, honk your horn and make sure no one is around the work area.

1.Start the engine

A.Safety Rules of Starting the engine

- 1) The horn must sound a warning before starting the engine.
- 2) Except for the operator, no other passengers allowed.
- 3) Operate the machine from the seat only.
- 4) Short-circuit starting motor is not allowed.
- 5) Warm up the machine under the cold weather



Warning: 1.The engine is not allowed to start when there is a No engine starting warning plate on the control handle.

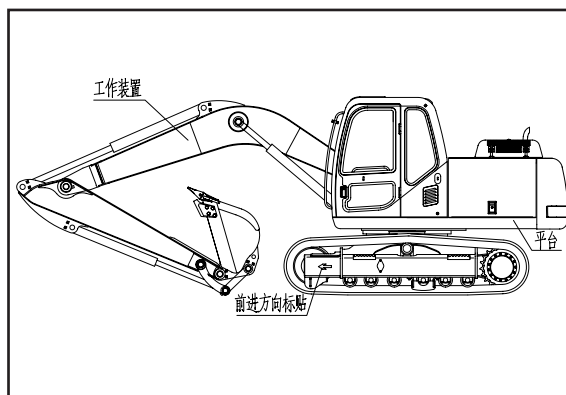
B.After starting the engine

After starting the engine, the following items must be checked:

- 1) If the seat belt is fastened.
- 2) If the moving parts such as work equipment, walking, rotating and working deflection devices can work properly.
- 3) If there is something wrong with the sound, vibration, smell and instrument of the machine.
- 4) If the oil and fuel leaks.

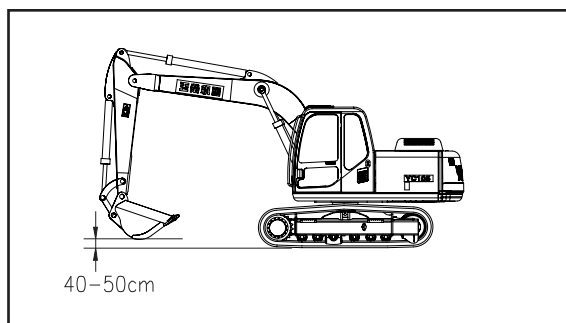
2.Working and Slewing

- 1) The excavator must walk and work on the ground at least 1.5 times wider than itself.
- 2) Before walking and slewing, you should honk to warn the people in the work area.
- 3) Before walking operation, please turn the upper part of machine platform to the right position, if the working device is in line with the forward direction stickers push the walking rod so that the machine can go forward; if the working device is at the opposite direction of the march sign, then operate reversely.
- 4) Before walking, please close and lock the door of the cab. The cab windows, overturn windows and sunroof are allowed to open, but must be locked.
- 5) If there is an area behind the machine that cannot be seen, a signal commander must be arranged before the machine retreating or slewing.

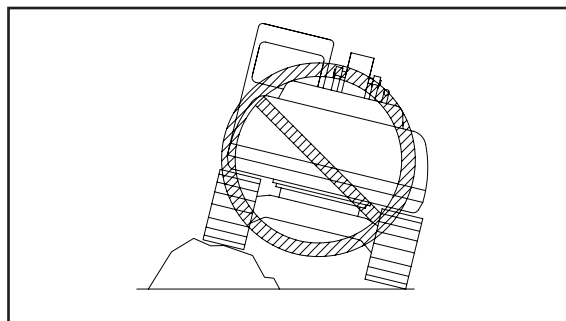


● Safety rules for walking

- 1) When walking on a flat surface, the boom must be lowered and the arm must be retracted to maintain the best position of the center of gravity, the distance from the bottom of the bucket to the ground must be 40cm to 50cm.



- 2) When walking on the rough and uneven road, you should walk at a low speed and not turn suddenly; otherwise the machine may overturn and cause personal injury.



- 3) The machine cannot walk on any obstacle leaning to one side, which may cause the machine to tip over.

- 4) When the machine is walking or in operation, it must keep a safe distance with people, buildings and other machines to prevent touching them.
- 5) When walking through limited heights such as underground passages, under Bridges, or under power lines, make sure that there is gesture command. And be careful to keep a safe distance from them.
- 6) When going up and down the slope, Be sure the platform is locked.
- 7) Before passing over bridge, building or support, make sure they are sufficient to support the weight of the machine.
- 8) Before driving on the road, consult the local traffic management department and get their permission.

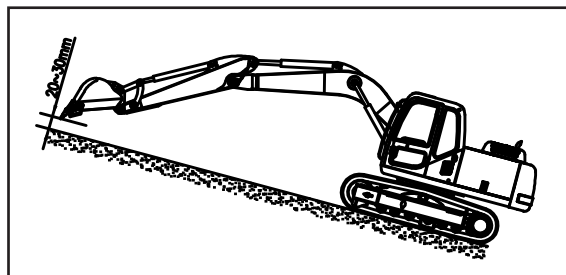
3.Walking or working on slopes

It is very dangerous driving the excavators to walk or work

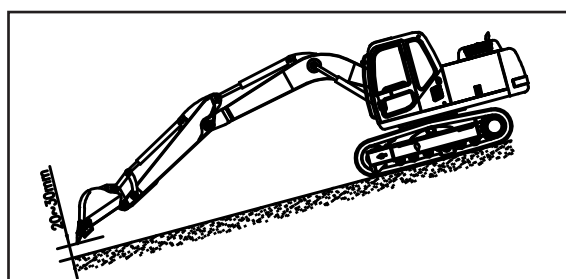
1) It is recommended not to go uphill or downhill on the longer slopes greater more than 20 degree.

2) Fasten your safety belt when the machine is working, especially when it is going up or down the slopes or in dangerous areas.

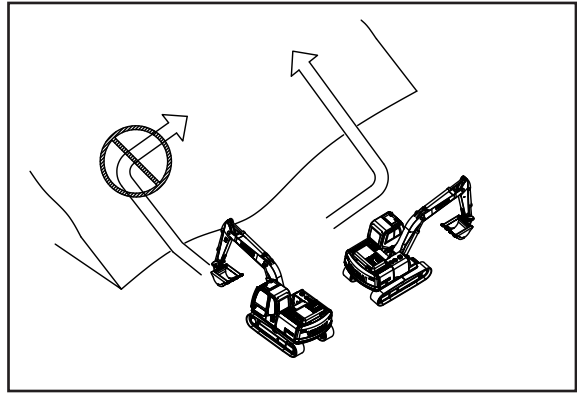
3) When the excavator is going uphill, the driving wheel should be in the downhill direction, the boom and arm should be extended parallel to the slope, and the bucket teeth should be 20-30cm from the ground. Lock the platform and go uphill at a low speed.



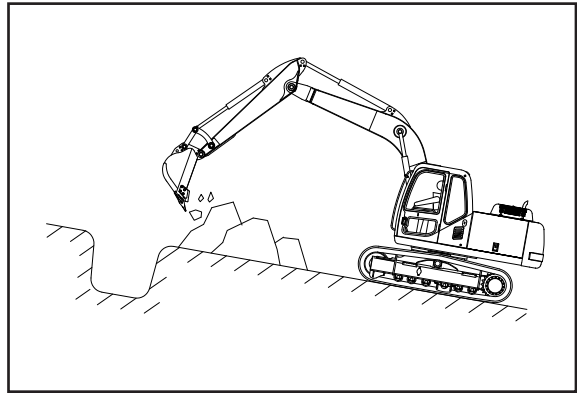
4) When the excavator is going downhill, the driving wheel should be in the downhill direction, the boom and arm should be extended parallel to the slope, and the bucket teeth should be 20-30cm from the ground. Lock the platform and go downhill at a low speed.



5) Do not turn or cross the slope. Be sure to go down to a flat place to change the position of the machine and then go up on the slope again.



6) When working on the slope, it must start in the higher place, and gradually dig in the downhill direction, and the dumping position is in the uphill direction.



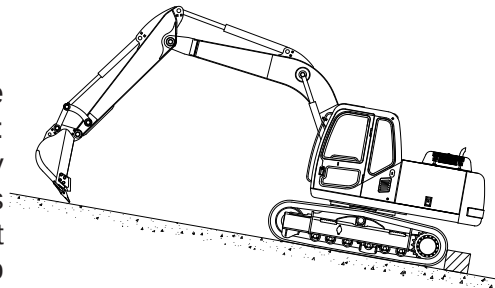
7) Walk at a low speed on grass, leaves, or wet steel, as the machine is at risk of slipping even at a small slope.

8) Do not make sharp turns when going uphill or downhill, otherwise the machine will tip over.

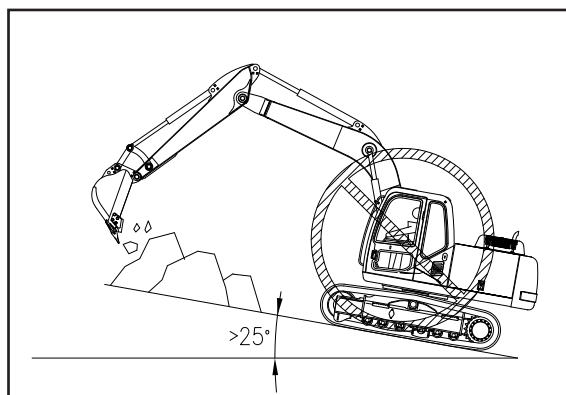


Dangerous

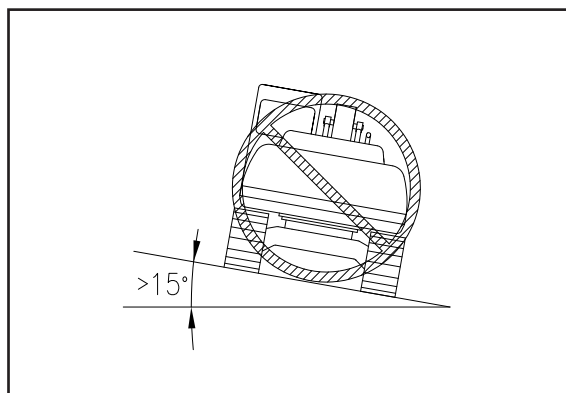
It is very dangerous to stop the machine on the slope! If it is inevitable, be sure to do the following: if the engine stalls on the slope, please immediately lower the bucket to the ground, put all the handles in place, and then restart the engine. Even a short stop on the slope, you should lower the bucket to the ground, put all the handles in place, at the same time, place enough fixed obstacles at the lower end of the tracks.



10) It is strictly prohibited to walk or work on slopes with longitudinal slope direction greater than 25 degrees.



11) It is strictly prohibited to walk or work on slopes with a lateral slope greater than 15 degrees.

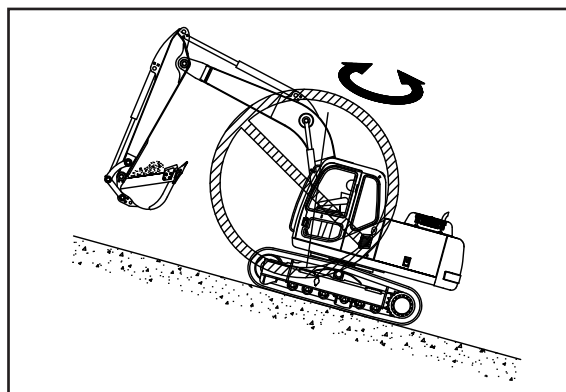


12) Try to keep the machine balanced, do not walk on rocks or over obstacles.

13) No reversing is allowed on the slope.

14) When going uphill, make sure the engine and hydraulic fluid are properly preheated, or it could cause an accident.

15) When the excavator is on the slope, and the two tracks are in 90 degree direction of the slope, the slewing is very dangerous and should be avoided. When it is necessary to turn, make the bucket close to the ground and close to the machine at the same time, and the tracks towards the top of the hill, turns slowly.



16)When working on the slope, the operation of the rotation and work equipment will cause danger of losing balance and overturn to the machine, which will lead to serious injury and equipment damage. Thus, when do these operations, a solid platform must be built with soil to keep the machine in the balance.



4.Safe digging operations



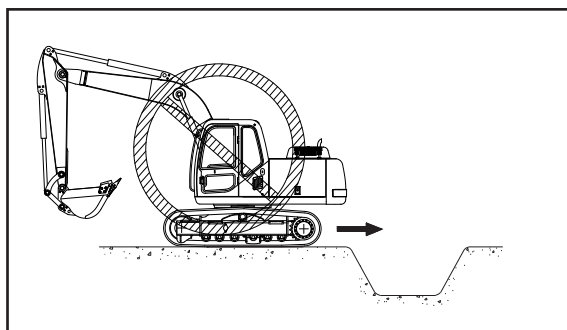
Warning: operators must memorize the functions of each



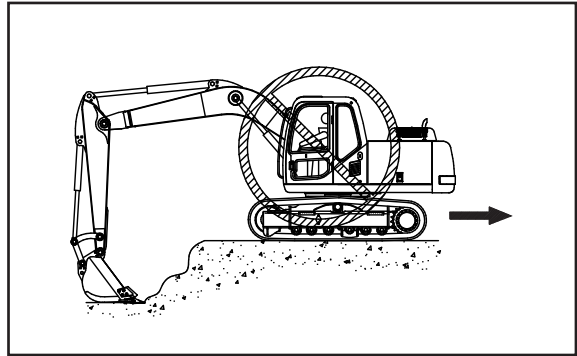
Warning: improper use of excavators can cause toppling and skidding. Keeping this section in mind will play a key role in ensuring your personal safety.

- 1)Before working, the irrelevant personnel should be cleared out of the excavation site..
- 2)Make sure that the work site can fully support the machine before entering.
- 3*Before working, the two tracks of the excavator should be kept in the same level as possible as they can.
- 4)Make sure that there are no cables, pipes or water pipes under the working site, or the specific location has been identified before digging.

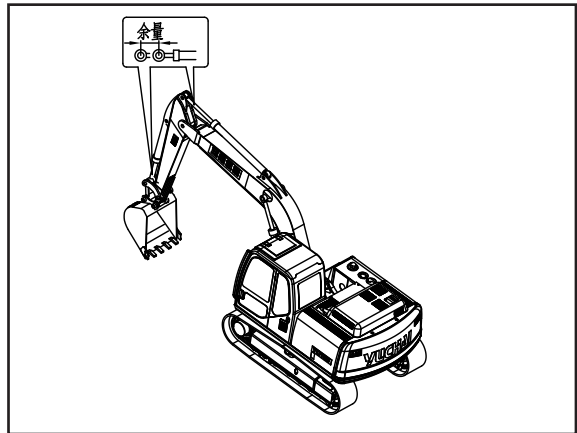
5)When the machine retreats (such as digging ditches, etc.), it is necessary to observe whether the shifting road line is flat and if there is any obstacle. The machine could be shifted in safe conditions only, or otherwise it will cause the machine to tip over



6) When the bucket subjects to a special resistance on the ground do not walk or turn, otherwise the machine may be damaged.



7) In the operation, if the hydraulic cylinder is controlled to the end of the travel, the force will act to the spacing ring inside the hydraulic cylinder, which will reduce the life of the machine. To prevent this happening, when operating the hydraulic cylinder, a small margin should be kept all the time.



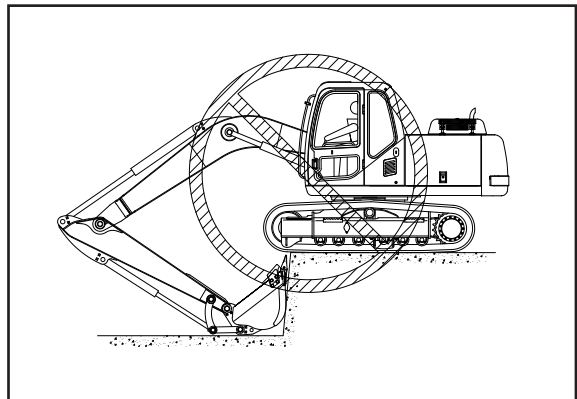
8) When digging deep, the bottom of the boom or bucket cylinder hose should be avoided to touch the ground.

9) When operating the machine, avoid external objects touching the moving boom, bucket, bucket, cab.

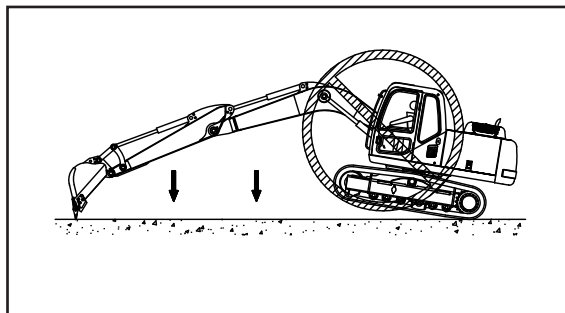
10) When the machine is rotating, touching the engine bonnet and the weight blocks in the rear should be avoided.

11) When lowering the boom, do not stop suddenly to avoid damage to the machine and improve the safety of the work.

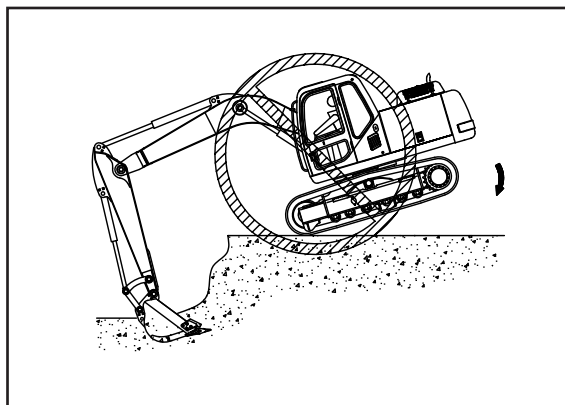
12) Do not dig towards the machine body.



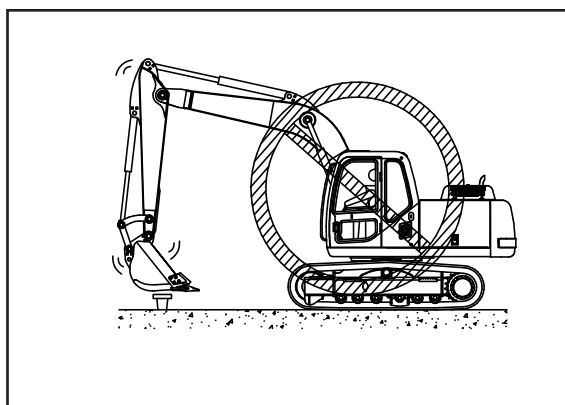
13) Do not excavate when the track is off the ground, otherwise the machine and structure will be damaged*



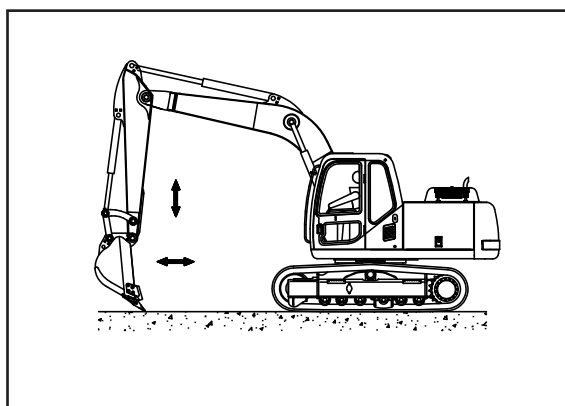
14) Do not use the machine's dead weight to increase the digging force of the machine.



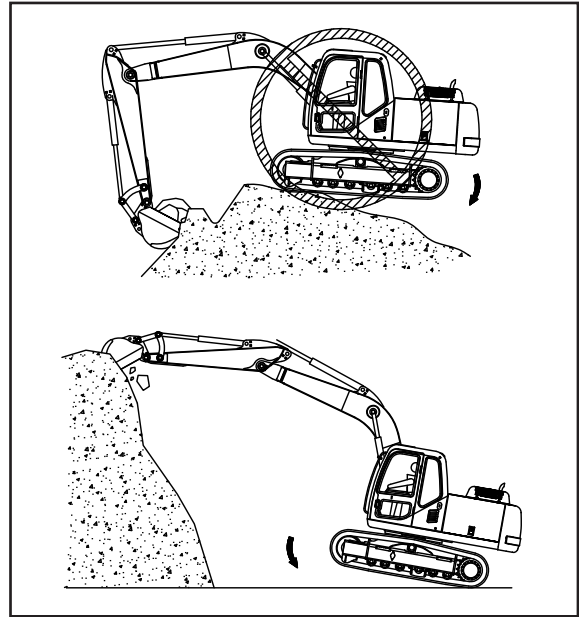
15) Don't take the bucket down force as a hand picks, crushing device or pile driver, which will make the rear of the machine withstand excessive force. It is very dangerous and will cause damage to the machine.



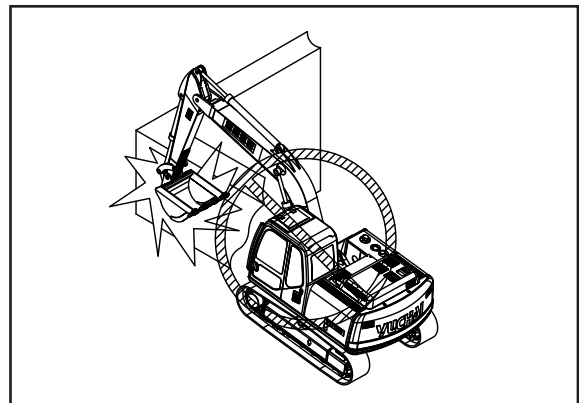
16) Do not build the flat road with the bucket too much, otherwise the components of the machine may be damaged due to the overload operation.



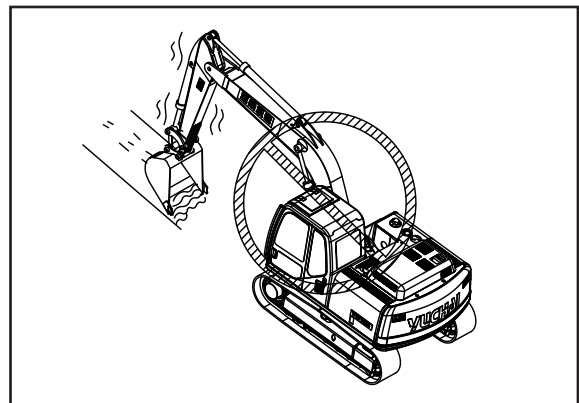
17) Do not use the falling-down force of the machine to dig, otherwise the machine will be damaged.



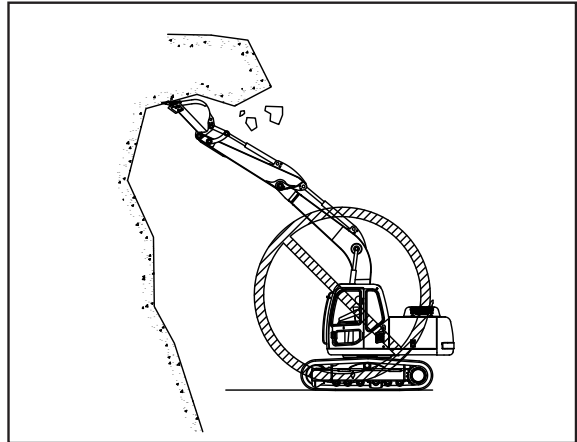
18) Do not use rotary force to compact the soil or damage mounds and walls. When rotating, don't insert the bucket teeth into the soil, which will damage the working device.



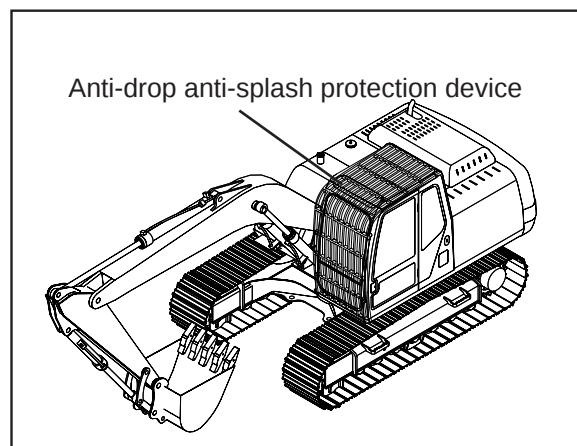
19) Don't use walking force to dig with the bucket inserted into the soil, which will make the rear of the machine bear too much force.



20) Do not dig under the suspended part of the working face. There will be danger of falling rocks or suspended part of the collapse, which will hit the machine.



21) If the machine is working in a field where there is a risk of falling or splashing, install anti-falling and anti-splashing protection device.



22) Do not drive or work on soft roads or marshland.

23) Do not use the excavator to drag other equipment or objects

24) There may be a blind spot in the rear of the machine, make sure the rear of the machine is safe during operation.

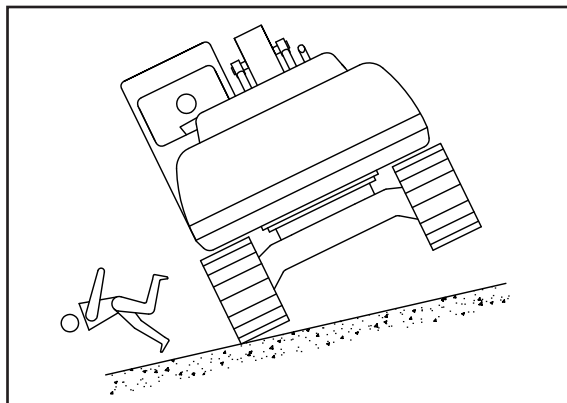
5. Anti-toppling, anti-skid and disposal during operation



Warnings: *)when you have to turn on the slope, it must be a big curve turn. When the machine is to turn right, the boom stick should be toward the left with the bucket about 30cm from the ground, and the platform should be locked. And vice versa.
2)When skidding, immediately push the bucket underground.
3)When the machine is overturned, the driver must not jump off the machine, but should tightly grasp the handrail in the cab. Jumping off a car is extremely easy to cause casualties.

The following situations, the machine is very easy to tip over, must be avoided:

- 1)When the machine is shifting on the uneven ground, with one track higher and the other lower, or more than half of one track hanging in the air.
- 2)When one track is touching the loosen soil and the other is touching the compacted soil.
- 3)When the underground of one side of the machine is cave or mud pit.
- 4)When walking and working on the slope whose vertical gradient is greater than 25°, as well as the unloading of the heavy objects is in the downhill direction.
- 5)When walking and working on the slope whose Horizontal gradient is greater than 15°, as well as the unloading of the heavy objects is in the downhill direction.
- 6)On the slope, the angle of the two tracks and the slope is 90°, and the rotation of the platform is greater than 90°.
- 7)When working on the slope, the machine is turning suddenly, the platform is rotating quickly or the machine is stopped in a sudden.
- 8)When on the slope, the machine is swinging 180° towards the downhill.
- 9)When in a reverse operation (trenching, etc), the shift road is rugged.
- 10)When the machine is digging to below the machine body.
- 11)When walking on the frozen ground.
- 12)If there is engine oil or lubricant oil on the two tracks, then the machine is prone to slipping.



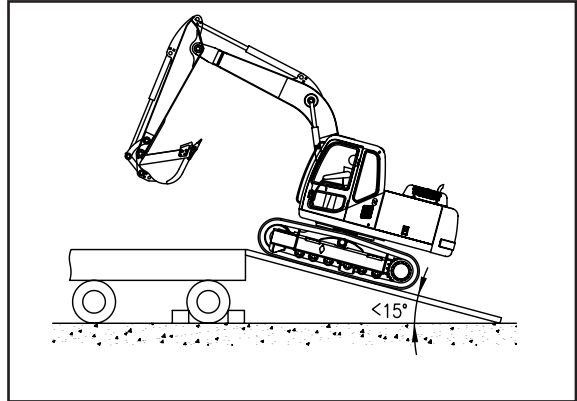
6. Shut down the machine

Please refer to the section of *parking machines* in this Chapter

Transport and handling machine

Excavator transport (handling) should strictly abide by safety principles.

- * When transporting excavator, abide by the rules or good habits of safe transport (handling) in national and local industry.
- * When transporting excavator, it's strictly forbidden to take any personnel or other items and strictly forbidden man-machine mixed or mix-carried.



- * When handling excavator, within action radius of crane arm including suspended object, it's strictly forbidden any person or items which may interfere handling.

- * When handling excavator, within walking domain of excavator handled including rotary range, it's strictly forbidden any person or items which may interfere handling.

- * Except by hoisting or direct entry from the pier, excavators can also use access boards with enough strength to ride on the transport vehicles. Tilt angle of access board should be less than 15°. The length of slope is 3.5 times larger than the height. The width of access board is 1.2 to 1.5 times than the width of track.

- * Before going up and down the slide, be sure to put down the positioning handle of the rotary platform to prevent the platform from turning.

- * When going up and down the slide, it is not allowed to pull any handle other than the walking handle.

- * Handle the machine on a solid flat surface.

- * When the machine is driving on the road, clearance banner, lights and warning signs should be ready, and ensure that other people can see these signs, and ensure that vehicles behind can see the sign saying "slow moving vehicle" .

Shutdown maintenance



Warning: When performing any repair work on the machine, a repair warning board must be placed on the control handle.

- *The excavator must stop on the solid and flat ground.
- *After the excavator stops, the bucket must be lowered to the ground, the engine must be idled for 3 minutes, and then shut the machine down and remove the switch key.
- *Relief the pressure of all the hydraulic systems.
- *When the machine has to stop on the slope, sufficient obstacles should be set in the downward direction of both sides of the track.
- *Be sure to keep it at a good distance from other machines when stopping.
- *When repairing the electrical system or welding, remove the negative cable of the battery to prevent the flow of current.
- *Firmly support the machine or accessories if they are to be supported before servicing the machine. Do not work under a machine supported only by a jack.
- *After the machine starts, do not lubricate or repair, do not let hands, feet or clothes contact the power rotating parts.
- *If maintenance work is to be carried out while the engine is running, the machine must be watched over.
- *Don't carry loose items in your pocket to prevent them from falling into moving parts.
- *High pressure liquids may splash into the eyes or skin. , which should be avoided in the repair.
- *Remove all debris inside the machine to prevent any possible misoperation, which will cause injury to personnel or damage to the machine.
- *Make proper disposal of the waste liquid. Do not pour oil into the ground, drainage ditch, stream, pond or lake. Discharge of oil, fuel oil, antifreeze, plastic, battery and other hazardous waste should comply with environmental regulations.

Fire prevention, explosion-proof and anti-poisoning

*The excavator should be avoided to contact with the electric wires when it is in transportation, walking or digging, otherwise serious injury and death may be caused.

*Electrical appliances and lines of the machine should be checked frequently. When damage, injury or aging are found, they must be replaced in time to prevent electrical circuits from short-circuiting and causing fire.

*Keep the wire connections clean and securely in place.

Check electrical wiring daily, tighten the loose joints or wire clips and repair the damaged wiring.

*Inflammable and explosive materials shall not be placed inside the excavator to prevent fire.

*When refueling, the engine must be stopped.

Refueling away from the source of the fire. And there must be someone watches it over.

*Do not allow fuel to spill over overheated surfaces or electrical system components while refueling.

*After refueling, wipe off the spilled fuel or oil and tighten the fuel and oil cap.

*Remove timely any leaf, wood, paper or any other inflammable material accumulated or stuck in the engine, exhaust pipe, muffler or engine compartment interior.

*Do not place oil-soaked rags in the machine to avoid spontaneous fire and combustion.

*Configure the fire extinguisher inside the machine, and put it in place to get readily.

*Welding the machine must be carried out in the condition that the hydraulic tubing and the fuel line have been isolated.

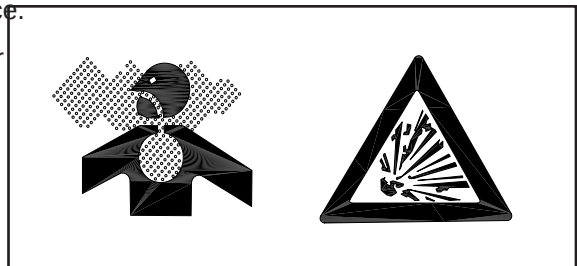
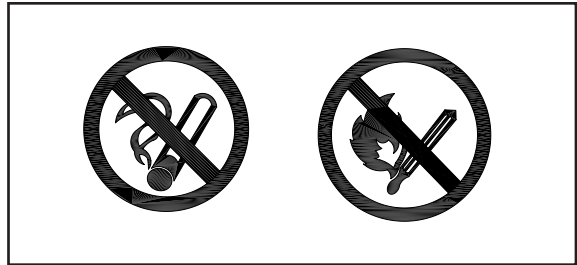
*Prevent fire caused by hydraulic piping: Check that all hoses and tubes' clamps, shields and cushions are securely in place. If there are any loose it will cause vibration and friction with other parts in the operation, leading to the damage of the hose, oil-spraying of the high pressure oil and even a fire or serious injury.

*Keep the battery away from the fire to avoid high temperature, which could cause an explosion.

*For excavator with a sealed cab, the tightness of the middle partition must be checked to prevent the engine exhaust from entering the cab and causing driver poisoned.

*Never work in a poorly ventilated area to prevent choking of the driver.

*In case of fire, do not put out the fire with water, but with powder fire extinguishers or sand. A covering or paulin can also be used to cover the fire off.



Battery

General safety rules for accumulators

Battery electrolyte contains sulfuric acid, which will produce flammable and explosive hydrogen gas. Erroneous operation will result in serious injury or fire. Therefore, we must observe the following precautions:

*The battery is equipped with the battery charge status indicator on its cover. When the indicator shows green, the battery can be used normally. When the indicator shows black, the battery should be promptly charged, and when the indicator shows white, the battery should be replaced immediately.

*When operating batteries, you must wear safety glasses and rubber gloves.

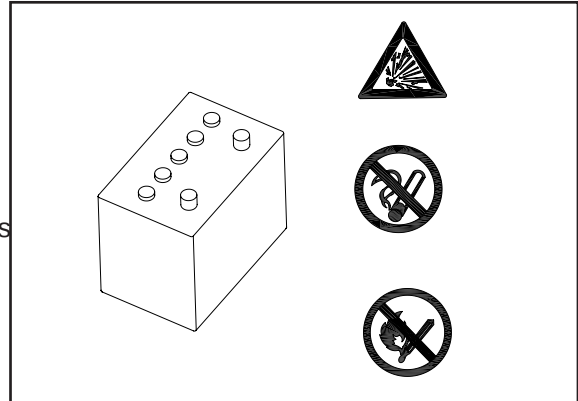
*Do not smoke or use open flames near the battery.

*If your eyes, clothes, or skin are splashed with sulfuric acid, rinse immediately with plenty of water and seek medical care immediately.

*Turn the key switch to the OFF position before operating the battery.

*Use a flashlight to check electrolyte levels and turn off the engine when checking.

*The expansion of the closed battery terminal indicates that the battery has been frozen. Do not charge the battery or jumper the engine while the battery is frozen. The heating of the frozen battery should not exceed 15°, otherwise the battery may explode.



The explosion protection of the battery



Warning: Spark or flame can cause explosion of the hydrogen inside the battery. To prevent explosions from occurring, please note:

- 1) When disconnecting the battery cables, you should firstly cut off a cathode (-) cable;
- 2) When connecting the battery cable, you should finally connect the cathode (-) cable;
- 3) You can not connect the terminal of the battery with metal components in a short circuit;
- 4) You can not weld, grind, or smoke in the vicinity of the battery.

Because of the risk of spark, you must do according to the following steps.

*Make the battery securely mounted to the determined position.

*Do not allow tools or other metal contact between the battery terminals. Do not leave the tools or other metal objects near the battery.

*Connect or disconnect positive pole and negative pole of the battery in the correct order. Firmly fix the battery terminals.

*Flammable hydrogen gas is produced when the battery is charged. Thus before charging, remove the battery from the lower body of the machine, place it in a well-ventilated place, and remove the cover.

*Tighten firmly the battery cover.

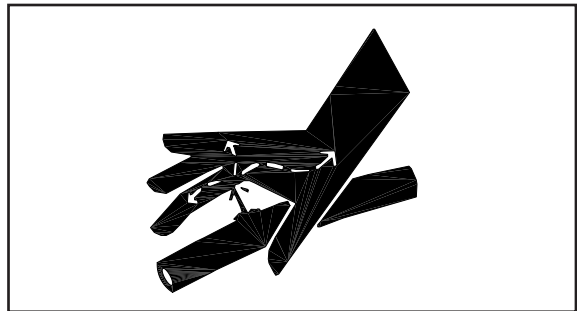
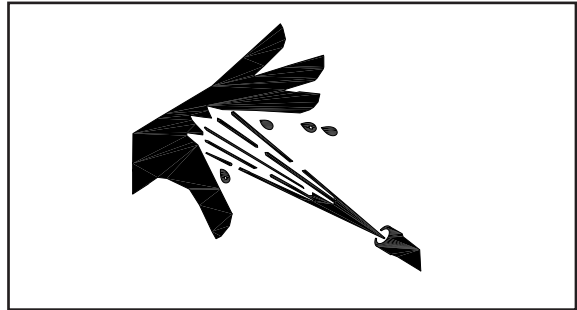
Note: When repairing electrical systems or conducting welding operations, remove the negative terminals of the battery to prevent the flow of current.

Hydraulic System

1. Safety rules for high pressure oils

There is always pressure inside the hydraulic system. When inspecting or replacing pipelines or hoses, be sure to check whether the pressure in the hydraulic oil line has been released. If the pressure is still in the oil line, it will cause serious injury or damage. Therefore, follow the following rules:

- 1) When there is pressure in the hydraulic system, do not conduct inspections or replacement.
- 2) If there is any leak in the pipeline or hose and the surrounding area is wet, check if the line or hose is cracked or expanded. When checking, wear goggles and leather gloves.
- 3) The high-pressure oil leaking through the holes can penetrate the skin. There is a risk of blindness if it comes into the eyes directly. If the skin or eye hit by a high pressure flow and injured, rinse immediately with plenty of water and seek medical care.



2. Safe operation of high pressure hoses

If the high-pressure hose leaks oil or fuel oil, it will cause a fire or failure of operations, resulting in serious injury or damage. If the bolt is loose, stop working and tighten the bolt to the specified torque. The welding cannot be carried out under the condition that the hydraulic lines (hoses) are not isolated. If there is any damages of the hose, stop the operation immediately, and contact the agents of Yuchai.

Replace hoses if any of the following are found:

- 1) Hydraulic pipe joint damaged or leaking.
- 2) Cladding worn or broken, or reinforced steel wire exposed.
- 3) The cladding is swollen in places.
- 4) The movable part distorts or crushes.
- 5) There are impurities in the cladding.

3. Safety rules for high temperature oils

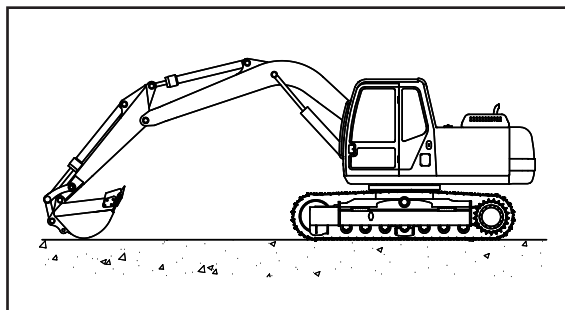
Uncooled hydraulic oil in or after operation is of high temperature and high pressure. Before the inspection or release of oil, the oil should be cool enough that you can touch the oil cap or plug to prevent burns caused by the spraying oil or the contact with hot parts. Slowly release the cover or plug to drain the internal pressure before removing the cover or plug even if the oil has cooled.

4. Release the pressure inside the hydraulic system

When the machine is just stopped, the hydraulic oil is with high temperature and pressure. While disassembling the oil port, the oil may spray out, therefore before disassembly the oil port cover should be turned to relief the pressure inside.

1) Supposing the working device is not in the state shown in the diagram, you should start the engine at a low speed, extend the bucket cylinder, retract the stick cylinder, put the bucket and blade on the ground, and then shut down the engine.

2) Within 15 seconds after turning off the engine, turn the starter switch to the ON position, and operate the shift level in each direction (work location, walking) to release the internal pressure.

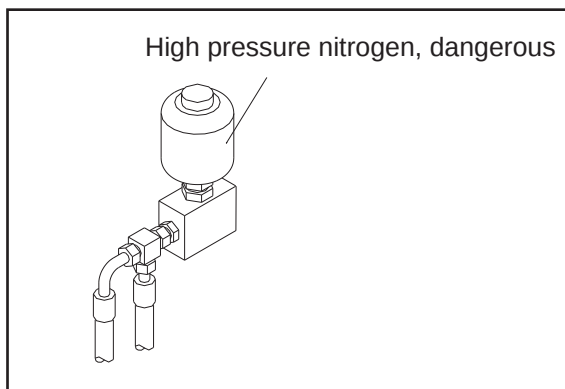


5. Safe operation of accumulator



Warning: Accumulator is filled with nitrogen gas of high-pressure, the improper use of it can cause explosion. Do not remove the accumulator or drill or weld on it. Prevent the accumulator from approaching the fire source or the collision and impact. Disposal of the accumulator should be carried out by professionals.

The machine is equipped with an accumulator in the control line, which is a device for storing pressure. When equipped with these devices, the control line can be operated for a short time even after the engine has stopped. By operating the joystick, the working device can be lowered under its own weight.



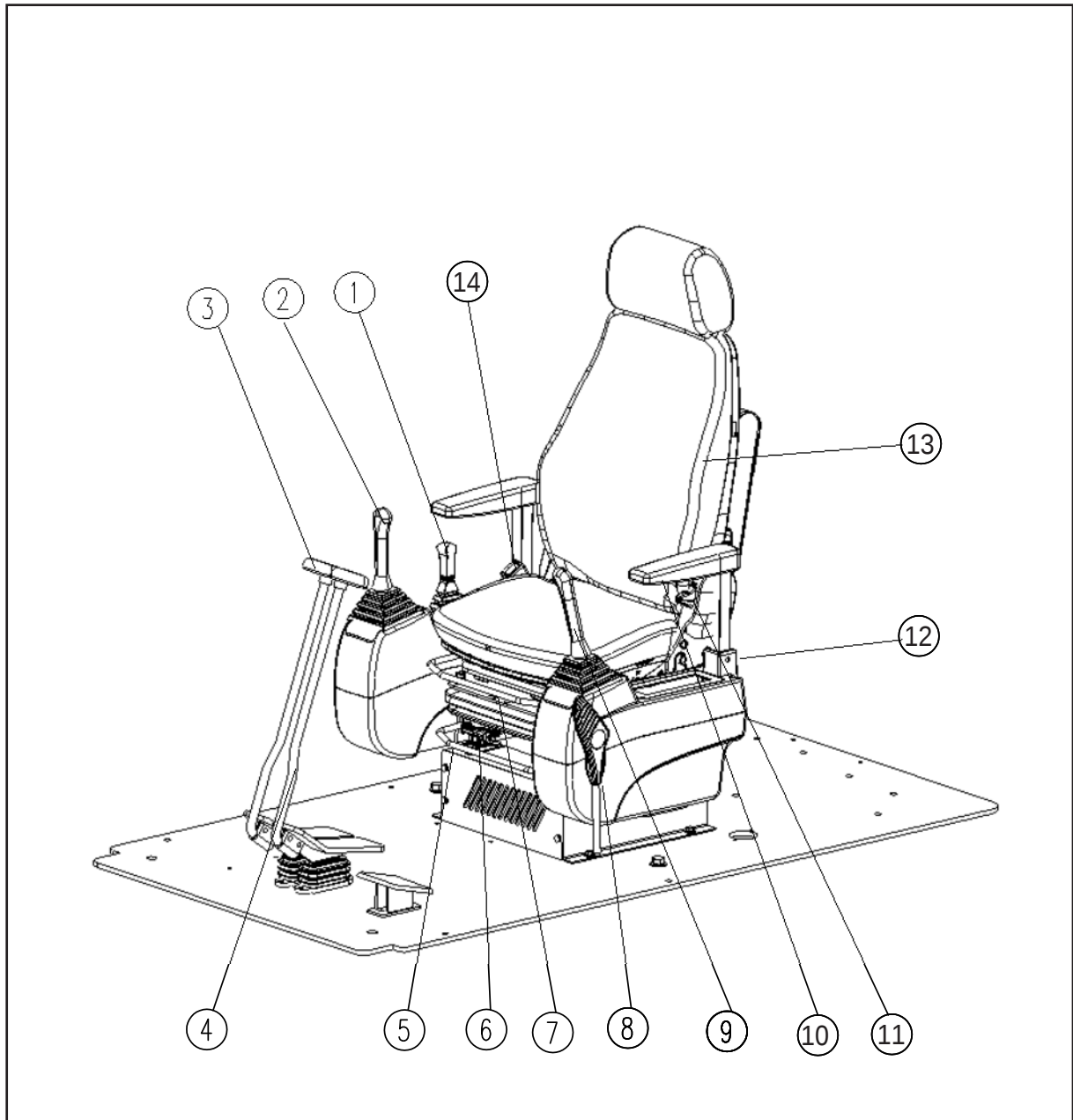
Method of pressure relief for machine control piping equipped with accumulator

- 1) Lower the working device to the ground and then shut down the hydraulic hammer or other accessories.
- 2) Turn off the engine.
- 3) Turn the starter switch to the ON position again to allow the current to flow in the circuit.
- 4) Adjust the safety lock lever to the free position, and then operate the working device joystick and accessory control pedal (if equipped) in all directions, forward, back, left and right to release pressure in the control line.
- 5) Set the safety lock lever to the lock position to lock the joystick and the accessory control pedal.

3

Components Description

Overview of Operating Equipment

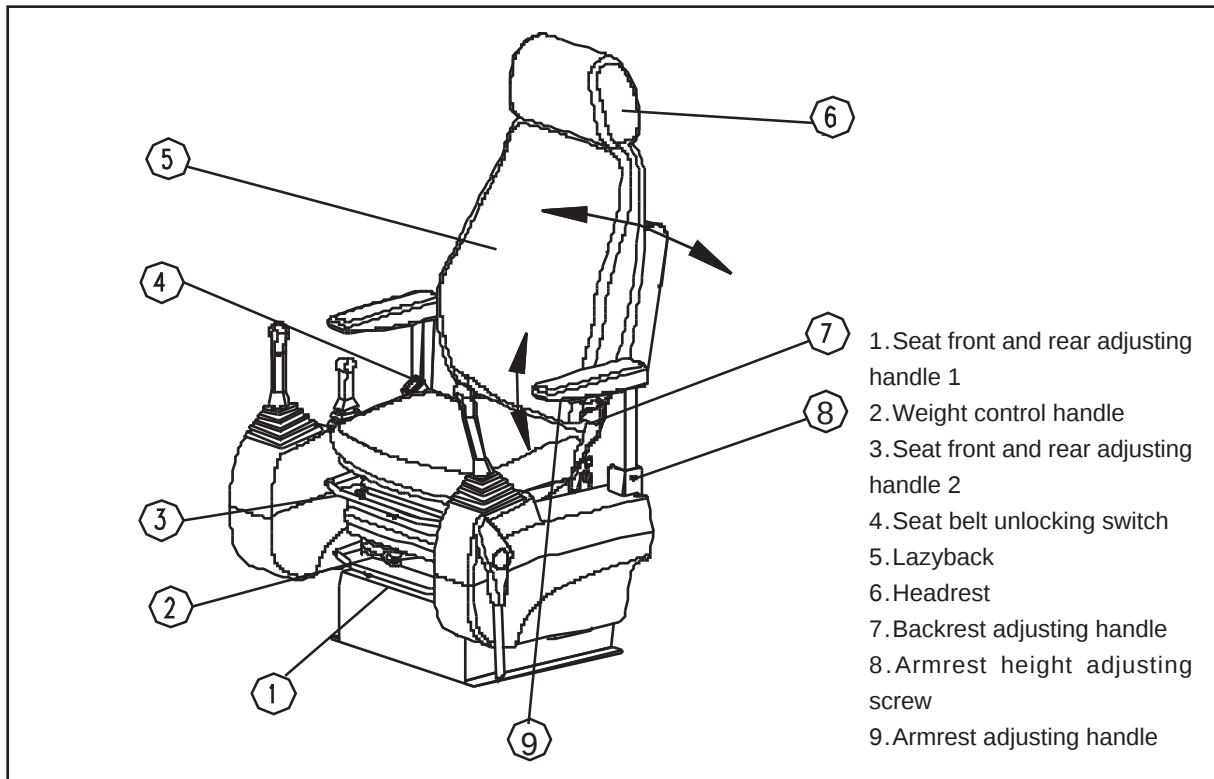


- | | |
|---|-------------------------------------|
| 1. Bulldozer valve handle | 8. Safety locking handle |
| 2. Right pilot valve handle | 9. Left pilot valve handle |
| 3. Right walk joystick | 10. Armrest Angle adjusting handle |
| 4. Left walk joystick | 11. Seat back adjusting handle |
| 5. Seat front and rear adjusting handle 1 | 12. Armrest height adjusting handle |
| 6. Weight control handle | 13. Seat |
| 7. Seat front and rear adjusting handle 2 | 14. Safety belt |

Operater Seat



Warning: Accidental tipping or sudden movement of the machine may result in injury or death. For safety reasons, please fasten the seat belt and adjust the seat before starting the machine.



*Seat front and rear adjusting: Pull the Seat front and rear adjusting handle 1 or 2 to allow the seat move forward or backward. While release the handle the seat will lock up. Position of seat and control box can be adjusted simultaneously through seat handle 1. The seat position can be adjusted separately by adjusting handle 2.

*Backrest adjusting: Pull up the backrest adjusting handle, the backrest can adjust 5 positions. While release the handle the backrest will lock up.

*Headrest adjusting: Pull back the headrest adjusting handle, then push and pull the headrest to the right position.

*Armrest tilts adjusting: Turn the armrest tilts adjusting handle, the handrail can be adjusted by tilting.

*Armrest height adjusting: Loosen the armrest height adjusting screw, adjust the armrest to the right height, then tighten the screw.

Note: Stop the machine when adjusting the seat. Shake the seat gently to ensure it's reliable locked.

Safety Belt



Warning: Seat belt is an important part of machine safety system. You must wear a seat belt before operating the machine. If you do not, the cab or the machine may press on your body and cause injury if the machine tilts over.

Warning: Before using the seat belt, check if it is installed well. If the seat belt is worn or damaged, it must be replaced.

- * The seat belt must be replaced every three years even if it looks good. The date of manufacture of the seat belt is shown on its factory date label.

- * Be sure to wear your seat belt during work.

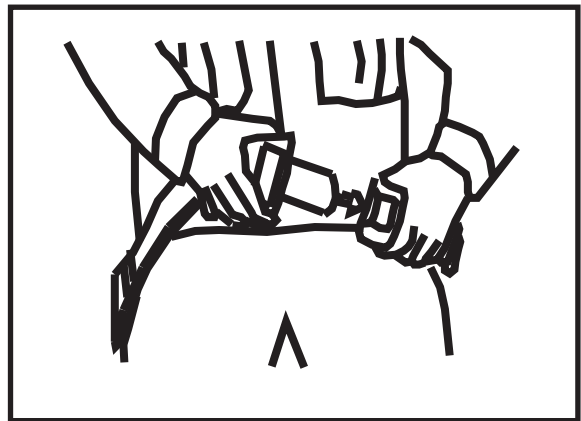
- * Don't twist the seat belt when you are wearing it.

1. Fasten the safety belt

Hold the belt clip, check for contortions, adjust the length of the belt, and insert its tongue firmly into the buckle. Gently pull the seat belt to check if it is properly locked.

2. Unfasten the seat belt

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



Safety locking unit

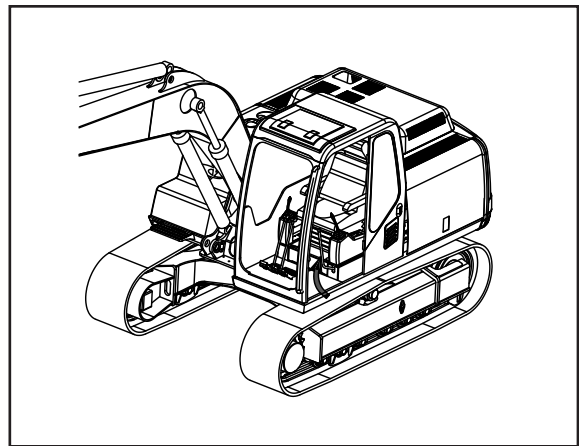
1.Safety locking rod



Warning: Working device safety lock mechanism is an important part of machine safety system. Safety locking must be performed when the driver leaves the cab. If the safety lock handle is not in the locked position, the handle may move, causing the working device or platform to act and causing an accident.

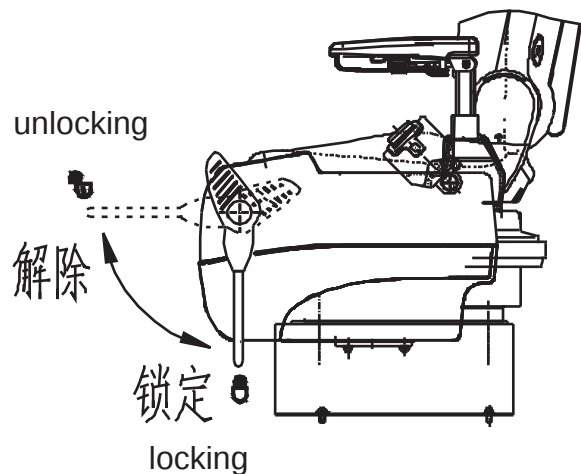
Pilot locking

*Rotate the safety lock lever counterclockwise to the vertical position, the pilot system control doesn't supply oil, the machine's working device, platform slew and walking operation can't work, thus the machine is protected.



Relieve of pilot locking

Turn the safety lock handle clockwise to the horizontal position and switch on the voltage source. The machine can work normally.



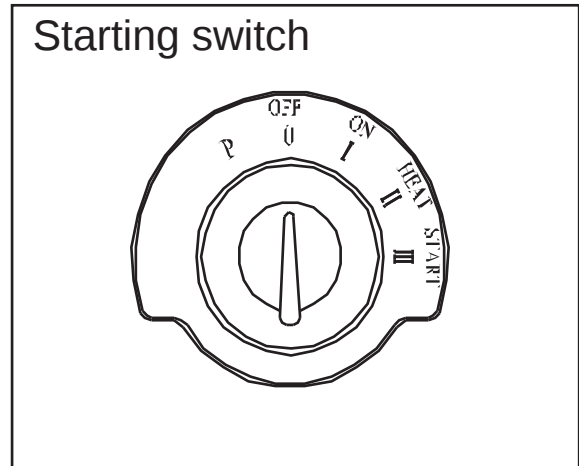
Starting switch (at the right control box panel)

1. 0 position/OFF

Stopping Position, the engine shut off, the machine power supply cut off.

2.I position/ON

Working gear, machine power on.



3.III position /START

Engine start gear. Switch to this gear to start the engine. If the gear is not maintained, it will automatically reset to work.

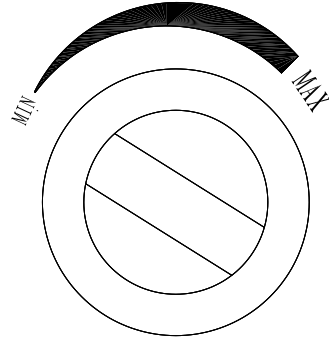
To protect the engine starting motor, the single start time is not allowed to exceed 15 seconds. There must be more than 30 seconds between two starts.

Throttle control (in the right side of cab)

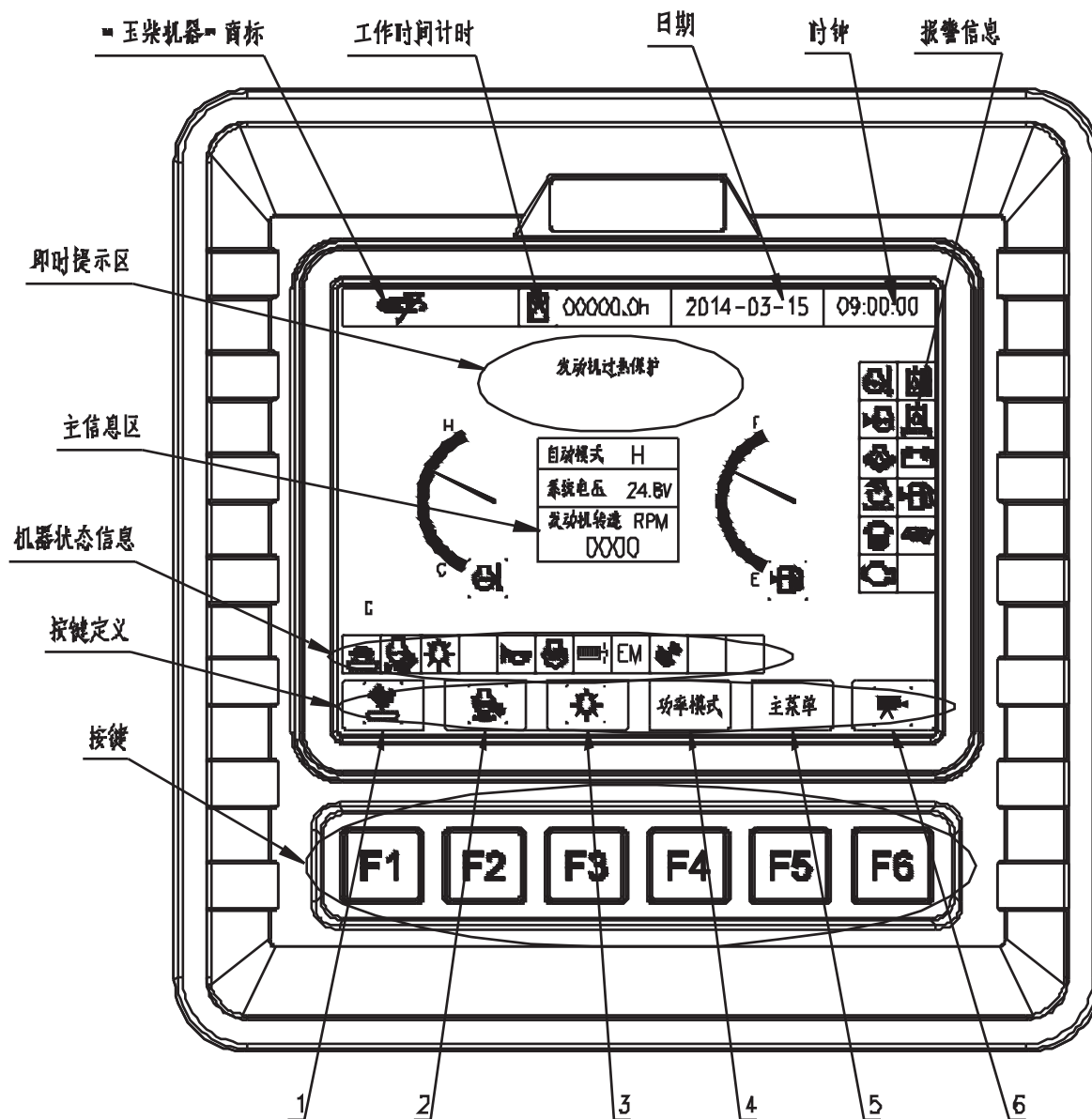
Throttle knob

The throttle knob has 1 ~ 10 gears to choose the engine operating speed. Twist the throttle knob to the right to increase the engine speed, while turn it to the left to reduce. Before stopping the engine, be sure to twist the knob to the far left, the minimum throttle.

Throttle knob



Monitor

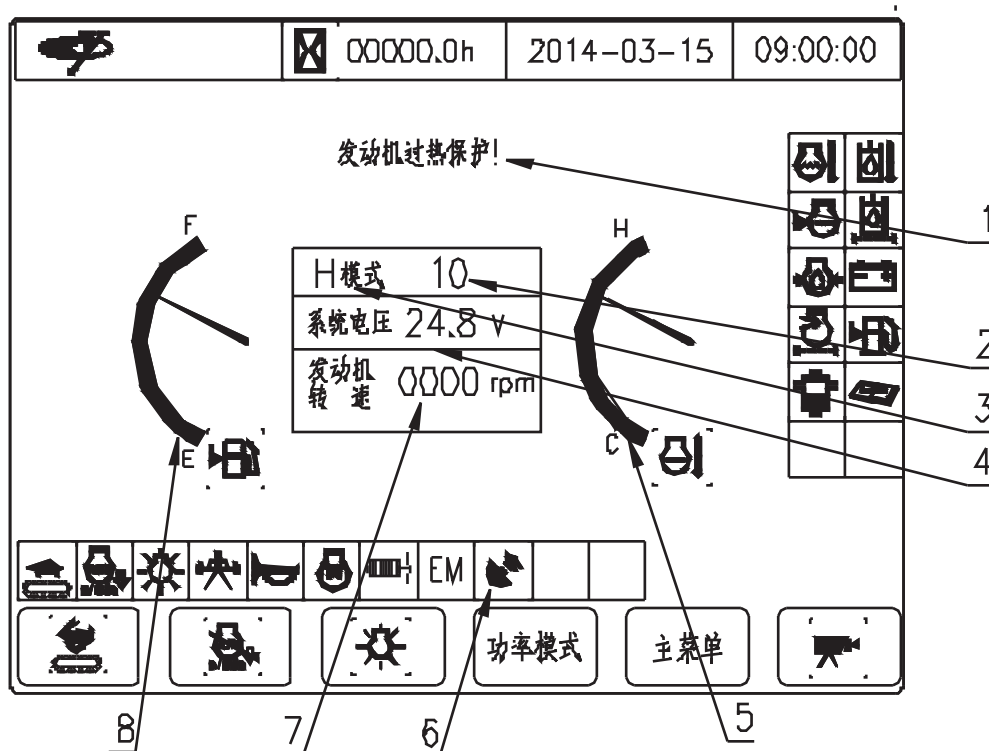


Press the corresponding button of the icon to realize the corresponding function

- 1.Walk idle function selection
- 2.Automatic idle function selection
- 3.Warm-up function selection
- 4.Power mode function selection
- 5.Enter main menu
- 6.Rearview mirror camera switch (When installing rearview mirror system)

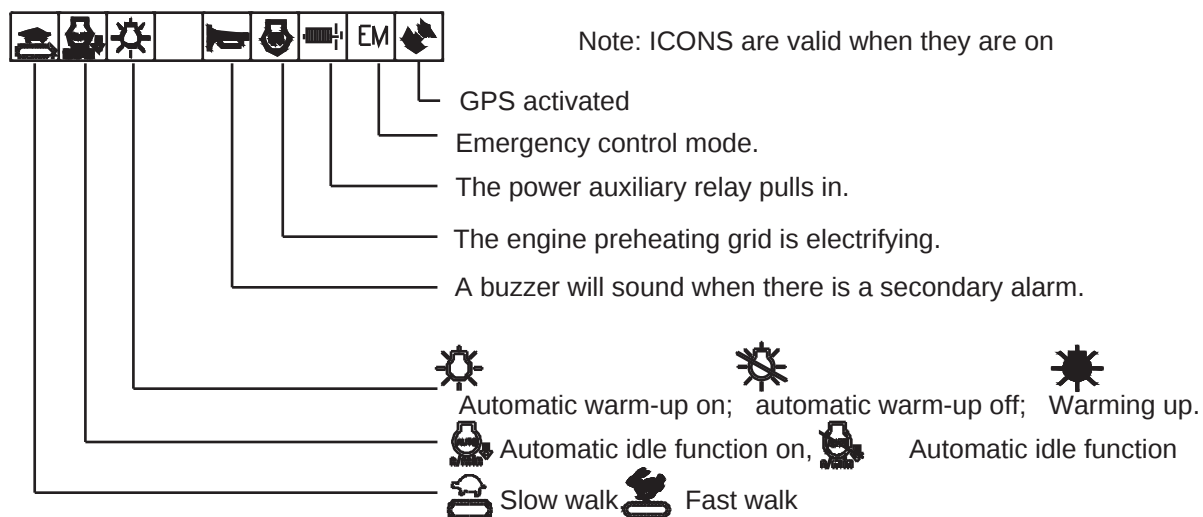
Home screen and basic operations

1.Main information area



- 1.Instant display.
- 2.Accelerator gear, 1-10 gears.
- 3.Power Mode: S mode(Default), H mode, L mode.
- 4.Current voltage of the system.
- 5.Engine coolant temperature. When the temperature of engine coolant is too high, the instrument alarm area is displayed.
- 6.For machines equipped with GPS, this symbol will be displayed after the GPS monitoring function is activated.
- 7.Current engine speed.
- 8.Fuel oil level gauge.When the fuel oil level is too low, the instrument alarm area has an alarm display.

2.Status display



Disply	Icon	color	The state corresponding to the light	switching operation
Fast/slow walking status indicator		white	Fast walk	Switch by the corresponding key, and keep.
		white	Slow walk	
Idle control mode indication		white	Automatic idle control mode has been selected	Switch by corresponding key. The system defaults to automatic idle mode, and each power on is the default mode.
		white	Non-automatic idle control mode has been selected	
Buzzer indicating		red	This icon will be displayed when the buzzer rings on the second alarm	
Preheating status indicator		yellow	The engine preheating relay generates electricity	
Warm-up status indication		white	Automatic engine warmer mode	Switch by corresponding key.
		white	Cancel the engine auto warmer mode	
		yellow	The engine is warming up	
Power control indication		green	The power auxiliary relay pulls in	
Emergency control mode	EM	yellow	Switch to emergency control mode	
GPS mode indicator light		green	The current GPS and control system interlock function is activated	

3.Alarm information



Note: ICONS are highlighted when alarm occurs.

If there is an alarm, please stop immediately to check and deal with it. If necessary, contact Yuchai Equipment Technology or authorized dealer to deal with it.

Icon	color	Alarms	Alarm activation condition	Alarm level	treatment
	red	engine coolant temp	Ultra high limit alarm	1	Stop the machine
	red	Engine coolant level	Ultra low limit alarm	1	Stop the machine
	red	engine oil pressure	Ultra low limit alarm	2	Stop the machine
	yellow	engine air filter	Engine air filters blocked for 3 minutes	1	Stop the machine
	yellow	oil-water separator	Ultra high limit alarm	1	Stop the machine
	red	Hydraulic oil temp	Ultra high limit alarm	1	Stop the machine
	yellow	Hydraulic oil return filter	Hydraulic oil filter blocked for 9 minutes	1	Stop the machine
	red	System Voltage	System Voltage*Upper limit voltage	2	***** *****
			System Voltage*Low limit alarm	1	***** ***
	yellow	fuel level	Ultra low limit alarm	1	refueling
	red	Maintenance Tips	Maintenance items Remaining maintenance time*0 hour	1	Maintenance on time
	yellow	Maintenance Tips	Maintenance items Remaining maintenance time*30 hours	1	
	yellow	Engine alarm	The engine has the current diagnostic fault code	1	Stop the machine

4.Main menu layout

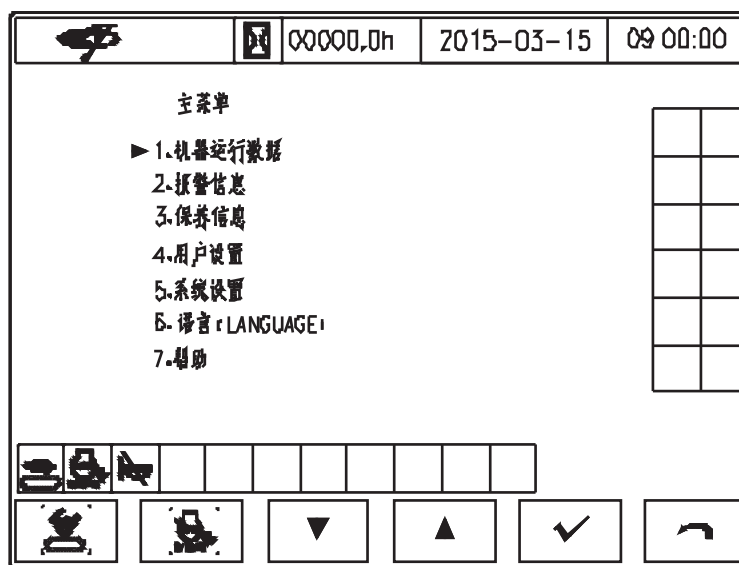
From main page press  enter the main menu

press   

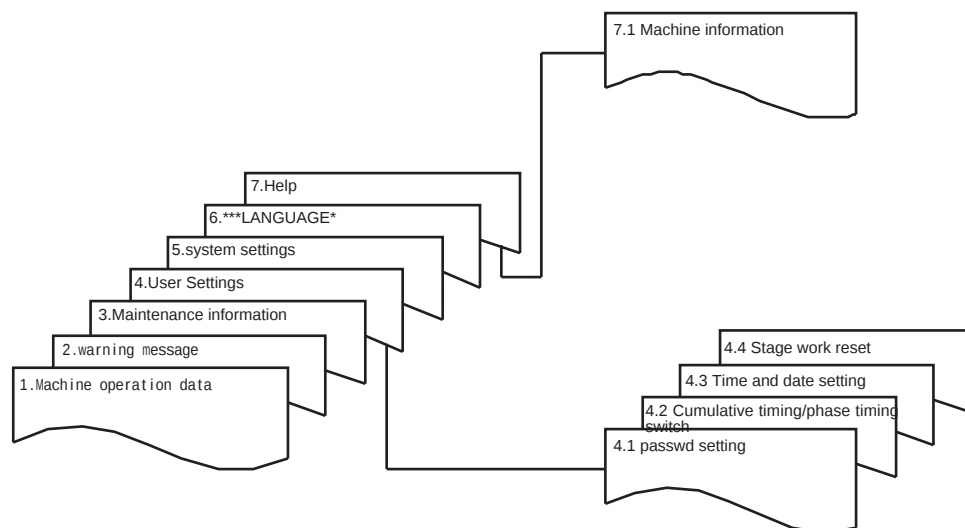
to select corresponding menu

press  enter the menu.

press  back To Previous Menu



Menu structure diagram



Description of working mode

This machine can choose throttle position, power mode and other functions. The correct choice of working mode is conducive to the best operation ability of the machine under different working conditions.

The accelerator gear		Power Mode	
Through the throttle knob can be in 1 to 10 speed of the engine optional	This working mode can satisfy the operator to choose the appropriate engine speed according to the working condition.	H	Overload working mode, to meet the greatest demand for productivity.
		S	Standard working mode, optimal match between fuel consumption and production efficiency.
		L	Light load working mode, with emphasis on precise control requirements.
Automatic idle mode	When all operations are stopped for 4 seconds, the engine speed automatically enters the standard idle state. When the operator resumes operation, the machine automatically returns to the operating speed before idle. But if the automatic idle mode cancelled, there is no such function.		
safe mode	After starting the engine, regardless of the position of the throttle knob, the engine speed is maintained at the minimum speed, only when turning the throttle knob, or changing the machine control mode, the engine speed can be adjusted. This mode cannot be cancelled.		



Warning: When the machine is running on the transporter, please cancel the automatic idle mode for safety.

manipulation of working device and rotary mechanism

1.manipulation of excavating device and platform turning mechanism

A.Left pilot handle operation

Stick control: when pushed, the stick extends outside, when pulled, it is retracted.

Platform rotation: when deflecting to right, the platform turns to right; and when deflects to left, the platform turns to left.

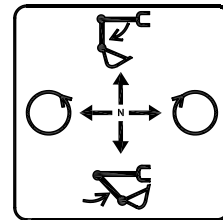


Illustration of left pilot handle operation

B. Right pilot handle operation

Boom control: when pushed downward, the boom goes down, and when pulled, it upgrades.

Bucket control: when deflecting to right, the bucket turns outside; and when deflects to left, the bucket turns inside.

In order to ensure performance of the machine and safety, the operation pilot handle should be controlled at constant speed as much as possible, and sudden gear shifting is not allowed.

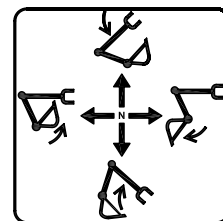


Illustration of right pilot handle operation

2.Operation of assistant working device (OPT)

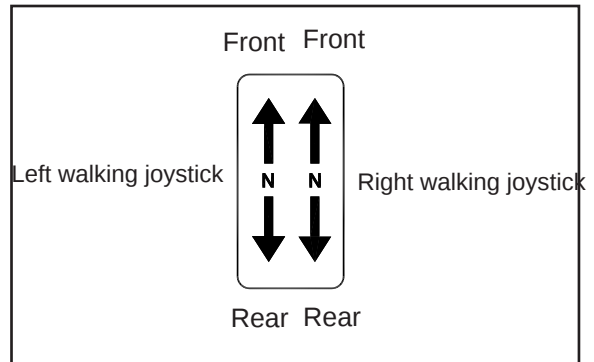
*Operation of assistant working device (OPT)

Walking manipulation

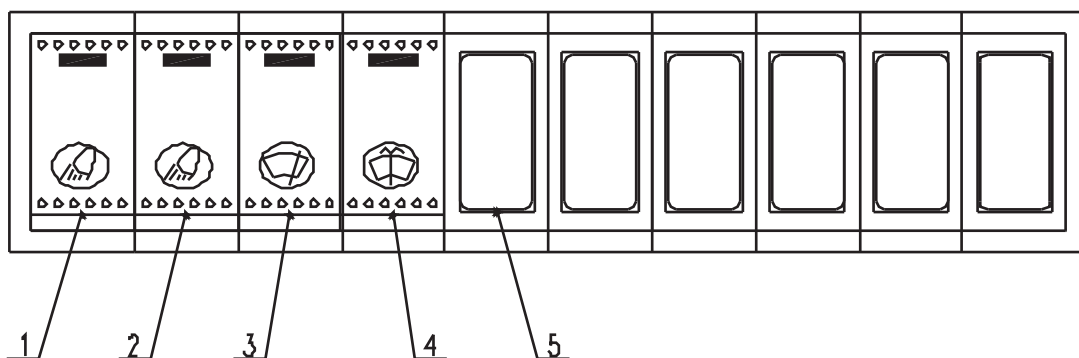
1.Walking and walking direction manipulation

manipulate the left and right control rods to control the walking of the track on both sides of the machine.

The unilateral control of control rod enables the machine's unilateral move.



Key control panel (Right side of cabin)



1. Working device light switch

Press the marked side of the switch to open, and vice versa.

2. Platform lamp switch

Press the marked side of the switch to open, and vice versa

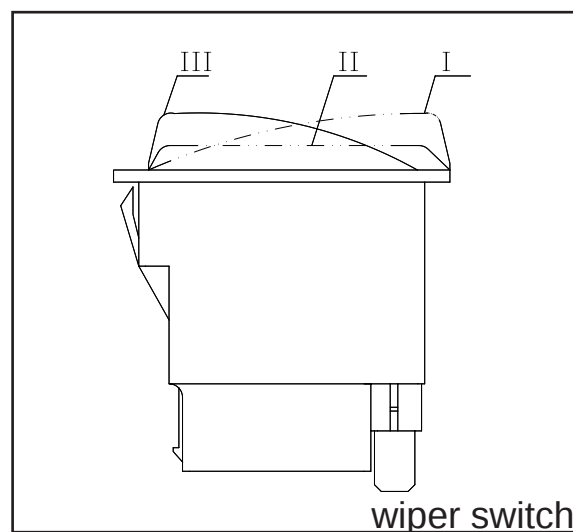
3. Two-speed wiper switch

Press the marked side of the switch to open, and vice versa.

I is stop gear

II is in low speed gear

III is high speed gear



4.Window wash switch

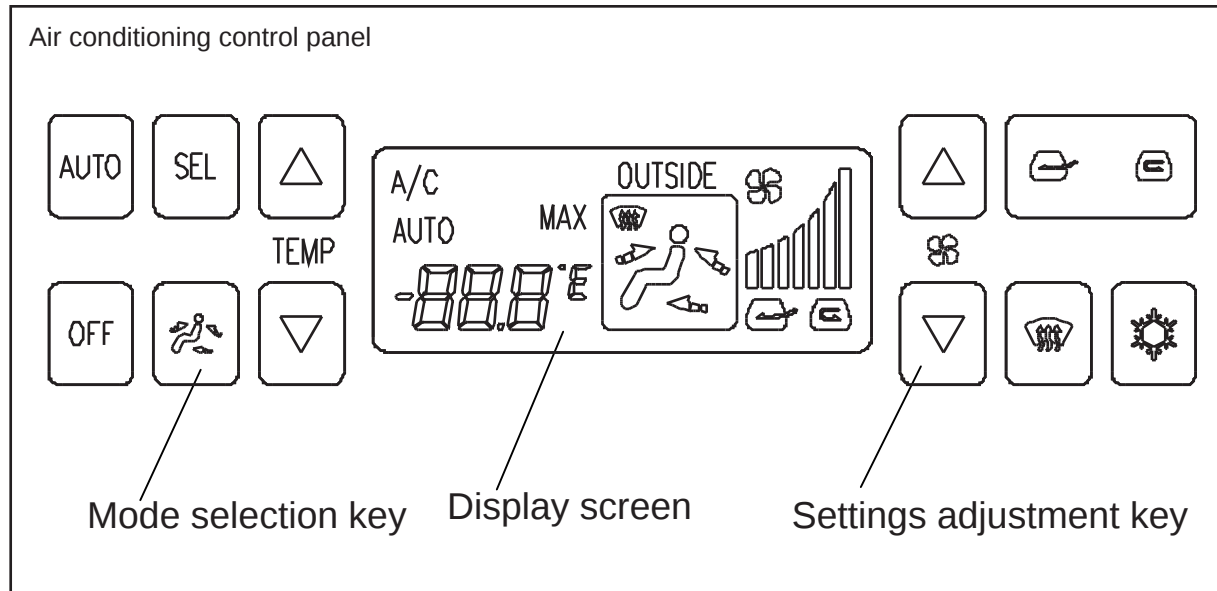
Press the marked side of the switch to open, spray water to the front window, then press the wiper

5.Switch cover plate

The switch cover only encloses the reserved switch position. When it is necessary to add functions,

Air conditioning control

The air conditioning control panel is installed on the Left control



1.Key function and basic operation

Power switch



When the machine is powered on, the air conditioning system is automatically powered on. The air conditioning system enters the automatic refrigeration mode, the default setting is temperature at 25*, wind speed in grade 4, internal circulation wind.

Press the "OFF" button to turn OFF the air-conditioning system and turn OFF the power without remembering the current working state.

Refrigeration key



Press this button in the ventilation mode to remember the current state (Wind speed setting), and the system enters the refrigeration mode. The screen shows A/C (upper left corner).

Press this button in refrigeration mode to cancel the refrigeration mode. The graphics A/C (upper left corner of screen) disappear and the system enters the ventilation state.

Press this key and defrost key in defrost mode to cancel defrost mode, the display  on the screen disappear. The system enters refrigeration mode and displays A/C (upper left corner) graphics.

Press this button in automatic cooling mode to cancel the automatic cooling mode, screen AUTO and A/C graphics disappear, and the system enters ventilation mode.

Defrosting key/heating key



Press this button in ventilation mode to enter defrosting/heating mode.  shows on the screen.

Circulating air key

 Press this key to enter the inner loop mode. The screen shows . Press this key again in the inner loop mode the system switches to the outer loop mode.

 Press this key to enter the outer loop mode. The screen shows . In the outer loop mode, press this key again and the system switches to the inner loop mode.

Increase setting key

 By pressing this key, different temperatures can be set. The screen shows the specific set value of temperature. Each time you press the key, the temperature increases 0.5*. The maximum value is 32*.

 Press this button to increase the wind speed, screen display . The bars  increase accordingly. Press the key once, the bar increases by 1, and the wind speed increases by 1 gear.

Reduce setting key

 By pressing this key, different temperatures can be set. The screen shows the specific temperature setting value. Each time you press this key, the temperature decreases by 0.5*. The minimum value is 17*.

 Press this button to reduce the wind speed, screen display . The bars  are correspondingly reduced. Press the key once, the bar decreases by 1, and the wind speed decreases by 1 gear.

Mode setting key

 Through this key, you can switch successively in the following four blowing modes:
Face blown + back blown mode, when the screen shows , the face and back blowing vents opened.
Full blown mode, when the screen shows , the face, back and feet blowing vents opened.
Feet blown mode, when the screen shows , the feet blowing vents opened.
Feet blown foot + defrost mode, when the screen shows , the feet blowing and defrost vents opened.

Ambient temperature check key

 Through this key, the ambient temperature can be viewed, and the screen shows the specific ambient temperature value.

2.The use of special operations

1) Strong refrigeration operation

This operation usually be chosen in hot climates, especially in the early days of cooling. The operation: select the refrigeration mode, press the "increase wind speed" button to select the maximum wind speed, and press the temp "reduce setting" button to select the lowest temperature value.

2) Weak refrigeration operation

This operation usually be chosen in a slightly hot climate, especially after a period of cooling, the indoor temperature has been suitable or even cool. The operation: select the refrigeration mode, press the "reduce wind speed" button to select the minimum wind speed, press the temp "increase setting" button to properly increase the set temperature value.

3) Forced heat and defrost operations

This operation usually be used in cold climates, especially during the first few days of heating, when frost removal is needed on the outside of the glass. The operation: select the heating mode, press the "increase wind speed" button to select the maximum wind speed, and press the temp "increase setting" button to select the maximum temperature value.

4) Weak heating operation

This operation be chosen in slightly cold climates, especially after heating for a period of time, when the indoor temperature is already suitable or even warmer. The operation: select the heating mode, press the "reduce wind speed" button to select the minimum wind speed, press the temp "reduce setting" button to reduce the temperature appropriately.

5) Dehumidification and defogging operation

This operation be selected in humid climate conditions (including indoor human exhaled water vapor and sweat), when the indoor temperature is higher than the outdoor temperature (including the use of heating). Such indoor humidity makes people feel uncomfortable, also it will form a layer of fog on the inside of the glass, affecting the line of sight.

There are two ways to do this:

A. Choose "Weak cooling operation" in lukewarm or slightly hot climates(See "4" above for details.)

B. In a cold climate, select heating and cooling to work at the same time (i.e., "Defrost mode" in Table

1, the screen shows ). In this defrosting mode, the cooling capacity has been set by the program and cannot be adjusted or displayed. The heat produced can be adjusted by the operator according to the requirement of indoor temperature.

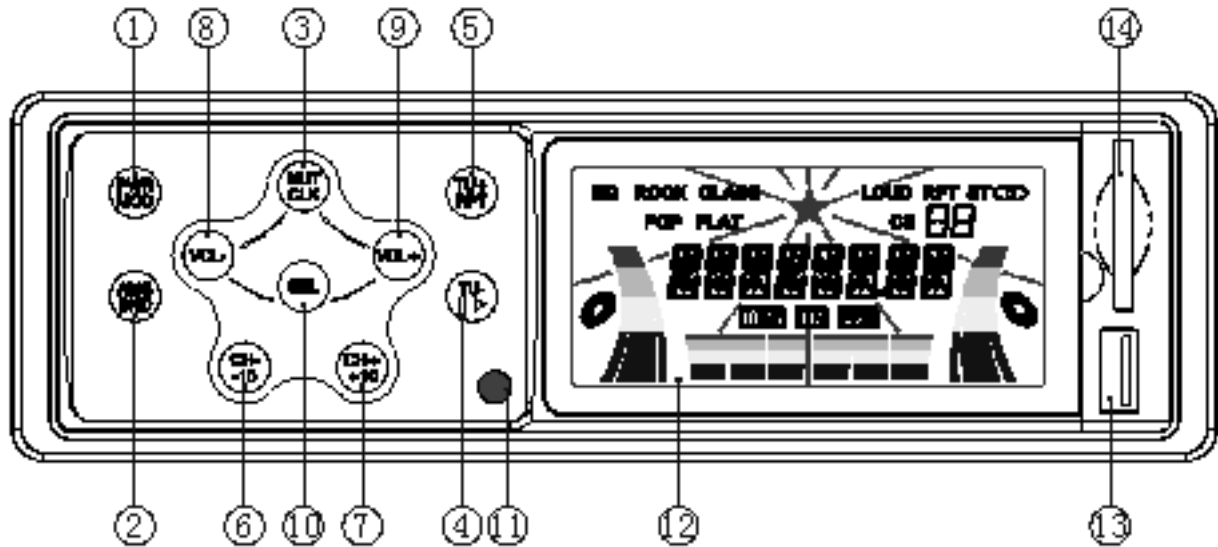
3 Other Notes

*.Using the internal circulation for a long time may make the air indoor stale can not be fresh, while using the external circulation for a long time will cause partial loss of cooling or heating. Therefore, please use it appropriately.

Default setting: As long as the operation mode is changed or the system is shut down, the system automatically closes the outer circulation damper (enters the inner circulation mode). 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 external circulation wind selection key.

*.The air conditioning system of the machine is automatic. Every time the machine starts up, the air conditioning system enters the refrigeration mode automatically. The temperature is set within the comfort range of human perception, the air volume is set at level 4. If the automatic control mode is maintained, the air conditioning system can automatically adjust the blowing air temperature, blowing direction and air volume, so as to approach the set temperature of the cab. When you do not like the automatic control of the air volume, use the air volume adjustment button to manually change the air volume.

Radio



Radio operating instructions

.PWR/MODE--Power switch/Radio-MP3 switching

When the power is off, press this key or insert SD/MMC card or USB to turn on the power.

When the power is on, Long press this key to turn on and off the power, Short press to convert between radio, Mp3 (USB, SD).

2. AMS/BAND--Auto search and store stations and band switch, display MP3 information and music search.

In Radio mode, Short press this key to switch between FM and AM, Long press this key to automatically search for and store radio stations (FM and AM can store 31 stations each).

In MP3 mode, Short press to display information about Mp3 songs (displaying Western symbols only), Long press to enter music search mode. Use key 8 (VOL-) or key 9 (VOL+) to select the first/last track, key 6 (CH-) or key 7 (CH+) to select the first/last track, key 5 (TU+) or key 4 (TU-) to select the track number, then press this key to confirm.

3.CLK/MUTE--ute, time display and adjust.

Radio /MP3 status, Short press the key to Mute Sounds. Long press, show time. When the time is displayed, long press to enter the time adjustment mode, minutes will flash, Short press again the hours will flash, then press 8 (VOL-) and 9 (VOL+) to reduce or increase the clock or minutes.

4.TU/--Manual search, automatic search, MP3 selection and start or stop playing

In radio statu, Short press the key to search stations manually, Long press to search stations automaticly.

In MP3 statu, short press the key to play the previous song, Long press to Start or pause the Mp3 playing. Cooperate with key 2 (AMS/BAND) to search Mp3 tracks.

5. TU+/RPT--Manual search, automatic search, MP3 selection and Repeat play.
 In radio mode, Short press the key to search channels backward manually, Long press to search channels backward automatically
 In MP3 mode, short press the key to play the next song. Long press to Repeat all the songs (Single repeat while the screen 12 shows PRT)
 Cooperate with key 2 (AMS/BAND) to search Mp3 tracks.
6. CH-/10--Select, memory stations and MP3 tracks quick selection
 In radio mode, short press to select the last memory channel. Long press to enter memory mode, the station will blinking display, then short press key 7(CH+)/key 6(CH-) to select stations. Or long press to continuously add or subtract the station number, select the station number that needs to be stored, after 3 seconds, the Hz will be automatically saved to the selected station number.
 In MP3 player mode:
 Subtract 10 from the playing number.
7. CH+/+10-- Select, memory stations and MP3 tracks quick selection
 In radio mode, short press to select the next memory station.
 Long press to enter memory mode, the station will blinking display, then short press key 7(CH+)/key 6(CH-) to select stations. Or long press to continuously add or subtract the station number, select the station number that needs to be stored, after 3 seconds, the Hz will be automatically saved to the selected station number.
 In MP3 player mode:
 Add 10 to the playing number
8. VOL+ - Increases volume and Function selection Settings
 Press this key to increase the volume.
 Long press can be adjusted continuously.
 Cooperate with SEL key to select functions.
 Cooperate with key 2 (AMS/BAND) to search Mp3 tracks.
9. VOL - - decreases volume and Function selection Settings
 Press this key to decrease the volume.
 Long press can be adjusted continuously.
 Cooperate with SEL key to select functions.
 Cooperate with key 2 (AMS/BAND) to search Mp3 tracks.
10. SEL-- Function Settings (use with key 8VOL-, key 9VOL+)
 Short press the button to enter the sound menu. Loop switch VOL * BASS * TRE * BAL, then adjust the value with keys 8 (VOL-) and 9 (VOL+).
 Long press to enter the system menu, then short press SEL key to loop switch menu, and then use keys 8 (VOL-), 9 (VOL+) to adjust the value.
11. Remote control window
12. Display screen
13. USB socket - After plugging into the USB drive, the machine searches for all the tracks on the USB drive and starts playing.
14. SD/MMC Card slot - After inserting the SD/MMC card, the machine searches all tracks on the USB drive and starts playing

Note: The operation panel will be slightly different due to different radio models

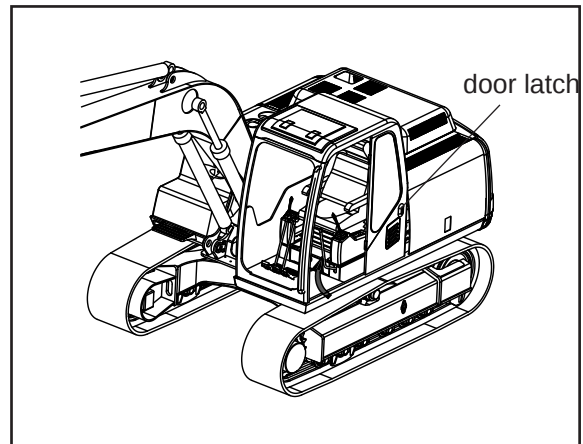
Door and windows

1.Cab door

The excavator door is the only normal access path for the driver. Lock the door when the driver leaves the cab.

When the cab door is opened, please lock the door tightly to the door latch to avoid hurting others.

When the door needs to be closed, press the door latch lever, the door lock is opened, and the cab door can turn.



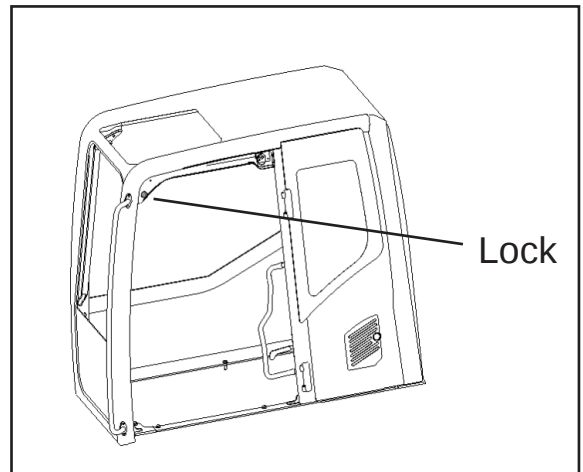
2.Rear window

The rear window can be used as an emergency exit. When the door of the cab cannot be opened for some reason and the trapped driver cannot get in and out of the cab normally, he can hit the rear window glass with the tip of the escape hammer until it breaks the glass, and then escape.

3.Front window (flip window)

If the flip window is opened, the driver can get better viewing conditions and better ventilation.

To open the flip window (front window), you need to pull the handle locks on both sides of the flip window first. By the handle of the lock, you can slide the flip window up and down. Pull the flip window to an appropriate position, then push the flip window up to the locked position, release the handle lock and lock the flip window.



Contrary, the flip window can be lowered.

Power switch

1. Manual power switch

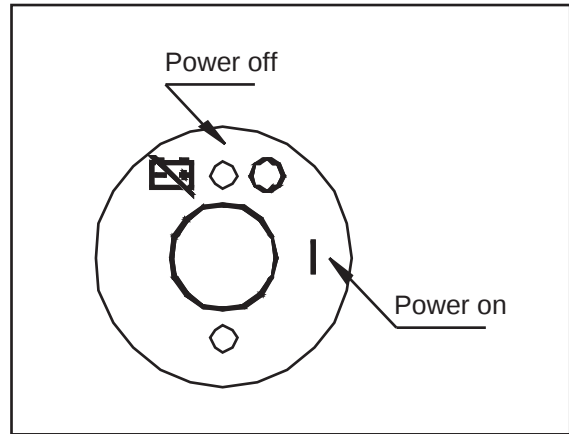
Refer to the attached drawing for the on and off of manual power switch.

Switch in on position: machine power on, can operate normally

Switch in off position: the machine power off.

When the machine needs to be repaired or maintained, please disconnect the manual power switch to ensure the safety of person and machine.

When the machine is down for a long period of time, please disconnect the manual power switch to protect the battery and extend the battery's service time.



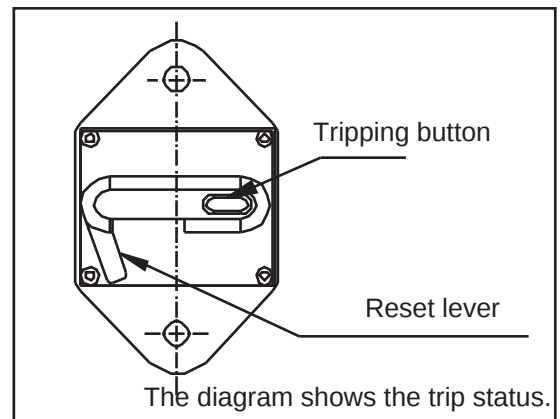
2. Circuit breaker

The machine is equipped with circuit breakers to protect the machine's circuits.

When the machine is working normally, the circuit breaker is in the reset state.

When the machine circuit short-circuit fault occurs, the short-circuit device will trip automatically and disconnect the power supply of the whole machine.

At this time, the circuit fault of the whole machine should be eliminated and determined. The circuit breaker can be reset after the circuit is normal.



4

Operating Guide

Preparations before operating this machine

- 1) The excavator should be operated by the trained driver, who must comply with the specific requirements of the local area before operating independently.
- 2) Unless the drivers have been read carefully the manual, the operation is strictly prohibited.
- 3) Drivers must wear tight-fitting clothing and appropriate adaptation of the safety items such as helmets, shoes, gloves, protective glasses, safety belt light before the operation.
- 4) Every day, before starting, the machine should be carefully checked according to the requirements.
- 5) Check if the working equipments, the tanks and the hoses are damaged.
- 6) Remove the dust and dirty around the engine, radiator and the battery.
- 7) Check if the hydraulic equipment, mailboxes, pipes, joints leak oil. (By the method of inspecting if there are significant traces of oil).
- 8) Check if the frame parts (tracks, driving wheels idles, etc) are broken, if the bolts are loose, and if the connection between the frame and the platform is loose.
- 9) Check the equipment, and the monitoring device should not be damaged.
- 10) Clear and check the mirrors, and adjust the angle to the correct vision.



Warning: Before the operation, you should make sure that you have understood and remember the contents related to the safe operation of the safety regulations in the manual.

Engine operation



Warning: Please refer to the safety details in this manual before starting the engine. Read all safety signs on the machine. There shall be no other persons in the workplace. Learn and practice safe operation before operation. When operating the machine, the operation and maintenance sections of the instructions must be clearly understood and followed, and the corresponding regulations must be observed.

1. Checking before starting the engine

- 1) Check whether the safety belt is fastened, honk the horn, confirm whether there are people around the working area and above or below the machine.
- 2) Check whether each window glass and rearview mirror can provide a good visual field.
- 3) Check whether there is dust or dirt around the engine, battery and radiator, and remove it if there is.
- 4) Check and confirm the working device, cylinder, connecting rod and hydraulic hose have no cracks, excessive wear or clearance. If an anomaly is found, it should be replaced or repaired.
- 5) Check whether the hydraulic device, hydraulic oil tank, hose and joint leak oil.
- 6) Check the lower part of the machine (track, sprocket, guide wheel, etc.) for damage, wear, loose bolts or oil leakage.
- 7) Check whether the instrument display is normal, whether all the working lights can work normally, and whether the electrical circuit is open or not.
- 8) Check whether the coolant level, fuel oil 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 oil, hydraulic oil, battery electrolyte, oil and lubricating oil are frozen or not. If there is freezing, the engine can only be started after the oil thawing.
- 10) Check whether the hydraulic safety lock is in the locked state.
- 11) Check the working condition, direction and position of the machine, so as to provide relevant information for operation.

2.Start the Engine



Warning:

The engine is not allowed to start when the warning board for no engine starting is hung on the control handle.

Before starting the engine, make sure that the safety locking handle is in the locked position, so as to prevent accidentally contact with the joystick during starting, which may cause sudden action of the working device and cause accidents.

Thoroughly preheat the engine when starting in cold weather. Machines will be slow to respond if the machine is not thoroughly warmed up before operating the joystick, and it may lead to an accident.

If the battery electrolyte is frozen, do not charge the battery or start the engine with a different power supply, which will cause the fire hazard to the battery. Before charging the battery or start the engine with the different power supply, make the battery electrolyte to dissolve. Check whether the battery electrolyte is frozen and leaked before starting the engine.

Before starting the engine, insert the key to the start switch and turn it to the ON position. Check all of the alarm lights display status on the digital instrument cluster, if any alarms are found, please troubleshoot it before starting the engine.

A.Start the engine under the normal temperature

Turn the key to the working position, the alarm indicator is off and the meter shows "Engine is ready to start", which indicates the machine can be started normally, then turn the key to the starting position and keep it there for no more than 15 seconds. After the engine starts, release the key and it will automatically return to the working position. If the engine fails to start, wait for 30 seconds before restarting.

B.Start the engine under low temperature

Cold temperature (temperature determined automatically by the machine), turn the key to the working position, the instrument shows "engine is preheating", the machine automatically enters the preheating state, it's forbidden to turn the key at this time. When the preheating is finished and the instrument shows "engine can be started", turn the key to start position to start the engine.

C.Engine warming

After the engine starts, the controller automatically judges that, if it does not meet the warm-up conditions, the engine will run in the lowest gear regardless of the original position of the throttle gear, and will not set the speed until the throttle gear is turned or the power mode is set. If the controller judges that the machine meets the conditions for heating, the engine will automatically run in gear 3 to warm up the machine. The maximum heating time is not more than 5 minutes.

Note: Continuous start should not exceed 15 seconds; time interval between two starts should not be shorter than 30 seconds; the engine systems should be checked if the engine can't be started after three attempts.



Warning:

- 1) Never turn the key while the engine is running. Or the engine would be damaged.
- 2) Never start the engine when dragging the excavator.
- 3) Never start the machine by starting the motor in a short circuit.

● Start the engine with the auxiliary cable



Warning: When the battery electrolyte is frozen, if you (1) try to charge the battery or (2) make jumper of the engine, the battery will explode. To prevent freezing of the battery electrolyte, please maintain the battery is charged fully. If you do not comply with these instructions, you or



Warning: Batteries can produce explosive gases. Stay away from sparks, flames and fireworks. When the batteries are charged or used in a closed area, keep ventilation. when working near the battery you should wear an eye mask .

If the auxiliary cable is connected in the wrong way, the battery will explode. Therefore, follow the following rules.

1) When starting with the auxiliary cable, the operation should be carried out by two persons (one sitting on the operator's seat, the other operating the battery).

2) When starting with another machine, do not allow two machines to touch each other.

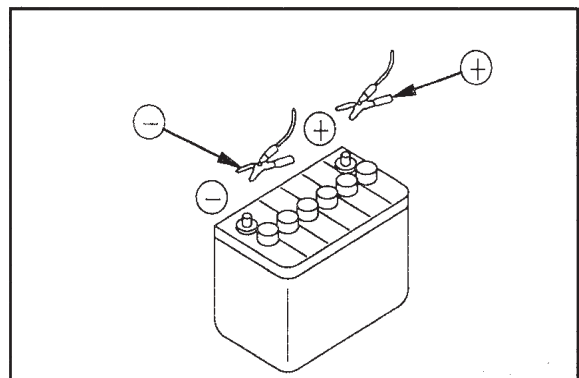
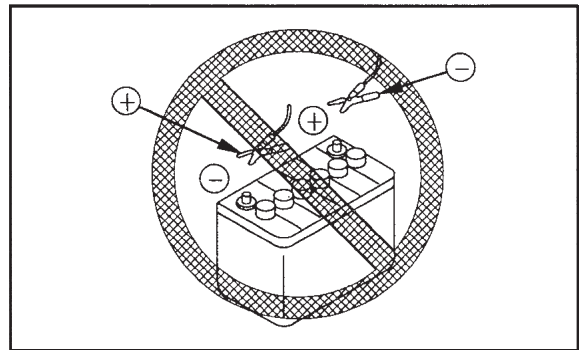
3) When connecting the auxiliary cable, turn the key switch for normal and faulty machines to the OFF position. Otherwise, the machine will be in danger of moving when the power is switched on.

4) When installing auxiliary cables, be sure to connect the battery cathode (-) at the end; When removing the auxiliary cable, the battery negative (-) cable should be disconnected first.

5) When removing the auxiliary cable, do not allow the auxiliary cable clamp to contact each other or the cable clamp to contact the machine.

6) When starting the engine with an auxiliary cable, always wear goggles and rubber gloves.

7) When connecting the faulty machine with a normal machine with the auxiliary cable, use the normal machine whose battery voltage is the same voltage as the faulty machine.



3.After starting the engine

A.Warm-up of the engine and the machine

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

- 1) Automatic engine warming-up
- 2) When the automatic engine warm-up is finished, put the throttle in the middle position to run for 5 ~ 10min.
- 3) At this speed, flex each cylinder several times, and gently operate the rotary and traveling motors to preheat them. Only when the oil temperature reaches above 20°C can it work. If necessary, the bucket cylinder can be extended or shrunk to the end of the trip. Preheat the hydraulic oil with full load, but not more than 30 seconds each time. Repeat the operation until the oil temperature requirements is met.

B.Inspection after starting the engine

- 1) Check whether every indicator light is off.
- 2) Check for oil leakage (lubricating oil, fuel oil) and water leakage.
- 3) Check the sound, vibration, heating, smell and meter of the machine for any abnormalities. If anything abnormal is found, repair it immediately.

4.Turn off the engine

Note: If the engine is shut off suddenly before cooling down, the service life of the engine will be greatly shortened. So don't shut down the engine suddenly, except in an emergency.

If the engine overheats, do not shut down suddenly, but run at a moderate speed to gradually cool down the engine, and then turn it off.

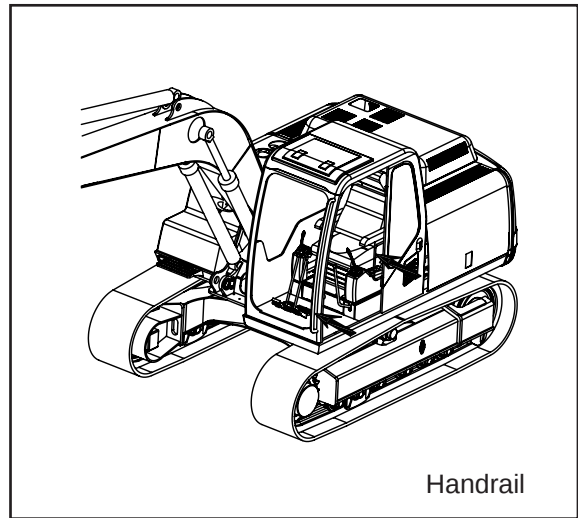
- 1) Turn the throttle knob or handle to the Min. speed position.
- 2) Run the engine in an idle for about 5min to make it gradually cooled.
- 3) Turn the key switch to the OFF position to turn off the engine, and all the indicators off.
- 4) Remove the key of the starter switch.

5.Checking after turning off the engine

- 1) Inspect the working device, outside the machine and the chassis, and check if there is oil leakage or water leakage. If there is anything abnormal, please make treatment immediately.
- 2) Fill up the fuel tank
- 3) Check if there are scraps of paper or debris in the engine room. If any, clear them to prevent fire.
- 4) Remove mud from the chassis.

Getting in or out of the machine

- 1) Make sure to clench the handrail at the cab door as shown in the picture (shown by the arrow in the picture)
- 2) Make sure your feet step steadily on the track.
- 3) When getting on or off the machine, you should not take the control rod as handrails to grasp.
- 4) Before getting on or off the machine, check whether there are mud, grease or other substances on the handrail and crawler surface that may cause skidding. If there are any, clean them up.
- 5) Do not jump on or jump off the machine. Do not get on or off the machine when it is running.

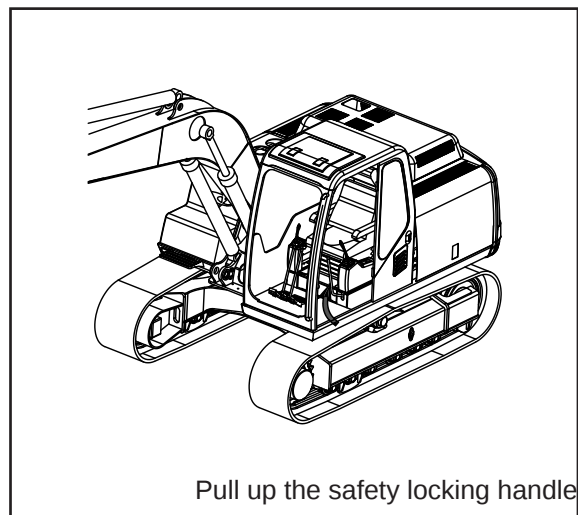


- 6) Before leaving the machine, the working device must be lowered to the ground completely, and the safety locking lever must be turned to the locking position, so that the whole machine is in the locking state, then shut down the engine, and keep this state until the next operation of the machine.

Note: Please remove the key and lock all doors and Windows before leaving.

Climbing onto the engine hood or cab roof is forbidden.

No person is allowed to be on the working device (such as bucket, arm, boom, and accessories) in any condition.



Moving of the machine

1. Safety principles for moving the machine

- 1) Before starting the excavator, you should be familiar with the environment around the site, to know whether there are pedestrians, obstacles, ground bearing, etc.
- 2) Before starting excavator, honk to warn others.
- 3) The drivers are strictly prohibited to start or manipulate the machine on the ground.
- 4) The excavator must walk and work on solid ground more than 1.5 times as its width.
- 5) When walking through underground tunnels, Bridges or under high voltage, make sure there are gesture commands.
- 6) When walking, you must lower the boom and bucket rod to maintain the best position of the center of gravity.
- 7) When walking, nobody but the driver is allowed to be on the machine.
- 8) When walking long distances on flat roads, the platform can be left unlocked, but must be locked when going uphill and downhill.
- 9) Before operating the steering joystick, check the direction of the crawler frame.
- 10) Don't let anyone in the area around the machine.
- 11) Clear all obstacles in the path of the machine.
- 12) There is a blind spot at the rear of the machine, so take special care to ensure safety when reversing or turning.

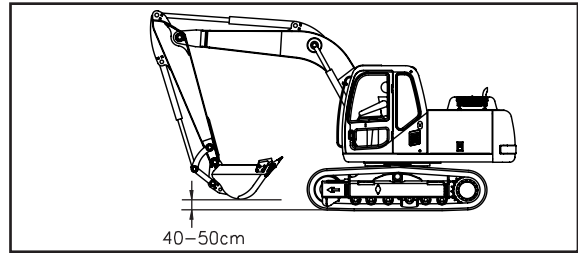


Warning: The sudden convert of control rod in the high-speed walking is dangerous.

- 1) Do not convert the joystick suddenly, otherwise it will cause a sudden start.
- 2) Avoid suddenly switching the joystick from forward to backward (or from backward to forward).
- 3) Avoid sudden shifts in the joystick, such as sudden stops from high speed (release the joystick).

3. Moving the machine forward

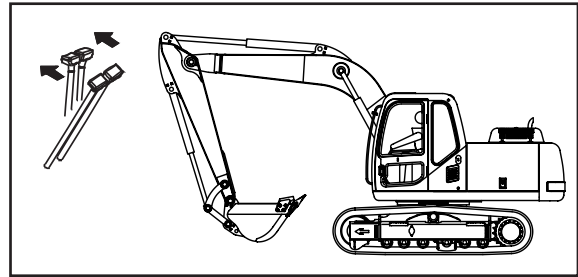
1) Turn the safety lock handle to the unlocked position, lift the working device and lift it 40 to 50cm off the ground.



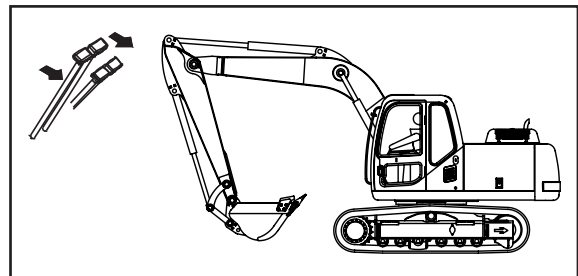
Manipulate the left and right joystick as following steps.

When the march sign is on the front part of the machine,

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



Note: At low temperature, if the speed of the machine is not normal, the machine should be warmed up thoroughly. In addition, if the machine's abnormal speed is due to the lower body blocked by dirt, please remove the dirt and soil.



4. Moving the machine backward

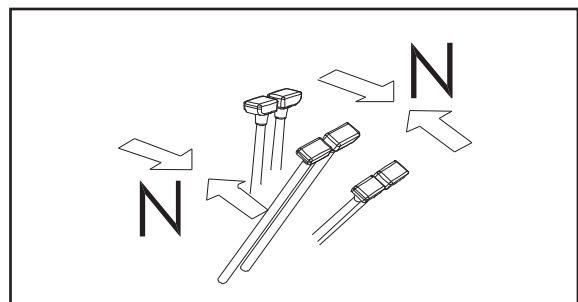
1) Turn the safety lock handle to the unlocked position, lift the working device and lift it 40-50cm off the ground.

2) The operation is the opposite of moving forward.

5. Stopping the machine

The machine can be stopped by placing the left and right levers in the middle position.

Note: Do not stop the machine suddenly during its walking. The parking space should be enough.



Turning of the machine

Note: Before manipulating the control rod, check the position of the forward sign. If the forward sign is at the back, the operation of the control rod is to the opposite.

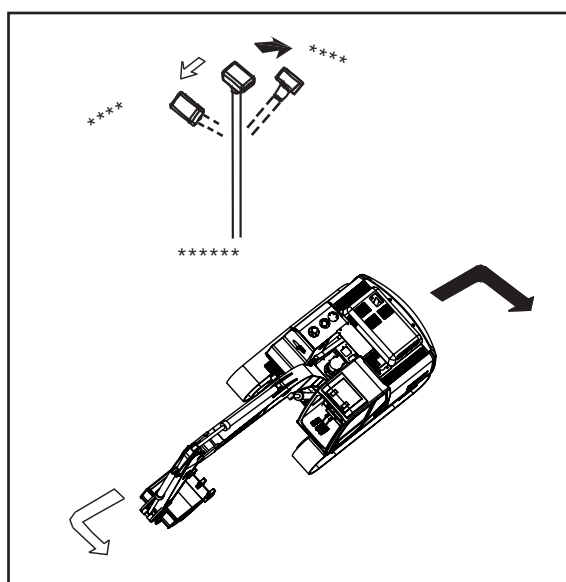
Use left and right joysticks to change direction.

Avoid sudden changes of direction as possible. as you can Especially when thdoing e

1. Turning when the machine is stopped

When turning left (see the right side figure): When the machine is walking forward, push forward the right control rod and the machine will turn left. When the machine is walking backward, pull back the right control rod, and the machine will turn left.

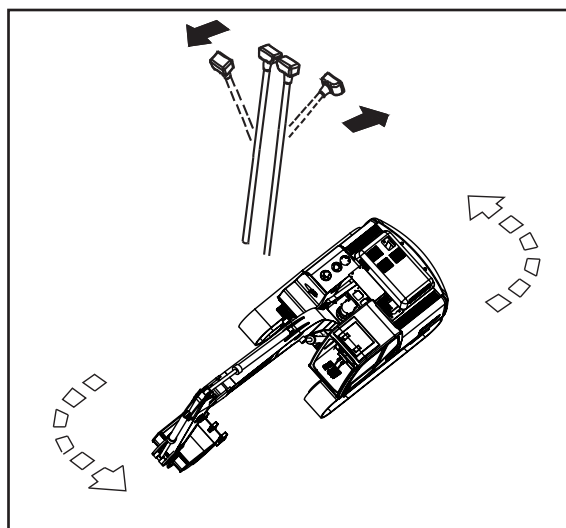
When turning right, please manipulate the left walking control rod in the same way.



Turning on the spot

When turning left in situ, pull the left control rod backward and push forward the right traveling control rod.

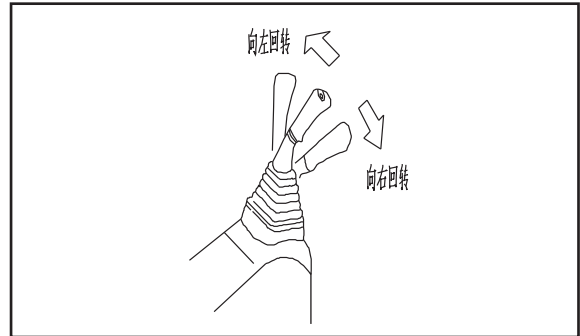
When turning right in situ, pull the right control rod backward and push forward the left traveling control rod.



Rotating of the machine

- * Before rotating the upper part of the machine, check that the surrounding area is safe
- * Operate the swivel lever quickly and the superstructure will rotate quickly. While operate the slewing lever slowly, the superstructure will turn slowly. Mind the speed of operating the joystick.

Manipulate the left working device joystick for rotary operation.



Operation of a working device

If you operate the working device control rod quickly, the working device will rotate quickly. If you operate the working device control rod slowly, the working device will rotate slowly.

Working device is operated by the pilot valve. The left control pilot valve controls the stick and rotation. The right control pilot valve controls the boom and bucket.

When the joystick is released, they automatically return to the middle position and the working device remains in place.

If you operate the pilot valve within 15 seconds of shutting down the engine, you can still low the working device down to the ground.

In addition, you can operate the control pilot valve to release the remaining pressure within the hydraulic oil circuit as well as make the boom fall down after the machine

1.Stick control

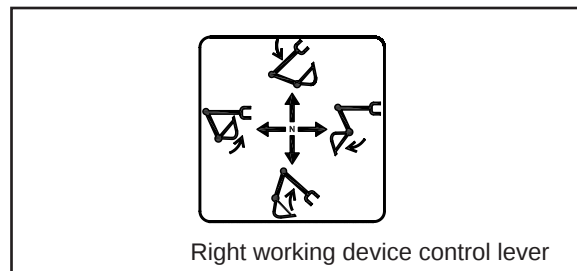
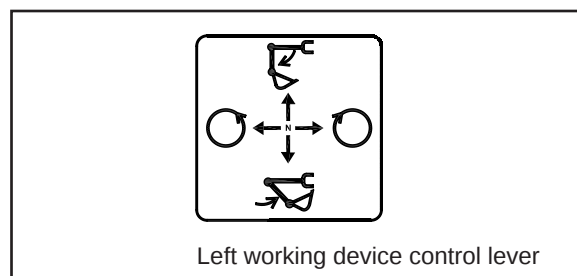
Manipulate the left control pilot valve, push it forward, the stick will extend out, while pull it back, the stick will retract inside.

2.Rotation control

Manipulate the left control pilot valve, turn it to the left, the platform will turn left, while turn it to the right, the platform will turn right.

3.Boom control

Operate the right pilot valve, push it forward to low the arm down, pull it back to lift the arm.



4. Bucket control

Manipulate the right control pilot valve, turn it to the right then the bucket stretches outwnturn it to the left and the bucket adducts.

Note: There may be a pause during the stick operation, which is not a mechanical fault but a normal phenomenon, because the dead weight of the excavator may cause the stick to move faster, which may cause insufficient oil supply.

Work on slopes or in water



Warning: Construction near foothill slopes is very dangerous. Different working conditions, such as raining, muddy ground, snow ground, ice ground, loose sand, soft ground and ect., bring potential danger to operation safety. Therefore, in the construction of dangerous areas such as foothills or ramps, you should correctly determine whether it is safe to operate.

*When walking, lift the bucket about 20 ~ 30 cm from the ground.

*Don't walk downhill backwards.

*When walking on bumps or other obstacles, keep the working device close to the ground and walk slowly.

*Do not turn on a slope or cross a slope. Go to a flat place and turn around.

*When working on a slope, turning or operating the working device can cause the machine to lose its balance and tip over, so such operation should be avoided. It is very dangerous to turn downhill when the bucket is loaded.

If such operation must be carried out, pile up a platform on the slope with soil to keep the machine in balance during operation.

*Don't go up or down a steep slope, which will caused a danger of the machine tipping over.

*When walking uphill, if the tracks board slip or the force of the tracks is not enough to walk uphill, do not use the force of the bucket pole to help the machine uphill, for it will cause danger of the machine tilting.

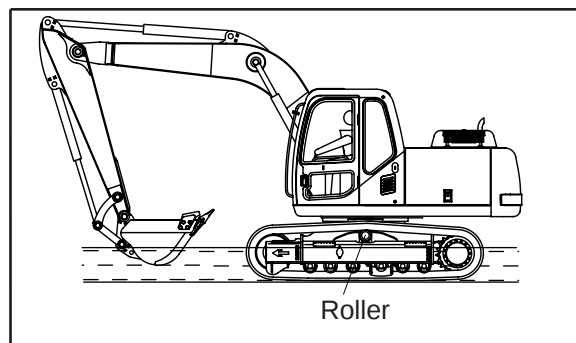
*When going uphill, make sure the engine and hydraulic oil are properly warmed up, otherwise it will cause an accident.

Allowable water depth

Do not drive the machine in water or mud deeper than the center line of the roller.

For parts that have been submerged underwater for a long time, add butter until the used butter is completely squeezed out.

Remove the dirt or sundries in lower part of the machine in time, otherwise the parts may be damaged.



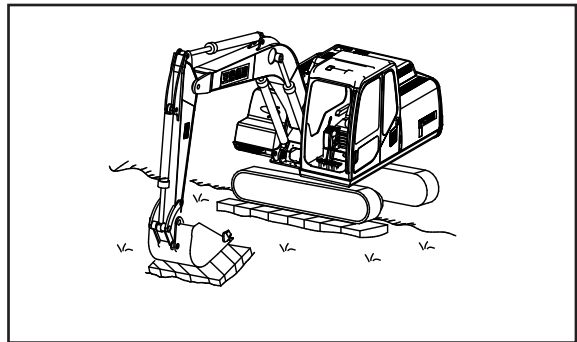
Getting out of the mud

Operate carefully at all times to avoid getting stuck in the mud. If the machine is stuck in the mud, follow the steps below to drive it out.

A. One side of the track stuck into mud

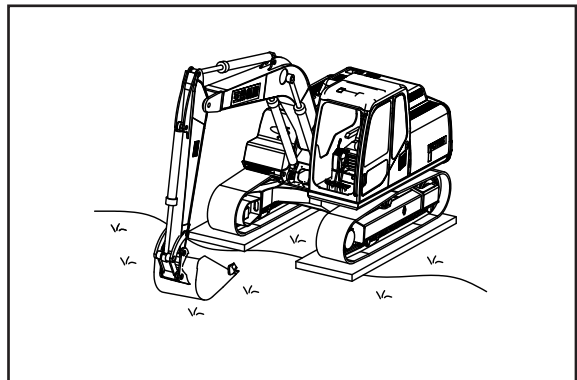
Note: make sure the bottom of the bucket is in contact with the ground when lifting the machine with the moving arm or bucket rod (do not push with bucket teeth). The Angle between the boom and the bucket rod shall be 90 to 110 degrees.

When only one side of the track is stuck in the mud, use the bucket to lift the track and then pad boards or logs to drive the machine out.



B. Both sides of the track stuck into mud

If tracks of both sides are caught in the mud, and they cannot be moved due to the skidding, mat boards or logs according to the method provided above. Insert the bucket into the front ground, manipulate the stick in the same manner with digging, and adjust the walking control stick to the forward position to pull out the machine.



Construction Operation Guide

1.Backhoe operation

Backhoe is suitable for the excavation in the position lower than the machine.

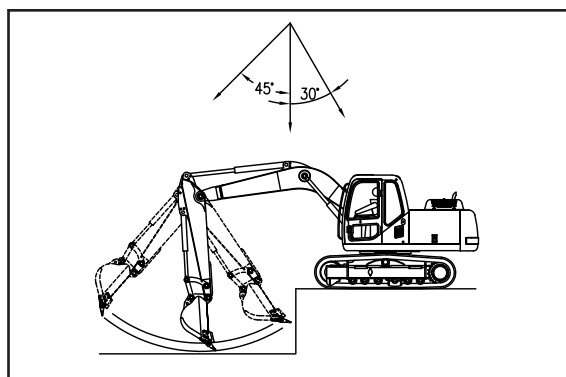
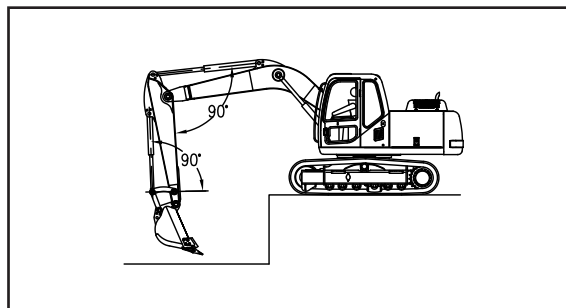
When the machine is in the state shown in the right picture, that is, when the angles between the bucket cylinder and linkage, the stick and the stick cylinder are both 90° , the push force of the bucket is biggest.

The effective use this angle in the excavation can optimize the efficiency.

The excavation scope of the stick is between 45° leaving the machine and 30° toward the machine.

The scope may be different due to the different depth of excavation, but please carry out the operation in the above range as possible as you can, and do not operate the cylinder to the end of its trip.

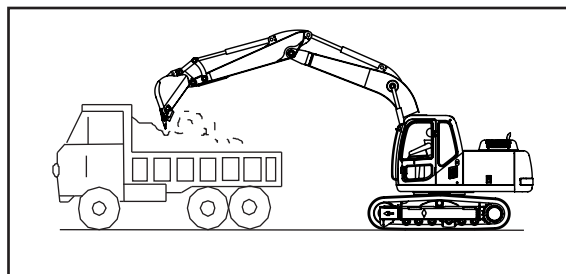
Note: As to the hard rock surface, you d better carry out the excavation after the surface has been broken in other ways, which not only reduces the damage to the machine, but also is more economical.



2.Loading operation

In the place where the rotation angle is smaller, making the dump truck stop where the operator can easily see will make the operation more efficient.

Compared with from one side of the dump truck, loading from the rear of the dump truck is more convenient, and the loading capacity is greater.



3.Trenching operations

Extend the boom and stick, and make the bucket teeth inserted into the soil.

In the process of stick cylinder excavation, you should timely adjust the cut angle and the loading angle of the bucket, or carry out the digging with the bucket cylinder. Do not insert the bucket teeth into the soil too much to avoid the machine fail to dig the soil due to the overloading of the hydraulic system. In case of the failing of ground-breaking, you can lift the boom appropriately, and the situation will change. After the bucket is full, raise the boom and stick to make the bucket above the ground, and then turn the platform to the proper location for dumping.

Note:

- 1) Never touch the wires in the air.
- 2) Before digging, know clearly the situation of the underground pipes and cables, to avoid breaking the pipes or the electric shock accident.
- 3) When there is an electric shock accident, the driver does not leave the seat, and warn others not to approach. Drive the machine to safety zone, cut the power and then leave.

4.Shaking off the sand and soil in the bucket

Make the stick in the state of approximate level, and the bucket in the state of unloading. If the sand and soil remain there, manipulate the bucket control stick left and right for a few times, then the sand will come out from the bucket. Never use the impact vibration of the end trip of the bucket cylinder to shake the sand.

5.Precautions for the use of the related components

A.Precaution for the use of tracks

- 1) Too much debris into the tracks will increase the operating strength of the tracks, resulting in the damage.
- 2) Avoid the sudden turn on the road with strong friction.
- 3) Try to avoid the tracks stained with salt water or salt air, because the salt will corrode the track.
- 4) If the track is not under use for a relatively long time, it should be saved in a cool and dry place.
- 5) When one track and the front device are being jacked up, you can not drive the machine with the other track, because such operation will cause wear and tear.
- 6) When walking, the track cannot be relaxed; otherwise, the track may fall off or subject to the damage.

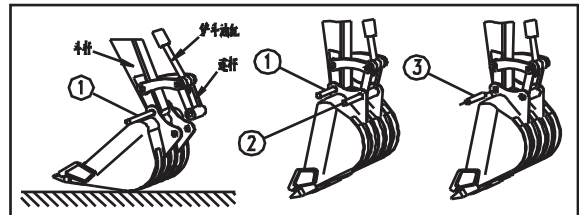
Disassembly and installation of the bucket

Safety principles

- *When you are striking the pin bearing, the metal debris may fly into your eyes, causing serious injury. So when doing this, you should always wear goggles, helmets, gloves and other protective equipment.
- *When removing the bucket, you must put the bucket steadily.
- *If the pins are hit hard, the pin can come out and hurt the people within the surrounding area. So, before hitting the pins, make sure that the surrounding area is safe.
- *When removing the pins, do not stand below the bucket, and do not let the feet or any part of your body below the bucket.
- * When removing or installing the pins, please do not have your hand bruised.
- *When facing the hole, do not put your fingers into the pin.

Installation

Put the machine on a solid and flat face. In the working of connection, for the sake of the safety, you should understand the signal of each other. Have the excavator in the working state, facing the bucket, and manipulate the stick, until the holes of the stick and bucket in the same line, and then insert a steel bar *of *30mm into the hole. Lift the boom and stick to make the bucket hang on the stick vertically. Manipulate the stick cylinder, to make the hole of the connecting rod and the holes of the bucket are on the same line. Install Shaft *. Remove the steel bar * and install Shaft *.



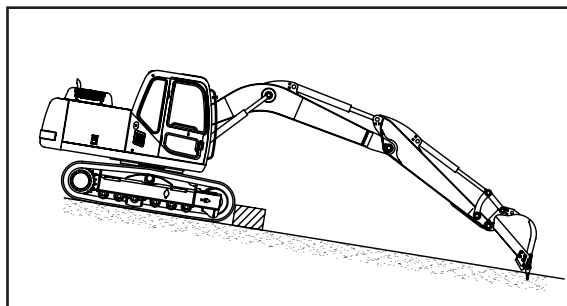
Disassembly

Stop the machine on a solid, flat surface, with the bucket on the position of just contact with the ground. If the bucket heavily falls to the ground, the resistance will be increased, and the pin will not be removed easily. Remove the bolts and dual-nut bolts of the locking bolts on the stick and the connection rod. And remove the stick pin *and the connecting rod pin*, and then remove the bucket.

Parking the machine

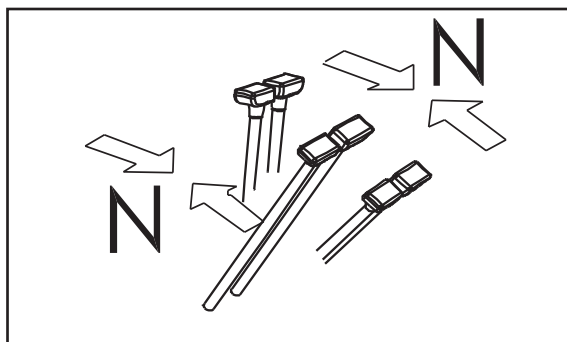
Safety principles

- 1) Avoid a sudden stop. When you are parking the machine, please leave a space as large as possible.
- 2) Park the machine on the solid and flat ground and avoid parking the machine on slopes. If the machine must be parked on the slopes, put the pads under the tracks and insert the working device into the ground to prevent the moving of the machine (See the right figure).
- 3) If you hit the working device control stick accidentally, the working device will move suddenly, resulting in serious personal injury or accident. So, before you stand up from the seat, you must make the safety lock lever fixed in the locking position.



Parking the machine

- 1) Stop the machine with the left and right walking control stick in the neutral place.
- 2) Do not immediately stop the machine after the heavy-duty work. Let it run for 5 minutes at a low speed to clear the overheating, and then shut down the machine.
- 3) Put the bucket and the bulldozing plate down to the ground.
- 4) Push forward the throttle to the end.
- 5) Turn the starter key to the *OFF* position (all the indicators go off).
- 6) Press the unmarked side of the slewing switch to lock the platform.



After the operation

1. Inspection

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

2. Locking

Please lock the following places:

- 1) Cab door (do not forget to shut the windows and the flip window). In any case, if you want to open the flip window, you need to first pull the handle lock on the both sides of the flip window. By operating the handle of the flip window handle locks, you can make the flip window slide upward and downward. When the flip window is pulled to the proper position, push upward the flip window to the locking position, release the handle lock and lock the flip window. Conversely, you can operate the flip window down.
- 2) Oiling port of the fuel tank
- 3) Oiling port of the hydraulic tank
- 4) Battery cover
- 5) Engine cover

Note: When you open the engine cover, there should be nobody standing behind it to avoid the harm to the human body by the sudden hop of the engine cover.

Handling and transport of the machine

1.Safety rules of the machine shipment

- 1) Run the machine at a slow speed, and operate slowly the machine when loading or unloading.
- 2) During the automatic warm-up operation, do not handle the machine.
- 3) If the automatic warm-up operation is canceled in the process of the handling operation, then the speed will suddenly change.
- 4) When handling the machine, you should choose a solid and flat surface, with a safe distance to the edge of the road.
- 5) Please use the ramp with sufficient width, length, thickness and strength, with the board's width equal to 1.2-1.5 times the width of the track. To avoid any failures, the handling gradient is proposed to be less than 15°, or the length of the slope is more than 3.5 times the height. When the soil pile is to be used, please compact the pile completely, and take measures to prevent the collapse of the slope.
- 6) To prevent the machine from slipping on the ramp, you should remove all the soil and dirt on the track before starting. Please make sure that the ramp surface is clean, without water, snow, ice, grease or oil.
- 7) Do not correct the direction on the ramp; otherwise the machine will have the risk of overturn. If you have to, please drive the machine out of the slope and correct the direction, then enter the ramp again.
- 8) Do not use the working device for the handling operation, for it is very dangerous.
- 9) When you are on the ramp, do not any control stick but the walking control stick.
- 10) At the direct junction point of the ramp and the transport truck, the machine's

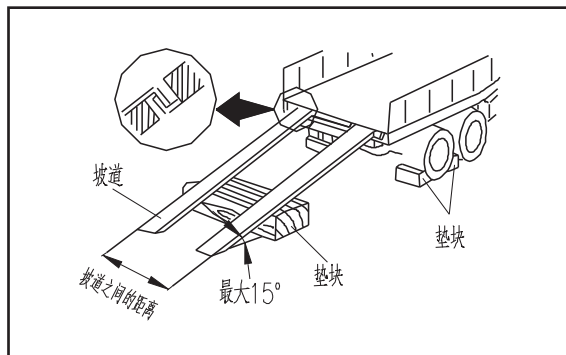
2.Loading

1) Loading can only be carried out on the solid and flat ground, with a safe distance to the road edge.

2) Impose appropriate brake to the transport vehicle, and put pads under the tires to ensure that the transport vehicle cannot move.

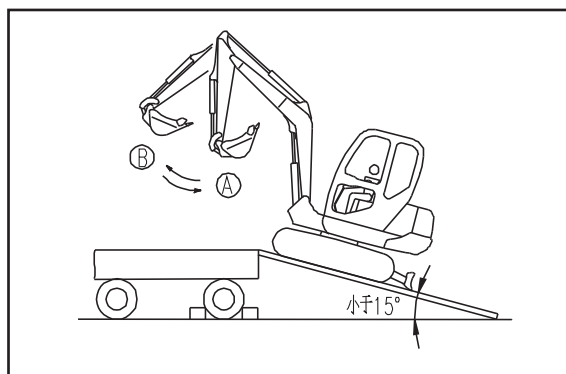
3) Install a ramp between the truck and the machine, and ensure that the ramps of both sides at the same horizontal surface. The gradient of the ramps should not exceed 15 degrees. Adjust the distance of the ramps to match the track enter.

4) Align the excavator with the ramp. For safety, bring the excavator close to the ramp and slowly climb up until the end of the ramp.



Note: When on the ramp, you can only operate control rod, and do not operate other sticks or pedals.

6) Stop driving and extend the stick (position B in the picture), making the front of the excavator track fall to the floor of the transport truck. During the down-dip of the machine, do not let the working device touch the body of the truck. Drive the machine continually to the required position on the transport vehicle.

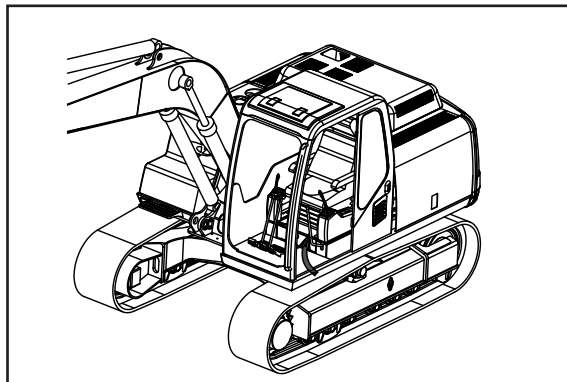


Warning: Before leaving the seat after the completion of the work or the completion of the control, the driver should turn the safety lock handle to the locked position to cut off the source of the fuel line to the pilot, so to avoid misoperation of the machine due to error or accidental collision with the joystick.

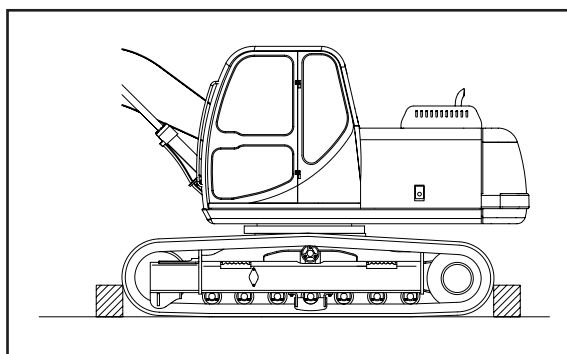
Note: Please select the transport vehicles whose size and weight match that provided in this operation manual.

3. Fixing the machine on the transport vehicle

- 1) Adjust the working device.
- 2) Turn off the engine and remove the key from the starter switch.
- 3) Lift the safety locking lever.
- 4) Lock the cab, the engine bonnet.



- 5) Put pads under the both ends of the tracks to prevent the moving of the machine in the transportation, and tether the machine firmly with the wire ropes. Please pay special attention to the fixing of the machine to prevent it from sliding to one side.



4. Unloading from the transport vehicle

- 1) Unloading can only be carried out on the solid and flat ground, with a safe distance to the road edge*
- 2) Impose appropriate brake to the transport vehicle, and put pads under the tires to ensure that the transport vehicle cannot move.
- 3) Install a ramp between the truck and the machine, and ensure that the ramps of both sides at the same horizontal surface. The gradient of the ramps should not exceed 15*. Adjust the distance of the ramps to match the track enter.
- 4) Remove the wire ropes used to fix the machine.
- 5) Start the engine. If in the winter, you should do a thorough warm-up operation.
- 6) Put down the safety locking lever.
- 7) Lift the stick and bucket, and raise the bucket.
- 8) Check and make sure that there is no obstruction within the range of the excavator.
- 9) Pull out the platform locking pin, making the platform turn 180 *, the digging device toward the slope, and the machine on the way forward.
- 10) The excavator walk forward slowly to the top of the stab, and now overhang the stick, making the tracks of the machine dump onto the ramp, and then move the machine slowly to the ground.

5. Hoisting the machine

A. Safety issues

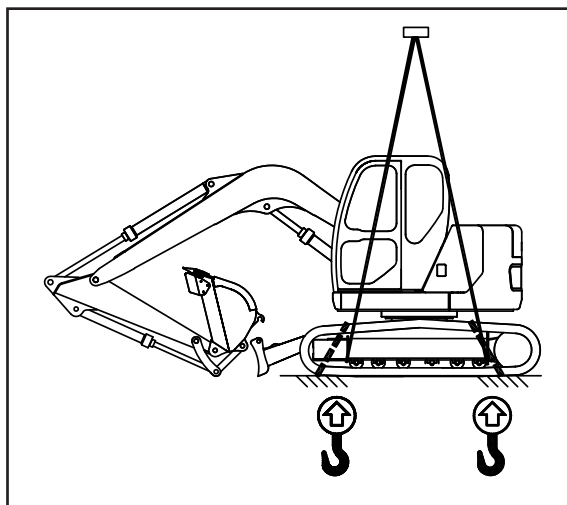
- 1) You can never hoist the machine when someone is on it.
- 2) Ensure that the wire ropes used for hoisting the machine has sufficient strength to withstand the weight of the machine.
- 3) Except the positions provided in the following procedures, do not hoist the machine in any other positions, otherwise the machine will have the risk of losing balance.
- 4) Do not hoist the machine when the upper structure is turning to the side. Before hoisting, you should turn the working device to the side of the sprocket, and make the lower track parallel to the upper structure.
- 5) When raising the machine, keep the machine in balance.
- 6) When the machine is being hoisted, it is very dangerous to walk under the machine, so please do not walk under the machine.

B. Hoisting procedures - the machine of standard technical specifications

Note: The hoisting procedures apply to the machine of standard technical specifications. According to the different accessories and optional parts, with different dimensions, weight, center of gravity distribution, etc., the hoisting method will be different.

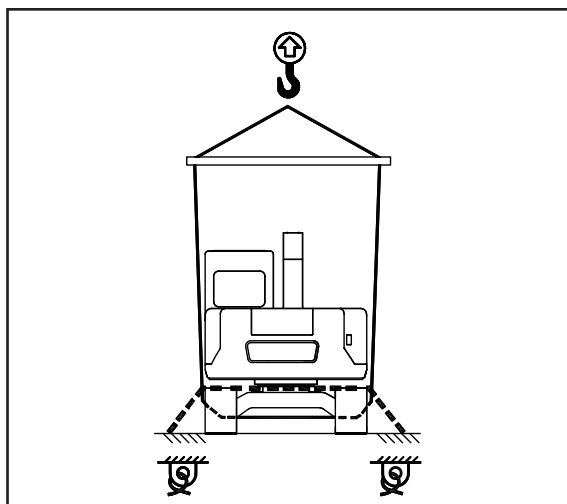
When lifting the machine, you should operate according to the following steps on the flat ground.

- 1) Turn the upper structure, making the working device at one end of the sprocket.
- 2) Fully extend the bucket cylinder and stick cylinder, and then make the working device fall to the ground with the boom cylinder.
- 3) Turn off the engine and make sure there is nothing around the cab, and then leave the machine after shutting the cab door and the windows.
- 4) Pass the wire ropes in the front from between the idlers and the tracks to at the back between the driving wheels and the track rollers. You can also pass the wire ropes from below the tracks.



- 5) Adjust the lifting angle of the wire ropes to 30° to 40°, and then lift the machine slowly.

- 6) After the machine leaves the ground, you should check carefully whether the machine is in balance, and then lift the machine slowly.



Operating under the hot or cold climate

1. Operating in the cold climate

The cold weather can cause particular problems, so you must pay special attention to the protection to prevent the serious damage of the machine. The maintenance in the cold weather will extend the life of the machine.

- 1) Electrical System: Keep the battery clean, full of power; and check the battery cables and connectors, clean and coat them with a layer of grease to prevent corrosion.
- 2) Lubricant: use the lubricant of suitable viscosity at each junction. Please use the lubricant recommended for this machine.
- 3) Fuel system: check if the fuel supply is suitable for the cold climate. If not, change with the low-viscosity fuel.

Check the water in the fuel system. Cold weather causes the water concentration in the tank, so please check the water in the fuel filter every 50 hours of the operation. If there is no water there, you can extend the inspection cycle. If there is water, check the fuel tank.

- 4) Cooling system: Before operating the machine in cold weather before, check the coolant and adjust the appropriate mix ratio. Use the antifreeze applying to the ambient temperature conditions.
- 5) Working device: Before operating the machine, hang the low file and drive the machine slowly, and then stop the machine to operate the working device for about 10minutes, or until all of the hydraulic cylinders is thought to work normally, After this, you can carried out the operation.

2. Operating in the hot climate

To prevent the damage to the machine, please do according to the following terms:

- 1) Make sure that the amount of coolant within the radiator is proper.
- 2) Before the hot season begins, check the radiator. If necessary, replace the coolant.
- 3) Remove all the dirt and fouling on the surface of the radiator and the engine.
- 4) Check the rotation belt of the fan.*
- 5) Use the Lubricating oil of proper viscosity.
- 6) Use the coolant of proper ratio in the cooling system.
- 7) You should always check the air filter when operating under the poor conditions such as the dusty environment.

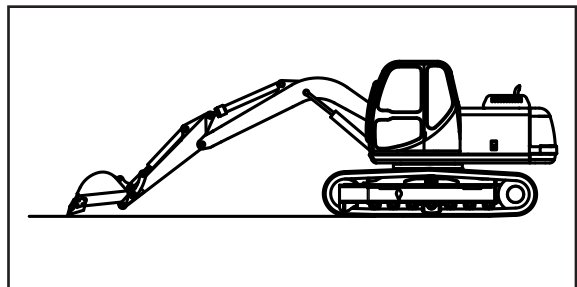
Storage of the machine

1. Preparation before the storage

When the machine need as long-tern storage, please do according to the following steps:

- 1) Clean and wash all the parts, then put the machine into the room. If the machine has to be stored outdoors, choose the flat ground and cover the machine with a cover cloththe metal surface of the piston rod coated with a layer of grease. Lubricate all lubrication points.
- 3) Remove the battery for fillin,g chang, and the it upstore it in the dry ice-free place.
- 4) Drain the engine oil in a hot state and fill corrosion resistant oil.The corrosion resistant oil used for piston engines is MII-L-21260. Use level 1 or 2 SAE10W for winter storage and Level 30 SAE30 for summer storage.
- 5)Add 4-6% of the same type of corrosion resistant oil to the fuel and mix well. To prevent condensation, the fuel tank should be refilled with this composite fuel.
- 6) Check the antifreeze performance of the coolant and make it at least -20* by adding antifreeze. If there is no preservative in the coolant due to climatic reasons, an etchant should be added (e.g. 5% according to MIL-G4339C).
- 7) Start the engine and make it run for more than 15 minutes, with different speeds but no load. For the hydraulic components and reducer oil empty, should also be allowed to operate, and then replaced with a new oil storage.
- 8) Close the air inlet of the air filter and the air outlet of the exhaust pipe. For this, it is recommended to use plastic thick paper and adhesive tape.
- 9) Lock the platform and lift the safety lock handle (lift the left control box) so that each joystick and pedal are locked.
- 10) Place the globe valve for mounting accessories on the machine in the locked position. Install a screw plug in the elbow.
- 11) Keep the machine clean and keep it in a dry place.

Note: When storing the machine, adjust the machine to the position shown in the picture on the right to protect the cylinder piston rod and prevent the piston rod from rusting.



2. During storage

- 1) During storage, operate the machine once a month to make the surface of the moving parts attached with a layer of the new film and charge the battery at the same time.
- 2) Run the air conditioning for the machine equipped with the air conditioning.
- 3) Turn the track.



Warning: If you must carry out the antirust operation to the machine stored indoors, you have to open the doors and windows to promote the air circulation and prevent the gas poisoning.

3. Use recovery after storage

Before using the machine after long-term storage, please do according to the following steps:

- 1) Wipe off the grease coated on the surface of the cylinder piston rod.
- 2) Fill oil and grease to all the parts of the machine.
- 3) After long-term storage, the atmospheric moisture will enter the within the machine. Before or after starting the machine, you have to check the oil of all parts of it. If there is water in the oil, replace all the oil.

Note: 1) Under the condition of normal climate, the method above introduced can make the excavator in storage for one year. However, after 6 months of the storage, you should run all the parts of the machine without load for 15minutes, and at the same time, fill lubricants to all the parts of it.

- 2) Before reusing the machine after long-term storage, you have to do the necessary work and all the inspections. After the machine is stored for one year, you also have to exclude the oil in the reducer and the hydraulic circuit and immediately make the

Reasons of technical failures and solutions

Failures	Reasons	Solutions
1.The engine cannot start or is difficult to start	*There is a problem with the starting motor	*Replace or repair the starter motor
	*Insufficient battery charge	*Charge or replace the battery
	*Improper use of the warm-up lines or plugs	*Repair or replace the plugs
	*Incorrect injection time	*Check the injection timing
	*Blockage of the pipelin	*Clear the oil line
	*Blockage of the fuel filter	*Clean or replace the fuel filter
	*Water, dust or air in the fuel system	*Exclude the air and clean the oil lines
	*Dirty or low-pressure fuel injection nozzle	*Repair in the local service center
	*Failure of the fuel pump	*Consult the agents of the company
	*Fuel shortage	*Refuel
	*Blockage of the intake and exhaust system	*Make the intake and exhaust system unimpeded
2.Knock, irregular running or shutdown of the engine	*A large amount of blow-by gas	*Consult the agents of the company
	*Blockage of the fuel filter	*Clean the fuel filter
	*Dust or air in the fuel system	*Exclude the air and clean the oil lines
	*Fuel filter blockage, dirty or defective nozzle	*Repair in the local service center
	*High-pressure pipeline damage	*Replace the high-pressure pipeline
	*Fuel shortage	*Refuel
	*Unadjustable speed governor connection	*Consult the agents of the company
	*Faulty fuel pump	*Consult the agents of the company
	*Incorrect injection timing or the stuck nozzle	*Check the injection timing and the nozzle
3.Power of the engine is reduced	*Fuel mixed with air	*Exclude the air
	*Unsmooth oil supply	*Check and wash
	*Injection timing changes	*Adjust following the value required
	*Bad work of the injector	*Check the working pressure and atomization of fuel
	*Blockage of the air filter	injection
	*Incorrect clearance of the intake and exhaust valves or the valve is not sealed	*Clean the filter element *Adjust the valve clearance
	*Broken air cylinder pad and leakage	*Replace the air cylinder pad
	*Bad work of the fuel pump	*Consult the agents of the company
	*Engine overheating	*Check if the coolant used is correct, if the pump and the belts are too loose, if necessary, repair or replace immediately. And clear the obstructions in the
		waterway

Failures	Reasons	Solutions
4.Engine overheating	*Coolant level is too low	*Add coolant
	*Failure of the temperature sensor	*Replace the sensor
	*Blockage of the air filter	*Clean the air filter
	*Fan belt is loose or faulty	*Re-tighten or replace
	*Dirt in the cooling system	*Clean the channel
	*Oil of poor quality or too much	*Replace the oil
5.Low oil pressure	*Engine oil level is too low	*Refuel
	*Blockage of the oil filter	*Clean the oil filter
	*Pipeline leakage	*Re-tighten or replace
	*Temperature of the engine cooling water is too high	*Properly configure coolant mixing ratio, or consult the agents of the company
6.Motor discharges the gray-black smoke	*Fuel of poor quality	*Use the correct fuel
	*Blockage of the air filter	*Replace the filter element
	*Incorrect injection timing	*Adjust following the required value
	*Poor atomization of the nozzle	*Check and replace the parts
7.Motor discharges the white smoke	*Fuel of poor quality	*Use the correct fuel
	*Too much engine oil	*Recover the recommended oil level
	*Incorrect injection timing	*Adjust following the required value
	*Water in the cylinder or in the oil	*Check and replace the oil
8. Battery cannot be	*Loose or rusted connection	*Clean or tighten
	*Alternator belt is loose or defective	*Tighten or replace
	*Generator cannot be charged	*Consult the agents of the company
9.Starter does not work or runs slowly	*Loose or rusted connection	*Clean or tighten
	*Insufficient battery charge	*Replace
	*Wires damage	*Consult the agents of the company
10.running of the engine with the with the alarm indicator	*Generator failure	*Consult the agents of the company
	*Electronic regulator fault	*Replace
	*Wires failure	*Check and repair
11.Hydraulic system parts run too slowly	*Hydraulic oil is cold	*Operate to raise the temperature
	*Too low pressure of the pilot system	*Consult the agents of the company
	*Use the wrong hydraulic oil	*Use the correct hydraulic oil
	*Engine speed is too low	*Consult the agents of the company

Failures	Reasons	Solutions
12. Hydraulic oil temperature is high	*Use the incorrect hydraulic oil	*Use the correct hydraulic oil
	*Oil lines blockage	*Consult the agents of the company
	*Blockage of the hydraulic oil filter	*Clean or replace
	*Oil pump wear	*Consult the agents of the company
	*Blockage of the oil cooler	*Clean the oil cooler
	*Oil cooler failure	*Consult the agents of the company
	*High pressure of the main safety valve or the rotation system	*Consult the agents of the company
	*The oil is too dirty	*Replace the oil
	*Sensor failure	*Replace
13. Hydraulic oil emulsion or has foam	*Leakage of the pipeline between the tank and the oil pump	*Repair or tighten
	*Use the incorrect hydraulic oil	*Use the correct hydraulic oil
	*Water in the hydraulic oil	*Replace the oil
	*The oil level is too low	*Correct the oil level
14. Oil pressure is low or no oil	*Hydraulic pump damage	*Consult the agents of the company
	*Oil shortage in the system	*Refuel
	*Safety valve failure	*Consult the agents of the company
15. All parts cannot work	*Hydraulic pump damage	*Consult the agents of the company
A. Pump noise	*Hydraulic oil shortage	*Refuel
	*Suction line leakage	*Repair or replace
B. Constant pump noise	*Auxiliary pump damage	*Replace
	*Hydraulic safety control device does not work.	*Check and repair
16. All the cylinders or motors does not work or work weakly	*Hydraulic pump damage	*Consult the agents of the company
	*Main safety valve pressure is lower.	*Readjust the pressure
	*Hydraulic oil level is low.	*Refuel
	*Blockage of the oil filter	*Clean the oil filter
	*Oil seal damage	*Repair or replace
	*Oil spills due to the piston rod damage	*Repair or replace
	*Pilot valve failure	*Replace
	*Breakage or leakage of the pilot pipe	*Repair or replace
17. Two working device do	*Oil flushing of the center rotation joint	*Consult the agents of the company
18. One working device does not work	*Walking device damage	*Consult the agents of the company
	*Control structure damage	*Check and repair

Failures	Reasons	Solutions
19.Abnormal waling	*Tracks are too loose or tight	*Readjust
	*Oil pump performance is dropping.	*Consult the agents of the company
	*Track frame deformation	*Repair or replace
	*Track chain with gravel or rock	*Remove and repair
	*Control valve leakage	*Consult the agents of the company
	*Motor performance is dropping	*Consult the agents of the company
20.Abnormal rotation	*Oil pump performance fell down	*Consult the agents of the company
	*Rotary motor damage	*Consult the agents of the company
	*Pilot valve does not work	*Consult the agents of the company
21.Rotation is of no continuous	*Rotation gears wear	*Consult the agents of the company
	*Rotation bearing and balls damage	*Consult the agents of the company
	*Grease shortage	*Consult the agents of the company
	*Control valve leakage	*Consult the agents of the company
22.Air- conditioning system noise	*Clutch of different directions due to the	*Tight the plug or do the corresponding processing
	loose of the *electrical connector	*Adjust moderately, if damaged, then replace
	*Belts are loose	*Retighten
	*Loose blower fan	*Repair or replace
	*Blower is not functioning properly	*Repair or replace
	*Electric fan is not functioning properly	*Repair or replace
	*Compressor bearing damage	*Replace
23.Air conditioning is not cooling	*Tensioning wheel bearing damage	*Replace
	*Electric line fault	*Repair or replace
	*Air conditioning switch failure	*Repair or replace
	*No refrigerant	*Check, repair and fill the refrigerant
	*System blockage	*Clean or replace
	*Loose or broken belt	*Adjust or replace
	*Expansion valve malfunction	*Clean or replace
	*Compressor is not functioning properly	*Repair or replace
24.Cooling is of no continuous	*Pressure switch failure	*Replace
	*Poor contact of the wires	*Check and repair
	*Belts are too loose	*Adjust the belts properly
	*Improper adjustment of air conditioning refrigeration switch	*Readjust
		*Replace the drier
	*System contains too much water and the internal is of ice blockage	*Repair or replace
	*Electric fan or its relay damage	

Fai lures	Reasons	Solut ions
25. No meter display	*Fusing of the starter switch safety plate	*Replace with the safety plate of the same size
	*Broken starter switch, wiring errors or joint laxity	*Replace the switch; Check the lines, tighten the connector
	*Power Switch Failure	*Replace the power switch; Check the lines, tighten the connector
	*Battery connection fault	*Check the battery connection installation eliminate off-line and other phenomena
	*Storage battery body fault	*Check the battery's electric eye, if it is red, replace or charge the battery.
	*Fusing of the instrument safety plate	
	*Meter body failure	*Check the connection of the instrument to eliminate
26.The engine can not start. Starter does not run Starter motor starts weakly	*Broken starter switch, wiring errors or joint laxity	*Replace the switch; Check the lines, tighten the connector
	*Busing of the start motor safety plate	*Replace with the safety plate of the same size
	*The starter relay is broken	*Check the relay connector, eliminating the poor connection; *Replace the
	*Poor connection of the starter wires	*Clean and tighten the contact points
	*Insufficient battery charge	*Charge or replace the battery
	*Open circuit of the engine itself	*Repair or replace the starter motor
	*Poor connection of the starter switch	*Repair or replace the starter switch
	*Poor connection of the motor main line	*Clean and tighten the electrical contact point
	*Electromagnetic switch lines are loose	*Tighten electrical contact points
	*Insufficient battery charge	*Charge the battery
27.No preheating	*Starter switch breakage, wiring errors or joint laxity	*Replace the switch; Check the lines, and tighten the connector
	*Fusing of the preheat safety chip	*Replace with the safety chip of the same size
	*Preheat relay breakage	*Check the relay connector, eliminating the poor connection; Replace the starter relay.
	*Insufficient battery power	*Replay with the new battery or charge the old battery
28.Meter is not working properly	*Instrument panel display is abnormal	*If the LCD panel is broken, replace with the new instrument.
	*Key instrument is abnormal.	*If the button is broken, replace with a new one
	*The running speed value display of instrument is abnormal.	*If the instrument is broken, replace it. *If the sensor is broken, or the connection is poor, check the wiring. *Check if the number of flywheel teeth set by instrument
	*The oil level value display of the instrument is abnormal.	*If the instrument is broken, replace it. *If the oil level sensor is broken or the connection is poor, check the wiring.

Fai lures	Reasons	Solut ions
	*Instrument display of the hydraulic temperature is abnormal	*If the instrument is broken, replace it. If the oil temperature sensor is broken or the connection is poor, check the wirings
	*Instrument display of the water temperature is abnormal	*If the instrument is broken, replace it. If the water temperature sensor is broken or the connection is poor, check the wirings.
	*Instrument display of the oil pressure is abnormal	*If the instrument is broken, replace it. If the oil pressure sensor is broken or the connection is poor, check the wirings.
	*Air filter and oil filter alarm	*if the instrument is broken, replace it. If the oil pressure sensor is broken or the connection is poor, check the wirings.
29.Other appliances working abnormally	*Electric fan does not work	*If the electric fan is broken, replace it. Check the connector to eliminate the poor connection. If the electric fan switch is broken, replace the switch,
	*Work lights do not work.	*If the work light is broken, replace with a new one of the same size. Check the connector to eliminate the poor
	*Electric horn does not work.	*If the electric horn is broken, replace it. Check the connector to eliminate the poor connection. If the electric horn switch is broken, replace the switch
	*Dome light of the cab does not	*If the dome light is broken, replace it. Check the connector to eliminate the poor connection. If the dome light switch is broken, replace the switch
	*Radio does not work normally	*if the radio is broken, replace with a new one. Check if the radio antenna is intact, the wiring is normal, and the power plug connector contact is good. If the speaker wirings are not good, check the speaker wirings
	*Wiper does not work properly	*If the wiper is broken, replace it. Check the connector to eliminate the poor connection. If the wiper switch is broken, replace the switch.

5

Maintenance

Maintenance knowledge

New machines running-in

used carefully, without letting the machine engage in the work of heavy load or high intensity. During the first 50 hours of the run-in period, it is just allowed to withstand 80% of the workload. Whether the machine is used properly during the run-in period affects the life of the machine.

After the first 50 hours of work, please do the first inspection and maintenance based on the table of inspection and maintenance, replacing the related oil and filter. At the same time, please check the pollution of the hydraulic oil, whose value cannot exceed NAS9 level, otherwise replace with the new hydraulic oil.

When the hydraulic system is not working, you cannot have the working device running at a high speed. Only when the temperature of the hydraulic oil exceeds 20*, the working device can be operated.

Construction in a dusty site

When working in a dusty workplace, please do according to the following steps:

- * Always check if the air filter is blocked with the air filter sensor.
- * Clean the radiator core frequently to prevent clogging.
- * Clean and replace the fuel filter element frequently.
- * Clean the electric parts, especially the start motor and the alternator to prevent the accumulation of dust
- * When checking the machine or changing the oil, you should move the machine to the place without dust to prevent the dust from entering the oil.

Oil and filter element

Please use the clean oil and grease, and do not let the contamination enter the oil container.

After changing the oil or replacing the filter element, you should check if there is swarf or impurities in the oil and filter element. If a large number of metal particles or impurities is found, you are required to report to the supervisors and take appropriate measures.

Do not mix different grades of oil of different grades. If you want to add the oil of different grades, you have to drain the old oil with the replacement of the oil of new grades.

Maintenance hours

View the timer on the dashboard, and see if it is time for maintenance based on the hours of work.

Use the genuine parts

The use of the genuine Yuchai parts is an important factor to ensure the normal work of the machine and extend the life of the machine.

Waste disposal

Promote environmental protection, paying particular attention to the waste treatment:

- * Put the emissions oil of the engine into the container, but not directly dump it into the ground, or into the sewer, or ditch, river, ocean or lake.
- * When handling the hazardous materials, such as oil, fuel, coolant, antifreeze, plastic parts, solvents, filter element, battery and other hazardous substances, you should comply with environmental regulations.

Prevent the things falling into the machine

- * When you are open the tank nozzle to check, be careful not to make the bolt, nut, gasket or tool falls into the machine. If these things fall into the machine, the machine will be caused damage and failure, which may lead to the accidents. If something fell into the machine, please immediately take it out.
- * Before or after checking, you have to make an inventory of the tools and parts brought, to make sure that nothing falls into the machine.

Regular inspection and maintenance

Regular inspection and maintenance according to the items listed in *Regular inspection and maintenance table* is an important prerequisite to ensure the proper work of the machine and to prolong the service life of it. You must do this complying with the inspection and maintenance cycles.

Rechecking after the inspection and maintenance

If not reviewed after each inspection and maintenance, an unexpected malfunction can occur, resulting in serious injury or damage. Note to check the following:

- * Whether certain parts that should be checked and maintained are omitted.
- * Whether all the inspections and maintenance projects have been carried out properly.
- * Check if there are tools or parts falling into the machine. If the tools or parts fall into the machine and are stuck in the linkage, it will brings severe danger.
- * Check around the machine to see if there is water leakage or oil leakage, and if all the bolts have been tightened.

Maintenance Summary

Lubricating oil

- * You should use the oil whose level and temperature meet the requirement of the *oil selection table* in this operation manual. Within the prescribed time, even if the oil is not dirty, it also should be replaced.
- * Please prevent impurities (water, metal particles and dust, etc.) into the lubricating oil. Most problems of the machine are caused by the impurities entering it.
- * Do not mix together the oil of different grades or bands.
- * Refuel according to the provisions. Too much or too little oil will cause oil breakdown.
- * When changing the oil, make sure to replace the associated filter element, especially when changing the oil filter element, before the installation, please add to the new filter element with the fresh and clean oil which meets the requirement.

Fuel

- * When storing or adding the fuel, you should be particularly careful to prevent the impurities from entering the fuel.
- * Be sure to use the fuel provided in the *Oil Select Table* of this operation manual. The fuel should be selected based on the ambient temperature, because if the temperature is very low, it is easy for the oil to freeze (especially below minus 15 **5**). Therefore, you must replace with the oil matching to the ambient temperature.
- * To prevent moisture in the air condensing into water in the fuel tank, the fuel tank should be filled fully after the end of the work every day.
- * Before starting the engine or 10minutes after filling the fuel, please discharge the sediment or water in the tank.
- * If the engine has run out of fuel, or if you have replaced the filter element, the air in the oil lines must be excluded.

Grease

- * Grease is used to prevent distortion and noise at the connection.
- * After long-term use, if any parts do not seem flexible or have noise, please add grease to them.
- * Wipe the old grease squeezed out when filling grease.
- * Remember to wipe the old grease everywhere. The and or dust sticking to the grease will cause the wear of the rotating components.

Coolant (Antifreeze solution)

- * Antifreeze must be used in any climate.
- * Check the coolant level according to the provisions. If it is not enough, please immediately add it. Coolant shortage will cause the engine overheating.
- * According to the ambient temperature, configure coolant and antifreeze of applying mixing ratio.
- * Do not add coolant when the engine is overheating or has not been cooled.

Filter element

- * Replace all of the filter elements regularly. However, when operating in harsh conditions, you should replace the filter element in a shorter period according to the oil or fuel (sulfur content) being used.
- * Do not reuse the cleaned filter elements (filter-element type). Please replace with the new one.
- * When replacing the filter element, check if there are metal particles absorbed on the old filter element. If any, please contact Yuchai dealer.
- * Before using, do not open the packaging of spare filters.

Hydraulic System

- * The system is under high temperature in the work or after work, and it is in the high pressure state when you are operation. Therefore, when you are to do inspections and maintenance to the hydraulic system, please wait until the temperature falls down and the pressure in the hydraulic lines is released.
- * Do not stand in front of the parts when you are releasing the bolts, screws or hose connectors. Before demolition, please release gradually to make the pressure inside released.
- * When you do inspection and maintenance for the hydraulic oil lines, be sure to exhaust the air to release the internal pressure.
- * Hydraulic system inspection and maintenance include: checking the hydraulic oil level, replacing the filter element and adding hydraulic oil.
- * When removing the high-pressure pipe, check whether the O-ring is damaged. If it is damaged, please replace immediately.
- * When removing the parts with O-ring or sealed with gasket, you have to clean the mounting surface and replace with new parts.
- * When installing the hose, you are not allowed to twist the hose or bend it into a small diameter of the circle, because this will damage the hose, and significantly reduce the service life of it.

Parts of mandatory replacement

With the working time accumulation of the machine, some components playing an important role in safety, mainly include some oil hose, of which the material will change, and prone to aging, wear or deterioration, not only affecting the play of its normal functions, but also forming a potential risk to the safety. However, it is not easy to judge these phenomena; therefore, these parts must be replaced forcefully after the required using time limit.

If there is something abnormal with these parts before the using time limit, you also have to repair or replace them immediately. When replacing the hoses, please replace the appropriate seals at the same time.

Oil Selection Table

Choose the applicable fuel according to the ambient temperature, working conditions and other factors. The oil to be used must meet the following requirements.

	Lube or Fuel	usage temperature	Viscosity	Recommended replacement oil
Lube of the engine	CI-4 SAE 15W-40 CI-3 SAE 5W-30	-15*~+40* -25*~+30*		
Hydraulic oil	Chilliness area: HS46+ General area: HMP46+	-35* upwards -25* upwards	when it is 40* 46*4.5(* ² /s)	Meet yuchai Equipment enterprise standards The hydraulic oil conform to <Engineering mechanical hydraulic oil technical specifications*>
Lube of the driving reducer	Overload use the gear oil(GL-5)	Winter/summer		SAE80W/90
Lube of the rotating reducer	Overload use the gear oil(GL-5)	Winter/summer		
Lube of the guide wheel/ carrier wheel	SAE80W-90	All the temperatures	when it is 50* 20*25(* ² /s)	
Lubricating grease	Lithium molybdenum disulfide lubricating grease(3#)	-20*~160*°C		
Fuel	Summer: 0#light diesel oil Winter: -10# light diesel oil -20# light diesel oil -35# light diesel oil	>0* 0** -5* -5** -15* -15** -28*		
Coolant (antifreeze) (Ethylene glycol type)	JT 225-1996 -25# -35# -45#	>- 15 * >- 25 * >- 35 *		

● Oil capacity data

Category	Unit	Value
Fuel Tank	Liter	350
Hydraulic Tank	Liter	25
Engine oil	Liter	210

Tightening torque

The following table provides tightening torque for all kinds of bolts, nuts installed on the machine. If the bolt or nut is not tightened to the specified torque, the parts tightened or linked by it will be loosen or even damaged, leading to the machine failure or impacting on the operations.

Tightening torque of the general parts

Bolt strength grade	Yield strength N/mm2	Bolt nominal 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/mm2	Bolt nominal 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 the hydraulic hose

Metric threaded rotating nut			
Metric thread	Pipe OD (outer diameter)	Nm	
		Nominal torque	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 the hydraulic hose

BSP thread and rotating nut		
BSPP thread	Nm	
	Metric torque	min./max
G1/4	20	15~25
G3/8	34	27~41
G1/2	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 rotating nut			
UNF thread	Lineation specification	Nm	
		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 Table

Carry out regular inspection and maintenance for the machine according to the following table and combined with the working time indicated on the engine timer. If the working conditions of the machine is very poor or the work intensity is very large, or the machine is equipped with the hydraulic hammer and other accessories, the inspection and maintenance cycle should be lessened.

NO.	Page	Contents of inspection and maintenance	Maintenance cycle (total working hours)					
			10	50	100	250	500	2000
1		Routine examination						
		*Whether the engine oil, water or fuel leaks	▲					
		*Appearance of mechanical parts and hoses	▲					
		*Bolts and hydraulic fittings fixed conditions	▲					
		*Manipulation parts, work lights and indicators conditions	▲					
		*Working conditions of the diesel engine	▲					
2		Engine fuel system						
		*Checking the oil level and filling	▲					
		*Discharging condensate water and impurities			▲			
		*Cleaning the tank				▲		
		*Checking the injection pressure					▲	
		*Replace the filter elements					☆▲	
3		Engine cooling system						
		*Checking the status of the rubber hose and clamps	▲					
		*Checking the coolant level	▲					
		*Cleaning the radiator heat sink					▲	
		*Replacing the coolant						■
		*Checking the concentration of the coolant	▲					
4		Engine lubrication system and other						
		*Checking the oil level(if required, it shall be added)	▲					
		*Oil replacement					☆▲	
		*Replacing the oil filter element					☆▲	
		*Checking the tension degree of the fan belt		☆	▲			
		*Checking the valve clearance					☆	▲
		*Checking the fastening of the cylinder cover					☆	▲
				☆			▲	

Regular Inspection and Maintenance Table (continued)

NO.	Page	Contents of inspection and maintenance	Maintenance cycle (total working hours)						
			10	50	100	250	500	1000	2000
5		Engine intake system							
		*Emptying cans of dust	▲						
		*Cleaning the air filter element			▲				
		*Replacing the air filter element					▲		
6		Hydraulic System							
		*Checking the hydraulic oil level (if required it shall be added)	▲						
		*Excluding water and dirt in the tank				▲			
		*Replacing the hydraulic oil and wash the oil filter							☆▲
		*Replacing the filter element of the hydraulic return oil line and pilot line						☆▲	
		*Checking the pressure of the system					▲		
7		Battery							
		*Checking the electrolyte level		▲					
		*Checking the acidity and charging status					▲		
8		Reducer							
		*Checking the oil level and oiling				▲			
		*Replacing the oil						☆▲	
		*Checking the gear bolts tightening torque		☆			▲		
9		Track							
		*Checking and adjusting the tension status of the tracks	▲						
10		Supporting wheels, under rollers, and idlers							
		*Checking the tightening torque of supporting wheels		☆			▲		
		*Checking the oil level of the rollers and idlers						▲	
11		Lubricating							
		*Adding lubricating oil to each lubrication point		▲					



Following the normal cycle



For the first maintenance



In every spring and autumn

Routine examination

Every day or every 10 hours, do the general routine examination for the machine.

- 1) In the leak inspection, check whether there is leakage of engine oil, water and fuel of all the parts.
- 2) Check whether the elastic connections and the attachments have been scratched, broken or deformed.
- 3) Check the fixing and connecting of the hydraulic device.
- 4) Check the appearance of mechanical parts.
- 5) Check the working status of the operation equipment, the control indicators and any other indicators.
- 6) Check the working situation of the engine: if the exhaust color is normal, if there is abnormal noise, and know exactly the location of the abnormal sound.

Engine fuel system

Maintenance instructions

Fuel tank capacity*****350 liters

Oil level inspection*****every 10 hours

Excluding water and impurities from the tank *****every 100 hours

Cleaning the tank*****every 250 hours

Injection pressure inspection*****every 500 hours

Replacing the fuel filter element *****every 500 hours

1.Checking the oil level and refueling

Check the oil level through the oil sign on the side of the tank or the display on the instrument cluster in the right front of the cab, once every day or once every ten hours.

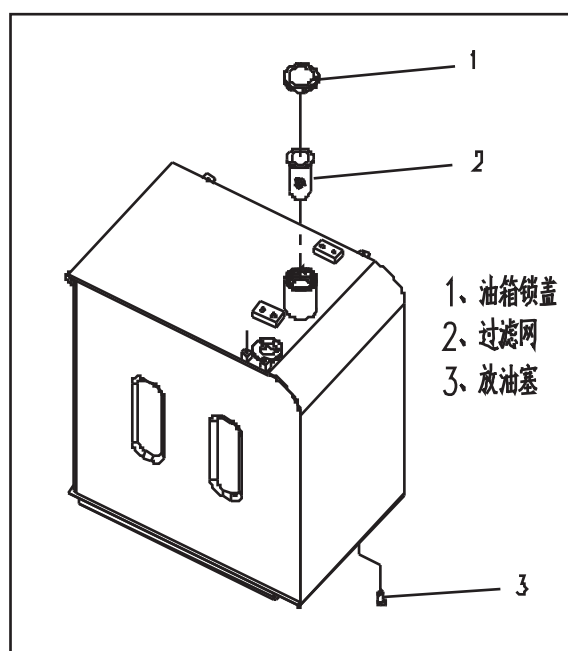
In order to avoid the formation of condensation water, the tank should be filled up after work every day. The oil filler is located in front of fuel * hydraulic tank.

A.Fueling directly

Open the filler cap of the fuel tank, and pour the fuel into the filler.

B. Using oil pumps(Optional equipments)

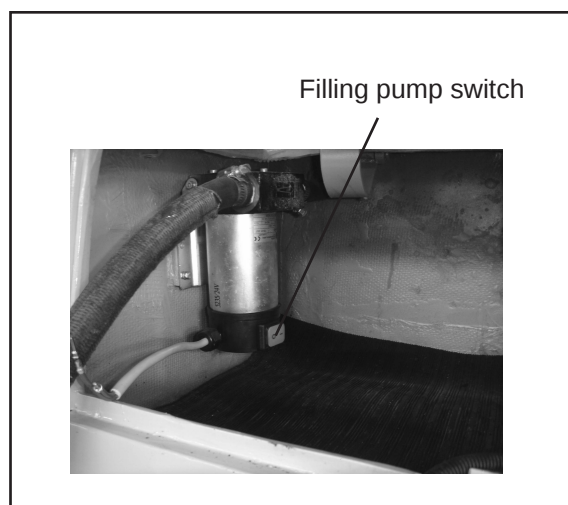
After put the filling tube into the oil barrel, press the switch "-", and the oil pump will suck automatically the oil into the tank. When the tank is full, press the switch *O", and stop oiling.



2.Excluding water and impurities from the tank

As to the condensation water and sediment removal, you should do this once every 100 hours.

Open the oil charge valve to make the condensation water and sediment flow out. Once the fuel flows out, replace the drain plug. The cycle of emissions of the condensation water can be redefined by the users themselves depending on the quality of the fuel.



3.Cleaning fuel tank

Clean once every 250 hours.

- 1) Prepare a container for the fuel discharged
- 2) Remove the oil discharge valve and the filter located in the filler. Fill up the half of the tank and discharge again.
- 3) Clean the fuel filter and put it back.
- 4) Replace the drain plug and fill the fuel through the filter in the filler.
- 5) Exclude the air in the oil lines.

Note: When rinse the inside of the tank, do not use trichloroethylene and you can only use diesel.

4.Checking fuel injection pressure

Check every 500 hours!

Fuel injection pressure should be checked periodically according to the maintenance table. And adjust the injection pressure when necessary. This check should be done by the organization authorized by the company!

Work efficiency of the engine depends on the work condition of the injection nozzle, so it should be maintained periodically to ensure its normal working.

For the better use of the engine by the excavator driver, attention should be paid to the following phenomena that indicate bad nozzle working:

A. Knocking sound of one or more cylinder; B. Overheating of engine; C. Reduction of efficiency; D. Black exhaust; E. Increased fuel consumption

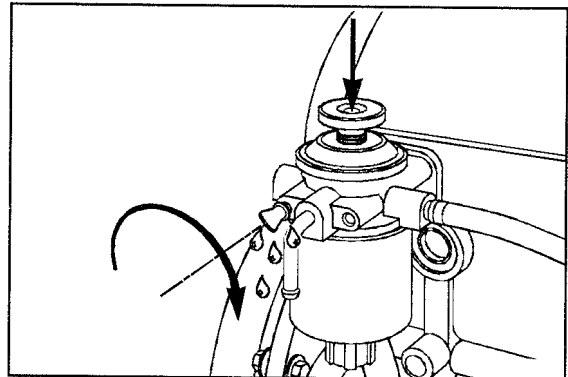
The above phenomena may be caused by the following reasons, so check should be done:

A. Bad sealing of air intake and outtake valves; B. Incorrect injection nozzle adjustment; C. Dirty or damaged fuel filter; D. Bad fuel quality; E. Water in the fuel; F. Dirty or blocked air filter.

5.Air removal in the fuel circuit

If you do not intend to make the tank empty and make the air flow into the fuel circuit during replacing the fuel filter element, disconnect the fuel line or cleaning the fuel filter, then you should exclude all the air before restarting the engine.

- 1)Open the exhaust screw on the fuel filter holder,
- 2)Operate the filling pump plug until there is no air in the fuel flowing out of the exhaust screw,
- 3)Close the exhaust screw on the fuel filter holder.



Warning: pressure of the fuel in the high pressure fuel tube is so high that it can penetrate skin and may cause serious personal injury. Therefore gloves and protective clothes should be dressed before operation.

6. Diesel pre-filter (diesel strainer)

Replace the filter element every 500 hours (see the section of *Replacing the fuel filter element* in the following).

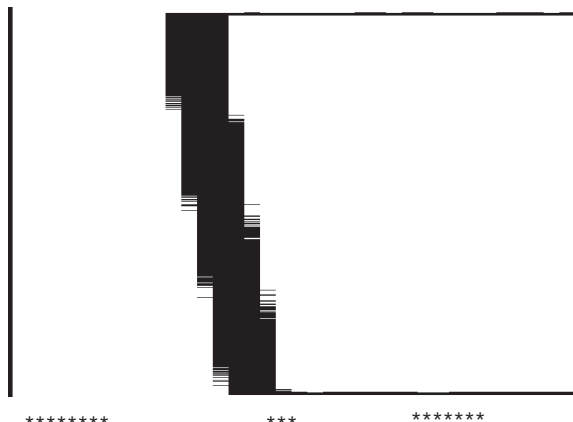
Discharge the water and sediment in the separator every day.

1) After turning off the machine, open the drain valve by hand, turn the valve knob counter-clockwise about three times and a half, until the valve falls down 25.4mm (1 in), and then start discharging.

2) Discharge the water in the separator, until the clean fuel can be seen.

3) When close the valve, turn the valve clockwise until it is tightened by hand.

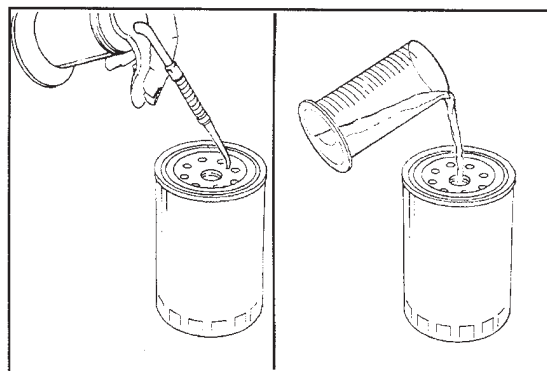
Note: When closing the valve, do not have the valve too tightened.



7. Replace the fuel filter element

After the first 500 hours of the new machine, it should be replaced for the first time. And then, replace the filter element every 500 hours or 6 months. Please use the genuine filter element for replacement.

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



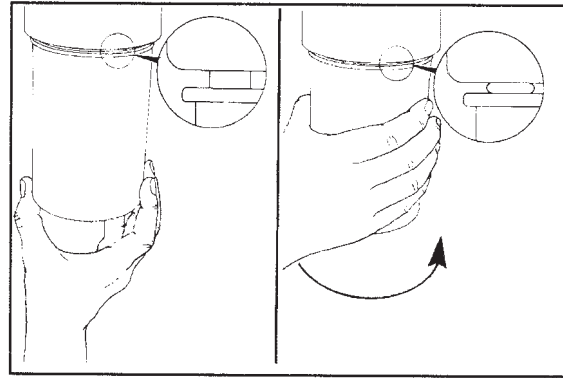
Note: Check if there is old seal sticking to the filter seat, if any, it will cause oil spills.

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

6) Install the fuel filter according to the requirement of the manufactures.

Note: To reduce the possibility of fuel leaks, you should ensure that the fuel filter is installed tighten, but not over-tighten, which will damage the fuel filter.

7) After replacing the filter element, start the engine and check if the filter sealing surface has oil spills.



Engine cooling system

Maintenance instructions

The coolant level inspection*****

Checking the state of the rubber hose and clamps*****

Cleaning the radiator blade*****

Coolant replacement*****

Checking the coolant concentration*****

every day or every 10 hours

every day or every 10 hours

every 500 working hours

every 2000 working hours

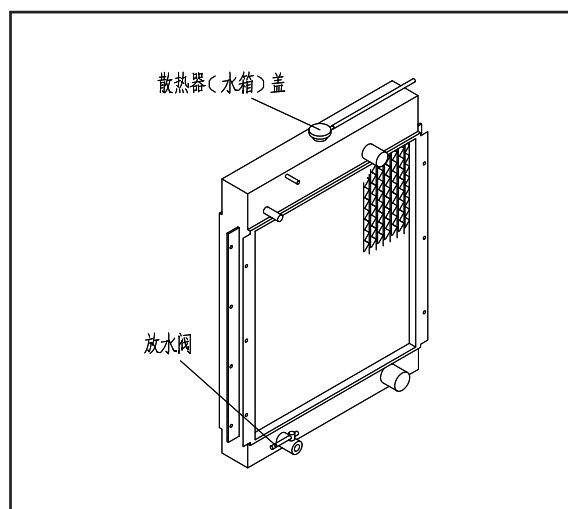
every day or every 10 hours

1.Checking the coolant level

Before the new machine is used, you should check the coolant level in the radiator, and later on, check it once every day or every 10 working hours.

Remove the radiator (radiator) cap, and check the coolant level.

When the engine is at cold state, liquid level of coolant should be 20mm below the water inlet.



Warning: When you are unscrewing the radiator cap, the hot coolant will spray out. The method of unscrewing the cap: making the cap slightly loose to let the pressure fully released. If you screw the cap quickly, the coolant will spay out, which may cause personal injury.

2.Checking the status of the rubber hose and clamps

Check it every 10 hours or every day.

Check the rubber horse, if there are cracks on it, or it becomes hard due to the aging, please replace with the new horse.

Check if the hose clamp is locked, if it is loose or broken, you must replace it immediately.



3.Cleaning and checking the radiator blade

Clean it every 500 hours.

The dust accumulating on the surface of the radiator (radiator) will affect the cooling effect, so it must be cleaned promptly.

Open the engine hood; blow out the dust or leaves and other debris on the oil coolant blocking the radiator blade with high pressure water or compressed air. Also, clean the filter before the oil is cooled. For the machine equipped with an air conditioner, the condenser film should also be cleaned.



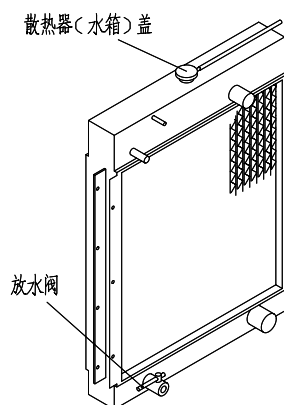
Warning: If the compressed air, high pressure water and steam directly hit the body, or when using them to blow off the dust or dirt, there is risk of serious injury, so, please remember to wear goggles, dust masks and other protective masks.

Note: To prevent damage to the heat sink, the distance between the nozzle of the high water or compressed air and the radiator (radiator) surface should be greater than 500mm, because the damaged heat sink will create leaks or overheating. Check the heat sink every day in the dusty worksite, without the limitation of the maintenance cycle.

4.Coolant replacement

Replace it every 2000 working hours.

- 1)Remove the radiator (radiator) cap, and twist the valve open to make the coolant flow out;
- 2)Clean the cooling circuits, close the drain valve, fill with the special cleaning fluid, and then start the engine. After the engine runs for 10minutes at low speed, shut the engine down and release the leaning fluid.
- 3)Re-close the drain valve.
- 4)Fill up with the coolant and make the engine idling for several minutes, making entire cooling circuit full of the coolant.
- 5)Check the coolant level, and add the coolant.



Warning: Do not open the radiator cap from the heat engine (water tank). You should not open the radiator before the temperature of the coolant drops to below 50°; otherwise the exhaust of the hot coolant or the steam may cause injury.

5. Checking the coolant concentration

Before the start of the cold season, you have to check the coolant concentration. Coolant can work at the ambient temperature of -35°. If the ambient temperature is lower, the proportion of the antifreeze should be increased.



Warning: The coolant is toxic. So prevent children and pets from contacting with the coolant. If the coolant is not used any longer, the disposal of it should be in accordance with the local environmental regulations.



Warning: Antifreeze must be used under any climate.
Do not just use water as coolant. Otherwise, it will be damaged because of corrosion. Water in the river contains large amounts of calcium and other impurities. If the river water is used, the scale will be formed, adhering to the engine cooling water and the heat sink, which will result in heat exchanger failure and overheating. If the antifreeze gets into somebody's eyes, immediately wash with water, and promptly sent him to hospital for treatment.

Engine lubrication system

Maintenance instructions

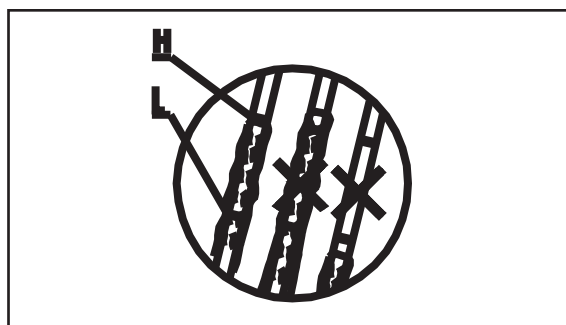
Oil volume*****every 10 working hours or every day

Replacing the oil or the oil filter element*****every 500 working hours

1.Checking the oil level

Before the new machine is used, check the oil level once, and later on, check it every 10 working hours.

- 1) Stop the excavator on the flat ground and make the engine shut down.
- 2) Open engine hood, remove the oil gauge and observe the stick position on it. The oil should be at between the two marks the lowest (L) and highest (H).
- 3) If necessary, you can refuel from the filler to make the oil level reach the specified value.

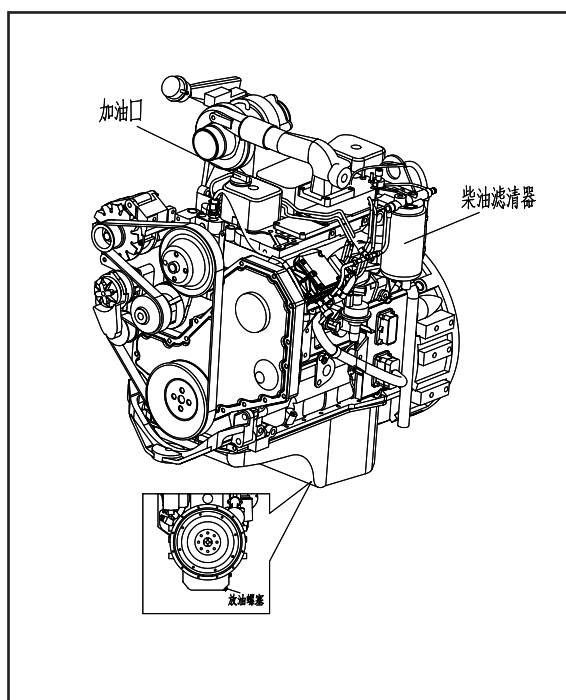


Warning: After turning off the engine, the parts and the oil are still in the high temperature and will cause serious burns. Therefore, the maintenance must be carried out after the oil temperature has dropped.

2.Replacing the engine oil

Replace it for the first time after the first 500 working hours of the new machine, and later on, it should be replaced every 500 working hours.

- 1) Stop the excavator on the flat and shut down the engine, letting the hot oil out.
- 2) Remove the oil drain plug to make all the oil flow out.



Note: The positions of the refueling port and the discharge port of different types of engines will be different.



Avoid inhalation of oil vapors, swallowing the oil, and prolonged exposure to the used motor oil.

- 3) Clean and re-install the oil drain plug. If the seal is damaged, replace it.
- 4) Open the filling hole.
- 5) Re-inject the new oil, until the oil level reaches the position of greatest mark *H* on the oil gauge.
- 6) Cover the oiling hole, and make the engine idling for five minutes.
- 7) 10-20 minutes after the shut down of the engine, check the oil level, if necessary, add the oil.

3.Replacing the engine oil filter element

Clean it for the first time after the first working 500 hours of the new machine, and after this, clean or replace it every 500 working hours.

Oil filter replacement

- 1) Clean the area around the filter, remove the oil filter, and clean the surface of the gasket seat on the filter seat ;
- 2) Lubricate the two gaskets in the oil filter;
- 3) Coat the gasket surface with a layer of oil before install the oil filter;
- 4) Install the oil filter according to the oil filter manufacturer's specifications;
- 5) Run the engine at low idle to check if the oil filter has oil spills;
- 6) Turn off the engine, and wait for 15minutes to make the oil in the parts of the engine fully return;
- 7) Check the oil level, and if necessary, add oil to make the oil level reach the position of highest *H* mark on the oil gauge.

Engine intake system

Maintenance instructions

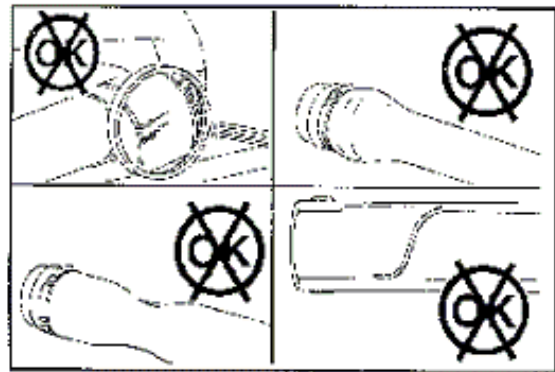
Air filter element cleaning cycle*****every 100 working hours

Air filter element replacement cycle*****every 500working hours

Checking of air intake pipeline

Check every day whether the air intake tubes are worn or damaged, clip loosen or other phenomena that will cause damage of the engine.

If necessary, replace the damaged tubes, and tighten the loose clips to ensure non air leakage of the air intake system.



Other maintenance of the engine



Warning: To prevent injury, do not carry out maintenance with the engine running if the maintenance must be done in the case that the engine is running, please make sure the operation will be completed by at least two persons, and it will comply with the following provisions.

One person must always sit in the operator seat, ready to turn off the engine. All the personal must keep in touch at any time.

When the operation is close to the fan, the fan belt or other rotating parts, there is the risk of being entangled by the components, so please pay special attention. Do not drop or insert the tools or other objects into the fan or fan belt, otherwise, the parts will be broken or fly out.



Warning: Too much noise of the machine will cause temporary or permanent hearing problems. When doing the engine maintenance and prolonged exposure to the noise, you should wear earmuffs or earplugs during the work.

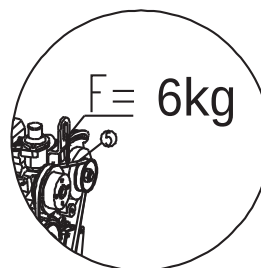
● Checking the tension of the fan belt

Check it for the first time after the first 50 working hours of the new machine, and after this, check it every 100 hours.

In order to ensure that proper work of the generator and service life of the belt, fan belt must be tensioned correctly.

For the proper belt tension, when you impose the weight of 6kg perpendicular to the belt between the fan belt and A/C compressor belt, the belt will have about 10mm subsidence.

If the belt was found broken, replace it.



- As to other engine components maintenance cycle and specific methods, please refer to *Diesel Operation Manual* attached to the machine.

Hydraulic System

Maintenance instructions

Hydraulic Tank Capacity*****210 liters
Oil level inspection*****every 10 hours
Oil filter replacement*****every 1000/2000 hours
Hydraulic oil change*****every 2000 hours
Checking the system pressure*****every 500 hours



Warning: if the hydraulic oil or grease injects into the skin, it will cause serious injury and damage. Please prevent your hands and body close to the hydraulic oil leak area. You can check for leaks with cardboard or paper. If the hydraulic oil accidentally injects into your skin, please immediately go to the hospital for treatment

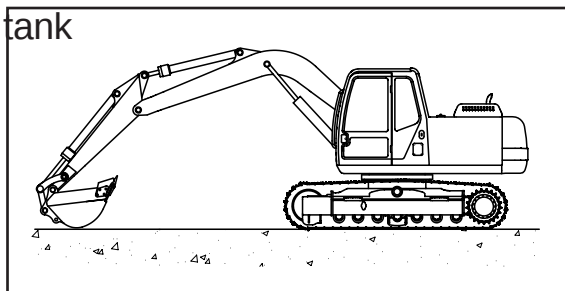


Warning: to avoid burns, you can only do the related maintenance after the hydraulic oil has been cooled or when the oil is cold before the daily work. When removing the fuel filler flange cover, in order to prevent the oil spray, you need to turn the cover slowly to release the pressure inside.

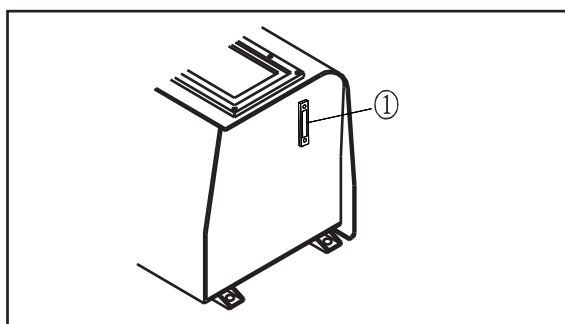
1. Checking the oil level in the hydraulic tank

Check the oil level in the hydraulic tank every 10 hours.

- 1) Stop the machine on the flat ground.
- 2) Start the machine to make each cylinder in the reciprocating motion.
- 3) Retract the stick cylinder and extend the bucket cylinder to make the bucket fall on the ground with the blade on the ground, and then turn off, as shown in the picture 1.
- 4) Observe the hydraulic oil level through the oil gauge on the hydraulic oil tank.



The level of the hydraulic oil can be observed through the oil gauge (shown in the picture 2 *) It is required that the hydraulic oil level should be clearly seen within the range of the oil gauge, You can not add too much oil that the oil level cannot be seen through the oil gauge, which will cause damage to the hydraulic oil lines or the oil spray. If the oil is too full, you have to stop the engine and discharge the excess oil through the oil drain plug port after the oil has cooled. If the hydraulic oil level is low displayed in the oil gauge, or it cannot be seen, you should promptly refuel through the oil filler at the top of the hydraulic tank to raise the oil level.

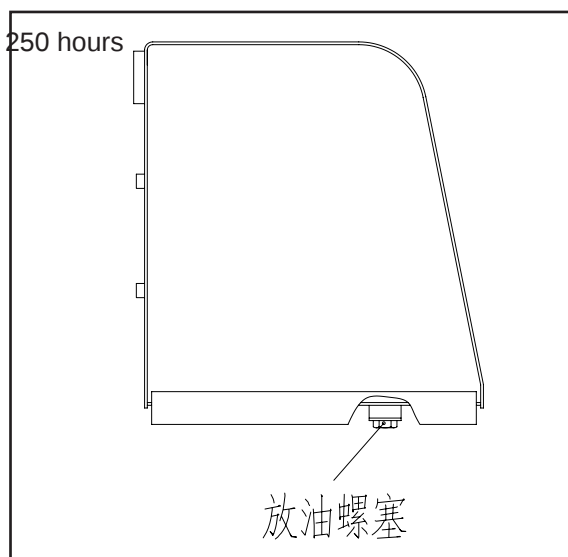


Note: The hydraulic oil level will change with the rising of the oil temperature in the work. Before the operation, the oil level is in the middle of the oil gauge, while the oil level will be close to the top of the oil gauge due to the rising temperature in the proper operation.

2.Removing the water and dirt in hydraulic tank

Remove the water and dirt in the hydraulic tank every 250 hours

- 1) After the oil temperature has dropped during the shutdown of the machine or before the daily work starting, expel the air in the oil tank.
- 2) Slowly release the oil drain valve at the bottom of the tank or the drain plug (as shown).
- 3) Discharge the water or dirt, until the clean and transparent hydraulic oil flows out. Re-close the drain valve or tighten the plug.
- 4) If the oil in the tank is insufficient, it should be added.



3.Replacing hydraulic oil and cleaning the oil filter

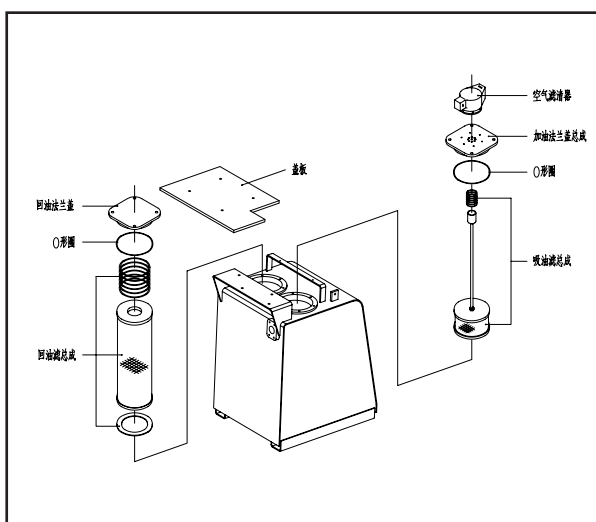
Replace it for the first time after the first 2000 working hours of the new machine, and after this, clean or replace it every 2000 working hours.



- Warning: 1) To avoid burns, the oil can only be excluded after the hydraulic oil has cooled or before the starting of the daily work.
- 2) When removing the fuel filter flange cover, in order to prevent oil spray, you should rotate the cover slowly to release the pressure inside.
- 3) When changing the oil, be careful not to let the water oil, dirt, sand, etc. into the tank.

Oil change procedures:

- 1) Stop the excavator on the flat ground.
- 2) Slowly release the air filter on the filler flange assembly of the upper part of the fuel tank, to lower the pressure of the air stored in the fuel tank.
- 3) Pump the hydraulic oil out with the pump, and put it into an empty oil drum.
- 4) Loosen the oil drain valve at the bottom of the tank or the drain plug, completely draining the remaining oil.
- 5) Remove the suction filter.
- 6) Clean inside the tank thoroughly.
- 7) Clean re-install the drain plug.
- 8) Clean the suction filter.
- 9) Add the required hydraulic oil (see the *Oil Selection Table*), making the oil level to the middle place of the oil gauge.
- 10) Install the suction filter and cover the air filter.



4. Discharging the air in the hydraulic system

A. Discharging the air in the pump

- 1) Release the air exhaust plug installed at the drain vent, and check if the oil flow out, completing the exhaust.
- 2) Tighten the bolt after the exhaust completion.

Note: If run the pump when it is not full of oil, the pump will become abnormally hot, leading to the premature failure of it.

B. Discharging the air between the hydraulic pump and the tank

- 1) Start the engine and keep it running at low or middle speed.
- 2) Operate the working device slowly about 5 minutes to discharge the air.

Note: If you keep the engine running rapidly before exhausting the air between the pump and tank, the pump will also have an abnormally high temperature, thereby damaging the pump.

C. Discharging the air in the cylinder

- 1) When the engine is running at low speed, extend and retract the cylinder to the position about 100mm from the end of its trip four or five times.(remember not to the end of its trip)
- 2) Then, operate the cylinder to the end of its trip three or four times.
- 3) At last, operate the cylinder to the end of its trip four or five times, completing the air discharge,

Note: If you let the engine running at high speed or operate it to the end of its trip the time the motor is just started, the air in the cylinder will cause damage to the piston seal, thereby damaging the cylinder.

D. Discharging the air in the rotating motor (when the oil in the rotating motor has been discharged)

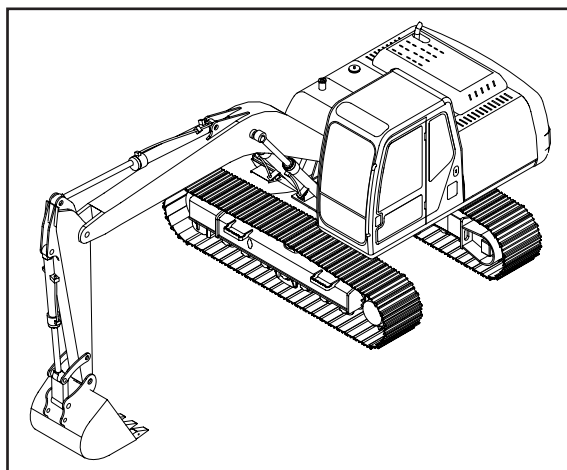
Note: During the discharge, the machine cannot be rotated in any case.

- 1) Idle the engine and release the exhaust plug, to check if the oil flows out from the exhaust plug.
- 2) If there is no oil flowing out, open the exhaust plug, then inject the hydraulic fluid into the motor housing.
- 3) After completing the exhaust, tighten the exhaust plug.
- 4) Finally, run the engine at low idle and slowly rotate the upper body of the machine to left and to right, twice respectively, to make the exhaust complete and full.

Note: If the air within the motor is not discharged, the bearings of the rotating motor may be damaged.

E. Discharging the air within the walking motor (when the oil in the walking motor has been discharged)

- 1) Idle the engine and release the exhaust plug. If there is oil flowing out, tighten the bolt.
- 2) Idle the engine, turn the working device 90° to make it located on one side of the track (as shown in the right picture).
- 3) Jacking the machine with the working device to make the track of one side slightly off the ground, and then run the track without load for 2 minutes. Repeat such operation to both the tracks and rotate the tracks forward and backward equally.



F. Discharging the air within the accessories

If you have installed the accessories on the machine, idle the engine, and operate the accessory pedal several times (about 10 times) until the air is discharged from the accessory pipelines.

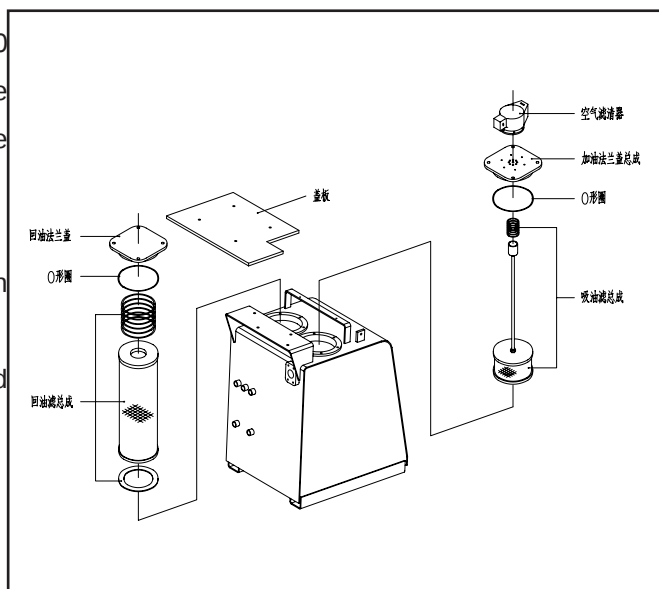
Note:

1. If the manufacturer provides the specific exhaust means, you should discharge the air in accordance with its provisions.
2. After completing the exhaust operation, turn off the engine. Before the operation, Please wait at least five minutes to clear the bubbles in the hydraulic oil tank.
3. There should be no leakage during the inspection. Wipe the oil spills.
4. After completing the exhaust operation, check the oil level. If the oil level is low, you should make fuel supplement.

5. Replacing the filter element

Replace it for the first time after the first 1000 hours of the new machine, and after this, replace it every 1000 hours. The return oil filter is in the hydraulic tank, therefore,

- 1) Unscrew the lid at the top of the tank.
- 2) Remove the spring, the bypass valve and return oil filter from the tank.
- 3) Assemble the new filter element, clean and reassemble the spring and pass-by valve.
- 4) Install the fuel tank cap.

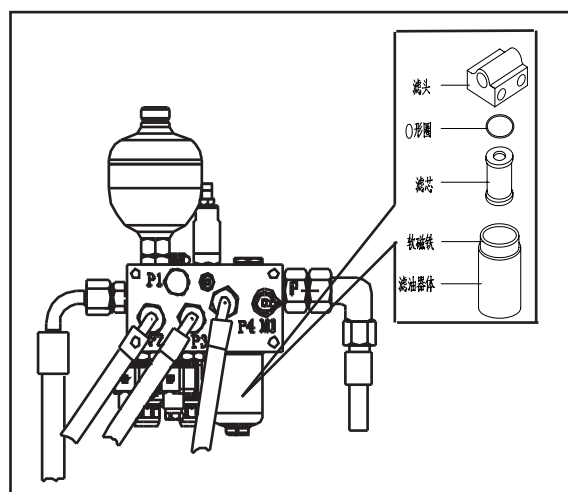


6. Replacing the filter element of the pilot oil circuit

Replace it for the first time after the first 1000 working hours of the new machine, and after this, replace it every 1000 hours.

Note: Before demolishing the filter element, you must exhaust the air pressure within the hydraulic tank.

- 1) Unscrew the oil filter housing
- 2) Remove the filter element.
- 3) Install the new O-ring in the groove of the filter head.
- 4) Before the installation of the new filter element, coat the filter seal surface with a layer of hydraulic oil, and then put the filter element into the filter head.
- 5) Clean the filter shell and the soft magnets, not allowing the dirt, dust or water enter the oil filter housing.
- 6) Tighten the filter housing and the filter head with the torque of 25-35Nm.
- 7) After connecting the pipelines, start the engine slowly. Keep it running continually for three to five minutes to discharge the air in the system.
- 8) After stopping the machine on the flat ground, check the oil level, and if necessary, you need to add the fuel. Please pay attention to that the oil level cannot exceed the required maximum oil level limits.



■ The replacement cycle of the hydraulic oil and filter element when the accessories are being used(such as hammer)

Use of hammer increases the pollution of the hydraulic system and accelerates the corrosion. Compared with the digging device, the replacement cycle of the hydraulic oil and filter element also should be shortened correspondingly, to avoid the damage to the hydraulic pumps and other hydraulic components. Recommended replacement cycles are shown in the following form: (unit: hour)

Hydraulic hammer operating rate	Hydraulic oil replacement cycle(hour)	Filter element replacement cycle(hour)
50*	1000	Oil return filter 750* Oil suction filter 1500
100*	500	Oil return filter 500* Oil suction filter 1000

Note: The system pressure should be adjusted appropriately according to the requirements of the hydraulic hammer when you are using a hydraulic hammer.

Battery



Warning: 1) Battery contains sulfuric acid liquid with a strong corrosive, so please keep it away from children, and the user should wear protective glasses and rubber gloves. Once the eyes, skin and clothing are splashed with sulfuric acid, wash with plenty of water promptly, and if serious, go to hospital for treatment.

2) Battery in charging will produce hydrogen and oxygen, so once it meets the open air or the exhaust port blocking, it will cause explosion. Therefore, the battery should stay away from the open fire and short circuit.

3) The battery, whose case is molded with polypropylene, is flammable, and should stay away from the open fire.

1. Battery storage

1) This series products are the lead-acid batteries of charge with liquid and should be stored at 5-25*, dry, clean and ventilated environment, and should be free from the direct sunlight, at least two meters away from the heat source. Too high temperature will cause a great impact to the battery performance.

2) Batteries should not be put upside down or lying down, and can not be subject to any mechanical shock or suppression.

3) The storage period of the products of this series is six months, during which, the battery can be used without additional charge. The battery that has been stored for more than six months, can be used after the additional charge.

2. Battery charging

In the later of the charging, batteries will produce hydrogen and oxygen due to the electrolysis of water, resulting in water losses. The higher the charging voltage is, the more water is lost. This series of battery need not to be added water in the course of charging, so constant voltages charging method is highly recommended, and please avoid the constant current charging method as possible as you can.

2.1 Battery additional charging

2.1.1) Constant current charging method

Charge the battery with the one-tenth current of the 20 hour battery capacity for 2-4 hours.

2.1.2) constant voltage charging method

Charge the battery with the constant voltage of 16V for 16 hours. (Maximum current does not exceed 25A).

2.2 Battery normal charging

2.2.1) Continually charge the battery with the one-twentieths current of the 20 hour battery capacity for 1-3 hours until the battery voltage reaches 14.4V.

2.2.2) Charge the battery with the constant voltage of 16V for 24 hours. (Maximum current does not exceed 25A).



1) Batteries in charging will produce gas, so you should check regularly if the vent on the battery is locked to prevent the explosion.

2) When charging the battery, you should have the battery positive cathode connected to the charger positive cathode and the battery negative cathode connected to the charger negative cathode, and the reverse charge is strictly prohibited.

3) In the process of charging, if the battery electrolyte temperature exceeds 45 *, reduce the charging voltage or charging current as appropriate, to prevent electrolyte splash due to the overheating.

3. Battery Installation

- 1) Before the installation of the battery, please pay attention to the safety standards on the battery label to prevent the unnecessary accidents.
- 2) Coat the side column of the battery with a small amount of Vaseline before the installation to prevent corrosion. Wiring should be solid and reliable. Side column percussion is strictly prohibited to prevent the acid infiltration due to the loose column.
- 3) Before installing the machine, you should first connect the battery positive cathode with the engine positive cathode, and then connect the battery negative cathode with the engine negative cathode.
- 4) Make the battery flat on the battery rack with the method of upper fixing or lower fixing, to prevent the battery from being damaged due to the looseness.

4. Battery maintenance

- 1) Battery cover is equipped with the indicator showing the state of charge. When the indicator shows green, the battery can be used normally; when the indicator shows black, the battery should be promptly charged; and when the indicator shows white, the battery should be replaced immediately.
- 2) Promptly charge the battery of power loss due to the various reasons in use to prevent battery performance decline caused by the sulfation.
- 3) Prevent over-charging the battery in use or in the process of charging. Avoid the premature failure caused by the water loss and grid growth.
- 4) For the battery in use, if it is not used for a long time (usually more than 15 days), you should remove it from the machine and store it in a ventilated and dry place. It should be charged additionally every 3-6 months (depending on whether the indicator is black).
- 5) As to the battery you have question with, please immediately contact the dealer to resolve.

Reducer

Maintenance instructions

Rotating reducer oil capacity*****5.6liters

Walking reducer lubricating oil capacity*****5liters

Checking the lubricating oil level and oiling*****every 250 working hours

Replacing the lubricating oil *****every 1000 working hours

Checking the reducer bolt tightening torque***** every 500 working hours

A:Traveling reducer

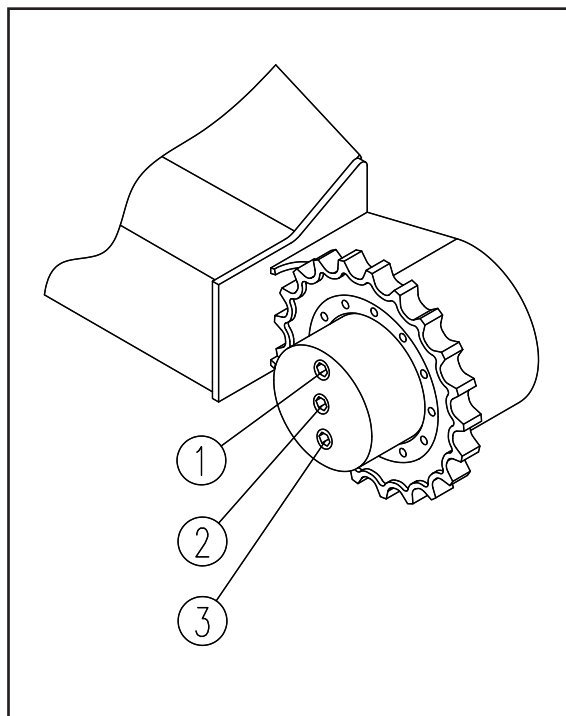
1.Checking the lubrication oil level of walking reducer and oiling



Warning: After a short time of machine walking, the oil in the reducer will be very hot. After turning off the engine, the walking reducer and the oil are still in the high temperature, which will cause serious burns. So before the operation, you must wait until the oil has cooled down. Loosen the exhaust plug two to three buttons to release the air pressure in the box, and then you can remove the plug. Rapid removal of plugs is dangerous.

Check it every 250 hours.

- 1) Prepare an Allen wrench.
- 2) Stop the excavator on the flat ground.
- 3) Turn the walking speed reducer, to let the 3 screws on its external end vertical to the ground, then stop the machine.
- 4) Open the screw *, check lubrication oil level, which should be at the lower edge of the screw hole.
- 5) If necessary oil can be added (according to the following lubrication oil replacement steps)
- 6) Wash screw * and reassemble it.



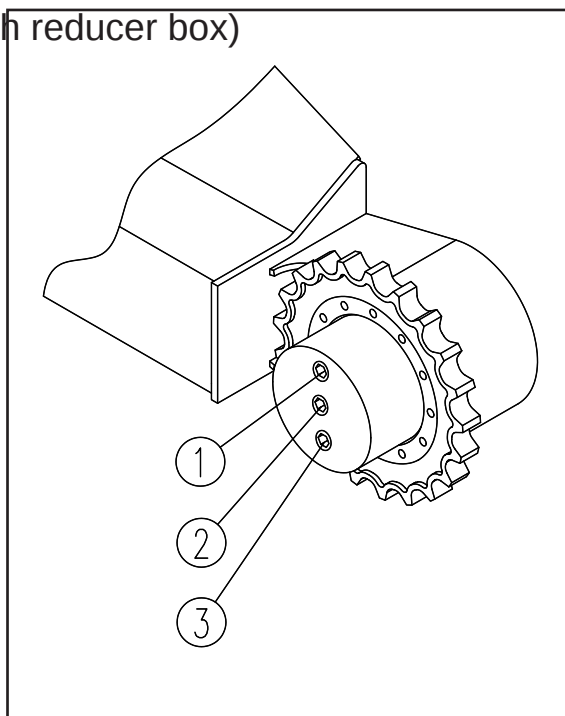
2. Replacing the lubricating oil(for each reducer box)

Replace it for the first time after the first 1000 working hours of the new machine, and after this, replace it every 1000 hours.

- 1) Stop the excavator on the flat ground.
- 2) Turn the walking speed reducer, to let the 3 screws on its external end vertical to the ground, then stop the machine.
- 3) Draining oil when the reducer's oil is still hot.

Caution: Do not be burned by the hot oil.

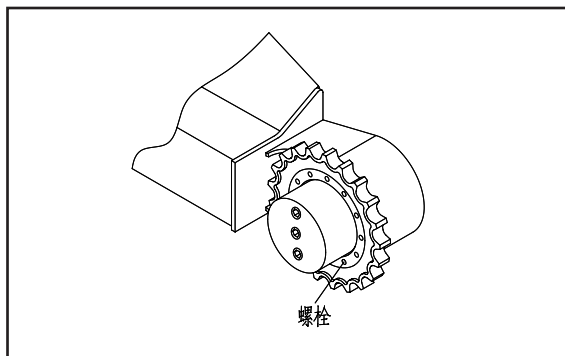
- 4) Loosen screw* to start draining oil, Loosen the screw* to completely drain the oil.
- 5) Loosen screw*.
- 6) Add the required lubrication oil from hole* till there's oil flow from the oil hole*.
- 7) Wash screw *** and reassemble them.



3. Checking the walking reducer bolt tightening torque

Checking the fastening of the walking reducer connecting bolts

Check it for the first time after the first 50 hours of the new machine, and after this, check it every 500 hours.

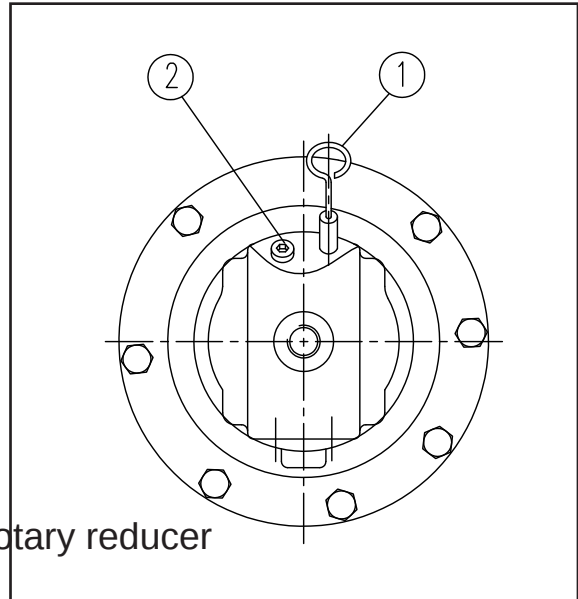


B:Rotating Reducer

1. Checking the lubrication oil level of rotating reducer

Check it every 250 hours.

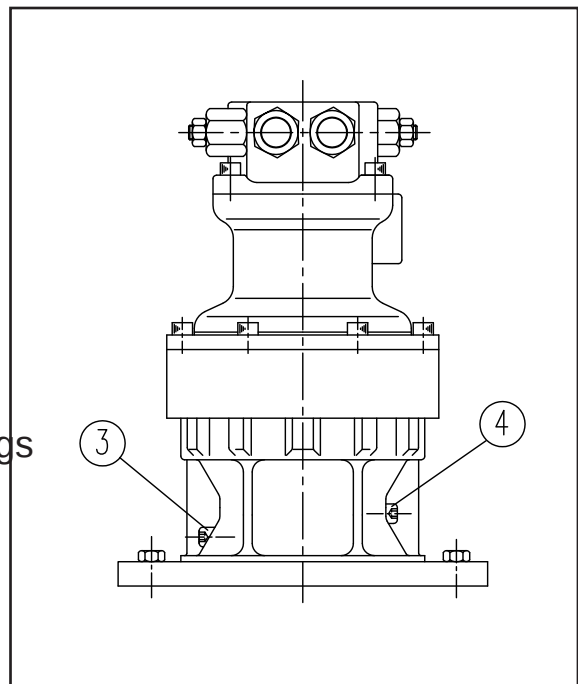
- 1) Stop the excavator on the flat ground.
- 2) Pull out the oil gauge*, the lubricating oil level should be between the upper and lower scratch of the oil gauge.
- 3) If necessary oil can be added (according to the following lubrication oil replacement steps)
- 4) Install the oil gauge and tighten it.



2. Replacing the lubricating oil of the rotary reducer

Replace it for the first time after the first 1000 working hours of the new machine, and after this, replace it every 1000 hours. Drain the oil when the reducer's oil is still hot. Attention: Do not be burned by the hot oil.

- 1) Loosen oil plug* to start draining oil, Loosen the oil plug* to completely drain the oil.
- 2) Install oil plug* and tighten it.
- 3) Add the required lubrication oil from oil port till its level arrives between the upper and lower scratch of the ruler .
- 4) Install the oil gauge and plug.



3. Lubrication of Rotary reducer bearings

- 1) Loosen screw-plug*.
- 2) Inject lubricating grease into the screw hole with the oil gun until the screw hole is extruded with grease.
- 3) Retighten the screw.

4. Checking fastness of connecting bolt of rotary reducer

Check it for the first time after the first 50 hours of the new machine, and after this, check it every 500 hours.

Tighten the bolts connecting the reducer to the platform.

5. Check the lubrication of the rotary gear

Check every 500 hours and replace the grease in the reducer every 2000 hours.

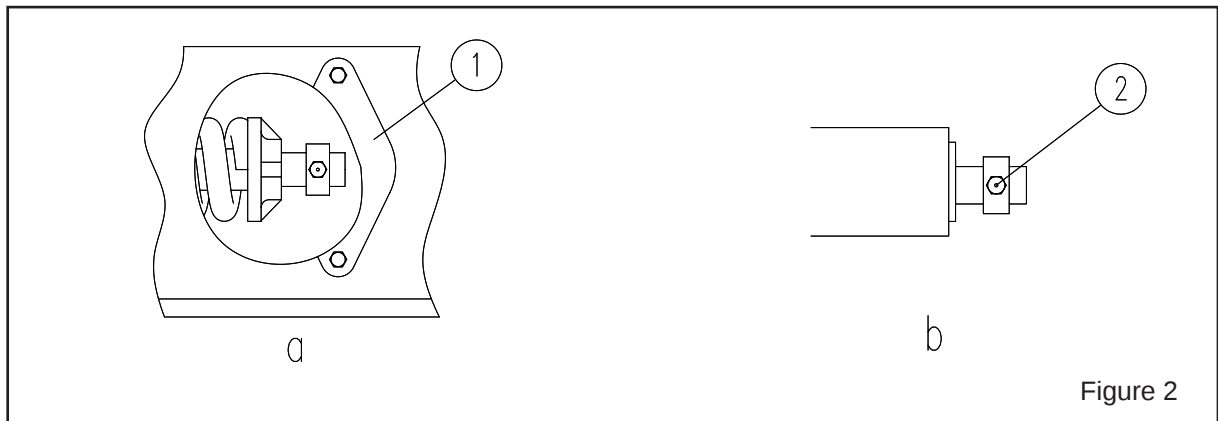
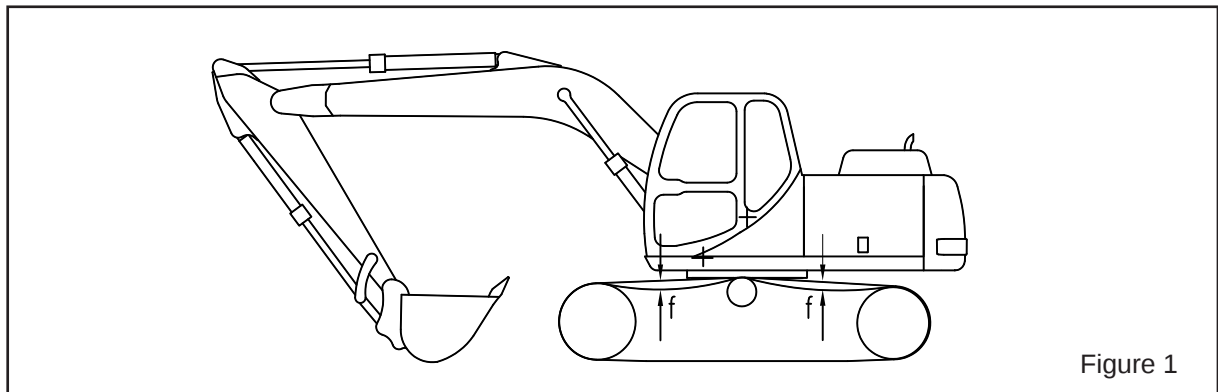
- 1) Remove the small cover plate beside the boom cylinder plate on the platform, where there is an observation hole, from which you can observe the lubrication of the tooth surface
- 2) If the tooth surface lubrication is insufficient, add grease from here, and then rotate the oil groove in the platform room evenly distributed, and the height of the oil surface should reach one third of the height of the tooth surface.
- 3) Replace the grease in the oil tank, first remove the bottom plate under the frame, and then remove the oil plug on the frame, clean the oil in the oil tank through the hole, retighten the screw plug, and add the corresponding lubrication grease at the observation hole.
- 4) Reinstalled the cover plate.

Track

Checking and adjusting the tension state of the track

Check it every 10 hours.

- 1) Put the excavator on the flat and solid ground.
- 2) Take off the cover of each track carrier (No. * of Figure 2).
- 3) In order to loosen the track, firstly release connector * (Figure 2) to make the grease flow out, and ensure that the branch volume f of the track is controlled within 2-4cm of deflection (Figure 1), then re-tighten it.
- 4) In order to tension the track, you need to connect the Grease Gun connector with the connector *(Figure 2). Then refuel with the grease gun till the branch volume f of the track is controlled within 2-4cm of deflection (Figure 1).



Warning: Do not beat track tension springs, which will explosively fracture due to the enormous pressure, resulting in personal injury. Do not remove the spring under the tension state.

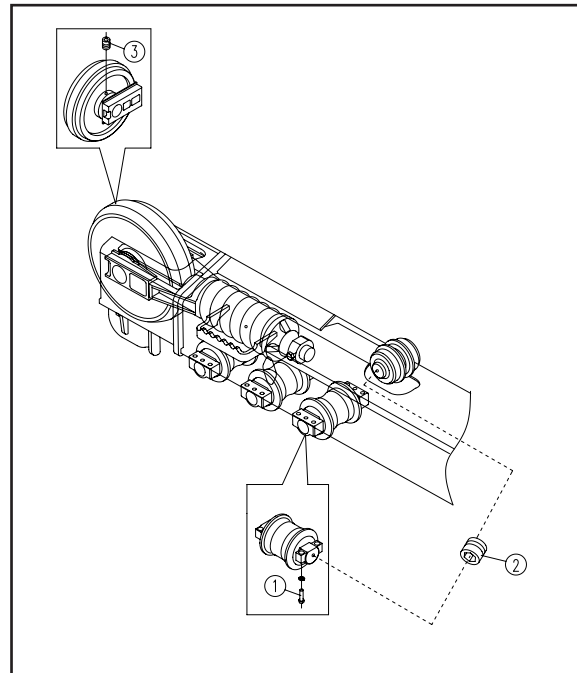
Supporting wheel, under roller and idler

1. Checking the tightening torque of supporting the wheel

Check it for the first time after the 50 working hours of the new machine, and after this, it should be checked every 500 hours.

If there is any bolt loose, unscrew the plug and clean the thread locking agent between the bolt and the thread, coat the thread joints with the thread locking agent, and then tighten the bolt in accordance with the specified torque.

If the bolt must be replaced, the new bolt must be of the same size and the same strength grade.



1.Supporting wheel bolts

2.Roller oil plug

3.Guide the oil plug

2.Checking the oil level of the under roller and the idler

Check it every 1000hours.

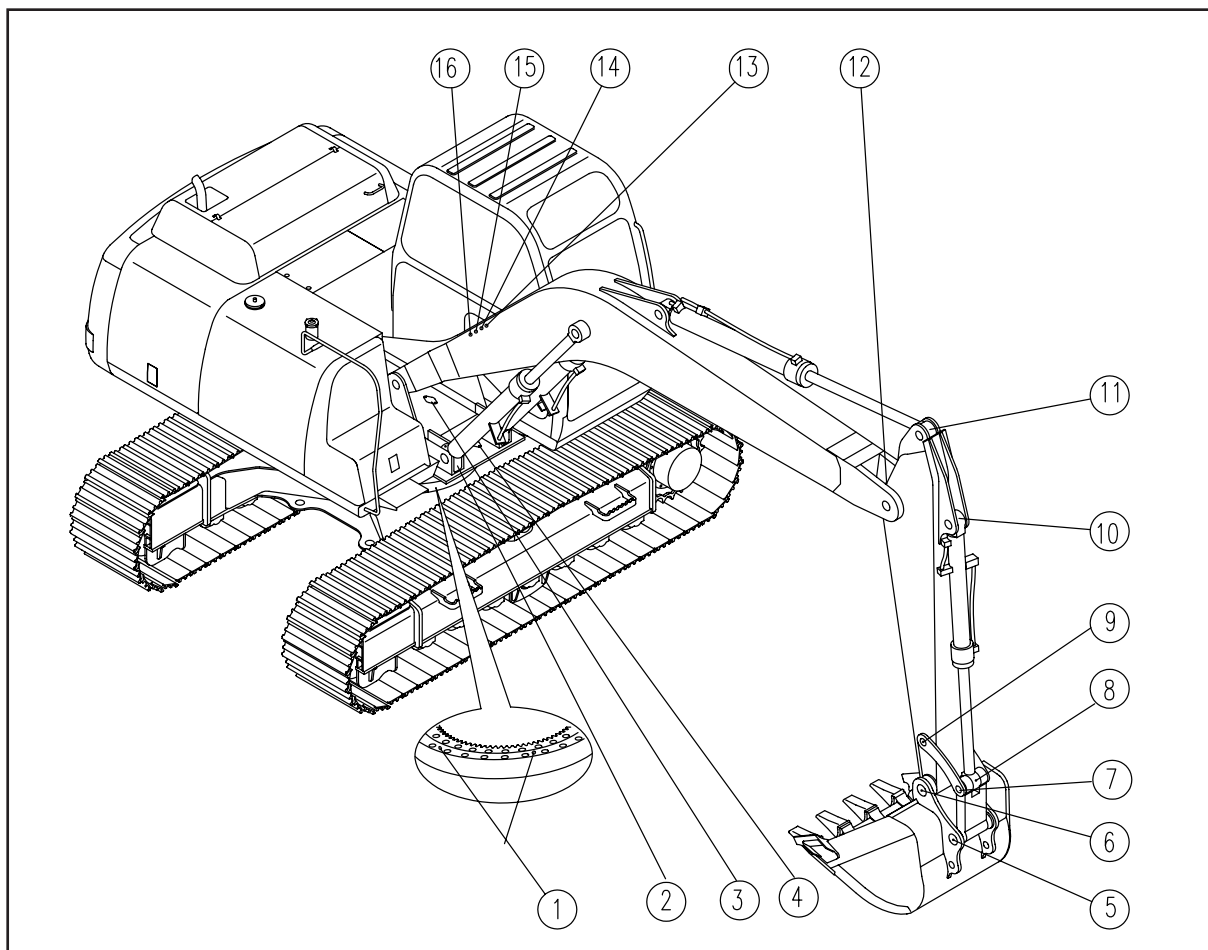
- 1) Remove the plug * and plug * respectively from the under roller and the idler.
- 2) Refuel with the oilier.
- 3) When there is oil flow out from the filling hole, re tighten the plug * and plug *.

Lubricating

Lubricate each lubrication point of the machine every 50hours.

Lubrication steps:

- 1) Start the working device and put the bucket to the ground.
- 2) Put the blade to the ground.
- 3) Turn off the engine.
- 4) Clean the refueling nozzle of each oil cup.
- 5) Lubricate all the lubrication points and wipe the excess grease that is squeezed.



1. Lubrication point of the rolling passage of slewing support
2. Lubrication point on the tail of the boom oil cylinder
3. Lubrication point of slewing support's speed reducer
4. Lubrication point of slewing ring gear
5. Lubrication point of connecting rod and bucket
6. Lubrication point of connecting stick and bucket

7. Lubrication point of connecting rocker and rod
8. Lubrication point of bucket cylinder head
9. Lubrication point of connecting rocker and stick
10. Lubrication point of rear bucket cylinder
11. Lubrication point of stick cylinder head
12. Lubrication point of connecting stick and boom

13. Lubrication point of the boom cylinder head
14. Lubrication point on the tail of stick cylinder head
15. Lubrication point of connecting left boom and platform
16. Lubrication point of connecting right boom and platform

Caution:

- 1) If there is abnormal noise in lubricating point, please do additional lubricating besides maintenance period.
- 2) At the beginning 50working hours, do lubricating for every 10 hours.
- 3) Working in the water, please lubricating the pins before and after working.
- 4) When doing the deeper digging or overload working, lubricate mount pins of the working equipments before working, operate the boom, arm, bucket and knife for several times and then lubricate them again. After that, do lubrication every 10 hours.
- 5) Please fill lithium molybdenum disulfide grease (No.3)

Air conditioning

The machine is equipped with the air conditioning device in the cab, and its operation knob is on the left control box in the cab.

As to the specific operation and maintenance of the air conditioning system, you can not only refer to this operation manual, but also the Air conditioning operation manual attached to this machine.

1. Precautions for the air conditioning maintenance

1) If the graphics flicks on the manipulation screen, then the cooling system pressure has failure. The compressor does not work and the system can not cool down, when you should find a professional to repair.

2) Automatic shutdown after the starting (the manipulation screen goes off after going on) or the graphics flicking (about 5 minutes) shows that non-normal power failure is occurring or non-normal power failure has occurred at the beginning of last starting (for example, turn off the power switch without turning off the air conditioning control power, insurance is burned in the process of the starting the air conditioning, power cable connection is poor, etc.). At this point, if the graphics stop flicking 5 seconds after starting, then the air conditioning can be used continually; if you cannot boot or it automatically shut down after the boot, and then check whether the air conditioning power supply circuit is open, or the connection is bad.

3) To protect the compressor, the compressor start interval is set for 15 seconds in this machine, so if the time of choosing cooling from the last cooling choice time is less than 15seconds, it is normal that the compressor does not run. After the interval of 15 seconds, the air conditioning system will automatically accept your instructions of cooling.

4) Air conditioning air filter box assembly must be cleaned regularly once a month, otherwise dust and dirt can clog the network, and the indoor air cannot smoothly go through the heat exchanger, affecting the effectiveness of the air conditioning.

5) In special conditions (such as wet, the not very hot environment, the use of outside air circulation, low-speed blower running, dirty and clogging air filter, return air blockage, etc.), if you use the strong cooling for a long time, you will sometimes feel the wind is smaller and smaller, or even almost no wind, which is the performance of air conditioning evaporator frost. The frost on the evaporator blocks the air circulation flow channel, making the cooling effect if poor. However, this is not a fault. As long as you suspend the cooling, remove the dirty block and select the wind, then a few minutes later, choose the cooling, it can return to normal. After returning to the normal use, do not select wind, strong cooling, and outer loop at the same time, for example, you can select the weak cooling or the middle cooling.

6) When using the heating system in the winter, you should wait the engine water temperature has increased before use.

7) Heating core tank is connected with the engine water tank, so once the heating core leaks, the water tank will be lack of water, making the engine overheating. In the winter, to prevent the coolant from freezing is as important as to protect the water tank from cracking. To prevent the coolant freezing leading to the cracking of the heating core tank and the water tank, please use the specified coolant. Because in winter, the coolant may freeze easily, if necessary, if the standby time is long, please let the coolant out. Please note: heating core tank cracking in the winter is not within the scope of *three guarantees*.

In addition, the heating core tank corrosion and leakage, warm water valve damage due to the coolant that is not in accordance with the requirements of the manufacturer are also not within the scope of *three guarantees*.

8) Refrigerant easily frostbites the skin, especially the eyes; in addition, it will emit toxic phosgene in case of meeting the open fire. Therefore, under any situations that the cooling system needs to be demolished, please recover the refrigerant before disassembling the cooling system. The whole process should be free from flame!

9) When the cooling system is not used for a long time, it should be run every half a month for 5-10 minutes each time.

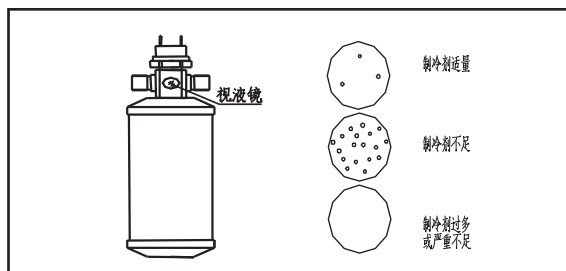
2. Checking the amount of the refrigerant



Refrigerant easily frostbites the skin, especially the eyes; in addition, it will emit toxic phosgene in case of meeting the open fire. Therefore, under any situations that the cooling system needs to be demolished, please recover the refrigerant firstly in the case that the refrigerant will not spray to the skin and eyes, and then demolish the cooling system. Please make sure that there is no open flame during the whole process.

If the refrigerant is insufficient, the cooling performance will be very poor. Therefore, check the amount of the refrigerant every month or every 250 hours.

In the case of the engine idling at high speed, operate the air conditioning in the state of strong cooling, check and determine the amount of refrigerant according to the bubbles on the sight glass of the drying bottle.



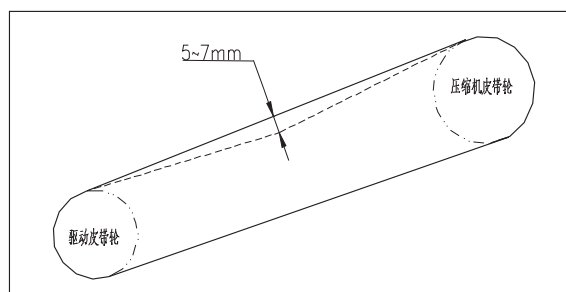
3. Checking, adjusting the tension of the air conditioning compressor belt

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

A. Checking

Press the belt in the middle between the driving wheel belt and the compressor belt with the finger force of 12N, and check if the deflection is about 5-7mm.

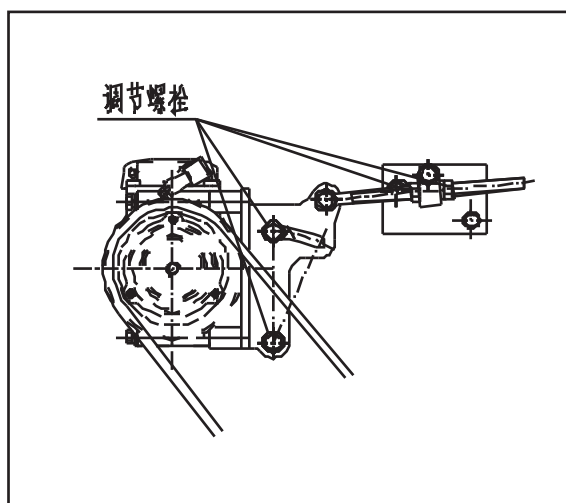
Check if the belt is damaged. If the belt has been stretched without the margins for adjustment or it has cuts or cracks on its surface, please replace with a new belt.



B. Adjusting

Loosen the adjusting bolt as shown in the figure, adjust the bolt to make the belt properly tensioned, tighten the bolt again.

Note: Different types of air conditioning compressor belt adjustment may be different, specific to the actual model shall prevail.



4. Air conditioning regularly inspection contents

No.	Inspection items	Inspection contents	Inspection cycle	
			Per month	Per season
1	All fasteners	Looseness or drop	★	
2	Air conditioning belt	Tension and wear	★	
3	Pipelines	Wear or cracking	★	
4	Connector	Wear or leakage		★
5	Electric fan	If run properly	★	
6	Harness	Wear, tear and scorch	★	
7	Condenser	Dirt clogging on the surface		★
8	Electromagnetic (compressor)	Slipping	★	
9	Compressor	Any abnormal sound		★
10	Amount of coolant	If the sight glass has bubbles	★	
11	Dust filter	Any dirt clogging	★	

Bucket Teeth Replacement

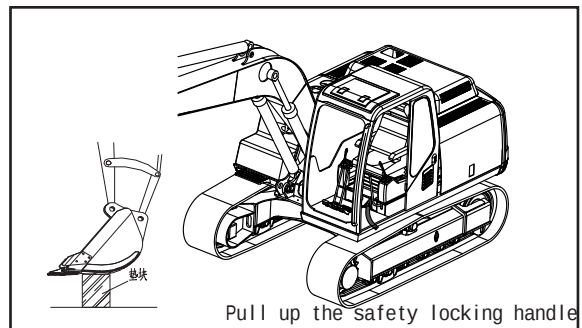
Replace the bucket teeth before the wear of the bucket seat.



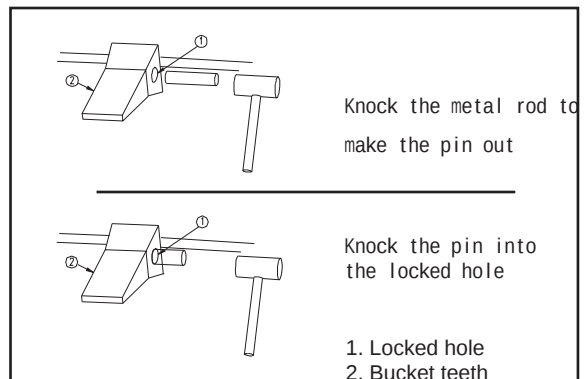
Warning: when replacing the bucket teeth, the accidental movement due to the misuse of the working device is very dangerous. Therefore, before replacing the bucket teeth, you have to place the working device in the locked state, shut down the engine and have all the operating stick firmly locked. In the replacement, wear the necessary protective equipment to prevent items flying out of the lock pin.

Replacing bucket teeth

1) Place the bottom of the bucket on the pad to remove the pin. Check if the working device is in the locked state, and place the bucket horizontally. Then lift the safety lock lever on the left control box, making the machine in the locked state, and turn off the engine.



2) Put a metal rod whose diameter is slightly less than that of the pin on the pin head, knock it with a hammer, and remove the bucket teeth.



3) Clean the mounting surface. Put the new teeth into the teeth seat, push the pin partially into by hand, and then knock the pin into with a hammer to fit the bucket to the bucket seat.

Washing the floor pads

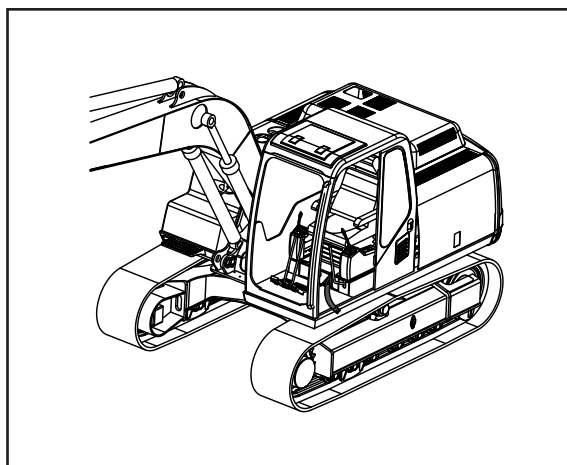
Clean the floor pads whenever it is dirty to prevent the accidents due to the slipping or falling.



Warning: if you hit the stick accidentally, the working device will move suddenly, causing a serious accident. Therefore, before removing the floor pad, you must stop the machine on the flat and solid ground. Before the operator stands up, he must lift the pilot safety handle and the control box above it, locking the pilot system.

Floor pads washing steps:

- 1) Take the floor pad out of the cab.
- 2) Remove the dirt with a brush or wash the floor pad directly with water
- 3) Clean the floor of the cab with a dry mop.*
- 4) Put the floor pad back to the cab after it has been dried.



Maintenance of electrical system

Electrical system is an important component of Excavator, The electrical maintenance should be carried out in strict accordance with the instructions. Be sure to turn off the power when checking and maintaining electrical components.

1. First, check whether the battery connector is loose. The battery is the main power supply of the whole electrical aspect, so the battery connector must be tightened to ensure the normal power supply.
2. Check the condition of the line every half a month, wipe the line and joint with a clean towel for long time using of the excavator must bring oil, dust and other impurities to the line, which would probably make the circuit short circuit or open circuit, and cause machine failure.
3. Check the appearance of the wiring. See whether there is any break or aging in the line, if there is, ask the electrician that has relevant experience to change wire.
4. Check whether the fuse of the electrical appliance is working. When the electrical appliance does not work, first check whether the following fuses are burnt out, if so, it is necessary to update the fuses. Note that you should never replace a fuse with a wire or other conductor.
5. It is very dangerous if the electrical equipment is damp or the insulation layer of the wire is broken, which will cause electricity leakage and cause machine failure. Do not flush the inside of the cab with water. When flushing the machine, be careful not to let water rush into the electrical parts.
6. Do not install any electronic components other than those specified by Yuchai Equipment Technology.
- 7*External electrical interference can cause electrical system failure, so please contact Yuchai Heavy Industry dealers when installing radios or other wireless equipment.
8. When working at the beach, clean the electrical system carefully to prevent corrosion.
- 9*When installing a cab air cooler or other equipment, it should be connected to a special power supply. The selected power supply should never be connected to a fuse, start switch or relay.

6

Accessory Guide

Safety issues

If the accessories or options that have not been approved by Yuchai are installed, this will not only affect the service life of the machine, but also can cause some safety problems.

When installing the accessory that has not been approved by Yuchai, please contact Yuchai dealer firstly.

If you do not contact Yuchai, we will not assume any liability to the accident or damage.

1.Safe operation of accessories

- * Accessories have a strong auxiliary function. To prevent serious injury or damage, you have to use the accessories properly.
- * Before you have a full understanding of the contents of the operation manual, do not use the accessories. If the instruction manual is lost, ask the manufacturer or the company that sells the accessories for a new manual.
- * According to the conditions of accessories, the necessary front guard should be installed on the machine.
- * According to the case of accessories, vibration noise, my colleagues will make the conveyance of instructions between the colleges very difficult. So, before starting the operation, assign a command and determine the signal to be used.
- * In the case of heave load on the accessory, do not do the rotating operation of turning to the side, especially on the slope. Such operation is very dangerous.
- * Compared with the machine equipped with a bucket, the machine equipped with a breaking hammer has heavier load in the front and is unstable. To avoid the risk of tipping, do not carry out any operations during the accessory rotation to the side.
- * After the machine has been equipped with accessories, you have to set out a cordon around the machine to prevent the personnel from entering. When someone is near the machine, do not operate the machine
- * Before starting the operation, you should set up a cordon around the machine to prevent personnel. When someone is near the machine, do not operate the machine.
- * To prevent serious accidents caused by misuse, do not put your feet on the pedal unless for the operation.
- * When the machine is fitted with an accessory, if the accessory is recovered to the direction of the machine body, it will be interference with the body, so please operate the accessory carefully.

2.Removal or installation of accessories

- * When removing or installing the accessory, be sure to do according to the following steps go ensure the operation safety:
- * Removal and installation should be carried out on the flat and solid ground.
- * When the operation is done by two or more persons, you should determine the signals and comply with these signals in the operation.
- * When upgrading or moving heavy objects (over 25 kg), be sure to use the crane.
- * When removing the heavy components, you have to support them with a crane before removing. When using the crane, please pay particular attention to the position of the gravity center.
- * When lifting the heavy loads with a crane and if it is dangerous, prepare a stand and ensure that its state is safe.
- * When placing the removed accessory, make sure that it is stable and cannot overturn.
- * Do not walk under the load lifted by the crane. You should stand at the place that even if the load falls down, it has no danger.

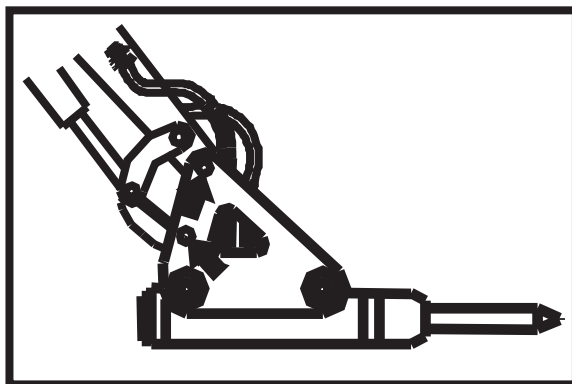


Warning: The person who operates the crane must have the operation qualification. The people without qualifications are not allowed to operate the crane. For the details of the removal and installation, Please contact Yuchai dealer.

Accessories installation and removal steps

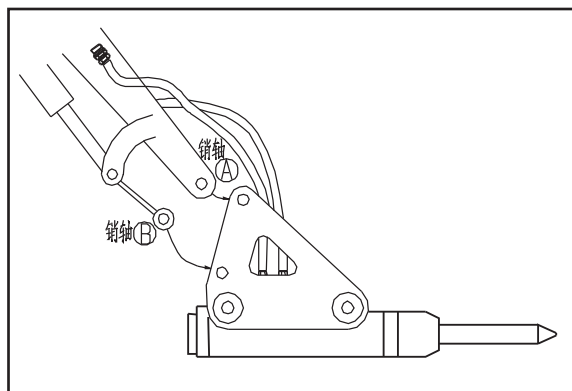
1. Removal procedures

- 1) Place the accessory on the ground and turn off the engine
- 2) Turn the starter switch to *ON* position and push the left control box to the free position.
- 3) Do the full-stroke operation of forward, backward, left and right to all the work units stick and accessory control pedal to eliminate the internal pressure in the hydraulic circuit.
- 4) After the oil temperature is reduced, lock the switch valve connected to the stick side inlet and out let pipe.
- 5) Remove the side hose of the accessory and tighten then washer on the blocking plug to the two exports.
- 6) Remove the accessories by removing the pins(2) and then install the bucket.
- 7) Strap the two unconnected hose ends of the hydraulic hammer with a clean plastic bag, doing dust control measures. Store the accessory proper.



2. Installation Steps

- 1) Remove the bucket.
- 2) Place the accessory at a flat place, connect the stick and hydraulic hammer with pin A and connect the connecting rod and hydraulic hammer with pin B.
- 3) After the temperature is reduced, respectively remove the bolts from the export and import. Be careful not to allow dust, dirt, etc. stuck to the hose interface parts. If the washer is damaged, replace it with a new one.
- 4) Connect the hose on the accessory side. When connecting, check the flow of the oil and do not connect it wrongly.
- 5) Release the switch valve lock connected to the stick side inlet and outlet pipes.
- 6) After the installation of accessories, make sure the oil level in hydraulic tank is in the right place.



Accessories Instruction Guide

This section describes when operating the hydraulic excavators with accessories, the precautions to be observed.

Note: Choose the accessory most suitable to the host. The models of the accessory that can be installed are different. For accessories and machine model selection, please contact Yuchai Dealer.

Hydraulic Breaking hammers

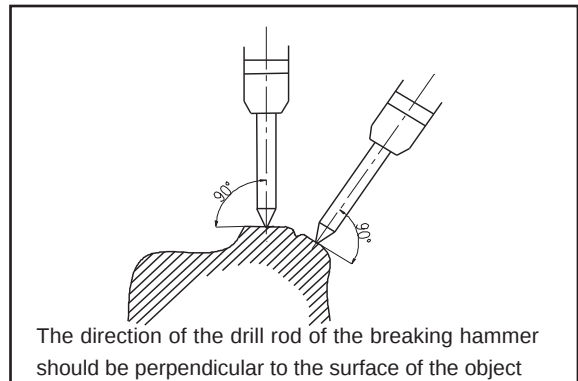
1. Hydraulic Breaking hammers operation Guide

Hydraulic crushing hammer is the most common working accessory. It is widely used in demolition of buildings, cracking of pavement, tunnel operation, crushing of steel slag, stone and crushing in quarry.

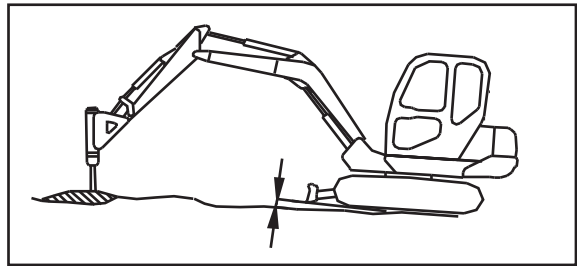
1) When carrying out crushing operations, make sure Breaker Chisel point in the direction perpendicular to the surface of the object, and keep it as far as possible. If it is inclined to the surface of the broken object, the drill may slide from the surface, which will cause damage to the drill and affect the piston.

When doing the breaking, please select the appropriate blow points, and make sure the drill rod is stable, and then begin blowing.

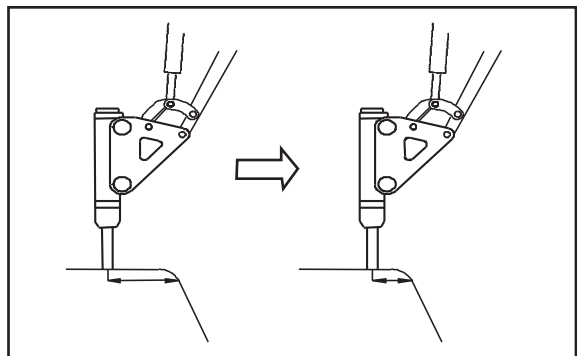
During the operation, it is required to adjust the bucket cylinder to keep the drill rod penetrating direction and the body of breaking hammer in the same line.



2) When the shock is applied, press the drill rod down to the shock surface, with the chassis from the ground about 5cm. Do not let the machine off the ground too much.



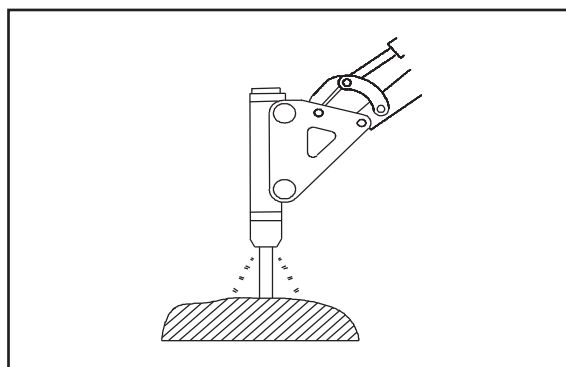
3) When making continuous shock to the same shock surface, if the drill rod cannot penetrate or break the surface within 1minute, change the shock position and do the breaking near the edge of the surface.



4) Maintain the drill rod blow the surface appropriately to prevent the use of the impact when there is no resistance.

When the target or rock has been crushed, please stop the blow action of the breaking hammer immediately. Blowing of continuous and aimlessness can only cause the precursor and the main bolt loose and damaged, or even cause damage to the excavator itself.

Aimless blowing is due to the properly inserting, as well as shaking the breaking hammer.

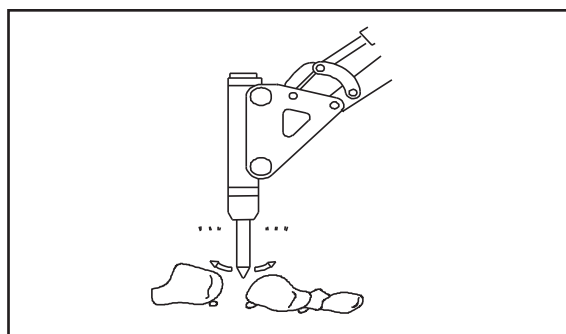


2. Hydraulic breaking hammers operation taboo

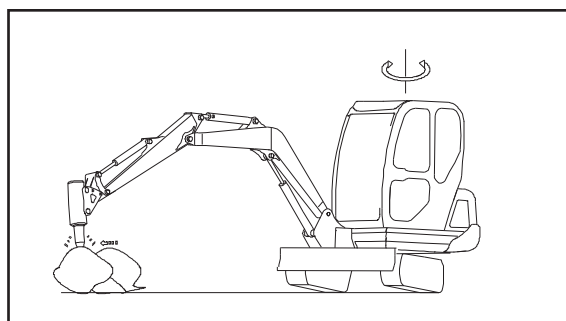
To ensure that the machine has a long life and ensure the safe operation, do not operate the machine in any of the following ways:

Note: Do not operate all cylinders to the end of the cylinder stroke, and about 5 cm margin should always been kept.

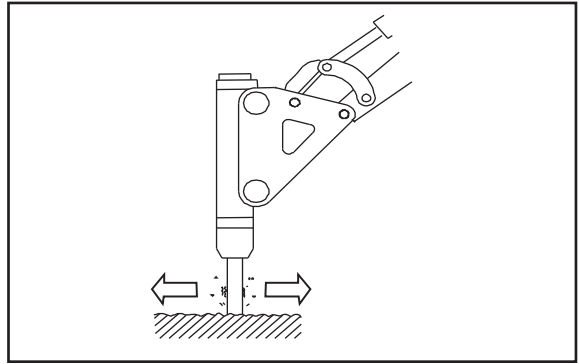
1) Push heavy objects or large stones with the breaking hammer.



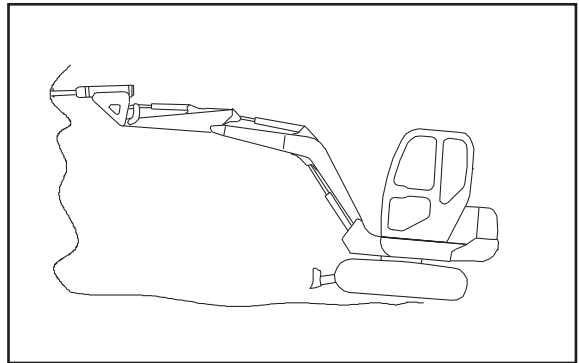
2) Operate with rotary force.



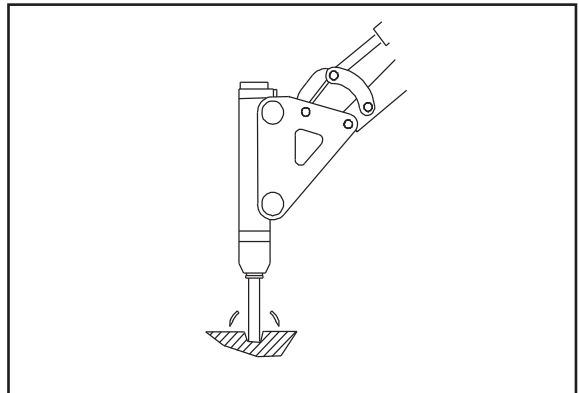
3) Move the drill pod in the impact operation.



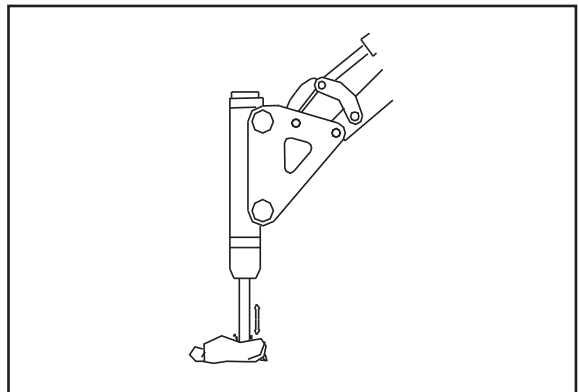
4) Apply impact force in the level or upward.



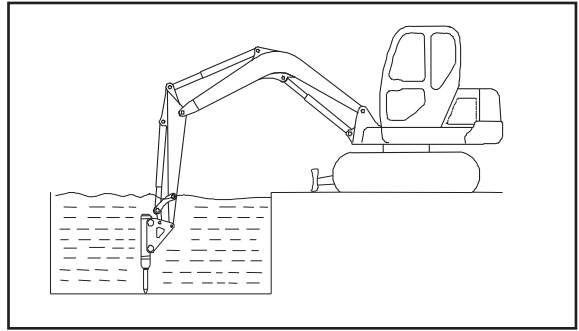
5) Swing the drill rod when it has been penetrated into the rock.



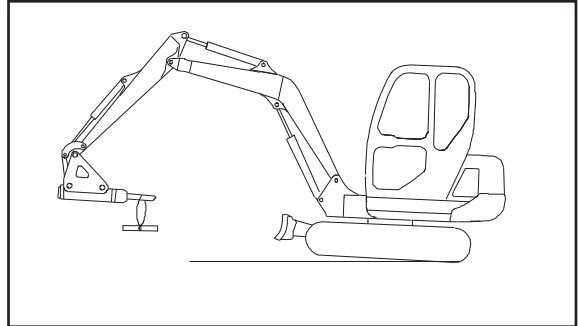
6) Pecking operation.



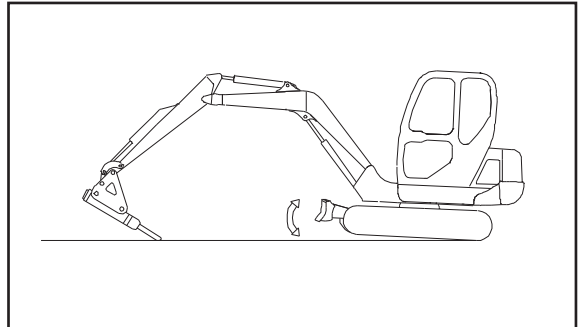
7) Carry crushing operation in the water or in the muddy ground.



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



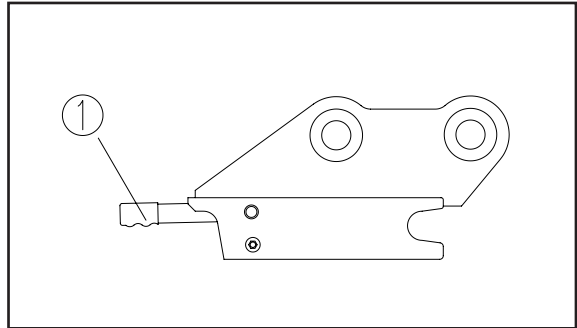
9) Make the bucket cylinder fully extended and the machine off the ground.



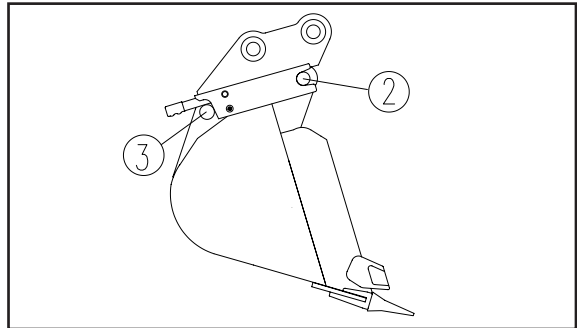
Quick Hitch Couplings

1. Bucket Installation

1) Pry * with a crowbar.



2) Place the bucket pin into the position of **, put down the crowbar, and the bucket is installed



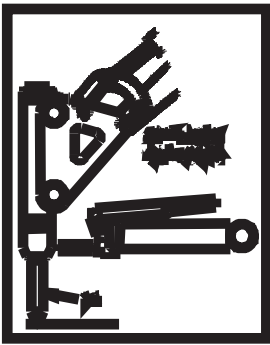
2. Bucket Removal

1) Pry * with a crowbar.

2) Remove the bucket.

Daily inspection of hydraulic breaking hammer

Do the daily inspection and maintenance for hydraulic breaking hammer according to the following table.

Number	Inspection or maintenance items	Inspection points	Maintenance manner
1	If bolts and nuts are loose or lost	Main bolts and side bolts	Tighten the bolts or re-install a new bolt
2	Check hoses parts for looseness, damage or leakage	Hydraulic breaking hammer piping	Re-tighten the loose parts; Replace the seriously damaged parts.
3	Lubricating 	Before the operation or the in the continuous operation of 2-3 hours, the lubricating oil should be used. Inject lubrication oil 5-10 times for each lubricating.	Inject lubricating oil from the oil hole of on the precursors of the breaking hammer.
4	Check the hydraulic oil capacity and pollution	The status of hydraulic oil	Hydraulic oil mass ratio change is different due to the different working environment. A simple way to judge the change of the oil mass if to observe the oil colure. If the oil turn bad seriously, please immediately discharge the hydraulic oil in the hydraulic tank and after cleaning the tank, inject the new hydraulic oil.