



HYDRAULIC EXCAVATOR

YC18SR

OPERATION AND MAINTENANCE MANUAL

GUANGXI YUCHAI HEAVY INDUSTRY CO.,LTD.

SJ008/816(E)-2009

GUANGXI YUCHAI HEAVY INDUSTRY CO.,LTD.

Manufacturing Base: 168 Tianqiao Road, Yulin, Guangxi, 537005 P.R. China

Tel: 0086-775-3283502 3283505 3283507 3283510

Fax: 0086-775-3289578

Web-site: www.yuchai-excavator.com

E-mail: export@yuchai-excavator.com

YUCHAI MACHINERY

EC DECLARATION OF CONFORMITY

THIS IS HEREBY DECLARED THAT FOLLOWING DESIGNATED PRODUCT COMPLIED WITH THE ESSENTIAL HEALTH AND SAFETY REQUIREMENTS OF MACHINE DIRECTIVE 2006/42/EC ON THE APPROXIMATION OF THE LAWS OF THE MEMBER STATES RELATING TO IT.

MANUFACTURER

GUANGXI YUCHAI HEAVY INDUSTRY COMPANY LIMITED
YUCHAI ENGINEERING INDUSTRY CENTER, LUCHUAN, YULIN, CHINA

AUTHORIZED REPRESENTATIVE

LI JIANGFAN, AM STAUWEIHER 5 51688 WIPPERFEURTH, GERMANY
AUTHORIZED TO HOLD TECHNICAL FILE ON BEHALF OF MANUFACTURER ABOVE

DESCRIPTION OF MACHINERY

PRODUCT NAME: HYDRAULIC EXCAVATOR
MODEL TYPE: YC08-8, YC15-8, YC18-8, YC25-8, YC35-8, YC45-8, YC55-8, YC85-8, YC135-8,
YC230LC-8, YC18SR, YC25SR, YC35SR, YC55SR, YC75SR

APPLICABLE STANDARDS

EN 474-1:2006+A1:2009
EN 474-5: 2006
EN ISO 14121-1: 2007

THIS DECLARATION APPLIES TO ALL SPECIMENS MANUFACTURED IDENTICAL TO THE MODEL SUBMITTED FOR TESTING / EVALUATION. ASSESSMENT OF COMPLIANCE OF THE PRODUCT WITH THE REQUIREMENTS RELATING TO SAFETY STANDARDS LISTED ABOVE WAS PERFORMED BY MANUFACTURER.

SIGNED ON BEHALF OF GUANGXI YUCHAI HEAVY INDUSTRY COMPANY LIMITED



SIGNATURE _____

TITLE _____

VICE CHIEF ENGINEER

PLACE _____

YULIN

DATE _____

2010-1-15



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Material safety list

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.

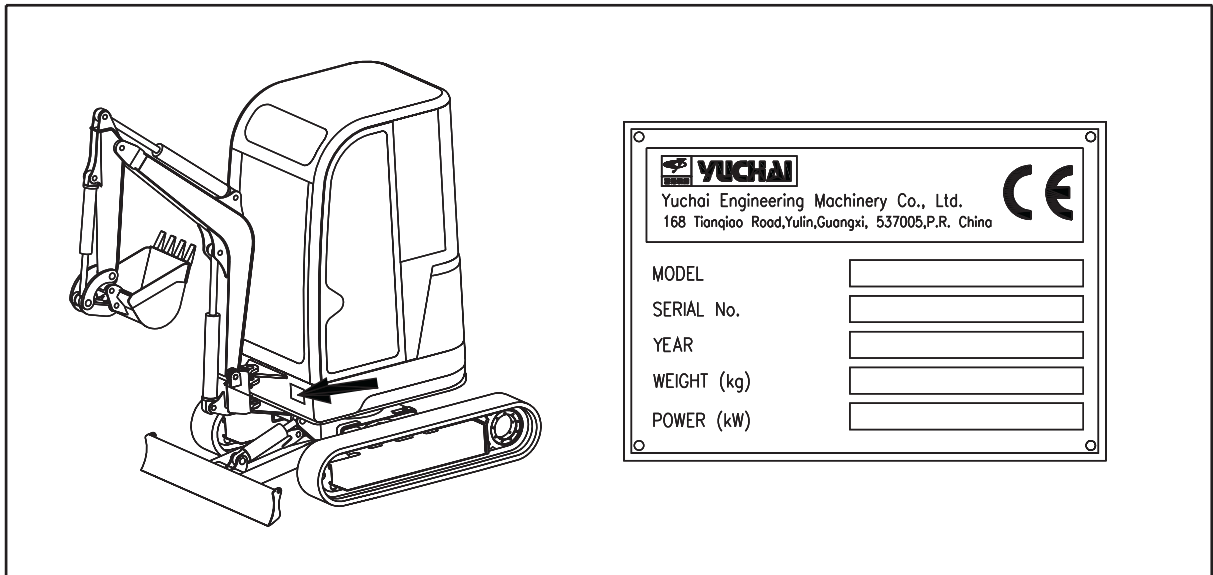
According to the principle of "The customer is god", we will keep improving the machine for supplying the product to the user as best as we can. The improvement will be take in any minute, we will not responsible for sending the new manuals for the selling products and giving the notice in advance. Hope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

Guangxi Yuchai Heavy Industry Co.,Ltd

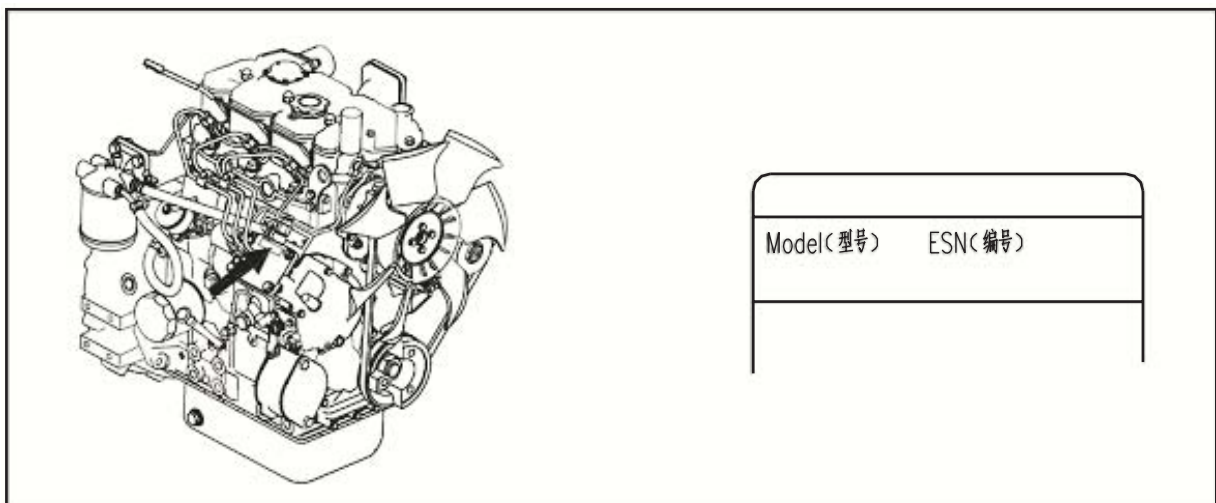
Product Information

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

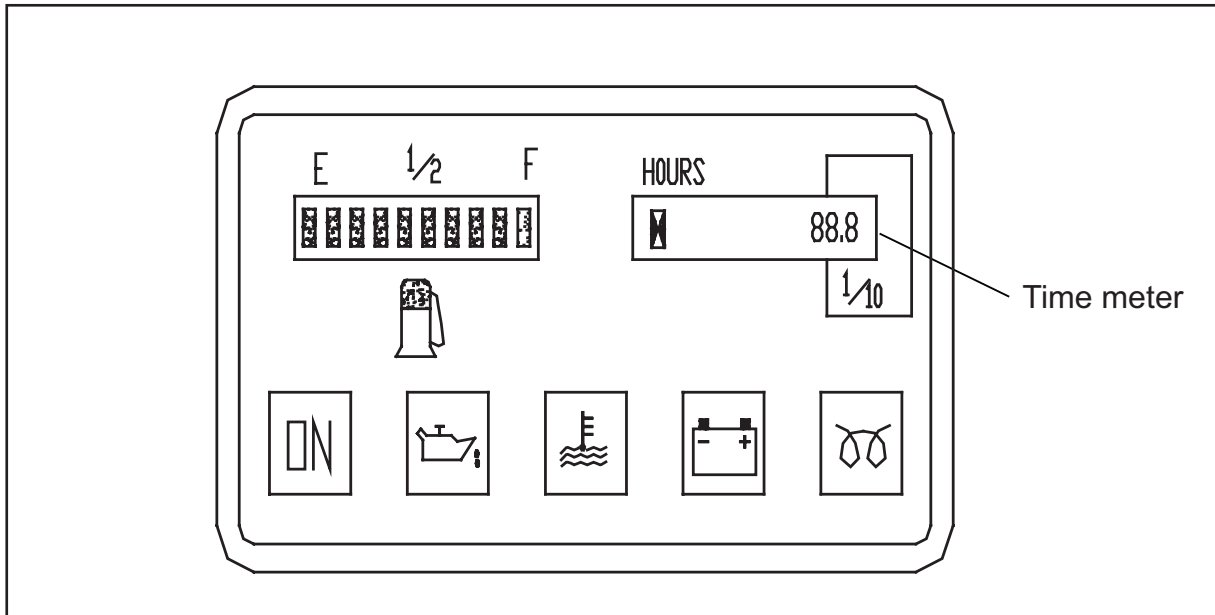
● **Machine Information**(The nameplate is on the left-front side of the platform)



● **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 record

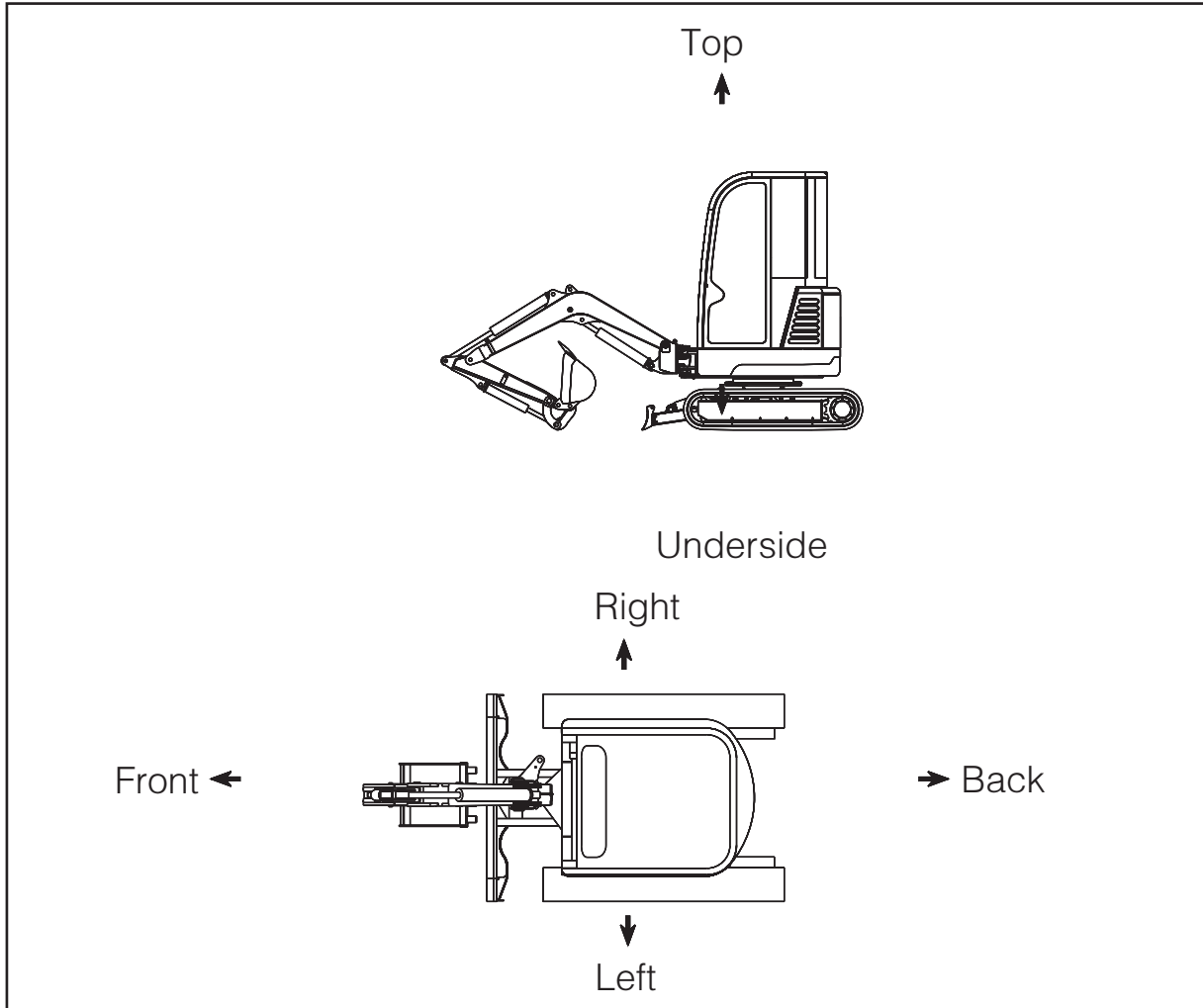
Please fill the machine series No. and engine series No. in the following table. If you need to buy the spare parts or related information, please advice YUCHAI these series numbers.

Please keep this paper together with the production certificate in a safe place, you can supply this information for your local police station if the machine is stolen.

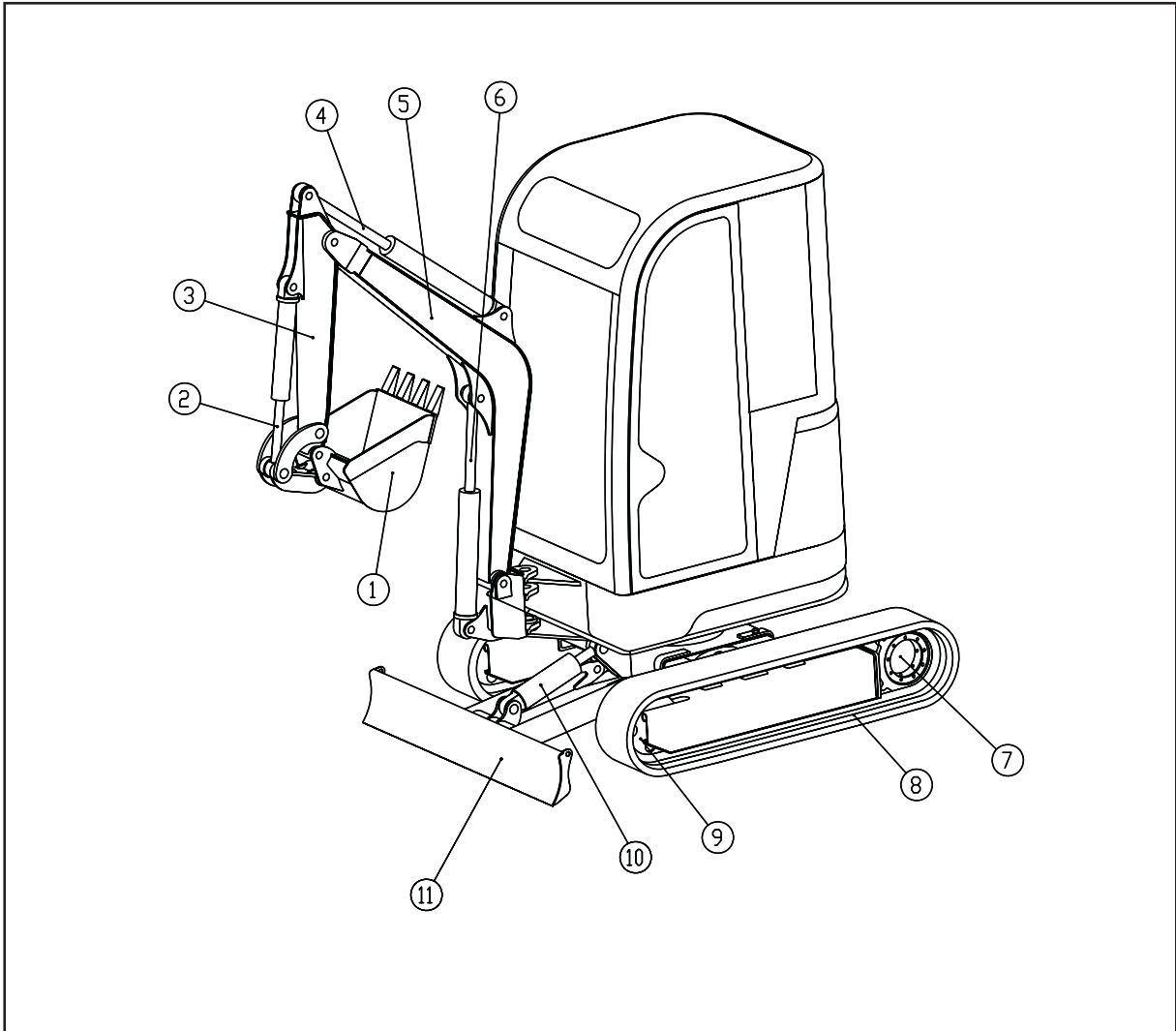
	<ul style="list-style-type: none"> ● Model: _____ ● Machine No: _____ ● Engine No: _____ ● Dealer Information: _____ _____ _____ _____
--	---

Machine Direction

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



Machine configuration



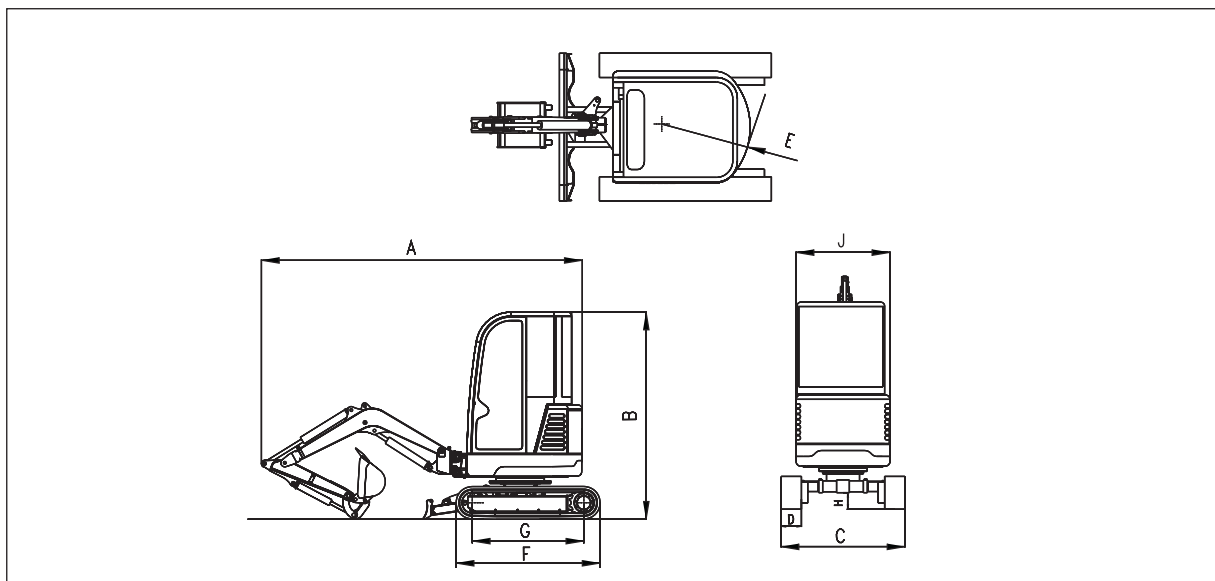
- | | | | |
|----------------------|--------------------|-------------------|-----------------|
| 1. Bucket | 2. Bucket cylinder | 3. Arm | 4. Arm cylinder |
| 5. Boom | 6. Boom cylinder | 7. Dozer cylinder | |
| 8. Driving wheel | 9. Crawler | 10. Front Idler | |
| 11. Bull dozer plate | | | |

Technical Data

1.Dimension parameter(YC18SR)

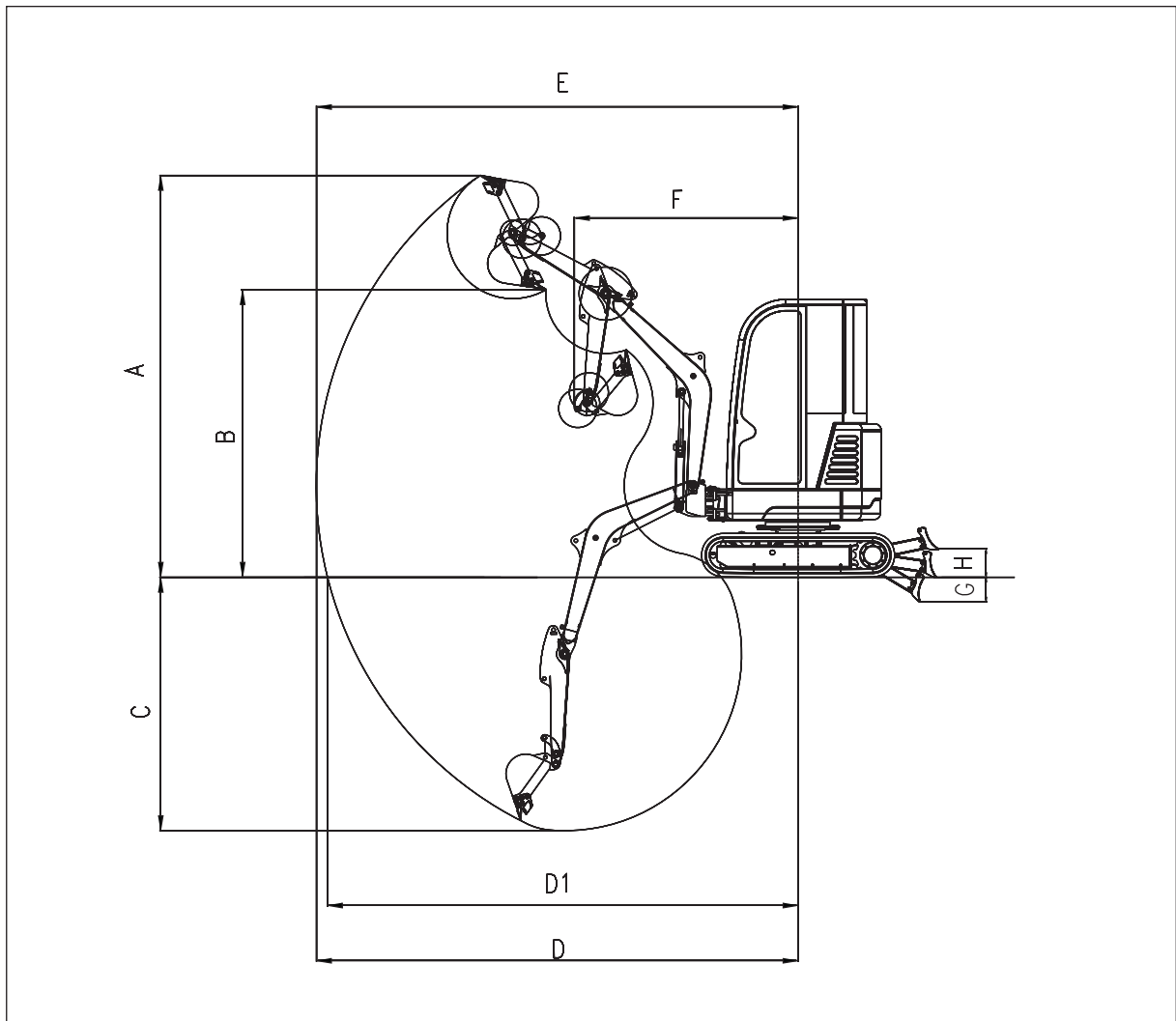
Code	Item	Units	YC18SR
	Operating Weight	Kg	1850
	Standard bucket capacity	m ³	0.05
	Name of engine		PERKINS 403D-11
	Power of engine	KW/rpm	14.2/2200
A	Machine length	mm	3835
B	Machine height	mm	2350
C	Overall width	mm	1060
D	Crawler width	mm	230
E	Platform slewing radius	mm	700
F	Crawler length	mm	1628
G	Wheel-base	mm	1261
H	Min ground clearance	mm	190
J	Width of platform	mm	1060
L	Height from floor to platform	mm	488
	Width of bucket	mm	638
	Walking speed(low/high)	Km/h	1.7/3
	Platform slewing speed	rpm	11
	Cab	○	●

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



2.Operating parameters

Code	Item	Unit	YC18SR
A	Max. digging height	mm	3360
B	Max. Dumping height	mm	2330
C	Max. digging depth	mm	2105
D	Max. digging radius	mm	4050
D1	Max. horizontal digging length	mm	3960
E	Max. digging height radius	mm	2948
F	Min. slewing radius	mm	1885
G	Max. depth of Bulldozer	mm	110
H	Max. height of Bulldozer	mm	180
	Max. digging force	kN	13



Note: Technical parameters are subject to change without prior notice!

3. Bucket

SN.	Capacity(m ³)	Bucket Width(mm)	Bucket Weight(kg)	Bucket teeth .
1	0.08			

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	3		30°
Low speed	1.7	14.6	

5. Hydraulic system

Advance throttle hydraulic system

Main valve: Imported multiple valve

Pressure (mpa): 20 MPa

Oil return filter: 10 um

Oil intake filter: 150 u

6. Electric system

Voltage: 12V

Battery: 60AH

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.

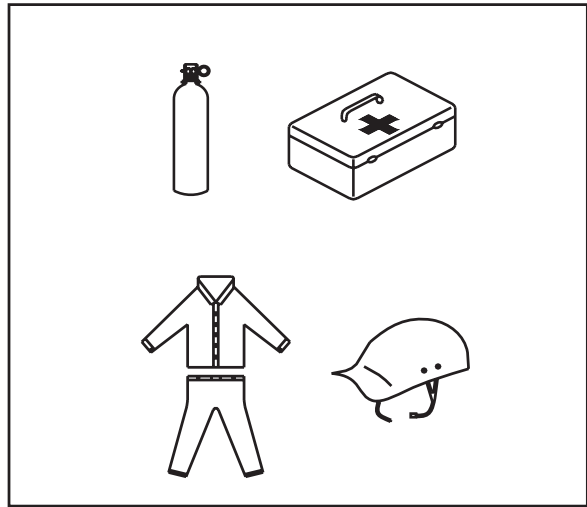


Notice: It indicates that it may lead to lower and medium hurts if he potential danger happens. And it can also give the advice of risky operation.

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.

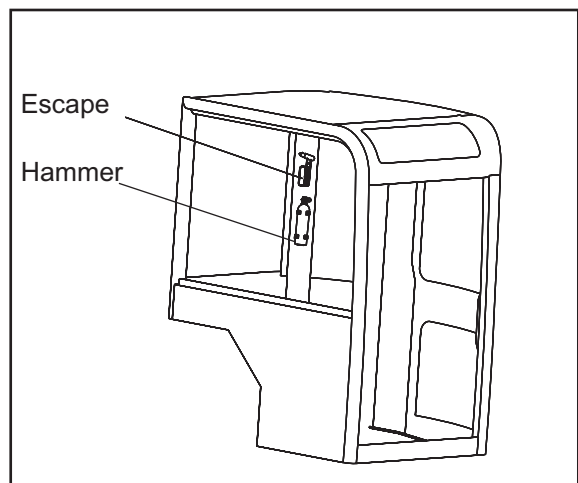
3) Users should arrange the first aid medicines in the machine, check them periodically, and arrange more medicines if necessary.

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

2. Escape Hammer and Fire Extinguisher

Escape hammer and fire extinguisher shall be installed in the driver's Cabs.

It is required to hit the glass with hammerhead if the driver is trapped in cabs, under this condition, the driver shall notice to protect the eyes and face.



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

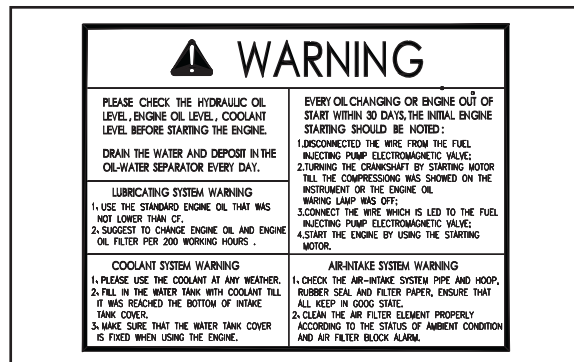
A. Safety Signs with Picture

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



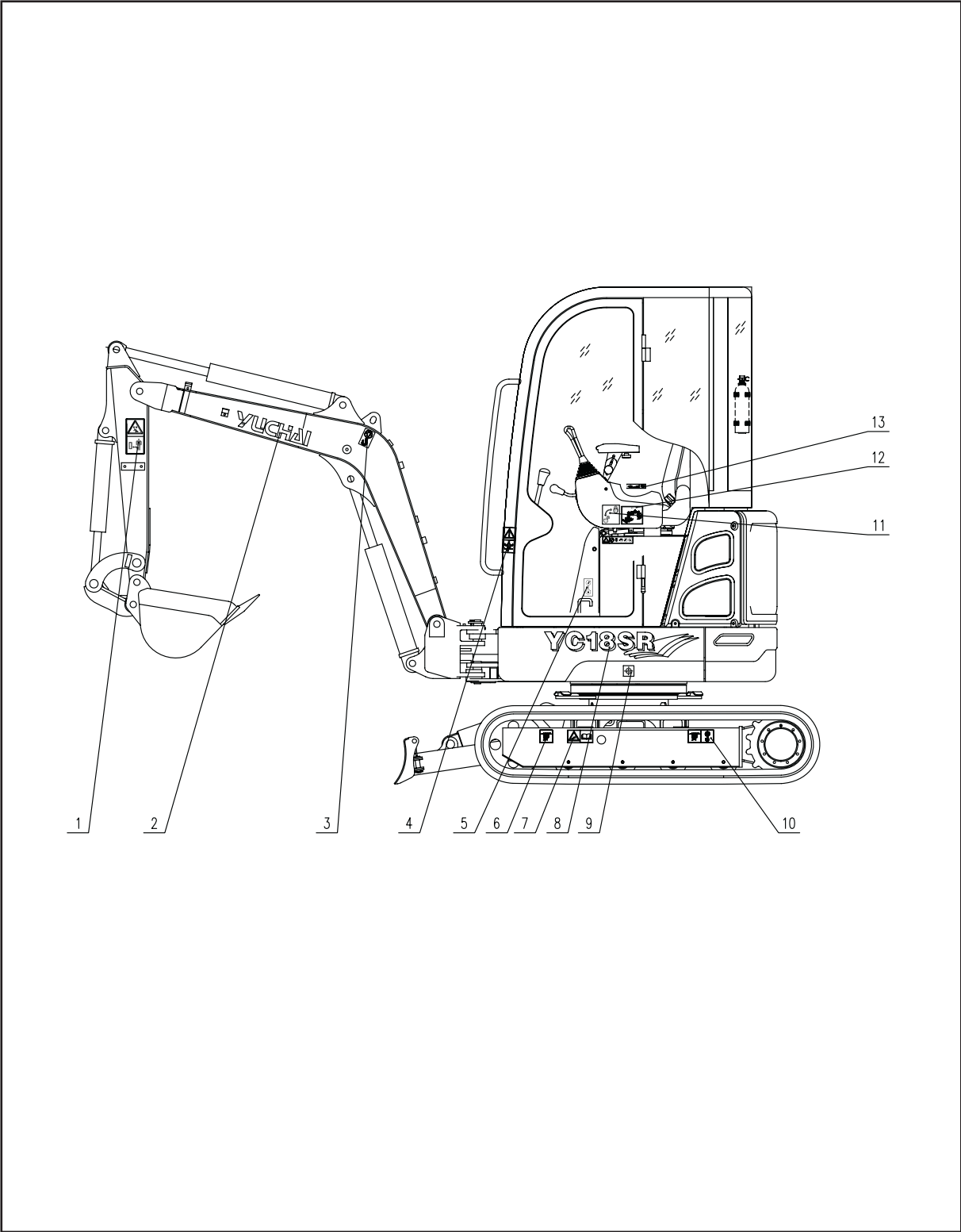
B. Safety Signs with Character

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 The position of the warning plates

1) Make sure do not run over people
The moving machine will hurt people.
Please keep safe distance from the machine



2) Precaution to lock the front windows when open it.

The unlock windows may suddenly fall down and hurt the people by machine shaking or other strength from outside.

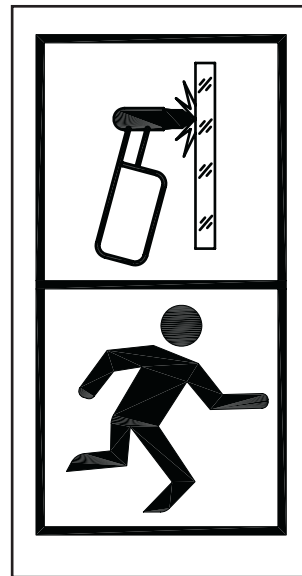


3) Please pay attention when up and down.

Please use the step and plates of the crawler,hold the bar and slowly get in the machine.




4) The notice of Escape hammer when in emergency.



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



6) Waning plates.

 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>LUBRICATING SYSTEM WARNING</p> <p>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> <p>COOLANT SYSTEM WARNING</p> <p>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.</p>	<p>EVERY OIL CHANGING OR ENGINE OIL OUT OF START WITHIN 30 DAYS, THE INITIAL ENGINE STARTING SHOULD BE NOTED:</p> <p>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> <p>AIR-INTAKE SYSTEM WARNING</p> <p>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>

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



8)Warning plates.



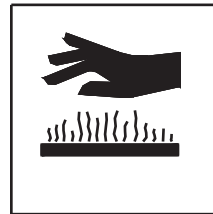
9)Please stop the engine when adjust the inner assembly of the machine.



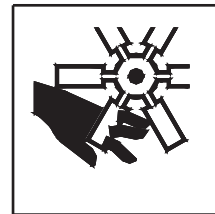
10)It's forbidden to start the engine by shorting alalternator.



11)Precaution the engine,radiators,muffler and some other hot or pressurized components.



12)Hand,arm,skin and clothes may be damaged by fan blades or fan belt so never touch them if they are moving.



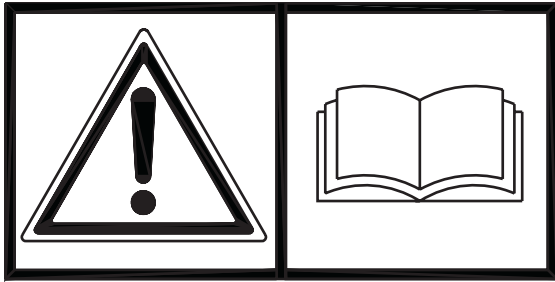
13)It's forbidden to disassemble,drill and cut off the accumulator and air-spring. Those equipments are containing the hight-pressure air.

The wrong operation will cause human hurt.

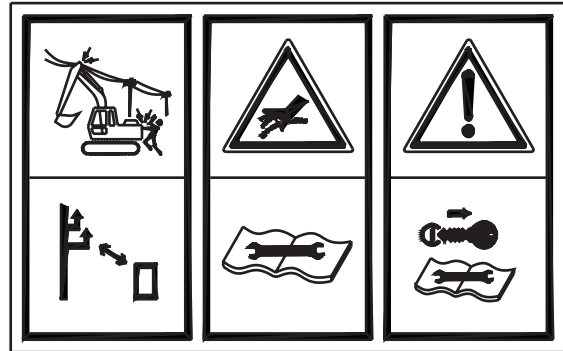
Please ask the professional people to deal with such problem.



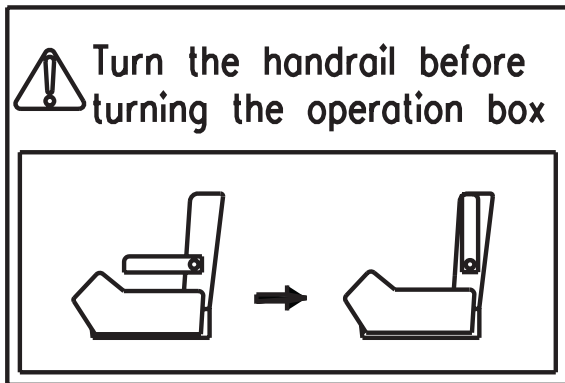
14) Please check the Operation Manual and file before maintenance.



17) The warning plates for Electric shock.



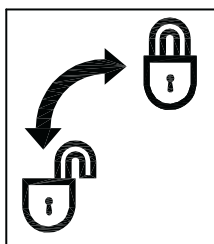
15) Warning plates on left box.



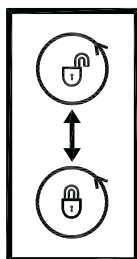
18) The system warning plates.

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 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. 	

16) Lock-plates.



operation box lock-in

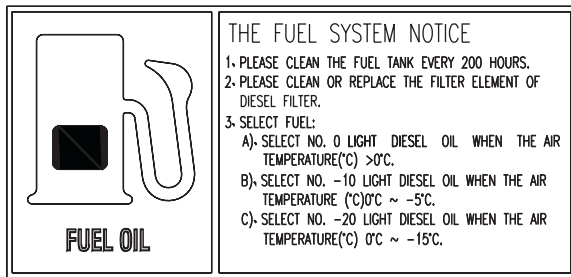


platform lock-in

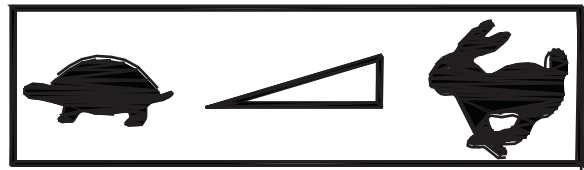
19) Sign of transfuse the hydraulic oil.

<p>HYDRAULIC OIL</p>	<p style="text-align: center;">NOTICE</p> <ol style="list-style-type: none"> 1. PLEASE REPLACE THE HYDRAULIC OIL AND CLEAN THE FILTER EVERY 800 HOURS. 2. PLEASE REPLACE THE FILTER ELEMENT FOR OIL RETURN EVERY 400 HOURS. 3. PLEASE SELECT L-HM68 TYPE HYDRAULIC OIL.
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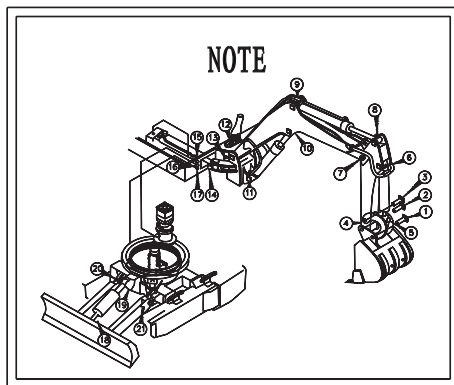
20) Sign of transfuse the fuel oil.



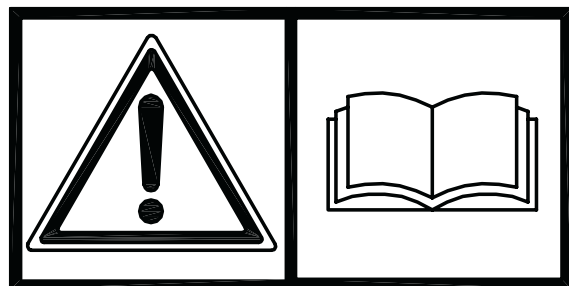
23) Accelerograph Mark.



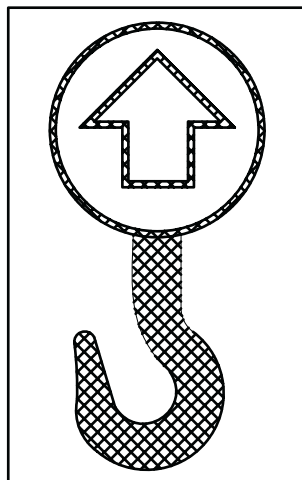
21) Lubricate mark



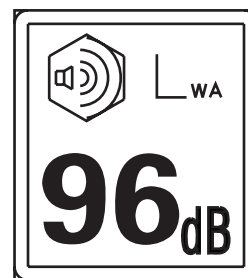
24) Sign of Reading Manual.



22) Hook mark.



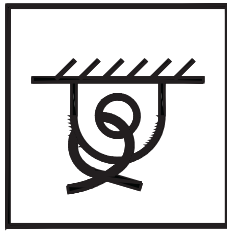
25) Noise Volume Mark



26) CE



27) Grab Hook Mark.



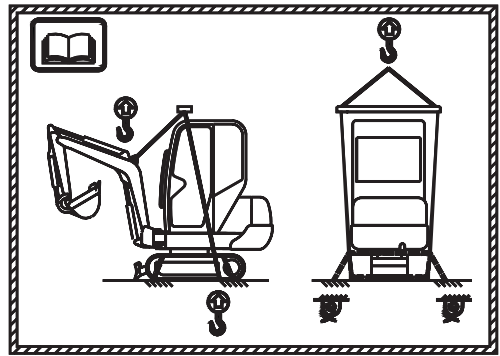
30) Tail sign.



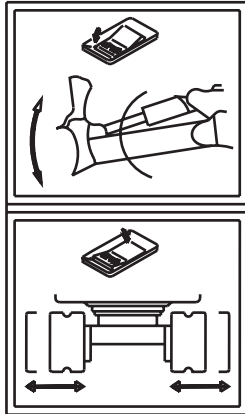
28) The sign of center of rotating.



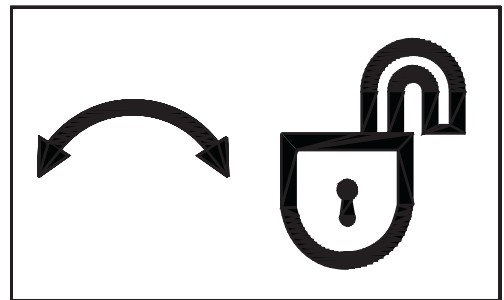
31) Binding sign.



29) The sign of adjust Dozer and chassis



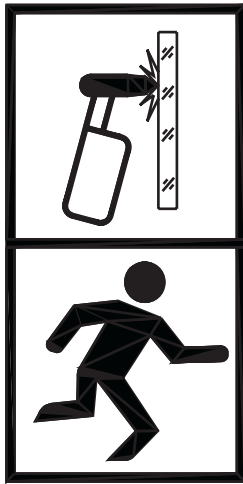
32) Door Lock mark.



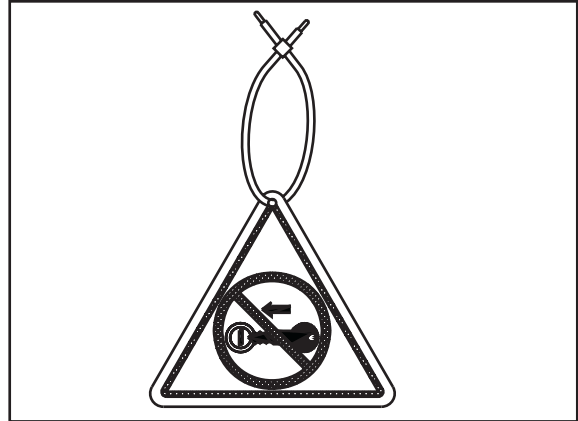
30) The sign on stern.



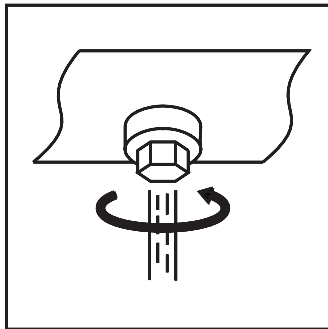
33)Escaping sign.



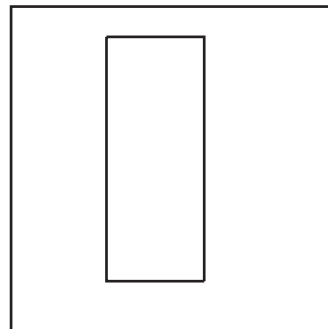
34)Maintenauce Warnign Sign.



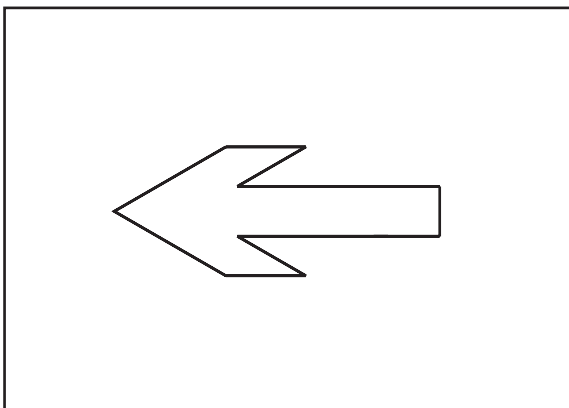
34)Sige of fuel outlet



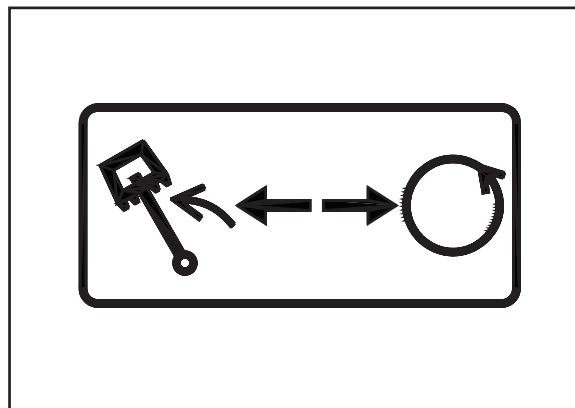
34)Reflecting Sign



34)Forward Direction



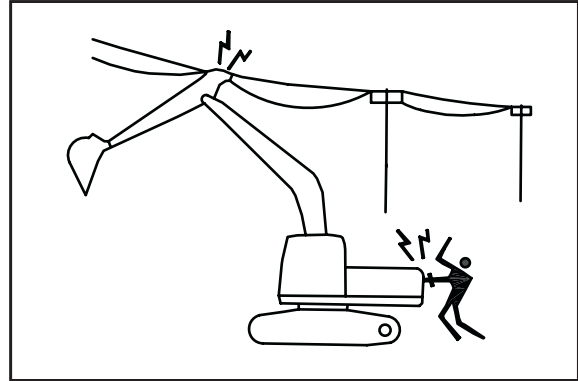
34)Shift lever sign



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 and 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,



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.

Operation Safety

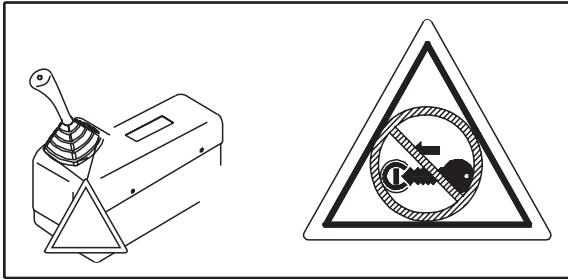


Warning: Before start work, check the seat belt and ring the trumpet.

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.

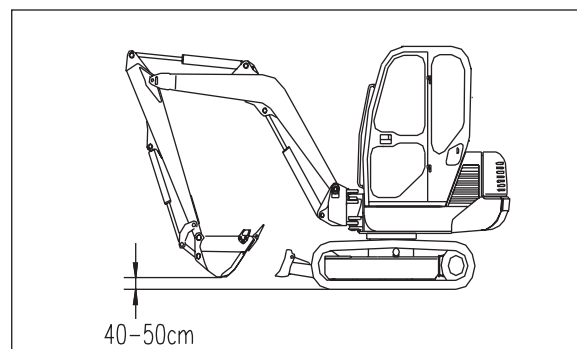
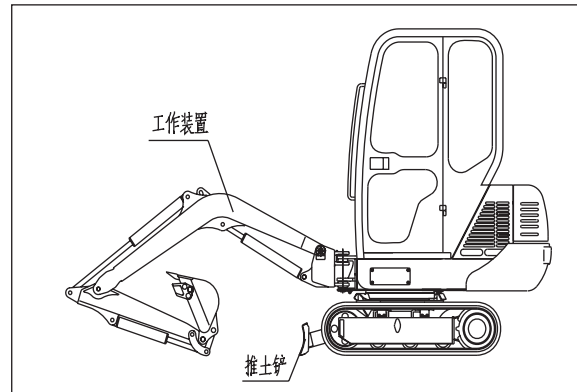
2) please do ring the trumpet when traveling and slewing the machine.

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.

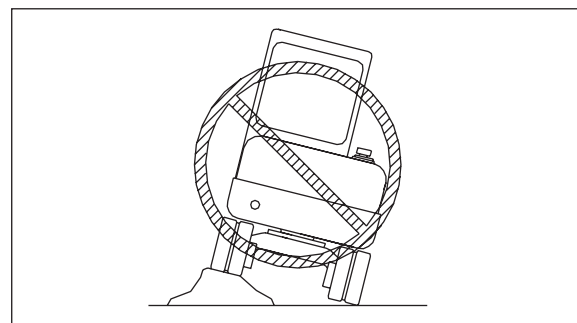


The safety rules when traveling

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.

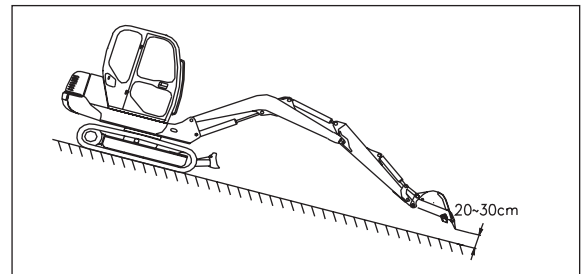
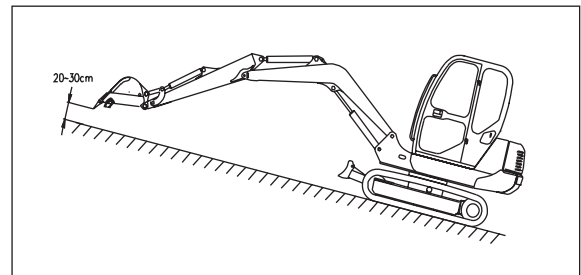


- 4) Please make sure keep the safe distance between the machine and human, building, when traveling or operating the machine.
- 5) when across the passage, bridge and some place where is limited the high, please make sure there are gesticulation from the guide. At the same time, precaution keep the 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..

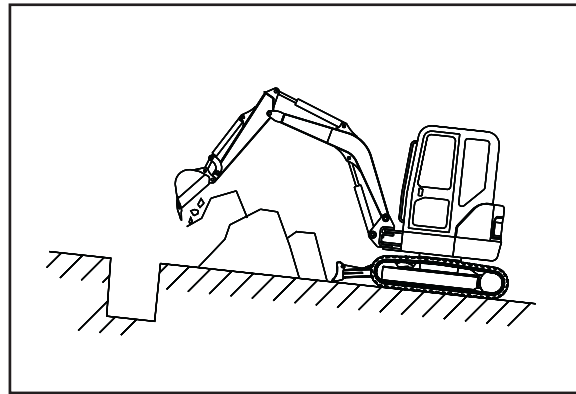
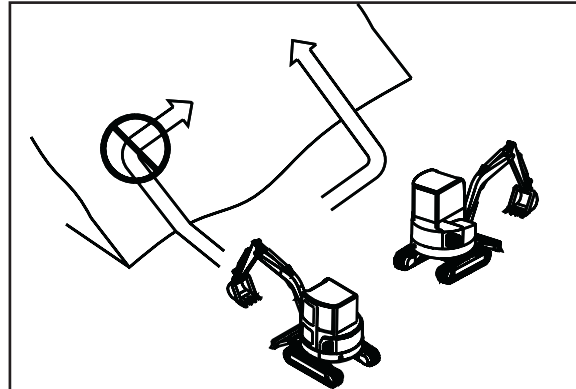


5) Do not change the directions or cross slopes sideways. First return to a flat surface then redirect the machine.

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.

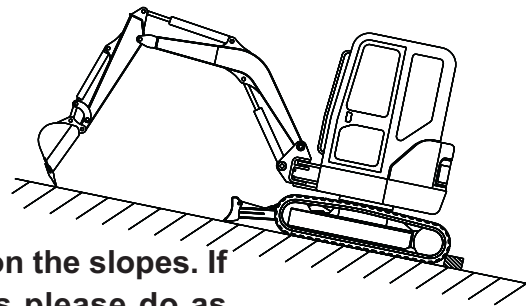
8) It's forbidden to turning direction when up and down the slopes. Otherwise, the machine may be roll over.



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.

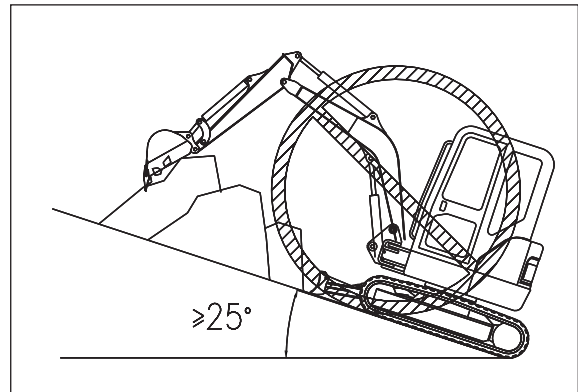


Dangerous

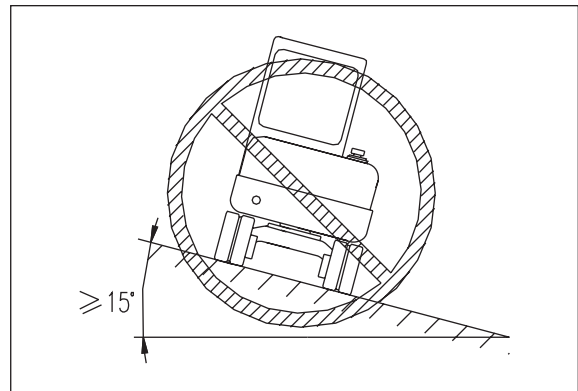


It's very dangerous to stop the machine on the slopes. If the machine have to stop on the slopes please do as following ways: If the engine stop suddenly, remember put the bucket and dozer on the surface of the ground. And make sure all the handle are in middle position. After restart the engine. Even 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°.

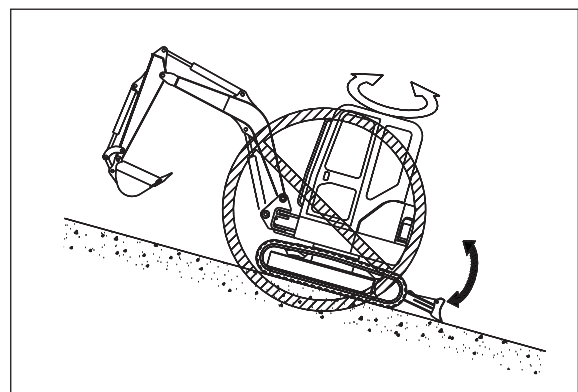


12) Do keep the machine balanceable, don't drive on the rock or over the roadblock.

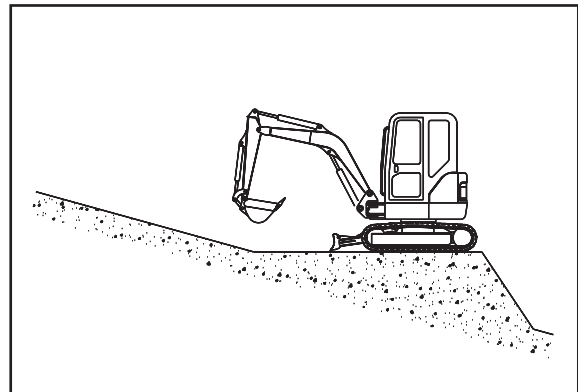
13) Don't swerve on the slope.

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

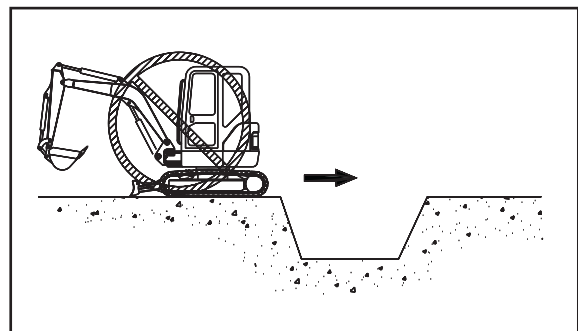


Warning: the operation must remember the operation handles to avoid the wrong operation.

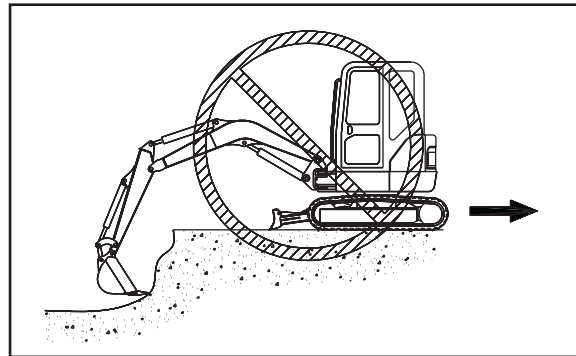


Warning: the wrong operation will make the machine overturn. Remembering the information can make a right guide to protect the body.

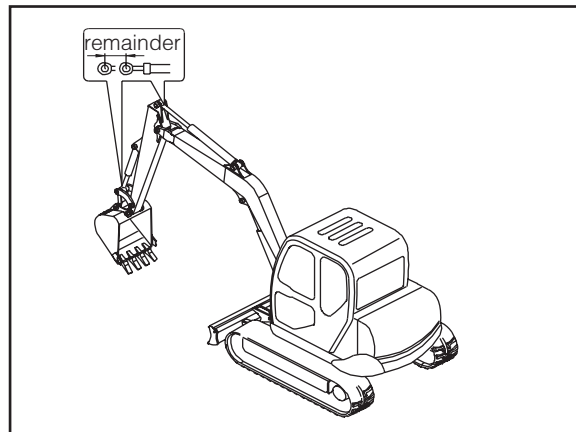
- 1) Before operating, all the things and the people should be removed.
- 2) Do confirm the workplace can bear the machine before the machine enters.
- 3) As far as possible the two crawlers are in the same plane, then it can operate.
- 4) Do confirm there is no cable、no windpipe、no water pipe in the 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.

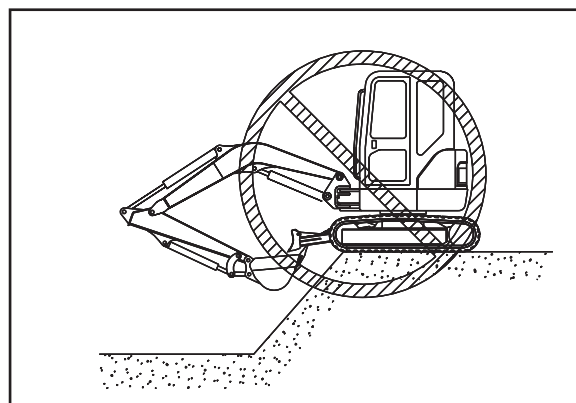
9) When the machine is operated, do avoid collision between the boom*the arm*the bucket*the cabin (canopy) and the nonego.

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

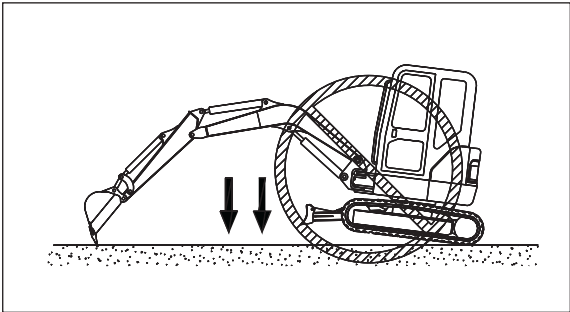
11) When the boom fall, it can't stop suddenly to avoid injury the machine and improve the work safety.

12) Do not dig to the machine body.

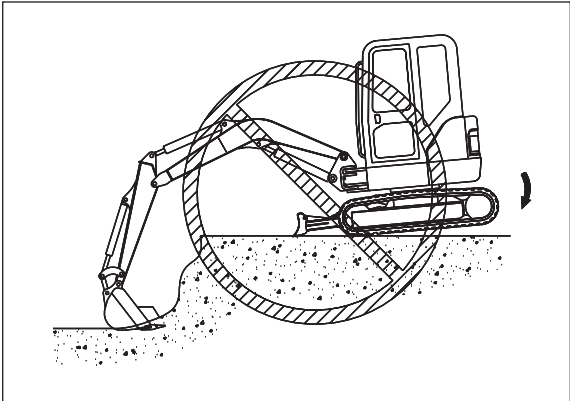
13) The machine is prohibited to travel or work in the loose and soft ground or swamp land.



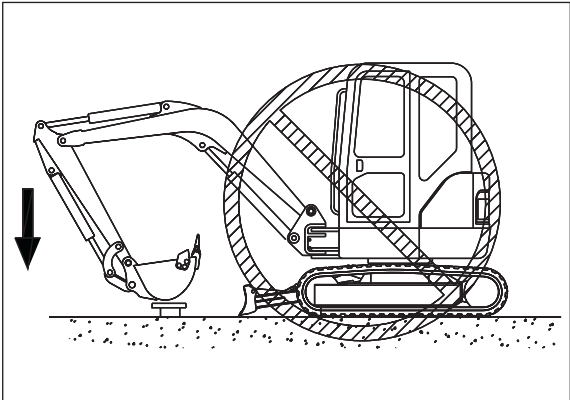
14). When the crawlers leave the ground, do not dig. Otherwise the machine and the frame will be broken.



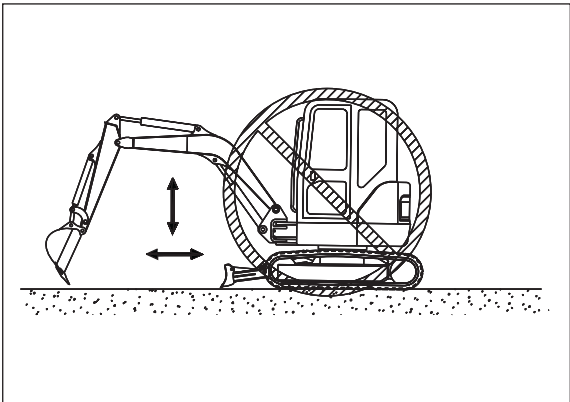
15) Do not use the deadweight of the machine to increase the digging power.



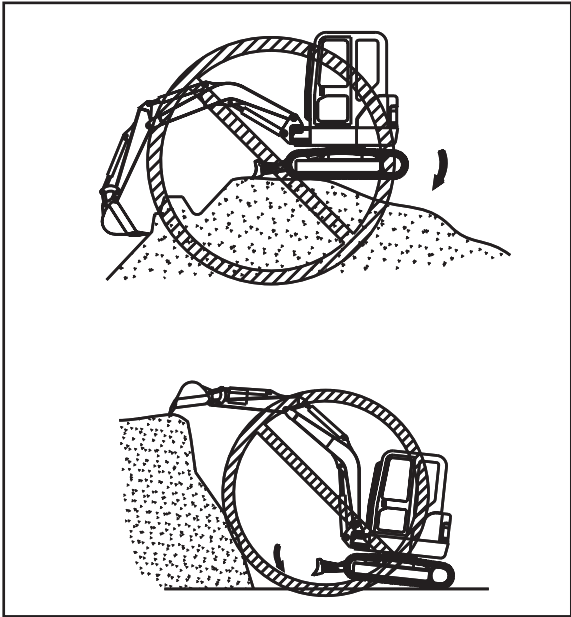
16) Do not use the falling power of the bucket as the handle*the knapper or the pile driver. It will make the back of the machine bear over-weight.



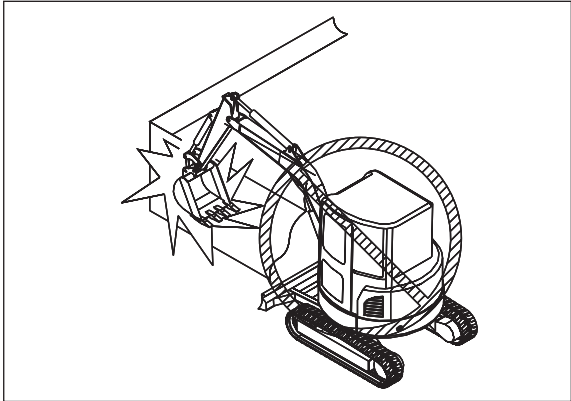
17) Do not use the bucket to dig the road surface more. Otherwise the parts will be overload and broken.



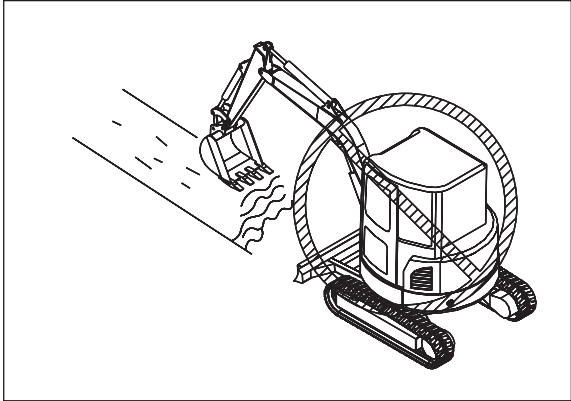
18) Do not use the falling power of the machine. Otherwise the machine will be broken.



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.

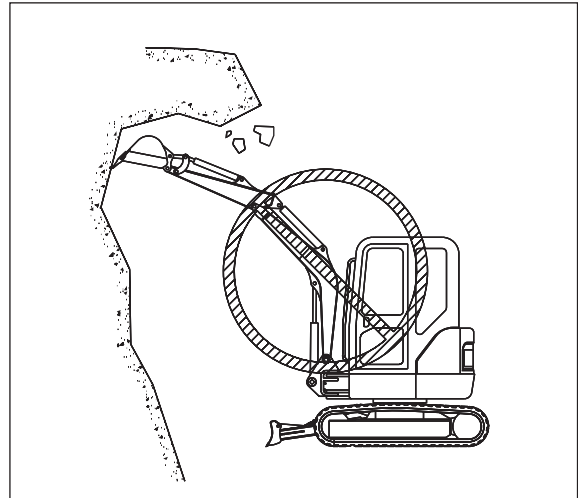


20) Do not make the bucket into the soil to use the driving power to dig. It makes the back of the machine bear overweight.



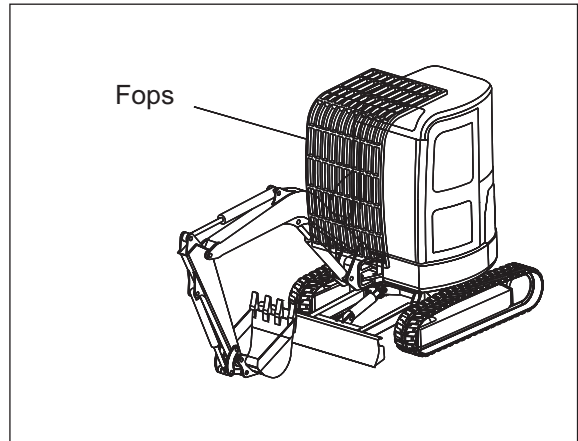
21). Do not dig the working range which is under the hanging part. It may cause the danger of the rock-fall or the collapse.

22). It is need to install the safe device for protecting the falling object and spalsh if the machine is working in the place of the danger of existing falling object or splash.



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

24). 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.

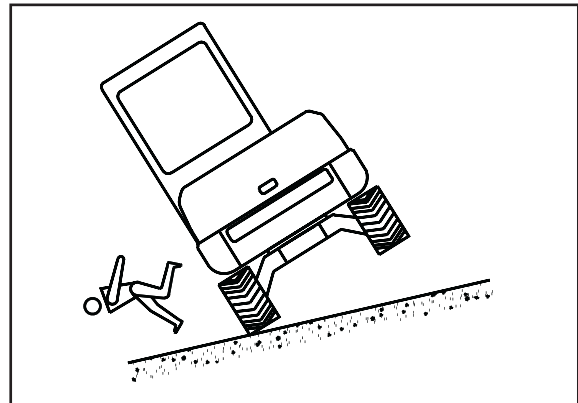
8)When the machine turn adown about 180° .

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.

Maintain



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"

Fire-proof、Explosion-proof& Antigas

●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.

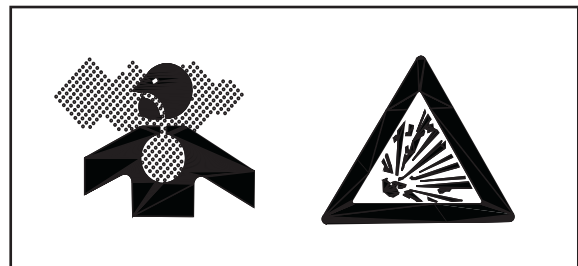
●There should be fire extinguisher in the cab, and put it on the place where can be easily to take from.

●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.

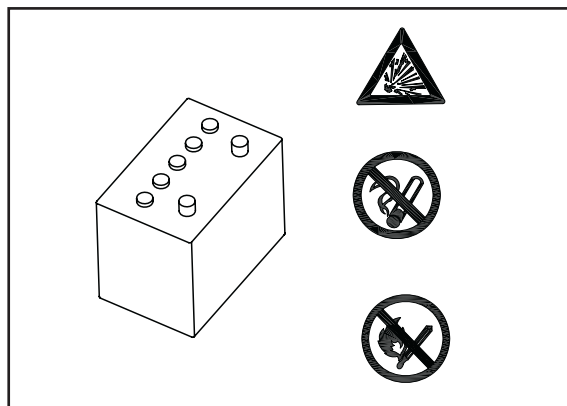
●When the fire happens, do not use the water to put out the fire. Should use the powder extinguisher or the sand, or use the slipcover.

Accumulator

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 accumulator**
- 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

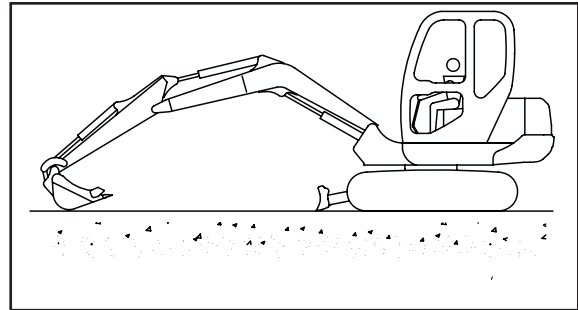
3.Safety rule of the high-temperature oil

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.

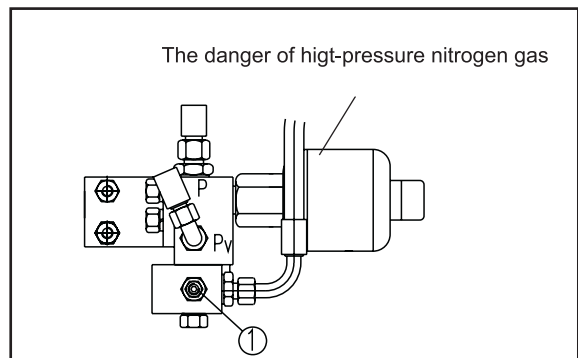
5.Safety operation of the stored energy device



Warning:The stored energy device is the part which full of the high-pressure nitrogen gas.If it's wrong to use,it will explode.No take-down the stored energy device,no drilling and welding.No close the fire,no hit and impact.It deals it ,it would let the professional

The machine have the stored energy device in the control pipeline,It is a device which stores the pressure.When the machine has the device,after stop the engine,it can operates the control pipeline short time.

It operates the joy stick,it can down the operation device by the deadweight.



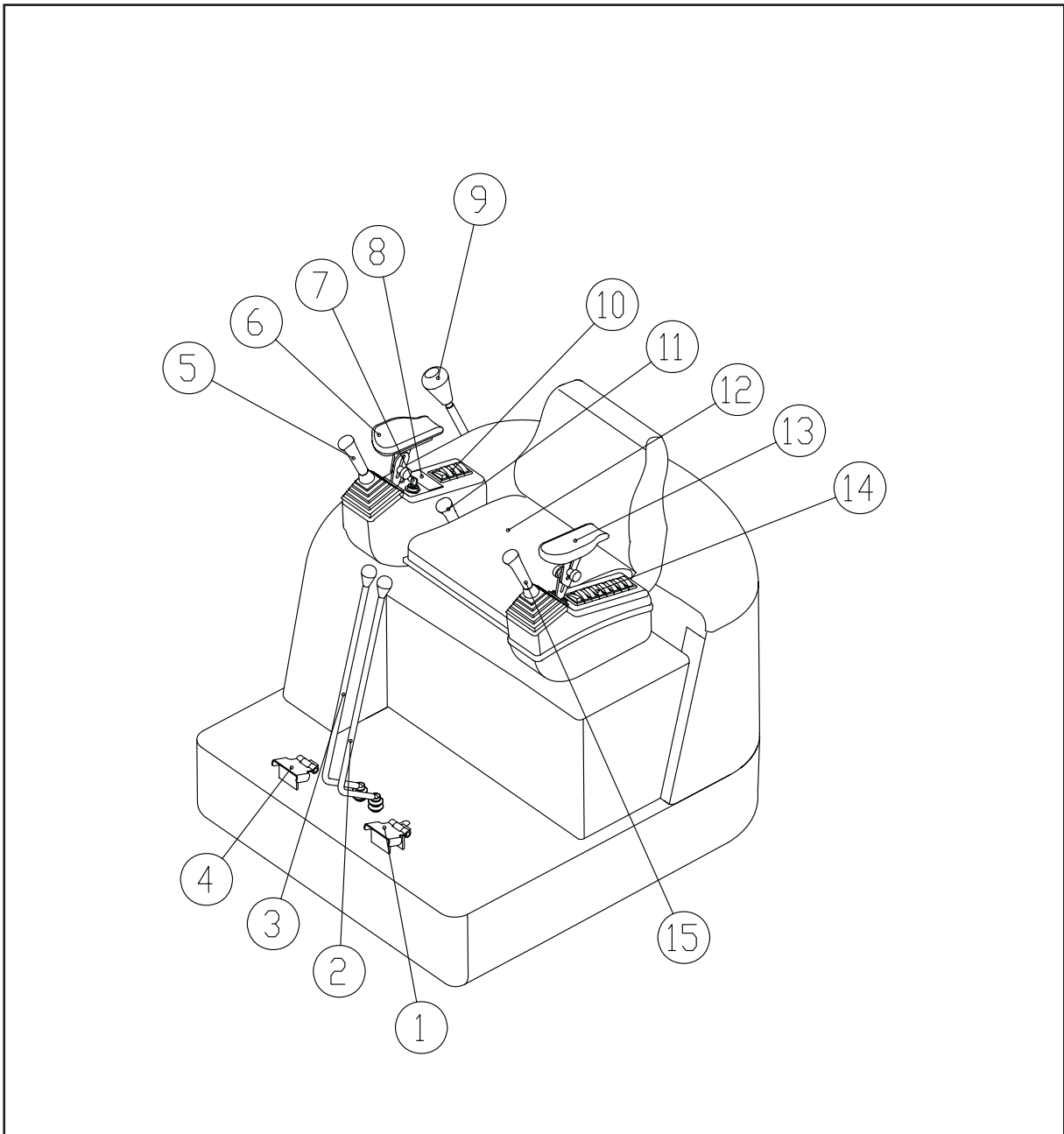
The way of controlling pipeline to release the pressure with accumulator:

- 1) Put down the working equipment to the ground, and stop the rock breaker or other attachments.
- 2) Stop the engine.
- 3) Turn the start key to "ON" to make the current of the circuit moves.
- 4) Turn the safety lock joy stick to the free place, driving the joy stick of the working equipment to front、back、left、right and the pedal of attachments controlling to release the pressure of the control pipeline.
- 5) Turn the safety lock joy stick to the lock place to lock the job stick and the pedal of attachments controlling.

3

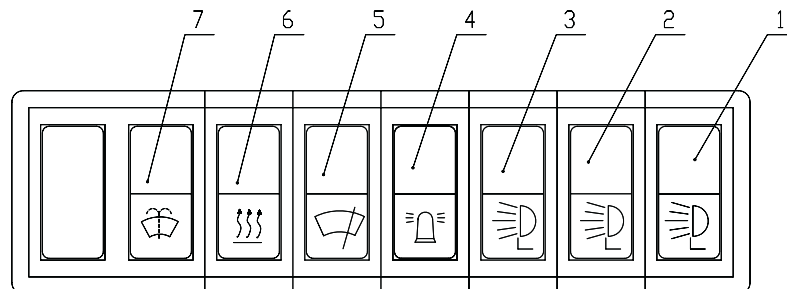
Parts Introduction

General view of control levers



- | | | |
|----------------------------------|-----------------------------|---------------------------|
| 1. Slewing footstep | 6. Right armrest | 11. Dozer handle |
| 2. Left traveling control lever | 7. Starting switch | 12. Seat |
| 3. Right traveling control lever | 8. Instrument | 13. Left armrest |
| 4. Accessories footstep | 9. Engine accelerator lever | 14. Left switch board |
| 5. Right operating lever | 10. Right switch board | 15. Right operating lever |

Left switch board



1. Boom lamp switch

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

2. Front lamp switch

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

3. Rear lamp switch

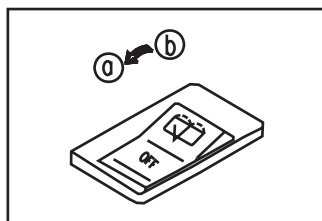
Press the switch identifier side to turn on the lights. Press the other side to turn off lamp.

4. Warning lamp switch

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

5. Wiper switch

To control the front window wiper. There are two positions of the switch:



a)OFF: wiper stops

b)ON: wiper moves continuously.

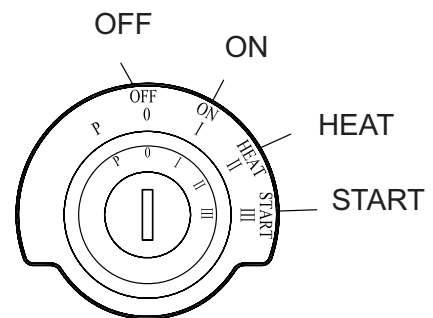
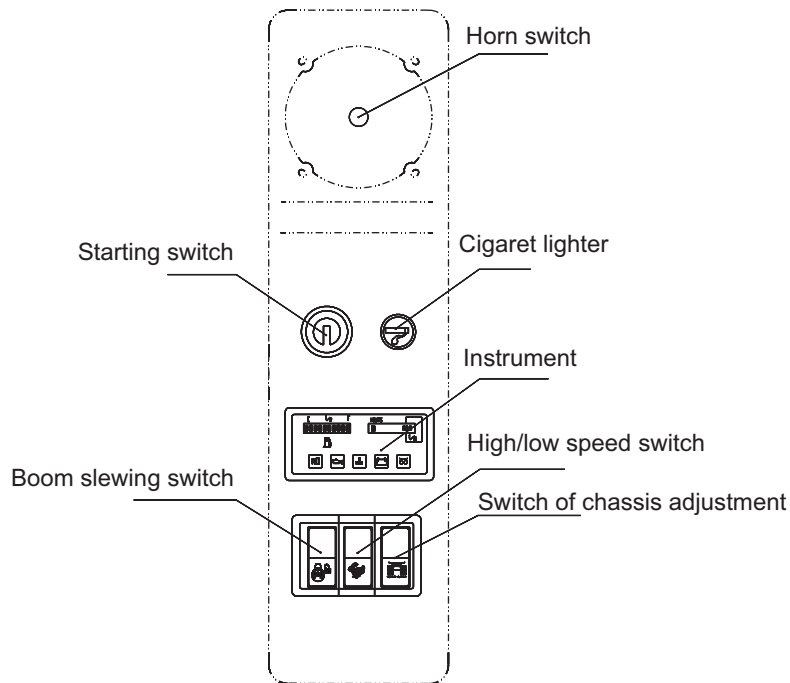
6. Heater switch

Press the switch identifier side to turn on the Heater. Press the other side to turn off Heater.

7..Switch of washing

To control the cleaning mixture. Press the switch identifier side to eject the cleaning mixture. Press the other side to stop ejecting.

Right instrument board



1. Horn switch

When starting the machine, it should be press the Horn to keep the person around the machine noticed.

2. Starting switch

OFF:This

WORK:

ON :

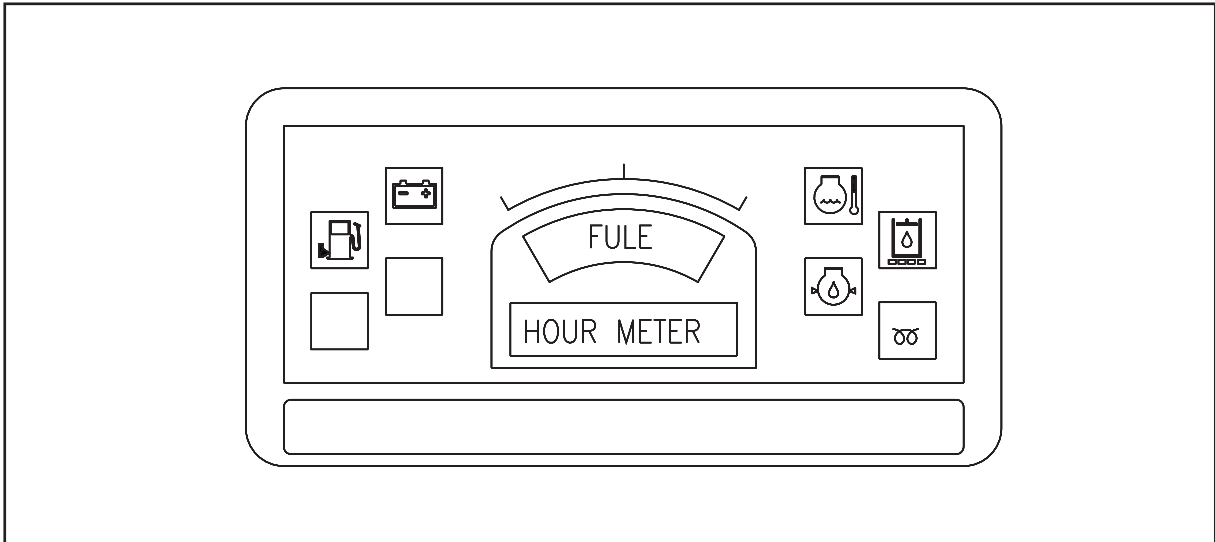
HEAT:

3. Boom slewing switch

4. High/low speed switch

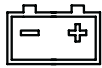
5. Chassis adjustment switch

Instrument



1. Low fuel level warning lamp

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



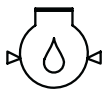
2. System power voltage warning lamp

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.

Safety Locking parts

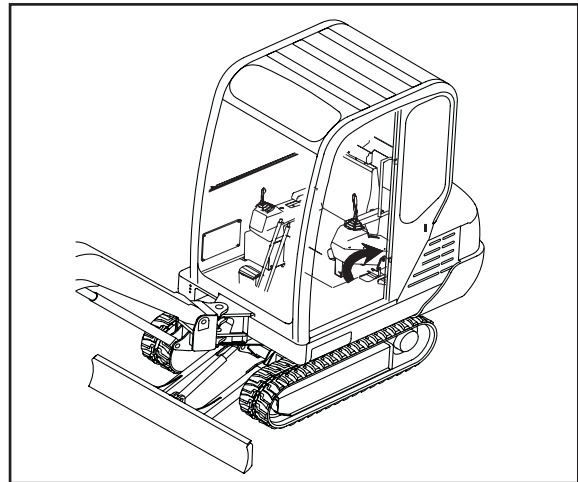
Safety lock lever



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 level the left controlling box up to lock position. Therefore Pilot system does not supply hydraulic oil, working equipment and platform slewing do not work (except left/right travelling and dozer blade), which can protect the machine.

Press controlling box down to the bottom and reach the free position, therefore pilot system is connected with oil pressure origin, then machine can work properly.



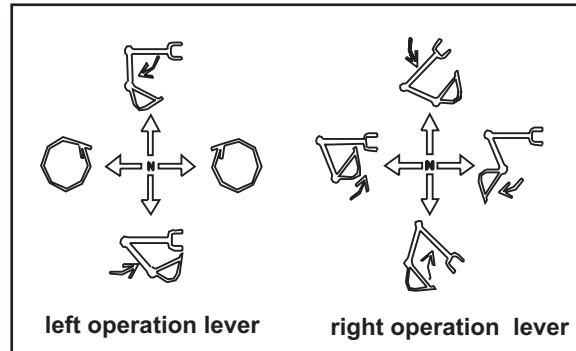
Operating working equipment and platform equipment

● 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.



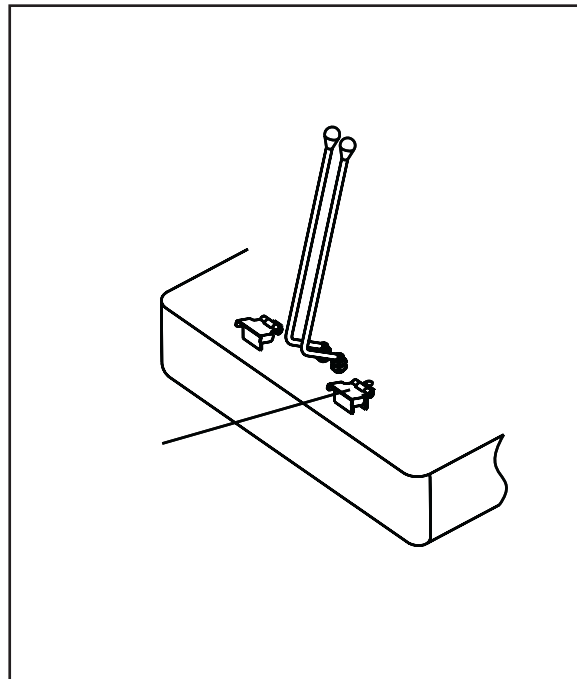
B. Right Operation Lever

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.

● Boom slewing

Step the left footstep, the Boom turn left; Step right footstep, the Boom turn right.

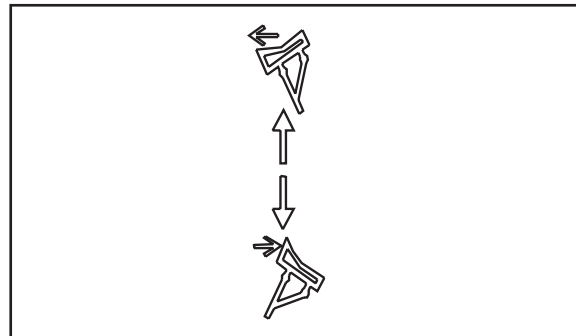


● Operating dozer blade

Push down the dozer control lever, dozer cuts down. Drawing up the control lever, dozer lifts up.

● 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.

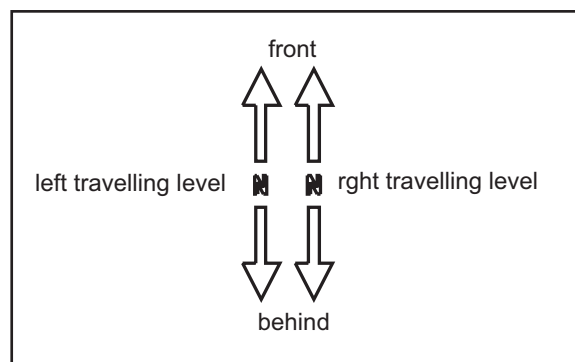


Travelling control

● Directional Control

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

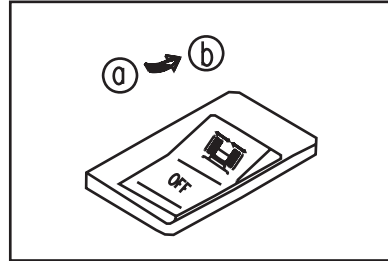
The single lever controls the machine to turn to one side.



Adjust the chassis

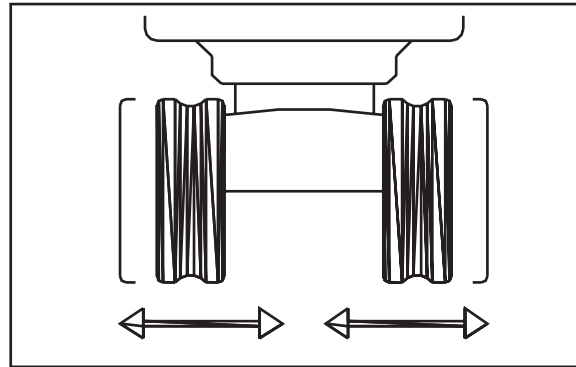
● Switch of chassis adjustment

As the right picture, at "b" position means the condition that it can be adjust the width of Chassis. The solenoid valve is switched to the adjustable condition.



● Chassis control lever

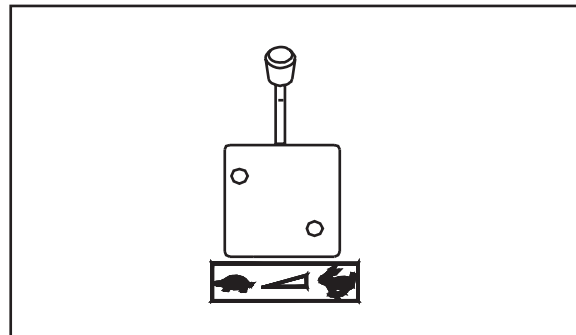
Operate the Chassis control lever to extendable the chassis. (detail operating information, please find in the Operation and Maintenance Manual)



Throttle Lever

● Throttle Lever

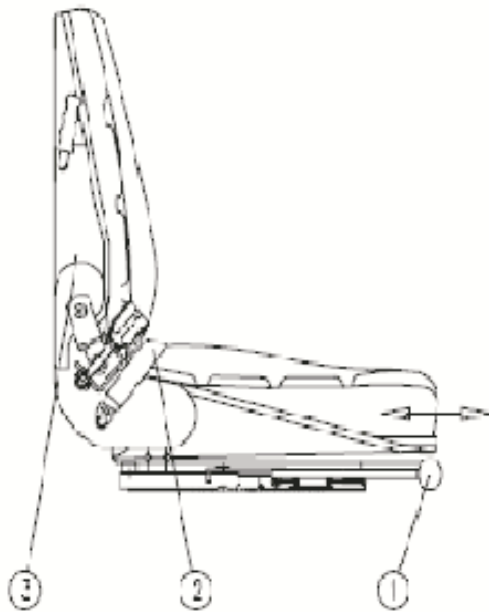
1) Accelerate: Push backward the lever;
2) Push forwards the lever before the engine stop and push backe the lever after the engine stop.



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.



● **Seat-Forward/Backward Adjust:**
Control the
Seat-Foarward/Backward Adjusting Lever
and the rang of activity are $0\sim\pm 45\text{mm}$. The
seat in lock position when uncontrol the
lever.

1. Seat-forward/backward adjust lever
2. Safty belt
3. Backrest

Notice: Must stopping machine when adjust the operation seat. To ensure the operation seat in lock position, please shake it after adjusted.

Safety Belt



Warning:The safety belt is the important part of the safety system.Before the operation,it must tie the safety belt.If the operator doesn't tie it,it will hurt him when the machine to turn over.



Warning:Before tie the safety belt, it need to check whether the safety belt unconventionality.If it fray or destroy,it need to replace it.

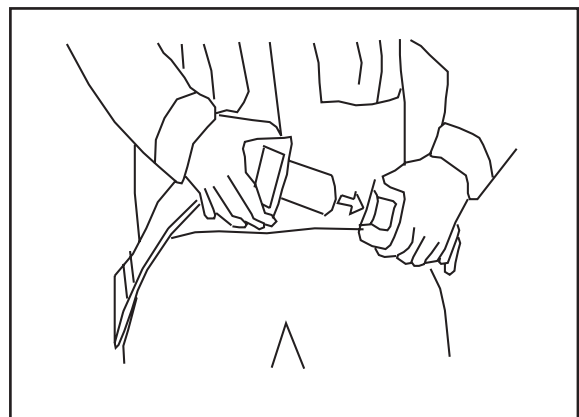
- If the safety belt doesn't have any unconventionality,it need replace the belt every three year.The product date indicates in the leave factory label
- Operating the machine,it must tie the safety belt.
- When the operator tie the safety belt,it doesn't make the belt twist.

1.Fix the safety belt

Holds the safety belt and checks the belt whether twists.Adjusts the length of the belt.Then puts it into the button.And pulls the belt lightly.Last checks the safety belt whether locked right.

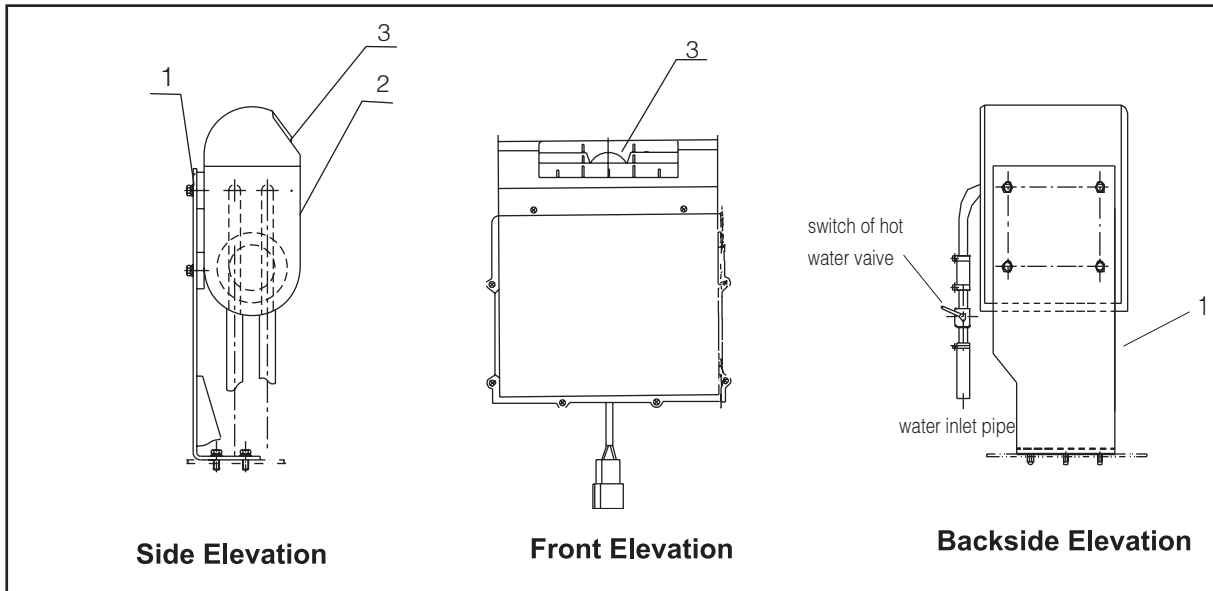
2.Ravel the safety belt

Press the red button,it can ravel the safety belt.



AIR-CONDITION

The Heater is equipped on the top right side of the cabin. And the water valve of Heater is equipped in the right side of Heater.



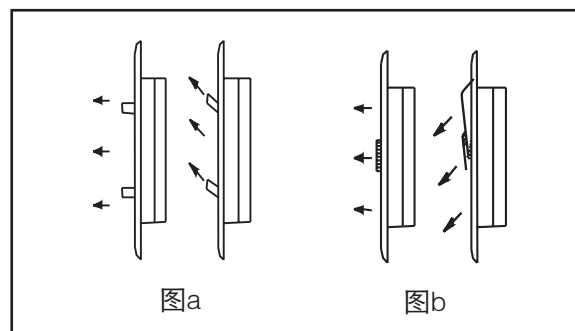
- 1.Fix board
- 2.Heater
- 3.The warm air current exit

Operation of the Heater

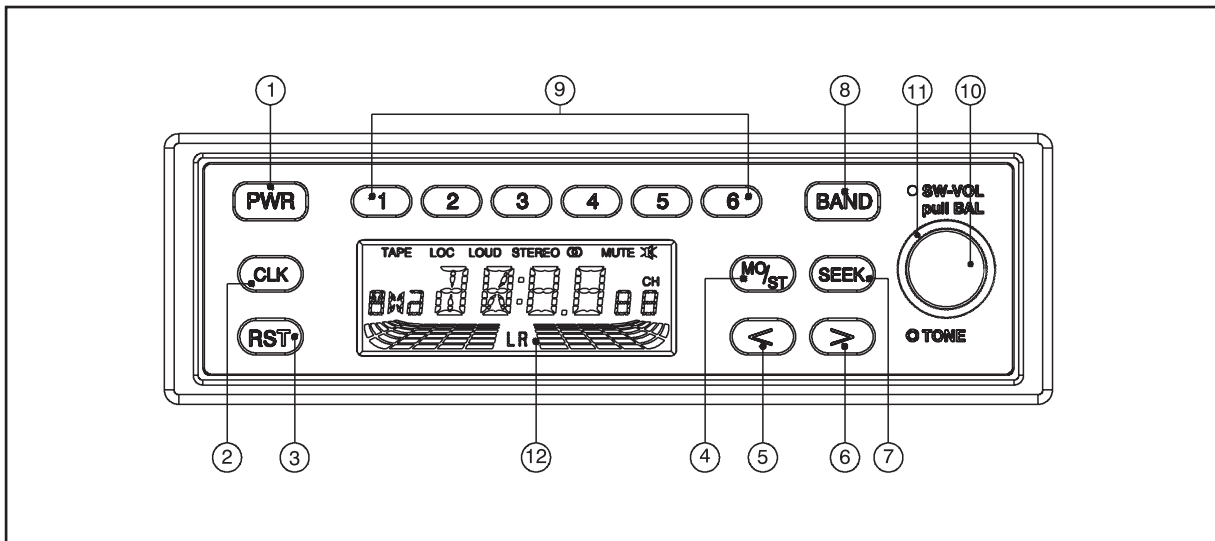
1) First open the Heater switch of the control box and turn to the "ON" position.

2) Like the picture a and picture b, it show the Wind Direction.

3) Put the switch on the "OFF" position to turn off the Heater function.



Radio



- | | |
|---|------------------------------------|
| 1. Electrical source key | 7. Automatic channel selection key |
| 2. Time/ frequency switcher | 8. wave band switcher |
| 3. Replace key | 9. Channe preset key |
| 4. Stereo/mono mix switcher | 10. Volume/balance adjuster |
| 5. Manual downwards channel selection/time adjuster | 11. Volume adjuster |
| 6. Manual upwards channel selection/time adjuster | 12. Display |

Operation Manual of The Radio

1. Start & Stop

Press 1. PWP key, the electrical source open, the radio starts. Press it again, the electrical source close, the radio stops. (If the radio is the automatic electrical source, press any key to start the radio, press 1. PWP key stop it.)

2. Switch the wave band

Press 8. BAND key to switch the wave band, the order of the wave band: FM1–FM2–FM3–AM1–AM2

3. Channel selection by automatic

Press 7. SEEK key one time, the radio will select channel from low to high by itself. When it select the channel, it will lock and play.

4. Channel selection by manual

When the radio's signal weak, it adopts channel selection by manual. Press 5. < key or 6. > key to downwards or upwards channel selection. Press 5. < key or 6. > key long time, it can downwards or upwards channel selection fast.

5.Memory channel by manual

When it selects the channel by automatic or by manual,press the preset key of memory channel long time (more than 3 seconds).

6.Stereo/mono mix switcher

Press 4.MO/ST to switch the stereo mix and mono mix.When the display "STEREO" lights,it is the stereo mix mode.If the display “∞” lights,it means the stereo channel.If the signal of the stereo mix weak,please switch to the mono mix mode to improve the effect.

7.Time/ frequency switcher

Press 3.CLK key to switch the time/frequency mode..When it is the time mode,press other key(except PWR key),it will return the frequency mode.It will return the time mode by automatic after 5 seconds

8.Time adjusting

Press 2.CL key long time(more than 3seconds),the time sparks.It mean it enter the time adjusting mode.Now press 5.<key to adjust the minute,press 6.>key to adjust the time.After adjusting,it will return the natural display mode in 5seconds.

9.Volume adjusting

Turn 10.to adjust the volume.

10.Tonality adjusting

Turn 11.to adjust the tonality.

11.Left&right balance adjusting

12.System replace

If the radio doesn't work good,please press 3.RST,it will renew the status when it produced.

Note1:The digger doesn't have the time function of the radio.

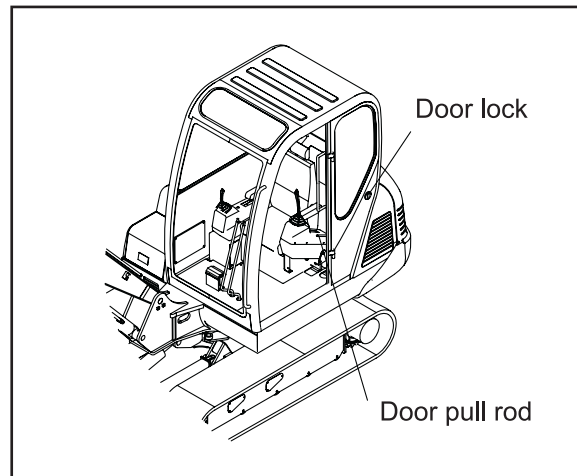
Note2:Because of the different radio,it has the different operation plane.

Door and Window

1. Door of the cab

It is the only way to enter the digger for the operator. When the operator leaves the cab, he needs to lock the door.

When open the door, it should the lock belcoks to the lockpin. When it needs to close the door, it shoild press the door pull rod. The lockpin open, and the door open.



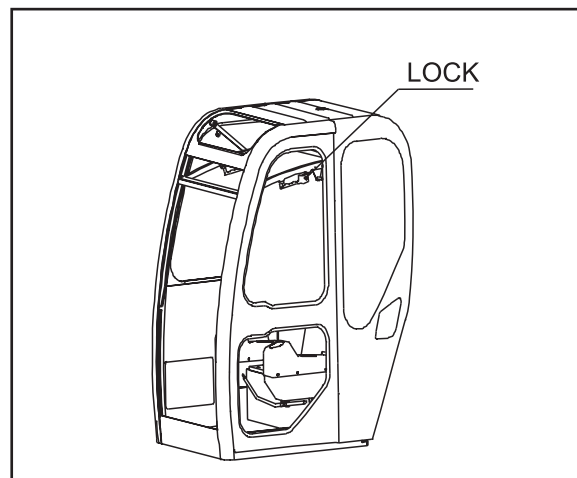
2. Rear window

The rear window can as a exit. When the door couldn't open, and the operator couldn't out and need get away from the cab, it can use the flee hammer to smash the rear window.

3. Fore window (Turnover window)

If it opens the turnover window, the operator can have a good condition.

If it wants to open the turnover window (fore window), it needs to pull the two commode handles of the turnover window. Operating the commode handles to glide the turnover window. When the turnover window glide to the right place, and push-up the turnover window to the lock place, loosen the commode handle lock, the turnover window locked. Whereas, the turnover lets down.



4

Operation Manual

Preparation for Running Machine

- 1)The digger is operated by the qualified driver.
- 2)Don't operate the machine before the operator read the user manual.
- 3)The operator need to put on the interrelated safeguard: sheathy work clothes、 motorcycle safety helmet、 work shoe and so on(safety glass、 safety earplug、 glove、 safe belt)
- 4)It needs to check the machine before running the machine every day.
- 5)Check whether the operation device、 the oil tank、 the rubber pipe destroy.
- 6)Clear the dust which around the engine、 the radiator、 the accumulator.
- 7)Check whether the hydraulic device、 the oil tank、 the rubble pipe、 the tie-in leak.
- 8)Check whether the infrastructure destroys ,whether the bolt loosens,Whether the bolt loosens which connect the frame and the platform.
- 9)Check whether the instrument destroys.
- 10)Clean the reaview mirror,check whetherdestroies and adjust the angle.
- 11)Check whether the safety belt destroys.
- 12)Make sure to do the maintenance with the right way.



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

Engine Operation



Warning: Before start the engine, please reading the safety detail of the user manual. Reading the safety sign of the machine.

1. Check the machine before start the engine

- 1) Check whether ties the safety belt, rings the trumpet, make sure nobody on the workplace and the top/bottom of the machine.
- 2) Check whether the reaview mirror and the widow can supply good view.
- 3) Clear the dust which around the engine、 the radiator、 the accumulator
- 4) Check whether the operation device、 the oil tank、 the rubber pipe destroy
- 5) Check whether the hydraulic device、 the hydrualic oil tank、 the rubble pipe、 the tie-in leak
- 6) Check whether the infrastructure destroies , whether the bolt loosens or whether leaks.
- 7) Check whether the instrument destroies
- 8) Check whether the oil level of the hydraulic oil、 the fuel、 the electrolyte of the accumulator、 the machine oil of the engine between the upper limit and the lower limit.
- 9) In the cold day, it need to check whether the hydraulic oil、 the fuel、 the electrolyte of the accumulator、 the machine oil、 the lube freeze. If they freeze, it should start the engine after thaw.
- 10) Check whether the left joy stick on the lock state.
- 11) Check what the state、 the direction、 the station of the machine.

2. Start the engine



Warning: When the joy stick hangs the safety sign "No start engine", it doesn't allow to start the engine.



Warning: Before start the engine, it must to make sure the safety lock handle on the lock state.



Warning:In the cold day to start the engine,it need to warm-up.If it doesn't warm-up,the joy stick will slowness,and may be lead the accident.



Warning:If the electrolyte of the accumulator thaw,it doesn't electricize or use the different power to start the engine.Where as ,it will fire. Before the electrification or use the different power to start the engine,it makes the electrolyte of the accumulator unfreeze.

Before start the engine,it should the key insert the start switch.,and turn to “ON” ,check the display state of the indicate alarming light of the digital combination instruction sheet.If it has the alarming,it need to deal the trouble and then start the engine.

A.Normal temperature to start the engine

When the temperature of the condition exceeds 5 degree,turn the key to “ON” ,the indicator light wink,and it mean the machine can start.Then turn to “START” ,it keep the key on the place not exceed 10seconds.After starting the engine and loose the key,it will return to “ON” by itself.If it finds the engine not start,it should start the engine again after 30 seconds.

B.Cold temperature to start the engine

When the temperature of the condition under 5 degree, turn the key to “HEAT” to warm-up. About 6 seconds after warm-up finish, the warm-up indicator light wink. Then turn to “START” , and start the engine

Caution: the time of the warm-up not exceed 30 seconds.

Caution: continuous start it not exceed 10second;The time for start it again not under 1 minute.If it doesn't start the engine three time,it needs to check whether the system ok.

Warning:



- 1)When the engine runs,it hadn't to turn the key.
- 2)When it drags the digger,it haven't to start the engine.
- 3)Haven't to use the way to start the engine which start the motor short circuit

C.Use the assistant cable to start the engine



Warning:When the electrolyte of the battery freezes,if (1) it electricizes or(2) use the different power to start the engine,the battery will explode.To avoid the electrolyte of the battery or freeze,it keeps it have full electricity.



Warning:The battery can produce the explode air.It must keep away from the fire、 the spark.Electricize it in thesealing area or it keeps ventilated area when use the battery.Working need the battery,it need wear the eyepatch.

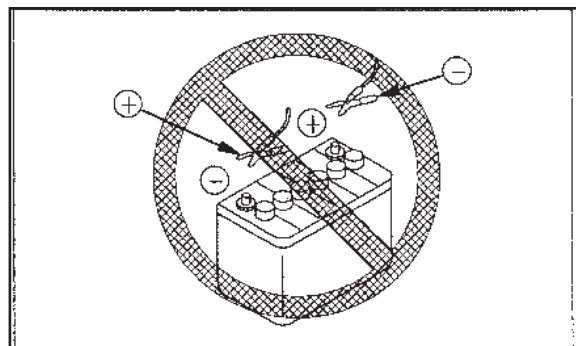
If the way for connect the assistant cable wrong,it will lead explode.It must do as follow:

1)When it uses the assistant cable to start,it need two persons to operate(one sit on the operator'seat,another operates the accumulator)

2)When it uses another machine to start,it haven't to the two machine touch.

3)When it connect the assistant cable,it need to turn the keys of the normal machine and the trouble machine to "OFF"

Whereas,when it has the power,the machine will move.

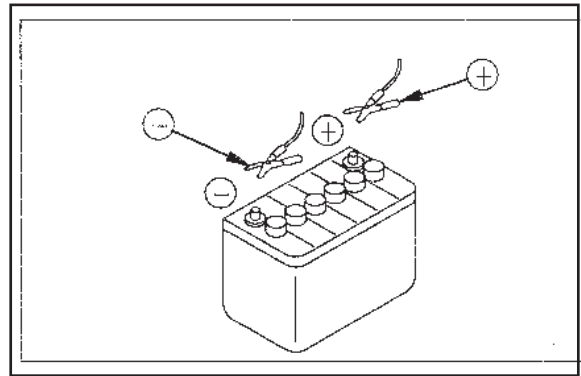


4)When it installs the assistant cable,it must connect the cathode(-) of the accumulator at last;When it removes the cable,it must off the cathode(-) of the accumulator first.

5)When it removes the assistant cable,it doesn't let the nip of the assistant cable touch one another or the nip of the cable touch the machine.

6)When it uses the assistant cable to start the engine,it must to wear the eyepatch and the rubber glove.

7)When the use the assistant cable to connect the normal machine and the trouble machine ,it needs to use the normal machine which has the same volt with the trouble machine.



3.After start the engine

A.Warning the engine and warn-up the machine

The normal temperature of the hydraulic oil is 50°C–80°C.If it operates the hydraulic oil under 20°C,it will destroy the hydraulic element.So before start to working, if the temperature under 20°C., it must warn–up as follow:

- 1)The engine runs 5 min with the speed exceed 200rpm
- 2)Put the gun of the engine to the median to run 5–10 min
- 3)Under the speed,flex each oil tank ,operate the rotating device and the driving motor to warn–up.When the oil temperature arrive 20°C,it can run.If it needs,it can flex the oil tank of the bucket to the travel end–point,warn–up the hydraulic oil.But the time for it not exceed 30seconds.It can repeat till arrive the request of the oil temperature.

B.Examining after start the engine

- 1)Check whether the indicator light wink.
- 2)Check whether leak oil(the lube、 the fuel) and leak water
- 3)Check whether the sound、 the libration、 the calefaction、 the smell、 the instrument have the unconventionality.

4. Stop the engine

Caution: If you shut down the engine before it cooling, it will shorten the use life. Except urgent, no stop the engine suddenly.

If the engine superheat, don't stop the engine, it need cooling the engine with the mid-speed running, then stop the engine.

- 1) Push the gun goes ahead to the end.
- 2) Make it cooling with the low-speed running about 5min.
- 3) Turn the key switch to "OFF" , stop the engine, and the indicator lights wink.
- 4) Take the key.

5. Examining after stop the engine.

- 1) Check whether the machine leaks oil or water.
- 2) Add the oil to the fuel tank
- 3) Check whether the engine cab has the wastepaper or the scrap. Clean the wastepaper and the scrap to avoid the fire.
- 4) Clear the soil of the underpan.

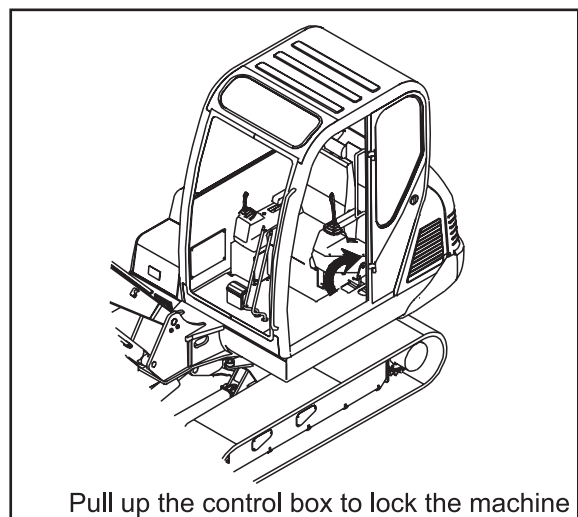
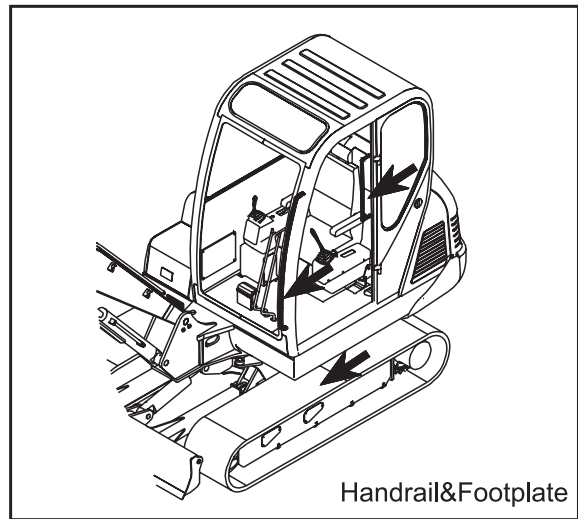
In&Out Machine

- 1) Make sure to grasp the handrail of the cab's door (see the arrowhead of the picture)
- 2) Make sure the feet step on the pedrail placidly.
- 3) In&out the machine, it hasn't to use the joy stick instead of the handrail
- 4) Before in&out the machine, it makes sure whether the handrail、 the pedrail have the soil、 the oil. If they have, please clean them.
- 5) No jump up or down the machine, when the machine moves, it doesn't allow to jump up or down the machine.
- 6) Before leave the machine, it must let the operation device down and use the safety lock handle to pull-up the control box, make the machine in the lock state, and stop the engine, and keep the state to the next operation.

Caution: When the operator leaves the cab, please take out the key and lock the door and the window.

No allow climb up the oil tank、 the cover of the engine、 the top of the cab.

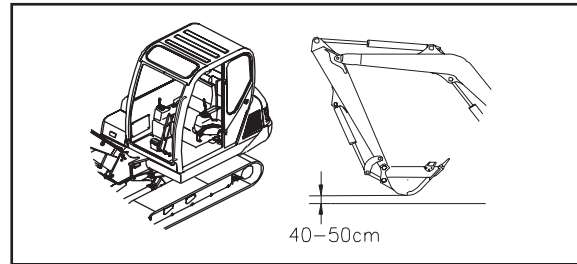
Under any state, the operation devices (the bucket、 the lever、 the moving-arm、 the attachment) don't allow have the person.



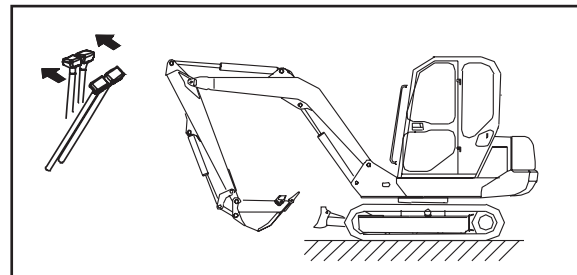


3. Machine moving forwards

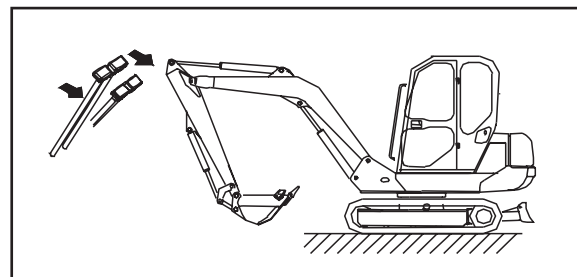
- 1) Lay down the safety handle, rise working equipment distance ground 40~50cm.
- 2) Following steps for operating travel lever.



When dozer blade is in front, slowly push travel levers to have the machine move forwards.



When dozer blade is at rear, slowly draw travel levers to make the machine move forwards.



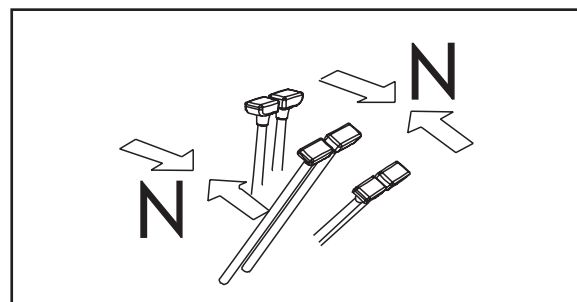
Caution:When it is the lower temperature,the driving speed of the machine doesn't right,it need to warm-up.Otherwise,if the bottom of the machine has the soil,the driving speed doesn't right,it need to clear the soil.

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.

Turning The machine

Caution: Before operate the joy stick, it need to check the station of the bulldozer. If the bulldozer in back, the operation reverse

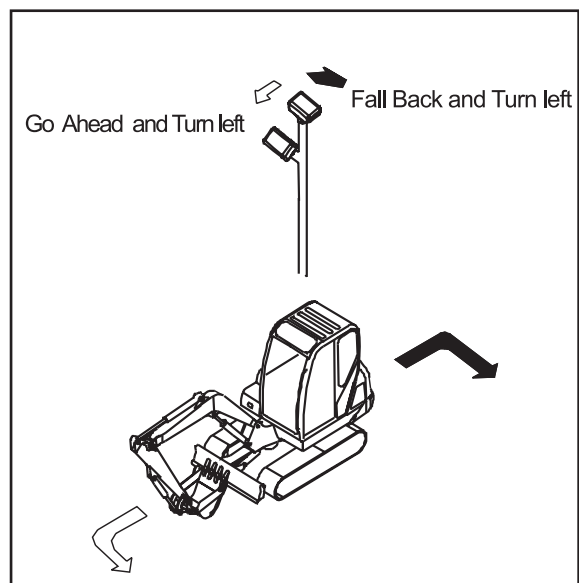
Use the left&right driving joy stick to replace the direction of the driving.
Avoide to replace the direction sudden as far as possible.

1. Turn the direction when the machine stops

Turn left:

Driving forward, pull the right driving joy stick, the machine will turn left. Driving backward, push the right driving joy stick, the machine will turn left.

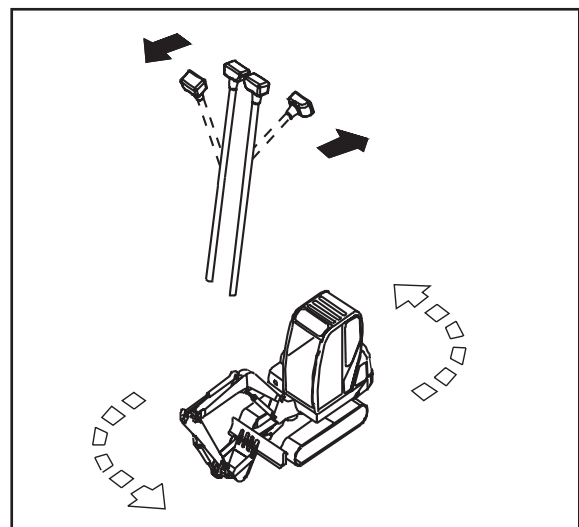
Turn right: the mode same as turn left.



2. Turn the direction at the same place.

When the machine is turn left at the same place, push the left driving joy stick and pull the right driving joy stick.

When the machine is turn right at the same place, push the right driving joy stick and pull the left driving joy stick



Machine slewing

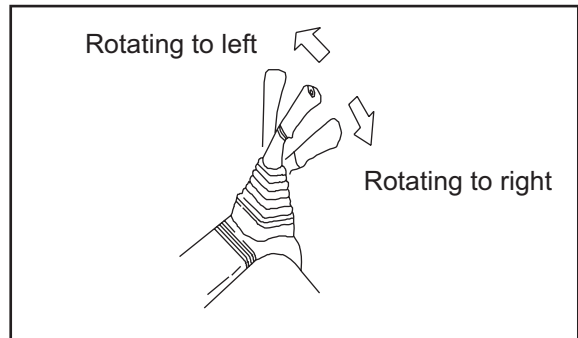
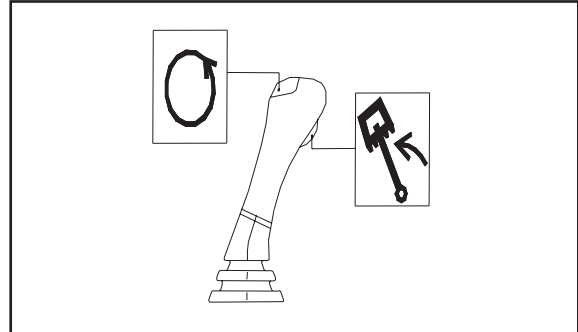
● Before swing the platform, check around whether it is safety.

● 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.

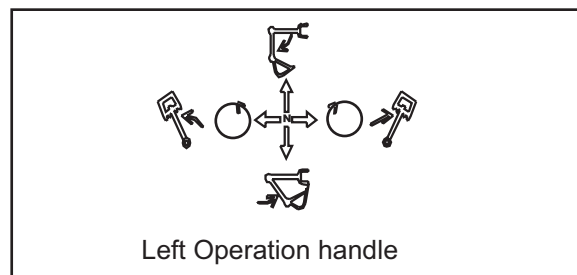
Let the handle return to the middle position, equipment will stop action and keep position.

When turning off the engine, within 15 seconds, operating he 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.

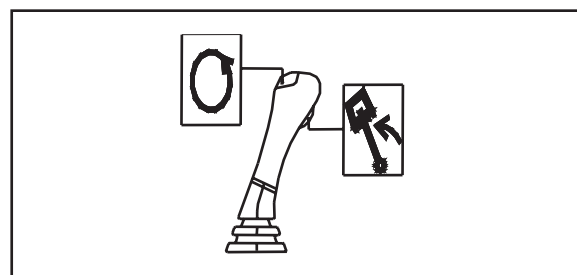
1. Operating arm

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



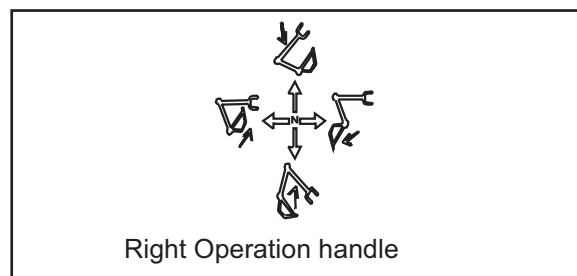
2. Operating swing.

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



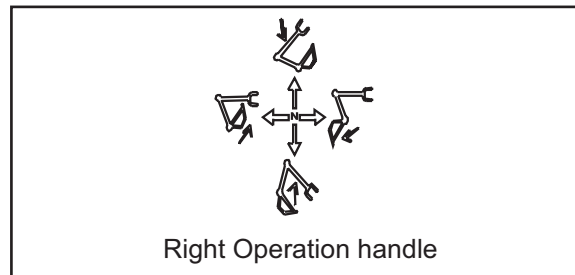
3. Operating boom

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



4. Operating bucket

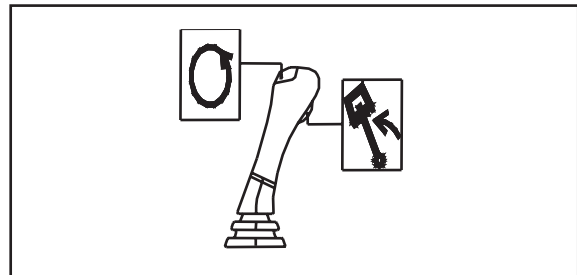
Push right handle to the right, bucket spread up, push the handle to the left, bucket draw down.



5. Operating boom slewing (steering head)

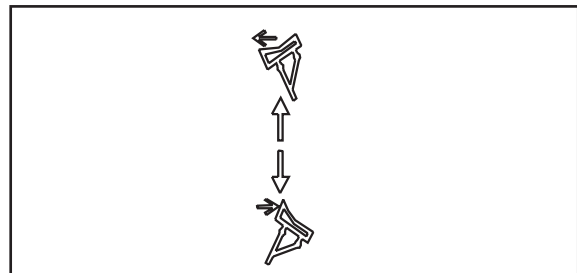
Push right handle to the left, boom will swing to the left. Push the handle to the right, the boom swing to the right.

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



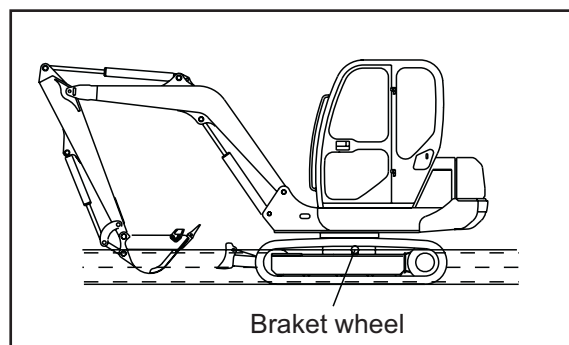
Caution: working on following condition is dangerous. On the slope, muddy ground, snow ground, frozen ground, sandy and loose ground. When working in such condition, operator has to judge the condition, whether it is available to work.

- 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.



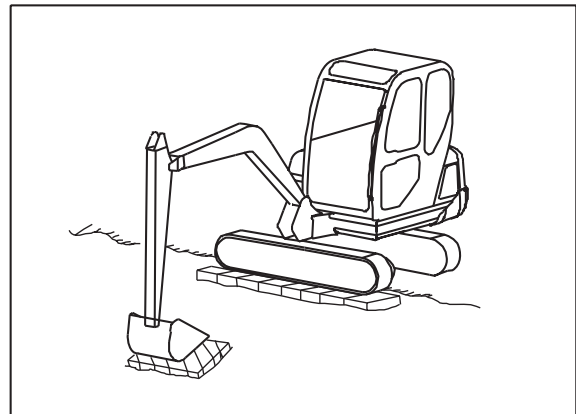
Escape from Muddy area

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

A. One side of the pedrail gets into the mud

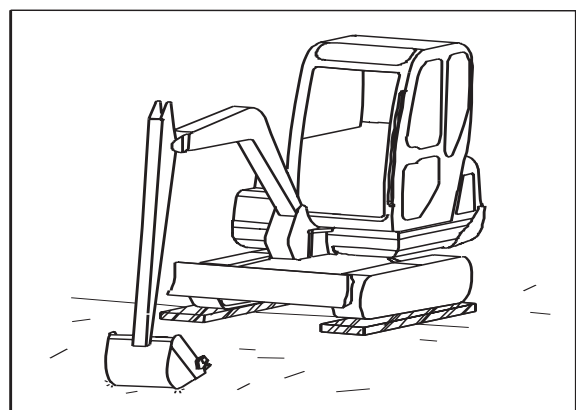
Caution: When it uses the moving-arm or the lever to uplift the machine, it must make the bottom of the bucket touch the ground. (No use the gear of the bucket to push). The angle of the moving-arm and lever is 90° to 110°

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

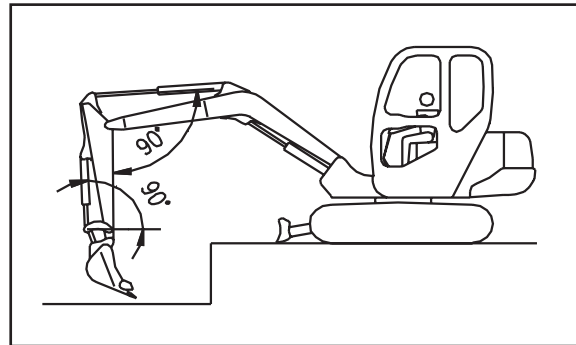


Operating guide

1. Backhoe work

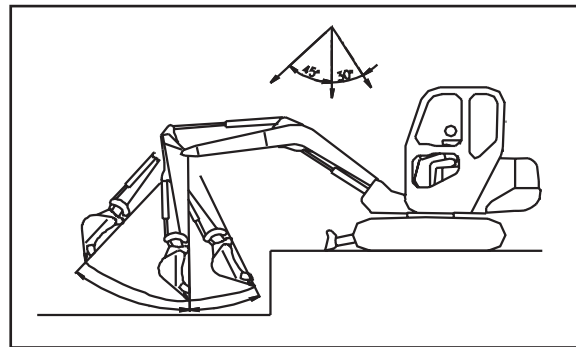
Backhoe is suitable on the position lower than the machine.

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.

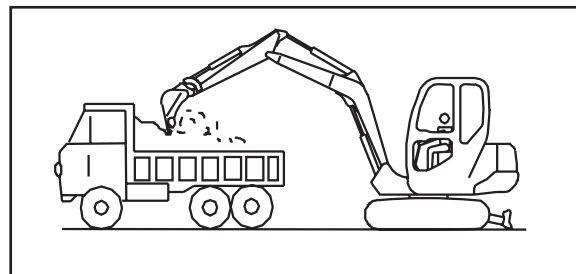
There may be some differences depending on the excavation depth, but try to use within the above range rather than going all the way to the extreme end of the cylinder stroke.



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.

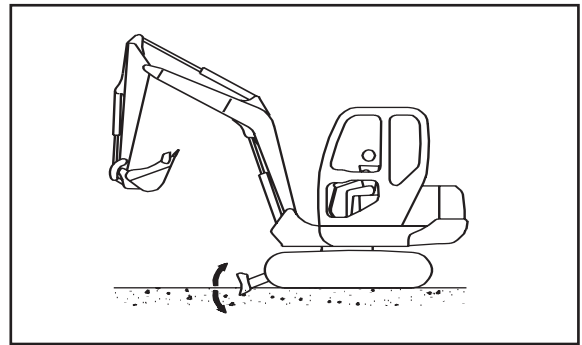
B. Notice for using dozer blade.

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.



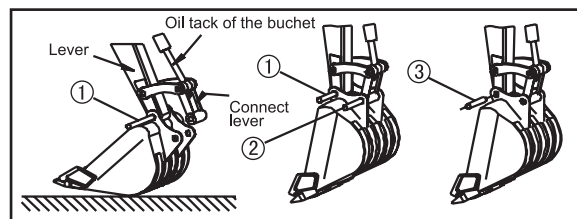
Removing & Installing Bucket

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

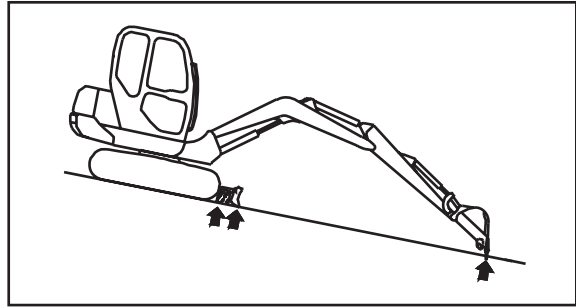
Plarking Machine

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.

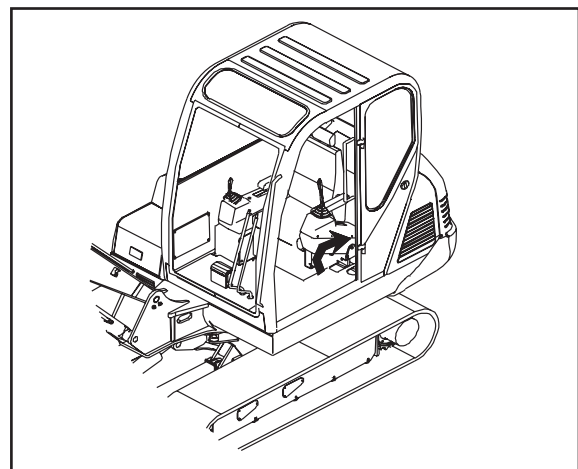
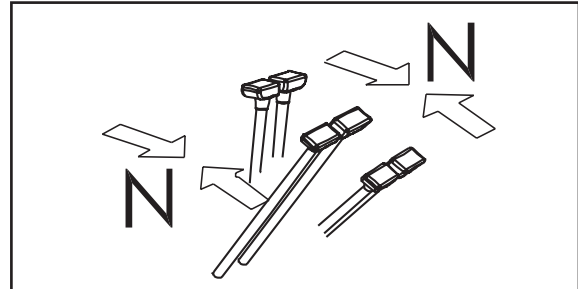
2) Don't stop the engine abruptly before it is cool enough. If the engine is over heated let it run at low speed for 5mins then stop it.

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

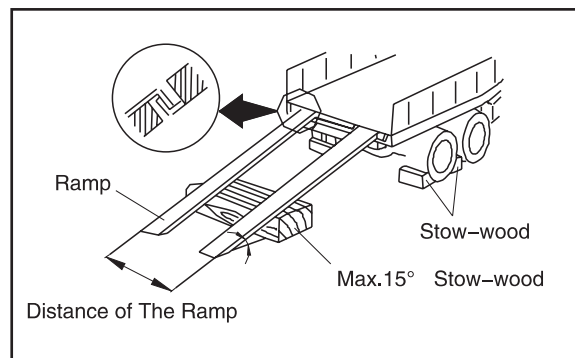
1. Safety regulation for loading machine

- 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° or 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.

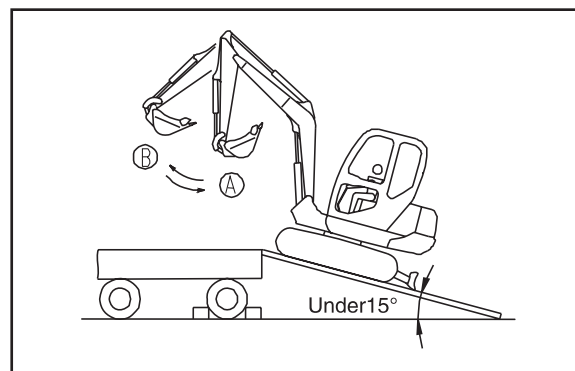
2 . Loading precaution

- 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.

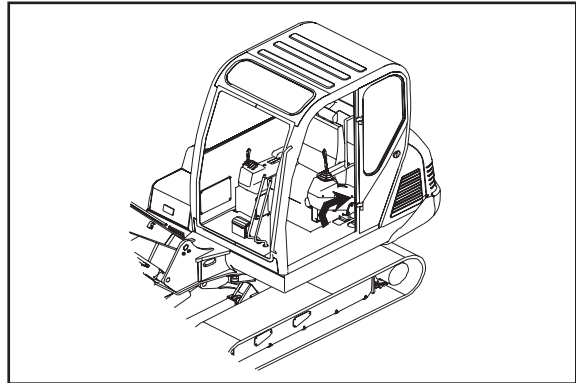


WARNING: After completing work or operating, before leave the seat, the operator should lift the safety lock lever at first to make the pilot operating oil circuit is cut off. For in case that somebody impact the operating lever accidentally what cause the machine move.

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

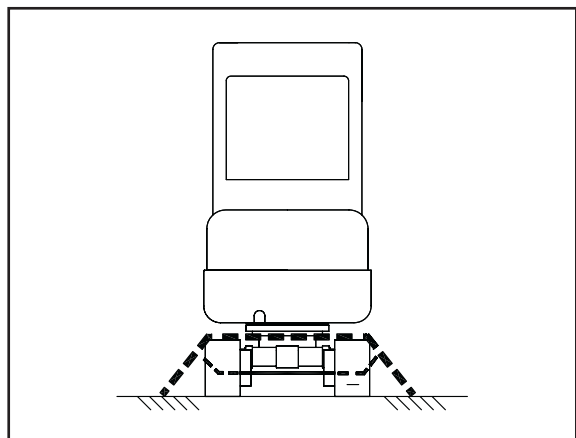
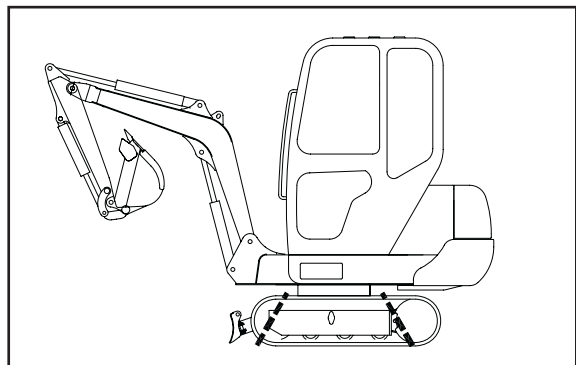
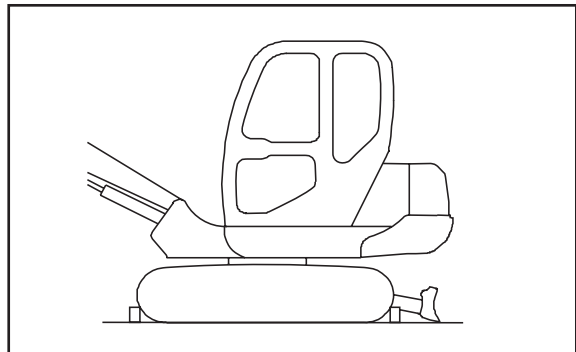
3. Fix the machine on the trailer

- 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

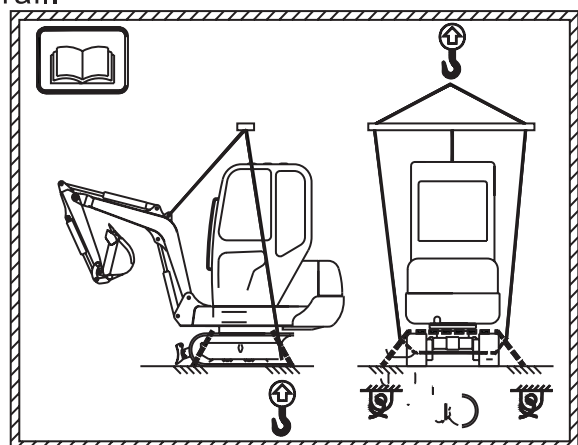
- 1) Don't suspend the machine when there is somebody on it.
- 2) It must be sure the chain that use to suspend the machine have the enough intensity to carry the weight of the machine.
- 3) In order to avoid the machine's unbalance, it must do just like following provided steps.
- 4) Don't suspend the 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.

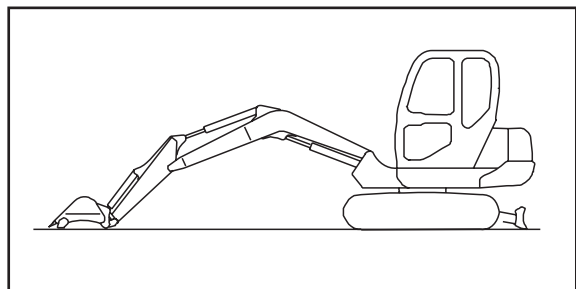
Long term storage

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 not 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

Maintenance Information

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 form 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

- 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.

Oil choosing list

As the temperature of the condition 、 the using fact to choose the oil plants. But the oil plants must pass muster:

	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	24
Hydraulic oil tank	L	24

The Tighten Moment

Please refer to the following values about the tightening torque of bolts and nuts. If bolts or nuts can not be screwed to the stated torque, that will cause failure of machine and bad influence in working.

Standard torque list

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

Maintenance List of Time-Check

Refer to the list and the calculagraph,time-Check and maintenance to the machine.If the condition of the machine bad or the working intensity strong,or it hast the hydraulic crash hammer and so on,the period of some parts maybe reduce.

No.	Item	Period of Maintenance (Total of the Working Hour)					
		10	50	100	250	500	1000
1	General Check						
	●Whether the machine oil、 water、 fuel leak	▲					
	●Parts of the machine and the appearance of the soft pipe	▲					
	●Fix circs of bolt and hydraulic joint	▲					
	●Circs of the operation device、 light 、 indicator light	▲					
●Working circs of the diesel engine	▲						
2	Fuel System of The Engine						
	●Check the level of the oil and supply	▲					
	●Vent the water and the impurity			▲			
	●Clean the oil tank				▲		
	●Check the pressure of oil injection					▲	
●Replace the filter core					▲		
3	Cooling System of The Engine						
	●Check soft pipe and cutting sleeve	▲					
	●Check the level of the coolant	▲					
	●Clean the vane of the radiator					▲	
	●Replace the coolant		☆				■
●Check the consistence of the coolant	▲						
4	Lubricate System of The Engine&Other						
	●Check the level of the machine oil	▲					
	●Replace the machine oil		☆		▲		
	●Replace the filter core of the machine oil		☆		▲		
	●Check belt of the fan		☆	▲			
	●Check the gap of the valve					☆	▲
	●Check fastening circs of the cylinder					☆	▲
●Check fastening circs of the engine bearing		☆			▲		

No.	Item	Period of Maintenance (Total of the Working Hour)						
		10	50	100	250	500	1000	2000
5	Air Intake System of The Engine							
	● Break out the deposit tank	▲						
	● Clean the core of the air filter			▲				
	● Replace the core of the air filter					▲		
6	Hydraulic System							
	● Check the level of the machine oil	▲						
	● Vent the water and dust of the oil tank				▲			
	● Replace the hydraulic oil, clean the filter							▲
	● Replace the return oil of the hydraulic oil and the core of the guide loop filter		☆			▲		
● Check the pressure of the system					▲			
7	Accumulator							
	● Check the level of the electrolyte		▲					
	● Check the acidity and the state of the electrification					▲		
8	Pedrail							
	● Check and adjust the tension state of the pedrial				▲			
	● Check the level of the oil and immit						▲	
	● Replace the machine oil		☆			▲		
9	Reducer							
	● Check the tighten moment of the reducer which connect the bolt	▲						
10	Bear wheel ,carrier wheel ,guide wheel							
	● Check the tighten moment		☆			▲		
	● Check the level oil of the guide wheel/carrier wheel						▲	
11	Lubricate							
	● Immit lube to the point which need		▲					



Routine period to do



Maintenance of the first time to do



Every spring and Autumn

Routine Check and Maintenance

Daily check or every 10 hours.

1)Check for oil, water and fuel leakage (if the case refill all fluid after you eliminated the defect)

2)Check for cutting, cracks or deformations on connection, muffers, accessories and machine frame.

3)Check for tightening and connection of hydraulic equipments.

4)Clean and check all controls (lever and pedal), lights and gauges.

5)Check engine state, particularly for exhaust colour and noise emission.

Fuel System of the Engine

Maintenance manual

Capacity of the oil tank-----	24L
Check the level of the oil-----	10h
Vent the water and the impurity from the oil tank-----	100h
Clean the oil tank-----	250h
Check the pressure of the oil injection-----	500h

1. Checking the fuel level and refueling.

You can check the oil level through the oil mark on the tank or the instrument in the cabin.

Do remember to refuel after work everyday.

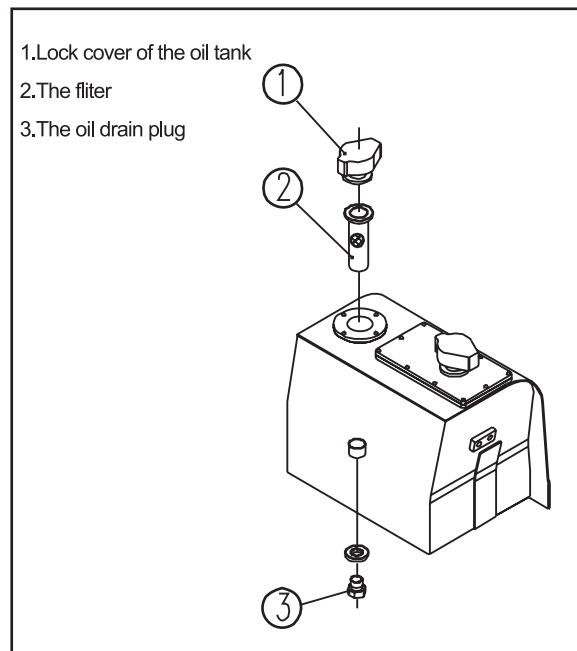
2. To drain the water and the impurity from the fuel tank

Get rid of water and impurities on the bottom of the tank every 100 working hours.

3. Clean the fuel tank

Clean the fuel tank with diesel oil every 250 working hours.

Caution: Wash the oil tank with diesel oil only



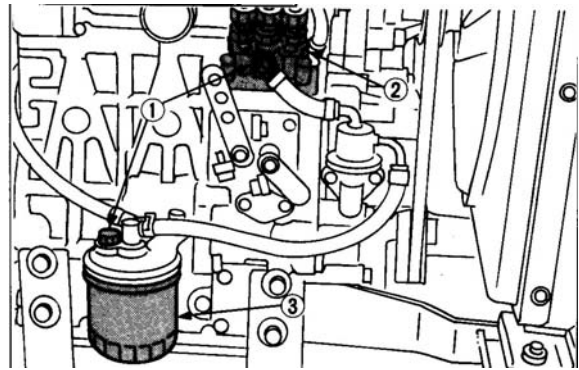
4. Draining the air before restarting the engine after you change the filter, cut off the fuel pipeline, clean the filter or bleed the air from fuel tank.

1) Fulfill the fuel tank and open the oil cutting valve of fuel of filter.

2) Loosen the bleed bolt in the fuel filter ① until the air is drained out completely.

3) Loosen the bleed bolt ① of ejecting pump until there is no air bubble, then screw the bolt.

*



① air exhausting bolt

② piston pump

③ fuel filter



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

5.Pre-filter of the diesel oil

Change the filter core every 500hours

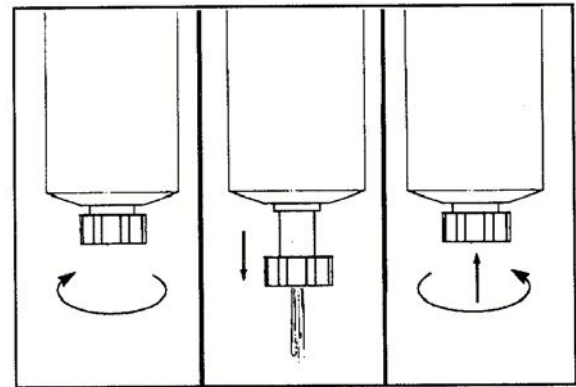
Vent the water and the dust of the separator everyday.

1)Stop the engine,open the outlet valve,and turn the valve about half and three circle counterclockwise till the valve drop down about 25.4mm(1 inch) and start to vent

2)Vent the water of the separator till see the cleanly fuel.

3)Screw down the valve clockwise when close the valve.

Caution:Don't screw the valve too tight. It will destroy the thread.



Turn the valve counter clockwise

Down the valve

Turn the valve clockwise

6.Replace the filter core of the fuel

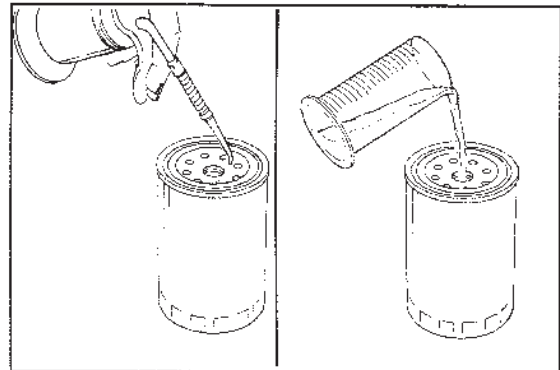
Replace it every 200hours or every 3 months.It must use the sterling filter core

1)Take-down the filter of the fuel

2)Use the cloth which not cottony to clean the surface of the sealing gasket.

3)Disuse the "O" ring.

4)Install the new "O" ring.



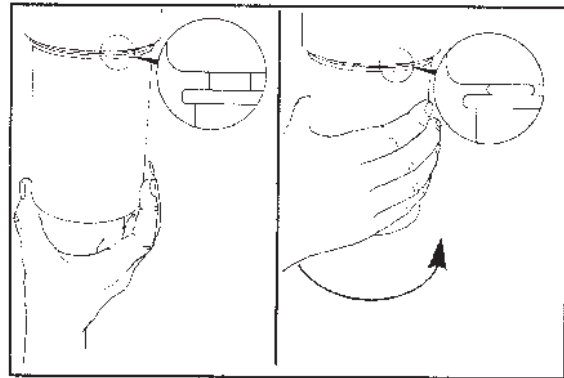
Caution:Check whether the base of the filter core has the old sealing gasket.If it has the old sealing wagher,it will leak oil.

5) Use the new fuel top up the new filter, and use the clean machine oil to lubricate the "O" seal ring.

6) Install the filter as the manufacturer's order

Caution: For Reducing the feasibility of the fuel leaks, it make sure to install the filter fix but on too tight. Too tight will destroy the filter of the fuel.

7) After replace the filter core, start the engine and Check whether the surface of the seal ring leaks the oil.



Cooling System of the Engine

Maintenance instructions

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-----	Every 6 months (spring & autumn)
Check the consistency of the coolant -----	Everyday or every 10working hours

1.Check the level of the coolant

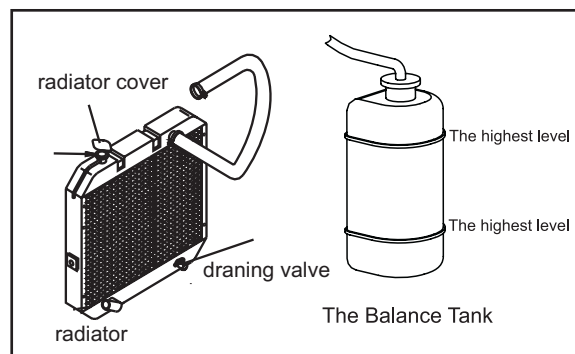
Check the coolant level in radiator before a new machine is used, and after that check the level every day or every 10 hours

Take out the radiator cover and check the level of coolant.

The coolant surface should be under the water filler 200 mm

Examine the coolant surface in the balance tank.

When the engine is in cool state, the surface should be between the highest and the lowest position.



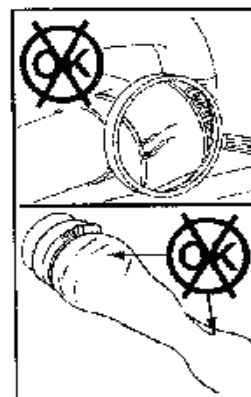
Warning: when unscrewing the radiator cover, the hot coolant will burst out. The way of unscrewing cover: after the system is cool down and then unscrew the cover slightly to release the pressure.

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 500 hours.

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.



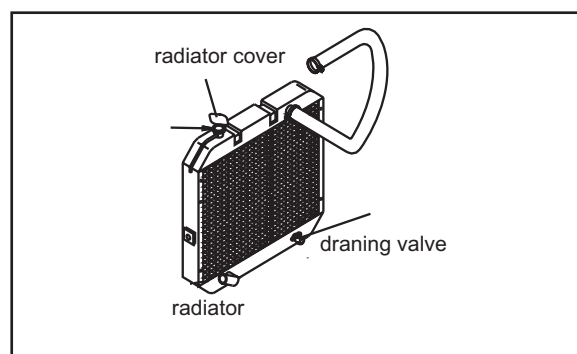
Warning: It is dangerous when the compress air, the high-pressure water, the steam hit the body. It must use the glasses, the veil and so on

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

Replace the coolant after the first 50 working hours. After that, replace the coolant twice a year (on spring and autumn).

- 1) Drain the coolant in the radiator
- 2) Wash the radiator with water, start the engine at low idle speed for 10 minutes. Then stop the engine and drain all the water in the system.
- 3) Close the blow off valve.
- 4) Add coolant for radiator and run the engine at the low idle speed for a few minutes.
- 5) Check and refill the coolant.





Warning: DO NOT open the cover of the radiator (water tank) when the engine is hot.

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 manual

Capacity of the radiator-----7L

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

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

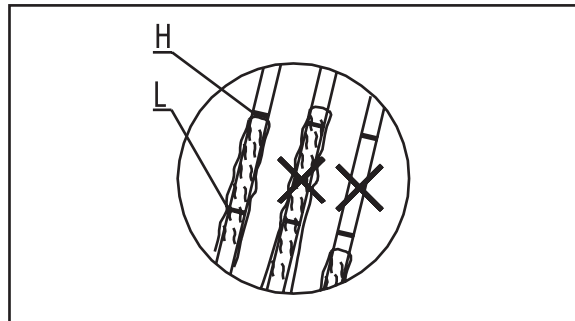
1.Check the oil level

Check the level of the oil before start the new machine.Then Check it every 10 hours.

1)Place the digger to the level road,and stop the engine.

2)Open the cover of the engine,take out the staff guage of the machine oil.Observe the value which has the oil.The level of the oil should lie in the value between the lowest(L) and the highest(H).

3)It can immit the oil through the sprue to make the level of the oil arrive the ordain value.



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.



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

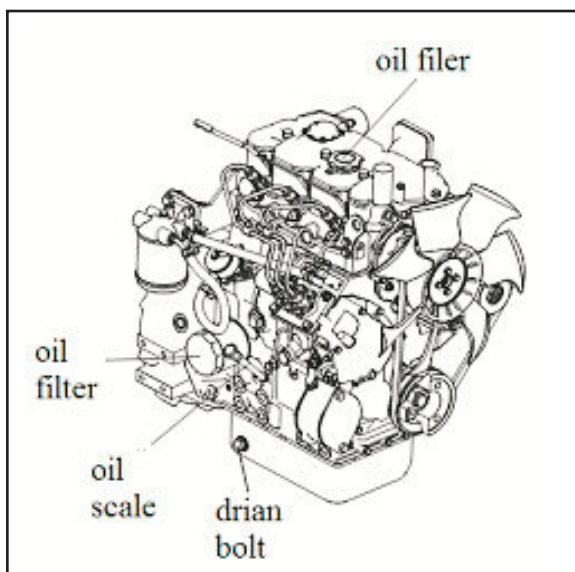
- 3) Clean the vent bolt and install, if the seal ring has broken, it needs to be replaced.
- 4) Open the sprue.
- 5) Fill the new machine oil until the oil reaches the "Max" of the oil leveler.
- 6) Close the cover of the sprue, and run the engine about 5 minutes.
- 7) After stopping the engine about 10–20 minutes, check the level of the machine oil. It may require adding machine oil if necessary.

3. Replace the filter core which for the engine oil of the engine

The first cleaning after the new machine runs 50 hours. Then clean or replace it every 250 hours.

Replace the filter of the engine oil

- 1) Clean the area which is around the base of the filter, take down the filter of the machine oil, clean the surface of the base.
- 2) Lubricate two seal gaskets which lie in the right of the filter.
- 3) Before installing the filter, it needs to be wiped with machine oil on the surface of the seal gasket.
- 4) Install the filter as the manufacturer's request.
- 5) Run the engine with the low-speed, check whether the filter leaks the oil.
- 6) Stop the engine and wait 15 minutes to make the engine oil return.
- 7) Check the level of the oil. Fill the machine oil to the "H" sign if necessary.



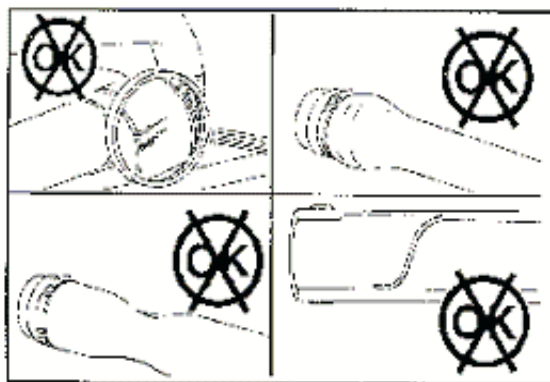
Air intake system of Engine

Maintenance manual

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 the air intake pipe every day and confirm there are no wear, breach or loose. These problems can damage the engine.

Change the broken pipe if necessary and screw tight the loose clamp for insuring noleak for air system.

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



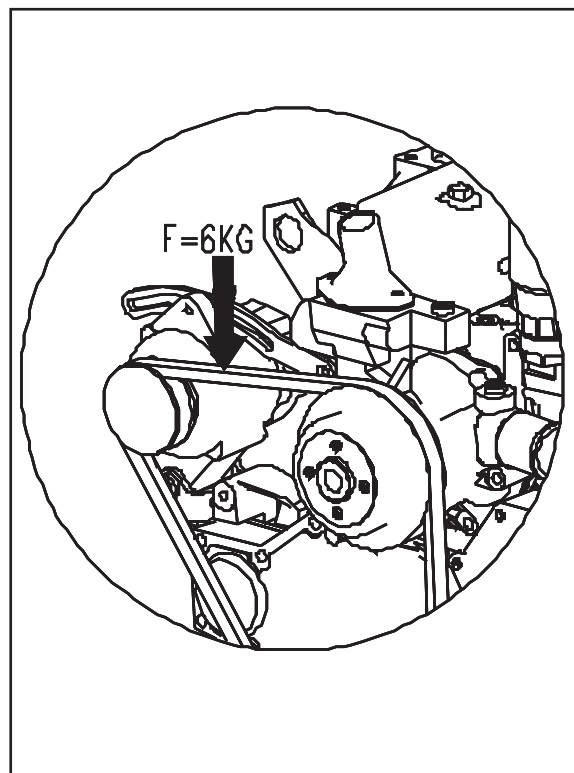
Warning:It has the audition problem with temporary oreverduring if the machine has the noise too big.It need wear the earplug when do the maintenance and in the noise long time.

● 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 manual

Capacity of the hydraulic oil tank-----	24L
Check the level of the oil-----	10h
Replace the filter-----	500h
Replace the hydraulic oil-----	1000h
Check the pressure system-----	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.

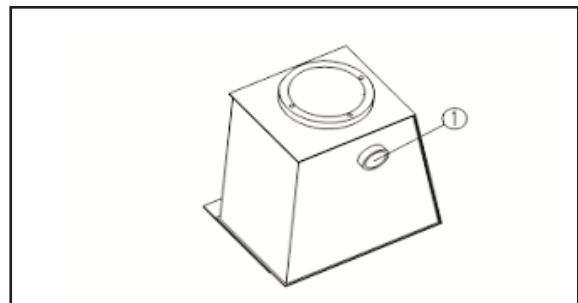
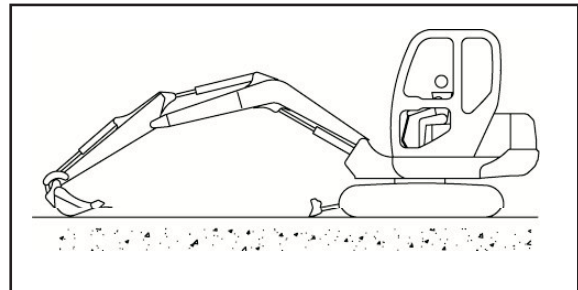


Warning: only do the maintenance when the hydraulic oil is cold. For avoiding the hydraulic oil spurt out, please turn slowly to release the inner pressure when remove the oil filler cover.

1. Check the level of the oil of hydraulic pressure tank

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) Draw back the arm cylinder, extend the bucket cylinder, then place the bucket and dozer blade on the ground (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 can be saw 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.

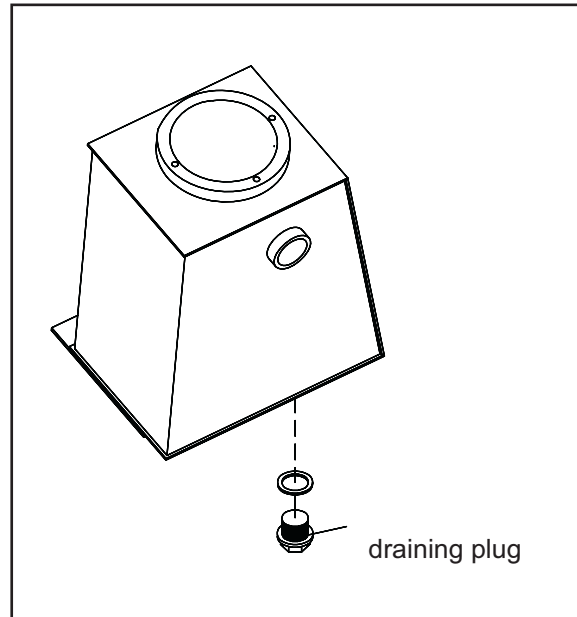


Caution: The level of the hydraulic oil will change when the temperature up. Before operate, the level lie the middle of the oil leveler, and when the temperature up, the level will arrive the top of the oil leveler.

2.Vent the water and the dust of the oil tank

Vent the water and the dust of the oil tank every 250hours.

- 1)Vent the air of the oil tank after stop the machine and the temperature down or before start the machine everyday.
- 2)Loosen the oil drain valve which lie in the bottom of the oil tank or the oil drain cock(see the picture)
- 3)Vent the water or the dust till the limpud hydraulic oil.Close the oil drain valve or screw down the bolt.
- 4)If the oil lacks,it should supply it.



3.Replace the hydraulic oil and clean the filter

Replace and clean it 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 nend 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)To extract hydraulic oil with oil pump and put it into a empty oil drum.

5)Loose the draining valve or draining plug on the bottom of oil tank, drain the remainder out completely.

6)Put down the oil intake filter.

7)Clean the inside of oil tank.

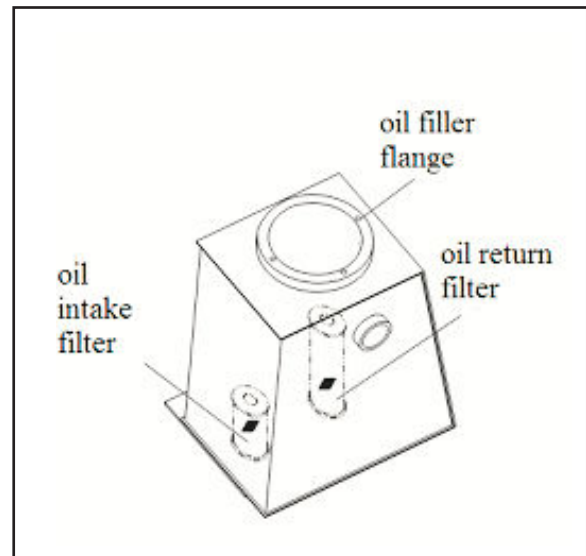
8)Clean the drain plug and reassemble.

9)Clean the oil intake filter

10)Fill the regulated hydraulic oil (see oil choosing oil list)

Until the oil lever has reached to the middle of oil scale.

11) Assemble the oil intake filter and cover the air filter



4.Drain the air which in the hydraulic system

A. Drain the air which in the pump

1)Loose the drain bolt of the vent, and check whether it has the oil out. Over the exhaust.

2)Over the exhaust*screw down the bolt.

Caution: If it run the pump without the oil, the pump will have the high temperature and make the pump break prematurely.

B.Vent the air which between the pump and the hydraulic oil tank

- 1)Start the engine,and keep it run with the mid-speed
- 2)Operate the operation device slow about 5 minutes to vent the air

Caution: If the engine runs with the high speed if it didn't vent the air which between the pump and the hydraulic oil, the pump also has the high-temperature

C.Vent the air which in the oil tank

- 1)Under the engine runs with the low-speed, draw/throw out the oil tank to the part 4-5 times which the end of the driving about 100mm(It mustn't draw/throw out to the end)
- 2)Then operate the oil tank to stroke end for 3-4 times
- 3)Last, operate the oil tank to stroke end for 4-5 times, and vent the air

Caution: If starts the machine and runs the engine with high-speed at once or the operate the oil tank to the end of the driving, the air which in the oil tank can destroy the piston airproof, and destroy the oil tank.

D.Vent the air which in the rotating motor(when it vent the oil from the shell of the rotating motor)

Caution :No rotating the machine at any time during vent the air

- 1)Run the engine with low-speed, loosen the blowoff cock, examine whether the oil outflow from the drain bolt
- 2)If it doesn't have the oil outflow, take-down the drain bolt, then immit the hydraulic oil into the crust of the motor
- 3)After vent the air, screw down the drain bolt
- 4)Last runs the engine with the low-speed, and turn the frame of the machine to left/right about two times.

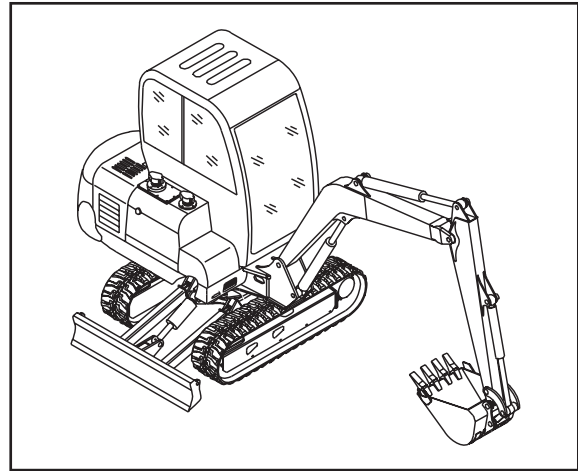
Caution: If it doesn't vent the air which in the motor, it maybe destroy the bearing of the rotating motor.

E.Vent the air which in the driving motor(when it vent the oil from the shell of the driving motor)

1)Run the engine with low-speed, loose the blowoff cock. If the right oil outflow, screw the bolt.

2)Run the engine with low-speed, make the operation device rotating 90° ,and let it lie in one side of the pedrail.(See the picture)

3)Use the operation device uplift the machine, make one side of the pedrail away the ground litter, and run the pedrail 2 minute. Repeat do for the left/right pedrial, and turn the pedrail forwards and backwards



F.Vent the air which in the attachment

If the machine has the attachment, it need run the engine with low-speed, and operate the footplate of the attachment(about 10 times),till the air vented from the pipe laying of the attachment.

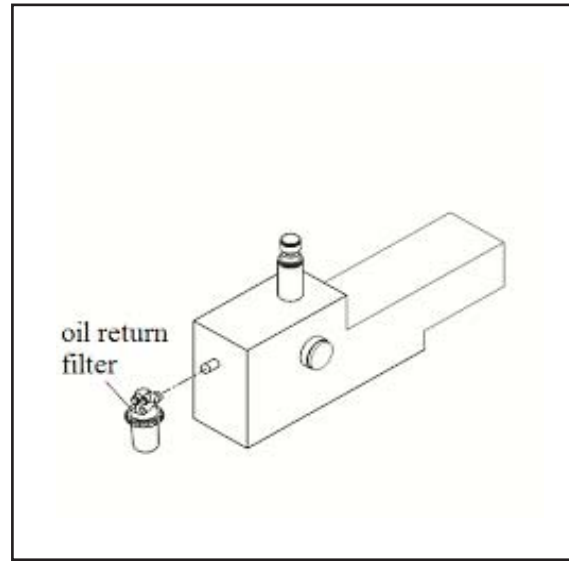
Caution:

- 1.If the manufacturer has the way for vent the air,it should do it as the way**
- 2.After finish the operation, stop the engine. It need lay up the machine 5 minutes before start the operation to clear the air bubble of the oil tank**
- 3.It shouldn't leak when checking. Wipe the oil which spill over.**
- 4.After the operation, check the level of the oil. If the level of the oil is low, it need supply it.**

5. Change the oil intake filter core.

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

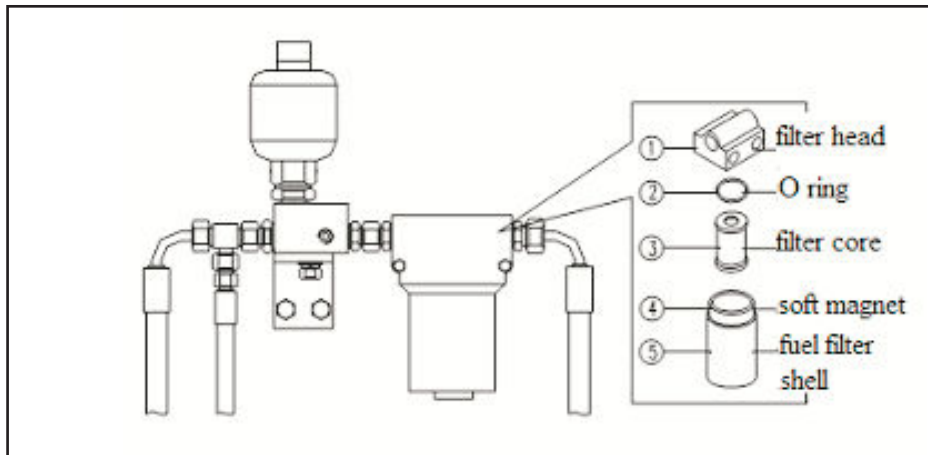
- 1) Take down the oil filler flange from the top of the oil tank
- 2) Take out oil return filter from the inner of the oil tank
- 3) Use the diesel oil to clean the filter core or replace the new core, then fix the filter back.
- 4) Install the cover of the oil tank



6. Replace the oil filter core of the pilot

Replace it every 500 hours

Caution: It must drain the pressure of the hydraulic oil tank before take out the filter core.



- 1) Screw down the filter shell
- 2) Take out the filter core
- 3) Install the new O ring into the groove of the filter head
- 4) Wipe the hydraulic oil on the surface of the seals before install the new core. Put the core

5)Clean the filter shell⑤ and soft magnet.No allow the duat and the water into the filter shell.

6)Screw down the filter shell and the filter head with the moment 25–35Nm

7)Connect the pipeline,and start the engine slow.And run 3–5 minutes vent the air

8)Place the machine on the level road,stop and check the level of the oil.It can supply the oil if it necessary.No let the oil over the highest limit

■The replace period of the hydraulic oil and the filter core when it the attachment(Crush hammer,ect.)

It increase the pollution of the hydraulic system when use the hydraulic hammer.The replace period of the hydraulic oil and the filter core reduces,too.Avoid destroy the hydraulic pump and other hydraulic elements,it suggest the periods as follow:(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:It adjust the pressure of the system as the hydraulic hammer'request when use the hydraulic hammer.

Battery



Warning: 1) It has liquid vitriol inside the battery, this kind of liquid is with strong causticity, please keep children away, when the user operating the battery, please wear the protecting glasses and rubber glove, if there are some vitriol splash into your eyes, skin or close, please cleaning by water, any worse condition must go to hospital.

2) It will produce the hydrogen and oxygen when the battery is being charged, once the gas mix with fire or the vent is blocked will cause explosion, so please keep the battery far from fire and avoid short circuit.

3) Battery house was made by polypropylene, it is tinderbox and should be kept far from fire.

1.Storage of Battery

1)This is liquid flow battery and should to be deposited in the circumstance with 5~25°C dry, clean and ventilative, and should not to be sunned straightly, far from the heat sources above 2m at least. It will greatly influence the capability of battery if the temperature is too high.

2)The battery don't to be upended or lied on the ground, also should not to be struck or pressed by any kind of machine.

3)The storage period for this battery is 6 months, it is needn't to charge the battery during storage period, after deposited exceeding 6 months, please charge before used.

2.Charge of Battery

The electrolyte will become the hydrogen and oxygen during charge, so it will vaporize the water, higher voltage will vaporize more water. This series battery needn't to fill the water during operating, so we will highly suggest to charge at constant voltage and try to avoid constant current charging method.

2.1Battery recharging

2.1.1) Constant current charging method

Charge the battery 2~4 hours as 10% current (A) of 20 hours rate capacity.

2.1.2) Constant voltage charging method

Charge the battery 16 hours as 16V (Max current is 25A).

2.2 Normal charge of Battery

2.2.1) Charge the battery 2~3 hours as 10% current (A) of 20 hours rate capacity until the voltage of battery head is 144V.

2.2.2) Charge the battery 25 hours as 16V (Max current is 25A).



- 1) It is producing gas during charge, please check the exhaust hole of battery for insuring it is not to be plugged and avoiding explosion.**
- 2) The positive pole of battery should to be contact with the positive pole of the charger and same for the cathode, charge reversely is strictly prohibited.**
- 3) If the degree of the electrolyte is exceeding 450C during charge, please lower the charging voltage and current for preventing the electrolyte splash out as over heat.**

3.Installation of Battery

- 1)Please read the safety mark on the battery before performed the installation for preventing the accident.
- 2)Please wipe some Vaseline on the end of poles for anti–corrosion, wire connection should be firm and credible, strictly prohibit to knock on the end of poles for preventing the poles losing and leaking vitriol.
- 3)When installing the battery, please contact the positive pole of battery with the positive pole of the charger, and then contact the cathode pole.
- 4)Use the up– fixation or low–fixation method to fasten the battery on the bracket, preventing the battery is damaged as loose.

4.Maintain of battery

- 1)There have a indicator on the cover of battery, the battery can be use normally if the indicator is green, when it is black, please charge immediately, when it is white, please change the new battery.
- 2)Please charge immediately if the battery is capacity loss during use, if not the battery is sulfation and lower capability.
- 3)Strictly prohibit to charge overtime, preventing the battery is premature invalidation as water over lose, growing grid and diachylon fall off.
- 4)Please remove the battery from machine and keep it at the dry, ventilative place if the machine was park a long time (exceed 15 days), charge the battery after each 3~6 months (as the indication of the indicator).
- 5)Any questions of the battery, please contact with the supplier for explaining.

Reducer

Instructions of maintenance

Lubricant capacity of slewing reducer	1.6L
Lubricant capacity of reducer	2.5L (each side)
Check the lubricant oil level and refill	every 250 hours
Replace the lubricant	every 1000 hours
Check the tightening torque of reducer connecting bolt	every 500 hours

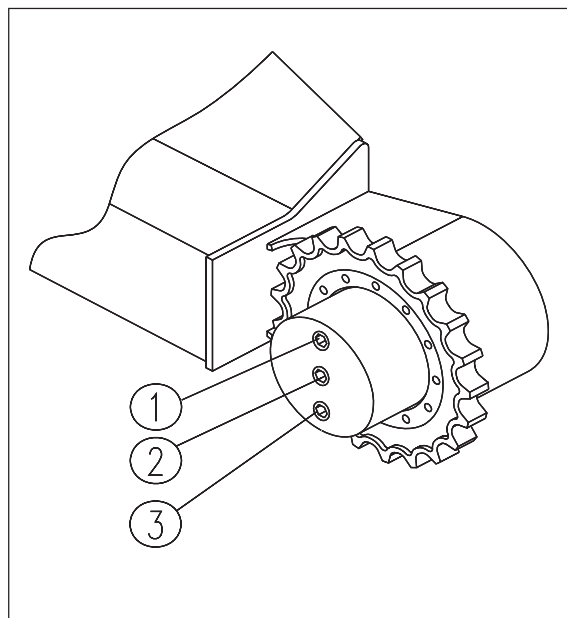
1. Check the level of the lube for the driving reducer and put on steam



Warning: The oil of the reducer will heat when the machine drives. The driving reducer and the oil in the high-temperature after stop the engine. It will make scald. It must wait the oil cool before start. Loose the vent bolt two or three, it can take-down the bolt after release the air pressure. It is dangerous to take-down the bolt fast.

Check it every 250 hours

- 1) Prepare a inside hexagon spanner.
- 2) Stop the Excavator on the level road.
- 3) Turn the driving reducer make the two bolt of the outboard in "a" position (see the picture), then stop the machine
- 4) After the oil cooling, open the bolt ①
- 5) After release the air pressure, use 12-15Nm the moment to screw down the bolt ①
- 6) Open the bolt ②, check the position of the level. The height of the level should arrive the bottom of the bolt hole



7) It can supply the machine oil if it necessary (as the way to append the oil)

8) Clean the bolt ②, install to the reducer again. The tighten moment is 12-15Nm.

2. Replace the lube (For each reducer)

Replace it every 1000 hours

- 1) Stop the Excavator on the level road.
- 2) Turn the driving reducer make the bolt ① in "b" position (see the picture)
- 3) Vent the oil when the oil of the reducer is in the hot state.

Caution: Don't let the hot oil scald

- 4) Loosen the bolt ① and vent the oil, and loosen the bolt ② to make vent the oil complete
- 5) Turn the driving reducer make the bolt in "a" position
- 6) Append the oration lube through the sprue till the check hole ② of the level has the oil out.

3. Check the tighten moment for the driving reducer with the connect bolt of the rotating reducer

A. Fixing check for the connect bolt of the driving reducer

After runs 50 hours check it the first time.

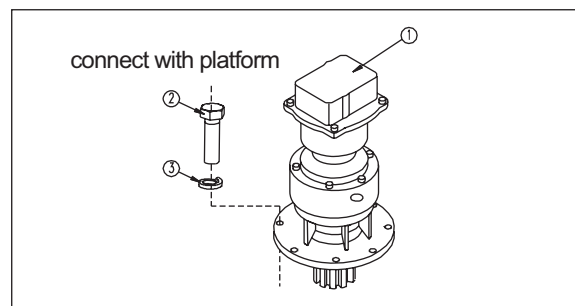
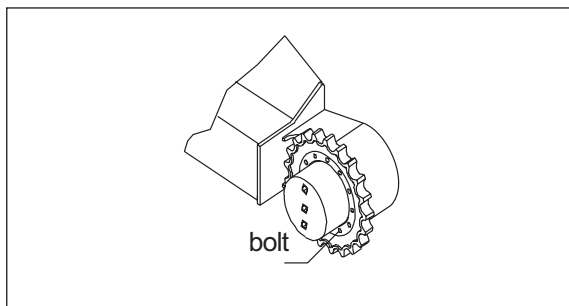
Then check it every 500 hours.

The tighten moment is $150 \pm 10 \text{ Nm}$ for the bolt which connect the reducer*the base and the driving wheel.

B. Fixing check for the connect bolt of the rotating reducer

After runs 50 hours check it the first time. Then check it every 500 hours.

Tighten the bolt which connecting the reducer and platform.



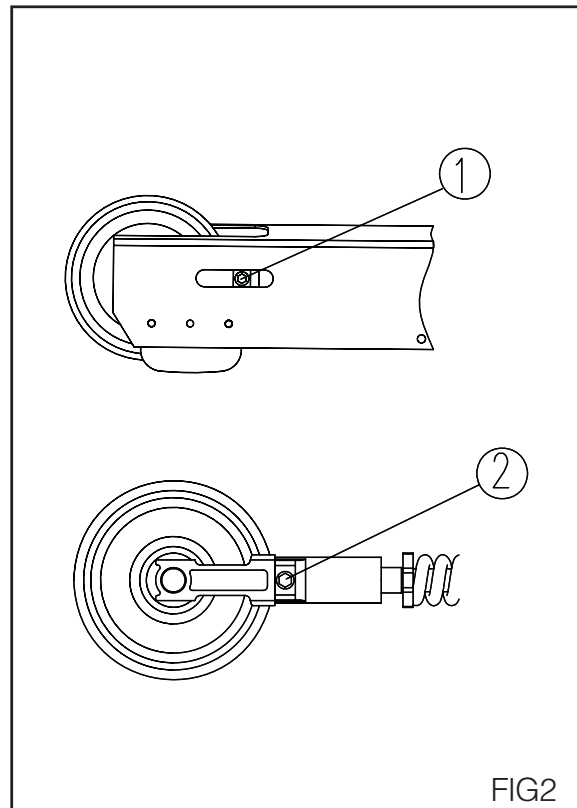
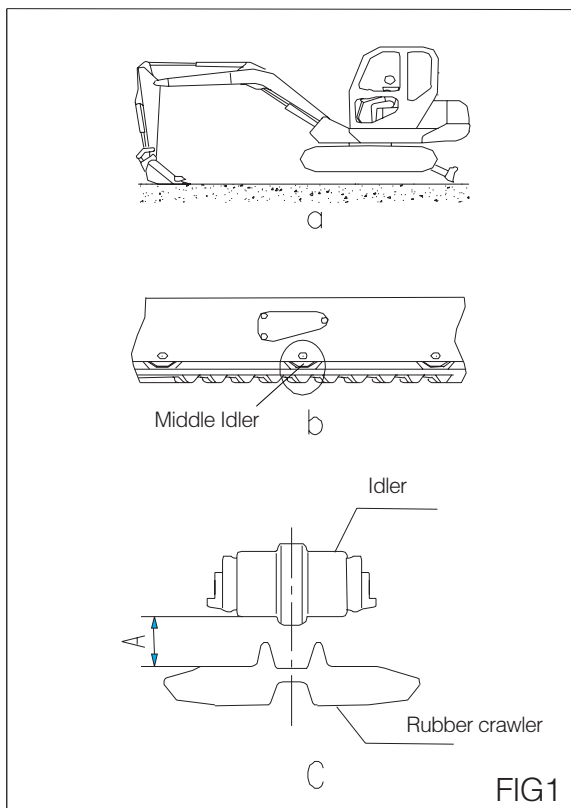
Crawler

Check and adjust the tension state of the crawler

Rubber Crawler

Check every 10 hours

- 1) Place the excavator on the smooth and hared road.
- 2) Turn the bulldozer blade at rear, and extend the dozer cylinder until the crawler is uplift.
- 3) Place 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 (C in fig.1) is 10–15mm.
- 5) Take down the cover (B in fig.1) on the crawler frame, and will see the oil filler (① in fig.2)
- 6) To loose the crawler, please loose the joint ② (fig.2) for releasing the lube, and tighten up this joint after the crawler get the correct tension state.
- 7) To adjust the tension of crawler, please use the grease gun to fill the oil from joint ② (fig.2) until the crawler get the correct tension state.



Idler, Upper roller and guide wheel

1. Check the tighten moment of the support roll

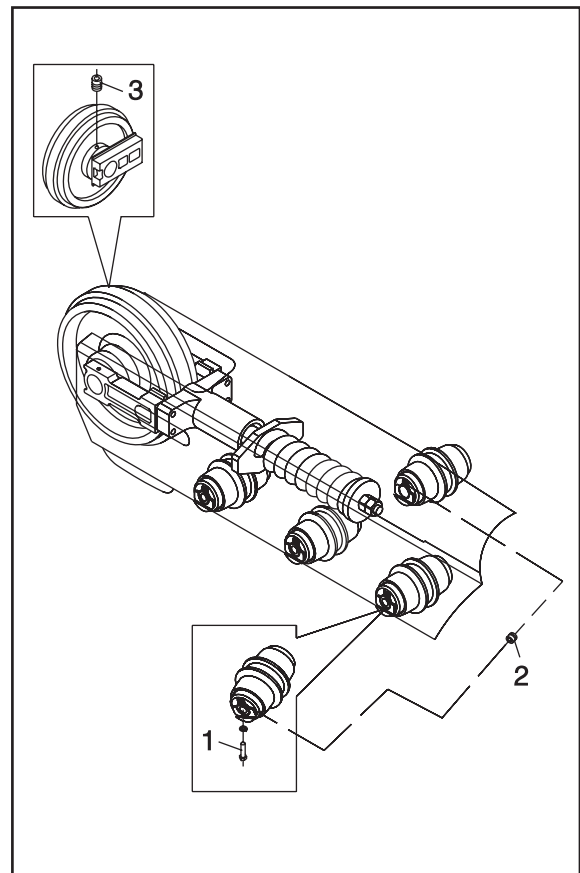
After runs 50 hours check it the first time.

Then check it every 500 hours.

The tighter moment of the bolt① is 420Nm.

If it finds the bolt looses, it need screw it down and clean the thread additive which for lock and fix of the bolt. And wipe the additive again, then screw down it with the tighten moment which requested.

If it need to replace the bolt, it must use the same bolt.



2. Check the level of the machine oil for the carrier roller and leading roller

Check it every 1000 hours.

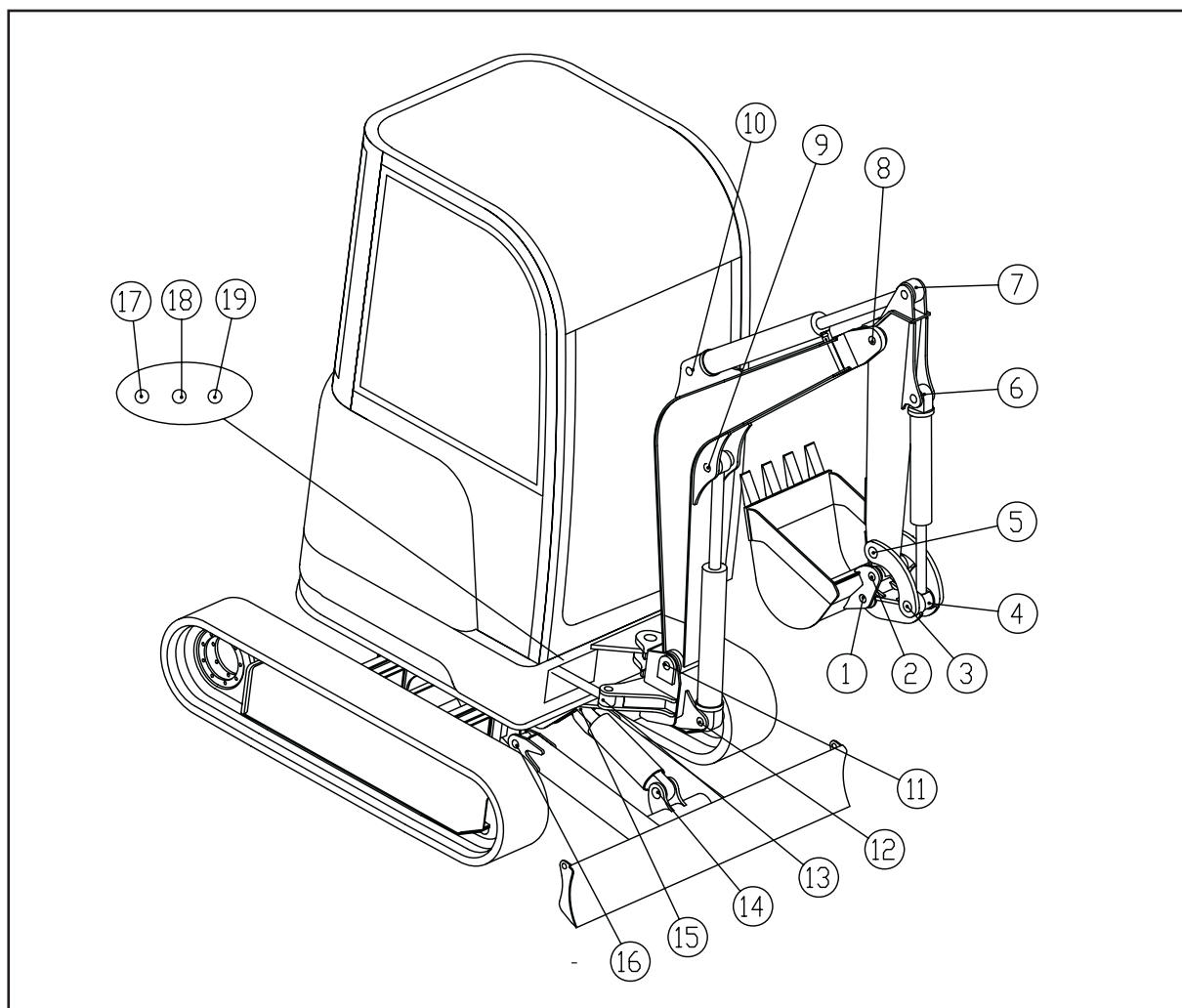
- 1) Take out the nut②③ of the carrier roller and leading roller
- 2) Immerse the oil
- 3) When the sprue has the oil out, screw down the nut②③ again.

Lubricate

Lubricating the parts which need every 50 hours

The step:

- 1) Start the operation device, and put the bucket to the ground
- 2) Put the bulldozer to the ground
- 3) Stop the engine
- 4) Clean the sprue of the oil cup
- 5) Lubricating the parts and wipe the superabundance



1. connecting point of connecting-rod and bucket
2. connecting point of arm and bucket
3. connecting point of rocker and connecting-rod
4. lubricating point of the bucket cylinder
5. connecting point of rocker and arm
6. lubricating point of the bucket cylinder
7. lubricating point of the arm cylinder
8. connecting point of boom and arm
9. lubricating point of the boom cylinder
10. lubricating point of the arm cylinder
11. connecting point of boom and platform
12. lubricating point of the boom cylinder
13. lubricating point of the swing cylinder
14. lubricating point of the dozer cylinder
15. lubricating point of the dozer cylinder
16. connecting point of dozer blade and Chassis
17. lubricating point of the swing cylinder
18. lubricating point of slewing support track
19. lubricating point of the slewing support teeth ring

Replace Bucket teeth

It replaces the gear of the bucket before the base of the gear fray.



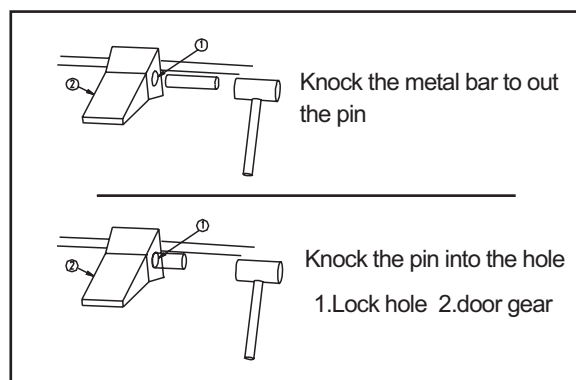
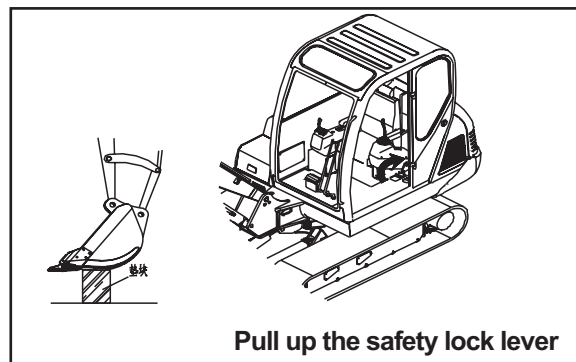
Warning:If the operation device because of the wrong operation and lead it moving,it very dangerous when replace the gear. Before replace the gear,it should make the operation device locked,then stop the engine and let all the joy stick locked.It need use the guard to avoid the axes out.

Replace the gear

1)Make the base device of the bucket on the stow-wood for take-down the axes. Check whether the operation device stay the tranquilization state and the bucker place level.Then push up the safety lock of the left control box,then stop the engine.

2)Put the metal stick which the diameter smaller than the axes on the axes'head,use the hammer knock the stick to knock out the axes,and take-down the gear.

3)Clean the installing surface.Install the new gear into the base of the gear,use the hand push the axes into it,then use the hammer knock the axes into the lock to make the gear into the base of the gear.



Washing the floor mat

Avoid the floor slip、tumble to make the accident,please wash it at any moment if it dirty.

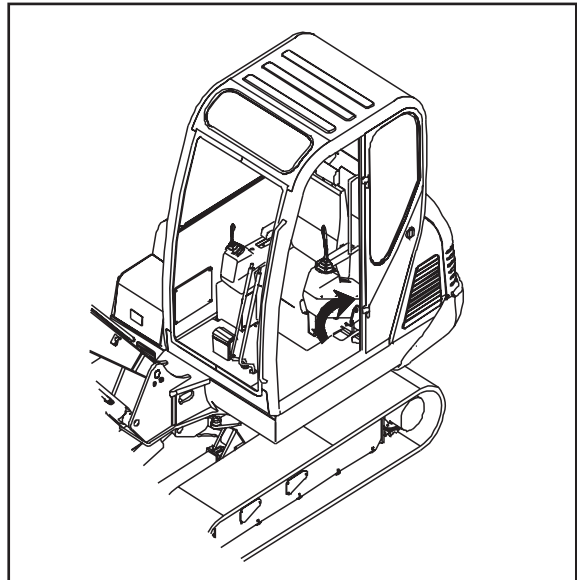


Warning:If it touches the joy stick unguarded,the operation device or the machine will move,and lead the accident.

So it must place the machine on the hard and smooth road before take down the plastic cushion.It must uplift the guide safety handle and the top control box to lock the guide system before the operator leave the seat.

The step for washing the plastic mat:

- 1)Take the plastic cushion out the cab
- 2)Use the brush to washing the dunghill or use the water washing it.
- 3)Use the clean mop to clean the floor
- 4)After the plastic cushion dry take back.



MATERIAL SAFETY PLEASE REFER

1. Chemicals name
【dangerous articles name】 : Diesel Oil
【Chinese name】 : 柴油
【English name】 : Diesel Oil
【Molecular formula】 :
【Relative molecular weight】 :
【CAS number】 :
【Fatalness classification】 :
2. Composition and characteristic
【Basic ingredient】 :
【Appearance and characteristic】 : Viscous Brown Liquid
【Function】 : Fuel of Engine
3. Health Hazard
【Intrusion Approach】 :
【Health Hazard】 : The absorb approach is breathing and it may bring emergency jury to the entrails. Diesel can cause contact dermatitis and oily acne. Breathing the fogdrop and chopping the liquid of diesel may cause aspiration pneumonitis. And the diesel can get into the brood of infant trough placenta. The exhaust gas of diesel irritates the eyes and chest, also cause the head dizzy and headache.
4. Emergency Treatment
【Contacting skin】 : Take off the polluted clothes immediately and wash the skin with soap and clean water. Go to the hospital.
【Contacting eyes】: Wash eyes with flowing water and normal saline. Go to the hospital.
【Breathing】 : Away from the scene and go to the spot with fresh air. Keep better breath and provide the oxygen therapy if the person is lack of oxygen. If absence of breath happens, the artificial respiration must be taken. Go to the hospital.

【Eating】 : Adopting gastric lavage and go to the hospital.
5. Burning characteristic and fire fighting
【Flash point】 :38
【Lower limit of burning】 : No information
【Ignition temperature】 :257
【Upper limit of explosion】 : No information
【Hazard characteristic】 : Contacting with the fire, hyperpyrexia and oxidant may cause burning and explosion. Meeting the high temperature may cause cracks and burning.
【Approaches of fire fighting】 :Fireman must wear gas mask and protecting clothing, fire fighting should be carried out on the upper drift. Move the container to a open area from the fire scene and keep the container cool through sparing water on it. Withdrawing the area when the color of container changes or the safe equipment makes a sound.
Fire extinguishing agent: spray water, foam, dry agent, carbon dioxide and sand soil.
6. Emergency Treatment of Leaking
Withdraw from the polluted area to a safety yard and isolated the polluted area. Cut off the ignition source. Working person must wear respirator and the working uniform. Do the best to cut off the leaking source. Prevent the leaking into the sewers and ditches or any enclosing spaces.
7. Notice for stock
【Notice for stock】 : Stocked in the warehouse in shade and keep venting. Keep away from ignition source and fire. Do not stock with oxidant and halogen. Use explosion proof light and keep venting.
8. Protecting approaches
【MAC in China】 : Not listed
【MAC in Former Soviet Union】 : Not listed
【Examine approaches】 :

【Project control】 : Operating in a seal space and pay attention to the venting.
【Protection of breathing systems】 : When the air consistency is exceeded, it is suggested to wear protection mask. Wearing respirator when emergent rescue happened or withdrawing.
【Protection of eyes】 : Must wear protection glasses.
【protection of body】 : Must wear protection clothing
【protection of hands】 : Must wear rubber groves
【other protection】 : No smoking in working area. Avoiding contacting over long period and repeatedly.
9. Physical and Chemical Characteristics
【Melting point】 :-18
【Boiling point】 :282-338
【Relative consistency (water=1)】 :0.87-0.9
【Relative consistency (air=1)】 : No information
【Saturated vapor pressure】 : No information
【logarithm of caprylicum/water Partition coefficient】 : No information
【Heat of combustion】 : No information
【Critical temperature】 : No information
【Critical pressure】 : No information
【Deliquescence】 :
10. Stability and reacting activation
【Stability】 :
【Polymerization Hazard】 :
【Forbidden】 : strong oxidizer, halogen
【production of burning decomposition】 :
11. Toxicology
【Acute toxicity】 : LD50: No information LC50: No information
【Thrill】 :
【subacute and chronic toxicity】 :
【Reproductive toxicity】 :

【Carcinogenicity】 :
【Mutagenicity】 :
12. Environment
【Environmental information】 : No information
13. Discarding
【Discarding】 : Refer to the country and local laws. It is suggested to use method of burning.
14. Transportation
【Number of danger stipulation】 : No information
【Number of UN】 :No information
【Packing classification】 : No information
【Packing labels】 :
【Packing approaches】 : No information
15. Rules and laws
【Rules and laws】 : Refer to the related rules and laws which issued by state department and department of labor.

Part I. Name of Chemicals

Chinese Name of Chemicals:	润滑油
English Name of Chemicals:	Lubricating oil
Chinese Name 2:	机油
English Name 2:	Lube oil
Number of technical instruction:	1279
CAS NO.:	
Molecular formula:	
Molecular weight:	230-500

Part II. Information of consisting

Hazard Ingredient	Content	CAS No.
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Part III. Hazard Information

Hazard classification:	
Approach of invasion:	
Health Hazard:	Suddenly breathing can cause power lacking, head dizzy, headache, nausea and Greasy pneumonia if seriously. The slow contact can cause oily acne and contact dermatitis. And also it can cause neurasthenic, respiratory tract and eyes irritation. It is reported that those workers who contact lubricating oil have chances to get cancers.
Environmental Hazard:	
Explosion and burning:	Inflammable and irritant

Part IV Emergency Treatment

Contacting skin	Take off the polluted clothes immediately and wash the skin with soap and clean water. Go to the hospital.
Contacting eyes	Wash eyes with flowing water and normal saline. Go to the hospital.
Breathing	Away from the scene and go to the spot with fresh air. Keep better breath and provide the oxygen therapy if the person is lack of oxygen. If absence of breath happens, the artificial respiration must be taken. Go to the hospital.

Part V. Fire fighting

Hazard characteristic	Contacting the fire, hyperpyrexia and oxidant may cause burning and explosion.
Noxious burning material	carbon monoxide, carbon dioxide
Approaches of fire fighting	Fireman must wear gas mask and protecting clothing, fire fighting should be carried out on the upper drift. Move the container to a open area from the fire scene and keep the container cool through sparing water on it. Withdrawing the area when the color of container changes or the safe equipment makes a sound. Fire extinguishing agent: spray water, foam, dry agent, carbon dioxide and sand soil.

Part VI. Emergency treatment of leaking

Emergency treatment	Withdraw from the polluted area to a safety yard and isolated the polluted area. Cut off the ignition source. Working person must wear respirator and the working uniform. Do the best to cut off the leaking source. Prevent the leaking into the sewers and ditches or any enclosing spaces.
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Part VII. Operation and stock

Notice for operation	Operating in a seal space and pay attention to the venting. Operator must
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	<p>wear protection glasses, protecting clothing and rubber gloves. Away from kindling and heat source, do not smoke in working place. Adopting explosion proof venting system and equipments. Preventing stem getting into the air in working place. Do not contact the oxidant. Handle the package and container with care to prevent rack and ruin. Equipment for emergency must be prepared. There may be some remained injurant in the empty container.</p>
<p>Notice for stock</p>	<p>Stocked in the warehouse in shade and keep venting. Keep away from ignition source and fire. Do not stock with oxidant and halogen. Equipment for emergency leaking and suitable container must be prepared.</p>

Part VIII. Contacting control/ Individual protection

<p>Professional contacting limits</p>	
<p>MAC in China</p>	<p>No standard</p>
<p>MAC in former soviet union</p>	<p>No standard</p>
<p>TLVTN</p>	<p>No standard</p>
<p>TLVWN</p>	<p>No standard</p>
<p>Examine approaches</p>	
<p>Project control</p>	<p>Operating in a seal space and pay attention to the venting.</p>
<p>Protection of breathing systems</p>	<p>When the air consistency is exceeded, it</p>

	is suggested to wear protection mask. Wearing respirator when emergent rescue happened or withdrawing.
Protection of eyes	Must wear protection glasses.
Protection of body	Must wear protection clothing
Protection of hands	Must wear rubber groves
Other protections	No smoking in working area. Avoiding contacting over long period and repeatedly.

Part IX. Physical and Chemical characteristics

Main ingredient	
Appearance and characteristic	Greasy liquid, light yellow to brown color. No odor or a little strange odor.
PH	
Melting point (°C)	No information
Boiling point (°C)	No information
Relative density (water = 1)	<1
Relative vapor density (water = 1)	No information
Saturated vapor pressure (kpa)	No information
Heat of combustion (kj/mol)	No information
Critical temperature (°C)	No information
Critical pressure (Mpa)	No information
logarithm of caprylicum/water	No information
Partition coefficient	
Flash point (°C)	76
Ignition temperature (°C)	248
Upper limit of explosion	No information
Lower limit of explosion	No information

Appendix

Solubility	
Main function	Used for the friction of machine, lubricating, cooling and seal.
Other Physical and Chemical characteristics	

Part X. Stability and reacting activation

Stability	
Forbidden	strong oxidizer
Conditions for avoiding contact	
Polymerization Hazard	
Dissociation product	

Part XI. Toxicology

Acute toxicity	LD50: No information LC50: No information
subacute and chronic toxicity	
Thrill	
Sensitization	
Mutagenicity	
Teratogenesis	
Carcinogenecity	

Part XII. Ecology

Ecological toxicology	
Biological degradation property	
Non biological degradation property	
Biological enrichment or biological accumulation	

Other hazard information	
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Part XIII Discarding

Discarding characteristics	
Discarding approaches	Refer to some related laws and rules. It is suggested to use burning as the discarding approach.
Notice of discarding	

Part XIV. Transportation

Name of dangerous cargos	No information
UN NO.	No information
Packing label	
Packing classification	Z01
Packing approaches	No information
Notice of packing	Check the integrity and leak proof of container before transporting. Ensure there is no leaking, clasp, damage of container during transportation. Do not mix the oxidant and edible chemicals. The vehicles or ships must be cleaned and disinfected. The container must be away from bedroom and kitchen, also isolate from engine room, electricity and fire.

Part XV. Rules and laws

Rules and laws	Refer to the related rules and laws about the usage safety, production, stock, transportation and loading, which issued by state department and department of labor.
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