

HYDRAULIC EXCAVATOR

YC08-8

OPERATION AND MAINTENANCE MANUAL

GUANGXI YUCHAI HEAVY INDUSTRY CO.,LTD.

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Caution

If it operates the machine with wrong way,it will make some dangers.Before use the machine,it should do as follow:

- **Remember the operation manual and the use criterion**
- **Read & understand the content of the user manual about the safety operation**
- **Understand & know the safety sign of the machine**
- **Let the person leave the workplace who not the operator**
- **It should have a safety operation training before operates the machine**

You have the duty to observance the ordinance & laws, follow the relevant direction about machine operation & maintain from YUCHAI.

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1

Prolegomenon

TO USER

Dear users,

You are welcome to use YUCHAI excavator, thank you for your support to our business.

This manual is for the operator and the service man of YUCHAI excavator. Hope you can read this manual carefully before operating and maintaining, and work strictly as the regulations of safety measures, operating guides, lubrication and periodic maintenance.

Correctly handle the operating method and maintain frequently are the necessary measures for the machine work reliably and efficiently, and also can lengthen machine use life.

Please send the machine to our company's service office or agent for important servicing and adjustment, and use the original parts supplied by our company. It will cause many problems if you install other parts on our machines even it is not clear effect for beginning.

We will not supply the warranty service if the machine broken as Used the unoriginal parts or repaired by the service department which is not authorized by Yuchai even it is during the warranty period.

According to the principle of "The customer is god", we will keep improving the machine for supplying the product to the user as best as we can. The improvement will be take in any minute, we will not responsible for sending the new manuals for the selling products and giving the notice in advance.

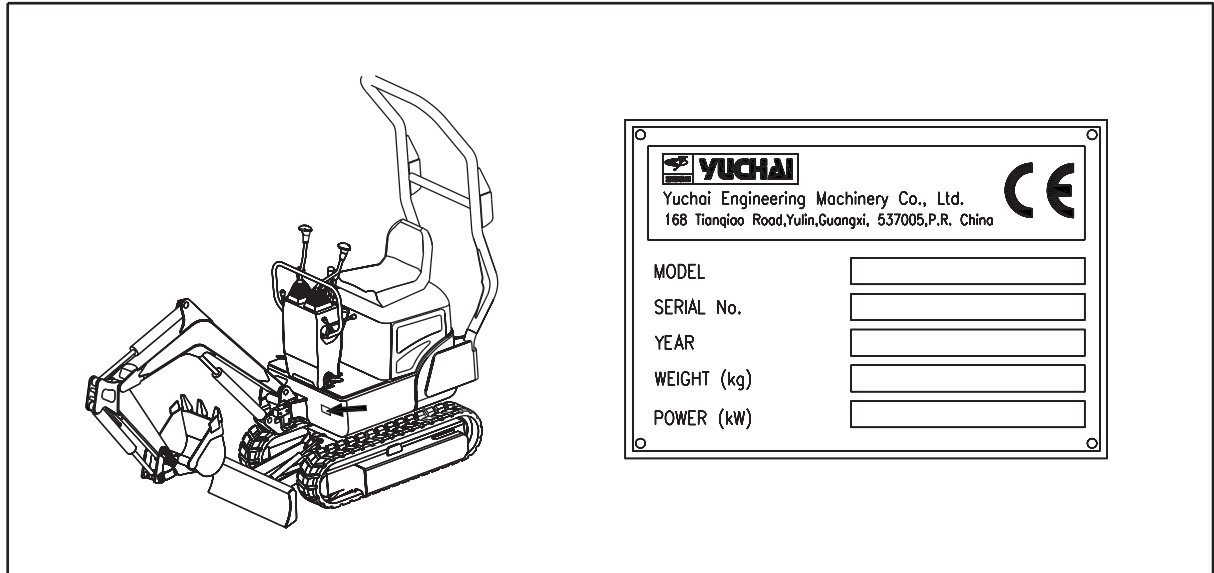
Hope this machine can supply the comfortable operating condition.

Guangxi Yuchai Heavy Industry Co.,Ltd.

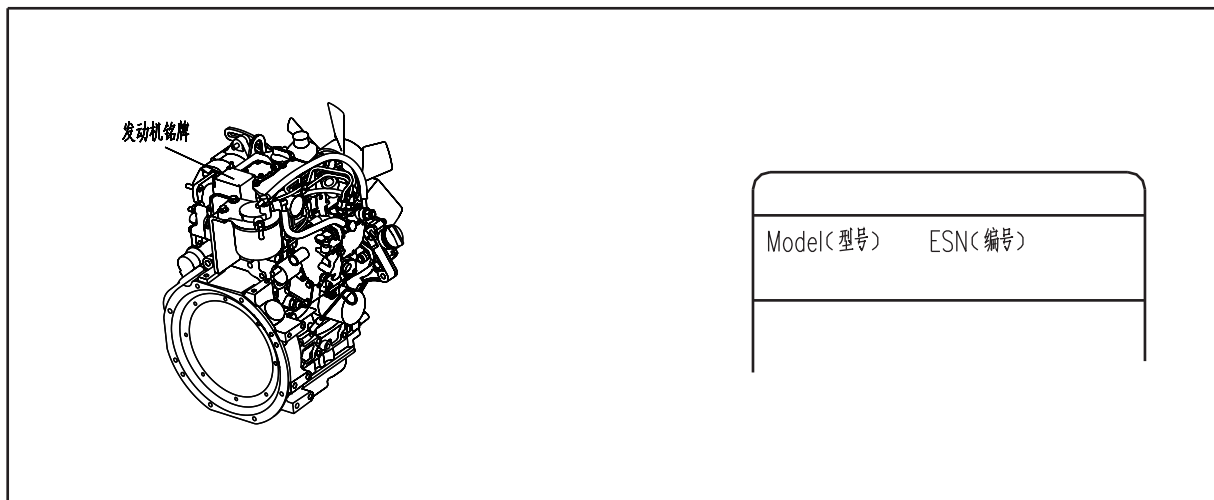
Product Information

If you want to know the basic information of the machine, please check the following picture:

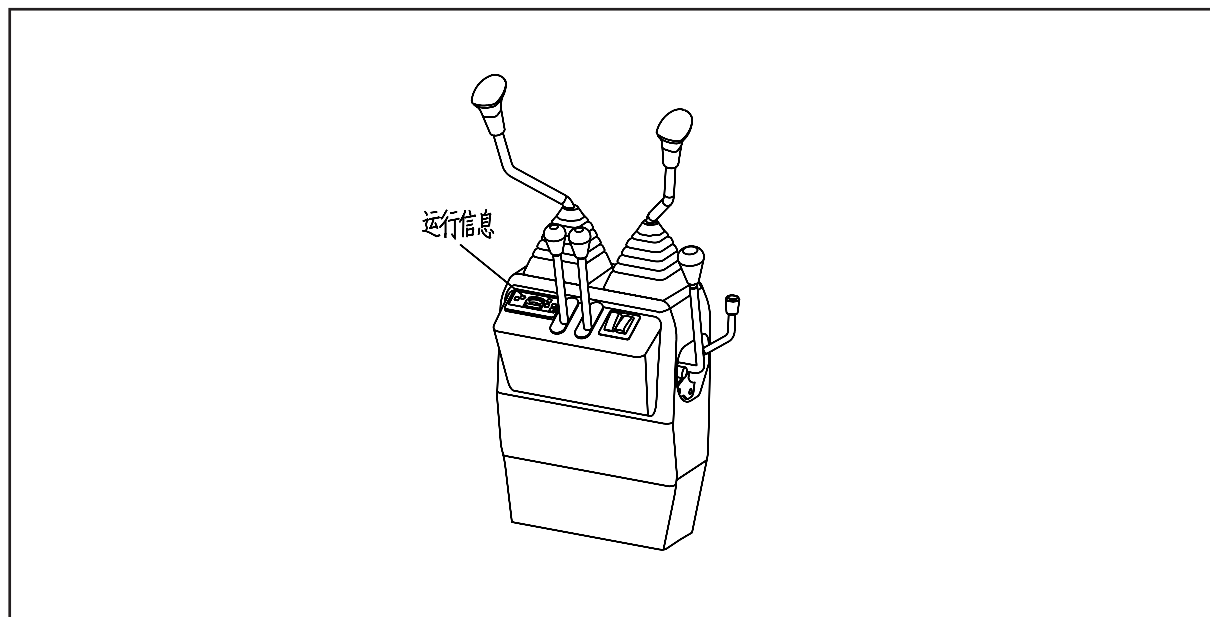
● **Machine Information**(The nameplate is on the left-front side of the platform)



● **Engine Information**(The nameplate is in the middle of the engine)



● Machine running Information(The time meter of the engine is on the digital instrument which is inside the cab)



Machine File

Please fill the machine series No. and engine series No. in the following table. If you need to buy the spare parts or related information, please advice YUCHAI these series numbers.

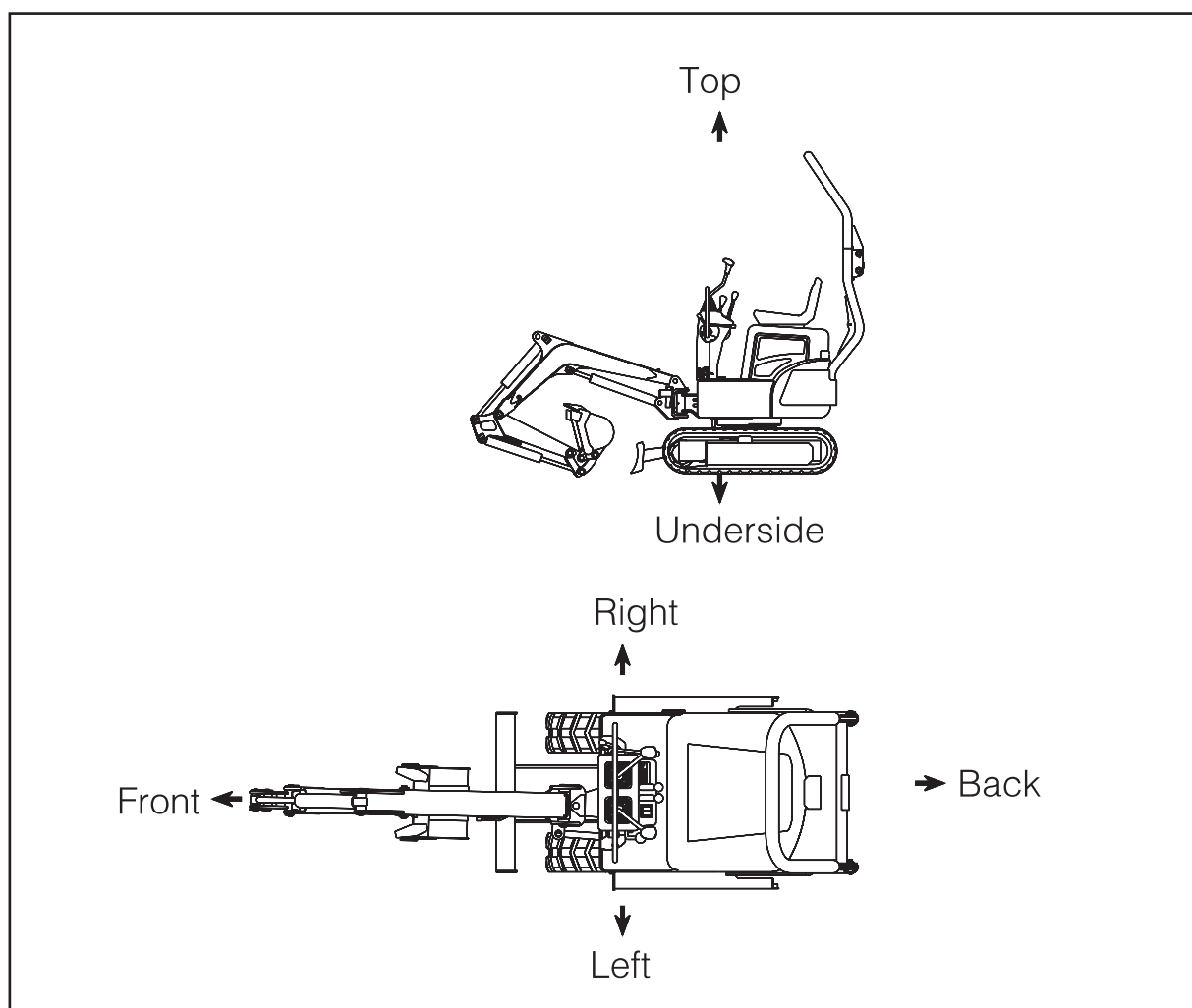
Please keep record for the series No, and put together with Production Certification. You can delivery those Material to Local Police office when the machine was stolen.



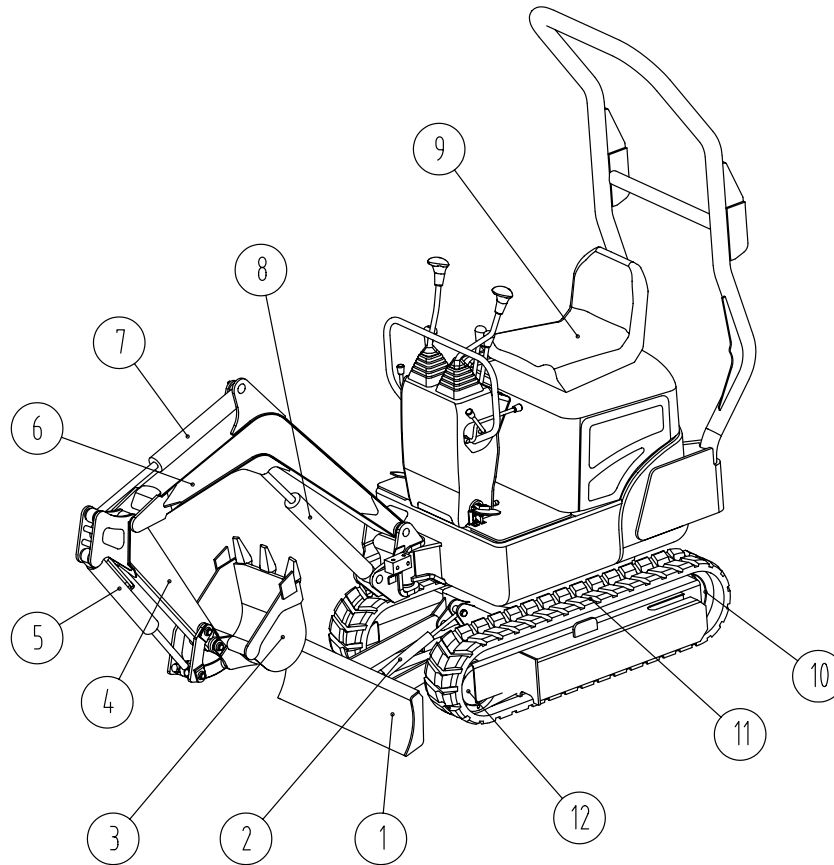
- Model: _____
- Machine No: _____
- Engine No: _____
- Dealer Information: _____

Machine Direction

Front、back、left、right、top、underside in the manual same as the direction as follow:



Machine Configuration



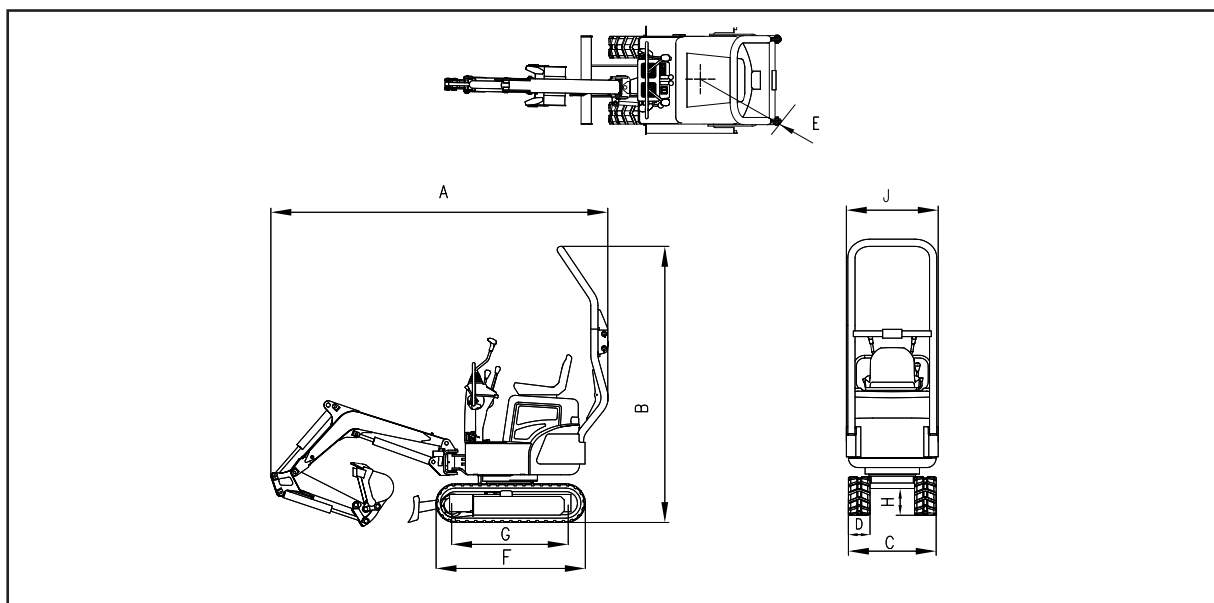
- | | | | |
|------------|--------------------|----------------------|------------------|
| 1. Bucket | 2. Bucket cylinder | 3. Arm | 4. Arm cylinder |
| 5. Boom | 6. Boom cylinder | 7. Dozer cylinder | 8. Driving wheel |
| 9. Crawler | 10. Front Idler | 11. Bull dozer plate | |

Technical Data

1.Dimension parameter

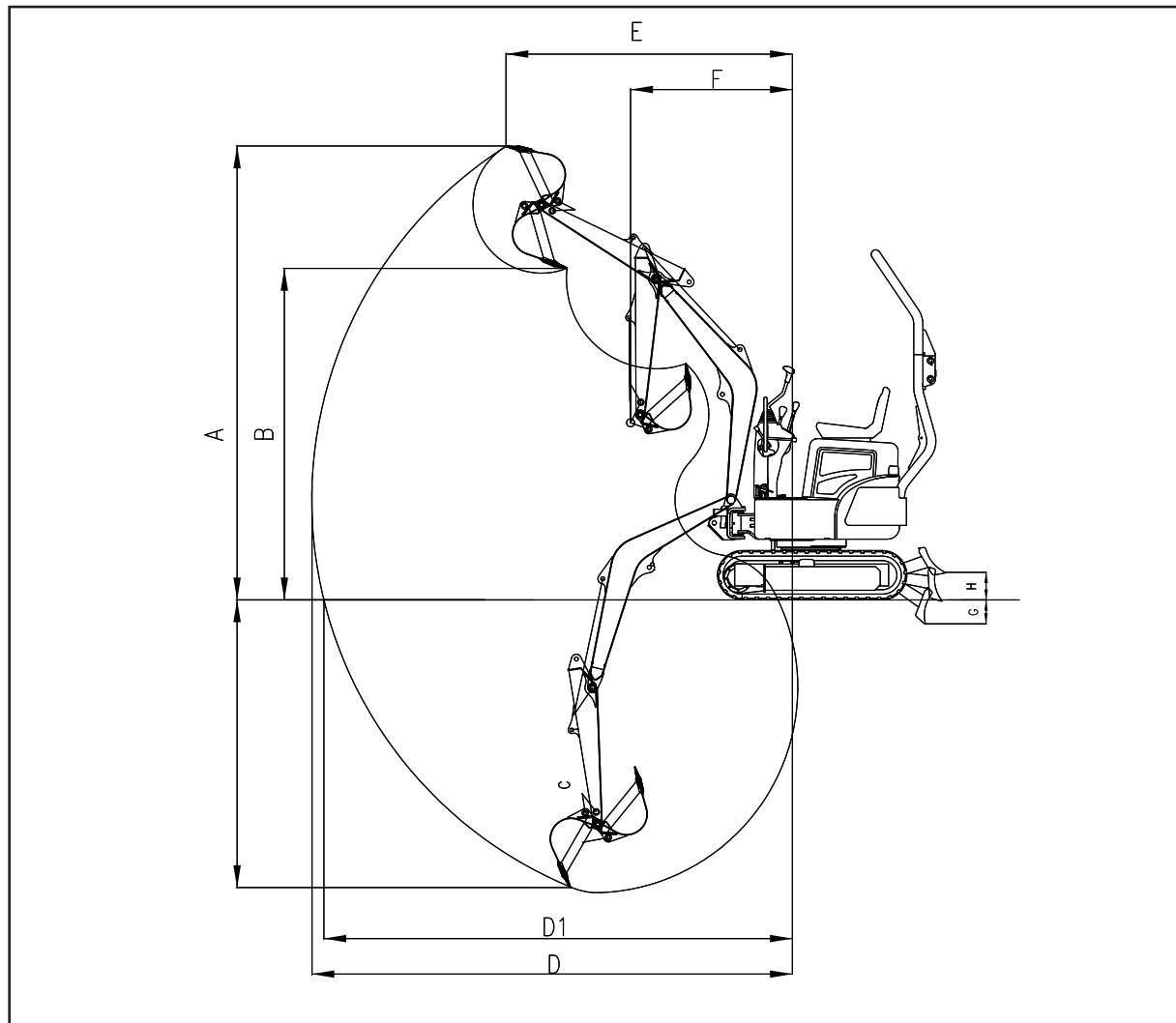
Code	Item	Unit	YC08-8
	Operating Weight	kg	1030
	Standard bucket capacity	m ³	0.02
	Name of engine		YAMMER2TNV70-PSU
	Power of engine	kw/min-1	17.2/2400
A	Machine length	mm	2800
B	Machine height	mm	2319
C	Overall width	mm	764
D	Crawler width	mm	180
E	Platform slewing radius	mm	800
F	Crawler length	mm	1234
G	Wheel-base	mm	895
H	Min ground clearance	mm	155
J	Width of platform	mm	764
L	Height from floor to platform	mm	418
	Width of bucket	mm	350
	Walking speed(low/hight)	km/h	1.7/2.7
	Platform slewing speed	rpm	10.8
	Cab		

Note:Technical data are subject to replace without prior notice!



2.Operating parameters

Code	Item	Unit	YC08-8
A	Max. digging height	mm	2737
B	Max. Dumping height	mm	1951
C	Max. digging depth	mm	1415
D	Max. digging radius	mm	2829
D1	Max. horizontal digging length	mm	2726
E	Max. digging height radius	mm	1527
F	Min. slewing radius	mm	1248
G	Max. depth of Bulldozer	mm	231
H	Max. height of Bulldozer	mm	267
	Max. digging force	kN	9.3



Note: Technical paremetes are subject to replace without prior notice!

3.Bucket

SN.	Capacity(m ³)	Bucket Width(mm)	Bucket Weight(kg)	Bucket teeth .
1	0.02			

4.Traveling system

Traveling system is combined by Hydraulic traveling motor and multiple-planetary reducer, reducer is inside the crawler.

	Walking speed(km/h)	Max. pull force (kN)	Gradeability
High speed	2.7		30°
Low speed	1.5	7.8	

5. Hydraulic system

Advance throttle hydraulic system

Main valve: Imported multiple valve

Pressure (mpa): 17 MPa

Oil return filter: 10 um

Oil intake filter: 150 u

6. Electric system

Voltage: 12V

Battery: 36AH

7: Environment Condition

Temperature: -15° ~40°C

Humidity:<85%

Altitude: The output is natural when the Altitude under level of 1200 Meter, and do please fix up the data follow the Manual when the Altitude is up to 1200 Meter.

Temperature for Transport and Stock: -15° ~40°C

2

Safe Rules

General Rules

Almost accidents about machines operation and maintenance will be avoided as per the related safety rules of this manual. It is required to read this book and all the safety information before operation and maintenance.

The related safety contents of the manual indicate the possible things made during the machines normal run, and give the methods to solve it.

The related safety contents can see from the integrative guidelines of each chapter, including the contents of this chapter.

This manual shall not include all the potential risks and related solving methods. It is your responsibility to adopt the methods and keep safety if you use the methods and actions that not allowed in this book.

The Forbidden purposes and operations of this manual shall never be done in any circumstance.

This excavator shall be operated and maintained by trained and qualified persons.

It is required to check each function of the machines before work, and look for the reasons if finding the malfunction. It only can work after being repaired.

The machines shall be checked and maintained according to the manual. And the operators are required to follow the operation ways and safety regulations in the work scope.

Under the condition of alcohol and medicines, it is not allowed to operate and maintain the machines.

It is required to learn the expressive contents of related signals and gestures

It is required to know and obey the related laws and regulations of the countries or the regions when being on the road.

The machine can be operated only if make sure nobody around the work area.

The machines can use on the ground in the normal working conditions only, please do not used for underwater, culverts, explosive and toxic environment, and other places dangerous working conditions.

Safety Tips

1.Warning sign



The sign in this manual indicates the important information about safety. You should carefully read the information and advice followed when you find this sign, to avoid the casualty accidents.

2. Safety Tips

The manual provides the security notices, signs and potential dangers conditions, the operators are required to carefully read this manual and the attached signs on the machines, and should work as per the related process.

The safety tips of this machine shall be expressed as: **Danger**, **Caution** and **Notice**, the explanations of these words are as follows:



Danger: It indicates that it can lead to casualty and serious hurts if the danger happens. It only appears in the most dangerous occasions.



Caution: It indicates that it can lead to casualty and serious hurts if the potential danger happens.

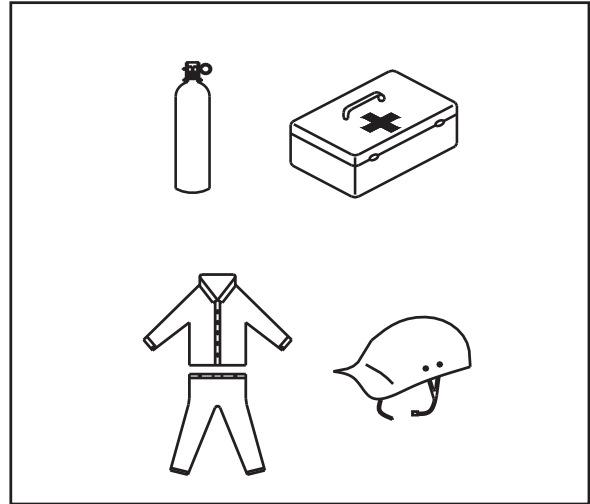


Notice: It indicates that it may lead to lower and medium hurts if he potential danger happens. And it can also give the advice of risky operation.

Safety Equipment

1.The safeguard for the operator

1) Operators should wear the skintight and suitable work clothes, safety helmets, work shoes and other related protective equipment before operation and maintenance work. (For example: Protective earplugs, grooves, protective glasses, safety belts and so on)



2) Long hair should be fastened and covered with safety helmets to prevent entanglement with any rotating.

3) Users should arrange the first aid medicines in the machine, check them periodically, and arrange more medicines if necessary.

4) It is required to check if the protective equipment are in normal before operation and maintenance work.

Safety Signs



Warning: Ignorant of safety signs or safety signs lost may lead to the casualty. Please replace the lost and damaged signs in time, and keep them clean.

Read the manual and caution signs attached on the machine before operation and maintenance work, and make sure to know and follow the contents.

Check the signs before operation every day, and clean them if dirty.

It can only use the calico, water and soap during the cleaning work. It is forbidden to use organic dissolvent or gas, because they can make the signs shed.

The signs shall be replaced if they are damaged, lost or unclear. New signs shall be attached on the new parts replaced. It can ask Yuchai agents for new safety signs.

1.Classifications of Safety Signs

Safety signs in this manual and on the machines shall be divided into: safety signs with picture and safety signs with picture & character

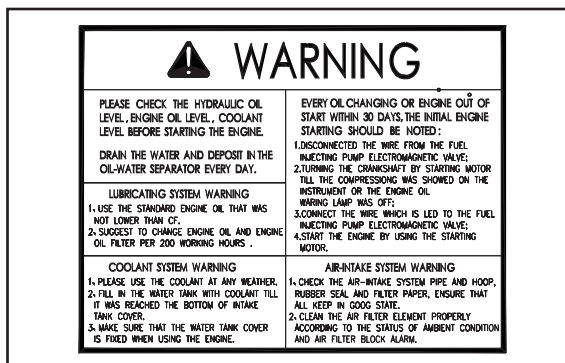
A.Safety Signs with Picture

This kind of safety sign can easily and clearly express the caution information with pictures.



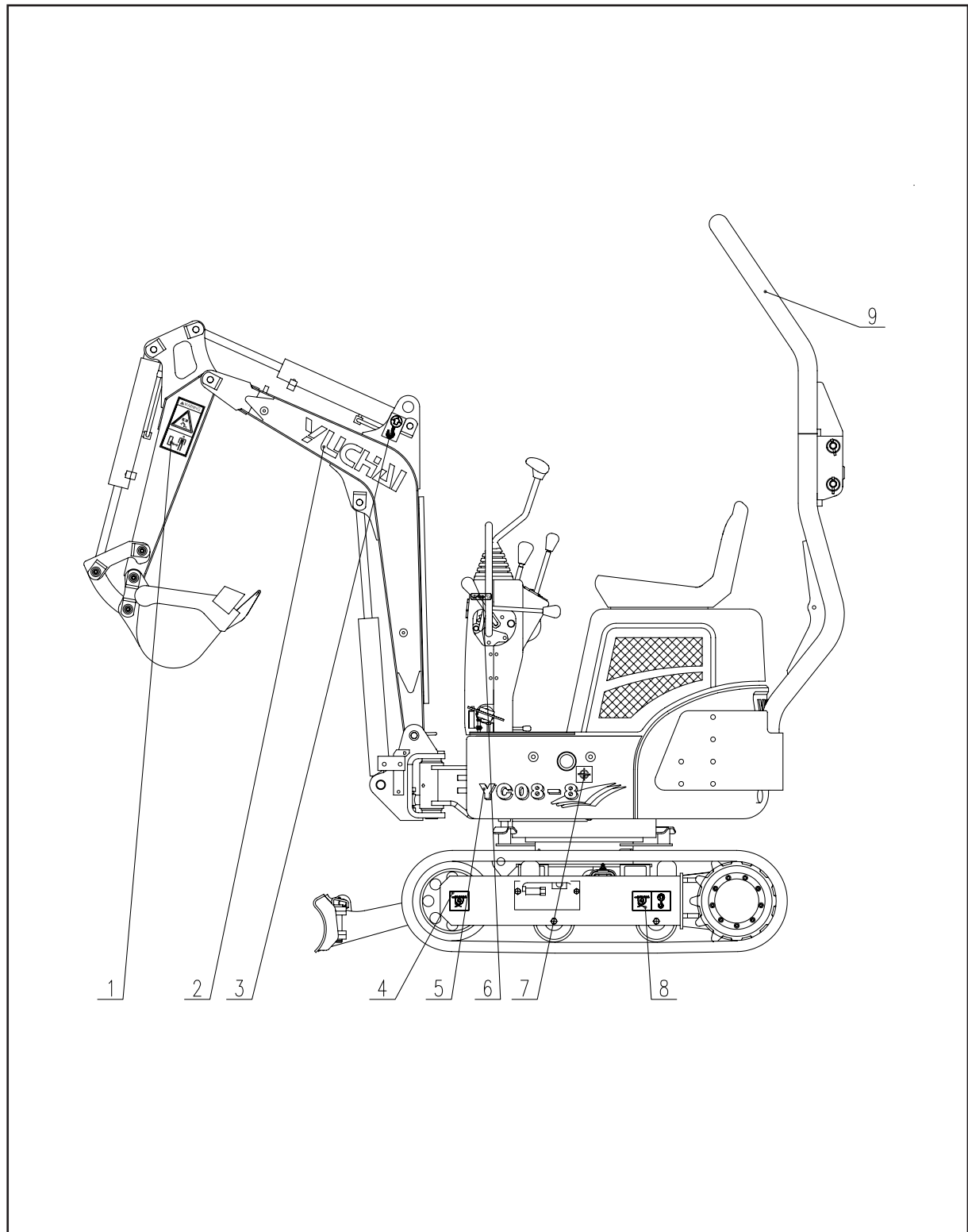
B.Safety Signs with Character

This kind of safety sign is configured with pictures and explanative words. It can be used in the place where cannot explain the safety information enough only with the pictures.



2.The position of the warning signs

Safe signs is the part of "safe marking" of all signs only. The rest function signs introduces in the behind the chapter



3.Safe signs illustration and explanation

1) Notice or Keep away from working equipment



Make sure do not run over people standing in the working zone, during reverse movement play the horn before moving

2). There might be eject the High-pressure hydraulic oil out from the tension assemble when adjust the tension pressure.

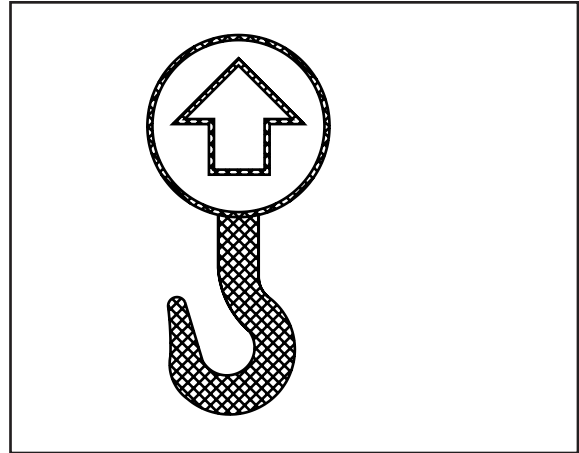


3) Make sure keep safe when up and down the machine.




Please keep the slow movement when up and down the machine.
clutch at the armrests of both sides and face the machine, use the pedal and tread shoe.

3). Sling sign



4). Warning Signs

 WARNING	
<p>PLEASE CHECK THE HYDRAULIC OIL LEVEL , ENGINE OIL LEVEL , COOLANT LEVEL BEFORE STARTING THE ENGINE.</p> <p>DRAIN THE WATER AND DEPOSIT IN THE OIL-WATER SEPARATOR EVERY DAY.</p>	<p>EVERY OIL CHANGING OR ENGINE OIL OUT OF START WITHIN 30 DAYS, THE INITIAL ENGINE STARTING SHOULD BE NOTED:</p> <ol style="list-style-type: none"> 1.DISCONNECTED THE WIRE FROM THE FUEL INJECTING PUMP ELECTROMAGNETIC VALVE; 2.TURNING THE CRANKSHAFT BY STARTING MOTOR TILL THE COMPRESSION WAS SHOWN ON THE INSTRUMENT OR THE ENGINE OIL WARNING LAMP WAS OFF; 3.CONNECT THE WIRE WHICH IS LED TO THE FUEL INJECTING PUMP ELECTROMAGNETIC VALVE; 4.START THE ENGINE BY USING THE STARTING MOTOR.
<p>LUBRICATING SYSTEM WARNING</p> <ol style="list-style-type: none"> 1. USE THE STANDARD ENGINE OIL THAT WAS NOT LOWER THAN CF. 2. SUGGEST TO CHANGE ENGINE OIL AND ENGINE OIL FILTER PER 200 WORKING HOURS . 	<p>AIR-INTAKE SYSTEM WARNING</p> <ol style="list-style-type: none"> 1.CHECK THE AIR-INTAKE SYSTEM PIPE AND HOOP, RUBBER SEAL AND FILTER PAPER, ENSURE THAT ALL KEEP IN GOOD STATE. 2. CLEAN THE AIR FILTER ELEMENT PROPERLY ACCORDING TO THE STATUS OF AMBIENT CONDITION AND AIR FILTER BLOCK ALARM.
<p>COOLANT SYSTEM WARNING</p> <ol style="list-style-type: none"> 1. PLEASE USE THE COOLANT AT ANY WEATHER. 2. FILL IN THE WATER TANK WITH COOLANT TILL IT WAS REACHED THE BOTTOM OF INTAKE TANK COVER. 3. MAKE SURE THAT THE WATER TANK COVER IS FIXED WHEN USING THE ENGINE. 	

5). precaution the hurt from engine, radiators muffler and some other hot or pressurized components.



Hand, arm, skin

and clothes may be damaged by blade fan or fan belt so never touch them if then are moving.

7). It's forbidden to open the container's cover when Hydraulic oil or coolant are in high temperature.

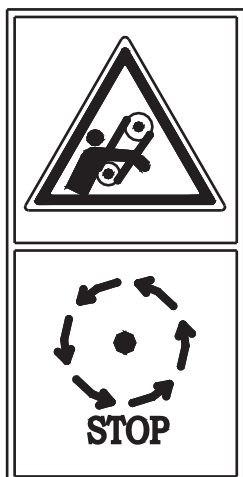


The hot hydraulic oil and coolant may hurt the human body when open the cover during the oil getting high temperature. Because of the hot hydraulic oil and coolant with high pressure.

8). Safe Sign



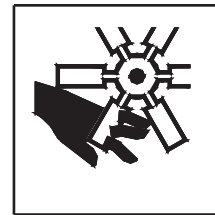
9) please stop the engine when adjust the inner assembly of the machine.



10). Can't depend the short circuit connect a start motor to start engine



11). Be careful of the engine fan hurt Human body

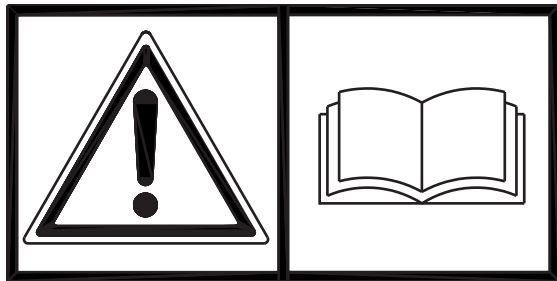


12) It's forbidden to disassemble, drill , cut or impact and keep for away from fire of or high temperture off the accumulator and air-spring.



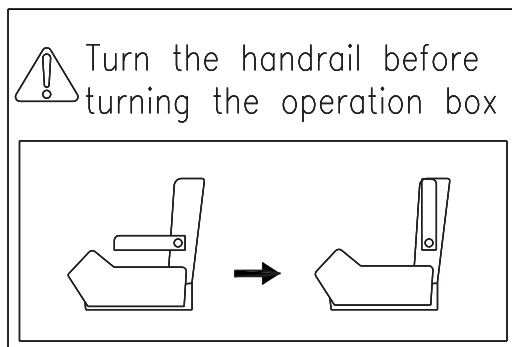
Those equipment is including the High-pressure air. The wrong operation will cause human hurt. Please ask the skillful people deal with such problem.

12). Please check the specification and other correlative file when you maintain the electric equipment.

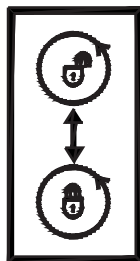


It is easy to happen the electric shock in electric system. Must follow manual's etc. relevant instruction while maintaining.

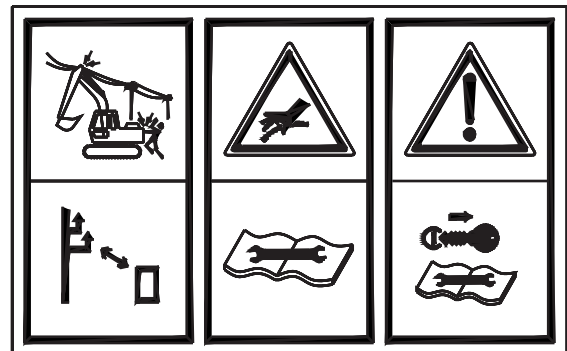
13). Warning sign of left operation box.



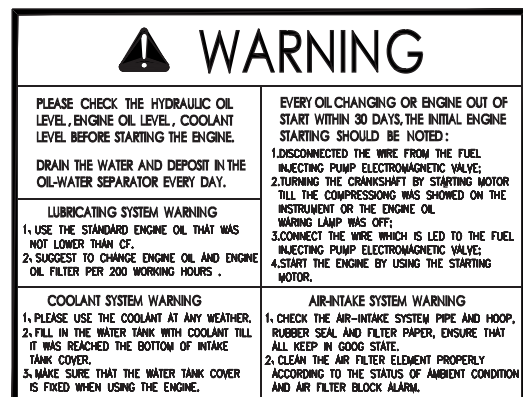
14). Lock of platform swing



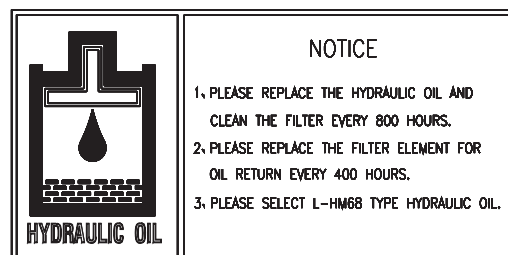
15). Electric shock signs of excavator



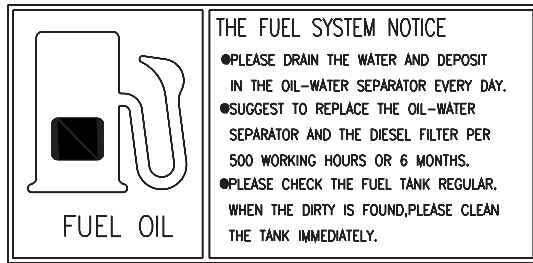
16). System Warning sign



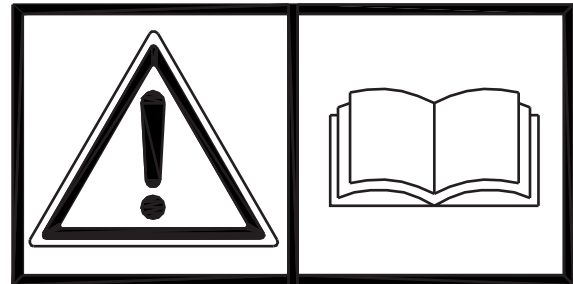
17). Hydraulic oil signs of Refill



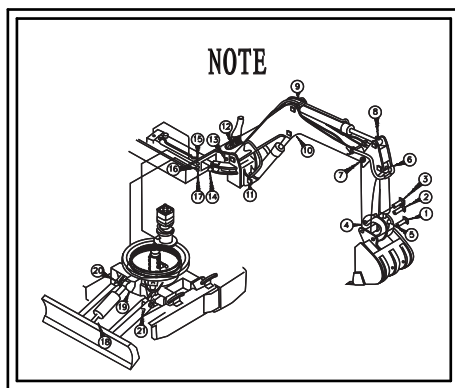
18).fuel sign of refi



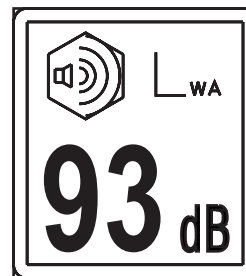
21). Read the signs of operator'manual



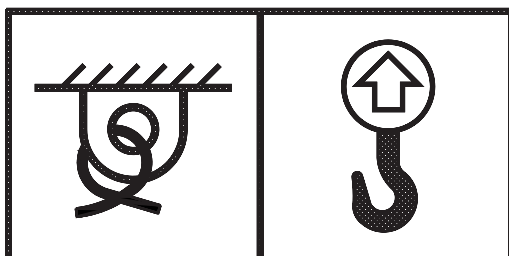
19). Refill sign



22). Noise sign



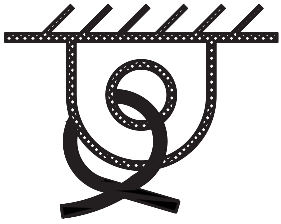
20) Sling sign



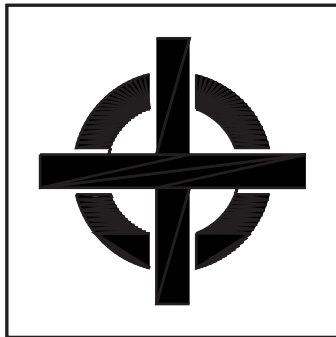
23). CE Sign



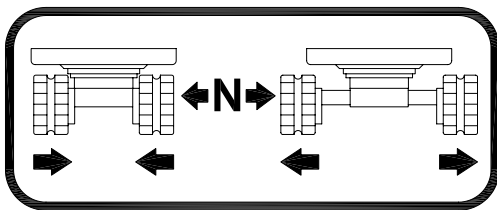
24). Signs for Hook of Crane



25). Slewing Center Sign



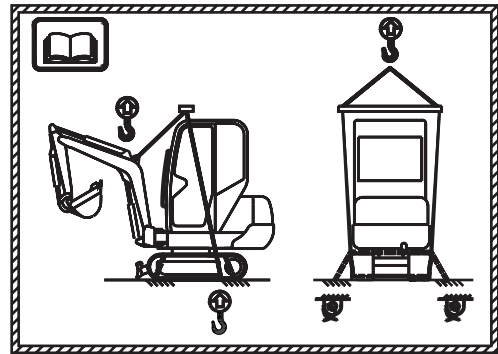
26) Bulidozer, chassis adjustment sign



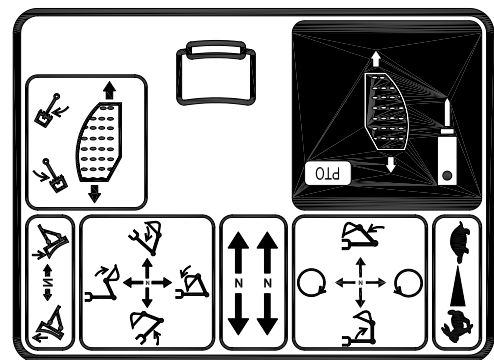
27). Tail sign



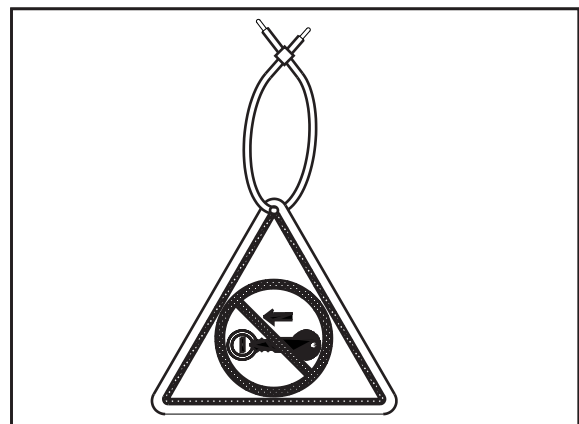
28). Binding sign



29) Control sign



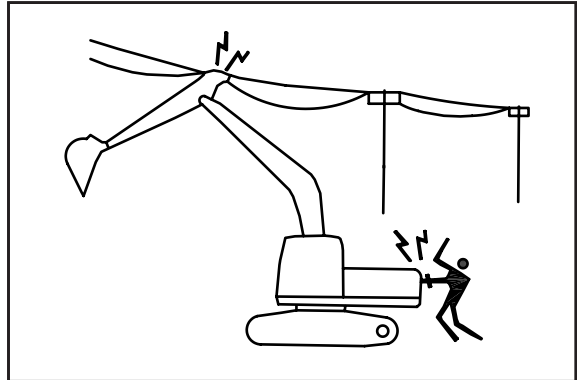
30) Maintenance Warning sign



Safte of Work Area

Before turning on the engine please do check the working area's situation as following

- 1: Slopes's position
- 2: Channel
- 3: Fallen things and Hanging things
- 4: Seeper and Swamp
- 5: Rock and Stump
- 6: Buried groundwork, pillar and verge of the wall.
- 7: Buried rubbish and verge of the filling
- 8: Hole of ground, impediment and Ice or earth
- 9: traffic



10: Dust, thick smoker, thick fog.

11: make sure the exact position of Buried line of electricity, gas, phone, water an other communal Establishment. It's necessary to ask the company remove or close those establishment whom own this.



Warning: Please contact the local public establishment department and system

12: when working in the building please make clear the top of area , aisle and passage. And ensure the Floor can hold the machine. Operate the machine in the house please make sure there have enough fresh air. The unknown things might hurt you.

13: Please find the exact Distance between machine and wire, line. It'd better cut off the power . If there could not cut off the power, please follow the guiding.



Warning: Touching electrical power line may will cause short circuit, so keep a safe distance between the machine and electrical line power. Unless the protection is already done.. Please pay attention.

14: Make sure keep the legal distance between machine and gas line, wire line, phone line.



Warning : Do not watch inside of broken optical fiber. It might hurt your eye badly

15. The machine is prohibited to work in the culvert, underground.

16. The machine is prohibited to work in chemical of hazardous material area.

17. The machine is prohibited to use in places with explosion danger.

Safety Operation



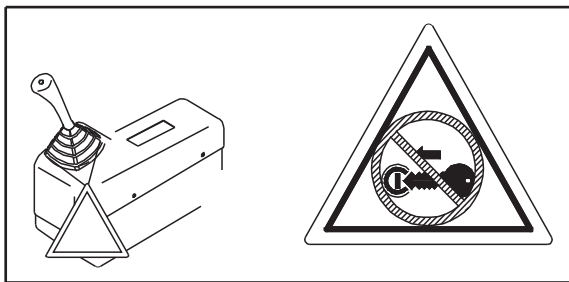
Warning: Before start work, check the seat belt and ring the trumpet. Make sure there is nobody under working zone and after that the operator can begin to work.

It's forbidden to use for underwater, culverts, explosive and toxic environment, Occasion of the chemical harmful substance and other places dangerous working conditions.

1: Start the Engine

A: the detail of safety start engine

- 1): the operator must ring the trumpet before start the engine
- 2): It's forbidden to load other passenger except the operator.
- 3): please make sure operate the machine on your seat
- 4): It's forbidden to start engine in short circuit way.
- 5): please pre-warm the machine in cold weather



Warning: It's forbidden to start the engine if the warning plate is on the handle

B: please make sure to check as following items after start the engine

- 1): make sure tie up the seat belt
- 2): make sure the working equipment, dozer equipment, traveling equipment, slewing equipment and other movement part is work well.
- 3): make sure the machine's sound, libration, smell and instrument is work well.
- 4) make sure there is not leaking of oil and fuel

2.Traveling & Slewing

1) please make sure the platform is turn to right position. The operation way is difference if the platform and dozer is on the opposite side.

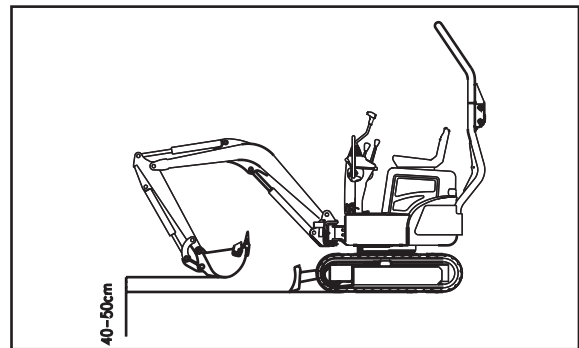
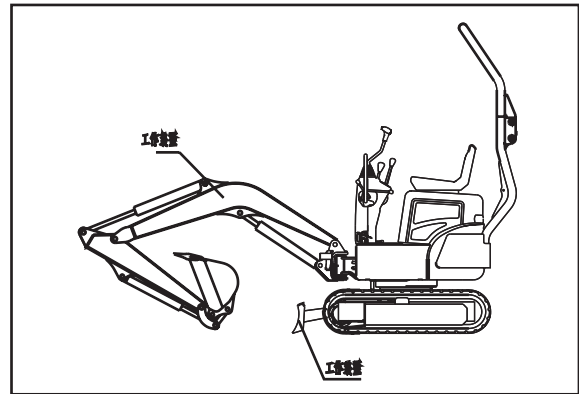
2) please do ring the trumpet when traveling and slewing the machine.

In order to warn the people who under working zone.

3) The excavator must work on ground 1.5 times than its wide.

4) please make sure the cabin's door is locked and closed. if the windows can open but please make sure the windows are in right position.

5) when the machine turning back and traveling, if there is unknown area please ask the guide.

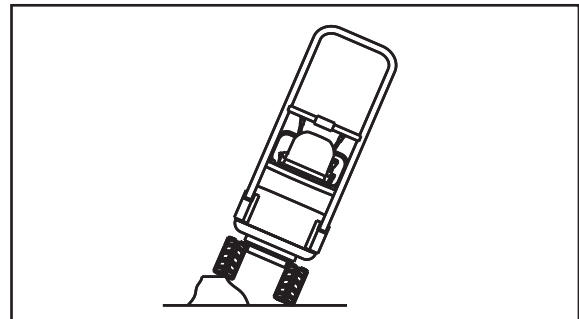


The safety rules when traveling

1) Travel with the dozer blade folded as shown on the diagram and the bucket raised 40-50 CM. from the ground.

2) On the uneven ground, travel at low speed and avoid accelerating, stopping or changing directions abruptly.

3) please make sure the machine didn't traveling on the uneven ground. It might be overthrow the machine.



- 4) Please make sure keep the safe distance between the machine and human, building, when traveling or operating the machine.
- 5) when across the passage, bridge and some place where is limited the high, please make sure there are gesticulation from the guide. At the same time, precaution keep the safety distance
- 6) the platform must be lock when across the slopes.
- 7) when the machine across the bridge and building please it can support the machine.
- 8) when the machine is traveling on the road, firstly please ask the permission from the traffic department. And then can traveling the machine on the road

3. Traveling on slopes.

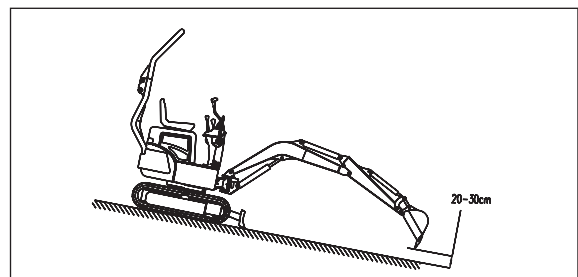
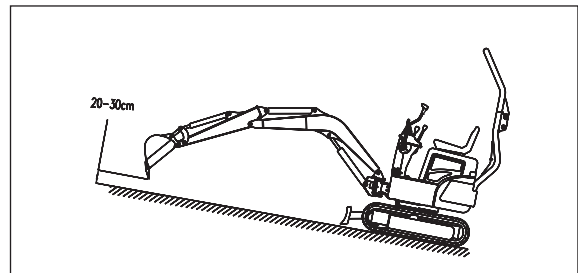
Please be careful when the excavator traveling and working on the slopes

1)It's suggest that not motion up and down the hill with severe Slope more than 20 degree.

2)When the machine is working, please make sure tie the seat belt, especially, the machine is working on the slopes.

3)When the machine is up to the slopes, please make sure the drive wheel are in down slopes direction. And lower the bucket to a height from 20 to 30 CM off the ground.

4)When the machine is down to the slopes, please make sure lock the platform and drive wheel on the up slopes direction. And lower the bucket to a height form 20 to 30 CM off the ground..

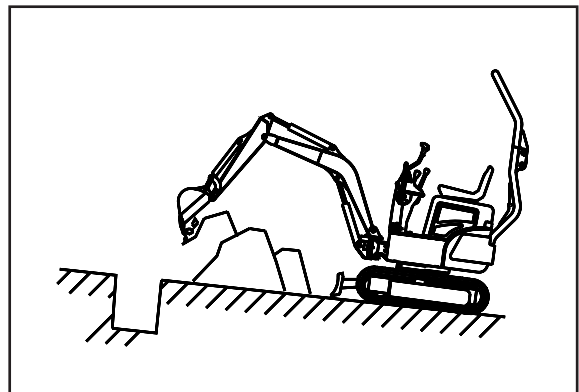
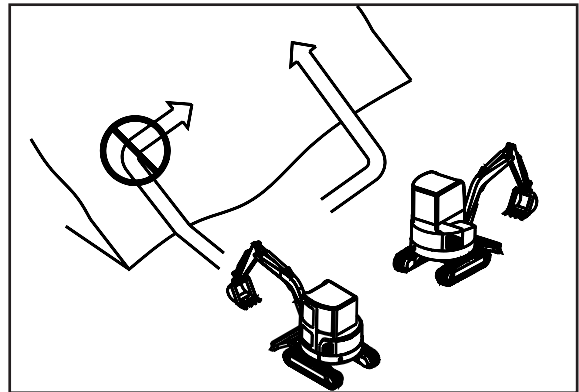


5) Do not change the directions or cross slopes sideways. First return to a flat surface then redirect the machine.

6) When working on the slopes, please make sure the machine work from the top of slopes and the dozer should push down the ground.

7) On grass, dead leaves and wet metal, the machine may slide sideways even on very gentle slopes, the machine is easy to slide on it.

8) It's forbidden to turning direction when up and down the slopes. Otherwise, the machine may be roll over.

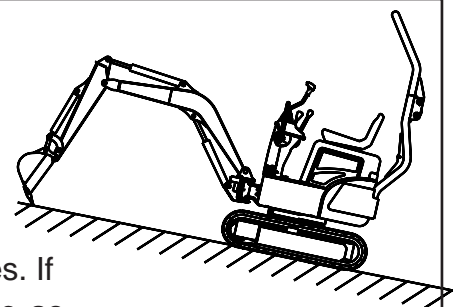


9) When stop the machine on the slopes, please make sure the dozer in the earth, at the same time, put the bucket into the surface of the earth. and it's no allow to stop the engine if the machine is not safe standing on the slopes.

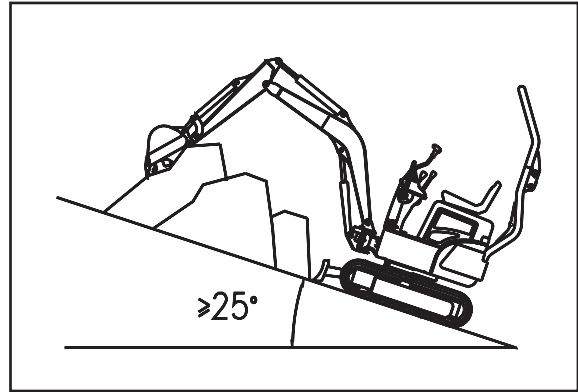


Danger

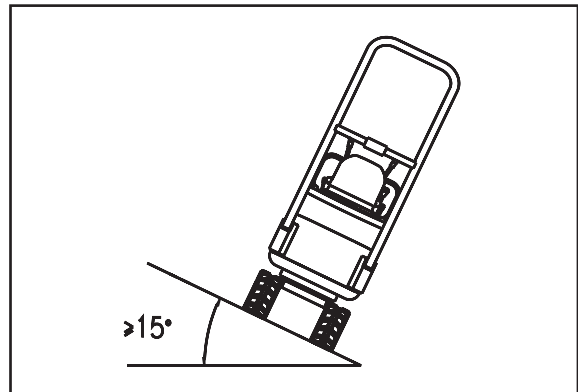
It's very dangerous to stop the machine on the slopes. If the machine have to stop on the slopes please do as following ways: If the engine stop suddenly, remember put the bucket and dozer on the surface of the ground. And make sure all the handle are in middle position. After restart the engine. Even stop the machine on the slopes in a short time. Also make sure put the bucket and dozer on the ground, and put the handle on the middle way. Besides, please use enough block to the track.



10) No driving or operating on the slope which the portrait gradient more than 25°.



11) Don't driving or operating on the slope which the landscape orientation gradient more than 15°.

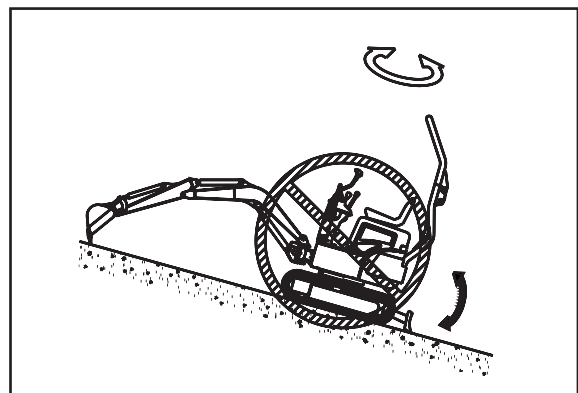


12) Do keep the machine balanceable, don't drive on the rock or over the roadblock.

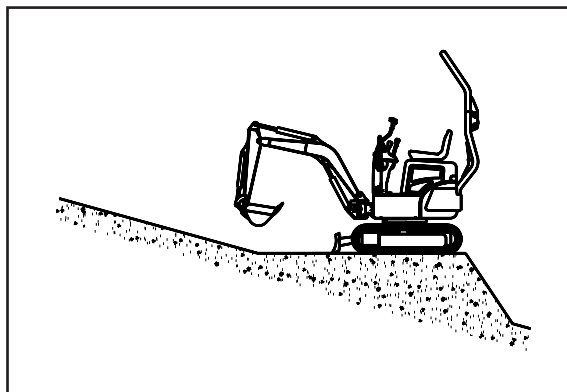
13) Don't swerve on the slope.

14) The engine and the hydraulic oil must be warmed-up on the slope.

15) When the angle between the crawler and the slope is 90°, the machine will be very dangerous if it rotating. If the machine must rotate, the bucket should close the ground, near the machine body, the crawler towards the top of the slope, and rotate with lower speed.



16) When the machine operates on the slope, operating the rotating or operation device, the machine may overturn.



4. Safe to operate

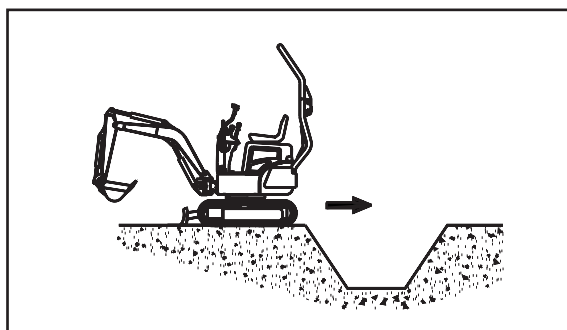


Warning: the operation must remember the operation handles to avoid the wrong operation.

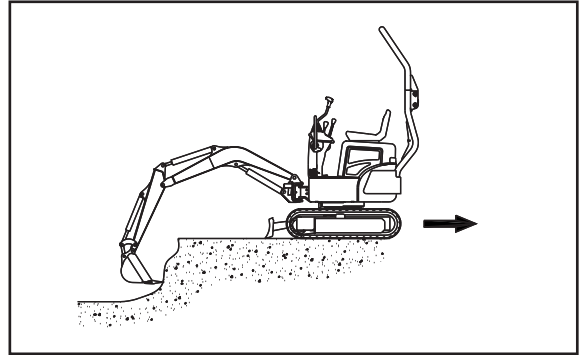


Warning: the wrong operation will make the machine overturn. Remembering the information can make a right guide to protect the body.

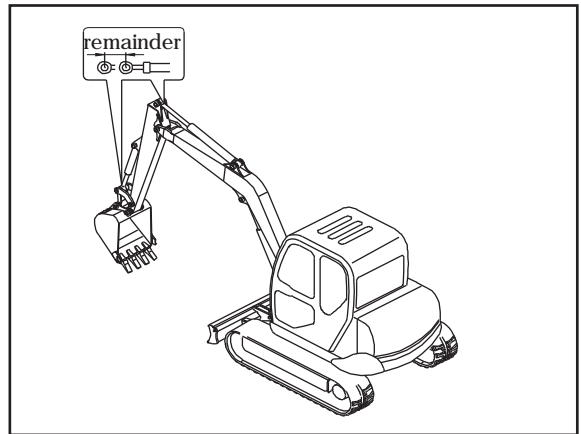
- 1) Before operating, all the things and the people should be removed.
- 2) Do confirm the workplace can bear the machine before the machine enters.
- 3) As far as possible the two crawlers are in the same plane, then it can operate.
- 4) Do confirm there is no cable*no windpipe*no water pipe in the workplace before the machine starts.
- 5) When the machine is back off, it should observe whether the moving line is regular, whether it has the roadblock.



6) When the bucket has the special resistance, do not allow to drive or rotate. Otherwise, the machine will be broken.



7) When the machine is operated, if the hydraulic oil tank reaches the end-point of the driving, the power will act on the limit ring of the oil tank. It will reduce the using life of the machine. Do avoid the case, when the hydraulic oil tank is operated, it should have a little remainder.



8) When the machine digs deep, it needs to avoid the bottom of the moving-arm or the oil tank's soft pipe of the bucket touch the ground.

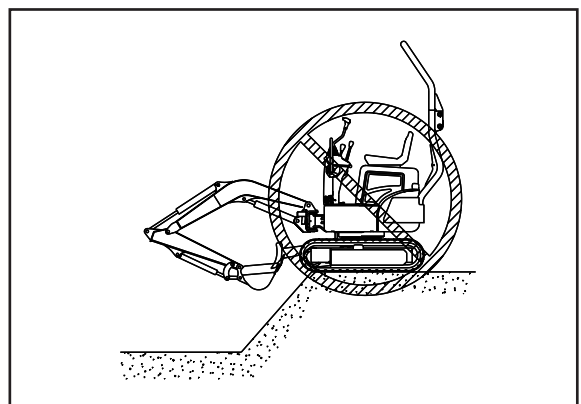
9) When the machine is operated, do avoid collision between the boom*the arm*the bucket*the cabin (canopy) and the nonego.

10) When the machine rotates, do avoid to colliding the engine hood and the counter weight.

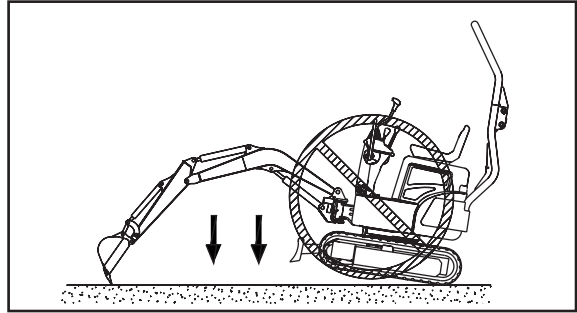
11) When the boom fall, it can't stop suddenly to avoid injury the machine and improve the work safety.

12) Do not dig to the machine body.

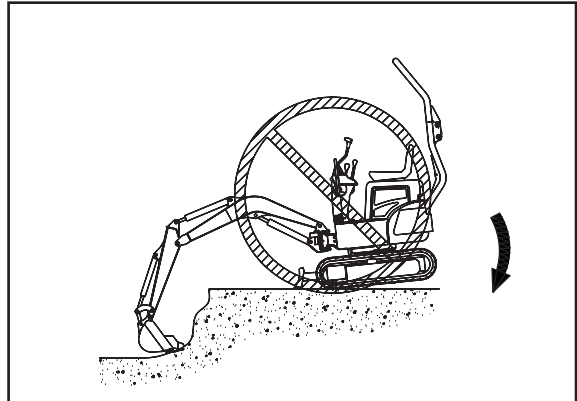
13) The machine is prohibited to travel or work in the loose and soft ground or swamp land.



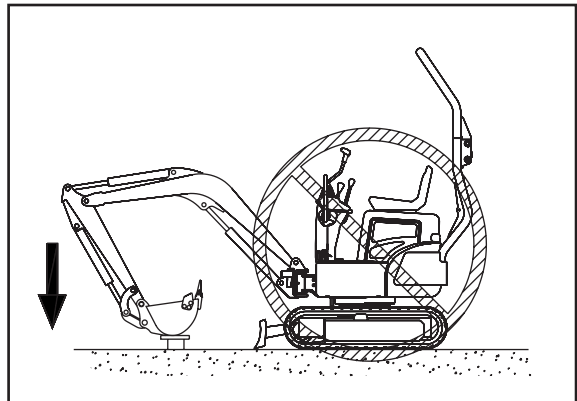
14). When the crawlers leave the ground, do not dig. Otherwise the machine and the frame will be broken.



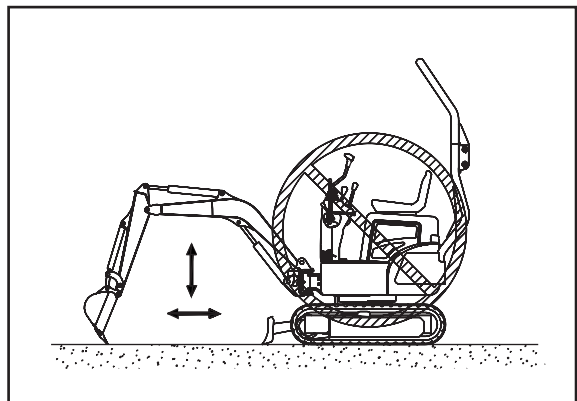
15) Do not use the deadweight of the machine to increase the digging power.



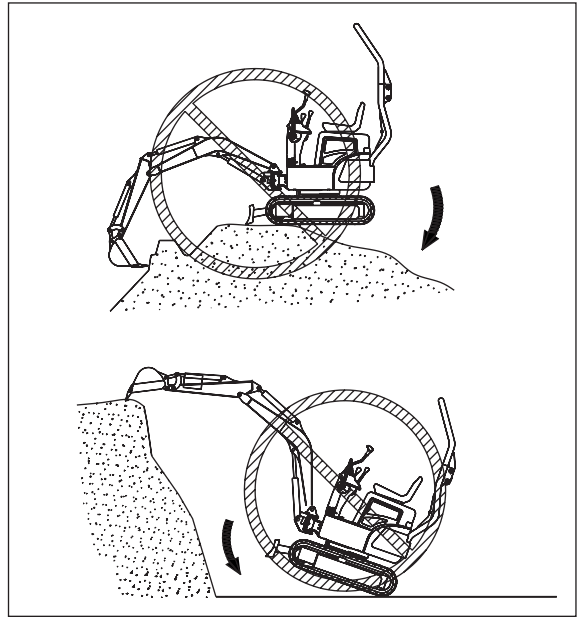
16) Do not use the falling power of the bucket as the handle*the knapper or the pile driver. It will make the back of the machine bear over-weight.



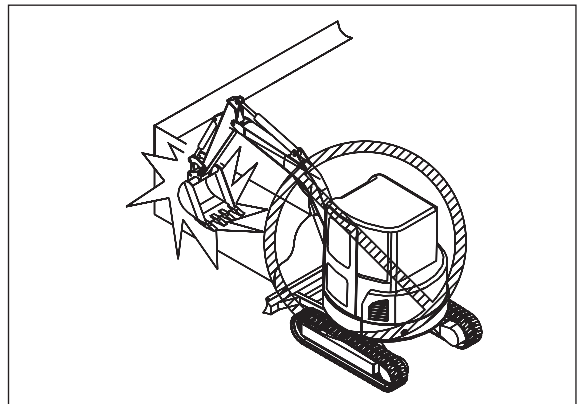
17) Do not use the bucket to dig the road surface more. Otherwise the parts will be overload and broken.



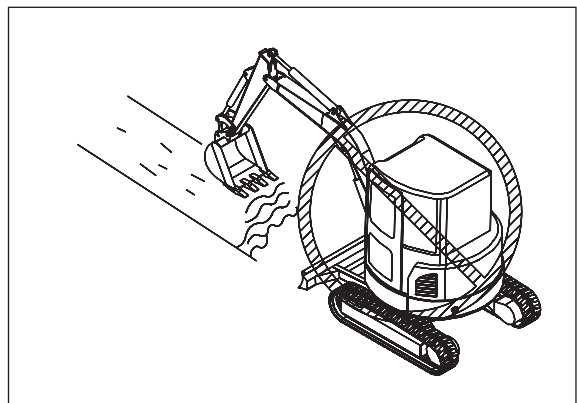
18) Do not use the falling power of the machine. Otherwise the machine will be broken.



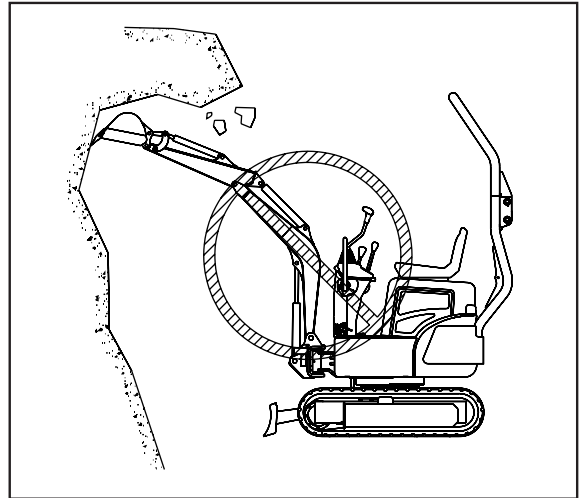
19) Do not use the power of rotating to press the soil or destroy the rideau and the wall. When the machine rotates, do not insert the teeth of the bucket into the soil.



20) Do not make the bucket into the soil to use the driving power to dig. It makes the back of the machine bear overweight.



21) Do not dig the working range which is under the hanging part. It may cause the danger of the rock-fall or the collapse.



22). The machine is prohibited to travel or work in the loose and soft ground or swamp land

23). Please don't use the excavator to drag the other equipment or the other object.

5. Prevent dumpage、ntiskid and the resolvent



Warning:1)If it need to swerve on the slope,it only use the big radian swerve.When the machine turn right,turn the lever of the moving-arm to left.The distance to the ground about 30cm,lock the platform.

2)When the machine slip,it need press the bulldozer and the bucket to the ground.

3)When the machine dumpages,the operator must fist the handrail or the pillar of the cab,do not jump off.

Following,the machine is easy to overturn:

1)The machine moves on the uneven road,the two pedrail one side high one side low or half of the pedrail hangs.

2)One of the pedrail touch the soft soil, another touch the hard soil.

3)One side of the machine is Limestone cave or the slime

4)The machine operates on the slope which the portrait gradient more than 25° ,the thing towards the downgrade.

5)The machine operates on the slope which the landscape orientation gradient more than 15° the thing towards the downgrade.

6)On the slope,it is 90° for the two pedrail and the gradient,the rotating platform more than 90°

7)The machine operates on the slope,it swerves,the platform rotates fast or no power.

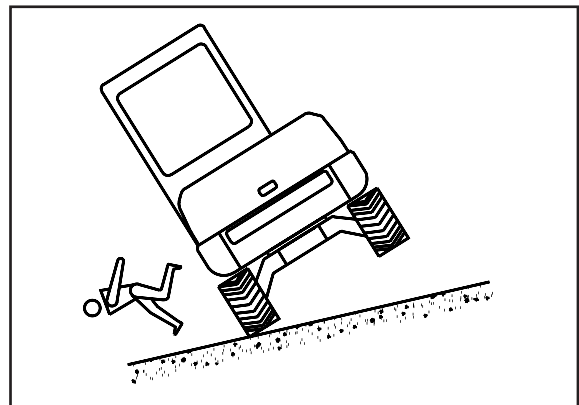
8)When the machine turn adown about 180° .

9)It is the uneven road for the back operation.

10)The machine dig the underside of the body when it depth digging.

11)The machine moves on the frost road.

12)The two pedrail have the machine oil or the lube



6.Stop the machine

See it at the chapter of parking machine.

Parking for servicing



Warning: When the machine is maintained, it should hang the warning sign "No operation" on the operation handle.

- Machines should stop on the smooth and hard road.
- After the excavator stops, it must put down the bucket, and run the engine 3 minutes with low speed, then stop it and pull out the key.
- Release all the power of the hydraulic system.
- If the machine should stop on the slope, there should be enough road-block under the crawlers.
- There should be enough distance between other machines when the machine stops.
- When the electric system or electric welding is maintained, it should take-down the cathode cable of the accumulator. Do avoid the current movement.
- After the machine starts, do not lubricate or maintain. Do not let the motion touch the running part.
- If the machine needs to maintain when the engine runs, there should be someone to see it.
- Do not put some small parts into the placket.
- The high-pressure liquid can hurt the eyes and the skin. Do avoid it when the machine maintains.
- Do clean all the sundries in the interior of the machine, it may hurt the operator or destroy the machine.
- Do deal with the waste liquid with correct way. Do not throw the oil into ground、drain、creek、pond or lake. Letting oil、fuel、antifreeze、plastic、accumulator oil and other poisonous waste should obey environmental protection rules.

Notice: When the machines broke down or can't operate, please lift excavator on the trucks and withdraw from the trouble scene, and then maintenance. Lifting steps, please refer to the "lifting machine"

Fireproofing ,Blast defend and Poison defend

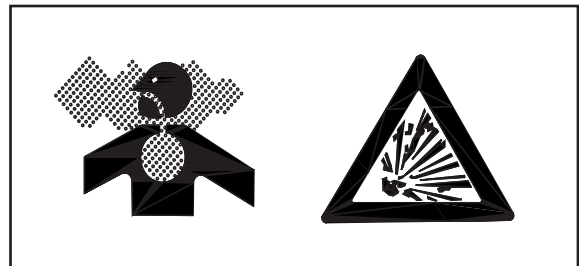
●When the excavator transported、driving、digging, it shouldn't touch the wire. Otherwise, it causes the casualty.

●The wiring and the line needs to check frequently. If it finds the broken、aging part, it must be replaced to avoid the fire.

● Keep the line linker clean and fix it firmly. Check the line everyday.

●Do not put the thing which is flammability or explosive into the excavator.

●Do stop the engine when it oils, and keep away from the fire and do not leave the machine.



●When it is oiling , the fuel can't overflow to the surface which is super heated or the parts of the electric system.

●After oiling, do clean the fuel or machine oil which overflow, and screw down the cover of the fuel or the machine oil.

●Clean out the slip、 spill、 lamina and other flammability thing which is in the engine*the vent-pipe、 the muffler、 the engine room.

●Do not put the dishcloth which is with the oil into the cab.

●There should be fire extinguisher in the cab, and put it on the place where can be easily to take from.

●When the machine is welded, do segregate the pipeline of the hydraulic oil and the fuel.

●Do avoid the fire caused by the hydraulic pipeline. Check all the soft pipe and the fastener*the cover*the block whether they fixed firmly.

●Accumulator should be far away from the fire. Do avoid the high temperature. Otherwise it will explode.

●The excavator with cabin should be checked with the sealed center clapboard. Do avoid the exhaust gas into the cab to cause the operator poison.

●Do not operate the machine on the area where the airiness system is not good.

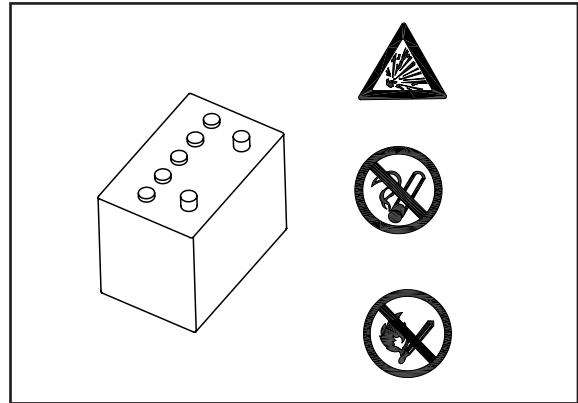
●When the fire happens, do not use the water to put out the fire. Should use the powder extinguisher or the sand, or use the slipcover.

Battery

Safety rules of the accumulator

The electrolyte of the accumulator includes the vitriol and the hydrogen which is flammability and explosive. The wrong operation leads hurt or fire. Do as follow:

● Check the level of the electrolyte timely. Supply the distilled water to make the level of the electrolyte between the “top level” and the “low level” line. If the electrolyte of the accumulator is lower than the “low level” line, do not use the accumulator.



● Do wear the safety glass and the rubber glove when operate the accumulator.

● Do not smoke or fire near the accumulator.

● If the eyes、cloth、skin are bespattered by the vitriol, do use lots of water to wash and go to the hospital.

● Before operating the accumulator, it should turn the key to “OFF”.

● Do stop the starting system when use the electric torch to check the electrolyte of the accumulator.

● The end of the sealed accumulator dilates, it show the accumulator freezing. When the accumulator freezing, do not electricize or connect the starting engine. The temperature should be less than 15°C when heat up the freezing accumulator. Otherwise it explodes.

Explosion-proof of the accumulator



Warning:the electric spark or the flame can make the hydrogen of the accumulator explodes.Avoid explode please caution as follow:

- 1)Cut off the cable of the accumulator,it should cut the cathode cable first**
- 2)Connect the cable,it should connect the cathode cable first**
- 3)No use the metal element to connect the port of the accumulatort**
- 4)No welding、grind、smoking near the accumulator**

Because it has danger of spark, do as follow:

- Please fix the accumulator to the right place.
- The tool or other metal can't touch the port of the accumulator. Do not fall the tool or other metal near it
- Connect or cut off the sign of the accumulator follow the right order. The port of the accumulator should fix fast.
- When the accumulator electricized, it produces flammability hydrogen. So before electricized, it should unload the accumulator from the machine, and put it to the draughty place and remove the cover.
- Screw down the cover of the accumulator.

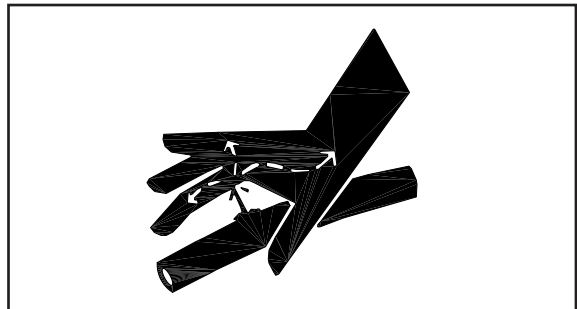
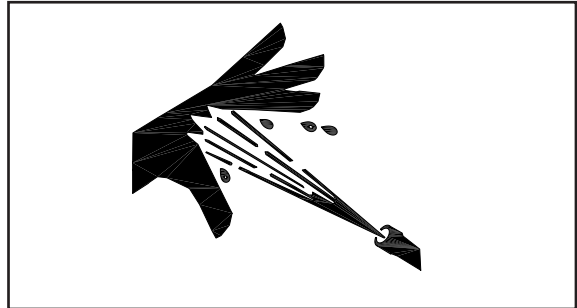
Caution: When maintaining the electric system or weld, it should remove the cathode port to avoid the current flowing

Hydraulic System

1.Safety rule of high-pressure oil

The inside of the hydraulic system always have the pressure. When check or replace the pipeline or the soft pipe, do check whether the pressure has release or not. If there is pressure, it will make a serious hurt or destroy. Do as follow:

- 1)When the hydraulic system has pressure, do not check or replace.
- 2)If the pipeline of the soft pipe leaks and in wet area, please check the pipeline or the soft pipe whether it is broken or dilates. The operator should wear the safety glass and the glove to check.
- 3) If the high-pressure touch the eyes, it will be dangerous of ablepsia. Use the clean water to wash the eyeS or the skin which touch the high-pressure, and go to the hospital.



2.Safety operation of the high-pressure soft pipe

If the high–pressure leaks,it will make the fire or the operation trouble. And lead the serious hurt or destroy.If it finds the bolt become less crowded,it should stop the machine,and screw down it.No welding the machine when the hydraulic oil pipeline(soft pipe) not separate.If it finds the soft pipe has any broken,it need to stop operate,and contact us.

If it finds the problems,it need to replace the soft pipe:

- 1)The tie–in of hydraulic pipe has leaked or destroyed
- 2)The envelope broken or cut off,or the steel wire of the reinforcement out
- 3) Some parts of the envelope dilates
- 4)The moving part contorts
- 5)The envelope has the impurity

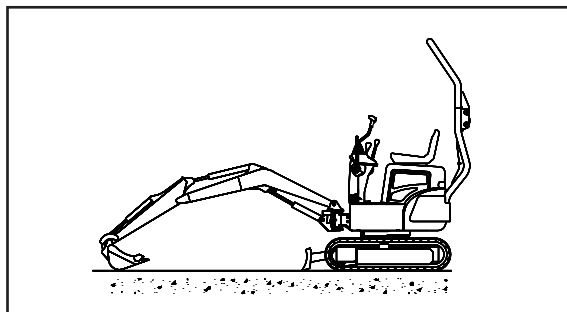
3.Safety rule of the high-temperature oil

The hydraulic oil doesn't cooling on the working or after working,it is high-temperature and high-pressure.To avoid the oil squirted or touch the hot part make scald when it checks or lets the oil.it should wait the oil cooling and the temperature can touch before do it.It need undo the cover or the bolt slow before unload the cover or the bolt even if the oil cooled.

4.Release the pressure of the hydraulic system

When the digger operates,the hydraulic oil of the hydraulic pipeline in the state of high-temperature and high-pressure.When it take-down the gun,the oil maybe squirts.So it need to turn the cover of the gun before take-down the gun and release the pressure.

1)If the operation device doesn't locate the state as like the picture,it need to start the engine and runs low speed,hold out the oil tank of the bucket.draw back the oil tank of the lever.Then down the bucket, put the bulldozer on the ground,stop the engine.

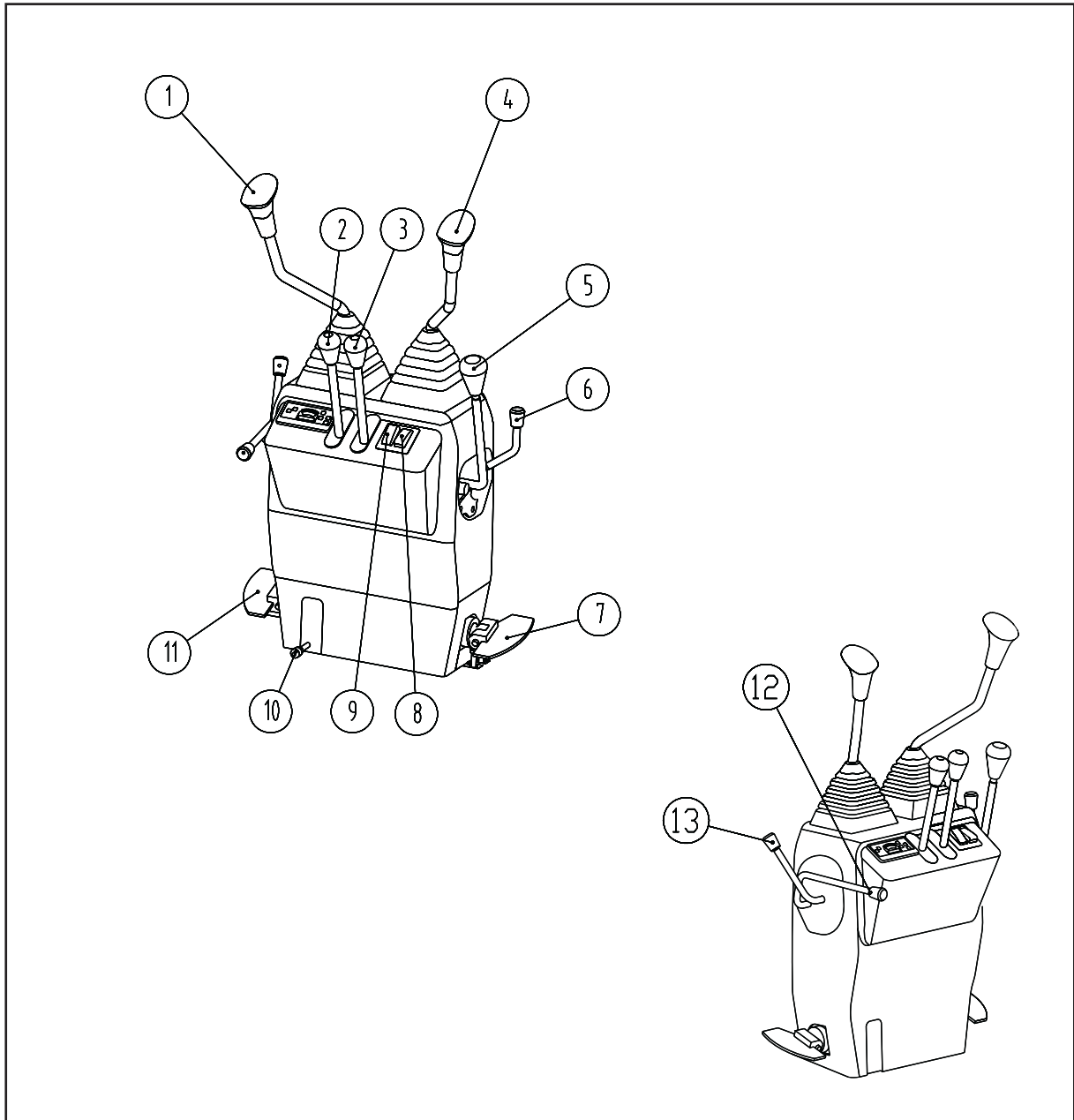


2)Within 15seconds after stop the engine,it turns the switch to “ON” and operates the joy stick to all the direction(operation device、 driving),to release the pressure.

3

Parts Introduction

General view of operating device



- 1. Left operation lever
- 2. Left travelling control lever
- 3. Right traveling control lever
- 4. Right operation lever
- 5. Bulldozing control lever

- 6. Chassis control lever
- 7. Slewing footplate
- 8. High or low speed switch
- 9. Work light switch
- 10. platform-lock control lever

- 11. Accessory footplate
- 12. Locking control lever
- 13. Throttle lever

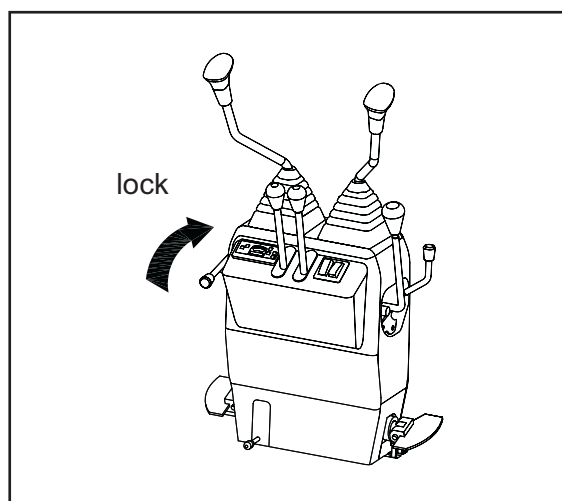
Safety lock parts

1. Safety lock lever

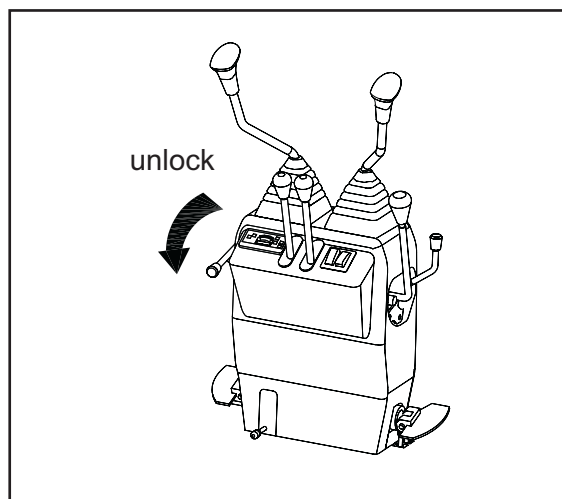


Warning: Working equipment safety lock framework is important component of machine safety system. User must lock the machine when leaving cabin. If left controlling box is not set to LOCK position, handle may be moved, therefore working equipment or platform will be operated, which could cause accident.

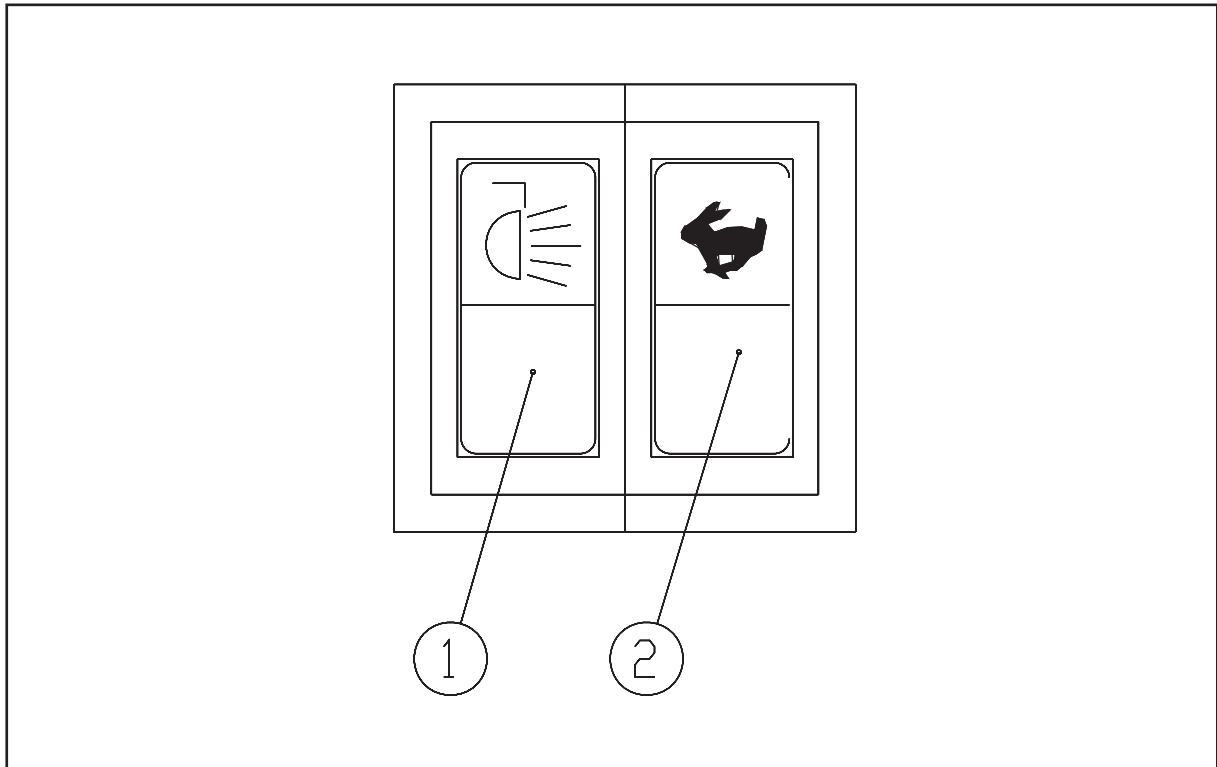
Please pull the Lock lever to the LOCK position. Therefore the machine do not work (except left/right travelling and dozer blade), which can protect the machine.



Pull the Lock control lever to the free position, therefore the machine will work properly.



Operating Switch



1. Work light switch

Press the switch identifier side to turn on the lights. Press the other side to turn off lamp.

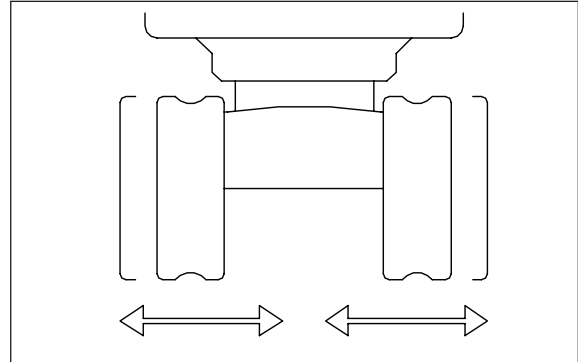
2. High travel speed switch

Press the switch identifier side to be on the high speed condition. Press the other side to be on low speed status.

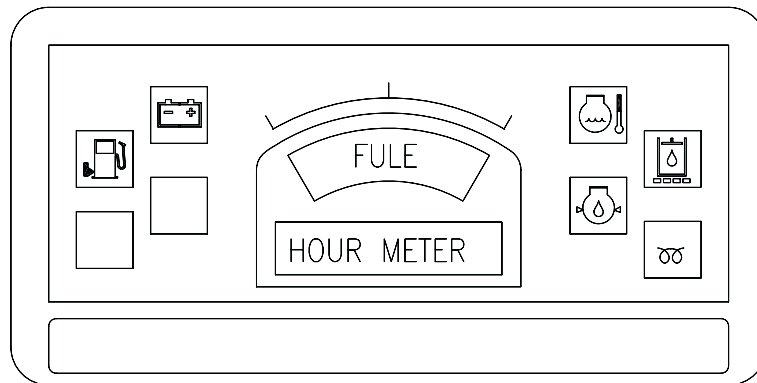
Adjust the chassis

Chassis control lever

Operate the Chassis control lever to extendable the chassis.

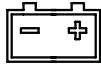


Instrument board



1. Low fuel level warning lamp

When the fuel level is low than 10% of the fuel tank, the lamp will light.



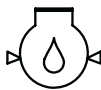
2. System power voltage warning lamp

It will flash if the system voltage is lower than 12.5V or higher than 14.8V.



3. Water temperature warning lamp

It will flash if the water temperature is high.



4. Low pressure of engine lubricating oil warning lamp

It will flash if the pressure of engine lubricating oil is low.



5. Pre-heating light

It will be on when pre-heating.



6. Hydraulic oil filter obstruction warning lamp

It will flash if the hydraulic oil filter is obstructed.

Platform lock framework

1. Platform lock framework



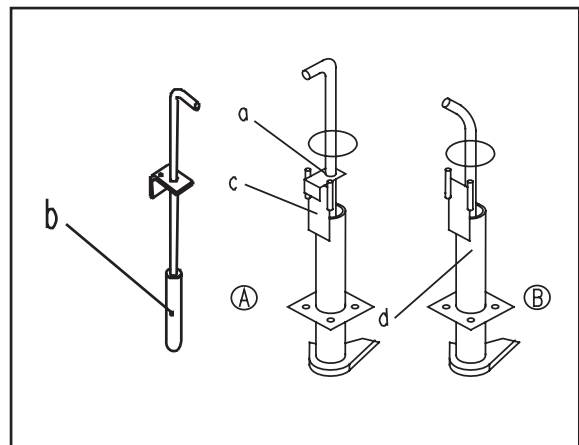
warning:Platform lock framework is one important part of the maching.It should be locked when the machine traved,park or park on the slope.

Lock and Unlock

Lift the shaft pin up to C position to unlock the platform.

Lay down the shaft pin to D position to lock the platform.

Note: The shaft pin should be fitted close the shaft pin hole when locking the platform.



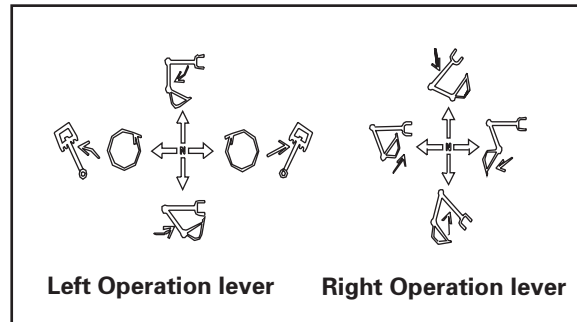
Operating working equipment and platform equipment

● Operating working equipment and platform equipment

A. Left Operation Lever

Operating arm: Pushing the Left Operation Lever forwards, the arm spreads forwards. Drawing back the lever, the arm draws backwards.

Operating platform slewing: Putting the Left Operation Lever to the left side, the platform swings to the left. Pushing it to the right side, the platform swings to the right.



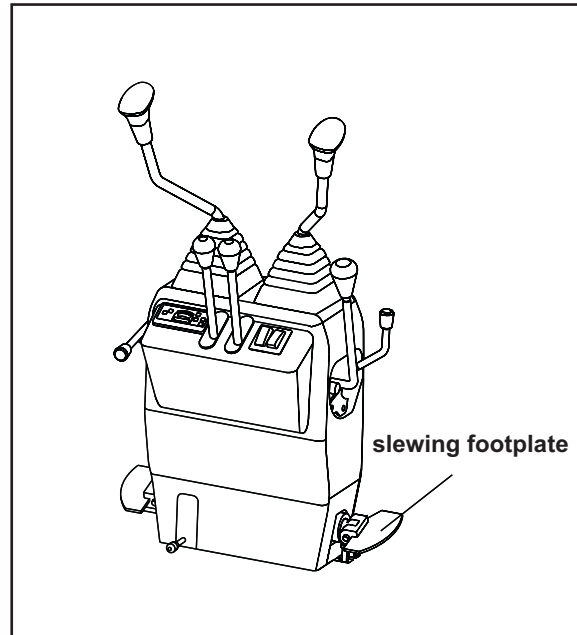
B. Right Operation Lever

Operating boom: Pushing the Right Operation Lever forwards, the boom drops down. Drawing back the lever, the boom lifts up.

Operating bucket: Pushing the Right Operation Lever to the right side, bucket spreads up, pushing the handle to the left side, bucket draws down.

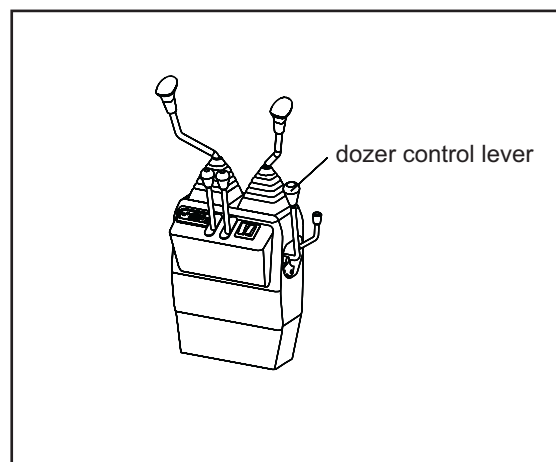
C. Boom slewing

Step upon the Slewing Footplate forwards, the Boom turn left; Step upon it backwards, the Boom turn right.



● Dozer Control Lever

Pushing the Dozer Control Lever down, the dozer blade move downwards; Lifting the lever up, the dozer blade move upwards.



● Operating accessory

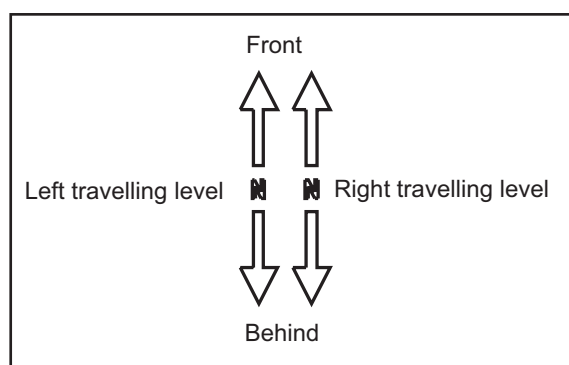
When the machine has equipped with accessory, open the cover of the Accessory Footplate, then step the pedal in order to connect the assistant oil supply.

Travelling control

● Directional Control

The left/right lever controls the left/right rubber crawler.

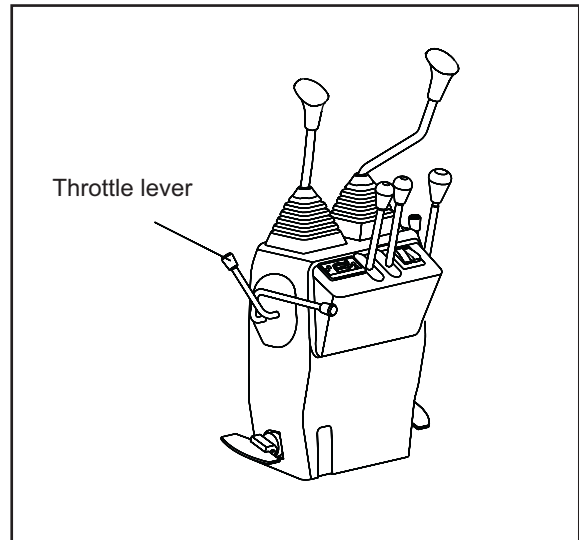
The single lever controls the machine to turn to one side.



Throttle Lever

1. Throttle Lever

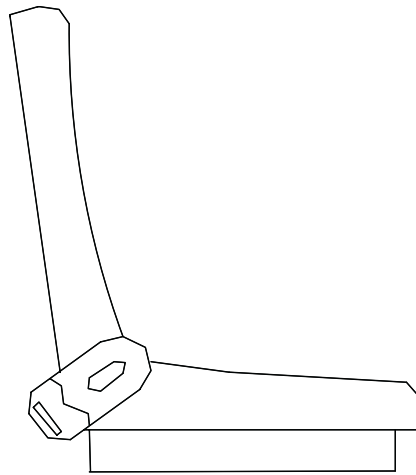
- 1) Accelerate: Drawing back the Throttle Lever;
- 2) Pushing the Throttle Lever forwards until to the end before stopping the engine.



Driver's seat



Warning: It will cause the damage if the machine turnover or the seat move suddenly. So make sure that the seat is in suitable position for your figure before starting job or changing the operator every time.



Safety belt



Warning: Seat Belt is an important part of the machine safety system. Before operation the machine , make sure to belt up. If the belt down, the cab or the machine will hurt you when the machine overturned



Warning: Pay attention that the seat belt without any problem. If it damaged please change in time.

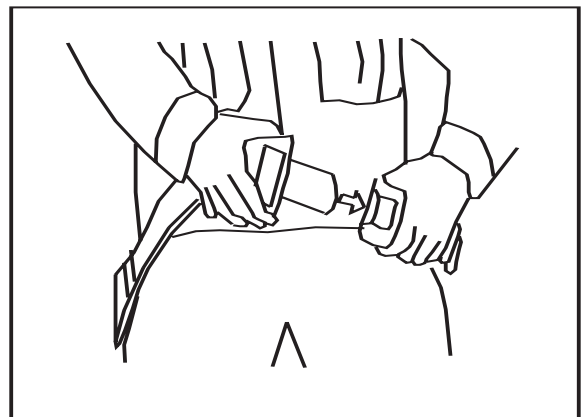
- **Must change the Seat Belt every three years without any problem.**
The date of production is mark on the label of the Seat Belt.
- **While working , make sure to belt up.**
- **Don't let the belt twisted.**

1.Fasten Seat Belt.

Pay attention that the seat belt is not twisted. Pull slowly the belt to be sure that the buckle is well fixed. Set the belt to avoid clearance between it and body.

2.Unfasten Seat Belt

Push the red button on the buckle to unfasten the belt.



4

Operating guide

Preparative before operating

- 1) Only trained, qualified, and authorized operator can drive the machine and make maintenance.
- 2) Operator has to read operation manual carefully before operate the machine.
- 3) When drive or make service on the machine, wear a tight work clothes, eyeglass, safety shoes, and heavy gloves.
- 4) Before turning on the engine check the machine follow the manual indication.
- 5) Check if the machine's equipments, hydraulic cylinders, and pipes are damaged.
- 6) Clear dust around machine's engine, cooler and battery.
- 7) Check if it is oil leak from tank, pipe, connection (check if there is obvious oil leak on the ground)
- 8) Check if parts of the machine (crawler, idler wheel) are damaged or loose.
- 9) Check all instruments, and make sure they are in good working condition.
- 10) Clean mirrors, and adjust them to the correct position for the best view.
- 11) Check if the safely belt is damaged or not.
- 12) Check if you have followed the manual to maintain the machine correctly.



Caution: Before operating the machine, make sure that you have read the safety concept and understand it well.

Engine Operation



Caution: Before starting the machine, read carefully the safety detail, and read every safety sign on the machine. Do not allow other people stay around the working place. Learn how to operate the machine, and follow the manual indication.

1. Checking before engine start

- 1) Before start working, check if the safety belt, horn is in good condition. Check the working area, if any person on the machine or down the machine.
- 2) Check glasses and mirrors for a best view.
- 3) Check the engine, cooler, battery. If the parts have dusted, clean it.
- 4) Check all equipments, hydraulic cylinder, rubber pipe, if any part has damaged or abrasion, repair or change it.
- 5) Check the hydraulic equipment, hydraulic oil tank, rubber pipe, connection, if they have oil leak.
- 6) Check the undercarriage (crawlers and wheels) whether they are damage, loose or oil leak.
- 7) Check if the instrument, working lamps are working well, and check if electronic circuitries system is working well.
- 8) Check coolant, fuel, hydraulic oil, engine oil level if they are in appropriate level, are they out of maximum or minimum limit.
- 9) When in the cold weather condition, check the coolant, fuel, hydraulic oil, battery electrolyte, and lube. If any of them is frozen, do not start the engine.
- 10) Check if the left operation handle is on LOCK condition.
- 11) Check the working condition, machine's direction and position before start the engine.

2. Start the engine



Caution: Do not start the engine if there is an alarm sign hang on the handle with NO START.



Caution: Make sure that the safety lever is on the LOCK position, avoiding unexpected touch the operating handle and cause accident.



Caution: If electrolyte is frozen, do not charge the battery or start the engine, it may cause the battery on fire. Check the electrolyte before starting the engine, preventing electrolyte frozen or leak.

When starting the engine, put the key into lock, turn to ON position, and check the instrument. If any alarm light up on the instrument, check the problem before start the machine.

A.Engine Starting in Normal Temperature

Turn the key clockwise to ON position. When Alarm light black out, start the machine. Turn the key to start position within 10 seconds, after the engine start, let the key turn back to ON position. If the engine does not start, try again after 30 seconds

Notice: Do not run the starter more then 10 seconds, if the engine does not start, wait for one minute then try to start the machine again. If the engine does not start for three times, check if the engine is in normal condition.



Caution:

- 1) Do not rotate the key to ON position when the engine is running, the starter could be damaged.
- 2) Do not start the engine when the machine is dragging by other vehicle.
- 3) Do not start engine by starter short circuit.

Assistant power for starting machine



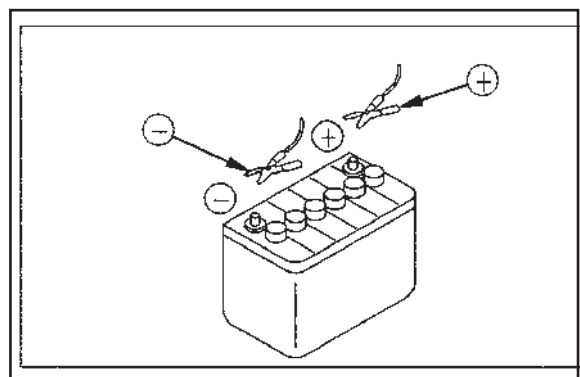
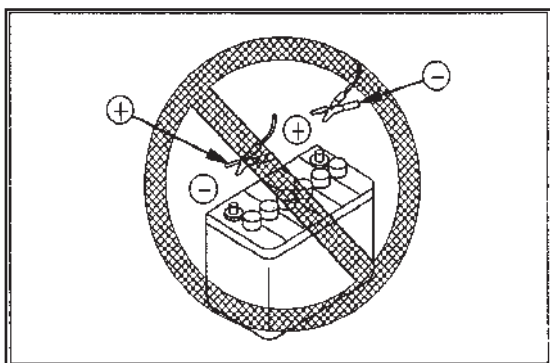
Caution: when electrolyte is frozen, DO NOT start the engine, DO NOT charge the battery, it may cause the battery explode. In order to avoid electrolyte freezing, always keep the battery on full charge.



Caution: Battery can generate flammable gas. Keep the battery away from spark or fire. Keep ventilate when charging the battery. Wear eyeglasses when working near to the battery.

Connecting wires wrongly may cause battery explosion. Please follow the manual.

- 1) Starting machine by assistant power request two worker to operate (one in the cabin of the machine, another operate the battery)
- 2) When the other machine starts, do not connect electricity to the fault machine.
- 3) Rotate the key to OFF position then connect the two machines, otherwise machine could move.
- 4) When connecting assistant power wire, connect cathode lastly, when disconnect, remove cathode firstly.
- 5) When disconnect assistant power wire, do not let both anode and cathode touch each other or touch the machine.
- 6) When using assistant power, do wear an eyeglass and rubber glove.
- 7) When using assistant power, using the same model of normal machine to start the failure machine.



3. Engine starting

A. Engine preheating

Hydraulic oil's normal working temperature is 50°C~80°C, machine working with hydraulic oil temperature under 20°C may cause the hydraulic parts damaged. If the hydraulic oil temperature is under 20°C, preheat the oil by following method.

- 1) Start engine and run it with rotate speed more than 200rpm for 5 min.
- 2) Running machine with turning accelerator to medium stage for 5~10min.
- 3) With this working speed, operate every motion, and slightly operate the slewing motor and traveling motor, operate the machine for work after the oil temperature get to 20°C.

B. Check the starting machine

- 1) Check every light on the instrument, any of the light out.
- 2) Check if there is oil leak (lube, fuel) or water leak.
- 3) Check the noise, shake, smell of the gas, and instrument to find any abnormality, if any of them is abnormality, find out the problem immediately.

4. Turing of the engine

Caution: turn off the engine before the engine cool down will reduce the engine's working life. So if it is not in emergency condition, do not turn off the engine suddenly.

Do not turn off the engine when it is over heat, operate the engine to a medium working speed and let the engine cool down gradually, then stop the engine.

- 1) Running the engine to idler for about 5 minutes and let the engine cool down gradually.
- 2) Push the accelerator to the end (most slowly); draw the stop handle back to the end.
- 3) Rotate key to OFF position, engine stop and all instruct light black out.
- 4) Take out the key.

5. Check the machine after it is stop

- 1) Check around the machine, if there is oil or water leak, find the problem and repair it.
- 2) Fill fuel into the fuel tank.
- 3) Check the cabin, if there is wastepaper or rubbish, cleaning it to avoid fire.
- 4) Clean the clay on the platform.

Enter & exit Machine

- 1) Hold the door rail according to the right picture.
- 2) Make sure step on the flat crawler.
- 3) Do not hold the operate hand to enter or exit the cabin.
- 4) Check the door rail and crawler if there is oil or slurry, clean it.
- 5) Do not jump up and down of the machine, do not enter or exit the machine when it is moving.
- 6) Before getting out of the machine, lower down the boom, bucket and dozer blade on the ground, draw up the LOCK handle, now the machine is on LOCK condition, turn off the engine. Keep this situation to the next machine start.



Machine Moving

1. Safety concept for moving the machine

- 1) Before starting engine, check around the working place to make sure no other people and object is around, check the ground support capability.
- 2) Horn the speaker to alarm near by people.
- 3) It is forbidden that worker operate machine by standing on the ground not in the cabin
- 4) Excavator should travel on a hard ground where 1.5 times wider than the machine.
- 5) When moving through underpass, bridge, electrical wire, it is necessary to have people commanding the driver.
- 6) When moving the machine, Lower down the boom and arm to keep the best machine weight balance.
- 7) Only operator can be in the cabin, no other person in the cabin when machine traveling.
- 8) Before turning traveling lever, check the crawlers' direction.
- 9) If the dozer blade is on rear, traveling action is opposite.
- 10) Do not let any other people around the machine's working area.
- 11) Clean all obstacles on the way.
- 12) There is a blind area on the rear of the machine, So be more careful when backward the machine.



Caution: When machine moving at a high speed, do not suddenly change the movement.

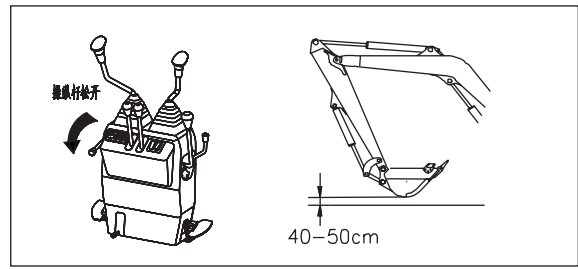
- 1) Do not suddenly operate the travel lever, if may cause a suddenly movement.**
- 2) Do not suddenly change the travel action from forwards to backwards.**
- 3) Do not suddenly change the moving speed from high to stop.**

2. Prepare for moving the machine

- 1) Lay down the safety handle
- 2) Turn the fuel handle to a accelerate position to increase the engine speed.

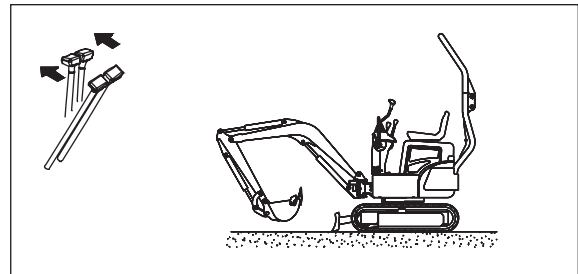
3.Moving the machine forwards

1)Adjust the safety lock handle and the control box to the free station, lift the operation device and off the ground 40cm to 50cm

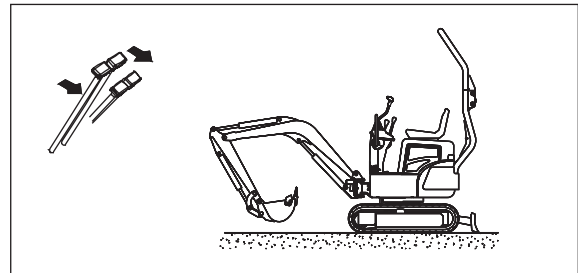


2)Operate the left&right driving joy stick as follow:

When the bulldozer in front, push the foreside of the joy stick forward slowly, and make the machine moves.



When the bulldozer in back, pull the joy stick backward slowly, and make the machine moves.



Caution:When it is the lower temperature, the driving speed of the machine doesn't right, it need to warm-up. Otherwise, if the bottom of the machine has the soil, the driving speed doesn't right, it need to clear the soil.

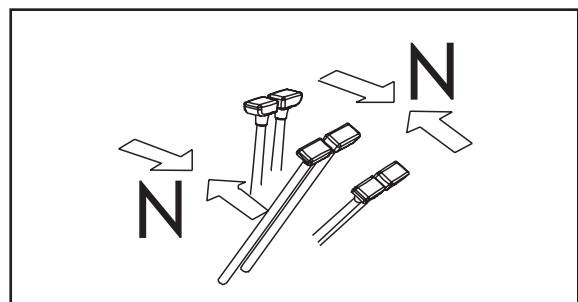
4.Moving the machine backward

1)Adjust the safety lock handle and the control box to the free station, lift the operation device and off the ground 40cm to 50cm

2)The operation is opposition forward

5.Stop the machine

Make the left&right joy stick to the middle, it stops the machine.



Caution:Avoid the machine stop suddenly, it need have enough space.

Machine turning

Rotate the machine

Notice: Check position of the dozer blade before operates the travel levers. If the dozer blader is at the back of the machine, travel operation should be opposite.

Using left and right travel to change the machine's moving direction.

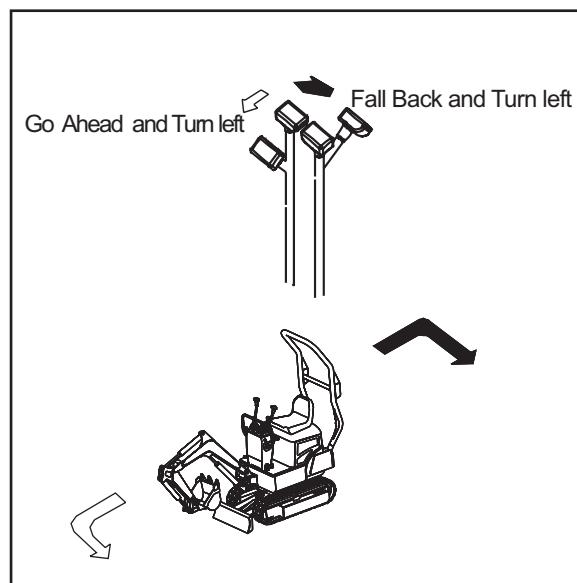
Avoiding suddenly change the direction, especially rotate the machine, stop the moving forwards action before rotate it.

1.Turning machine when machine is stop

Turning to the left:

When machine moving forwards, push the right travel lever, machine turns to the left.
When machine moving backwards, draw right travel lever, machine turns to the left.

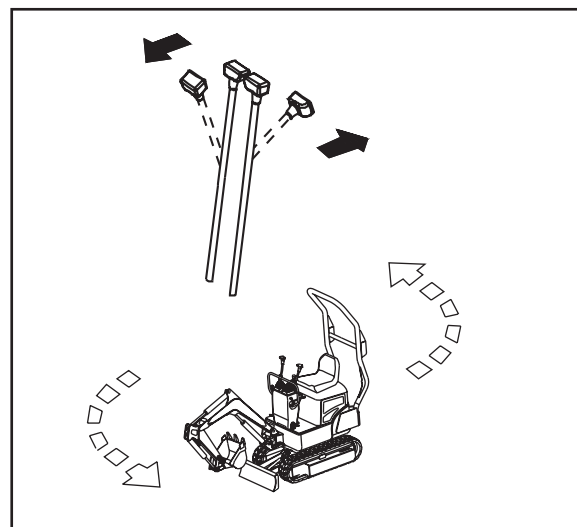
When turning machine to the right, operate it as the same method of turning to the left.



Rotate the machine

When rotate to machine to the left, draw back the left travel lever meanwhile push the right travel lever.

When rotate the machine to the right, draw back the right travel lever, meanwhile push the left travel lever.



Machine slewing

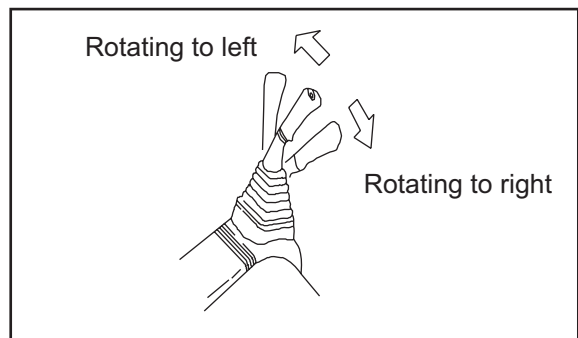
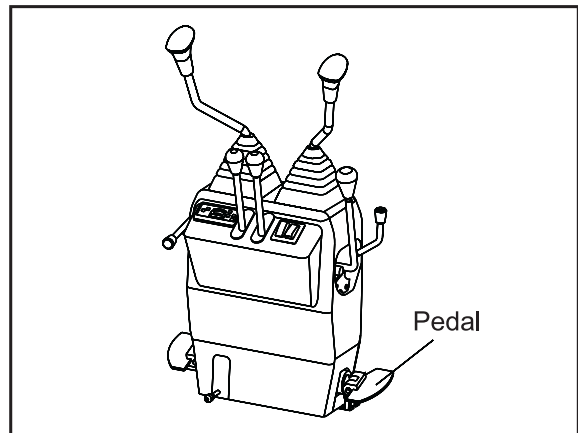
- Before swing the platform, check around whether it is safety.

- If operate the operation handle fast, the platform could also swing fast. If slowly operate the handle, platform swing slowly. Beware of the speed of operate the handle.

1) If the machine installs a boom swing function, let the pedal unstuck; make sure the machine is on platform slewing condition.

2) Pull up the platform lever, unlock the platform

3) Operate left handle to swing the platform as the pictures show.



Operating work equipment

If operate the handle fast, equipments could also move fast, if operate the handle slowly, equipments will move slowly.

Equipment was controlled by the left and right servo handle. The left handle controlling arm and swing (Boom slewing and platform slewing), right handle controlling the action of boom and bucket.

Let the handle return to the middle position, equipment will stop action and keep position.

When turning off the engine, within 15 seconds, operating the valve can still let the equipment drop down to the ground.

In additional, operating valve to reduce hydraulic oil pressure could also drop the boom on the ground.

1. Operating arm

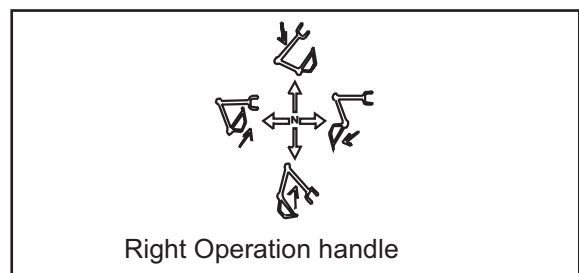
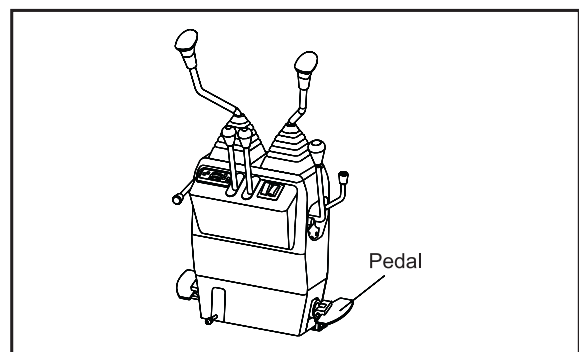
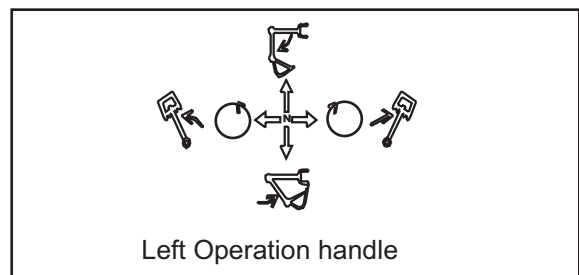
Push the left handle forwards, the arm spread forwards. Draw back the handle, the arm draw backwards.

2. Operating swing.

Put the left handle to the left side, the platform swing to the left. Push to the right, the platform swing to the right.

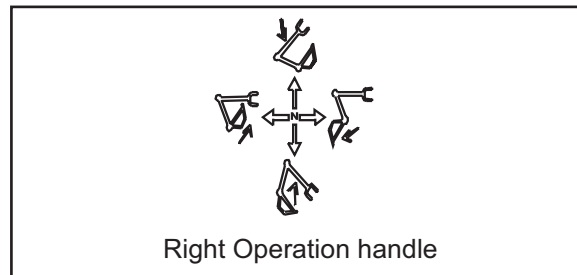
3. Operating boom

Push right handle forwards, the boom will drop down. Draw back the handle, the boom will lift up.



4. Operating bucket

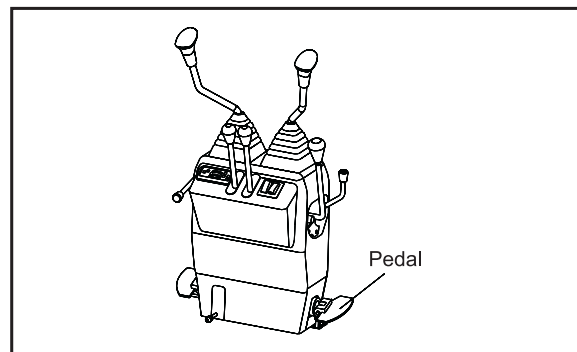
Push right handle to the right, bucket spread up, push the handle to the left, bucket draw down.



5. Operating boom slewing (steering head)

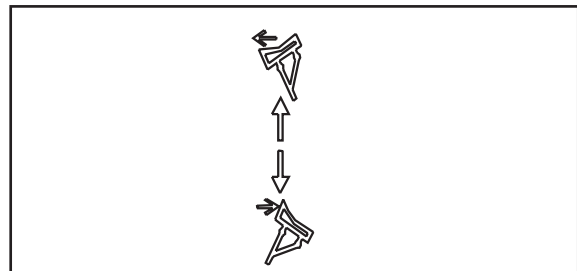
Push right handle to the left, boom will swing to the left. Push the handle to the right, the boom swing to the right.

If the machine has boom slewing function, make sure that the machine is in platform slewing condition.



6. Operating dozer blade

Push down the dozer control lever, dozer cutting down. Draw up the control lever, dozer lift up.



Notice: operating arm could come across action pause. This is not a false state, but a normal situation. Because when the arm moving; self weight accelerates the movement causing lack of oil supply.

Operating on the slope or in the water



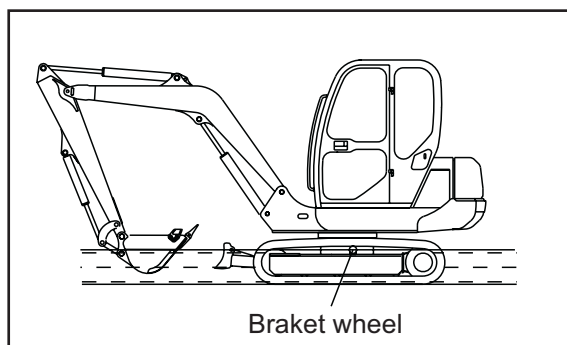
Caution: working on following condition is dangerous. On the slope, muddy ground, snow ground, frozen ground, sandy and loose ground. When working in such condition, operator has to judge the condition, whether it is available to work.

- Lift up the dozer blade away the ground 20~30cm, then move the machine.
- Do not move the machine backwards down a slope.
- When traveling through object or mound, keep the equipment down near to the ground, drive the machine slowly.
- Do not turn around on a slope, do not cross the slope. Turn to the correct direction on the flat ground then drive the machine to the slope.
- When working on a slope, turning around the machine may lose its balance and causing accident. Avoid turning around the machine on the slope. If the bucket is full loading, slewing platform to downgrade direction is very dangerous. Produce a flat ground on the slope to keep the machine balance.
- Do not drive the machine to a steep slope, machine may turn over.
- When driving the machine up to a slope, if the crawlers skid, do not use the arm to drag for climb up the slope. It may cause the machine turn over.
- When driving machine upgrade the slope, make sure the engine and hydraulic oil have been preheated. Otherwise may cause accident.

The depth of the water which it allows

Do not immerse the machine in water by more than the permissible depth (under centre of crawler)

For parts that have been immersed in water for long time, pump in grease until the old grease comes out form the bearing.



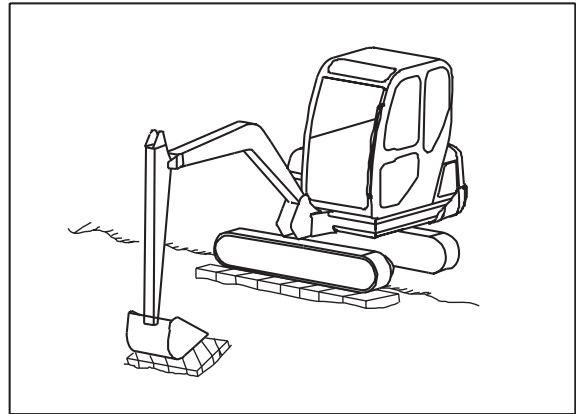
Escape from Muddy area

Always operate the machine carefully to avoid getting into the mire. If the machine gets into the mire, follow below steps to get out the machine.

A. One side of the pedrail gets into the mud

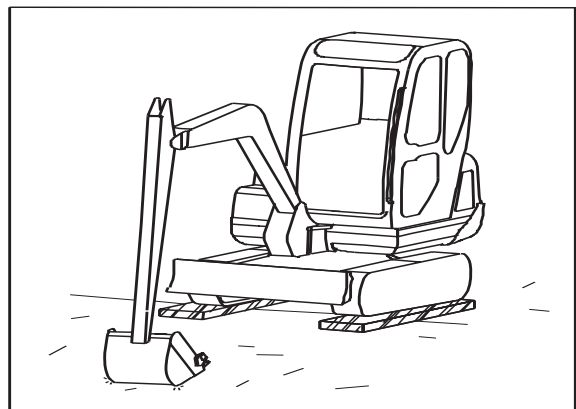
Caution: When it uses the moving-arm or the lever to uplift the machine, it must make the bottom of the bucket touch the ground. (No use the gear of the bucket to push). The angle of the moving-arm and lever is 90° to 110° .

When only one side of the pedrail gets into the mud, it uses the bucket to uplift the pedrail, and underlay the stow-wood, make the machine drive out. If necessary, it can underlay the board under the bucket.



B. Double sides of the pedrail get into the mud

If the double sides of the pedrail get into the mud, and skip not to move. It can adopt the way which as A to underlay the stow-wood. It makes the bucket dig into the ground, and operate the joy stick same as the way which it digs. And adjust the joy stick of the driving to the station which go ahead to pull out the machine.

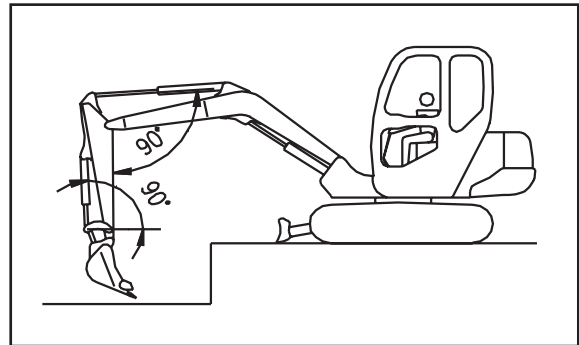


Operating guide

1. Backhoe work

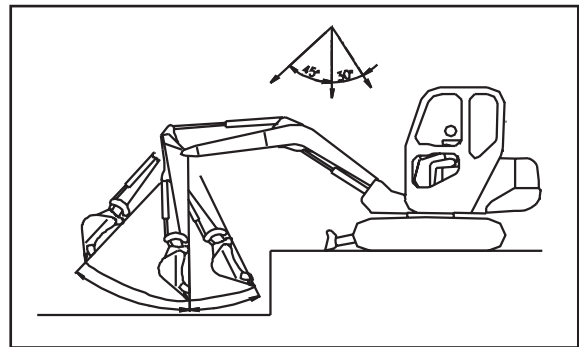
Backhoe is suitable on the position lower than the machine.

When condition of the machine is as shown in the diagram at right, each cylinders maximum pushing excavation force is obtained when the bucket cylinder and link, arm cylinder and arm at 90° . When excavating use this angle effectively to optimize work efficiency.



The range for excavating with the arm is from a 45° angle away from the machine to a 30° toward the machine.

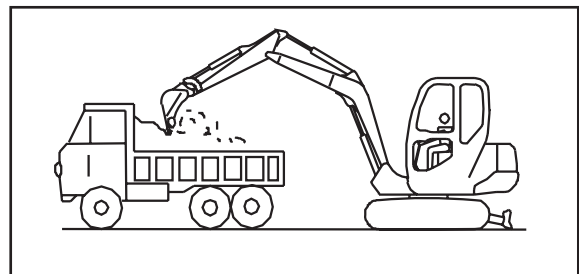
There may be some differences depending on the excavation depth, but try to use within the above range rather than going all the way to the extreme end of the cylinder stroke.



Notice: Excavating hard rock ground, better breaker the hard ground before excavating it. Doing by this way can reduce the damage of the machine, also more efficiency.

2. Loading work

In place where the swing angle is small, locating the dump truck in a place where easily visible to the operator, doing like this can increase the working efficiency.



3. Ditching work

Cut the dozer blade into the earth.

Spread out the arm and boom; dig teeth of the bucket in to earth.

Operate arm to excavate. Adjust the cutting angle of the bucket. Do not dig the bucket too deep into the soil, avoid hydraulic over loading, otherwise the arm can not excavate. If it can not excavate, lift up the arm a little. When bucket is fully loaded, lift the arm and boom up from the ground, swing platform to the right position for bucket unload.

Notice:

- 1) Do not touch the electricity wire.**
- 2) Make clear the condition of conduit, cable underground. Avoid damage the cable or conduit, damaging cable may cause electric shock**
- 3) If come across to this accident, do not leave the seat. Warnings near by people do not get close, drive the machine to a safety place, cut the electricity.**

4. Backfill and smoothing work.

When refilling after excavation, use the dozer blade, drive the machine for pushing the earth into the ditch.

5. Shake down the soil and sand from the bucket

Operate the arm to a level position, bucket to unload position, if the soil still does not drop down, operate bucket up and down to shake the soil down. Avoid using the cylinder end strike to shock the soil down.

6. Notice for relevant parts

A. Notice for crawler

- 1) Too many objects enter into the crawler will cause damage.
- 2) Avoid suddenly turning around the machine on a hard friction ground.
- 3) Try to avoid touch brine, it will erode the crawler.
- 4) If the crawler does no use for long, keep it in a dry and cool place.
- 5) When one of the crawlers is lifted, do not move the other crawler, this will cause the crawler fray.
- 6) When machine moving, do not loose the crawler, otherwise crawler may drop out.

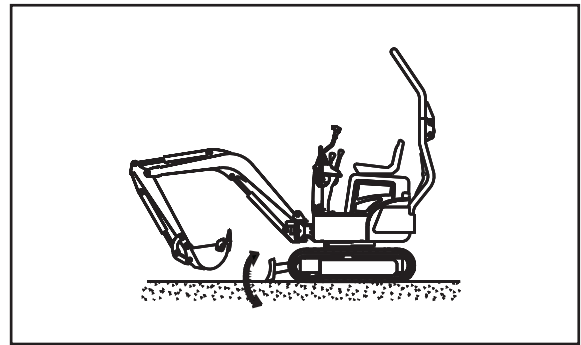
B. Notice for using dozer blade.

1) Dozer blade could only be used to push the earth. Do not use it for other purpose, otherwise dozer blade and crawler may be damaged.

2) Dozer blade could not endure huge heavy object.

3) When machine traveling, do not hang any object on the blade.

4) When using blade to lift up the machine, make sure it is on a flat and reliable ground.



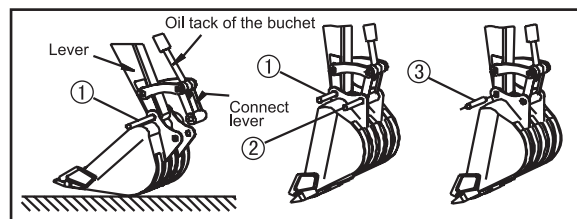
Removing & Installing Bucket

Safety rule

- When it uses the hammer to knock the pin bearing, the slug may be into the eye to make the hurt. When the person deal the operation, it need wear the safety glass、motorcycle safety helmet、the glove.
- When it take-down the bucket, it need to put it steady.
- When it uses the hammer to knock the pin bearing, it maybe fly off and hurt the person who in the around area. So before knock the pin bearing, it should make sure the are safe.
- When it take-down the pin bearing, no stand under the bucket, no let the foot or other parts of the body under the bucket.
- When it take-down or installing the pin bearing, caution no hurt the hand.
- When it make the hole in line, no put the finger into the pin bearing.

Installing

Stop the machine on the ground which hard and smooth. When it do the connect work, it should know the signal and work careful.



Make the digger stay the operation state, envisage the bucket, operate the lever till the hole of the lever and the bucket in line, and inset one steel stick($\Phi 30\text{mm}$, ①) into the hole

Lift up the moving-arm and the lever to make the bucket hang on the lever vertical. Operate the oil tank of the lever to make the holes of the connect lever and the connect hole of the bucket in line. Installing the bearing ②, take out the steel stick ① and installing the bearing ③。

Take-down

Stop the machine on the ground which hard and smooth. It request to put the bucket to the place which can touch the ground. If the bucket fall down heavy ,it will increase the resistance and difficult to take-down the pin bearing.

Take-down the double nuts of the lock bolt which connect the lever and the connect lever, and take-down the bolts, then tak-down the pin bearing ③ and the pin bearing of the connect lever ② and take-down the bucket

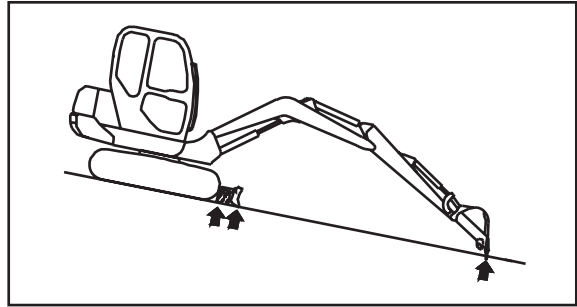
Plarking Machine

Safety regulation

1)Avoid abruptly stop. Keep enough space when you want to stop the machine

2)Stop the machine on a firm and solid ground, avoid dangerous place. If you must park the machine on slope, put some pieces of wood under the crawlers, then trust the bucket under ground.

3)If touch levers with unconsciously, the equipment could move suddenly ,That could be make a accident or hurt the people.Put the safety lock lever in the lock position, otherwise accidental action on a lever may cause sudden machine movement and it may cause injury or death.



Machine stop

1)Put all levers in neutral position.

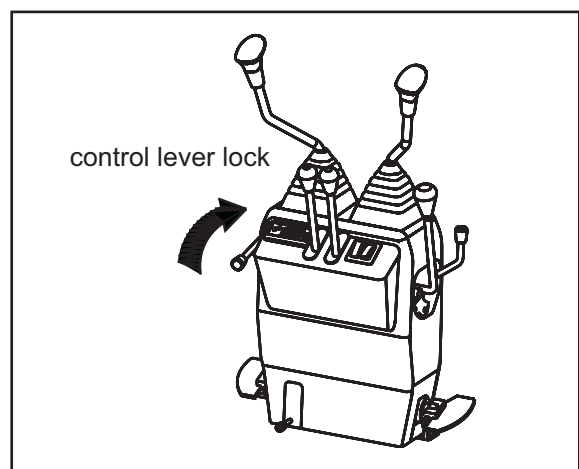
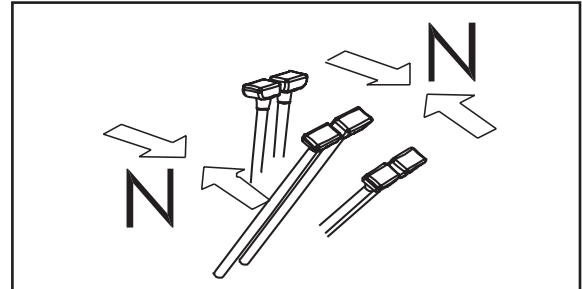
2)Don't stop the engine abruptly before it is cool enough. If the engine is over heated let it run at low speed for 5mins then stop it.

3)Lower bucket and dozer blade on the ground.

4)Put the throttle lever in low idle, and pull the stop lever rearwards in the end(If there is the stop lever).

5)Rotate the start key in "OFF" until the warning lamps go out.

6)Move the engine stop lever in clockwise until the engine stop completely.



After operation

1.Check

Check the water temperature、 engine oil pressure、 fuel pressure、 the level of the fuel on the instrument panel.

2.Lock

After completion work , make sure the follow compartment is locked.

1)Cab's door. (And don't forget the windows). In any condition, if you want to open the front windows, using the handle , can pull the front window up and down to slide the roller inside the guide, then lock it to upthrust till the lock position, whereas, put the front windows down.

2)Refuel port.

3)Hydraulic oil filing port.

4)Battery-box cover

5)Engine hood

Warning: Make sure that there is nobody stand by engine hood when opening the engine hood to avoid hurt.

Loading & Transport the Machine

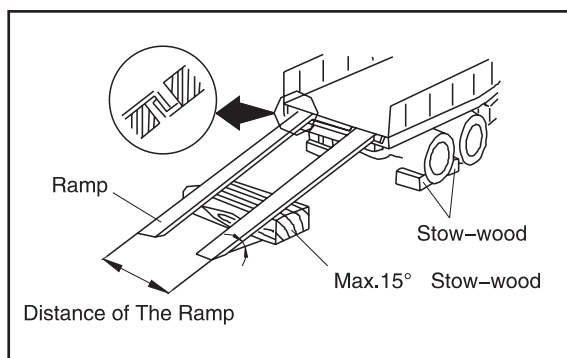
1.Safety regulation for loading machine

- 1)When loading or unloading the machine, run the engine at the idling speed.
- 2)Don't loading or unloading the machine when turn on the heater.
- 3)If you turn off the heater when operating the machine, the speed of machine's movement will suddenly change.
- 4)When loading or unloading the machine, park the trailer on a flat, firm road. Keep a fairly long distance between the road shoulder and the machine.
- 5)Make sure the ramp has sufficient width, length and thickness to enable the machine to be safely loaded and unloaded. And set the distance between ramps 1.2-1.5 times as much as the track width. In order to avoiding accident, advise to make the angle of the gangplank a maximum of 15°Cor the length of ramp is greater than the height 2.5 times.
- 6)Keep the crawler off mud and dirty to prevent from slipping on the slopes. Make sure the slope is cleanness, no water, snow, ice, lubricating grease or oil.
- 7)Never change the direction of travel when on the ramps. If it is necessary drive off the ramps and correct the direction, then drive on to the ramps again.
- 8)Don't use the work equipment to load or unload the machine.
- 9)Don't operate any lever besides walking lever when the machine is on the ramp.
- 10)The machine's focus may be suddenly changed at the joint of the ramp and trailer which may cause the machine lose balance. Therefore, carry out the operation slowly when pass through the joint.
- 11)When turning the machine on trailer, the machine's footing is unstable, so the work equipment should be retracted when slewing.
- 12)No matter loading or unloading the machine, there must be some blocks beneath the tires to ensure the trailer doesn't move.
- 13)Place rectangular timber underneath the front and rear track shoes to prevent the machine from moving about. Also, hold it down with chains or ropes.
- 14)After completing work or operating, before the operator leave the seat, make sure the pilot operating oil circuit is cut off by lifting the safety lock lever, in case that somebody impact the operating lever accidentally what cause the machine move.

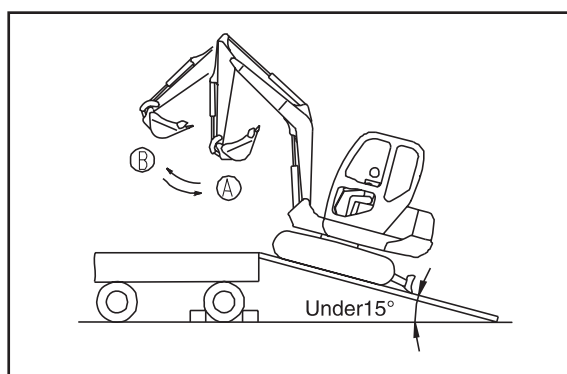
2 . Loading precaution

- 1)When loading or unloading the machine, park the trailer on a flat, firm road. Keep a fairly long distance between the road shoulder and the machine.
- 2)Properly apply the brakes on the trailer and insert blocks beneath the tires to ensure that it does not move.
- 3)Make the angle of the gangplank a maximum of 15° . Set the distance between the ramps to match the centre of the tracks.
- 4)Lock the slew flat.
- 5)Let the excavator and the ramp in the line, the bulldozer stay in the backside, for safety reason, the excavator should drive slowly when climbing the ramp until reach to the end of the ramp.

NOTICE: when you are on the ramps don't operate any lever besides the travel lever.



- 6)Set in direction of the ramps, then stop walking to extend the arm (B), enable the front of crawler load the trailer's floor. Lower the work equipment for fear it hitting the trailer, then travel slowly to load or unload the machine correctly in the specified position on the trailer.



- 7)Lower down the arm slowly and make the bucket contact with floor, then lower down the blade, load the machine correctly in the specified position on the trailer.

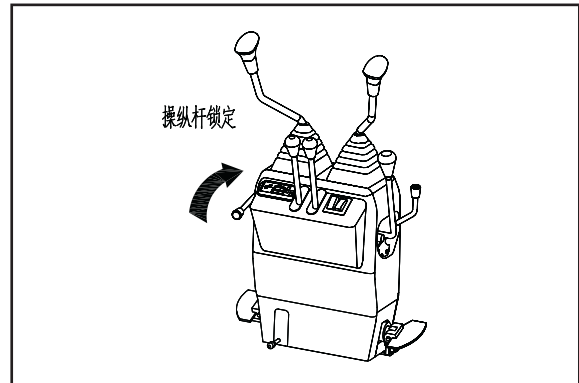


WARNING: After completing work or operating, before leave the seat, the operator should lift the safety lock lever at first to make the pilot operating oil circuit is cut off. For in case that somebody impact the operating lever accidentally what cause the machine move.

NOTICE: Choose the trailer to match the machine in weight and size offered in this manual

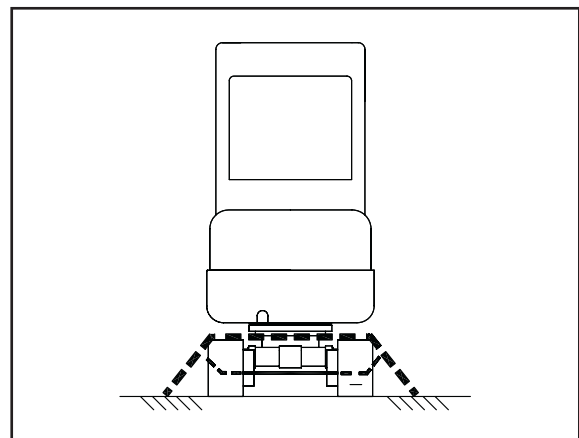
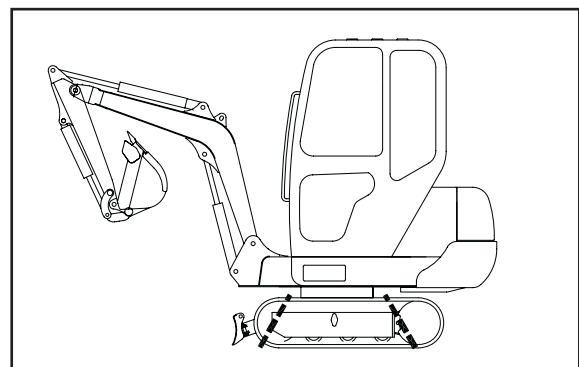
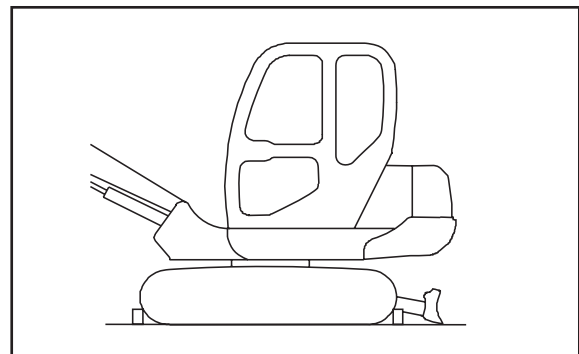
3. Fix the machine on the trailer

- 1) Lower the work equipment correctly
- 2) Stop the engine and remove the start key.
- 3) Lift the safety lock lever up
- 4) Lock the door and engine hood
- 5) Place rectangular timber underneath the front and rear crawler to prevent the machine from moving about. Also, hold it down with chains or ropes. Be particularly careful to ensure that the machine does not slip sideways.



4. Unload the machine from the trailer

- 1) When loading or unloading the machine, park the trailer on a flat, firm road. Keep a fairly long distance between the road shoulder and the machine.
- 2) Properly apply the brakes on the trailer and insert blocks beneath the tires to ensure that it does not move.
- 3) Fix ramps in line with the centre of the trailer and the machine. Be sure that two sides are at the same level as one another. Make the angle of the gangplank a maximum of 15° . Set the distance between the ramps to match the centre of the tracks.
- 4) Remove the chains or ropes on the machine.
- 5) Start the engine. If it is winter, turn on the heater to warm the machine completely.
- 6) Put the safety lock lever down.
- 7) Lift the arm and bucket, and raises blade.
- 8) Make sure no unauthorized obstacles in the working area.
- 9) Moving the platform lock pin and slewing the machine 180° , operate the work equipment to face to the ramps.
- 10) Run the engine at the idling speed then travel slowly till the top of the ramps, then extend the arm when the machine loads on the road.



5 Suspend the machine

A. safety regulation

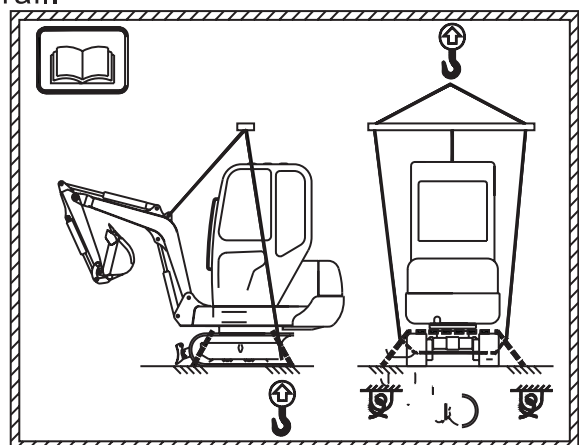
- 1) Don't suspend the machine when there is somebody on it.
- 2) It must be sure the chain that use to suspend the machine have the enough intensity to carry the weight of the machine.
- 3) In order to avoid the machine's unbalance, it must do just like following provided steps.
- 4) Don't suspend the machine when the above body doesn't parallel with the track. And only when they parallel, it can use the chain to suspend the machine.
- 5) When in the process of lifting, it must keep the machine in horizontal.
- 6) When in the process of lifting, there must be nobody under the machine or around the machine.

B. Suspending procedure

NOTICE: the suspending procedure is used for the standard machine. The suspender must be used the professional tool that can carry the weight of the machine enough.

When suspending the machine, it must be at the smooth floor before doing the following procedures.

- 1) Slew the a above part of the machine to in line with the wheel of the chain.
- 2) Let the cylinders of the arm and boom unwind, until the working equipment on the floor.
- 3) Stop the engine, make sure there is nothing else in the cabin, then leave the machine. Close the door of the cabin and the window.
- 4) Tightwire have to get through the front idler and idler of wheel in the front of the machine, meanwhile it also have to get through the driving wheel and pedrail supporting wheel in the back of the machine. Or putting the tightwire to get through the machine under its pedrail.
- 5) Firstly, we have to adjust the rising angle of the tightwire to 30 or 40 degree, then we can slowly rise the machine .
- 6) When the machine lifted above the floor, check if the machine is balance, then lift it up slowly.



Operating under the Cold/Hot weather

1.Cold weather operation

The cold weather may cause some trouble, so the protection is very important at this time. Avoiding the machine to be badly damaged, if maintain machinery adequately, it will extend machinery life.

1)Electrical system: keep the battery clean and charge fully. Check the cable and joint, clean the joint then apply a layer of grease at it to prevent it from rusting

2)Lubricants: apply the lubricant moderate in viscosity at every joint. Please use the recommended lubricant fit for this machine.

3)Fuel system: check if the fuel supply is suitable for the cold climate at that time, and change into fuel in low viscosity.

Check if there is water in the fuel system. In cold weather, moisture content will gather in the fuel box, so check whether there is moisture content in the fuel filter once working every 50 hours each time. If there's no water inside, extend the inspection cycle, or else, check the oil tank.

4)Cooling system: before operating the machine in cold weather, it is necessary to check the coolant if it is mixed at a suitable proportion, and the coolant must be the right one which is fit for the environment temperature.

5)Work equipment: before starting the engine, put the throttle lever in low idle, start the machine slowly, then stop traveling to operate the work equipment for about 10mins or till every hydraulic cylinder working normally.

2.Hot weather operation

To avoid the machine is damaged, follows these rules:

1)Make sure the quantity of liquid coolant in radiator is normal

2)Before the hot weather coming, check the radiator and change the coolant if necessary.

3)Removing the dirty and fouling on the surface of radiator and engine.

4)Check the fan belt.

5)Use the lubricant in moderate viscosity.

6)In the cooling system, use the appropriate mix of coolant.

7)In the condition of the large dusty environment, air filter should be often checked.

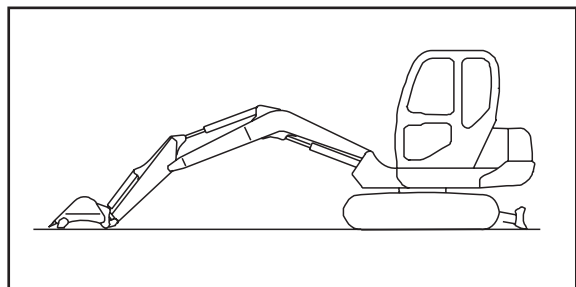
Long term storage

1.Before storage

When putting the machine in storage for a long time, do as follow:

- 1)After every part is washed and dried, the machine shall be housed in a dry building. Never leave it outdoor. In case it is indispensable to leave it outdoors, park the machine on a flat road and cover it with canvas etc.
- 2)Apply a thin coat of grease to metal surface of the hydraulic piston rods.
- 3)Removing the battery, which will be fulfilled with the electrolyte and electricity and then put it at a not dry ice-free areas.
- 4)Drain the engine oil at the warm state, and change with anticorrosion oil. For the piston-type engine the anticorrosion oil MIL-L-21260 is selected. For a winter storage use 1.grade or 2.grade SAE 10W, but for a summer storage use SAE 30.
- 5)Fill also the same type of the anticorrosion oil for about 4%~6% in the fuel oil, and mix them completely. In order to prevent from bringing about condensed water, refill the fuel tank with this kind of mixed oil.
- 6)Check the antifreeze function of the coolant. By filling with antifreeze, its antifreeze ability is at least 20° . There is non corrosion inhibitor in coolant because of the climate, you should fill with corrosion inhibitor.(it contains 5% corrosion inhibitor according to MIL-G4339C.)
- 7)Start the engine, run it above 15mins at different rotational speed and without load.
- 8)Shut off the inlet of the air filter and the outlet of the exhaust pipe. Plastic thick papers and tape are recommended in this case.
- 9)Lock the platform, and set the safety lock lever in lock position、 the left operating box、 , set all levers in lock position.
- 10)Lock the cut-off valve which for install the attachment, and installing a bolt in the elbow.
- 11)Keep the machine clean, and place it in a dry space.

NOTICE: When the machine is not being used, set the work equipment as showed in beside figure. This will prevent the cylinder rod from rusting.



2.During storage

- 1)Start the engine and travel the machine for a short stretch every month, so a thin coat of grease will cover the moving parts. At the same time, charge the battery.
- 2)Also run the air condition if it is assembled.
- 3)Turning the crawler.



WARNING: When the machine housed in the building, if the antirust operation should be done, open windows and doors to improve the ventilation and prevent gas poisoning.

3.After storage

When you start the machine after a long term storage, do as follow:

- 1)Remove the excess grease with a duster from cylinder rods.
- 2)Add oil and grease to all place.
- 3)After the machine have stored for a long time, moisture content in the atmosphere may mixed in the oil. Before or after starting the engine, you should check the oil at all places. If the oil mixed with some water, the oil at all places should be changed.

NOTICE: 1) According the climate, the machine can be stored for a year by means of above method. However, after storing for six months, you should operate every part for 15mins without load. At the same time add the lubricant to every part.

2) Before operating the machine again, which have stored for a long time, you should do some necessary inspection. After stored over a year, the machine must be drained out and change the oil from its reducers and hydraulic system, too.

Technical problem causes and solve step

Trouble	Reason	Resolve
1.The engine couldn't start or start difficult	●Problem for start the engine	●Replace or check the engine
	●Lack electrification of the battery	●Electrification or replace the battery
	●Error use for the line or the piston of the warm-up	●Mend or replace the warm-up piston
	●Error of the oil injection positive	●Check the oil injection positive
	●The pipe laying obstructed	●Clean the pipe laying
	●The filter of the fuel obstructed	●Clean or replace the filter of the fuel
	●The fuel system has the water、the dust or the air	●Ejectment the air, clean the pipe laying
	●The nozzle dirty or the pressure of oil injection lower	●Maintain the nozzle
	●The trouble of the fuel injection pump	●Contact assistant service
	●The fuel lacks	●Immit the oil
	●The intake/vent system obstructed	●Ejectment the trouble
2.The engine knocking、running irregularly or stop	●It have many air	●Contact assistant service
	●The filter of the fuel obstructed	●Clean the filter
	●The fuel system has the dust or the air.	●Vent and clean the oil line
	●The filter obstructed,the nozzle dirty or trouble	●Check them
	●The high-pressure oil pipe destroyed	●Replace the high-pressure oil pipe
	●The fuel lacks	●Immit the oil
	●The velometer couldn't adjust	●Contact assistant service
	●The trouble of the fuel injection pump	●Contact assistant service
	●Error of spurt oil positive or the nozzle clip	●Check them

Trouble	Reason	Resolve
3.The power of the engine descend	●The fuel has the air	●Ejectment the air
	●The pipe laying obstructed which supply the oil	●Check and clean it
	●The oil injection positive replaces	●Adjust it with the ordain value
	●The oil injection work not good	●Check the working pressure and the pulverization of the nozzle
	●The air filter obstructed	●Clean the core of the filter
	●Error of the intake vent or not seal	●Adjust the gap of the intake/vent
	●The cylinder cushion bad or leak	●Replace the cylinder cushion
	●The oil injection pump work not good	●Contact assistant service
	●The engine overheat	●Check whether use the coolant right.whether the water pump and the belt loose .If they have,it need to mend or replace them,and clear the choker of the flume
4.The engine overheat	●The level of the coolant low	●Immit the coolant
	●The temperature sensor has the trouble	●Replace the sensor
	●The air filter obstructed	●Clean the filter
	●The belt of the fan looses or trouble	●Screw down it again or replace
	●The pipe of the cooling system has the dust	●Clean the pipe
	●Bad machine oil or much the machine oil	●Replace the machine oil
5.The pressure of the engine low	●The level of the machine oil low	●Immit the oil
	●The filter of the machine oil Obstructed	●Clean the filter of the machine oil
	●The pipe leaks oil	●Screw down or replace
	●The coolant of the engine Exorbitant	●Mix the coolant with the right rate or contact assistant service

Trouble	Reason	Resolve
6.The engine emit the black smoke	●Bad fuel	●Use the better fuel
	●The air filter obstructed	●Replace the core of the filter
	●Error of the oil injection positive	●Adjust it with the ordain value
	●The pulverization of the nozzle not good	●Check and replace the parts
7.The engine emit the withe smoke	●Bad fuel	●Use the better fuel
	●The machine oil of the engine more	●Renew the level of the oil
	●Error of the oil injection positive	●Adjust it with the ordain value
	●The oil tank &the fuel have the water	●Check and replace the fuel
8.The electricize battery not	●The tie-in looses or rusts	●Clean or screw down
	●The belt of the engine loose or trouble	●Screw down or replace
	●The engine not electricize	●contact assistant service
9.The engine not run or run slow	●The tie-in looses or rusts	●Clean or screw down
	●The battery undercharge	●Replace
	●The line destroy	●Contact assistant service
10.The engine runs,but the alarming light lights	●The engine has trouble	●Contact assistant service
	●The electron adjuster has the trouble	●Replace
	●The line has the trouble	●Check and repair
11.The part of the hydraulic system runs slow	●The hydraulic oil cool	●Warm-up
	●The pressure of the guide system low	●Contact assistant service
	●Error use of the hydraulic oil	●Use the hydraulic oil which right
	●The speed of the engine too Slow	●contact assistant service

Trouble	Reason	Resolve
12.The temperature of the hydraulic oil too high	●Error use of the hydraulic oil	●Use the hydraulic oil which right
	●The pipe laying obstructed	●contact assistant service
	●The oil filter of the hydraulic oil obstructed	●Clean or replace
	●The oil pump attrite	●contact assistant service
	●The oil cooler obstructed	●Clean the oil cooler
	●The oil cooler has trouble	●contact assistant service
	●The pressure of the main safety valve or the spill valve too high	●Contact assistant service
	●The oil too dirty	●Replace the oil
	●The senor has trouble	●Replace
13.The hydraulic emulsification or has the foam	●The pipe which from the oil tank to the oil pump leak	●Check and repair,and screw down
	●Error use of the hydraulic oil	●Use the hydraulic oil which righ
	●The hydraulic oil includes the water	●Replace the oil
	●The level of the oil too low	●Check the level of the oil
14.The pressure of the oil too low or not	●The hydraulic pump destroy	●contact assistant service
	●The oil lacks	●Immit the oil
	●The safety valve has trouble.	●contact assistant service
15.All parts no work	●The hydraulic pump destroy	●Contact assistant service
A.The oil pump has the noise	●The hydraulic oil lacks	●Immit the oil
	●The oil suction pipe leaks	●Repair or replace
B.The noise of the oil pump not replace	●The donkey pump destroy	●Replace
	●The operation device of the hydraulic safety not working	●Check and repair

Trouble	Reason	Resolve
16.The oil tanks or the motor no working or no power to working	●The hydraulic pump destroy	●contact assistant service
	●The pressure of the main safety valve become low	●Adjust the pressure
	●The level of the oil low	●Immit the oil
	●The oil suction filter obstructed	●Clean the filter
	●The oil sealer destroy	●Repair or replace
	●The piston lever destroy and leak oil	●Repair or replace
	●The guide valve trouble	●Replace
	●The guide pipe rupture and leak oil	●Repair or replace
17.Double driving device not working	●The joint of the central rotating series oil	●Contact assistant service
18.One driving device no t working	●The driving device destroy	●Contact assistant service
	●The control machine destroy	●Check and repair
19.Driving deviant	●The pedrail too tight or too loose	●Adjust it again
	●The performance of the oil pump reduce	●contact assistant service
	●The pedrail frame metamorphosed	●Repair or replace
	●The chain of the pedrail has the scree	●Repair
	●The control valve leaks oil	●contact assistant service
	●The performance of the motor reduce	●contact assistant service
20.The rotating deviant	●The performance of the oil pump reduce	●contact assistant service
	●The rotating motor destroy	●contact assistant service
	●The guide valve not working	●contact assistant service
21.The rotating discrete	●The rotating gear attrite	●contact assistant service
	●The rotating bearing or ball bearing attrite	●contact assistant service
	●The axunge lacks	●contact assistant service
	●The control valve leaks oil	●contact assistant service

Trouble	Reason	Resolve
22.The air-condition system has the noise	●The joint of the electron looses, to lead the clutch not good	●Inter the joint tight or repaire
	●The belt looses	●Adjust it ,replace it if it broken
	●The fan of the blower looses	●Screw down agin
	●The blower works deviant	●Repair or replace
	●The electric fan works deviant	●Repair or replace
	●The bearing of the decrement machine destroy	●Replace
	●The tension bearing destroy	●Replace
23.The air-condition couldn't refrigeration	●The line trouble	●Repair or replace
	●The switch of the air-condition trouble	●Repair or replace
	●Not have the cryogen	●Check、 repair、 immit the cryogen
	●The system obstructed	●Clean or replace
	●The belt looses or rupture	●Adjust or replace
	●The expansion valve trouble	●Clean or replace
	●The decrement machine runs deviant	●Repair or replace
	●The switch of the pressure trouble	●Replace
24.The air-conditioning is intermittent	●The line touch not good	●Check and repair
	●The belt loose	●Adjust the belt
	●The temperature of the air-condition switch adjust unsuitable	●Adjust
	●The system includes much water,the inside has the ice	●Replace the dryer
	●The electron fan or other relays destroy	●Repair or replace

5

Maintenance

General Information of Maintenance

Break-in of the new machine

The break-in period is the first 100 working hours of the new machine. Cautious use must be taken during this period in order to prevent the machine from heavy load and working intensity. In the first 50 hours in break-in period, only 80% of working intensity is permitted, because the proper use during the break-in period has a deep influence in the service life of machine.

After 50 working hours, the user must check the machine according to the maintenance list for the first time, and change the relative oil and filter. Meantime, to check the pollution degree of hydraulic oil, the degree must lower than grade NAS9 or the hydraulic oil should be changed.

When the hydraulic systems stop working, high speed running of the engine is prohibited. Working equipments can be used only if the temperature of hydraulic oil has exceeded 20°C.

Working in the dusty worksites

When the machine is working on a dusty worksite, please follow the below instructions:

- To check whether the air filter is clogged or not with the sensor and frequent cleaning of filter core is required.
- Clean the radiator core frequently to prevent the clogging.
- Frequent cleaning and change of fuel filter are required.
- Clean the electrical equipment, especially the starting motor and alternator in order to avoid the blocking of the dust.
- Move the machine to a clean ground for preventing dust from oil when checking and changing the oil.

Oil and the filter core

Clean engine oil and greases are required to avoid any impurity in the engine oil container.

After changed the oil and filter core, to exam whether there are cuttings or impurities in the old oil and filter core. Adopt proper measures if large numbers of cuttings and impurities are found.

Never mix different kinds of oil.

The hour meter

Check the hour meter in the instrument to see if it is the time to do maintenance for the machine.

Use the original spare parts

It is important to use the original spare parts of YUCHAI EXCAVATOR.

Environment protection

When dealing with the engine oil, fuel, coolant, anti-freeze, plastic, impregnant, filter core and battery which will be harmful to the environment, do abide by the environmental laws.

Do not drop anything into the machine

When checking the machine, pay attention to avoid dropping the bolts, nuts, spacers and tools into the machine, that will cause the damage to the machine and may bring accidents. If something has dropped into the machine, take it out immediately.

Periodical maintenance

Periodical maintenance should be undertaken according to the items in the Maintenance Schedule.

Counter checking

Counter checking is important after doing the maintenance every time. Please pay attention to the following instructions:

- Whether some parts of the machine which need to be maintained are missed.
- Assure that all items of maintenance have been carried out.
- To check if there is impurity has dropped into the machine.
- To check if there is oil, water and fuel leakage in the machine and make sure that the bolts are tightened.

Maintenance Outlines

Lubricants

- Use the right type of oil which is indicated in the "Oil List" and change the oil on a specified time.
- Prevent the lubricant from impurities (water, metal cuttings and dust etc.). Most problems with the machine are caused by these impurities.
- Do not mix the different lubricant.
- Add the lubricant to the right quantity.
- When change the lubricant, change the relative filter at the same time.

Fuel

- Be sure that no impurity will contaminate fuel when storage or refueling.
- Always use fuel specified in the "Oil Chosen list". Fuel may freeze below -15°C , so it is necessary to change the fuel according to the environment.
- To avoid air condensation inside the fuel tank, refueling the tank after work.
- Before starting the machine or after refueling for 10 minutes, do let the deposits and water out of the tank.
- Exhaust the air in the oil circuit if the fuel of engine has run out or the filter has been changed.

Grease

- Grease is used to avoid the scratch wear and noise emission from jointed parts.
- To add grease after the parts are used for a long time.
- When adding the grease do remember to get rid of the old one.

Coolant

- Anti-freeze should be used under in different climate.
- Check the quantity of coolant in the tank and add it when the coolant is insufficient.
- Use the proportional mixture of coolant and anti-freeze according to the temperature.
- Never add the coolant when the engine is hot or not completely cool.

Filter Cores

- Change the filter core periodically.
- Do not use the filter core which has been cleaned.
- When changing the filter, contact YUCHAI if you have found that there are metal grains on the filter.
- Do not open the package of the spare filter before usage.

Hydraulic system

- Check and do the maintenance on the hydraulic system after the temperature is down and release the pressure of the pipeline in the cylinder.
- When loosening the bolts, nuts and tie-in of pipes, do not stand at the front of the spare parts.
- Release the air in the pipeline when doing the checking and maintenance.
- The maintenance of hydraulic system consists of checking the quantity of hydraulic oil, changing the filter and refilling the hydraulic oil.
- When disassembling the tubes, the o rings must be changed if they are found broken.
- Do not use the contorted or bended tubes.

Electrical system

- If cables become damp or will damage, the electrical wiring may reduce machine safety and acting.
- If you wash the machine, be careful to prevent electrical wiring wets.
- To avoid radio interference between control device and walkie-talkie or radio system please check from YUCHAI before install anything.
- If you work near the seashore, keep the electrical wiring clean to avoid corrosion.
- If you install a fan or other electrical device connect it to an independent connector.

Force changing part

Those parts which play an important role in safety, such as some soft pipes, will be aging, wear-out and deteriorated as working time accumulated and will cause some safety hazard. It must replace those parts after they have reached the expiry date.

If those parts have abnormality, maintenance and replacement must be taken. Change the related seals when replace the soft pipes.

Oil choosing list

Choose the suitable oil as the temperature and work condition, but please choose the oil according to the following schedule.

	Lube or Fuel	Use temperature	Viscosity	Fill-in
Lube of the engine	Chilliness area:CD10W/30 General area:CD15W/40	-20°Cupwards -15°C upwards	9.3-12.5 centipoise 12.-16.5 centipoise (when it is 100°C)	
Hydraulic oil	Low temperature:L-HS46 General area:L-HM68	-25°C upwards -4°C upwards	61.2-74.8 centipoise (When it is 40°C)	
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	Vehicle oil Hz-23	All the temperatures	20-25 centipoise (When it is 50°C)	
Lubricating oil	Lubricating grease	-20°C—160°C		
Fuel	Summer:0# light dies fuel Winter:-10# light dies fuel -20# light dies fuel	>0°C 0-5°C -5°C-15°C		
Coolant	Antifreeze (50%water and50%---Ethylene glycol)	>-32°C		
Refrigerant	R134a			

● The capacity of the Oil

Sort	Unit	Value
Fuel tank	L	8.5
Hydraulic oil tank	L	8.5

Torque

Unless otherwise specified, tighten the metric bolts and nuts to the torque shown in the table, if not, the tightened parts or connected parts will lose and be damaged, and will cause other problems or affect operation.

The torque list for general parts

Intensity Grade of The Bolt	Bend Intensity N/mm ²	Diameter of The Bolt mm							
		6	8	10	12	14	16	18	20
		The Tighten Moment 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	448~697	635~847

Intensity Grade of The Bolt	Bend Intensity N/mm ²	Diameter of The Bolt mm						
		22	24	27	30	33	36	39
		The Tighten Moment 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

The tighten moment of hydraulic soft pipe

Rotating Nut with The Metric System Thread			
Metric System Thread	Outside diameter of steel tube	Nm	
		Moment	min./max
M12x1.5	6	20	15~25
M14x1.5	8	38	30~45
M16x1.5	8/10	45	38~52
M18x1.5	10/12	51	43~85
M20x1.5	12	58	50~65
M22x1.5	14/15	74	60~88
M24x1.5	16	74	60~88
M26x1.5	18	105	85~25
M30x2	20/22	135	115~155
M36x2	25/28	166	140~192
M42x2	30	240	210~270
M45x2	35	290	255~325
M52x2	38/42	330	280~380

The tighten moment of hydraulic soft pipe

BSP Thread and Rotating Nut		
	Nm	
BSP Thread	Metric System Moment	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			
		Nm	
UNF Thread	Specs of the lineation	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

Periodic Maintenance schedule

Check the machine timely as follow list and the engine time-meter, the maintenance interval for some related parts must be shortened if the machine is working under the bad condition or equipped with Rock breaker or other accessories.

No.	Checking Items	Period of Maintenance (Total of the Working Hour)					
		10	50	100	250	500	1000
1	Routine Check						
	●Oil、 water、 fuel leakage	▲					
	●Appearance of the parts and hoses	▲					
	●Fastening of bolt and hydraulic connections	▲					
	●Controlling parts、 work lamp and warning light	▲					
	●Engine condition	▲					
2	Fuel System of Engine						
	●Check fuel oil level and refueling	▲					
	●Vent water and impurity			▲			
	●Clean the fuel tank				▲		
	●Check oil injecting pressure					▲	
	●Replacing filter core					▲	
3	Cooling System of Engine						
	●Check the rubber pipe and clamps	▲					
	●Check coolant level	▲					
	●Cleaning radiator fans					▲	
	●Replacing coolant		☆				■
	●Check coolant consistence	▲					
4	Lubricate System of Engine & Others						
	●Check engine oil level and refueling if needed	▲					
	●Replacing engine oil		☆		▲		
	●Replace engine oil filter core		☆		▲		
	●Check tension of fan belt		☆	▲			
	●Check gas valve clearance					☆	▲
	●Check fastening of the cylinder cover					☆	▲
	●Check fastening condition of the engine support		☆			▲	

No.		Period of Maintenance (Total of the Working Hour)						
		10	50	100	250	500	1000	2000
5	Engine Air Intake System							
	● Empty the dust collector	▲						
	● Cleaning air filter core			▲				
	● Replace the air filter core					▲		
6	Hydraulic System							
	● Check hydraulic oil level and refueling if need	▲						
	● Cleaning hydraulic oil tank				▲			
	● Replace the hydraulic oil, clean the suction filter							▲
	● Replace hydraulic oil—return filter core and pilot filter core		☆			▲		
	● Check pressure of system					▲		
7	Battery							
	● Check electrolyte level		▲					
	● Check electrolyte density and Charge					▲		
8	Reducer							
	● Check oil level and refueling				▲			
	● Replacing engine oil						▲	
	● Check tighten torque of connecting bolt		☆			▲		
9	Crawler							
	● Check and adjust the tension of crawler	▲						
10	Idler, upper roller and front Idler							
	● Check the tighten torque of Idler		☆			▲		
	● Check the oil level of front Idler and upper roller						▲	
11	Lubricate							
	● Immit lube to Lubricating point		▲					



Routine period to do



Maintenance of the first time to do



Every spring and Autumn

Routine Check

It need do the routine Check to the machine everyday or every 10hours.

- 1)Check whether the machine leak oil、 water or the fuel leaks
- 2)Check whether the parts and the attachment have the rupture、 the nick or the distortion
- 3)Check the hydraulic device's fix and connect
- 4)Check the appearance of the parts
- 5)Check the working circs of the operation device、 light 、 indicator light
- 6)Check the working circs of the engine.
- 7) Check the adjustment system of driver's seat.

Engine Fuel system

Maintenance manual

Capacity of the oil tank-----	8.5L
Check the level of the oil-----	10h
Vent the water and the impurity from the oil tank-----	100h
Clean the oil tank-----	250h
Replace the filter core of the fuel-----	500h

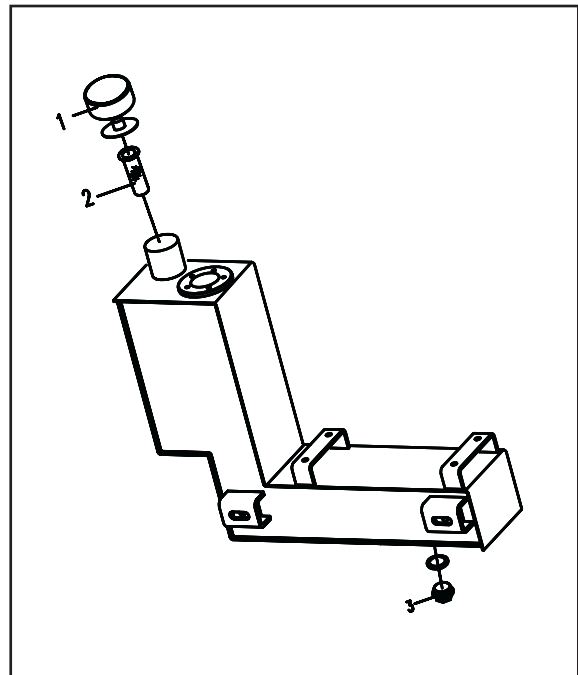
1.Check the level of the oil and immit

It can see the instruction sheet of the combination instruction sheet to Check the level of th oil.Do it everyday or every 10 hours. It should immit the oil tank after working to avoid have the hydrometeor.The gun stay front of the fuel-hydraulic oil tank

2.Vent the water and the impurity from the oil tank

Vent the hydrometeo and the impurity every 100 hours.

Loose the oil drain plug to make the hydrometeo and the impurity out.When the fuel out,please install the oil drain plug again.



3.Clean the oil tank

Clean it every 250hours

- 1)Vent the fuel to the container
- 2)Take-down the oil drain plug, take out the fliter.Top up half of the oil tank,and vent it again.
- 3)Clean the filter and replace.
- 4)Install the oil drain plug again.Through the fliter top up the fuel
- 5)Vent the air of the pipe laying

Caution:No use the trichlene to washing the inside of the oil tank,it only use the diesel oil

4. Air exhausting of fuel circuit

Draining the air before restarting the engine after you change the filter, cut off the fuel pipeline, clean the filter or bleed the air from fuel tank.

- 1) Turn the key to ON position about 10 to 15 seconds and fuel will be pumped by the electrical fuel pump.
- 2) Do not turn on the motor during fuel pumping, it may cause over-heating of the motor.

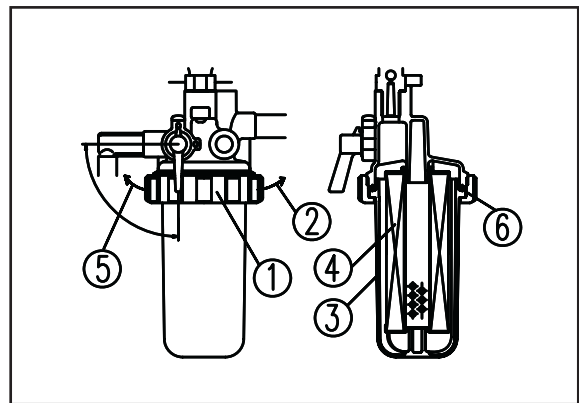


Warning: the fuel pressure may be harmful to human body and must wear gloves and protecting cloth when working.

5. Replace the fuel filter.

Please replace the filter element every 500 hours

- 1) Turn off the engine until it is cool down.
- 2) Turn off the fuel switch on the Separator.
- 3) Twist the fixing ring (①) to the right (⑤).
- 4) Disassemble the oil cup and clean the spilling oil.
- 5) pull down the filter element (④)
- 6) Change the filter element.
- 7) Clean the oil cup with clean fuel.
- 8) Check the O ring (⑥) and change if necessary.
- 9) Install the oil cup to the flange and screw the fixing ring (①) tightly to the right (②).
- 10) Turn of the fuel switch.
- 11) Pump oil to the fuel system. Please refer to the pumping of fuel system in page 32.
- 12) Check if there is leakage.



Caution: In order to decrease the possibility of fuel leakage, please make sure the installation of filter is not too tight.

Engine cooling system

Maintenance manual

Capacity of the radiator-----5.7L

Check the level of the coolant-----Everyday or 10h

Check the rubber soft pipe and the clip-----Everyday or 10h

Clean the vane of the radiator-----500h

Replace the coolant-----Spring and Autumn

Check the consistency of the coolant -----Everyday or 10h

1.Check the level of the coolant

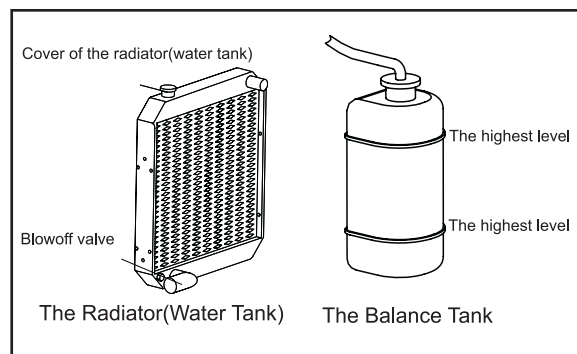
When a new machine has been started, you must check the level of the coolant first. And check the level of the coolant everyday or every 10hours.

Take out the cover of the radiator (water tank), check the level of the coolant.

The level of the coolant should under the sprue about 20mm

Observe the position of the level in the balance tank.

The level of the coolant should lie in between the highest and the lowest level when the engine cooling.



Warning:The hot coolant will spurt when open the cover of the radiator.

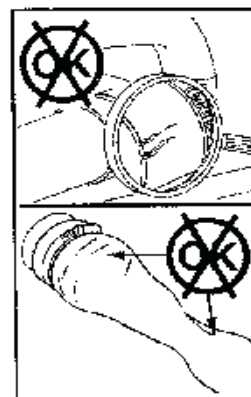
The way to open the cover:Open the cover little after the system cooled .Then wait it release the pressure.

2.Check the rubber soft pipe and the clip

Check it everyday or every 10hours.

It needs replace the soft pipe if it has the flaw or become hard because of the aging.

Check whether the clip locked,if it becomes less crowded or destroy ,it need replace it in time.



3.Clean and Check the vane of the radiator

Clean it every 500hours.

It need clean it in time.Because the dust of the radiator(water tank) will affect the effect of the cooling.

Open the cover,and use the high–pressure water or the compress air to blow the dust or the leaves and so on.Meantime,it need clean the cleading which front of the cooler.If the machine has the air–condition,it need clean the condenser.



Warning:It is dangerous when the compress air、 the high-pressure water、 the steam hit the body.It must use the glasses、 the veil and so on

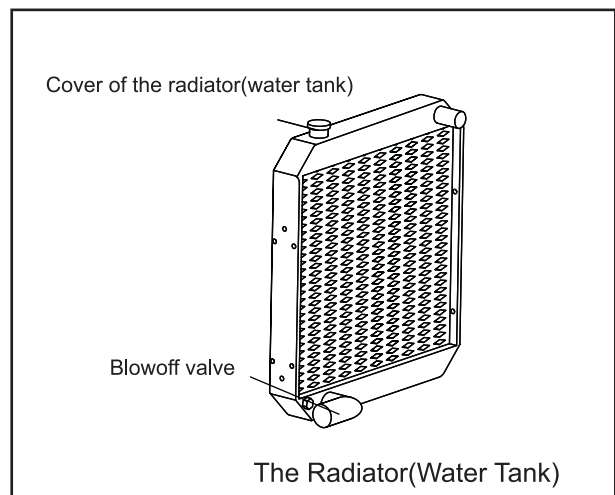
Caution:Avoid shatter the vane of the radiator,the distance should exceed 500mm between the nozzle of the high-pressure water or the compress air and the surface of the radiator(water tank).The vane of the radiator which destroyed lead leak water or overheat.It need Check the radiator everyday when the pace has much dust.

4.Replace the coolant

After work 50hours,the first time to replace it.Then it need replace it two times in one year, Spring and Autumn.

1)Take down the cover of the radiator(water tank),open the vent valve to make the coolant out.

2)Clean the cooling loop,close the vent valve. Immit the coolant,then start the engine to make the engine run about 10 minutes with the low–speed.Then stop the machine and blow off the coolant.



3)Close the vent valve again

4)Immit the coolant,let the engine run several minutes with the low-speed to make the coolant permeated the loop.

5)Check the level of the coolant and supply the coolant.



Warning:Don't open the cover of the radiator(water tank) with the hot engine except the temperature of the coolant under 50°C.

5.Check the consistency of the coolant

It need to Check the consistency of the coolant before the beginning of the cold weather.The coolant can use under 20°C.If the temperature of the condition lower,it should increase the proportion of the coolant.



Warning:The coolant is the toxicant.Avoid the children and the pet touch the coolant.If the coolant doesn't used,it need deal it as the rule.



Warning:It must use the coolant in any weather.

No use the water instead of the coolant.

The water from the river includes much autunite and other impurity.If it use this water,it will become the scale and adhesive to the radiator or the pipe of the cooling water.No use the drinking-water,too.

The coolant is easy to burn.No close the fire.

If the coolant into the eye,it should use the water to clean and to the hospital in time.

Lubricating System of the Engine

Maintenance instructions

Capacity of the radiator-----1.9L

Check the level of the oil-----Everyday or 10h

Replace the oil or replace the filter core-----Everyday 250 hour

1.Check the level of the oil

Check the level of the oil before start the new machine.

Then check it every 10 hours in the future.

1) Park the machine on a level and solid ground.

2) Take out the oil gauge (①in fig.1),and wiped by a clean fabric.

3) Insert the oil gauge completely.

4) Take out the oil gauge again and check the oil level. The level of the oil should lie in the value between the highest (H) and the lowest (L).

5) If necessary, you can refill the engine oil through oil filler until the oil level reach the regulated quantity.

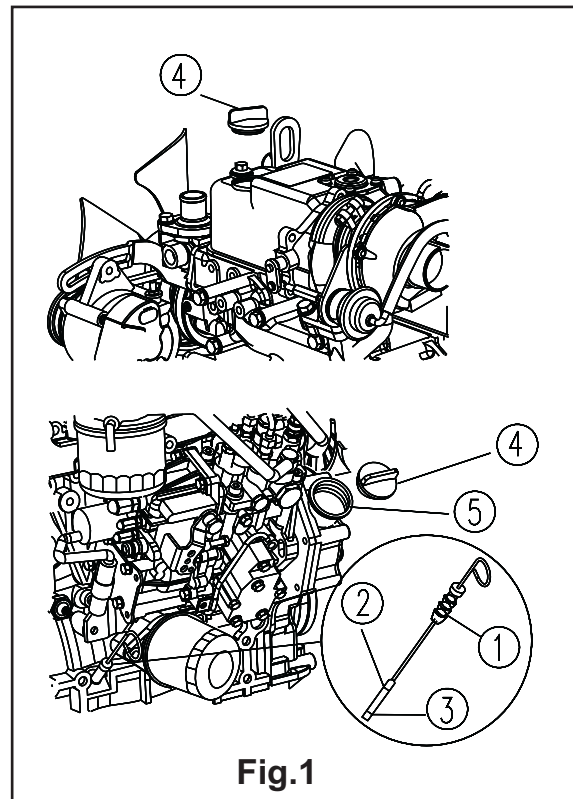


Fig.1



Warning:After stop the engine,the parts and the oil are the high-temperature.They will hurt the body.It need wait the temperature reduce when it start to maintenance.

2.Replace the engine oil

Replace the engine oil of the engine after start the new machine 50hours.Then replace it every 250 hours

1)Place the Excavator to the level road, and stop the engine, and remove the machine oil.

2)Take-down the vent bolt to make all the machine oil removed.

- 3)Stop the engine
- 4)Take out one of filter cover (②in fig. 2), open the exit of brace case to drain the engine oil more easier
- 5)Place a tray under the engine to collect the waste oil.
- 6)Take out the drain valve (①in fig. 2) to drain the oil.
- 7)Install the drain valve after the oil have drain completely.
- 8)Fill the oil from the oil filler (④in fig. 1) as the regulated quantity.
- 9)Check the oil level after 3 minutes.
- 10)Fill again if necessary.
- 11)Install the oil cover (④in fig. 1).

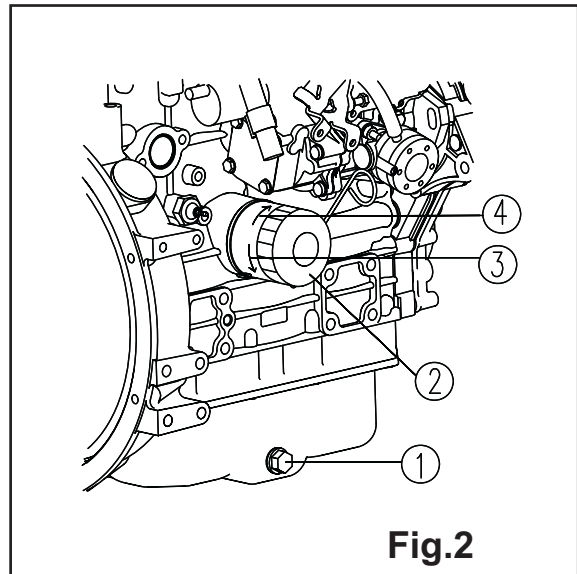


Fig.2



Warning: Avoid inhale the oil steam、eat or touch the engine oil long time

3.Replace the engine oil filer core

Clean the filter after first 50 working hours and clean or change it every 250 hours in the future.

Replace the engine oil filter

- 1)Use a spanner to turn the oil filter(②in fig.2) deasil (③in fig.2).
- 2)Clean the filter holder.
- 3)Place the washer on the new filter, and daub some oil on the face of washer, fixed the oil filter on the engine by spanner.
- 4)Fill the oil as regulations in last chapter (the oil filling operating procedure chapter).
- 5)Run the engine in a low idle speed about 5 minutes and check if there is oil leaking from the filter.
- 6)Stop the engine and wait for 10 minutes.
- 7)Chen the oil level again
- 8)Fill the engine oil (⑤in fig. 1) until the oil level arrived at the value between the highest (H) and the lowest (L) on the oil gauge (①in fig. 3)
- 9)Install the filter cover (④in fig.1), if there are oil flow out, please clean immediately.

Air intake system of Engine

Maintenance instructions

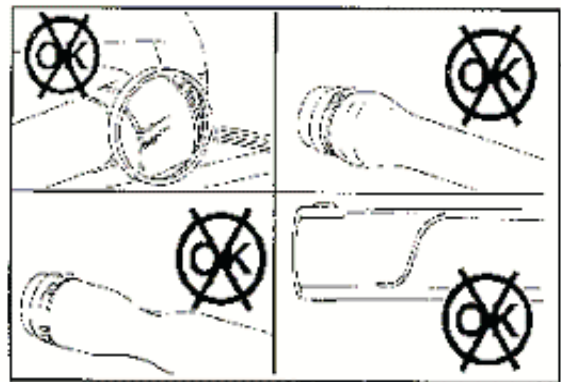
Replace period of the filter core-----Every 500h

1. Replace the air filter core

When the indicating lamp shines or every 500 hours, must replace the air filter cores.

2. Check the air intake pipe

Check whether it has the things which the intake pipe has the fray、the pipe destroy、the clip loose or the pipe break and so on



Replace the pipe and the clip if it necessary, to make sure the intake system not leak.

Other Maintenances of The Engine



Warning:No maintenance when the engine runs.If it must do the maintenance before the engine runs,it need have more than two persons to operate and operate as follow:

Must have one person sit on the operator's seat and prepare to stop the engine at any moment.And all the persons must keep in touch.

It maybe has the danger-winded when it near the fan、the belt of the fan and so on to operate.

No insert the tools or other things into the fan or the belt of the fan.Otherwise,the part rupture or fly out



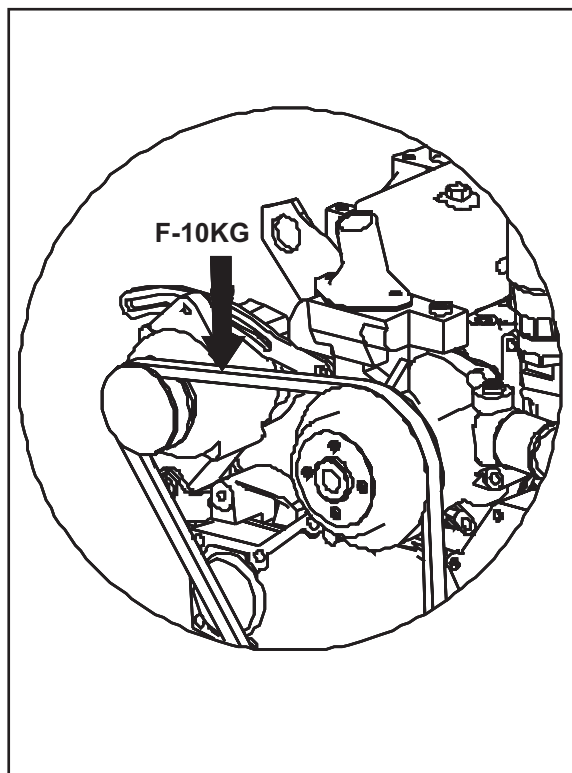
Warning:It has the audition problem with temporary oreverduring if the machine has the noise too big.It need wear theearplug when do the maintenance and in the noise long time.

●Check the belt of the fan'tension

After 50 hours do the first checking.Then ckeck it every 100hours.

It must use the right tension of the belt to assure the engine working and the belt's use life

About the right tension of the belt, between the belt wheel of the fan and belt wheel of the engine, it throw 110N to the belt by upright, the sinkage of the belt about 10mm or the deflexion of the belt wheel's center exceed the thickness



● Please see the attachment—《User Manual for The Diesel Engine》 for the maintenance period of the other element and the ways

Hydraulic System

Maintenance instructions

Capacity of the hydraulic oil tank-----8.5L
Check the oil level-----every 10h
Replace the filter-----every 500h
Replace the hydraulic oil----- every 3000-1000h
Check the system pressure ----- every 500h



Warning: It will cause serious hurt and death if the hydraulic oil rip into skin. Keep your hand and the body away from the pressure oil leaking area. Use the cardboard to check the leakage, if the skin was ripped into hydraulic oil, please send to hospital immediately.



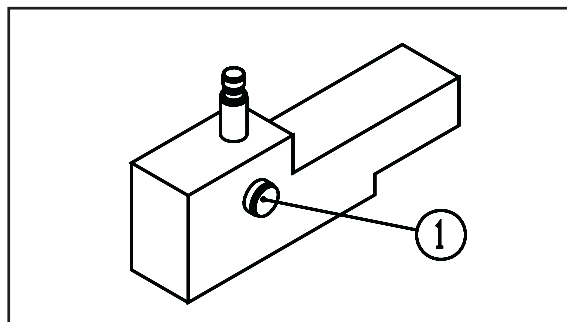
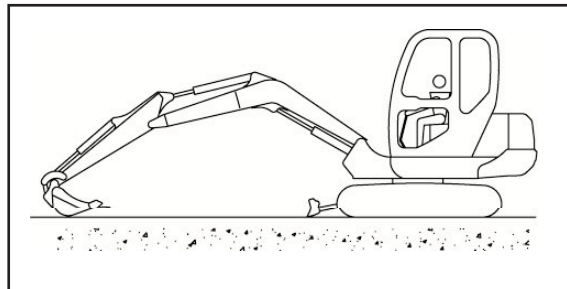
Warning: only do the maintenance when the hydraulic oil is cold. For avoiding the hydraulic oil spurt out, please turn slowly to release the inner pressure when remove the oil filler cover.

1. Check the oil level

Check it every 10 hours.

- 1) Park the machine on a level and solid ground.
- 2) Start the engine and operating each cylinder on work equipment.
- 3) Raise the boom and extend the arm and bucket cylinder, lower down the dozer blade (as the fig.)
- 4) Check the oil level through the oil scale.

Observe the level of the oil through the gauge of the hydraulic oil tank (see ①). The oil level should be seen clearly around the range of the oil scale, don't fill too much oil and make the oil level out of the range of the oil scale, it can damage the hydraulic circuit or oil spurt. If the oil is too full, please stop the engine and drain the oil from the drain plug after the hydraulic system is cold.

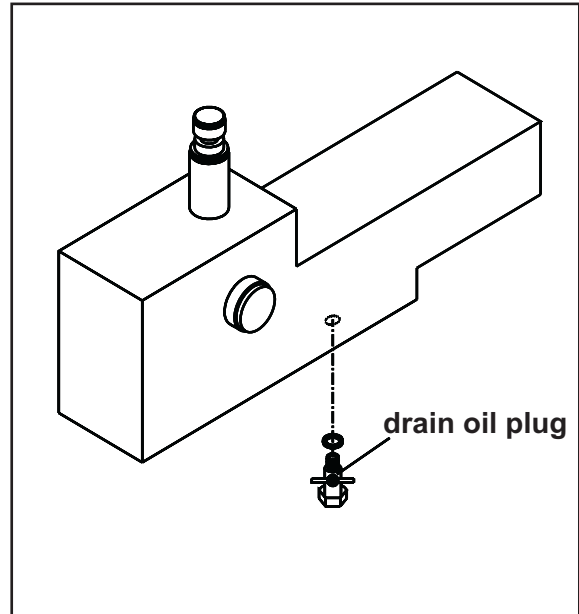


Caution: The level of the hydraulic oil will change when the temperature is changed. Before operating, the level lie the middle of the gauge, and when the temperature is going up, the level will reach to the top of the gauge.

2. Get rid of the water and the ordure dust in the oil tank

Get rid of the water and the ordure dust of the oil tank every 250 hours.

- 1) Drain the air of the oil tank after stop the machine and the oil temperature is down or before start working everyday.
- 2) Loose the drain valve which lie on the bottom of the oil tank or the drain bolt (see the picture)
- 3) Vent the water or the dust till the hydraulic oil is clean. Close the drain valve or screw up the bolt.
- 4) Refill the tank when the oil is inadequate.



3. Replace the hydraulic oil and clean the filter

Replace and clean them every 1000 hours.



Warning: 1) Avoid the scald, it vents the oil only after the hydraulic oil cool or before start the machine everyday.

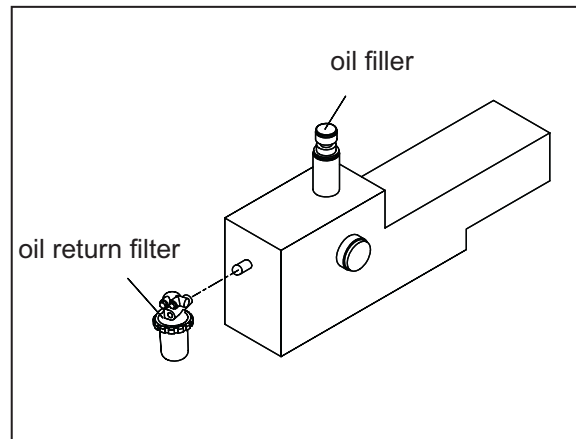
2) When Take-down the flange cover of the sprue, it need turn the cover slow and release the pressure to avoid the oil spurt out.

3) No allow the water, the dust, the soil into the oil tank when it replaces the oil.

Steps for replace the oil:

- 1) Park the Excavator to the level road
- 2) Loose the air filter of oil filter flange assembly on the oil tank, to lower the pressure in the tank.
- 3) Disassemble the cover under the air filter.

- 4). Loose the drain plug under the oil tank to drain the oil completely
- 5) Clean the inner of the tank.
- 7) Clean the draining bolt and fit it back.
- 8) Fill the new oil as regulation standard(see oil list), and the oil level should arrive the middle position of the oil scale.
- 9). Install the filling cover.



4. Drain the air from hydraulic system.

A. Take out the air from the pump.

- 1)Loosen the drain plug to drain the air, check if there is any oil flowing out.
- 2)Screw the bolt after drain the air.
- 3)Caution: Do not run the pump before fulfill the oil, it can cause damage to the pump.

B. Drain the air between the pump and hydraulic system.

- 1)Starting the engine and run in a medium low idling.
- 2)Operating the working equipments for 5 minutes to drain the air.

Caution: Run the engine before draining air will damage the pump.

C. Drain the air in cylinders.

- 1)Run the engine in low idling, extend and draw back the cylinder to a position which is 100mm from the end of piston about four to five times. (Do not reach to the end of the piston during operation)
- 2)Then operate every cylinder to extend the piston completely for 3 to 4 times.
- 3)Finally, operate every cylinder to extend the piston completely for 4 to 5 times in order to drain the air fully.

Caution: If running the engine in a high idling or operating the cylinder in a big stroke immediately after starting the machine, the piston seals will be broken and will damage the cylinder.

D.Drain the air in the slewing motor.

Caution: Do not slew the machine during draining.

- 1)Run the engine in a low idling and loosen the drain bolt. Check if the oil is flowing from the drain bolt.
- 2)If there is no oil flowing out, take out the drain bolt and refill the hydraulic oil to the motor shell.
- 3)Screw the bolt after draining was completed.
- 4) Run the machine in a low idling, slew the top of the machine slowly to the left and right for at least 2 times for drain the air completely.

Caution: If the air in the motor is not drained completely, the bearing of slewing motor will be damaged.

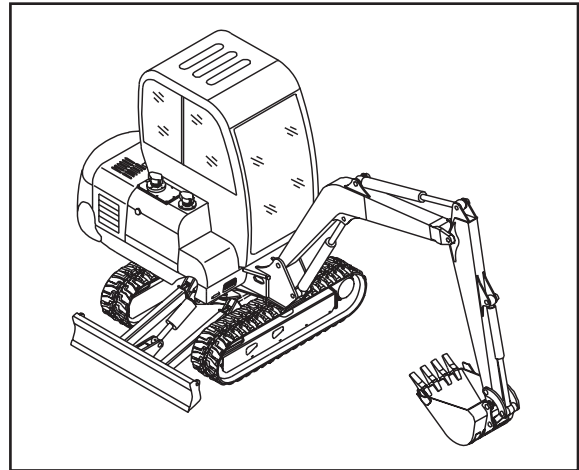
E.Drain the air in the driving motor

(when the oil leak from the driving motor)

- 1) Run the engine in low idling and loosen the drain bolt. If the oil is flowing out, screw tight the bolt.
- 2) Run the engine in low idling and rotate the working equipment in 90° to the side of the crawler.

- 3)Lift the machine with working

equipment to one side of the track to leave from the ground, and run this side of crawlers in the air for 2 minutes, change another side and do same operation, running the crawlers forward and backward equably.



F. Drain the air in the attachments.

If the machine has equipped with the attachment, please run the engine in low idling, and operate the pedal of the attachment (about 10 times), until the air is drained from the oil circuit.

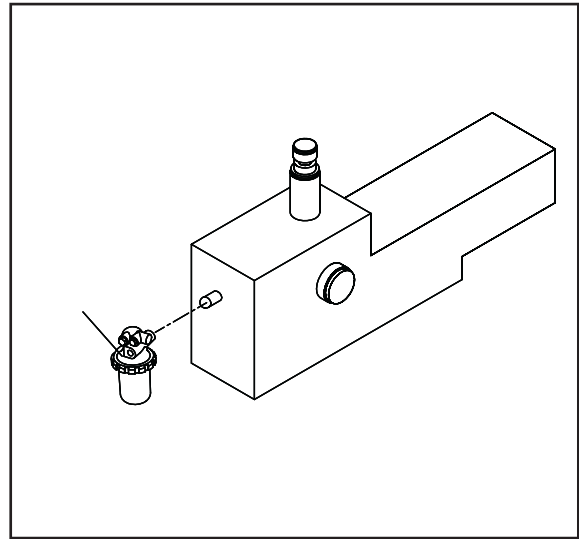
Caution:

- 1.Draining the air according to the instructions of manufacturer.**
- 2.Stop the engine after the draining is completed. Lay aside the machine for 5 minutes before operation in order to get rid of the air in the cylinder.**
- 3.Check and make sure there is no leakage, clean the leaking oil.**
- 4.Check the oil level after draining and refill if necessary.**

5. Change the oil intake filter core.

Change the filter which in the hydraulic oil tank every 500 hours.

- 1) Take down oil return filter.
- 2) Install the new filter



■ The replace period of the hydraulic oil and the filter core when the machine has equipped with the attachment (such as hammer etc.)

The pollution of hydraulic system will be serious when using the hydraulic hammer. The hydraulic oil and the filter core should be replaced frequently, in order to avoid the damage to the hydraulic pump and other hydraulic elements. Please find the following list: (Unit: Hour)

Working rate of the hydraulic hammer	Replace period of the hydraulic oil	Replace period of the filter core
50%	1000	300
100%	500	300

Caution: Adjust the pressure of the system according to the requirement of hammer when using it.

Reducer

Maintenance manual

Check the tighten torque for the connecting bolt of the reducer -----every 500h

1. Check the level of the lube for the driving reducer and put on steam



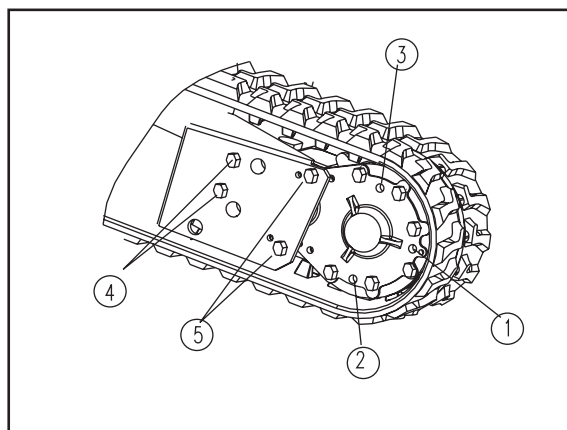
Warning: The oil of the reducer will heat when the machine drives. The driving reducer and the oil still in the high-temperature after stop the engine. It will make scald. It must wait the oil cool before start to check. Loose the vent bolt about 2 or 3 rounds, only can take-down the bolt after released the air pressure. It is dangerous to take-down the bolt too fast.

2. Check the tighten torque for the connecting bolt which is connecting the traveling reducer and slew reducer.

A. Check the tighten torque of the connecting bolt

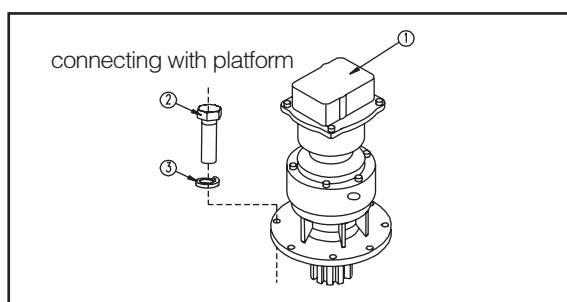
Check it after first 50 hours, then take the check every 400 hours in future.

The tighten torque of the bolt which connecting the reducer with chassis and driving wheel should be 110N.m (④,⑤ in fig.)



B. Check the tighten torque for the connecting bolt of slewing reducer

Check it after first 50 hours,

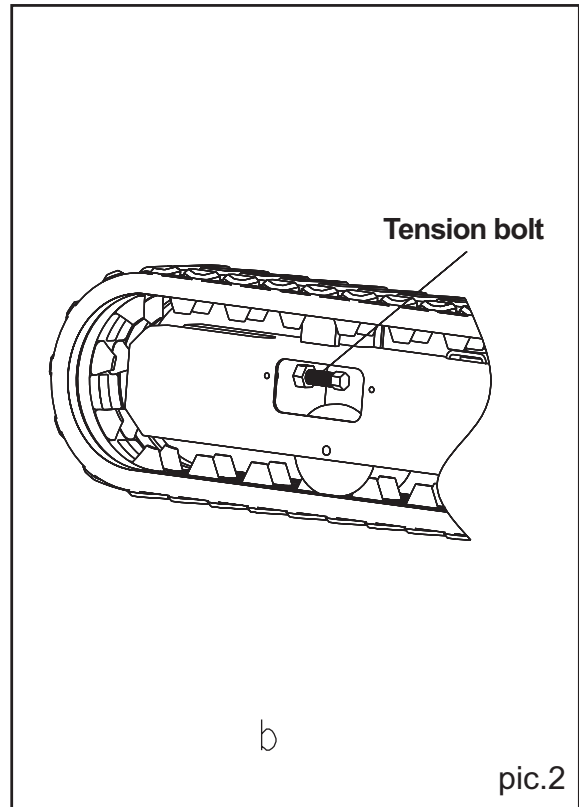
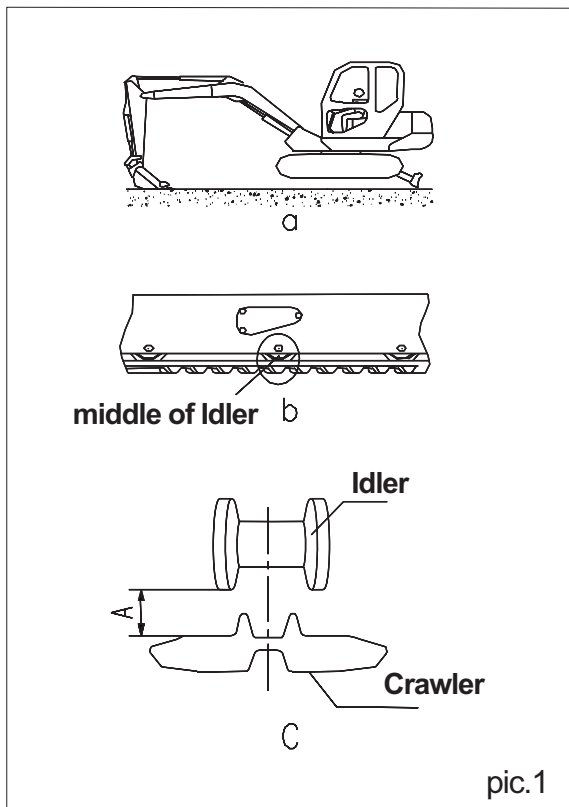


Crawler

Check and adjust the tension state of the crawler

Check every 10 hours

- 1) Place the excavator on the smooth and hard road.
- 2) Put the bulldozer back, and extend the piston of dozer cylinder until the crawler is uplift.
- 3) Put the bucket on the ground, operate the boom cylinder to lift the front part of machine.
- 4) Adjust the tension of the crawler correctly, make the flexibility between the middle part of the Idler and crawler (B in fig.) is 10–15mm.
- 5) To adjust the tension of crawler, please take down the side cover on the crawler and the tension bolt will show up, adjust the tension bolt until get suitable tension.



Warning: Don't knock the tension spring of the crawler. The spring will rupture when it bear the large pressure. And hurt the person. Don't take-down the spring when it in pull state.

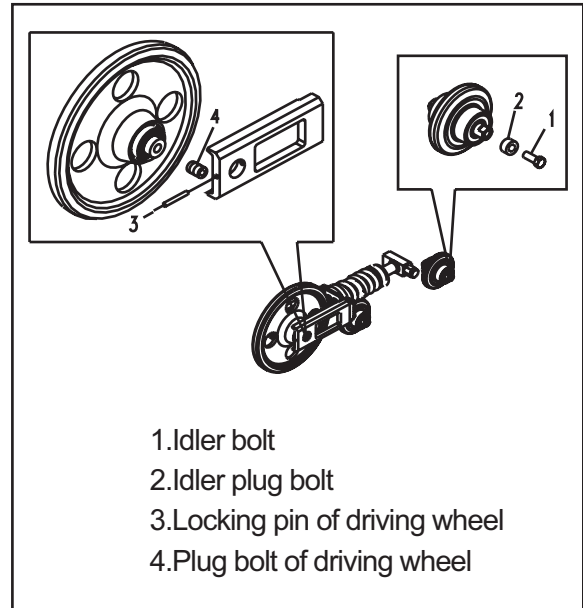
Idler, Upper roller and guide wheel

1. Check the tighten torque of the idler

Check after first 50 hours, and then check it every 400 hours in future.

The tighten torque of the bolt① should be 110Nm

If found any looses of the bolt, please take down and clean the thread locking additive, then wipe the new thread locking additive on it and screw up as the regulated torque.



If it is necessary to replace the bolt, please use the same specification of the bolt.

2. Check the engine oil level of the roller and driving wheel

Check it every 400 hours.

1) Idler: take down each bolt(① in fig) from the outside of each axel, then take down the plug bolt(② in fig) from the inner of the axel.

Driving wheel: Hit out the lock pin(③ in fig) from the axel

2) Take out plug bolt ④.

3) Immit the oil into the end of the axel.

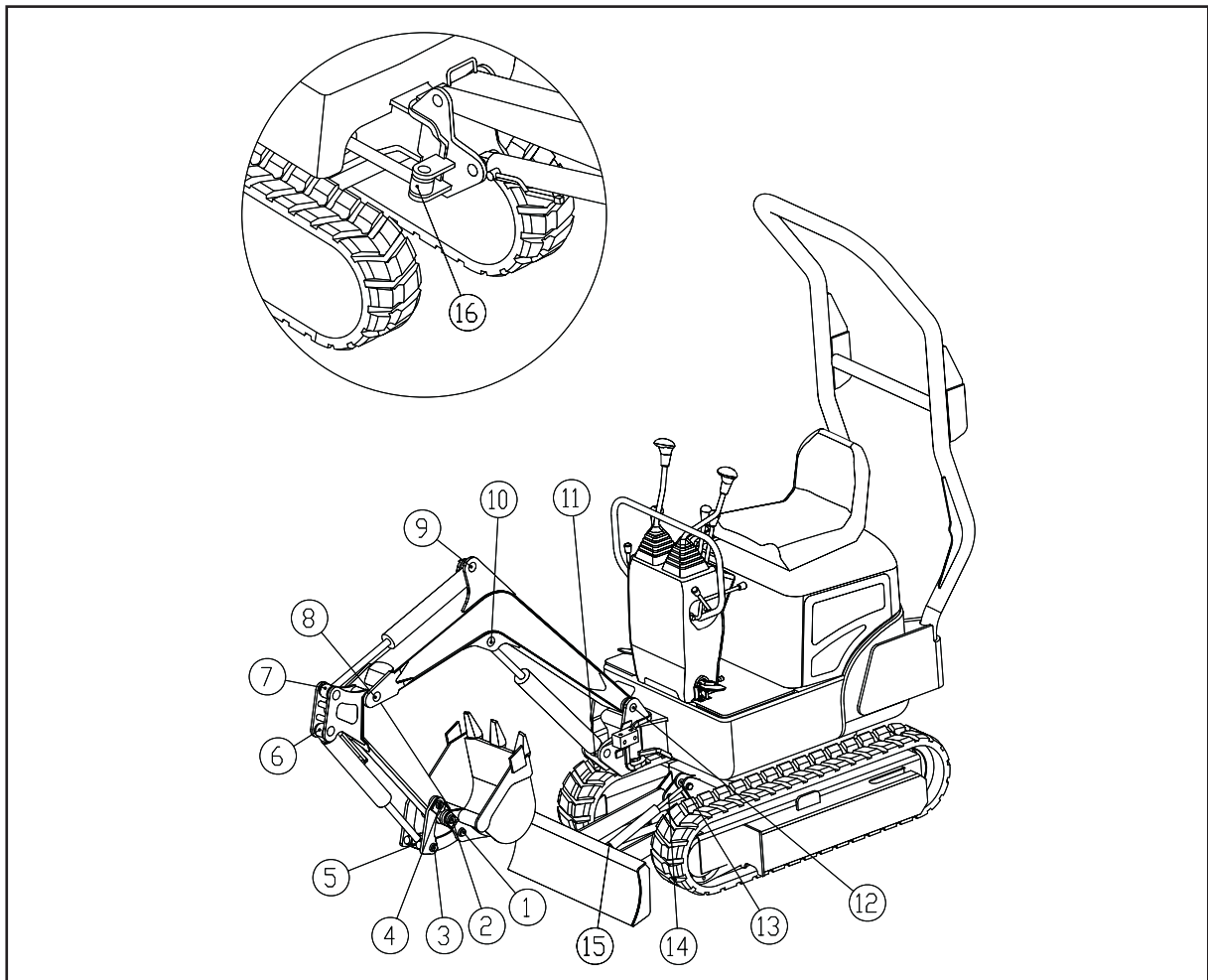
4) When the sprue has the oil out, screw up the bolt② and ④, install the bolt (tighten torque is 104Mma) or the pi.

Lubricate

Lubricate every 50 hours

The steps:

- 1) Starting the work equipment, and place the bucket on the ground
- 2) Put the bulldozer on the ground
- 3) Stop the engine
- 4) Clean the sprue of the oil cups
- 5) Lubricating the parts and wipe the superabundance



- | | |
|--|---|
| 1. connecting point of connecting-rod and bucket | 9. connecting point of boom and platform |
| 2. connecting point of arm and bucket | 10. lubricating point of the boom cylinder |
| 3. connecting point of rocker and connecting-rod | 11. lubricating point of the boom cylinder |
| 4. connecting point of rocker and arm | 12. connecting point of boom and platform |
| 5. lubricating point of the bucket cylinder | 13. lubricating point of the dozer cylinder |
| 6. lubricating point of the bucket cylinder | 14. connecting point of dozer blade and Chassis |
| 7. lubricating point of the arm cylinder | 15. lubricating point of the dozer cylinder |
| 8. lubricating point of the arm cylinder | 16. lubricating point of the swing cylinder |

Washing the Rubber pad

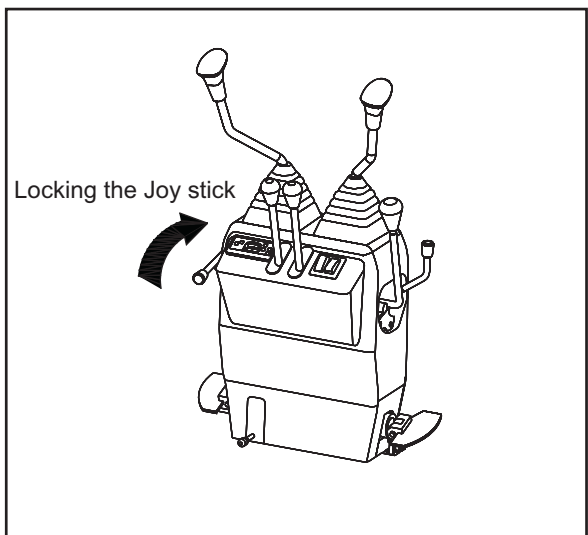
For avoid the floor slip or tumble cause the accident, please wash it at any moment when it is dirty.



Warning: The work equipment will moving suddenly and cause serious accident if the joy stick was touched without notice. So it must place the machine on the hard and smooth road before take down the rubber pad. Operator must uplift the locking handle for locking the joy stick before leave the operator' s seat,

The steps of washing the Rubber pad:

- 1)Take the rubber pad out from the cab
- 2)Use the brush to wipe the dunghill or washed by water.
- 3)Use the clean mop to clean the floor in side Cabin.
- 4)Put the rubber pad back into the cabin after it was dry.



6

Attachment Guide

Safety Item

It will affect the service life of the machine and bring some safety problems, if the machine have been installed some attachment which not authorized by Yuchai. If it need install the attachment, it must contact Yuchai.

If you don't contact us, we haven't to bear any duty about the accident or damage.

1.The attachment of safe operate

- The attachment has the strong assistant function. It need to use the attachment with right way to avoid hurt or damage.
- Read the attachment user manual. Don't use the attachment before you don't know the content of the manual. If the user manual has been lost, please let the manufacturer or the attachment sale company supply new one.
- It need install the necessary foreside mantle that according to the circs of the attachment.
- The libration noise cause the colleague difficult communicates the operation purpose. It need to seed a compere and fix on the signal before operating.
- Don't rotate the machine when the attachment has overload. It is very dangerous that doing this operation on the slop.
- The foreside of the operation device has overload and unstable when the machine has the hammer.For avoid dangerous overturn, don't operate the machine when the attachment turn to the side.
- The rotating area and the barycenter are different when the machine installs the attachment, the machine can move suddenness. It must realize the machine's instance.
- It need to set a warning line near the machine avoid the person enter before oprated. Don't operate the machine when it has the person near it.
- Avoid the wrong operating that lead the acident, don't put the foot on the footplate except operate the footplate.
- When the machine equip with attachment, if the direction of attachment back to the machine body, the attachment will interference with the machine body, so should be careful in handling of the attachment.

2.Take down or install the attachment

When take down or install the attachment, please do as the following step to ensure safe operation.

- Take down and install operation on the hard and smooth road.
- Fix on the signal when it has two persons do the operation or above. And abide the signal.
- It must use the chain block when upgrade or carry the heavy object(exceed 5kg)
- Need support e parts when take down the heavy parts. Caution the barycenter when use the chain block.
- It is dagerous to use the chain block for overload. It need have a plank to make sure the state safe.
- Make sure the steady state that can not overturn when place the attachment which take down or install.
- Don't walk under the chain block when it overload. It should stand even if down load but there is no danger safe place.

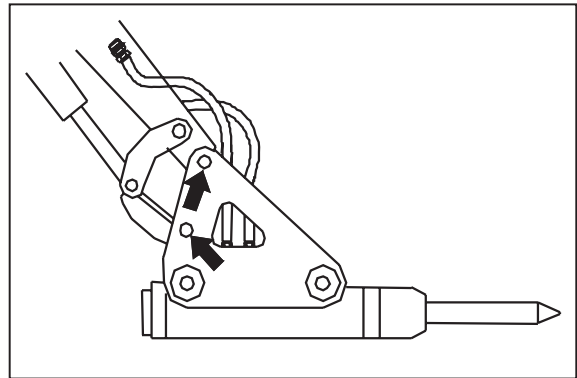


Warning: It needs the qualification certificate to operate the crane. No permit the person who no qulification certificate to operate the crane. About the details of take -down and installation, please contact Yuchai.

The steps of the attachment Installing & take down

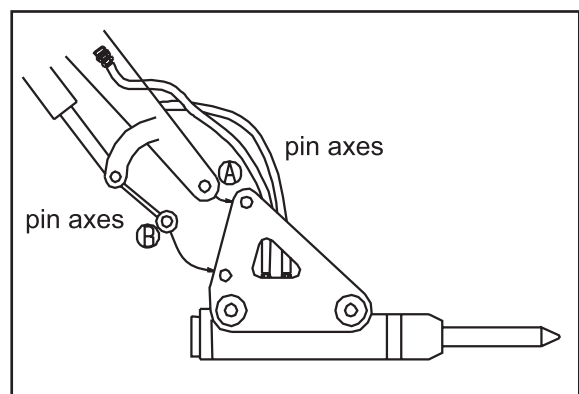
1.Steps for take-down

- 1)Put the attachment on the ground and stop the engine
- 2)Turn the start switch to “ON” and push the left control box to the free position
- 3)Turn the jot stick of the operation device to front、back、left、right and operate the attachment controlling footplate 2–3 times to release the pressure of the hydraulic pipe laying.
- 4)Lock the rotary valve which connect to the leading–in tube and outlet pipe of the lever'side after make sure the oil temperature down.
- 5)Take–down the soft pipe which in the side of the attachment, twist the combination gasket of the bulkhead cover to the leading–in tube and the outlet pipe.
- 6)Take down the attachment thought take–down the axes,then install the bucket.
- 7)Use the clean plastic bag to pack the end of the rubber pipe from the hydraulic hammer. Deposit the attachment



2.Steps for installing

- 1)Take down the bucket
- 2)Put the attachment to a smooth area,use the axes A and axes B connect the lever with the hydraulic and the connect lever with the hydraulic one by one
- 3)Take down the bolt from the leading–in tube and outlet pie after the oil temperature down.No let the dust、soil touch the tie–in of the soft pipe.If the combination gasket destroy,replace the new one.
- 4)Connect the soft pipe of the attachment side.Check the flux of the oil and no connect wrong when it connect
- 5)Unlock the rotary valve which connect to the leading–in tube and outlet pipe of the lever'side
- 6)After install the attachment,it need make sure the oil level of the hydraulic oil tank to the suitable position.



Operation Manual of the attachment

The parts introduce the caution when operate the digger which install the attachment.

Caution: Choose the attachment which is the best one of the main machine. The type of machine is different which can install the attachment. About the attachment and the type's choosing, please contact Yuchai.

Hydraulic crush hammer

1. User manual of the hydraulic crush hammer

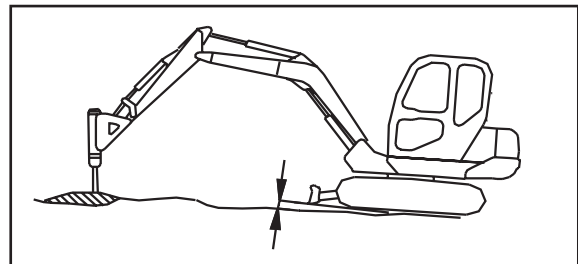
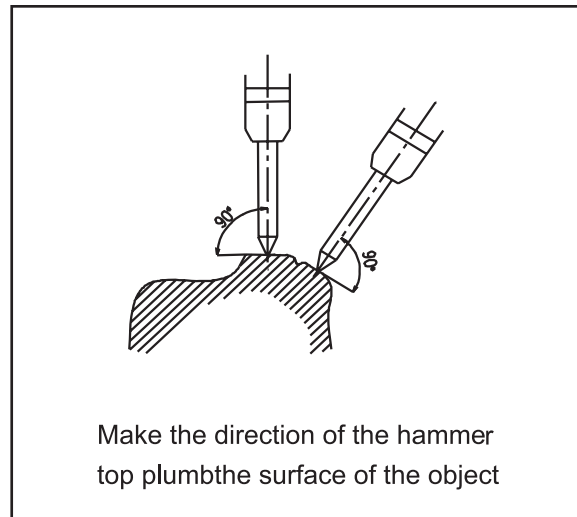
User manual of hydraulic breaking hammer Hydraulic breaching hammer is the familiar attachment. Widely used including demolition of buildings, surface rupture, tunnel operation, broken steel slag, stone and break in the quarry operation.

1) Make sure the direction of the hammer top plumb the surface of the object when the machine do the crush operation, and keep it at any moment. If it has the gradient with the surface of the object, the hammer maybe slips by itself. And will lead the hammer mangle and affect the piston. Please choose the best point to crush. And make sure the hammer steady then knock.

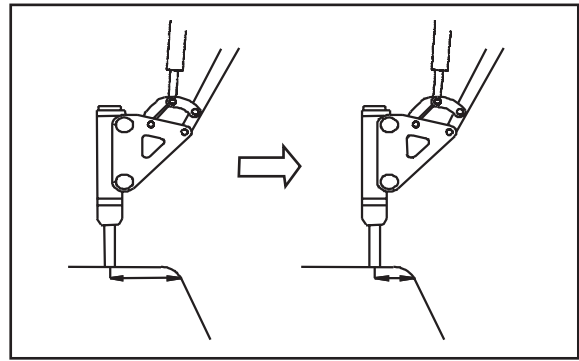
And make sure the hammer steady then knock.

Request to adjust the oil tank of the bucket to keep the penetrate direction of the hammer and the body of the hammer in on line.

2) Press the hammer to surface of the object, and make the underpan about 5cm from the ground. When inflict the wallop. No let the machine away the ground too much.

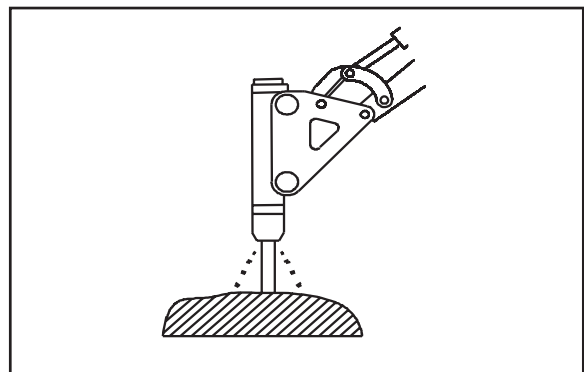


3)If the hammer doesn't penetrate or crush the surface within one minutes when inflict the wallop on one surface continuous,it need to change the impact part and near the edge of the object to crush.



4)Use the hammer to impact the surface suitable,avoid no resistance use the wallop

Stop use the crush hammer to impact when the rock or the object crushed.If not stop,it will lead the bolt of the main body loose and mangle.

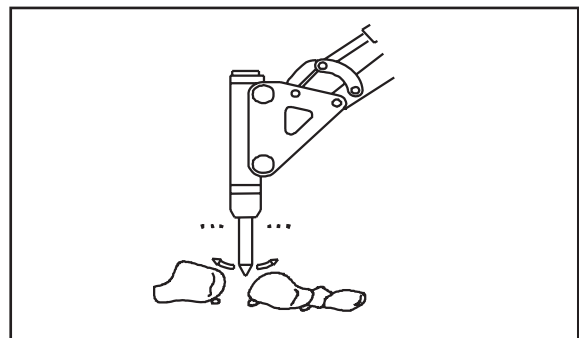


2.Operate tabu of the hydraulic crush hammer

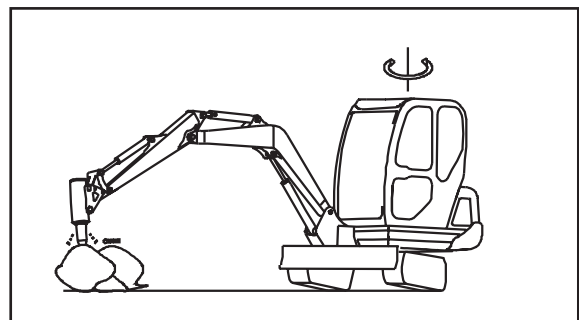
For the machine has long use life and the safety operation,no operate as follow:

Caution:No operate the oil tank to the end of the driving it should keep the rest about 5cm

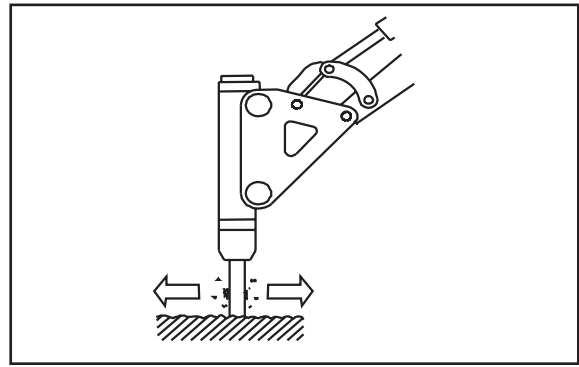
1)Push the heavy thing or the big block use the crush hammer



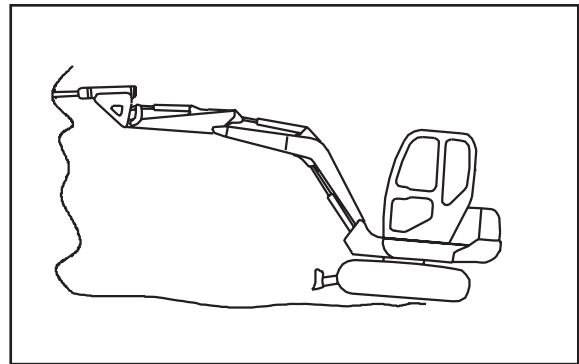
2)Use the rotating operation



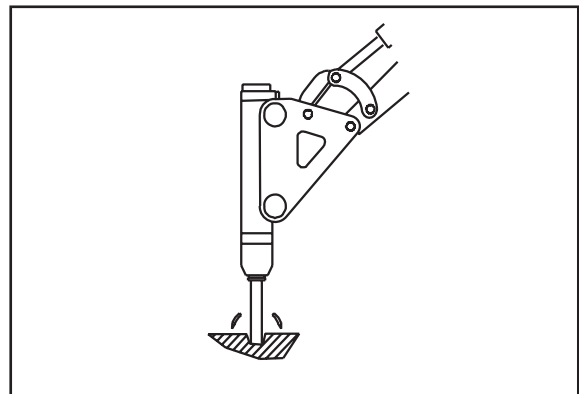
3) Move the hammer when do the impact operation



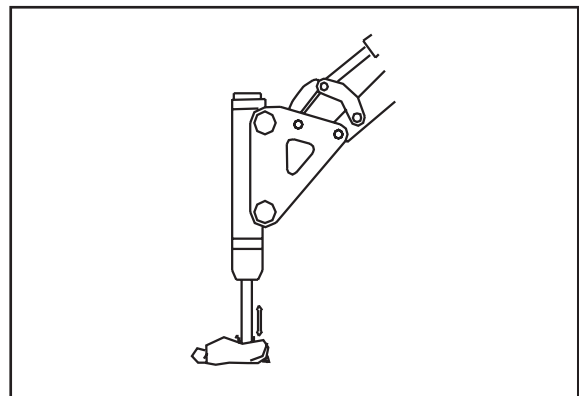
4) Inflict the wallop on the level ground or upwards



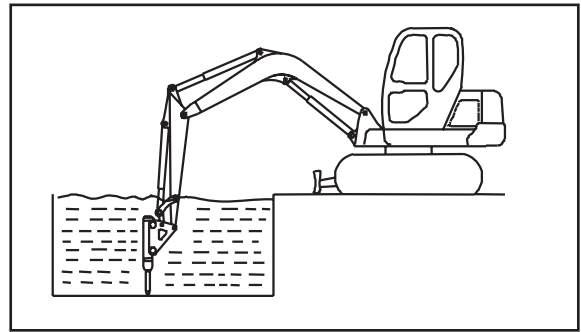
5) Waver the crush hammer when it penetrate the rock



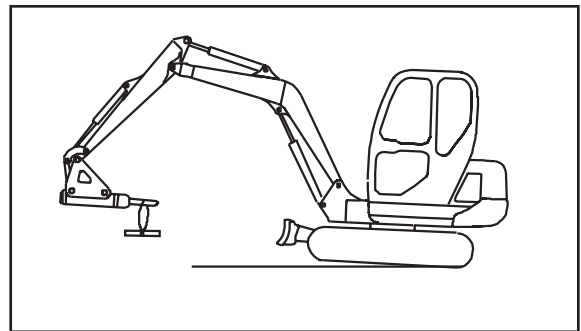
6) Peck operation



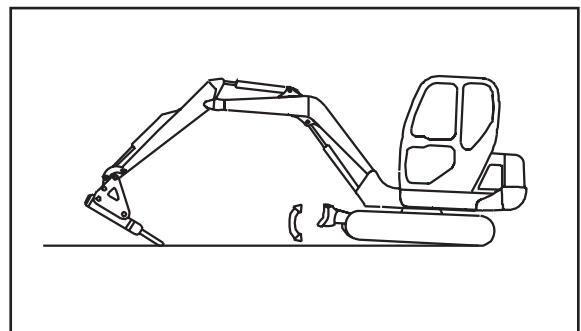
7) Operate it in the water or the muddy ground



8) Use the crush hammer hang the heavy thing



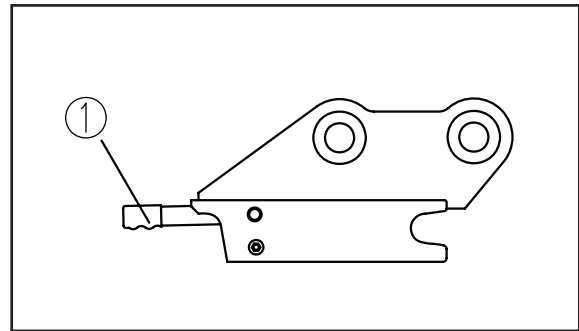
9) Throw out the oil tank of the bucket to make the machine leave the ground



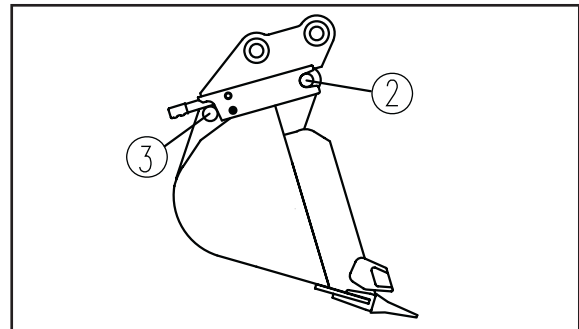
Fast-replace tie-in

1.Install the bucket

1)Use the tommy bar to prize ①



2)Put the axes of the bucket into the ②
③,down the tommy bar and the bucket
installed.



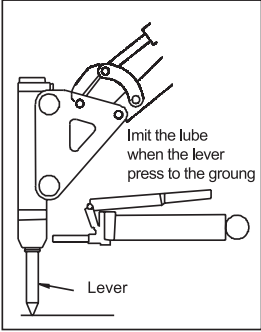
2.Take-down the bucket

1)Use the tommy bar to prize ①

2)Take down the bucket.

Daily Check of Hydraulic Crush Hammer

Do the daily check and the maintenance as the following list:

No.	Check or maintain item	Check point	Resolve
1	Check whether the bolt/nut loose or lose	Bolt of the main machine and the side of the bolt	Screw down the bolt or install the new bolt again
2	Check whether the parts of the soft pipe loose and the soft pipe break or leaks oil	Hydraulic pipeline of the crush hammer High-pressure vitta Use the lube to lubricate	Screw down the part which loose Replace the broken part
3	Lubricate 	before the operation and after operate 2-3hours Immit the lube 5-10times when lubricate.	Immit the lube thought the sprue which in the foreside of the crush hammer.
4	Check the capacity of the hydraulic oil and the pollution circs	The circs of the hydraulic	The change circs of the hydraulic oil is different as the different condition. The simple way to judge the oil is observe whether the color changes If the oil wroste,please vent the oil and clean the oil tank,Immit the new oil